



PROJECT MANUAL

California Middle School

Sacramento City Unified School District
Sacramento, CA

DSA Appl.# 02-121817

JK Architecture Project Number #23-145

1/22/2024

PROJECT MANUAL AND SPECIFICATIONS
FOR
CALIFORNIA MIDDLE SCHOOL

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JK ARCHITECTURE ENGINEERING

PROJECT MANUAL

For

Sacramento City Unified School District

California Middle School

Stamp and Signature Page

Prepared By
JK Architecture Engineering
11661 Blocker Drive, Suite 220
Auburn, CA 95603

Date 11/22/2023

DSA File No.: 34-53

DSA Application Number: 02-121817



01/22/2024

01/19/2024

NOTICE TO BIDDERS

1. Notice is hereby given that the governing board ("Board") of the Sacramento City Unified School District ("District") will receive sealed bids for the following project, Bid No. **0415-468**, Bid Package **California Campus Renewal** ("Project" or "Contract").
2. The Project consists of:

3. To bid on this Project, the Bidder is required to possess one or more of the following State of California contractors' license(s): **Class A and/or Class B**
The Bidder's license(s) must remain active and in good standing throughout the term of the Contract.
4. To bid on this Project, the Bidder is required to be registered as a public works contractor with the Department of Industrial Relations pursuant to the Labor Code.
5. Contract Documents will be available on or after (DATE), for review on e-Builder and can be downloaded at, <https://e-builder.net/>, using the [**"Facilities Projects and Information"**] link. In addition, Contract Documents are available for bidders' review at the following builders' exchanges:
 - A. Bay Area Builders Exchange, Builders Exchange of Stockton, CalBX, CMD, ConstructConnect, Construction Bidboard, Dodge, Marin Builder AssociaMcGraw-Hill Construction Plancenter, Nevada County Contractors' Association, Placer County Contractors' Association, Sacramento Regional BX, and Valley Contractors Exchange
6. Contract Documents are also available for purchase for _____ dollars (\$_____) at the District Facilities Office. This fee is refundable if the Contract Documents are returned in clean condition back to the District Facilities Office no later than ten (10) calendar days after the date of the bid opening.
7. Sealed bids will be received until _____ a.m./p.m., _____, 20____, at the District Facilities Office, 5735 47th Avenue, Sacramento, California 95824 at or after which time the bids will be opened and publicly read aloud. Any bid that is submitted after this time shall be nonresponsive and returned to the bidder. Any claim by a bidder of error in its bid must be made in compliance with section 5100 et seq. of the Public Contract Code.
8. Pursuant to Public Contract Code section 20111.5, only prequalified bidders will be eligible to submit a bid for this Project. Any bid submitted by a bidder who is not prequalified shall be non-responsive and returned unopened to the bidder.

[OR]

- 1 Pursuant to Public Contract Code section 20111.6, only prequalified bidders will be
2 eligible to submit a bid for contracts \$1 million or more using or planning to use state
3 bond funds. Any bid submitted by a bidder who is not prequalified shall be non-
4 responsive and returned unopened to the bidder. Moreover, any bid listing
5 subcontractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43 or
6 C-46 licenses who have not been prequalified shall be deemed nonresponsive.
- 7 9. All bids shall be on the form provided by the District. Each bid must conform and be
8 responsive to all pertinent Contract Documents, including, but not limited to, the
9 Instructions to Bidders.
- 10 10. A bid bond by an admitted surety insurer on the form provided by the District a
11 cashier's check or a certified check, drawn to the order of the Sacramento City
12 Unified School District, in the amount of ten percent (10%) of the total bid price,
13 shall accompany the Bid Form and Proposal, as a guarantee that the Bidder will,
14 within seven (7) calendar days after the date of the Notice of Award, enter into a
15 contract with the District for the performance of the services as stipulated in the bid.
- 16 11. A mandatory/voluntary pre-bid conference and site visit will be held on _____
17 _____, 20____, at ____m. at _____, California. All
18 participants are required to sign in front of the California Middle School Building at
19 1600 Vallejo Way, Sacramento, California. The site visit is expected to take
20 approximately 30 mins. Failure to attend or tardiness will render bid ineligible.
- 21 12. The successful Bidder shall be required to furnish a 100% Performance Bond and a
22 100% Payment Bond if it is awarded the Contract for the Work.
- 23 13. Pursuant to Education Code section 17550, the District is requiring the Bidder to
24 purchase and to remove from the school grounds all old materials required by the
25 specifications to be removed from any existing school building on the same school
26 grounds and not required for school purposes and to state in his or her bid the
27 amount which he or she will deduct from the price bid for the work as the purchase
28 price of the old materials. The board shall let the contract to any responsible bidder
29 whose net bid is the lowest, or shall reject all bids.
- 30 14. The District has elected to provide an owner-controlled or wrap-up insurance
31 program ("OCIP"). The successful Bidder and its subcontractors shall be required to
32 participate in and comply with the OCIP.
- 33 15. The successful Bidder may substitute securities for any monies withheld by the
34 District to ensure performance under the Contract, in accordance with the provisions
35 of section 22300 of the Public Contract Code.
- 36 16. The successful bidder will be required to certify that it either meets the Disabled
37 Veteran Business Enterprise ("DVBE") goal of three percent (3%) participation or
38 made a good faith effort to solicit DVBE participation in this Contract if it is awarded
39 the Contract for the Work.
- 40 17. The Contractor and all Subcontractors under the Contractor shall pay all workers on
41 all Work performed pursuant to this Contract not less than the general prevailing
42 rate of per diem wages and the general prevailing rate for holiday and overtime work
43 as determined by the Director of the Department of Industrial Relations, State of
44 California, for the type of work performed and the locality in which the work is to be

1 performed within the boundaries of the District, pursuant to section 1770 et seq. of
2 the California Labor Code. Prevailing wage rates are also available from the District
3 or on the Internet at: <<http://www.dir.ca.gov>>.

4 18. This Project is subject to labor compliance monitoring and enforcement by the
5 Department of Industrial Relations pursuant to Labor Code section 1771.4 and
6 subject to the requirements of Title 8 of the California Code of Regulations. The
7 successful Bidder shall comply with all requirements of Division 2, Part 7, Chapter 1,
8 Articles 1-5 of the Labor Code.

9 19. The District has entered into a Project Labor Agreement that is applicable to this
10 Project. A copy of the Project Labor Agreement is available for review at the District
11 Facilities Office and may be downloaded from the District's website, www.scusd.edu,
12 using the ["**Facilities Projects and Information**"] link. The successful bidder and
13 all subcontractors will be required to agree to be bound by the Project Labor
14 Agreement.

15 20. The Contractor and all Subcontractors under the Contractor shall comply with
16 applicable federal, State, and local requirements relating to COVID-19 or other public
17 health emergency/epidemic/pandemic including, if required, preparing, posting, and
18 implementing a Social Distancing Protocol. Contractor shall further comply with the
19 California Department of Public Health's August 11, 2021, Order requiring workers on
20 District sites to be fully vaccinated against COVID-19, or else subject to weekly
21 testing for COVID-19.

22 21. The District's Board has found and determined that the following item(s) shall be
23 used on this Project based on the purpose(s) indicated. (Public Contract Code
24 section 3400(c).) A particular material, product, thing, or service is designated by
25 specific brand or trade name for the following purpose(s):

26 (1) In order that a field test or experiment may be made to determine the
27 product's suitability for future use: _____.

28 (2) In order to match other products in use on a particular public
29 improvement either completed or in the course of completion:
30 _____.

31 (3) In order to obtain a necessary item that is only available from one
32 source: _____.

33 (4) In order to respond to an emergency declared by a local agency:
34 _____.

35 22. This Project is funded in whole or in part with federal funds, and therefore the
36 Contractor shall comply with the Davis-Bacon Act, applicable reporting requirements,
37 and any other applicable requirements for federal funding. This Project is also
38 subject to Buy American requirements.

39 23. The District shall award the Contract, if it awards it at all, to the lowest responsive
40 responsible bidder based on:

41 A. The base bid amount only.

2 **INSTRUCTIONS TO BIDDERS**

3 Bidders shall follow the instructions in this document, and shall submit all documents,
4 forms, and information required for consideration of a bid.

5 Sacramento City Unified School District ("District") will evaluate information submitted by
6 the apparent low Bidder and, if incomplete or unsatisfactory to District, Bidder's bid may be
7 rejected at the sole discretion of District.

8 1. Bids are requested for a general construction contract, or work described in general,
9 for the following project ("Project" or "Contract"):

10 **California Campus Renewal**

11 2. A Bidder and its subcontractors must possess the appropriate State of California
12 contractors' license and must maintain the license throughout the duration of the
13 project. Bidders must also be registered as a public works contractor with the
14 Department of Industrial Relations pursuant to the Labor Code. Bids submitted by a
15 contractor who is not properly licensed or registered shall be deemed nonresponsive
16 and will not be considered.

17 3. The District has prequalified bidders pursuant to Public Contract Code section
18 20111.5. Only prequalified bidders will be eligible to submit a bid for this Project.
19 Any bid submitted by a bidder who is not prequalified shall be deemed nonresponsive
20 and will not be considered.

21 **[OR]**

22 The District has prequalified bidders pursuant to Public Contract Code section
23 20111.6 for contracts \$1 million or more using or planning to use state bond funds.
24 Only prequalified bidders will be eligible to submit a bid for this Project. Any bid
25 submitted by a bidder who is not prequalified shall be deemed nonresponsive and
26 will not be considered. Moreover, any bid listing subcontractors holding C-4, C-7, C-
27 10, C-16, C-20, C-34, C-36, C-38, C-42, C-43 or C-46 licenses who have not been
28 prequalified shall be deemed nonresponsive.

29 4. District will receive sealed bids from bidders as stipulated in the Notice to Bidders.

30 a. All bids must be sealed in an envelope, marked with the name and address of
31 the Bidder, name of the Project, the Project Number and/or bid number, and
32 time of bid opening.

33 b. Bids must be submitted to the District Office at 5735 47th Avenue,
34 Sacramento, California 95824 by date and time shown in the Notice to
35 Bidders.

36 c. Bids must contain all documents as required herein.

37 5. Bidders are advised that on the date that bids are opened, telephones will not be
38 available at the District Offices for use by bidders or their representatives.

- 1 6. Bids will be opened at or after the time indicated for receipt of bids.
- 2 7. Bidders must submit bids on the documents titled Bid Form and Proposal, and must
3 submit all other required District forms. Bids not submitted on the District's required
4 forms shall be deemed nonresponsive and shall not be considered. Additional sheets
5 required to fully respond to requested information are permissible.
- 6 8. Bidders shall not modify the Bid Form and Proposal or qualify their bids. Bidders
7 shall not submit to the District a re-formatted, re-typed, altered, modified, or
8 otherwise recreated version of the Bid Form and Proposal or other District-provided
9 document.
- 10 9. Bids shall be clearly written and without erasure or deletions. District reserves the
11 right to reject any bid containing erasures, deletions, or illegible contents.
- 12 10. Bidders must supply all information required by each Bid Document. Bids must be
13 full and complete. District reserves the right in its sole discretion to reject any bid as
14 nonresponsive as a result of any error or omission in the bid. Bidders must complete
15 and submit all of the following documents with the Bid Form and Proposal:
 - 16 a. Bid Bond on the District's form, or other security.
 - 17 b. Designated Subcontractors List.
 - 18 c. Site Visit Certification, if a site visit was required.
 - 19 d. Non-Collusion Declaration.
 - 20 e. Iran Contracting Act Certification, if contract value is \$1,000,000 or more.
- 21 11. Bidders must submit with their bids cash, a cashier's check or a certified check
22 payable to District, or a bid bond by an admitted surety insurer of not less than ten
23 percent (10%) of amount of Base Bid, plus all additive alternates ("Bid Bond"). If
24 Bidder chooses to provide a Bid Bond as security, Bidder must use the required form
25 of corporate surety provided by District. The Surety on Bidder's Bid Bond must be
26 an insurer admitted in the State of California and authorized to issue surety bonds in
27 the State of California. Bids submitted without necessary bid security will be deemed
28 nonresponsive and will not be considered.
- 29 12. If Bidder to whom the Contract is awarded fails or neglects to enter into the Contract
30 and submit required bonds, insurance certificates, and all other required documents,
31 within **SEVEN (7)** calendar days after the date of the Notice of Award, District may
32 deposit Bid Bond, cash, cashier's check, or certified check for collection, and
33 proceeds thereof may be retained by District as liquidated damages for failure of
34 Bidder to enter into Contract, in the sole discretion of District. It is agreed that
35 calculation of damages District may suffer as a result of Bidder's failure to enter into
36 the Contract would be extremely difficult and impractical to determine and that the
37 amount of the Bidder's required bid security shall be the agreed and conclusively
38 presumed amount of damages.
- 39 13. Bidders must submit with the bid the Designated Subcontractors List for those
40 subcontractors who will perform any portion of Work, including labor, rendering of
41 service, or specially fabricating and installing a portion of the Work or improvement

- 1 according to detailed drawings contained in the plans and specifications, in excess of
2 one half of one percent (0.5%) of total bid. Failure to submit this list when required
3 by law shall result in bid being deemed nonresponsive and the bid will not be
4 considered.
- 5 14. All of the listed subcontractors are required to be registered as a public works
6 contractor with the Department of Industrial Relations pursuant to the Labor Code.
- 7 a. An inadvertent error in listing the California contractor license number on the
8 Designated Subcontractors List shall not be grounds for filing a bid protest or
9 grounds for considering the bid nonresponsive if the correct contractor's
10 license number is submitted to the District within 24 hours after the bid
11 opening and the corrected number corresponds with the submitted name and
12 location for that subcontractor.
- 13 b. An inadvertent error listing an unregistered subcontractor shall not be
14 grounds for filing a bid protest or grounds for considering the bid
15 nonresponsive provided that any of the following apply:
- 16 (1) The subcontractor is registered prior to the bid opening.
- 17 (2) The subcontractor is registered and has paid the penalty registration
18 fee within 24 hours after the bid opening.
- 19 (3) The subcontractor is replaced by another registered subcontractor
20 pursuant to Public Contract Code section 4107.
- 21 15. If a mandatory pre-bid conference and site visit ("Site Visit") is required as
22 referenced in the Notice to Bidders, then Bidders must submit the Site Visit
23 Certification with their Bid. District will transmit to all prospective Bidders of record
24 such Addenda as District in its discretion considers necessary in response to
25 questions arising at the Site Visit. Oral statements shall not be relied upon and will
26 not be binding or legally effective. Addenda issued by the District as a result of the
27 Site Visit, if any, shall constitute the sole and exclusive record and statement of the
28 results of the Site Visit.
- 29 16. Bidders shall submit the Non-Collusion Declaration with their bids. Bids submitted
30 without the Non-Collusion Declaration shall be deemed nonresponsive and will not be
31 considered.
- 32 17. The Contractor and all Subcontractors under the Contractor shall pay all workers on
33 all work performed pursuant to the Contract not less than the general prevailing rate
34 of per diem wages and the general prevailing rate for holiday and overtime work as
35 determined by the Director of the Department of Industrial Relations, State of
36 California, for the type of work performed and the locality in which the work is to be
37 performed within the boundaries of the District, pursuant to sections 1770 et seq. of
38 the California Labor Code. Copies of the general prevailing rates of per diem wages
39 for each craft, classification, or type of worker needed to execute the Contract, as
40 determined by Director of the Department of Industrial Relations, are available upon
41 request at the District's principal office. Prevailing wage rates are also available on
42 the internet at <http://www.dir.ca.gov>.

1 Since the Project is funded in whole or in part with federal funds, the Contractor and
2 all Subcontractors under the Contractor shall comply with the Davis-Bacon Act,
3 applicable reporting requirements, and any other applicable requirements for federal
4 funding. If a conflict exists with a state requirement, the more stringent provision
5 shall control.

6 18. The District has entered into a Project Labor Agreement that is applicable to this
7 Project. A copy of the Project Labor Agreement is available for review at the District
8 Facilities Office and may be downloaded from the District's website, www.scusd.edu,
9 using the <https://www.scusd.edu/pod/project-labor-agreement> link. The successful
10 bidder and all subcontractors will be required to agree to be bound by the Project
11 Labor Agreement.

12 19. Pursuant to Education Code section 17550, the District is requiring the Bidder to
13 purchase and to remove from the school grounds all old materials required by the
14 specifications to be removed from any existing school building on the same school
15 grounds and not required for school purposes and to state in his or her bid the
16 amount which he or she will deduct from the price bid for the work as the purchase
17 price of the old materials. The board shall let the contract to any responsible bidder
18 whose net bid is the lowest, or shall reject all bids.

19 20. Section 17076.11 of the Education Code requires school districts using funds
20 allocated pursuant to the State of California School Facility Program for the
21 construction and/or modernization of school building(s) to have a participation goal
22 for disabled veteran business enterprises ("DVBE") of at least three percent (3%) per
23 year of the overall dollar amount expended on projects that receive state funding or
24 demonstrate its good faith effort to solicit DVBE participation in this Contract. In
25 order to meet this requirement by demonstrating a good faith effort, Bidder must
26 advertise for DVBE-certified subcontractors and suppliers before submitting its Bid.
27 For any project that is at least partially state-funded, the lowest responsive
28 responsible Bidder awarded the Contract must submit certification of compliance with
29 the procedures for implementation of DVBE contracting goals with its signed
30 Agreement. DVBE Certification form is attached. Do not submit this form with your
31 Bid.

32 21. Submission of bid signifies careful examination of Contract Documents and complete
33 understanding of the nature, extent, and location of Work to be performed. Bidders
34 must complete the tasks listed below as a condition to bidding, and submission of a
35 bid shall constitute the Bidder's express representation to District that Bidder has
36 fully completed the following:

37 a. Bidder has visited the Site, if required, and has examined thoroughly and
38 understood the nature and extent of the Contract Documents, Work, Site,
39 locality, actual conditions, as-built conditions, and all local conditions and
40 federal, state and local laws, and regulations that in any manner may affect
41 cost, progress, performance, or furnishing of Work or that relate to any
42 aspect of the means, methods, techniques, sequences, or procedures of
43 construction to be employed by Bidder and safety precautions and programs
44 incident thereto;

45 b. Bidder has conducted or obtained and has understood all examinations,
46 investigations, explorations, tests, reports, and studies that pertain to the
47 subsurface conditions, as-built conditions, underground facilities, and all other

1 physical conditions at or contiguous to the Site or otherwise that may affect
2 the cost, progress, performance, or furnishing of Work, as Bidder considers
3 necessary for the performance or furnishing of Work at the Contract Sum,
4 within the Contract Time, and in accordance with the other terms and
5 conditions of Contract Documents, including specifically the provisions of the
6 General Conditions; and no additional examinations, investigations,
7 explorations, tests, reports, studies, or similar information or data are or will
8 be required by Bidder for such purposes;

9 c. Bidder has correlated its knowledge and the results of all such observations,
10 examinations, investigations, explorations, tests, reports, and studies with the
11 terms and conditions of the Contract Documents;

12 d. Bidder has given the District prompt written notice of all conflicts, errors,
13 ambiguities, or discrepancies that it has discovered in or among the Contract
14 Documents and the actual conditions, and the written resolution(s) thereof by
15 the District is/are acceptable to Bidder;

16 e. Bidder has made a complete disclosure in writing to the District of all facts
17 bearing upon any possible interest, direct or indirect, that Bidder believes any
18 representative of the District or other officer or employee of the District
19 presently has or will have in this Contract or in the performance thereof or in
20 any portion of the profits thereof;

21 f. Bidder must, prior to bidding, perform the work, investigations, research, and
22 analysis required by this document and that Bidder represented in its Bid
23 Form and Proposal and the Agreement that it performed prior to bidding.
24 Contractor under this Contract is charged with all information and knowledge
25 that a reasonable bidder would ascertain from having performed this required
26 work, investigation, research, and analysis. Bid prices must include entire
27 cost of all work "incidental" to completion of the Work.

28 g. Conditions Shown on the Contract Documents: Information as to
29 underground conditions, as-built conditions, or other conditions or
30 obstructions, indicated in the Contract Documents, e.g., on Drawings or in
31 Specifications, has been obtained with reasonable care, and has been
32 recorded in good faith. However, District only warrants, and Bidder may only
33 rely, on the accuracy of limited types of information.

34 (1) As to above-ground conditions or as-built conditions shown or
35 indicated in the Contract Documents, there is no warranty, express or
36 implied, or any representation express or implied, that such
37 information is correctly shown or indicated. This information is
38 verifiable by independent investigation and Bidder is required to make
39 such verification as a condition to bidding. In submitting its Bid,
40 Bidder shall rely on the results of its own independent investigation.
41 In submitting its Bid, Bidder shall not rely on District-supplied
42 information regarding above-ground conditions or as-built conditions.

43 (2) As to any subsurface condition shown or indicated in the Contract
44 Documents, Bidder may rely only upon the general accuracy of actual
45 reported depths, actual reported character of materials, actual
46 reported soil types, actual reported water conditions, or actual

1 obstructions shown or indicated. District is not responsible for the
2 completeness of such information for bidding or construction; nor is
3 District responsible in any way for any conclusions or opinions that the
4 Bidder has drawn from such information; nor is the District responsible
5 for subsurface conditions that are not specifically shown (for example,
6 District is not responsible for soil conditions in areas contiguous to
7 areas where a subsurface condition is shown).

8 h. Conditions Shown in Reports and Drawings Supplied for Informational
9 Purposes: Reference is made to the document entitled Geotechnical Data, and
10 the document entitled Existing Conditions, for identification of:

11 (1) Subsurface Conditions: Those reports of explorations and tests of
12 subsurface conditions at or contiguous to the Site that have been
13 utilized by Architect in preparing the Contract Documents; and

14 (2) Physical Conditions: Those drawings of physical conditions in or
15 relating to existing surface or subsurface structures at or contiguous to
16 the Site that has been utilized by Architect in preparing the Contract
17 Documents.

18 (3) These reports and drawings are **not** Contract Documents and, except
19 for any "technical" data regarding subsurface conditions specifically
20 identified in Geotechnical Data and Existing Conditions, and
21 underground facilities data, Bidder may not in any manner rely on the
22 information in these reports and drawings. Subject to the foregoing,
23 Bidder must make its own independent investigation of all conditions
24 affecting the Work and must not rely on information provided by
25 District.

26 22. Bids shall be based on products and systems specified in Contract Documents or
27 listed by name in Addenda. Whenever in the Specifications any materials, process,
28 or article is indicated or specified by grade, patent, or proprietary name, or by name
29 of manufacturer, that Specification shall be deemed to be followed by the words "or
30 equal." Bidder may, unless otherwise stated, offer any material, process, or article
31 that shall be substantially equal or better in every respect to that so indicated or
32 specified. The District is not responsible and/or liable in any way for a Contractor's
33 damages and/or claims related, in any way, to that Contractor's basing its bid on any
34 requested substitution that the District has not approved in advance and in writing.
35 Contractors and materials suppliers who submit requests for substitutions prior to
36 the award of the Contract must do so in writing and in compliance with Public
37 Contract Code section 3400. All requests must comply with the following:

38 a. District must receive any notice of request for substitution of a specified item
39 a minimum of **TEN (10)** calendar days prior to bid opening. The Successful
40 Bidder will not be allowed to substitute specified items unless properly
41 noticed.

42 b. Within 35 days after the date of the Notice of Award, the Successful Bidder
43 shall submit data substantiating the request(s) for all substitution(s)
44 containing sufficient information to assess acceptability of product or system
45 and impact on Project, including, without limitation, the requirements

- 1 specified in the Special Conditions and the Specifications. Insufficient
2 information shall be grounds for rejection of substitution.
- 3 c. Approved substitutions, if any, shall be listed in Addenda. District reserves
4 the right not to act upon submittals of substitutions until after bid opening.
- 5 d. Substitutions may be requested after Contract has been awarded only if
6 indicated in and in accordance with requirements specified in the Special
7 Conditions and the Specifications.
- 8 23. Bidders may examine any available "as-built" drawings of previous work by giving
9 District reasonable advance notice. District will not be responsible for accuracy of
10 "as-built" drawings. The document entitled Existing Conditions applies to all supplied
11 "as-built" drawings.
- 12 24. All questions about the meaning or intent of the Contract Documents are to be
13 directed via email to the District to Chris-Ralston@scusd.edu, Tina Alvarez-Bevens
14 at Tina-Alvarez-Bevens@scusd.edu, and Monica Witte at Mwitte@kitchell.com.
15 Interpretations or clarifications considered necessary by the District in response to
16 such questions will be issued in writing by Addenda and emailed, faxed, mailed, or
17 delivered to all parties recorded by the District as having received the Contract
18 Documents or posted on the District's website at [www.scusd.edu/construction-](http://www.scusd.edu/construction-projects-bids)
19 [projects-bids](http://www.scusd.edu/construction-projects-bids). Questions received less than **SEVEN (7)** calendar days prior to the
20 date for opening bids may not be answered. Only questions answered by formal
21 written Addenda will be binding. Oral and other interpretations or clarifications will
22 be without legal effect.
- 23 25. Addenda may also be issued to modify other parts of the Contract Documents as
24 deemed advisable by the District.
- 25 26. Each Bidder must acknowledge each Addendum in its Bid Form and Proposal by
26 number or its Bid shall be considered non-responsive. Each Addendum shall be part
27 of the Contract Documents. A complete listing of Addenda may be secured from the
28 District.
- 29 27. This Contract may include alternates. Alternates are defined as alternate products,
30 materials, equipment, systems, methods, or major elements of the construction that
31 may, at the District's option and under terms established in the Contract and
32 pursuant to section 20103.8 of the Public Contract Code, be selected for the Work.
- 33 28. The District shall award the Contract, if it awards it at all, to the lowest responsive
34 responsible bidder based on the criteria as indicated in the Notice to Bidders. In the
35 event two or more responsible bidders submit identical bids, the District shall select
36 the Bidder to whom to award the Contract by lot.
- 37 29. Discrepancies between written words and figures, or words and numerals, will be
38 resolved in favor of figures or numerals.
- 39 30. Bidders in contention for contract awards may be required to attend a Post-Bid
40 interview, which will be set within three (3) calendar days following bid opening. A
41 duly authorized representative of the apparent low bidder is required to attend the
42 Post Bid Interview, in person. The apparent low bidder's authorized
43 representative(s) must have (1) knowledge of how the bid submitted was prepared,

1 (2) the person responsible for supervising performance of the Work, and (3) the
2 authority to bind the apparent low bidder. Failure to attend the Post Bid Interview as
3 scheduled will be considered just cause for the District to reject the Bid as
4 nonresponsive.

5 31. Any bid protest by any Bidder regarding any other bid must be submitted in writing
6 to the District, before 5:00 p.m. of the **THIRD (3rd)** business day following bid
7 opening.

8 a. Only a Bidder who has actually submitted a bid, and who could be awarded
9 the Contract if the bid protest is upheld, is eligible to submit a bid protest.
10 Subcontractors are not eligible to submit bid protests. A Bidder may not rely
11 on the bid protest submitted by another Bidder.

12 b. A bid protest must contain a complete statement of any and all bases for the
13 protest and all supporting documentation. Materials submitted after the bid
14 protest deadline will not be considered.

15 c. The protest must refer to the specific portions of all documents that form the
16 basis for the protest.

17 (1) Without limitation to any other basis for protest, an inadvertent error
18 in listing the California contractor's license number on the Designated
19 Subcontractors List shall not be grounds for filing a bid protest or
20 grounds for considering the bid nonresponsive if the correct
21 contractor's license number is submitted to the District within 24 hours
22 after the bid opening and the corrected number corresponds with the
23 submitted name and location for that subcontractor.

24 (2) Without limitation to any other basis for protest, an inadvertent error
25 listing an unregistered subcontractor shall not be grounds for filing a
26 bid protest or grounds for considering the bid nonresponsive provided
27 that any of the following apply:

28 (i) The subcontractor is registered prior to the bid opening.

29 (ii) The subcontractor is registered and has paid the penalty
30 registration fee within 24 hours after the bid opening.

31 (iii) The subcontractor is replaced by another registered
32 subcontractor pursuant to Public Contract Code section 4107.

33 d. The protest must include the name, address and telephone number of the
34 person representing the protesting party.

35 e. The party filing the protest must concurrently transmit a copy of the protest
36 and any attached documentation to all other parties with a direct financial
37 interest that may be adversely affected by the outcome of the protest. Such
38 parties shall include all other bidders or proposers who appear to have a
39 reasonable prospect of receiving an award depending upon the outcome of
40 the protest.

- 1 f. The procedure and time limits set forth in this paragraph are mandatory and
2 are each bidder's sole and exclusive remedy in the event of bid protest.
3 Failure to comply with these procedures shall constitute a waiver of any right
4 to further pursue the bid protest, including filing a Government Code Claim or
5 legal proceedings.
- 6 32. The Bidder to whom Contract is awarded shall execute and submit the following
7 documents by 5:00 p.m. of the **SEVENTH (7th)** calendar day following the date of
8 the Notice of Intent to Award. Failure to properly and timely submit these
9 documents entitles District to reject the bid as nonresponsive.
- 10 a. Agreement: To be executed by successful Bidder. Submit four (4) copies,
11 each bearing an original signature. A facsimile or electronic signature shall be
12 deemed to be the equivalent of the actual original signature.
- 13 b. Escrow of Bid Documentation: This must include all required documentation.
14 See the document titled Escrow Bid Documentation for more information.
- 15 c. Performance Bond (100%): On the form provided in the Contract Documents
16 and fully executed as indicated on the form.
- 17 d. Payment Bond (Contractor's Labor and Material Bond) (100%): On the form
18 provided in the Contract Documents and fully executed as indicated on the
19 form.
- 20 e. Insurance Certificates and Endorsements as required.
- 21 f. Workers' Compensation Certification.
- 22 g. Prevailing Wage and Related Labor Requirements Certification.
- 23 h. Disabled Veteran Business Enterprise Participation Certification.
- 24 i. Drug-Free Workplace Certification.
- 25 j. Tobacco-Free Environment Certification.
- 26 k. Hazardous Materials Certification.
- 27 l. Lead-Based Materials Certification.
- 28 m. Imported Materials Certification.
- 29 n. Criminal Background Investigation/Fingerprinting Certification.
- 30 o. Registered Subcontractors List: Must include Department of Industrial
31 Relations (DIR) registration number of each subcontractor for all tiers.
- 32 33. Time for Completion: District may issue a Notice to Proceed within **NINETY (90)**
33 days from the date of the Notice of Award. Once Contractor has received the Notice
34 to Proceed, Contractor shall complete the Work within the period of time indicated in
35 the Contract Documents.

- 1 a. In the event that the District desires to postpone issuing the Notice to
2 Proceed beyond this 90-day period, it is expressly understood that with
3 reasonable notice to the Contractor, the District may postpone issuing the
4 Notice to Proceed.
- 5 b. It is further expressly understood by Contractor that Contractor shall not be
6 entitled to any claim of additional compensation as a result of the
7 postponement of the issuance of the Notice to Proceed beyond a 90-day
8 period. If the Contractor believes that a postponement of issuance of the
9 Notice to Proceed will cause a hardship to the Contractor, the Contractor may
10 terminate the Contract. Contractor's termination due to a postponement
11 beyond this 90-day period shall be by written notice to District within **TEN**
12 **(10)** calendar days after receipt by Contractor of District's notice of
13 postponement.
- 14 c. It is further understood by the Contractor that in the event that Contractor
15 terminates the Contract as a result of postponement by the District, the
16 District shall only be obligated to pay Contractor for the Work that Contractor
17 had performed at the time of notification of postponement and which the
18 District had in writing authorized Contractor to perform prior to issuing a
19 Notice to Proceed.
- 20 d. Should the Contractor terminate the Contract as a result of a notice of
21 postponement, District shall have the authority to award the Contract to the
22 next lowest responsive responsible bidder.
- 23 34. District reserves the right to reject any or all bids, including without limitation the
24 right to reject any or all nonconforming, nonresponsive, unbalanced, or conditional
25 bids, to re-bid, and to reject the bid of any bidder if District believes that it would not
26 be in the best interest of the District to make an award to that bidder, whether
27 because the bid is not responsive or the bidder is unqualified or of doubtful financial
28 ability or fails to meet any other pertinent standard or criteria established by District.
29 District also reserves the right to waive any inconsequential deviations or
30 irregularities in any bid. For purposes of this paragraph, an "unbalanced bid" is one
31 having nominal prices for some work items and/or enhanced prices for other work
32 items.
- 33 35. It is the policy of the District that no qualified person shall be excluded from
34 participating in, be denied the benefits of, or otherwise be subjected to
35 discrimination in any consideration leading to the award of contract, based on race,
36 color, gender, sexual orientation, political affiliation, age, ancestry, religion, marital
37 status, national origin, medical condition or disability. The Successful Bidder and its
38 subcontractors shall comply with applicable federal and state laws, including, but not
39 limited to the California Fair Employment and Housing Act, beginning with
40 Government Code section 12900, and Labor Code section 1735.
- 41 36. Prior to the award of Contract, District reserves the right to consider the
42 responsibility of the Bidder. District may conduct investigations as District deems
43 necessary to assist in the evaluation of any bid and to establish the responsibility,
44 including, without limitation, qualifications and financial ability of Bidders, proposed
45 subcontractors, suppliers, and other persons and organizations to perform and
46 furnish the Work in accordance with the Contract Documents to District's satisfaction
47 within the prescribed time.

1 37. Bidder expressly acknowledges that it is familiar with and capable of complying with
2 applicable federal, State, and local requirements relating to COVID-19 or other public
3 health emergency/epidemic/pandemic including, if required, preparing, posting, and
4 implementing a Social Distancing Protocol, and such costs shall be included in the
5 bid.

6 END OF DOCUMENT

1
2
3
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DOCUMENT 00 21 13.1

BIDDER INFORMATION AND FORMS

**[INTENTIONALLY LEFT BLANK UNLESS PROVIDED IN SPECIAL CONDITIONS
– SEPARATE PREQUALIFICATION PROCESS RECOMMENDED]**

(NOT USED)

END OF DOCUMENT

BIDDER INFORMATION AND FORMS

DETERMINATION OF BIDDER RESPONSIBILITY QUESTIONNAIRE

The Public Contract Code requires that school districts, in certain circumstances, bid and award public contracts to the lowest *responsive* and *responsible* bidder. California law establishes a very comprehensive standard concerning bidder responsibility, such that a school agency has wide discretion and broad authority to make its determination of bidder responsibility on a case-by-case basis. Such authority empowers the District to conduct its own investigation and make an assessment of the facts and circumstances to ascertain the quality, fitness, capacity and trustworthiness of each bidder. It is the purpose of this questionnaire to assist in determining contractor responsibility, and to aid the District in selecting the lowest responsible bidder (when the District does not opt to reject all bids).

Bidders must have completed the questionnaire, truthfully and completely, at least once in the past twelve (12) months to be considered for award on this project. If you completed this questionnaire within the past twelve (12) months, you must certify that the data previously submitted is still true and accurate. Bidders must either complete the entire questionnaire or certify the previously submitted data as still current, truthful, and accurate, to be determined responsible and responsive to the bid announcement.

Bidders must answer all questions and provide all requested information, where applicable. If the answer to any question is "none", or is not applicable, please so state in writing. The District will evaluate bidders not only on the information contained in this questionnaire, but also using any and all information available through other sources, including District records, staff or representatives, interviews, and/or reference checks. Based on a complete evaluation, the awarding authority has sole and discretionary judgment to determine if the bidder is deemed responsible and/or qualified to perform the work. Bidders discovered to have omitted required information or provided false, misleading, or substantively incorrect statements, as determined solely by the District, will be disqualified from bidding. The District reserves the right to waive minor irregularities and to make all final determinations regarding prospective bidders' responsibility, fitness, and/or qualifications.

1. Experience: Describe three (3) public works or school district projects that your firm completed within the last three years, either as a Prime or Subcontractor, where your scope of work was similar in building size, scope, contract value and complexity to the proposed project.

A. Project Name: _____

Location: _____ Date completed: _____

Project Description (Scope of work, similarities to current advertised project):

Owner's Representative Name: _____ Ph number: _____

Construction Manager Name: _____ Ph number: _____

General Contractor Name _____ Ph number: _____

(If you were a Subcontractor):

Name of Architect: _____ Number of RFIs _____

Your base contract amount: \$ _____ Final contract amount: \$ _____

Explain difference from Base Contract amount, if any. _____

Initial contract time: _____ days Time extensions: _____ days
Days past contract completion date (excl. authorized time extensions): _____ days

B. Project Name: _____

Location: _____ Date completed: _____

Project Description (Scope of work, similarities to current advertised project):

Owner's Representative Name: _____ Ph number: _____

Construction Manager Name: _____ Ph number: _____

General Contractor Name _____ Ph number: _____

(If you were a Subcontractor):

Name of Architect: _____ Number of RFIs _____

Your base contract amount: \$ _____ Final contract amount : \$ _____

Explain difference from Base Contract amount, if any. _____

Initial contract time: _____ days Time extensions: _____ days

Days past contract completion date (excl. authorized time extensions): _____ days

C. Project Name: _____

Location: _____ Date completed: _____

Project Description (Scope of work, similarities to current advertised project):

Owner's Representative Name: _____ Ph number: _____

Construction Manager Name: _____ Ph number: _____

General Contractor Name _____ Ph number: _____

(If you were a Subcontractor):

Name of Architect: _____ Number of RFIs _____

Your base contract amount: \$ _____ Final contract amount : \$ _____

Explain difference from Base Contract amount, if any. _____

Initial contract time: _____ days Time extensions: _____ days

Days past contract completion date (excl. authorized time extensions): _____ days

2. Financial Data: Complete the table below using data from your most recent completed accounting fiscal year and most recent completed accounting fiscal quarter. (Bidder may be required to submit a financial statement upon request.).

Financial Ratios	Ratio Calculation	Previous Fiscal Year	Ratio 1	Most Recent Quarter	Ratio 2
Current Ratio	Current Assets	a	a / b	e	e / f
	Current Liabilities	b		f	
Debt Ratio	Total Debt	c	c / d	g	g / h
	Total Net Worth	d		h	

3. Licensing: Your License Number: _____ (Bidder must be a licensed contractor in California for the appropriate classification for the project being advertised.)

a. Has your license ever been revoked or suspended?

YES NO If yes, please explain (include dates, alleged misconduct, findings, and terms of the revocation or suspension).

b. Has a complaint ever been filed with the Contractor's State License Board against your company that required a formal hearing or inquiry?

YES NO If yes, provide explanation

c. Have you ever been licensed in California under a different name or license number?

YES NO If yes, provide name and/or license number.

Was that license ever revoked or suspended?

YES NO If yes, provide explanation

4. Safety: Has Cal OSHA, Federal OSHA, the EPA or any Air Quality Management District cited your firm in the past three (3) years?

YES NO If yes, attach a copy and description of each citation.

5. Arbitration and Litigation History: Has your firm had any claims, litigation, or disputes ending in mediation or arbitration, or termination for cause associated with any project (either by your company or against your company) in the past five (5) years?

YES NO If yes, attach a description of each instance including details of total claim amount, settlement amount and owner's name and phone number.

6. Prior Disqualifications, Criminal Matters, and Related Civil Suits:

a. Has your firm ever been disqualified from performing work for the Sacramento City Unified School District?

YES NO If yes, provide the following information:

Project name: _____

Date of disqualification: _____

Duration of disqualification: _____

Reason for disqualification: _____

b. Has your firm ever been disqualified from performing work for any contracting entity other than the Sacramento City Unified School District:

YES NO If yes, provide the following information:

Contracting Entity Name: _____

Date of disqualification: _____

Duration of disqualification: _____

Reason for disqualification: _____

c. Has your firm or any of its owners, officers or partners ever been found liable in a civil suit or found guilty in a criminal action for making any false claim or material misrepresentation to any public agency or entity?

YES NO If "yes," explain who was involved, the name of the public agency, the date of the investigation and the grounds for the finding.

d. Has your firm or any of its owners, officers or partners ever been convicted of a crime involving any federal, state, or local law related to construction work, fraud, theft, or other act of dishonesty?

YES NO If "yes," explain who was involved, the name of the public agency, the date of the conviction and the grounds for the conviction.

Questionnaire Certification

The undersigned declares under penalty of perjury that all information submitted in this questionnaire is current, true and accurate, and that this declaration was executed by the undersigned on:

(Date)

(Name and Title) printed or typed

(Signature)

(Firm Name)

OR

Previously Submitted Questionnaire Certification

(Questionnaires completed more than twelve (12) months before the current bid date are no longer valid)

The undersigned declares under penalty of perjury that all information previously submitted to the District remains to be complete, true, and correct, and that this declaration was executed by the undersigned on:

(Date)

(Name and Title) printed or typed

(Signature)

(Firm Name)

END OF DOCUMENT

EXISTING CONDITIONS

1. Summary

This document describes existing conditions at or near the Project, and use of information available regarding existing conditions. This document is **not** part of the Contract Documents. See General Conditions for definition(s) of terms used herein.

2. Reports and Information on Existing Conditions

- a. Documents providing a general description of the Site and conditions of the Work may have been collected by the Sacramento City Unified School District ("District"), its consultants, contractors, and tenants. These documents may, but are not required to, include previous contracts, contract specifications, tenant improvement contracts, as-built drawings, utility drawings, and information regarding underground facilities.
- b. Information regarding existing conditions may be inspected at the District offices or the Construction Manager's offices, if any, and copies may be obtained at cost of reproduction and handling upon Bidder's agreement to pay for such copies. These reports, documents, and other information are **not** part of the Contract Documents. These reports, documents, and other information do **not** excuse Contractor from fulfilling Contractor's obligation to independently investigate any or all existing conditions or from using reasonable prudent measures to avoid damaging existing improvements.
- c. Information regarding existing conditions may also be included in the Project Manual, but shall **not** be considered part of the Contract Documents.
- d. Prior to commencing this Work, Contractor and the District's representative shall survey the Site to document the condition of the Site. Contractor will record the survey in digital videotape format and provide an electronic copy to the District within fourteen (14) days of the survey.
- e. Contractor may also document any pre-existing conditions in writing, provided that both the Contractor and the District's representative agree on said conditions and sign a memorandum documenting the same.
- f. The reports and other data or information regarding existing conditions and underground facilities at or contiguous to the Project are the following:
 - (1) Original Construction Drawings.
 - (2) Survey of Site.
 - (3) Geotechnical Report(s).
 - (4) Hazardous Material Report(s).
 - (5) Videotaped Survey(s).

1 **3. Use of Information**

- 2 a. Information regarding existing conditions was obtained only for use of District
3 and its consultants, contractors, and tenants for planning and design and is
4 **not** part of the Contract Documents.
- 5 b. District does not warrant, and makes no representation regarding, the
6 accuracy or thoroughness of any information regarding existing conditions.
7 Bidder represents and agrees that in submitting a bid it is not relying on any
8 information regarding existing conditions supplied by District.
- 9 c. Under no circumstances shall District be deemed to warrant or represent
10 existing above-ground conditions, as-built conditions, or other actual
11 conditions, verifiable by independent investigation. These conditions are
12 verifiable by Bidder by the performance of its own independent investigation
13 that Bidder must perform as a condition to bidding and Bidder should not and
14 shall not rely on this information or any other information supplied by District
15 regarding existing conditions.
- 16 d. Any information shown or indicated in the reports and other data supplied
17 herein with respect to existing underground facilities at or contiguous to the
18 Project may be based upon information and data furnished to District by the
19 District's employees and/or consultants or builders of such underground
20 facilities or others. District does not assume responsibility for the
21 completeness of this information, and Bidder is solely responsible for any
22 interpretation or conclusion drawn from this information.
- 23 e. District shall be responsible only for the general accuracy of information
24 regarding underground facilities, and only for those underground facilities that
25 are owned by District, and only where Bidder has conducted the independent
26 investigation required of it pursuant to the Instructions to Bidders, and
27 discrepancies are not apparent.

28 **4. Investigations/Site Examinations**

- 29 a. Before submitting a bid, each Bidder is responsible for conducting or obtaining
30 any additional or supplementary examinations, investigations, explorations,
31 tests, studies, and data concerning conditions (surface, subsurface, and
32 underground facilities) at or contiguous to the Site or otherwise, that may
33 affect cost, progress, performance, or furnishing of Work or that relate to any
34 aspect of the means, methods, techniques, sequences, or procedures of
35 construction to be employed by Bidder and safety precautions and programs
36 incident thereto or that Bidder deems necessary to determine its Bid for
37 performing and furnishing the Work in accordance with the time, price, and
38 other terms and conditions of Contract Documents.
- 39 b. On request, District will provide each Bidder access to the Site to conduct
40 such examinations, investigations, explorations, tests, and studies, as each
41 Bidder deems necessary for submission of a bid. Bidders must fill all holes
42 and clean up and restore the Site to its former condition upon completion of
43 its explorations, investigations, tests, and studies. Such investigations and
44 Site examinations may be performed during any and all Site visits indicated in
45 the Notice to Bidders and only under the provisions of the Contract

1 Documents, including, but not limited to, proof of insurance and obligation to
2 indemnify against claims arising from such work, and District's prior approval.

3 END OF DOCUMENT

GEOTECHNICAL DATA

1. Summary

This document describes geotechnical data at or near the Project that is in the District's possession available for Contractor's review, and use of data resulting from various investigations. This document is **not** part of the Contract Documents. See General Conditions for definition(s) of terms used herein.

2. Geotechnical Reports

- a. Geotechnical reports may have been prepared for and around the Site and/or in connection with the Work by soil investigation engineers hired by Sacramento City Unified School District ("District"), and its consultants, contractors, and tenants.
- b. Geotechnical reports may be inspected at the District offices or the Construction Manager's offices, if any, and copies may be obtained at cost of reproduction and handling upon Bidder's agreement to pay for such copies. These reports are **not** part of the Contract Documents.
- c. The reports and drawings of physical conditions that may relate to the Project are the following:

3. Use of Data

- a. Geotechnical data were obtained only for use of District and its consultants, contractors, and tenants for planning and design and are **not** a part of Contract Documents.
- b. Except as expressly set forth below, District does not warrant, and makes no representation regarding, the accuracy or thoroughness of any geotechnical data. Bidder represents and agrees that in submitting a bid it is not relying on any geotechnical data supplied by District, except as specifically allowed below.
- c. Under no circumstances shall District be deemed to make a warranty or representation of existing above ground conditions, as-built conditions, geotechnical conditions, or other actual conditions verifiable by independent investigation. These conditions are verifiable by Bidder by the performance of its own independent investigation that Bidder should perform as a condition to bidding and Bidder must not and shall not rely on information supplied by District.

1 **4. Limited Reliance Permitted on Certain Information**

2 a. Reference is made herein for identification of:

3 Reports of explorations and tests of subsurface conditions at or contiguous to
4 the Site that have been utilized by District in preparation of the Contract
5 Documents.

6 Drawings of physical conditions in or relating to existing subsurface structures
7 (except underground facilities) that are at or contiguous to the Site and have
8 been utilized by District in preparation of the Contract Documents.

9 b. Bidder may rely upon the general accuracy of the "technical data" contained
10 in the reports and drawings identified above, but only insofar as it relates to
11 subsurface conditions, provided Bidder has conducted the independent
12 investigation required pursuant to Instructions to Bidders, and discrepancies
13 are not apparent. The term "technical data" in the referenced reports and
14 drawings shall be limited as follows:

15 (1) The term "technical data" shall include actual reported depths,
16 reported quantities, reported soil types, reported soil conditions, and
17 reported material, equipment or structures that were encountered
18 during subsurface exploration. The term "technical data" does not
19 include, and Bidder may not rely upon, any other data, interpretations,
20 opinions or information shown or indicated in such drawings or reports
21 that otherwise relate to subsurface conditions or described structures.

22 (2) The term "technical data" shall not include the location of underground
23 facilities.

24 (3) Bidder may not rely on the completeness of reports and drawings for
25 the purposes of bidding or construction. Bidder may rely upon the
26 general accuracy of the "technical data" contained in such reports or
27 drawings.

28 (4) Bidder is solely responsible for any interpretation or conclusion drawn
29 from any "technical data" or any other data, interpretations, opinions,
30 or information provided in the identified reports and drawings.

31 **5. Investigations/Site Examinations**

32 a. Before submitting a bid, each Bidder is responsible for conducting or obtaining
33 any additional or supplementary examinations, investigations, explorations,
34 tests, studies, and data concerning conditions (surface, subsurface, and
35 underground facilities) at or contiguous to the Site or otherwise, that may
36 affect cost, progress, performance, or furnishing of Work or that relate to any
37 aspect of the means, methods, techniques, sequences, or procedures of
38 construction to be employed by Bidder and safety precautions and programs
39 incident thereto or that Bidder deems necessary to determine its Bid for
40 performing and furnishing the Work in accordance with the time, price, and
41 other terms and conditions of Contract Documents.

42 b. On request, District will provide each Bidder access to the Site to conduct
43 such examinations, investigations, explorations, tests, and studies, as each

1 Bidder deems necessary for submission of a bid. Bidders must fill all holes
2 and clean up and restore the Site to its former condition upon completion of
3 its explorations, investigations, tests, and studies. Such investigations and
4 Site examinations may be performed during any and all Site visits indicated in
5 the Notice to Bidders and only under the provisions of the Contract
6 Documents, including, but not limited to, proof of insurance and obligation to
7 indemnify against claims arising from such work, and District's prior approval.

8 END OF DOCUMENT

BID FORM AND PROPOSAL

To: Governing Board of the Sacramento City Unified School District ("District" or "Owner")

From: _____
(Proper Name of Bidder)

The undersigned declares that Bidder has read and understands the Contract Documents, including, without limitation, the Notice to Bidders and the Instructions to Bidders, and agrees and proposes to furnish all necessary labor, materials, and equipment to perform and furnish all work in accordance with the terms and conditions of the Contract Documents, including, without limitation, the Drawings and Specifications of Bid No. _____, for the following project known as:

_____ ("Project" or "Contract") and will accept in full payment for that Work the following total lump sum amount, all taxes included:

	dollars	\$ _____
BASE BID		
<i>Bidder acknowledges and agrees that the Base Bid accounts for any and all Allowance(s), Total Cost for Unit Prices, and OCIP excluded costs.</i>		

Additive/Deductive Alternates:

Alternate #1

	dollars	\$ _____
Additive/Deductive		

Descriptions of alternates are primarily scope definitions and do not necessarily detail the full range of materials and processes needed to complete the construction.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

Additional Detail Regarding Calculation of Base Bid

1. **Unit Prices.** The Bidder’s Base Bid includes the following unit prices, which the Bidder must provide and the District may, at its discretion, utilize in valuing additive and/or deductive change orders (Unit Prices shall include all labor, materials, services, profit, overhead, insurance, bonds, taxes, and all other incidental costs of Contractor, subcontractors, and suppliers):

SCHEDULE OF UNIT PRICES

<u>Item No.</u>	<u>Description</u>	<u>Unit of Measure</u>	<u>Estimated Quantity</u>	<u>Unit Price</u>	<u>Total Cost = Unit Price x Estimated Quantity (Included in Base Bid)</u>
				\$ _____	\$ _____
				\$ _____	\$ _____

Where scope of Work is decreased, all Work pertaining to the item, whether specifically stated or not, shall be omitted, and where scope of Work is increased, all work pertaining to that item required to render same ready for use on the Project in accordance with intentions of the Drawings and Specifications shall be included in the above agreed-upon price amount.

2. **Allowance.** The Bidder’s Base Bid and each alternate shall include a ten percent (10%) allowance for Unforeseen Conditions and complying with applicable federal, State, and local requirements relating to COVID-19 or other public health emergency/epidemic/pandemic.

The above allowance shall only be allocated for unforeseen items or COVID-19 or other public health emergency/epidemic/pandemic compliance relating to the Work. Contractor shall not bill for or be due any portion of this allowance unless the District has identified specific work, Contractor has submitted a price for that work or the District has proposed a price for that work, the District has accepted the cost for that work, and the District has prepared an Allowance Expenditure Directive incorporating that work. Contractor hereby authorizes the District to execute a unilateral deductive change order at or near the end of the Project for all or any portion of the allowance not allocated. Any unused portion of the allowance will revert back to the District documented by a deductive change order.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

1 3. **Purchase Price of Old Material.** Bidder specifically acknowledges and understands
2 that if it is awarded the Contract, that pursuant to Education Code section 17550,
3 that it will purchase and remove from the school grounds all old materials required
4 by the specifications to be removed from any existing school building on the same
5 school grounds and not required for school purposes and to state in his or her bid the
6 amount which he or she will deduct from the price bid for the work as the purchase
7 price of the old materials. The deducted amount must be shown separately below:

8 **Deducted Purchase Price of Old Material**

9			
10		dollars	\$ _____
11	Deductive		
12			

13

14 4. **OCIP.** Bidder specifically acknowledges and understands that if it is awarded the
15 Contract, that it and its subcontractors shall participate in and comply with the
16 owner-controlled or wrap-up insurance program (OCIP). Bidder and all of its
17 subcontractors are required to exclude the cost of insurance provided by the OCIP
18 from its bid price for the proposed scope of work, including subcontracted work
19 whether or not the subcontractor is identified at the time of the bid. The excluded
20 amount must be shown separately below:

21 **Excluded Cost of Insurance**

22			
23		dollars	\$ _____
24	Deductive		
25			

26 5. The undersigned has reviewed the Work outlined in the Contract Documents and
27 fully understands the scope of Work required in this Proposal, understands the
28 construction and project management function(s) is described in the Contract
29 Documents, and that each Bidder who is awarded a contract shall be in fact a prime
30 contractor, not a subcontractor, to the District, and agrees that its Proposal, if
31 accepted by the District, will be the basis for the Bidder to enter into a contract with
32 the District in accordance with the intent of the Contract Documents.

33 6. The undersigned has notified the District in writing of any discrepancies or omissions
34 or of any doubt, questions, or ambiguities about the meaning of any of the Contract
35 Documents, and has contacted the Construction Manager before bid date to verify
36 the issuance of any clarifying Addenda.

37 7. The undersigned agrees to commence work under this Contract on the date
38 established in the Contract Documents and to complete all work within the time
39 specified in the Contract Documents.

- 1 8. The liquidated damages clause of the General Conditions and Agreement is hereby
2 acknowledged.
- 3 9. It is understood that the District reserves the right to reject this bid and that the bid
4 shall remain open to acceptance and is irrevocable for a period of ninety (90) days.
- 5 10. The following documents are attached hereto:
- 6 • Bid Bond on the District's form or other security
 - 7 • Designated Subcontractors List
 - 8 • Site Visit Certification
 - 9 • Non-Collusion Declaration
 - 10 • Iran Contracting Act Certification
 - 11 • OCIP Insurance forms
- 12 11. Receipt and acceptance of the following Addenda is hereby acknowledged:

No. _____, Dated _____	No. _____, Dated _____
No. _____, Dated _____	No. _____, Dated _____
No. _____, Dated _____	No. _____, Dated _____

- 13 12. Bidder acknowledges that the license required for performance of the Work is a _____
14 _____ license.
- 15 13. Bidder hereby certifies that Bidder is able to furnish labor that can work in harmony
16 with all other elements of labor employed or to be employed on the Work.
- 17 14. Bidder specifically acknowledges and understands that if it is awarded the Contract,
18 that it shall perform the Work of the Project while complying with all requirements of
19 the Department of Industrial Relations.
- 20 15. Bidder hereby certifies that its bid includes sufficient funds to permit Bidder to
21 comply with all local, state or federal labor laws or regulations during the Project,
22 including payment of prevailing wage, and that Bidder will comply with the provisions
23 of Labor Code section 2810(d) if awarded the Contract
- 24 16. Bidder agrees to comply with all requirements of the Project Labor Agreement.
- 25 17. Bidder specifically acknowledges and understands that if it is awarded the Contract,
26 that it shall perform the Work of the Project while complying with the Davis Bacon
27 Act, applicable reporting requirements, and any and all other applicable requirements
28 for federal funding. If a conflict exists, the more stringent requirement shall control.
- 29 18. Bidder represents that it is competent, knowledgeable, and has special skills with
30 respect to the nature, extent, and inherent conditions of the Work to be performed.
31 Bidder further acknowledges that there are certain peculiar and inherent conditions

1 existent in the construction of the Work that may create, during the Work, unusual
2 or peculiar unsafe conditions hazardous to persons and property.

3 19. Bidder expressly acknowledges that it is aware of such peculiar risks and that it has
4 the skill and experience to foresee and to adopt protective measures to adequately
5 and safely perform the Work with respect to such hazards.

6 20. Bidder expressly acknowledges that it is familiar with and capable of complying with
7 applicable federal, State, and local requirements relating to COVID-19 or other public
8 health emergency/epidemic/pandemic including, if required, preparing, posting, and
9 implementing a Social Distancing Protocol.

10 21. Bidder expressly acknowledges that it is aware that if a false claim is knowingly
11 submitted (as the terms "claim" and "knowingly" are defined in the California False
12 Claims Act, Gov. Code, § 12650 et seq.), the District will be entitled to civil remedies
13 set forth in the California False Claim Act. It may also be considered fraud and the
14 Contractor may be subject to criminal prosecution.

15 22. The undersigned Bidder certifies that it is, at the time of bidding, and shall be
16 throughout the period of the Contract, licensed by the State of California to do the
17 type of work required under the terms of the Contract Documents and registered as
18 a public works contractor with the Department of Industrial Relations. Bidder further
19 certifies that it is regularly engaged in the general class and type of work called for in
20 the Contract Documents.

21 Furthermore, Bidder hereby certifies to the District that all representations, certifications,
22 and statements made by Bidder, as set forth in this bid form, are true and correct and are
23 made under penalty of perjury.

24 Dated this _____ day of _____ 20 ____

25 Name of Bidder: _____

26 Type of Organization: _____

27 Signature: _____

28 Print Name: _____

29 Title: _____

30 Address of Bidder: _____

31 Taxpayer Identification No. of Bidder: _____

32 Telephone Number: _____

33 Fax Number: _____

34 E-mail: _____ Web Page: _____

35 Contractor's License No(s): No.: _____ Class: _____ Expiration Date: _____

1 No.: _____ Class: _____ Expiration Date: _____

2 No.: _____ Class: _____ Expiration Date: _____

3 Public Works Contractor Registration No.: _____

4 END OF DOCUMENT

BID BOND

(Note: If Bidder is providing a bid bond as its bid security, Bidder must use this form, NOT a surety company form.)

KNOW ALL PERSONS BY THESE PRESENTS:

That the undersigned, _____, as Principal ("Principal"), and _____, as Surety ("Surety"), a corporation organized and existing under and by virtue of the laws of the State of California and authorized to do business as a surety in the State of California, are held and firmly bound unto the Sacramento City Unified School District ("District") of Sacramento County, State of California, as Obligee, in an amount equal to ten percent (10%) of the Base Bid plus alternates, in the sum of

_____ Dollars (\$ _____)

lawful money of the United States of America, for the payment of which sum well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted a bid to the District for all Work specifically described in the accompanying bid for the following project: _____ ("Project" or "Contract").

NOW, THEREFORE, if the Principal is awarded the Contract and, within the time and manner required under the Contract Documents, after the prescribed forms are presented to Principal for signature, enters into a written contract, in the prescribed form in accordance with the bid, and files two bonds, one guaranteeing faithful performance and the other guaranteeing payment for labor and materials as required by law, and meets all other conditions to the Contract between the Principal and the Obligee becoming effective, or if the Principal shall fully reimburse and save harmless the Obligee from any damage sustained by the Obligee through failure of the Principal to enter into the written contract and to file the required performance and labor and material bonds, and to meet all other conditions to the Contract between the Principal and the Obligee becoming effective, then this obligation shall be null and void; otherwise, it shall be and remain in full force and effect. The full payment of the sum stated above shall be due immediately if Principal fails to execute the Contract within seven (7) days of the date of the District's Notice of Award to Principal.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or the call for bids, or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or the call for bids, or to the work, or to the specifications.

1 In the event suit is brought upon this bond by the Obligee and judgment is recovered, the
2 Surety shall pay all costs incurred by the Obligee in such suit, including a reasonable
3 attorneys' fee to be fixed by the Court.

4 If the District awards the bid, the security of unsuccessful bidder(s) shall be returned within
5 sixty (60) days from the time the award is made. Unless otherwise required by law, no
6 bidder may withdraw its bid for ninety (90) days after the date of the bid opening.

7 IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety
8 above named, on the _____ day of _____, 20__.

9 _____
10 Principal

11 _____
12 By

13 _____
14 Surety

15 _____
16 By

17 _____
18 Name of California Agent of Surety

19 _____
20 Address of California Agent of Surety

21 _____
22 Telephone Number of California Agent of Surety

23 **Bidder must attach Power of Attorney and Certificate of Authority for Surety and a**
24 **Notarial Acknowledgment for all Surety's signatures. The California Department of**
25 **Insurance must authorize the Surety to be an admitted Surety Insurer.**

26 END OF DOCUMENT

DESIGNATED SUBCONTRACTORS LIST
(Public Contact Code Sections 4100-4114)

PROJECT: **California Campus Renewal**

Bidder acknowledges and agrees that it must clearly set forth below the name, location and California contractor license number of each subcontractor who will perform work or labor or render service to the Bidder in or about the construction of the Work or who will specially fabricate and install a portion of the Work according to detailed drawings contained in the plans and specifications in an amount in excess of one-half of one percent (0.5%) of Bidder's total Base Bid and the kind of Work that each will perform. Vendors or suppliers of materials only do not need to be listed.

Bidder acknowledges and agrees that, if Bidder fails to list as to any portion of Work, or if Bidder lists more than one subcontractor to perform the same portion of Work, Bidder must perform that portion itself or be subjected to penalty under applicable law. In case more than one subcontractor is named for the same kind of Work, state the portion of the kind of Work that each subcontractor will perform.

If alternate bid(s) is/are called for and Bidder intends to use subcontractors different from or in addition to those subcontractors listed for work under the Base Bid, Bidder must list subcontractors that will perform Work in an amount in excess of one half of one percent (0.5%) of Bidder's total Base Bid plus alternate(s).

If further space is required for the list of proposed subcontractors, attach additional copies of page 2 showing the required information, as indicated below.

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

1 **Subcontractor Name:** _____

2 CA Cont. Lic. #: _____ Location: _____

3 DIR Registration #: _____

4 Portion of Work: _____

5 **Subcontractor Name:** _____

6 CA Cont. Lic. #: _____ Location: _____

7 DIR Registration #: _____

8 Portion of Work: _____

9 **Subcontractor Name:** _____

10 CA Cont. Lic. #: _____ Location: _____

11 DIR Registration #: _____

12 Portion of Work: _____

13 **Subcontractor Name:** _____

14 CA Cont. Lic. #: _____ Location: _____

15 DIR Registration #: _____

16 Portion of Work: _____

17 **Subcontractor Name:** _____

18 CA Cont. Lic. #: _____ Location: _____

19 DIR Registration #: _____

20 Portion of Work: _____

21

22 Date: _____

23 Proper Name of Bidder: _____

24 Signature: _____

25 Print Name: _____

26 Title: _____

27 END OF DOCUMENT

SITE VISIT CERTIFICATION

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID
IF SITE VISIT WAS MANDATORY

PROJECT: **California Campus Renewal**

Check option that applies:

_____ I certify that I visited the Site of the proposed Work, received the attached _____ pages of information, and became fully acquainted with the conditions relating to construction and labor. I fully understand the facilities, difficulties, and restrictions attending the execution of the Work under contract.

_____ I certify that _____ (Bidder's representative) visited the Site of the proposed Work, received the attached _____ pages of information, and became fully acquainted with the conditions relating to construction and labor. The Bidder's representative fully understood the facilities, difficulties, and restrictions attending the execution of the Work under contract.

Bidder fully indemnifies the Sacramento City Unified School District, its Architect, its Engineers, its Construction Manager, and all of their respective officers, agents, employees, and consultants from any damage, or omissions, related to conditions that could have been identified during my visit and/or the Bidder's representative's visit to the Site.

I certify under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Date: _____

Proper Name of Bidder: _____

Signature: _____

Print Name: _____

Title: _____

ATTACHMENTS:

1.

2.

3.

END OF DOCUMENT

**NON-COLLUSION DECLARATION
(Public Contract Code Section 7106)**

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid.
[Title] [Name of Firm]

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____, [Date]
at _____, _____.
[City] [State]

Date: _____

Proper Name of Bidder: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

IRAN CONTRACTING ACT CERTIFICATION
(Public Contract Code Sections 2202-2208)

PROJECT/CONTRACT NO.: **California Campus Renewal #0415-468** between the Sacramento City Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

Prior to bidding on or submitting a proposal for a contract for goods or services of \$1,000,000 or more, the bidder/proposer must submit this certification pursuant to Public Contract Code section 2204.

The bidder/proposer must complete **ONLY ONE** of the following two options. To complete OPTION 1, check the corresponding box **and** complete the certification below. To complete OPTION 2, check the corresponding box, complete the certification below, and attach documentation demonstrating the exemption approval.

OPTION 1. Bidder/Proposer is not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services ("DGS") pursuant to Public Contract Code section 2203(b), and we are not a financial institution extending twenty million dollars (\$20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

OPTION 2. Bidder/Proposer has received a written exemption from the certification requirement pursuant to Public Contract Code sections 2203(c) and (d). *A copy of the written documentation demonstrating the exemption approval is included with our bid/proposal.*

CERTIFICATION:

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the bidder/proposer to the OPTION selected above. This certification is made under the laws of the State of California.

<i>Vendor Name/Financial Institution (Printed)</i>	<i>Federal ID Number (or n/a)</i>
<i>By (Authorized Signature)</i>	
<i>Printed Name and Title of Person Signing</i>	<i>Date Executed</i>

END OF DOCUMENT

WORKERS' COMPENSATION CERTIFICATION

PROJECT/CONTRACT NO.: **California Campus Renewal #0415-468** between the Sacramento City Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

Labor Code section 3700, in relevant part, provides:

Every employer except the State shall secure the payment of compensation in one or more of the following ways:

- a. By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this state; and/or
- b. By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his employees.

I am aware of the provisions of section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the Work of this Contract.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

(In accordance with Labor Code sections 1860 and 1861, the above certificate must be signed and filed with the awarding body prior to performing any Work under this Contract.)

END OF DOCUMENT

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**PREVAILING WAGE AND
RELATED LABOR REQUIREMENTS CERTIFICATION**

PROJECT/CONTRACT NO.: **0415-468 California Campus Renewal** between the
Sacramento City Unified School District ("District") and _____
_____ ("Contractor" or "Bidder") ("Contract" or "Project").

I hereby certify that I will conform to the State of California Public Works Contract requirements regarding prevailing wages, benefits, on-site audits with 48-hours' notice, payroll records, and apprentice and trainee employment requirements, for all Work on the above Project including, without limitation, labor compliance monitoring and enforcement by the Department of Industrial Relations.

I hereby certify that I will also conform to the Federal Labor Standards Provisions regarding minimum wages, withholding, payrolls and basic records, apprentice and trainee employment requirements, equal employment opportunity requirements, Copeland Act requirements, Davis-Bacon and Related Act requirements, Contract Work Hours and Safety Standards Act requirements, and any and all other applicable requirements for federal funding for all Work on the above Project.

Date: _____
Proper Name of Contractor: _____
Signature: _____
Print Name: _____
Title: _____

END OF DOCUMENT

DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION CERTIFICATION

PROJECT/CONTRACT NO.: **0415-468 California Campus Renewal** between the Sacramento City Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

GENERAL INSTRUCTIONS

Section 17076.11 of the Education Code requires school districts using, or planning to use, funds allocated pursuant to the State of California School Facility Program ("Program") for the construction and/or modernization of school buildings to have a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%) per year of the overall dollar amount expended each year by the school district on projects that receive state funding. Therefore, the lowest responsive responsible Bidder awarded the Contract must submit this document to the District with its executed Agreement, identifying the steps contractor took to solicit DVBE participation in conjunction with this Contract. **Do not submit this form with your bids.**

PART I – Method of Compliance with DVBE Participation Goals. Check the appropriate box to indicate your method of committing the contract dollar amount.

YOUR BUSINESS ENTERPRISE IS:	AND YOU WILL	AND YOU WILL
A. <input type="checkbox"/> Disabled veteran owned and your forces will perform at least 3% of this Contract	Include a copy of your DVBE letter from Office of Small Business and Disabled Veterans Business Enterprise Services ("OSDS")*	Complete Part 1 of this form and the Certification
B. <input type="checkbox"/> Disabled veteran owned but is unable to perform 3% of this Contract with your forces	Use DVBE subcontractors /suppliers to bring the Contract participation to at least 3%	Include a copy of each DVBE's letter from OSDS (including yours, if applicable), and complete Part 1 of this form and the Certification
C. <input type="checkbox"/> NOT disabled veteran owned	Use DVBE subcontractors /suppliers for at least 3% of this Contract	Complete all of this form and the Certification
D. <input type="checkbox"/> Unable to meet the required participation goals after good faith efforts	Make good faith efforts, including contacts, advertisement and DVBE solicitation	Complete all of this form and the Certification

* A DVBE letter from OSDS is obtained from the participating DVBE.

1 **You must complete the following table to show the dollar amount of DVBE**
 2 **participation:**

	TOTAL CONTRACT PRICE
A. Prime Bidder, if DVBE (own participation)	\$
B. DVBE Subcontractor or Supplier	
1.	
2.	
3.	
4.	
C. Subtotal (A & B)	
D. Non-DVBE	
E. Total Bid	

3 **PART II – Contacts.** To identify DVBE subcontractors/suppliers for participation in
 4 your contract, you must contact each of the following categories. You should contact
 5 several DVBE organizations.

CATEGORY	TELEPHONE NUMBER	DATE CONTACTED	PERSON CONTACTED
1. The District, if any			*
2. OSDS, provides assistance locating DVBEs at https://caleprocure.ca.gov/pages/PublicSearch/supplier-search.aspx	(916) 375-4940		*
3. DVBE Organization (List)			*

6 *Write "recorded message" in this column, if applicable.

1 **PART III – Advertisement.** You must advertise for DVBE participation in both a
 2 trade and focus paper. List the advertisement you place to solicit DVBE
 3 participation. Advertisements should be published at least fourteen (14) days prior
 4 to bid/proposal opening; if you cannot advertise fourteen (14) days prior,
 5 advertisements should be published as soon as possible. Advertisements must
 6 include that your firm is seeking DVBE participation, the project name and location,
 7 and your firm’s name, your contact person, and telephone number. Attach copies of
 8 advertisements to this form.

FOCUS/TRADE PAPER NAME	CHECK ONE		DATE OF ADVERTISEMENT
	TRADE	FOCUS	

9 **PART IV – DVBE Solicitations.** List DVBE subcontractors/suppliers that were
 10 invited to bid. Use the following instructions to complete the remainder of this
 11 section (read the three columns as a sentence from left to right). If you need
 12 additional space to list DVBE solicitations, please use a separate page and attach to
 13 this form.

IF THE DVBE.....	THEN.....	AND.....		
was selected to participate	Check "YES" in the "SELECTED" column	include a copy of their DVBE letter(s) from OSDS		
was NOT selected to participate	Check "NO" in the "SELECTED" column	state why in the "REASON NOT SELECTED" column		
did not respond to your solicitation	Check the "NO RESPONSE" column.			
DVBE CONTACTED	SELECTED		REASON NOT SELECTED	NO RESPONSE
	YES	NO		

14 A copy of this form must be retained by you and may be subject to a future audit.

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CERTIFICATION

I, _____, certify that I am the bidder's _____
and that I have made a diligent effort to ascertain the facts with regard to the
representations made herein. In making this certification, I am aware of section 12650 et
seq. of the Government Code providing for the imposition of treble damages for making
false claims.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DRUG-FREE WORKPLACE CERTIFICATION

PROJECT/CONTRACT NO.: **0415-468 California Campus Renewal** between the Sacramento City Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

This Drug-Free Workplace Certification form is required from the successful Bidder pursuant to Government Code section 8350 et seq., the Drug-Free Workplace Act of 1990. The Drug-Free Workplace Act of 1990 requires that every person or organization awarded a contract or grant for the procurement of any property or service from any state agency must certify that it will provide a drug-free workplace by doing certain specified acts. In addition, the Act provides that each contract or grant awarded by a state agency may be subject to suspension of payments or termination of the contract or grant, and the contractor or grantee may be subject to debarment from future contracting, if the contracting agency determines that specified acts have occurred.

The District is not a "state agency" as defined in the applicable section(s) of the Government Code, but the District is a local agency and public school district under California law and requires all contractors on District projects to comply with the provisions and requirements of the Drug-Free Workplace Act of 1990.

Contractor must also comply with the provisions of Health & Safety Code section 11362.3 which prohibits the consumption or possession of cannabis or cannabis products in any public place, including school grounds, and specifically on school grounds while children are present.

Contractor shall certify that it will provide a drug-free workplace by doing all of the following:

- a. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited in the person's or organization's workplace and specifying actions which will be taken against employees for violations of the prohibition.
- b. Establishing a drug-free awareness program to inform employees about all of the following:
 - (1) The dangers of drug abuse in the workplace.
 - (2) The person's or organization's policy of maintaining a drug-free workplace.
 - (3) The availability of drug counseling, rehabilitation, and employee-assistance programs.
 - (4) The penalties that may be imposed upon employees for drug abuse violations.
- c. Requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required above, and that, as a

1 condition of employment on the contract or grant, the employee agrees to
2 abide by the terms of the statement.

3 I, the undersigned, agree to fulfill the terms and requirements of Government Code section
4 8355 listed above and will publish a statement notifying employees concerning (a) the
5 prohibition of controlled substance at the workplace, (b) establishing a drug-free awareness
6 program, and (c) requiring that each employee engaged in the performance of the Contract
7 be given a copy of the statement required by section 8355(a), and requiring that the
8 employee agree to abide by the terms of that statement.

9 I also understand that if the District determines that I have either (a) made a false
10 certification herein, or (b) violated this certification by failing to carry out the requirements
11 of section 8355, that the Contract awarded herein is subject to termination, suspension of
12 payments, or both. I further understand that, should I violate the terms of the Drug-Free
13 Workplace Act of 1990, I may be subject to debarment in accordance with the requirements
14 of the aforementioned Act.

15 I acknowledge that I am aware of the provisions of and hereby certify that I will adhere to
16 the requirements of the Drug-Free Workplace Act of 1990 and Health and Safety Code
17 section 11362.3.

18 Date: _____

19 Proper Name of Contractor: _____

20 Signature: _____

21 Print Name: _____

22 Title: _____

23 END OF DOCUMENT

TOBACCO-FREE ENVIRONMENT CERTIFICATION

PROJECT/CONTRACT NO.: **0415-468 California Campus Renewal** between the Sacramento City Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

This Tobacco-Free Environment Certification form is required from the successful Bidder.

Pursuant to, without limitation, 20 U.S.C. section 6083, Labor Code section 6400 et seq., Health & Safety Code section 104350 et seq., Business and Professions Code section 22950 et seq., and District Board policies, all District sites, including the Project site, are tobacco-free environments. Smoking and the use of tobacco products by all persons is prohibited on or in District property. District property includes school buildings, school grounds, school-owned vehicles and vehicles owned by others while on District property. The prohibition on smoking includes the use of any electronic smoking device that creates an aerosol or vapor, in any manner or in any form, and the use of any oral smoking device for the purpose of circumventing the prohibition of tobacco smoking. Further, Health & Safety Code section 11362.3 prohibits the smoking or use of cannabis or cannabis products in any place where smoking tobacco is prohibited.

I acknowledge that I am aware of the District's policy regarding tobacco-free environments at District sites, including the Project site and hereby certify that I will adhere to the requirements of that policy and not permit any of my firm's employees, agents, subcontractors, or my firm's subcontractors' employees or agents, to use tobacco and/or smoke on the Project site.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

HAZARDOUS MATERIALS CERTIFICATION

PROJECT/CONTRACT NO.: **0415-468 California Campus Renewal** between Sacramento City Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

- 1. Contractor hereby certifies that no asbestos, or asbestos-containing materials, polychlorinated biphenyl (PCB), or any material listed by the federal or state Environmental Protection Agency or federal or state health agencies as a hazardous material, or any other material defined as being hazardous under federal or state laws, rules, or regulations, ("New Hazardous Material"), shall be furnished, installed, or incorporated in any way into the Project or in any tools, devices, clothing, or equipment used to affect any portion of Contractor's work on the Project for District.
- 2. Contractor further certifies that it has instructed its employees with respect to the above-mentioned standards, hazards, risks, and liabilities.
- 3. Asbestos and/or asbestos-containing material shall be defined as all items containing but not limited to chrysotile, crocidolite, amosite, anthophyllite, tremolite, and actinolite. Any or all material containing greater than one-tenth of one percent (0.1%) asbestos shall be defined as asbestos-containing material.
- 4. Any disputes involving the question of whether or not material is New Hazardous Material shall be settled by electron microscopy or other appropriate and recognized testing procedure, at the District's determination. The costs of any such tests shall be paid by Contractor if the material is found to be New Hazardous Material.
- 5. All Work or materials found to be New Hazardous Material or Work or material installed with equipment containing New Hazardous Material will be immediately rejected and this Work will be removed at Contractor's expense at no additional cost to the District.
- 6. Contractor has read and understood the document titled Hazardous Materials Procedures & Requirements, and shall comply with all the provisions outlined therein. Contractor certifies that it is knowledgeable of, and shall comply with, all laws applicable to the Work including, but not limited to, all federal, state, and local laws, statutes, standards, rules, regulations, and ordinances applicable to the Work.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

LEAD-BASED MATERIALS CERTIFICATION

PROJECT/CONTRACT NO.: **0415-468 California Campus Renewal** between the Sacramento City Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

This certification provides notice to the Contractor that:

- (1) Contractor's work may disturb lead-containing building materials.
- (2) Contractor shall notify the District if any work may result in the disturbance of lead-containing building materials.
- (3) Contractor shall comply with the Renovation, Repair and Painting Rule, if lead-based paint is disturbed in a six-square-foot or greater area indoors or a 20-square-foot or greater area outdoors.

1. Lead as a Health Hazard

Lead poisoning is recognized as a serious environmental health hazard facing children today. Even at low levels of exposure, much lower than previously believed, lead can impair the development of a child's central nervous system, causing learning disabilities, and leading to serious behavioral problems. Lead enters the environment as tiny lead particles and lead dust disburse when paint chips, chalks, peels, wears away over time, or is otherwise disturbed. Ingestion of lead dust is the most common pathway of childhood poisoning; lead dust gets on a child's hands and toys and then into a child's mouth through common hand-to-mouth activity. Exposures may result from construction or remodeling activities that disturb lead paint, from ordinary wear and tear of windows and doors, or from friction on other surfaces.

Ordinary construction and renovation or repainting activities carried out without lead-safe work practices can disturb lead-based paint and create significant hazards. Improper removal practices, such as dry scraping, sanding, or water blasting painted surfaces, are likely to generate high volumes of lead dust.

Because the Contractor and its employees will be providing services for the District, and because the Contractor's work may disturb lead-containing building materials, CONTRACTOR IS HEREBY NOTIFIED of the potential presence of lead-containing materials located within certain buildings utilized by the District. All school buildings built prior to 1978 are presumed to contain some lead-based paint until sampling proves otherwise.

2. Overview of California Law

Education Code section 32240 et seq. is known as the Lead-Safe Schools Protection Act. Under this act, the Department of Health Services is to conduct a sample survey of schools in the State of California for the purpose of developing risk factors to predict lead contamination in public schools. (Ed. Code, § 32241.)

1 Any school that undertakes any action to abate existing risk factors for lead is
2 required to utilize trained and state-certified contractors, inspectors, and workers.
3 (Ed. Code, § 32243, subd. (b).) Moreover, lead-based paint, lead plumbing, and
4 solders, or other potential sources of lead contamination, shall not be utilized in the
5 construction of any new school facility or the modernization or renovation of any
6 existing school facility. (Ed. Code, § 32244.)

7 Both the Federal Occupational Safety and Health Administration ("Fed/OSHA") and
8 the California Division of Occupational Safety and Health ("Cal/OSHA") have
9 implemented safety orders applicable to all construction work where a contractor's
10 employee may be occupationally exposed to lead.

11 The OSHA Regulations apply to all construction work where a contractor's employee
12 may be occupationally exposed to lead. The OSHA Regulations contain specific and
13 detailed requirements imposed on contractors subject to those regulations. The
14 OSHA Regulations define construction work as work for construction, alteration,
15 and/or repair, including painting and decorating. Regulated work includes, but is not
16 limited to, the following:

- 17 a. Demolition or salvage of structures where lead or materials containing lead
18 are present;
- 19 b. Removal or encapsulation of materials containing lead;
- 20 c. New construction, alteration, repair, or renovation of structures, substrates,
21 or portions thereof, that contain lead, or materials containing lead;
- 22 d. Installation of products containing lead;
- 23 e. Lead contamination/emergency cleanup;
- 24 f. Transportation, disposal, storage, or containment of lead or materials
25 containing lead on the site or location at which construction activities are
26 performed; and
- 27 g. Maintenance operations associated with the construction activities described
28 in the subsection.

29 Because it is assumed by the District that all painted surfaces (interior as well as
30 exterior) within the District contain some level of lead, it is imperative that the
31 Contractor, its workers and subcontractors fully and adequately comply with all
32 applicable laws, rules and regulations governing lead-based materials (including title
33 8, California Code of Regulations, section 1532.1).

34 **Contractor shall notify the District if any Work may result in the disturbance**
35 **of lead-containing building materials. Any and all Work that may result in**
36 **the disturbance of lead-containing building materials shall be coordinated**
37 **through the District. A signed copy of this Certification shall be on file prior**
38 **to beginning Work on the Project, along with all current insurance**
39 **certificates.**

1 **3. Renovation, Repair and Painting Rule, Section 402(c)(3) of the Toxic**
2 **Substances Control Act**

3 The EPA requires lead safe work practices to reduce exposure to lead hazards
4 created by renovation, repair and painting activities that disturb lead-based paint.
5 Pursuant to the Renovation, Repair and Painting Rule (RRP), renovations in homes,
6 childcare facilities, and schools built prior to 1978 must be conducted by certified
7 renovations firms, using renovators with training by a EPA-accredited training
8 provider, and fully and adequately complying with all applicable laws, rules and
9 regulations governing lead-based materials, including those rules and regulations
10 appearing within title 40 of the Code of Federal Regulations as part 745 (40 CFR
11 745).

12 The RRP requirements apply to all contractors who disturb lead-based paint in a six-
13 square-foot or greater area indoors or a 20-square-foot or greater area outdoors. If
14 a DPH-certified inspector or risk assessor determines that a home constructed before
15 1978 is lead-free, the federal certification is not required for anyone working on that
16 particular building.

17 **4. Contractor's Liability**

18 If the Contractor fails to comply with any applicable laws, rules, or regulations, and
19 that failure results in a site or worker contamination, the Contractor will be held
20 solely responsible for all costs involved in any required corrective actions, and shall
21 defend, indemnify, and hold harmless the District, pursuant to the indemnification
22 provisions of the Contract, for all damages and other claims arising therefrom.

23 If lead disturbance is anticipated in the Work, only persons with appropriate
24 accreditation, registrations, licenses, and training shall conduct this Work.

25 It shall be the responsibility of the Contractor to properly dispose of any and all
26 waste products, including, but not limited to, paint chips, any collected residue, or
27 any other visual material that may occur from the prepping of any painted surface.
28 It will be the responsibility of the Contractor to provide the proper disposal of any
29 hazardous waste by a certified hazardous waste hauler. This company shall be
30 registered with the Department of Transportation (DOT) and shall be able to issue a
31 current manifest number upon transporting any hazardous material from any school
32 site within the District.

33 The Contractor shall provide the District with any sample results prior to beginning
34 Work, during the Work, and after the completion of the Work. The District may
35 request to examine, prior to the commencement of the Work, the lead training
36 records of each employee of the Contractor.

37 THE CONTRACTOR HEREBY ACKNOWLEDGES, UNDER PENALTY OF PERJURY, THAT IT:

38 1. HAS RECEIVED NOTIFICATION OF POTENTIAL LEAD-BASED MATERIALS ON THE
39 OWNER'S PROPERTY;

40 2. IS KNOWLEDGEABLE REGARDING AND WILL COMPLY WITH ALL APPLICABLE LAWS,
41 RULES, AND REGULATIONS GOVERNING WORK WITH, AND DISPOSAL, OF LEAD.

1 THE UNDERSIGNED WARRANTS THAT HE/SHE HAS THE AUTHORITY TO SIGN ON BEHALF
2 OF AND BIND THE CONTRACTOR. THE DISTRICT MAY REQUIRE PROOF OF SUCH
3 AUTHORITY.

4 Date: _____

5 Proper Name of Contractor: _____

6 Signature: _____

7 Print Name: _____

8 Title: _____

9 END OF DOCUMENT

IMPORTED MATERIALS CERTIFICATION

PROJECT/CONTRACT NO.: **0415-468 California Campus Renewal** between the Sacramento City Unified School District ("District") and _____ ("Contractor" or "Bidder") ("Contract" or "Project").

This form shall be executed by all entities that, in any way, provide or deliver and/or supply any soils, aggregate, or related materials ("Fill") to the Project Site and shall be provided to the District at least ten (10) days before delivery. All Fill shall satisfy all requirements of any environmental review of the Project performed pursuant to the statutes and guidelines of the California Environmental Quality Act, section 21000 et seq. of the Public Resources Code ("CEQA"), and all requirements of section 17210 et seq. of the Education Code, including requirements for a Phase I environmental assessment acceptable to the State of California Department of Education and Department of Toxic Substances Control.

Certification of: Delivery Firm/Transporter Supplier Manufacturer Wholesaler Broker Retailer Distributor Other _____

Type of Entity Corporation General Partnership Limited Partnership Limited Liability Company Sole Proprietorship Other _____

Name of firm ("Firm"): _____

Mailing address: _____

Addresses of branch office used for this Project: _____

If subsidiary, name and address of parent company: _____

By my signature below, I hereby certify that I am aware of section 25260 of the Health and Safety Code and the sections referenced therein regarding the definition of hazardous material. I further certify on behalf of the Firm that all soils, aggregates, or related materials provided, delivered, and/or supplied or that will be provided, delivered, and/or supplied by this Firm to the Project Site are free of any and all hazardous material as defined in section 25260 of the Health and Safety Code. I further certify that I am authorized to make this certification on behalf of the Firm.

Date: _____

Proper Name of Firm: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

CRIMINAL BACKGROUND INVESTIGATION
/FINGERPRINTING CERTIFICATION

PROJECT/CONTRACT NO.: **0415-468 California Campus Renewal** between the
Sacramento City Unified School District ("District") and _____
_____ ("Contractor" or "Bidder") ("Contract" or "Project").

The undersigned does hereby certify to the District that I am a representative of the Contractor currently under contract with the District; that I am familiar with the facts herein certified; and that I am authorized and qualified to execute this certificate on behalf of Contractor.

Contractor certifies that it has taken at least one of the following actions (check all that apply):

Pursuant to Education Code section 45125.2(a), Contractor has installed or will install, prior to commencement of Work, a physical barrier at the Work Site, that will limit contact between Contractor's employees, Subcontractors or suppliers and District pupils at all times; and/or

Pursuant to Education Code section 45125.2(a), Contractor certifies that all employees will be under the continual supervision of, and monitored by, an employee of the Contractor who the California Department of Justice ("DOJ") has ascertained, or as described below, will ascertain, has not been convicted of a violent or serious felony. The name and title of the employee who will be supervising Contractor's and its subcontractors' or suppliers' employees is:

Name: _____

Title: _____

NOTE: If Contractor is a sole proprietor, and elects the above option, Contractor must have the above-named employee's fingerprints prepared and submitted by District for submission to the DOJ, in accordance with Education Code section 45125.1(h). No work shall commence until such determination by DOJ has been made.

Pursuant to Education Code section 45125.2(a), the District will take appropriate steps to protect the safety of any pupils that may come in contact with Contractor's employees, subcontractors or suppliers so that the fingerprinting and criminal background investigation requirements of Education Code section 45125.2 shall not apply to Contractor under the Contract.

The Work on the Contract is either (i) at an unoccupied school site and no employee of Contractor and/or subcontractor or supplier of any tier of the Contract shall come in contact with the District pupils or (ii) if Contractor's employees or any subcontractor or supplier of any tier of the Contract interacts with pupils, such interaction shall only take place under the immediate supervision and control of the pupil's parent or guardian or a school employee, so that the fingerprinting and criminal background investigation requirements of Education Code section 45125.1 shall not apply to Contractor under the Contract.

ATTACHMENT "A"

List of Employees/Subcontractors

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- Name/Company:** _____

If further space is required for the list of employees/subcontractors, attach additional copies of this page.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

1 By my signature below, I hereby certify that, to the best of my knowledge, the contents of
2 this disclosure are true, or are believed to be true. I further certify on behalf of the Firm
3 that I am aware of section 3000 et seq. of the California Public Contract Code, and the
4 sections referenced therein regarding the penalties for providing false information or failing
5 to disclose a financial relationship in this disclosure. I further certify that I am authorized to
6 make this certification on behalf of the Firm.

7 Date: _____

8 Proper Name of Firm: _____

9 Signature: _____

10 Print Name: _____

11 Title: _____

12 END OF DOCUMENT

POST BID INTERVIEW

PART 1 – GENERAL

1.01 SUMMARY

If requested by the District, this Section requires the apparent low bidder to attend and participate in a Post Bid Interview with the Construction Manager, prior to award of any contract by the District. The Post Bid Interview will be scheduled by the Construction Manager within three (3) calendar days after the date of bid.

1.02 REQUIRED ATTENDANCE

- A. A duly authorized representative of the apparent low bidder is required to attend the Post Bid Interview, in person.
- B. The apparent low bidder’s authorized representative(s) must have (1) knowledge of how the bid submitted was prepared, (2) the person responsible for supervising performance of the Work, and (3) the authority to bind the apparent low bidder.
- C. Failure to attend the Post Bid Interview as scheduled will be considered just cause for the District to reject the Bid as nonresponsive.

1.03 POST BID INTERVIEW PROCEDURE

- A. The Construction Manager will review the Bid with the attendees.
- B. The Construction Manager will review the Contract Documents with the attendees, including but not limited to:
 - (1) Insurance
 - (2) Bonding
 - (3) Addenda
 - (4) Pre-Bid Clarifications
 - (5) Scope of Work
 - (6) Bid Packages Descriptions
 - (7) Bid Alternates
 - (8) Contract Plans
 - (9) Contract Specifications
 - (10) Project Schedule and Schedule Requirements

- 1 (11) Critical Dates Requirement for Other Bid Packages
- 2 (12) Prevailing Wage Requirements
- 3 (13) Liquidated Damages
- 4 (14) Required Documentation for Contract Administration
- 5 (15) Contract Coordination Requirements

6 **1.04 POST BID INTERVIEW DOCUMENTATION**

7 The Construction Manager will document the Post Bid Interview on the form attached to this
8 Section. Both the apparent low bidder and the Construction Manager are required to sign
9 the Post Bid Interview Documentation.

10

11 *[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]*

12

13

1

POST BID INTERVIEW

2 **CONSTRUCTION MANAGER**

3 [Name]

4 [Address 1]

5 [Address 2]

6 [Phone]

[Fax]

BIDDER: _____

DATE: _____ TIME: _____ PHONE: _____

I.

INTRODUCTIONS:

A.

Present

CONTRACTOR

[CM]

CONTRACTOR

[CM]

II.

PROPOSED CONTRACT:

III.

PURPOSE OF INTERVIEW IS TO ASSURE A MUTUAL UNDERSTANDING OF THE FOLLOWING:

- A. Do you acknowledge submission of a complete and accurate bid? Yes No
- B. Do you acknowledge the Bid Document submittal timelines after NOA and NTP and can you meet those timelines? Yes No
- C. Do you acknowledge the requirements for the escrow of bid documents? Yes No
- D. Are you comfortable with your listed subcontractors? Yes No

IV.

CONTRACTUAL REQUIREMENTS:

- A. Do you understand you are a prime contractor? Yes No
- B. Can you meet specified insurance requirements? Yes No
 - 1. Do any of your policies that require Additional Insured endorsements exceed the minimum coverage requirements? Yes No
 - 2. Are you requesting that the District accept an Excess Liability Insurance Policy to meet the policy limit? Yes No
 - 3. Will there be a gap between the per occurrence amount of any underlying policy and the start of the coverage under the Umbrella or Excess Liability Insurance Policy? Yes No

- | | | | |
|----|---|-----|----|
| C. | Will you provide the Performance Bond and Labor and Material Bond for 100% of the Contract Price as stipulated? | Yes | No |
| 1. | Cost for bonds: _____% | Yes | No |
| 2. | Is the cost of your bonds in your base bid? | Yes | No |
| 3. | Is your surety licensed to issue bonds in California? | Yes | No |
| D. | Do you understand the fingerprinting requirements? | Yes | No |
| E. | Is it understood that all workers must be paid prevailing wage? | Yes | No |
| F. | Is it understood that all subcontractors of every tier must be registered as a public works contractor with the Department of Industrial Relations? | Yes | No |

V.

SCOPE OF WORK:

- | | | | |
|----|--|-----|----|
| A. | Acknowledged Receipt of Addenda #1-__ | Yes | No |
| B. | Are the costs for addenda items included in your bid? (if applicable) | Yes | No |
| C. | Do you have a complete understanding of your Scope of Work under the proposed Agreement? | Yes | No |
| D. | You have re-reviewed the documents and understand the Scope of the Work. Are there any items that require clarification? | Yes | No |

If yes, please identify them.

1. _____

2. _____

3. _____

- | | | | |
|----|---|-----|----|
| | Is (are) there additional cost(s) for the above item(s)? | Yes | No |
| E. | Is the cost for allowance included in your bid? | Yes | No |
| F. | Have you reviewed bid alternative(s) #1-___? (if applicable) | Yes | No |
| G. | Are the costs for bid alternatives included in your bid? | Yes | No |
| H. | Are the plans and specifications clear and understandable to your satisfaction? | Yes | No |

VI. I. Do you acknowledge that the time to submit notice of requests for substitution of specified materials has expired? Yes No

SCHEDULE:

A. Do you acknowledge and agree to the stipulated completion dates and milestones in the contract? Yes No

1. Will you provide a detailed construction schedule to _____ within the required ten (10) days of the Notice to Proceed, per the contract? Yes No

2. Can you meet the submittal deadline? Yes No

3. It is understood that the Project schedule is critical and that that weekend and overtime work may be required to meet the milestones. Yes No

4. It is understood that if rain does occur, then all dewatering and protection of work is required, per the contract. If not, what do you believe must change and why? Yes No

B. Identify critical materials, deliveries, long lead items and other dependencies, including Owner Furnished items that could affect the completion of your work. Yes No

1. _____

2. _____

3. _____

4. _____

5. _____

VII. C. Do you understand that there is going to be maintenance and other construction taking place on site during the course of the project? Yes No

EXECUTION OF WORK

A. Do you understand the access to the site? Yes No

B. Do you understand the staging area restrictions? Yes No

C. Have you included protection of [asphalt, floors, and roofs]? Yes No

D. Do you understand that the site is occupied by students, teachers, administrators, parents, etc.? Yes No

VIII.

CONTRACTOR COMMENTS/SUGGESTIONS:

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

1

2 IX. CONTRACTOR

3 **You agree the information contained herein is part of your contractual obligations.**
4 **Your signature acknowledges your agreement to perform all Work in the Contract**
5 **Documents, and that costs for all Work are included in your bid.**

6 The foregoing information is true and accurate, and I am authorized to sign as an officer of
7 the company I am representing.

8 [Company Name]

9 _____

10 Signature _____ Title: _____

11 Date: _____

12 X. CONSTRUCTION MANAGER

13 Signature _____ Title: _____

14 Date: _____

15 Title of Document: POST BID INTERVIEW

16 Number of Pages: _____

17 Date of Document: _____

18 END OF DOCUMENT

NOTICE OF AWARD

Dated: _____ 20__

To: _____ (Contractor)

(Address)

From: Governing Board ("Board") of the Sacramento City Unified School District ("District")

Re: **California Campus Renewal**, Project No. #**0415-468** ("Project").

Contractor has been awarded the Contract for the above-referenced Project on _____, 20__, by action of the District's Board.

The Contract Price is _____ Dollars (\$_____), and includes alternates _____.

Three (3) copies of each of the Contract Documents (except Drawings) accompany this Notice of Award. Three (3) sets of the Drawings will be delivered separately or otherwise made available. Additional copies are available at cost of reproduction.

You must comply with the following conditions precedent within **SEVEN (7)** calendar days of the date of this Notice of Award.

The Contractor shall execute and submit the following documents by 5:00 p.m. of the **SEVENTH (7th)** calendar day following the date of the Notice of Award.

- a. Agreement: To be executed by successful Bidder. Submit three (3) copies, each bearing an original signature.
- b. Escrow of Bid Documentation: This must include all required documentation. See the document titled Escrow Bid Documentation for more information.
- c. Performance Bond (100%): On the form provided in the Contract Documents and fully executed as indicated on the form.
- d. Payment Bond (Contractor's Labor & Material Bond) (100%): On the form provided in the Contract Documents and fully executed as indicated on the form.
- e. Insurance Certificates and Endorsements as required.
- f. Workers' Compensation Certification.
- g. Prevailing Wage and Related Labor Requirements Certification.
- h. Disabled Veteran Business Enterprise Participation Certification.
- i. Drug-Free Workplace Certification.

- j. Tobacco-Free Environment Certification.
- k. Hazardous Materials Certification.
- l. Lead-Based Materials Certification.
- m. Imported Materials Certification.
- n. Criminal Background Investigation/Fingerprinting Certification.
- o. Buy American Certification.
- p. Roofing Project Certification: from Contractor, Material Manufacturer and/or Vendor.
- q. COVID-19 Vaccination/Testing Certification

Failure to comply with these conditions within the time specified will entitle District to consider your bid abandoned, to annul this Notice of Award, and to declare your Bid Security forfeited, as well as any other rights the District may have against the Contractor.

After you comply with those conditions, District will return to you one fully signed counterpart of the Agreement.

SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

BY: _____

NAME: _____

TITLE: _____

END OF DOCUMENT

AGREEMENT

THIS AGREEMENT IS MADE AND ENTERED INTO THIS _____ DAY OF _____
_____, 20____, by and between the Sacramento City Unified School District ("District") and

("Contractor").

WITNESSETH: That the parties hereto have mutually covenanted and agreed, and by these presents do covenant and agree with each other, as follows:

1. The Work: Contractor agrees to furnish all tools, equipment, apparatus, facilities, labor, and material necessary to perform and complete in a good and workmanlike manner, the work of the following project:

SCUSD Bid #0415-468 California Campus Renewal

("Project" or "Contract" or "Work")

It is understood and agreed that the Work shall be performed and completed as required in the Contract Documents including, without limitation, the Drawings and Specifications and submission of all documents required to secure funding or by the Division of the State Architect for close-out of the Project, under the direction and supervision of, and subject to the approval of, the District or its authorized representative.

2. The Contract Documents: The complete Contract consists of all Contract Documents as defined in the General Conditions and incorporated herein by this reference. Any and all obligations of the District and Contractor are fully set forth and described in the Contract Documents. All Contract Documents are intended to cooperate so that any Work called for in one and not mentioned in the other or vice versa is to be executed the same as if mentioned in all Contract Documents.

3. Interpretation of Contract Documents: Should any question arise concerning the intent or meaning of Contract Documents, including the Drawings or Specifications, the question shall be submitted to the District for interpretation. If a conflict exists in the Contract Documents, valid, written modifications, beginning with the most recent, shall control over this Agreement (if any), which shall control over the Special Conditions, which shall control over any Supplemental Conditions, which shall control over the General Conditions, which shall control over the remaining Division 0 documents, which shall control over Division 1 Documents which shall control over Division 2 through Division 49 documents, which shall control over figured dimensions, which shall control over large-scale drawings, which shall control over small-scale drawings. In the case of a discrepancy or ambiguity solely between and among the Drawings and Specifications, the discrepancy or ambiguity shall be resolved in favor of the interpretation that will provide District with the functionally complete and operable Project described in the Drawings and Specifications. In no case shall a document calling for lower quality and/or quantity material or workmanship control. The decision of the District in the matter shall be final.

1 **4. Time for Completion:** It is hereby understood and agreed that the Work under this
2 Contract shall be completed within _____ (____)
3 consecutive calendar days ("Contract Time") from the date specified in the District's
4 Notice to Proceed.

5 **5. Completion - Extension of Time:** Should the Contractor fail to complete this
6 Contract, and the Work provided herein, within the time fixed for completion, due
7 allowance being made for the contingencies provided for herein, the Contractor shall
8 become liable to the District for all loss and damage that the District may suffer on
9 account thereof. The Contractor shall coordinate its Work with the Work of all other
10 contractors. The District shall not be liable for delays resulting from Contractor's
11 failure to coordinate its Work with other contractors in a manner that will allow
12 timely completion of Contractor's Work. Contractor shall be liable for delays to other
13 contractors caused by Contractor's failure to coordinate its Work with the Work of
14 other contractors.

15 **6. Liquidated Damages:** Time is of the essence for all work under this Agreement. It
16 is hereby understood and agreed that it is and will be difficult and/or impossible to
17 ascertain and determine the actual damage that the District will sustain in the event
18 of and by reason of Contractor's delay; therefore, Contractor agrees that it shall pay
19 to the District the sum of _____
20 dollars (\$_____) per day as liquidated damages for each and every
21 day's delay beyond the time herein prescribed in completion of the Work.

22 It is hereby understood and agreed that this amount is not a penalty.

23 In the event that any portion of the liquidated damages is not paid to the District,
24 the District may deduct that amount from any money due or that may become due
25 the Contractor under this Agreement, and such deduction does not constitute a
26 withholding or penalty. The District's right to assess liquidated damages is as
27 indicated herein and in the General Conditions.

28 The time during which the Contract is delayed for cause, as hereinafter specified,
29 may extend the time of completion for a reasonable time as the District may grant,
30 provided that Contractor has complied with the claims procedure of the Contract
31 Documents. This provision does not exclude the recovery of damages by either
32 party under other provisions in the Contract Documents.

33 **7. Loss Or Damage:** The District and its agents and authorized representatives shall
34 not in any way or manner be answerable or suffer loss, damage, expense, or liability
35 for any loss or damage that may happen to the Work, or any part thereof, or in or
36 about the same during its construction and before acceptance, and the Contractor
37 shall assume all liabilities of every kind or nature arising from the Work, either by
38 accident, negligence, theft, vandalism, or any cause whatsoever; and shall hold the
39 District and its agents and authorized representatives harmless from all liability of
40 every kind and nature arising from accident, negligence, or any cause whatsoever.

41 **8. Limitation Of District Liability:** District's financial obligations under this Contract
42 shall be limited to the payment of the compensation provided in this Contract.
43 Notwithstanding any other provision of this Contract, in no event shall District be
44 liable, regardless of whether any claim is based on contract or tort, for any special,
45 consequential, indirect or incidental damages, including, but not limited to, lost

1 profits or revenue, lost bonding capacity, arising out of or in connection with this
2 Contract for the services performed in connection with this Contract.

3 **9. Insurance and Bonds:** Prior to issuance of the Notice to Proceed by the District,
4 Contractor shall provide all required certificates of insurance, insurance
5 endorsements, and payment and performance bonds as evidence thereof.

6 **10. Prosecution of Work:** If the Contractor should neglect to prosecute the Work
7 properly or fail to perform any provisions of this Contract, the District, may, pursuant
8 to the General Conditions and without prejudice to any other remedy it may have,
9 make good such deficiencies and may deduct the cost thereof from the payment
10 then or thereafter due the Contractor.

11 **11. Authority of Architect, Project Inspector, and DSA:** Contractor hereby
12 acknowledges that the Architect(s), the Project Inspector(s), and the Division of the
13 State Architect ("DSA") have authority to approve and/or suspend Work if the
14 Contractor's Work does not comply with the requirements of the Contract
15 Documents, Title 24 of the California Code of Regulations, and all applicable laws and
16 regulations. The Contractor shall be liable for any delay caused by its non-compliant
17 Work.

18 **12. Assignment of Contract:** Neither the Contract, nor any part thereof, nor any
19 moneys due or to become due thereunder, may be assigned by the Contractor
20 without the prior written approval of the District, nor without the written consent of
21 the Surety on the Contractor's Performance Bond (the "Surety"), unless the Surety
22 has waived in writing its right to notice of assignment.

23 **13. Classification of Contractor's License:** Contractor hereby acknowledges that it
24 currently holds valid Type _____ Contractor's license(s) issued by the State of
25 California, Contractors' State License Board, in accordance with division 3, chapter 9,
26 of the Business and Professions Code and in the classification called for in the
27 Contract Documents.

28 **14. Registration as Public Works Contractor:** The Contractor and all Subcontractors
29 currently are registered as public works contractors with the Department of
30 Industrial Relations, State of California, in accordance with Labor Code section
31 1771.1.

32 **15. Payment of Prevailing Wages:** The Contractor and all Subcontractors shall pay all
33 workers on all Work performed pursuant to this Contract not less than the general
34 prevailing rate of per diem wages and the general prevailing rate for holiday and
35 overtime work as determined by the Director of the Department of Industrial
36 Relations, State of California, for the type of work performed and the locality in
37 which the work is to be performed within the boundaries of the District, pursuant to
38 sections 1770 et seq. of the California Labor Code. The Contractor and all
39 Subcontractors shall comply with the Davis Bacon Act, applicable reporting
40 requirements, and any other applicable requirements for federal funding. If a
41 conflict exists, the more stringent provision shall control over this Agreement.

42 **16. Labor Compliance Monitoring and Enforcement:** This Project is subject to labor
43 compliance monitoring and enforcement by the Department of Industrial Relations
44 pursuant to Labor Code section 1771.4 and Title 8 of the California Code of
45 Regulations. Contractor specifically acknowledges and understands that it shall

1 perform the Work of this Agreement while complying with all the applicable
2 provisions of Division 2, Part 7, Chapter 1, of the Labor Code, including, without
3 limitation, the requirement that the Contractor and all of its Subcontractors shall
4 timely submit complete and accurate electronic certified payroll records as required
5 by the Contract Documents, or the District may not issue payment.

6 **17. Contract Price:** In consideration of the foregoing covenants, promises, and
7 agreements on the part of the Contractor, and the strict and literal fulfillment of each
8 and every covenant, promise, and agreement, and as compensation agreed upon for
9 the Work and construction, erection, and completion as aforesaid, the District
10 covenants, promises, and agrees that it will well and truly pay and cause to be paid
11 to the Contractor in full, and as the full Contract Price and compensation for
12 construction, erection, and completion of the Work hereinabove agreed to be
13 performed by the Contractor, the following price:

14 _____ Dollars
15 (\$ _____),

16 in lawful money of the United States, which sum is to be paid according to the
17 schedule provided by the Contractor and accepted by the District and subject to
18 additions and deductions as provided in the Contract. This amount supersedes any
19 previously stated and/or agreed to amount(s).

20 **18. No Representations:** No representations have been made other than as set forth
21 in writing in the Contract Documents, including this Agreement. Each of the Parties
22 to this Agreement warrants that it has carefully read and understood the terms and
23 conditions of this Agreement and all Contract Documents, and that it has not relied
24 upon the representations or advice of any other Party or any attorney not its own.

25 **19. Entire Agreement:** The Contract Documents, including this Agreement, set forth
26 the entire agreement between the parties hereto and fully supersede any and all
27 prior agreements, understandings, written or oral, between the parties hereto
28 pertaining to the subject matter thereof.

29 **20. Severability:** If any term, covenant, condition, or provision in any of the Contract
30 Documents is held by a court of competent jurisdiction to be invalid, void or
31 unenforceable, the remainder of the provisions in the Contract Documents shall
32 remain in full force and effect and shall in no way be affected, impaired, or
33 invalidated thereby.

34 **21. Authority of Signatories:** Each party has the full power and authority to enter into
35 and perform this Contract, and the person signing this Contract on behalf of each
36 party has been properly authorized and empowered to enter into this Contract. This
37 Contract may be executed in one or more counterparts, each of which shall be
38 deemed an original. For this Agreement, and for all Contract Documents requiring a
39 signature, a facsimile or electronic signature shall be deemed to be the equivalent of
40 the actual original signature. All counterparts so executed shall constitute one
41 Contract binding all the Parties hereto.

42 **[SIGNATURES ON FOLLOWING PAGE]**

1 IN WITNESS WHEREOF, accepted and agreed on the date indicated above:

2 **[CONTRACTOR NAME]**

**SACRAMENTO CITY UNIFIED SCHOOL
DISTRICT**

4

5 _____

6 By: _____

By: _____

7 Title: _____

Title: _____

8 NOTE: If the party executing this Contract is a corporation, a certified copy of the by-laws,
9 or of the resolution of the Board of Directors, authorizing the officers of said
10 corporation to execute the Contract and the bonds required thereby must be
11 attached hereto.

12

END OF DOCUMENT

NOTICE TO PROCEED

Dated: _____, 20__

TO: _____
("Contractor")

ADDRESS: _____

PROJECT: _____

PROJECT/CONTRACT NO. # **0415-468 California Campus Renewal**

You are notified that the Contract Time under the above Contract will commence to run on _____, 20__. By that date, you are to start performing your obligations under the Contract Documents. In accordance with the Agreement executed by Contractor, the date of completion is _____, 20__.

You must submit the following documents by 5:00 p.m. of the TENTH (10th) calendar day following the date of this Notice to Proceed:

- a. Contractor’s preliminary schedule of construction.
- b. Contractor’s preliminary schedule of values for all of the Work.
- c. Contractor’s preliminary schedule of submittals, including Shop Drawings, Product Data, and Samples submittals
- d. Contractor’s Safety Plan specifically adapted for the Project.
- e. Registered Subcontractors List: A complete subcontractors list for all tiers, including the name, address, telephone number, email address, facsimile number, California State Contractors License number, license classification, Department of Industrial Relations registration number, and monetary value of all Subcontracts.

Thank you. We look forward to a very successful Project.

**SACRAMENTO CITY UNIFIED
SCHOOL DISTRICT**

BY: _____

NAME: _____

TITLE: _____

END OF DOCUMENT

ESCROW BID DOCUMENTATION

1. Requirement to Escrow Bid Documentation

- a. Contractor shall submit, within **SEVEN (7)** calendar days after the date of the Notice of Award, one copy of all documentary information received or generated by Contractor in preparation of bid prices for this Contract, as specified herein. This material is referred to herein as "Escrow Bid Documentation." The Escrow Bid Documentation of the Contractor will be held in escrow for the duration of the Contract.
- b. Contractor agrees, as a condition of award of the Contract, that the Escrow Bid Documentation constitutes all written information used in the preparation of its bid, and that no other written bid preparation information shall be considered in resolving disputes or claims. Contractor also agrees that nothing in the Escrow Bid Documentation shall change or modify the terms or conditions of the Contract Documents.
- c. The Escrow Bid Documentation will not be opened by District except as indicated herein. The Escrow Bid Documentation will be used only for the resolution of change orders and claims disputes.
- d. Contractor's submission of the Escrow Bid Documentation, as with the bonds and insurance documents required, is considered an essential part of the Contract award. Should the Contractor fail to make the submission within the allowed time specified above, District may deem the Contractor to have failed to enter into the Contract, and the Contractor shall forfeit the amount of its bid security, accompanying the Contractor's bid, and District may award the Contract to the next lowest responsive responsible bidder.
- e. NO PAYMENTS WILL BE MADE, NOR WILL DISTRICT ACCEPT PROPOSED CHANGE ORDERS UNTIL THE ABOVE REQUIRED INFORMATION IS SUBMITTED AND APPROVED.
- f. The Escrow Bid Documentation shall be submitted in person by an authorized representative of the Contractor to the District.

2. Ownership of Escrow Bid Documentation

- a. The Escrow Bid Documentation is, and shall always remain, the property of Contractor, subject to review by District, as provided herein.
- b. Escrow Bid Documentation constitute trade secrets, not known outside Contractor's business, known only to a limited extent and only by a limited number of employees of Contractor, safeguarded while in Contractor's possession, extremely valuable to Contractor, and could be extremely valuable to Contractor's competitors by virtue of reflecting Contractor's contemplated techniques of construction. Subject to the provisions herein, District agrees to safeguard the Escrow Bid Documentation, and all

information contained therein, against disclosure to the fullest extent permitted by law.

3. Format and Contents of Escrow Bid Documentation

- a. Contractor may submit Escrow Bid Documentation in its usual cost-estimating format; a standard format is not required. The Escrow Bid Documentation shall be submitted in the language (e.g., English) of the specification.
- b. Escrow Bid Documentation must clearly itemize the estimated costs of performing the work of each bid item contained in the bid schedule, separating bid items into sub-items as required to present a detailed cost estimate and allow a detailed cost review. The Escrow Bid Documentation shall include all subcontractor bids or quotes, supplier bids or quotes, quantity takeoffs, crews, equipment, calculations of rates of production and progress, copies of quotes from subcontractors and suppliers, and memoranda, narratives, add/deduct sheets, and all other information used by the Contractor to arrive at the prices contained in the bid proposal. Estimated costs should be broken down into Contractor's usual estimate categories such as direct labor, repair labor, equipment ownership and operation, expendable materials, permanent materials, and subcontract costs as appropriate. All labor rates must be broken down to specify any and all burden costs including, but not limited to, health and welfare pay, vacation and holiday pay, pension contributions, training rates, benefits of any kind, insurance of any kind, workers' compensation, liability insurance, truck expenses, supply expenses of any kind, payroll taxes, and any other taxes of any kind. Plant and equipment and indirect costs should be detailed in the Contractor's usual format. The Contractor's allocation of indirect costs, contingencies, markup, and other items to each bid item shall be identified.
- c. All costs shall be identified. For bid items amounting to less than \$10,000, estimated unit costs are acceptable without a detailed cost estimate, provided that labor, equipment, materials, and subcontracts, as applicable, are included and provided that indirect costs, contingencies, and markup, as applicable, are allocated.
- d. Bid Documentation provided by District should not be included in the Escrow Bid Documentation unless needed to comply with the following requirements.

4. Submittal of Escrow Bid Documentation

- a. The Escrow Bid Documentation shall be submitted by the Contractor in a sealed container within **SEVEN (7)** calendar days after the date of the Notice of Award. The container shall be clearly marked on the outside with the Contractor's name, date of submittal, project name and the words "Escrow Bid Documentation – Intended to be opened in the presence of Authorized Representatives of Both District and Contractor".
- b. By submitting Escrow Bid Documentation, Contractor represents that the material in the Escrow Bid Documentation constitutes all the documentary information used in preparation of the bid and that the Contractor has

personally examined the contents of the Escrow Bid Documentation container and has found that the documents in the container are complete.

- c. If Contractor's proposal is based upon subcontracting any part of the work, each subcontractor whose total subcontract price exceeds 5 percent of the total contract price proposed by Contractor, shall provide separate Escrow Documents to be included with those of Contractor. Those documents shall be opened and examined in the same manner and at the same time as the examination described above for Contractor.
- d. If Contractor wishes to subcontract any portion of the Work after award, District retains the right to require Contractor to submit Escrow Documents for the Subcontractor before the subcontract is approved.

5. Storage, Examination and Final Disposition of Escrow Bid Documentation

- a. The Escrow Bid Documentation will be placed in escrow, for the life of the Contract, in a mutually agreeable institution. The cost of storage will be paid by Contractor for the duration of the project until final Contract payment. The storage facilities shall be the appropriate size for all the Escrow Bid Documentation and located conveniently to both District's and Contractor's offices.
- b. The Escrow Bid Documentation shall be examined by both District and Contractor, at any time deemed necessary by either District or Contractor, to assist in the negotiation of price adjustments and change orders or the settlement of disputes and claims. In the case of legal proceedings, Escrow Bid Documentation shall be used subject to the terms of an appropriate protective order if requested by Contractor and ordered by a court of competent jurisdiction. Examination of the Escrow Bid Documentation is subject to the following conditions:
 - (1) As trade secrets, the Escrow Bid Documentation is proprietary and confidential to the extent allowed by law.
 - (2) District and Contractor shall each designate, in writing to the other party **SEVEN (7)** calendar days prior to any examination, the names of representatives who are authorized to examine the Escrow Bid Documentation. No other person shall have access to the Escrow Bid Documentation.
 - (3) Access to the documents may take place only in the presence of duly designated representatives of the District and Contractor. If Contractor fails to designate a representative or appear for joint examination on **SEVEN (7)** calendar days' notice, then the District representative may examine the Escrow Bid Documents alone upon an additional **THREE (3)** calendar days' notice if a representative of the Contractor does not appear at the time set.
 - (4) If a subcontractor has submitted sealed information to be included in the Escrow Bid Documents, access to those documents may take place only in the presence of a duly designated representative of the District,

Contractor and that subcontractor. If that subcontractor fails to designate a representative or appear for joint examination on **SEVEN (7)** calendar days' notice, then the District representative and/or the Contractor may examine the Escrow Bid Documentation without that subcontractor present upon an additional **THREE (3)** calendar days' notice if a representative of that subcontractor does not appear at the time set.

- c. The Escrow Bid Documentation will be returned to Contractor at such time as the Contract has been completed and final settlement has been achieved.

END OF DOCUMENT

ESCROW AGREEMENT IN LIEU OF RETENTION
(Public Contract Code Section 22300)

(Note: Contractor must use this form.)

This Escrow Agreement in Lieu of Retention ("Escrow Agreement") is made and entered into this _____ day of _____, 20____, by and between the Sacramento City Unified School District ("District"), whose address is 5735 47th Avenue, Sacramento, California 95824, and _____ ("Contractor"), whose address is _____, and _____ ("Escrow Agent"), a state or federally chartered bank in the state of California, whose address is _____.

For the consideration hereinafter set forth, District, Contractor, and Escrow Agent agree as follows:

1. Pursuant to section 22300 of Public Contract Code of the State of California, which is hereby incorporated by reference, Contractor has the following two (2) options:
 - Deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by District pursuant to the Construction Contract No. _____ entered into between District and Contractor for the _____ Project, in the amount of _____ Dollars (\$_____) dated, _____, 20____, (the "Contract"); **or**
 - On written request of Contractor, District shall make payments of the retention earnings for the above referenced Contract directly to Escrow Agent.

When Contractor deposits the securities as a substitute for Contract earnings (first option), Escrow Agent shall notify District within ten (10) calendar days of the deposit. The market value of the securities at the time of substitution and at all times from substitution until the termination of the Escrow Agreement shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between District and Contractor.

Securities shall be held in the name of Sacramento City Unified School District, and shall designate Contractor as beneficial owner.

2. District shall make progress payments to Contractor for those funds which otherwise would be withheld from progress payments pursuant to Contract provisions, provided that Escrow Agent holds securities in form and amount specified above.
3. When District makes payment of retentions earned directly to Escrow Agent, Escrow Agent shall hold them for the benefit of Contractor until the time that the escrow created under this Escrow Agreement is terminated. Contractor may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the Parties shall be equally applicable and binding when District pays Escrow Agent directly.

4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account, and all expenses of District. The District will charge Contractor \$_____ for each of District's deposits to the escrow account. These expenses and payment terms shall be determined by District, Contractor, and Escrow Agent.
5. Interest earned on securities or money market accounts held in escrow and all interest earned on that interest shall be for sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to District.
6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from District to Escrow Agent that District consents to withdrawal of amount sought to be withdrawn by Contractor.
7. District shall have the right to draw upon the securities and/or withdraw amounts from the Escrow Account in the event of default by Contractor. Upon seven (7) days' written notice to Escrow Agent from District of the default, if applicable, Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by District. Escrow Agent shall not be authorized to determine the validity of any notice of default given by District pursuant to this paragraph, and shall promptly comply with District's instructions to pay over said escrowed assets. Escrow Agent further agrees to not interplead the escrowed assets in response to a conflicting demand.
8. Upon receipt of written notification from District certifying that the Contract is final and complete, and that Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all monies and securities on deposit and payments of fees and charges.
9. Escrow Agent shall rely on written notifications from District and Contractor pursuant to Paragraphs 5 through 8, inclusive, of this Escrow Agreement and District and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of securities and interest as set forth above.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

10. Names of persons who are authorized to give written notice or to receive written notice on behalf of District and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of District:

Title

Name

Signature

Address

On behalf of Contractor:

Title

Name

Signature

Address

On behalf of Escrow Agent:

Title

Name

Signature

Address

At the time that the Escrow Account is opened, District and Contractor shall deliver to Escrow Agent a fully executed copy of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

On behalf of District:

Title

Name

Signature

Address

On behalf of Contractor:

Title

Name

Signature

Address

END OF DOCUMENT

PERFORMANCE BOND
(100% of Contract Price)

(Note: Contractor must use this form, NOT a surety company form.)

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the governing board ("Board") of the Sacramento City Unified School District, ("District") and _____ ("Principal") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

California Campus Renewal

("Project" or "Contract") which Contract dated _____, 20____, and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof; and

WHEREAS, said Principal is required under the terms of the Contract to furnish a bond for the faithful performance of the Contract.

NOW, THEREFORE, the Principal and _____ ("Surety") are held and firmly bound unto the Board of the District in the penal sum of

_____ Dollars (\$_____), lawful money of the United States, for the payment of which sum well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents, to:

- Promptly perform all the work required to complete the Project; and
- Pay to the District all damages the District incurs as a result of the Principal's failure to perform all the Work required to complete the Project.

Or, at the District's sole discretion and election, the Surety shall obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by the District of the lowest responsible bidder, arrange for a contract between such bidder and the District and make available as Work progresses sufficient funds to pay the cost of completion less the "balance of the Contract Price," and to pay and perform all obligations of Principals under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of liquidated damages. The term "balance of the Contract Price," as used in this paragraph, shall mean the total amount payable to Principal by the District under the Contract and any modifications thereto, less the amount previously paid by the District to the Principal, less any withholdings by the District allowed under the Contract. District shall not be required or obligated to accept a tender of a completion contractor from the Surety for any or no reason.

The condition of the obligation is such that, if the above bound Principal, its heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions, and agreements in the Contract and any alteration

thereof made as therein provided, on its part to be kept and performed at the time and in the intent and meaning, including all contractual guarantees and warranties of materials and workmanship, and shall indemnify and save harmless the District, its trustees, officers and agents, as therein stipulated, then this obligation shall become null and void, otherwise it shall be and remain in full force and virtue.

Surety expressly agrees that the District may reject any contractor or subcontractor proposed by Surety to fulfill its obligations in the event of default by the Principal. Surety shall not utilize Principal in completing the Work nor shall Surety accept a Bid from Principal for completion of the Work if the District declares the Principal to be in default and notifies Surety of the District's objection to Principal's further participation in the completion of the Work.

As a condition precedent to the satisfactory completion of the Contract, the above obligation shall hold good for a period equal to the warranty and/or guarantee period of the Contract, during which time Surety's obligation shall continue if Contractor shall fail to make full, complete, and satisfactory repair and replacements and totally protect the District from loss or damage resulting from or caused by defective materials or faulty workmanship. The obligations of Surety hereunder shall continue so long as any obligation of Contractor remains. Nothing herein shall limit the District's rights or the Contractor or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond. The Surety also stipulates and agrees that it shall not be exonerated or released from the obligation of this bond by any overpayment or underpayment by the District that is based upon estimates approved by the Architect. The Surety does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract or to the work or to the specifications.

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ day of _____, 20__.

_____ Principal	_____ Surety
_____ By	_____ By
	_____ Name of California Agent of Surety
	_____ Address of California Agent of Surety
	_____ Telephone No. of California Agent of Surety

Contractor must attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.

END OF DOCUMENT

PAYMENT BOND
Contractor's Labor & Material Bond
(100% Of Contract Price)

(Note: Contractor must use this form, NOT a surety company form.)

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the governing board ("Board") of the Sacramento City Unified School District, ("District") and _____, ("Principal") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

California Campus Renewal

("Project" or "Contract") which Contract dated _____, 20____, and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof; and

WHEREAS, pursuant to law and the Contract, the Principal is required, before entering upon the performance of the work, to file a good and sufficient bond with the body by which the Contract is awarded in an amount equal to one hundred percent (100%) of the Contract price, to secure the claims to which reference is made in sections 9000 through 9510 and 9550 through 9566 of the Civil Code, and division 2, part 7, of the Labor Code.

NOW, THEREFORE, the Principal and _____ ("Surety") are held and firmly bound unto all laborers, material men, and other persons referred to in said statutes in the sum of _____ Dollars (\$_____), lawful money of the United States, being a sum not less than the total amount payable by the terms of Contract, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally, by these presents.

The condition of this obligation is that if the Principal or any of its subcontractors, or their heirs, executors, administrators, successors, or assigns of any, all, or either of them shall fail to pay for any labor, materials, provisions, or other supplies, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal or any of his or its subcontractors of any tier under Section 13020 of the Unemployment Insurance Code with respect to such work or labor, that the Surety will pay the same in an amount not exceeding the amount herein above set forth, and also in case suit is brought upon this bond, will pay a reasonable attorney's fee to be awarded and fixed by the court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims under section 9100 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void; otherwise it shall be and remain in full force and affect.

And the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of Contract or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration, or addition.

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ day of _____, 20__.

_____	_____
Principal	Surety
_____	_____
By	By

	Name of California Agent of Surety

	Address of California Agent of Surety

	Telephone No. of California Agent of Surety

Contractor must attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.

END OF DOCUMENT

ALLOWANCE EXPENDITURE DIRECTIVE

Sacramento City Unified School District
 5735 47th Avenue
 Sacramento, CA 95824

Contractor Name
 Address
 Address

ALLOWANCE EXPENDITURE DIRECTIVE NO.:

Project: California Campus Renewal

Date: _____
DSA File No.: _____
DSA Appl. No. _____

Bid No.: 0415-468

The following parties agree to the terms of this Allowance Expenditure Directive ("AED"):

Reference	Description	Allowance Authorized for Expenditure
Request for AED # Requested by: Performed by: Reason:	[Description of unforeseen item relating to Work] [Requester] [Performer] [Reason]	\$

Total Contract Allowance Amount:	\$
Amount of Previously Approved Allowance Expenditure Directive(s):	\$
Amount of this Allowance Expenditure Directive:	\$

The undersigned Contractor approves the foregoing release of allowance for completion of each specified item, and agrees to furnish all labor, materials and services and perform all work necessary to complete any additional work specified for the consideration stated therein ("Work"). Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650, et seq.

This Allowance Expenditure Directive must be signed by an authorized District representative.

It is expressly understood that the authorized allowance expenditure granted herein represents a full accord and satisfaction for any and all cost impacts of the items herein, and Contractor waives any and all further compensation based on the items herein. The value of the extra work or changes expressly includes any and all of the Contractor's costs and expenses, and its subcontractors, both direct and indirect. Any costs, expenses, or damages not included are deemed waived.

Signatures:

CONTRACTOR: _____ Date: _____ By: _____ [Print Name and Title here]	CONSTRUCTION MANAGER: _____ Date: _____ By: _____ [Print Name and Title here]
SCUSD FACILITIES PROJECT MANAGER: _____ Date: _____ By: Anthony Lea, Project Manager III	SCUSD DIRECTOR III FACILITIES MGMT: _____ Date: _____ By: Chris Ralston, Director III

END OF DOCUMENT

DAILY FORCE ACCOUNT REPORT

From: Contractor
[Name/Address]

To: Owner
[Name/Address]

Project: 0415-468 California Campus Renewal

Contractor hereby submits this Daily Force Account Report for Work performed, pursuant to Force Account Directive No. _____, on _____.
[Date of Work]

Contractor attests that the material, labor, and equipment itemized herein were used only on the force account work.

A. Material: *Attach all applicable invoices not provided in prior Daily Force Account Reports and complete the information below.*

Description	Unit Price	Quantity	Cost

Daily subtotal (w/out markup): \$ _____

B. Labor: *Labor must be fully Burdened. Attach timesheets, if applicable, and complete the information below.*

Name	Craft	Regular Hrs.	Rate	OT Hrs.	Rate

Daily subtotal (w/out markup): \$ _____

C. **Equipment:** Attach all applicable invoices not provided in prior Daily Force Account Reports and complete the information below.

Type / Model	Hrs. Operated	Rate

Daily subtotal (w/out markup): \$ _____

Complete based on information reported above.

	<u>WORK PERFORMED OTHER THAN BY CONTRACTOR</u>	<u>ADD</u>
(a)	<u>Material</u>	
(b)	<u>Add Labor</u>	
(c)	<u>Add Equipment</u>	
(d)	<u>Subtotal</u>	
(e)	<u>Add overhead and profit for any and all tiers of Subcontractor</u> , the total not to exceed ten percent (10%) of Item (d)	
(f)	<u>Subtotal</u>	
(g)	<u>Add Overhead and Profit for Contractor</u> , not to exceed five percent (5%) of Item (f)	
(h)	<u>Subtotal</u>	
(i)	<u>Add Bond and Insurance</u> , not to exceed two percent (2%) of Item (h)	
(j)	<u>TOTAL</u>	

	<u>WORK PERFORMED BY CONTRACTOR</u>	<u>ADD</u>
(a)	<u>Material</u>	
(b)	<u>Add Labor</u>	
(c)	<u>Add Equipment</u>	
(d)	<u>Subtotal</u>	
(e)	<u>Add Overhead and Profit for Contractor</u> , not to exceed fifteen percent (15%) of Item (d)	
(f)	<u>Subtotal</u>	
(g)	<u>Add Bond and Insurance</u> , not to exceed two percent (2%) of Item (f)	
(h)	<u>TOTAL</u>	

Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act (Gov. Code, § 12650 et seq.).

It is expressly understood that all force account work for the date stated above must be reported herein, and Contractor may not claim any labor, equipment, material or any other costs or expenses not reported herein. Contractor is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, or damages, not included are deemed waived.

SUBMITTED BY:

REVIEWED BY:

Contractor:

District:

[Name]

Date

[Name]

Date

District may require additional information from Contractor to review this Daily Force Account Report. Upon District's return of the Daily Force Account Report, Contractor may invoice the Work reflected therein. District's review and return of the Daily Force Account Report and/or payment for the force account work does not constitute acceptance of the Work or waiver of any Contract rights or criteria.

END OF DOCUMENT

PROPOSED CHANGE ORDER FORM

Sacramento City Unified School District
 5735 47th Avenue
 Sacramento, CA 95824

PCO NO.:

Project: California Campus Renewal
Bid No.: 0415-468
RFI #: _____

Date: _____
DSA File No.: _____
DSA Appl. No.: _____

Contractor hereby submits for District’s review and evaluation this Proposed Change Order (“PCO”), submitted in accordance with and subject to the terms of the Contract Documents, including Sections 17.7 and 17.8 of the General Conditions. Any spaces left blank below are deemed no change to cost or time.

Contractor understands and acknowledges that documentation supporting Contractor’s PCO must be attached and included for District review and evaluation. Contractor further understands and acknowledges that failure to include documentation sufficient to, in District’s discretion, support some or all of the PCO, shall result in a rejected PCO.

	<u>WORK PERFORMED OTHER THAN BY CONTRACTOR</u>	<u>ADD</u>	<u>DEDUCT</u>
(a)	Material (attach suppliers’ invoice or itemized quantity and unit cost plus sales tax)		
(b)	Add Labor (attach itemized hours and rates, fully Burdened, and specify the hourly rate for each additional labor burden, for example, payroll taxes, fringe benefits, etc.)		
(c)	Add Equipment (attach suppliers’ invoice)		
(d)	<u>Subtotal</u>		
(e)	Add overhead and profit for any and all tiers of Subcontractor , the total not to exceed ten percent (10%) of Item (d)		
(f)	<u>Subtotal</u>		
(g)	Add General Conditions (if Time is Compensable) (attach supporting documentation)		
(h)	<u>Subtotal</u>		
(i)	Add Overhead and Profit for Contractor , not to exceed five percent (5%) of Item (h)		
(j)	<u>Subtotal</u>		
(k)	Add Bond and Insurance , not to exceed two percent (2%) of Item (j)		
(l)	<u>TOTAL</u>		
(m)	Time (zero unless indicated; “TBD” not permitted)	_____ Calendar Days	

[REMAINDER OF PAGE LEFT BLANK INTENTIONALLY]

	WORK PERFORMED BY CONTRACTOR	ADD	DEDUCT
(a)	Material (attach itemized quantity and unit cost plus sales tax)		
(b)	Add Labor (attach itemized hours and rates, fully Burdened, and specify the hourly rate for each additional labor burden, for example, payroll taxes, fringe benefits, etc.)		
(c)	Add Equipment (attach suppliers' invoice)		
(d)	Add General Conditions (if Time is Compensable) (attach supporting documentation)		
(e)	Subtotal		
(f)	Add Overhead and Profit for Contractor , not to exceed fifteen percent (15%) of Item (e)		
(g)	Subtotal		
(h)	Add Bond and Insurance , not to exceed two percent (2%) of Item (g)		
(i)	TOTAL		
(j)	Time (zero unless indicated; "TBD" not permitted)	_____ Calendar Days	

The undersigned Contractor approves the foregoing as to the changes, if any, to the Contract Price specified for each item, and as to the extension of time allowed, if any, for completion of the entire Work as stated herein, and agrees to furnish all labor, materials, and service, and perform all work necessary to complete any additional work specified for the consideration stated herein. Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq. It is understood that the changes herein to the Contract shall only be effective when approved by the governing board of the District.

It is expressly understood that the value of the extra Work or changes expressly includes any and all of the Contractor's costs and expenses, direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project including, without limitation, cumulative impacts. Contractor is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

SUBMITTED BY:

Contractor:

[Name]

Date

END OF DOCUMENT

CHANGE ORDER FORM

Sacramento City Unified School District
 5735 47th Avenue
 Sacramento, CA 95824

CHANGE ORDER NO.:

CHANGE ORDER

Project: California Campus Renewal
Bid No.: 0415-468

Date: _____
DSA File No.: _____
DSA Appl. No.: _____

The following parties agree to the terms of this Change Order:

Owner: _____
 [Name / Address]

Contractor: _____
 [Name / Address]

Architect: _____
 [Name / Address]

Project Inspector: _____
 [Name / Address]

Reference	Description	Cost	Days Ext.
PCO # Requested by: Performed by: Reason:	[Description of change] [Requester] [Performer] [Reason]	\$	
PCO # Requested by: Performed by: Reason:	[Description of change] [Requester] [Performer] [Reason]	\$	
PCO # Requested by: Performed by: Reason:	[Description of change] [Requester] [Performer] [Reason]	\$	
Contract time will be adjusted as follows: Previous Completion Date: __[Date] _____[#] Calendar Days Extension (zero unless otherwise indicated) Current Completion Date: __[Date]		Original Contract Amount:	\$
		Amount of Previously Approved Change Order(s):	\$
		Amount of this Change Order:	\$
		Contract Amount:	\$

The undersigned Contractor approves the foregoing as to the changes, if any, to the Contract Price specified for each item, and as to the extension of time allowed, if any, for

AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS

THIS AGREEMENT AND RELEASE OF CLAIMS ("Agreement and Release") IS MADE AND ENTERED INTO THIS _____ DAY OF _____, 20__ by and between the SACRAMENTO CITY UNIFIED SCHOOL DISTRICT ("District") and _____ ("Contractor"), whose place of business is _____.

RECITALS

WHEREAS, District and Contractor entered into PROJECT/CONTRACT NO.: **0415-468 California Campus Renewal** ("Contract" or "Project") in the County of Sacramento, California; and

WHEREAS, the Work under the Contract was completed on _____, and a Notice of Completion was recorded with the County Recorder on _____.

NOW, THEREFORE, it is mutually agreed between District and Contractor as follows:

AGREEMENT AND RELEASE

1. Contractor will only be assessed liquidated damages as detailed below:

Original Contract Sum	\$ _____
Modified Contract Sum	\$ _____
Payment to Date	\$ _____
Liquidated Damages	\$ _____
Payment Due Contractor	\$ _____

2. Subject to the provisions hereof, District shall forthwith pay to Contractor the undisputed sum of _____ Dollars (\$ _____) under the Contract, less any amounts represented by any notice to withhold funds on file with District as of the date of such payment.

3. Contractor acknowledges and hereby agrees that there are no unresolved or outstanding claims in dispute against District arising from the performance of work under the Contract, except for the claims described in Paragraph 4 and continuing obligations described in Paragraph 6. It is the intention of the parties in executing this Agreement and Release that this Agreement and Release shall be effective as a full, final and general release of all claims, demands, actions, causes of action, obligations, costs, expenses, damages, losses and liabilities of Contractor against District and all of its respective agents, employees, trustees, inspectors, assignees, consultants and transferees, except for any Disputed Claim that may be set forth in Paragraph 4 and the continuing obligations described in Paragraph 6 hereof.

4. The following claims are disputed (hereinafter, the "Disputed Claims") and are specifically excluded from the operation of this Agreement and Release:

<u>Claim No.</u>	<u>Description of Claim</u>	<u>Amount of Claim</u>	<u>Date Claim Submitted</u>
_____	_____	\$ _____	_____
_____	_____	\$ _____	_____
_____	_____	\$ _____	_____
_____	_____	\$ _____	_____
_____	_____	\$ _____	_____
_____	_____	\$ _____	_____

[If further space is required, attach additional sheets showing the required information.]

5. Consistent with California Public Contract Code section 7100, Contractor hereby agrees that, in consideration of the payment set forth in Paragraph 2 hereof, Contractor hereby releases and forever discharges District, all its agents, employees, inspectors, assignees, and transferees from any and all liability, claims, demands, actions, or causes of action of whatever kind or nature arising out of or in any way concerned with the Work under the Contract.
6. Guarantees and warranties for the Work, and any other continuing obligation of Contractor, including without limitation, the duty to defend, indemnify and hold harmless the District, shall remain in full force and effect as specified in the Contract Documents.
7. Contractor hereby waives the provisions of California Civil Code section 1542 which provides as follows:
- A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS THAT THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE AND THAT, IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY.
8. The provisions of this Agreement and Release are contractual in nature and not mere recitals and shall be considered independent and severable. If any such provision or any part thereof shall be at any time held invalid in whole or in part under any federal, state, county, municipal, or other law, ruling, or regulations, then such provision, or part thereof, shall remain in force and effect to the extent permitted by law, and the remaining provisions of this Agreement and Release shall also remain in full force and effect, and shall be enforceable.

9. All rights of District shall survive completion of the Work or termination of Contract, and execution of this Release.

* * * CAUTION: THIS IS A RELEASE - READ BEFORE EXECUTING * * *

SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

Signature: _____

Print Name: _____

Title: _____

CONTRACTOR: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

GUARANTEE FORM

(Print on Contractor/Subcontractor Letterhead)

_____ **[Contractor's Name]** hereby unconditionally guarantees that the Work performed at **California Campus Renewal - Bid/Project #0415-468** has been done in accordance with the requirements of the Contract therefore and further guarantees the Work of the contract to be and remain free of defects in workmanship and materials for a period of two (2) years from and after the recordation of the Notice of Completion of the Project and completion of all Contract obligations by the Contractor, including formal acceptance of the entire Project by the District, unless a longer guarantee period is called for by the Contract Documents, in which case the terms of the longer guarantee shall govern. The Contractor specifically waives any right to claim or rely on the statutory definition of completion set forth in Civil Code section 9200. The Contractor specifically acknowledges and agrees that completion shall mean the Contractor's complete performance of all Work required by the Contract Documents, amendments, change orders, construction change directives and punch lists, and the District's formal acceptance of the entire Project, without regard to prior occupancy, substantial completion doctrine, beneficial occupancy, or otherwise. The Contractor hereby agrees to repair or replace any and all Work, together with any adjacent Work which may have been damaged or displaced in so doing, that may prove to be not in accordance with the requirements of the Contract or that may be defective in its workmanship or materials within the guarantee period specified, without any expense whatsoever to the District, ordinary wear and tear and unusual abuse and neglect only excepted. The Contractor has provided contract bonds, which will remain in full force and effect during the guarantee period.

The Contractor further agrees that within ten (10) calendar days after being notified in writing by the District of any Work not in accordance with the requirements of the contract or any defects in the Work, it will commence and prosecute with due diligence all Work necessary to fulfill the terms of this guarantee, and to complete the Work within a period of time stipulated in writing. In the event it fails to so comply, Contractor does hereby authorize the District to proceed to have such Work done at the Contractor's expense and it will pay the cost thereof upon demand. The District shall be entitled to all costs, including reasonable attorneys' fees, necessarily incurred upon the Contractor's refusal to pay the above costs.

The guarantee period for corrected defective work shall continue for a duration equivalent to the original guarantee period.

Notwithstanding the foregoing paragraph, in the event of an emergency constituting an immediate hazard to the health or safety of the employees of the District, or its property or licensees, the District may undertake at the Contractor's expense without prior notice, all Work necessary to correct such hazardous condition when it was caused by the Work of the Contractor not being in accordance with the requirements of this contract, or being defective, and to charge the same to the Contractor as specified in the preceding paragraph.

The guarantee set forth herein is not intended by the parties, nor shall it be construed, as in any way limiting or reducing the District's rights to enforce all terms of the Contract referenced hereinabove or the time for enforcement thereof. This guarantee is provided in addition to, and not in lieu of, the District's rights on such contract.

_____ Spec Section(s): _____

CONTRACTOR'S SIGNATURE

PRINT NAME

General Conditions

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GENERAL CONDITIONS

1. CONTRACT TERMS AND DEFINITIONS

1.1 Definitions

Wherever used in the Contract Documents, the following terms shall have the meanings indicated, which shall be applicable to both the singular and plural thereof:

1.1.1 Adverse Weather: Shall be only weather that satisfies all of the following conditions: (1) unusually severe precipitation, sleet, snow, hail, or extreme temperature conditions in excess of the norm for the location and time of year it occurred based on the closest weather station data averaged over the past five years, (2) that is unanticipated and would cause unsafe work conditions and/or is unsuitable for scheduled work that should not be performed during inclement weather (i.e., exterior finishes), and (3) at the Project.

1.1.2 Allowance Expenditure Directive: Written authorization for expenditure of allowance, if any.

1.1.3 Approval, Approved, and/or Accepted: Written authorization, unless stated otherwise.

1.1.4 Architect (or "Design Professional in General Responsible Charge"): The individual, partnership, corporation, joint venture, or any combination thereof, named as Architect, who will have the rights and authority assigned to the Architect in the Contract Documents. The term Architect means the Design Professional in General Responsible Charge as defined in DSA PR 13-02 on this Project or the Architect's authorized representative.

1.1.5 As-Builts: Reproducible blue line prints of drawings to be prepared on a monthly basis pursuant to the Contract Documents, that reflect changes made during the performance of the Work, recording differences between the original design of the Work and the Work as constructed since the preceding monthly submittal. See **Record Drawings**.

1.1.6 Bidder: A contractor who intends to provide a proposal to the District to perform the Work of this Contract.

1.1.7 Burdened: The labor rate for Contractor or any Subcontractor inclusive of any and all burden costs including, but not limited to, health and welfare pay, vacation and holiday pay, pension contributions, training rates, benefits of any kind, insurance of any kind, workers' compensation, liability insurance, truck expenses, supply expenses of any kind, payroll taxes, and any other taxes of any kind.

1.1.8 Change Order: A written order to the Contractor authorizing an addition to, deletion from, or revision in the Work, and/or authorizing an adjustment in the Contract Price or Contract Time.

1.1.9 Claim: A Dispute that remains unresolved at the conclusion of the all the applicable Dispute Resolution requirements provided herein.

1.1.10 Construction Change Directive: A written order prepared and issued by the District, the Construction Manager, and/or the Architect and signed by the District and the Architect, directing a change in the Work.

1.1.11 Construction Manager: The individual, partnership, corporation, joint venture, or any combination thereof, or its authorized representative, named as such by the District. If no Construction Manager is used on the Project that is the subject of this Contract, then all references to Construction Manager herein shall be read to refer to District.

1.1.12 Construction Schedule: The progress schedule of construction of the Project as provided by Contractor and approved by District.

1.1.13 Contract, Contract Documents: The Contract consists exclusively of the documents evidencing the agreement of the District and Contractor, identified as the Contract Documents. The Contract Documents consist of the following documents:

- 1.1.13.1** Notice to Bidders
- 1.1.13.2** Instructions to Bidders
- 1.1.13.3** Bid Form and Proposal
- 1.1.13.4** Bid Bond
- 1.1.13.5** Designated Subcontractors List
- 1.1.13.6** Site Visit Certification (if a site visit was required)
- 1.1.13.7** Non-Collusion Declaration
- 1.1.13.8** Notice of Award
- 1.1.13.9** Notice to Proceed
- 1.1.13.10** Agreement
- 1.1.13.11** Escrow of Bid Documentation
- 1.1.13.12** Escrow Agreement for Security Deposits in Lieu of Retention (if applicable)
- 1.1.13.13** Performance Bond
- 1.1.13.14** Payment Bond (Contractor's Labor & Material Bond)
- 1.1.13.15** General Conditions
- 1.1.13.16** Special Conditions (if applicable)
- 1.1.13.17** Project Labor Agreement (if applicable)
- 1.1.13.18** Hazardous Materials Procedures and Requirements
- 1.1.13.19** Workers' Compensation Certification
- 1.1.13.20** Prevailing Wage Certification
- 1.1.13.21** Disabled Veteran Business Enterprise Participation Certification (if applicable)
- 1.1.13.22** Drug-Free Workplace Certification (if applicable)
- 1.1.13.23** Tobacco-Free Environment Certification
- 1.1.13.24** Hazardous Materials Certification (if applicable)
- 1.1.13.25** Lead-Based Materials Certification (if applicable)
- 1.1.13.26** Imported Materials Certification (if applicable)
- 1.1.13.27** Criminal Background Investigation/Fingerprinting Certification
- 1.1.13.28** Buy American Certification (if certain federal funds used)
- 1.1.13.29** Roofing Project Certification (if applicable)
- 1.1.13.30** Registered Subcontractors List

- 1.1.13.31** Iran Contracting Act Certification (if applicable)
- 1.1.13.32** COVID-19 Vaccination/Testing Certification
- 1.1.13.33** Federal Debarment Certification (if applicable)
- 1.1.13.34** Federal Byrd Anti-Lobbying Certification (if applicable)
- 1.1.13.35** Post Bid Interview
- 1.1.13.36** All Plans, Technical Specifications, and Drawings
- 1.1.13.37** Any and all addenda to any of the above documents
- 1.1.13.38** Any and all change orders or written modifications to the above documents if approved in writing by the District

1.1.14 Contract Price: The total monies payable to the Contractor under the terms and conditions of the Contract Documents.

1.1.15 Contract Time: The time period stated in the Agreement for the completion of the Work.

1.1.16 Contractor: The person or persons identified in the Agreement as contracting to perform the Work to be done under this Contract, or the legal representative of such a person or persons.

1.1.17 Daily Job Report(s): Daily Project reports prepared by the Contractor's employee(s) who are present on Site, which shall include the information required herein.

1.1.18 Day(s): Unless otherwise designated, day(s) means calendar day(s).

1.1.19 Department of Industrial Relations (or "DIR"): is responsible, among other things, for labor compliance monitoring and enforcement of California prevailing wage laws and regulations for public works contracts.

1.1.20 Design Professional in General Responsible Charge: See definition of **Architect** above.

1.1.21 Dispute: A separate demand by Contractor for a time extension, or payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the Contract and payment of which is not otherwise expressly provided for or Contractor is not otherwise entitled to; or an amount of payment disputed by the District.

1.1.22 District: The public agency or the school district for which the Work is performed. The governing board of the District or its designees will act for the District in all matters pertaining to the Contract. The District may, at any time,

1.1.22.1 Direct the Contractor to communicate with or provide notice to the Construction Manager or the Architect on matters for which the Contract Documents indicate the Contractor will communicate with or provide notice to the District; and/or

1.1.22.2 Direct the Construction Manager or the Architect to communicate with or direct the Contractor on matters for which the Contract Documents indicate the District will communicate with or direct the Contractor.

1.1.23 Drawings (or "Plans"): The graphic and pictorial portions of the Contract Documents showing the design, location, scope and dimensions of the work, generally including plans, elevations, sections, details, schedules, sequence of operation, and diagrams.

1.1.24 DSA: Division of the State Architect.

1.1.25 Force Account Directive: A process that may be used when the District and the Contractor cannot agree on a price for a specific portion of work or before the Contractor prepares a price for a specific portion of work and whereby the Contractor performs the work as indicated herein on a time and materials basis.

1.1.26 Job Cost Reports: Any and all reports or records detailing the costs associated with work performed on or related to the Project that Contractor shall maintain for the Project. Specifically, Job Cost Reports shall contain, but are not limited by or to, the following information: a description of the work performed or to be performed on the Project; quantity, if applicable, of work performed (hours, square feet, cubic yards, pounds, etc.) for the Project; Project budget; costs for the Project to date; estimated costs to complete the Project; and expected costs at completion. The Job Cost Reports shall also reflect all Contract cost codes, change orders, elements of non-conforming work, back charges, and additional services.

1.1.27 Labor Commissioner's Office (or "Labor Commissioner", also known as the Division of Labor Standards Enforcement ("DLSE")): Division of the DIR responsible for adjudicating wage claims, investigating discrimination and public works complaints, and enforcing Labor Code statutes and Industrial Welfare Commission orders.

1.1.28 Municipal Separate Storm Sewer System (or "MS4"): A system of conveyances used to collect and/or convey storm water, including, without limitation, catch basins, curbs, gutters, ditches, man-made channels, and storm drains.

1.1.29 Plans: See **Drawings**.

1.1.30 Premises: The real property owned by the District on which the Site is located.

1.1.31 Product(s): New material, machinery, components, equipment, fixtures and systems forming the Work, including existing materials or components required and approved by the District for reuse.

1.1.32 Product Data: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work.

1.1.33 Program Manager: The individual, partnership, corporation, joint venture, or any combination thereof, or its authorized representative, named as such by the District. If no Program Manager is designated for Project that is the subject of this Contract, then all references to Project Manager herein shall be read to refer to District.

1.1.34 Project: The planned undertaking as provided for in the Contract Documents.

1.1.35 Project Inspector (or "Inspector"): The individual(s) retained by the District in accordance with title 24 of the California Code of Regulations to monitor and inspect the Project.

1.1.36 Project Labor Agreement (or "PLA"): a prehire collective bargaining agreement in accordance with Public Contract Code section 2500 et seq. that establishes terms and conditions of employment for a specific construction project or projects and/or is an agreement described in Section 158(f) of Title 29 of the United States Code.

1.1.37 Proposed Change Order (or "PCO"): a written request prepared by the Contractor requesting that the District and the Architect issue a Change Order based upon a proposed change to the Work.

1.1.38 Provide: Shall include "provide complete in place," that is, "furnish and install," and "provide complete and functioning as intended in place" unless specifically stated otherwise.

1.1.39 Qualified SWPPP Practitioners (or "QSP"): certified personnel that attended a State Water Resources Control Board sponsored or approved training class and passed the qualifying exam.

1.1.40 Record Drawings: Reproducible drawings (or Plans) prepared pursuant to the requirements of the Contract Documents that reflect all changes made during the performance of the Work, recording differences between the original design of the Work and the Work as constructed upon completion of the Project. See also **As-Builts**.

1.1.41 Request for Information (or "RFI"): A written request prepared by the Contractor requesting that the Architect provide additional information necessary to clarify or amplify an item in the Contract Documents that the Contractor believes is not clearly shown or called for in the Drawings or Specifications or other portions of the Contract Documents, or to address problems that have arisen under field conditions.

1.1.42 Request for Substitution for Specified Item: A request by Contractor to substitute an equal or superior material, product, thing, or service for a specific material, product, thing, or service that has been designated in the Contract Documents by a specific brand or trade name.

1.1.43 Safety Orders: Written and/or verbal orders for construction issued by the California Division of Occupational Safety and Health ("CalOSHA") or by the United States Occupational Safety and Health Administration ("OSHA").

1.1.44 Safety Plan: Contractor's safety plan specifically adapted for the Project. Contractor's Safety Plan shall comply with all provisions regarding Project safety, including all applicable provisions in these General Conditions.

1.1.45 Samples: Physical examples that illustrate materials, products, equipment, finishes, colors, or workmanship and that, when approved in accordance with the Contract Documents, establish standards by which portions of the Work will be judged.

1.1.46 Shop Drawings: All drawings, prints, diagrams, illustrations, brochures, schedules, and other data that are prepared by the Contractor, a subcontractor, manufacturer, supplier, or distributor, that illustrate how specific portions of the Work shall be fabricated or installed.

1.1.47 Site: The Project site as shown on the Drawings.

1.1.48 Specifications: That portion of the Contract Documents, Division 1 through Division 49, and all technical sections, and addenda to all of these, if any, consisting of written descriptions and requirements of a technical nature of materials, equipment, construction methods and systems, standards, and workmanship.

1.1.49 State: The State of California.

1.1.50 Storm Water Pollution Prevention Plan (or "SWPPP"): A document which identifies sources and activities at a particular facility that may contribute pollutants to storm water and contains specific control measures and time frames to prevent or treat such pollutants.

1.1.51 Subcontractor: A contractor and/or supplier who is under contract with the Contractor or with any other subcontractor, regardless of tier, to perform a portion of the Work of the Project.

1.1.52 Submittal Schedule: The schedule of submittals as provided by Contractor and approved by District.

1.1.53 Surety: The person, firm, or corporation that executes as surety the Contractor's Performance Bond and Payment Bond, and must be a California admitted surety insurer as defined in the Code of Civil Procedure section 995.120.

1.1.54 Work: All labor, materials, equipment, components, appliances, supervision, coordination, and services required by, or reasonably inferred from, the Contract Documents, that are necessary for the construction and completion of the Project.

1.2 Laws Concerning the Contract

Contract is subject to all provisions of the Constitution and laws of California and the United States governing, controlling, or affecting District, or the property, funds, operations, or powers of District, and such provisions are by this reference made a part hereof. Any provision required by law to be included in this Contract shall be deemed to be inserted.

1.3 No Oral Agreements

No oral agreement or conversation with any officer, agent, or employee of District, either before or after execution of Contract, shall affect or modify any of the terms or obligations contained in any of the documents comprising the Contract.

1.4 No Assignment

Contractor shall not assign this Contract or any part thereof including, without limitation, any Work or money to become due hereunder without the prior written consent of the

District. Assignment without District's prior written consent shall be null and void. Any assignment of money due or to become due under this Contract shall be subject to a prior lien for services rendered or material supplied for performance of work called for under this Contract in favor of all persons, firms, or corporations rendering services or supplying material to the extent that claims are filed pursuant to the Civil Code, Code of Civil Procedure, Government Code, Labor Code, and/or Public Contract Code, and shall also be subject to deductions for liquidated damages or withholding of payments as determined by District in accordance with this Contract. Contractor shall not assign or transfer in any manner to a Subcontractor or supplier the right to prosecute or maintain an action against the District.

1.5 Notice and Service Thereof

1.5.1 Any notice from one party to the other or otherwise under Contract shall be in writing and shall be dated and signed by the party giving notice or by a duly authorized representative of that party. Any notice shall not be effective for any purpose whatsoever unless served in one of the following manners:

1.5.1.1 If notice is given by personal delivery thereof, it shall be considered delivered on the day of delivery.

1.5.1.2 If notice is given by overnight delivery service, it shall be considered delivered one (1) day after date deposited, as indicated by the delivery service.

1.5.1.3 If notice is given by depositing same in United States mail, enclosed in a sealed envelope, it shall be considered delivered three (3) days after date deposited, as indicated by the postmarked date.

1.5.1.4 If notice is given by registered or certified mail with postage prepaid, return receipt requested, it shall be considered delivered on the day the notice is signed for.

1.5.1.5 Electronic mail may be used for convenience but is not a substitute for the notice and service requirements herein.

1.6 No Waiver

The failure of District in any one or more instances to insist upon strict performance of any of the terms of this Contract or to exercise any option herein conferred shall not be construed as a waiver or relinquishment to any extent of the right to assert or rely upon any such terms or option on any future occasion. No action or failure to act by the District, Architect, or Construction Manager shall constitute a waiver of any right or duty afforded the District under the Contract, nor shall any action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

1.7 Substitutions for Specified Items

Unless the Special Conditions contain different provisions, Contractor shall not substitute different items for any items identified in the Contract Documents without prior written approval of the District.

1.8 Materials and Work

1.8.1 Except as otherwise specifically stated in this Contract, Contractor shall provide and pay for all materials, labor, tools, equipment, transportation, supervision, temporary constructions of every nature, and all other services, management, and facilities of every nature whatsoever necessary to execute and complete this Contract, in a good and workmanlike manner, within the Contract Time.

1.8.2 Unless otherwise specified, all materials shall be new and of the best quality of their respective kinds and grades as noted or specified, workmanship shall be of good quality, and Contractor shall use all diligence to inform itself fully as to the required manufacturer's instructions and to comply therewith.

1.8.3 Materials shall be furnished in ample quantities and at such times as to insure uninterrupted progress of Work and shall be stored properly and protected from the elements, theft, vandalism, or other loss or damage as required.

1.8.4 For all materials and equipment specified or indicated in the Drawings, the Contractor shall provide all labor, materials, equipment, and services necessary for complete assemblies and complete working systems, functioning as intended. Incidental items not indicated on Drawings, nor mentioned in the Specifications, that can legitimately and reasonably be inferred to belong to the Work described, or be necessary in good practice to provide a complete assembly or system, shall be furnished as though itemized here in every detail. In all instances, material and equipment shall be installed in strict accordance with each manufacturer's most recent published recommendations and specifications.

1.8.5 Contractor shall, after award of Contract by District and after relevant submittals have been reviewed, place orders for materials and/or equipment as specified so that delivery of same may be made without delays to the Work. Contractor shall, upon five (5) days' demand from District, present documentary evidence showing that orders have been placed.

1.8.6 District reserves the right but has no obligation, in response to Contractor's neglect or failure in complying with the above instructions, to place orders for such materials and/or equipment as the District may deem advisable in order that the Work may be completed at the date specified in the Contract, and all expenses incidental to the procuring of said materials and/or equipment shall be paid for by Contractor or deducted from payment(s) to Contractor.

1.8.7 Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver the Site to District, together with all improvements and appurtenances constructed or placed thereon by it, and free from any claims, liens, or charges. Contractor further agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any work covered by the Contract shall have any right to lien any portion of the Premises or any improvement or appurtenance thereon, except that Contractor may install metering devices or other equipment of utility companies or of political subdivision, title to which is commonly retained by utility company or political subdivision. In the event of installation of any such metering device or equipment, Contractor shall advise District as to owner thereof.

1.8.7.1 If a lien or a claim based on a stop payment notice of any nature should at any time be filed against the Work or any District property, by any entity that has supplied material or services at the request of the Contractor, Contractor and Contractor's Surety shall promptly, on demand by District and at Contractor's and Surety's own expense, take any and all action necessary to cause any such lien or a claim based on a stop payment notice to be released or discharged immediately therefrom.

1.8.7.2 If the Contractor fails to furnish to the District within ten (10) calendar days after demand by the District, satisfactory evidence that a lien or a claim based on a stop payment notice has been so released, discharged, or secured, the District may discharge such indebtedness and deduct the amount required therefor, together with any and all losses, costs, damages, and attorney's fees and expense incurred or suffered by District from any sum payable to Contractor under the Contract.

1.8.8 Nothing contained in this Article, however, shall defeat or impair the rights of persons furnishing materials or labor under any bond given by Contractor for their protection or any rights under any law permitting such protection or any rights under any law permitting such persons to look to funds due Contractor in hands of District (e.g., stop payment notices), and this provision shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing material for work when no formal contract is entered into for such material.

1.8.9 Title to new materials and/or equipment for the Work of this Contract and attendant liability for its protection and safety shall remain with Contractor until incorporated in the Work of this Contract and accepted by District. No part of any materials and/or equipment shall be removed from its place of storage except for immediate installation in the Work of this Contract. Should the District, in its discretion, allow the Contractor to store materials and/or equipment for the Work off-site, Contractor will store said materials and/or equipment at a bonded warehouse and with appropriate insurance coverage at no cost to District. Contractor shall keep an accurate inventory of all materials and/or equipment in a manner satisfactory to District or its authorized representative and shall, at the District's request, forward it to the District.

1.8.10 [RESERVED]

2. [RESERVED]

3. ARCHITECT

3.1 The Architect shall represent the District during the Project and will observe the progress and quality of the Work on behalf of the District. Architect shall have the authority to act on behalf of District to the extent expressly provided in the Contract Documents and to the extent determined by District. Architect shall have authority to reject materials, workmanship, and/or the Work whenever rejection may be necessary, in Architect's reasonable opinion, to ensure the proper execution of the Contract.

3.2 Architect shall, with the District and on behalf of the District, determine the amount, quality, acceptability, and fitness of all parts of the Work, and interpret the

Specifications, Drawings, and shall, with the District, interpret all other Contract Documents.

3.3 Architect shall have all authority and responsibility established by law, including title 24 of the California Code of Regulations.

3.4 Contractor shall provide District and the Construction Manager with a copy of all written communication between Contractor and Architect at the same time as that communication is made to Architect, including, without limitation, all RFIs, correspondence, submittals, claims, and proposed change orders.

4. CONSTRUCTION MANAGER

4.1 If a Construction Manager is used on this Project ("Construction Manager" or "CM"), the Construction Manager will provide administration of the Contract on the District's behalf. After execution of the Contract and Notice to Proceed, all correspondence and/or instructions from Contractor and/or District shall be forwarded through the Construction Manager. The Construction Manager will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences, or procedures or for safety precautions in connection with the Work, which shall all remain the Contractor's responsibility.

4.2 The Construction Manager, however, will have authority to reject materials and/or workmanship not conforming to the Contract Documents, as determined by the District, the Architect, and/or the Project Inspector. The Construction Manager shall also have the authority to require special inspection or testing of any portion of the Work, whether it has been fabricated, installed, or fully completed. Any decision made by the Construction Manager, in good faith, shall not give rise to any duty or responsibility of the Construction Manager to: the Contractor; any Subcontractor; the Contractor or Subcontractor's respective agents, employees; or other persons performing any of the Work. The Construction Manager shall have free access to any or all parts of Work at any time.

4.3 If the District does not use a Construction Manager on this Project, all references within the Contract Documents to Construction Manager or CM shall be read as District.

5. INSPECTOR, INSPECTIONS, AND TESTS

5.1 Project Inspector

5.1.1 One or more Project Inspector(s), including special Project Inspector(s), as required, will be assigned to the Work by District, in accordance with requirements of title 24, part 1, of the California Code of Regulations, to enforce the building code and monitor compliance with Plans and Specifications for the Project previously approved by the DSA. Duties of Project Inspector(s) are specifically defined in section 4-342 of said part 1 of title 24.

5.1.2 No Work shall be carried on except with the knowledge and under the inspection of the Project Inspector(s). The Project Inspector(s) shall have free access to any or all parts of Work at any time. Contractor shall furnish Project Inspector(s) reasonable opportunities for obtaining such information as may be necessary to keep Project Inspector(s) fully informed respecting progress and

manner of work and character of materials, including, but not limited to, submission of form DSA 156 (or the most current version applicable at the time the Work is performed) to the Project Inspector at least 48 hours in advance of the commencement and completion of construction of each and every aspect of the Work. Forms are available on the DSA's website at: <http://www.dgs.ca.gov/dsa/Forms.aspx>. Inspection of Work shall not relieve Contractor from an obligation to fulfill this Contract. Project Inspector(s) and the DSA are authorized to suspend work whenever the Contractor and/or its Subcontractor(s) are not complying with the Contract Documents. Any work stoppage by the Project Inspector(s) and/or DSA shall be without liability to the District. Contractor shall instruct its Subcontractors and employees accordingly.

5.1.3 If Contractor and/or any Subcontractor requests that the Project Inspector(s) perform any inspection off-site, this shall only be done if it is allowable pursuant to applicable regulations and DSA approval, if the Project Inspector(s) agree to do so, and at the expense of the Contractor.

5.2 Tests and Inspections

5.2.1 Tests and Inspections shall comply with title 24, part 1, California Code of Regulations, group 1, article 5, section 4-335, and with the provisions of the Specifications.

5.2.2 The District will select an independent testing laboratory to conduct the tests. Selection of the materials required to be tested shall be by the laboratory or the District's representative and not by the Contractor. The Contractor shall notify the District's representative a sufficient time in advance of its readiness for required observation or inspection.

5.2.3 The Contractor shall notify the District's representative a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents, which must by terms of the Contract Documents be tested, in order that the District may arrange for the testing of same at the source of supply. This notice shall be provided, at a minimum, seventy-two (72) hours prior to the manufacture of the material that needs to be tested.

5.2.4 Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required, shall not be incorporated into and/or onto the Project.

5.2.5 The District will select the testing laboratory and pay for the cost of all tests and inspections, excepting those inspections performed at Contractor's request and expense. Contractor shall reimburse the District for any and all laboratory costs or other testing costs for any materials found to be not in compliance with the Contract Documents. At the District's discretion, District may elect to deduct laboratory or other testing costs for noncompliant materials from the Contract Price, and such deduction shall not constitute a withholding.

5.3 Costs for After Hours and/or Off Site Inspections

If the Contractor performs Work outside the Inspector's regular working hours or requests the Inspector to perform inspections off Site, costs of any inspections required

outside regular working hours or off Site shall be borne by the Contractor and may be invoiced to the Contractor by the District or the District may deduct those expenses from the next Progress Payment.

6. CONTRACTOR

Contractor shall construct and complete, in a good and workmanlike manner, the Work for the Contract Price including any adjustment(s) to the Contract Price pursuant to provisions herein regarding changes to the Contract Price. Except as otherwise noted, Contractor shall provide and pay for all labor, materials, equipment, permits (excluding DSA), fees, licenses, facilities, transportation, taxes, bonds and insurance, and services necessary for the proper execution and completion of the Work, except as indicated herein.

6.1 Status of Contractor

6.1.1 Contractor is and shall at all times be deemed to be an independent contractor and shall be wholly responsible for the manner in which it and its Subcontractors perform the services required of it by the Contract Documents. Nothing herein contained shall be construed as creating the relationship of employer and employee, or principal and agent, between the District, or any of the District's employees or agents, and Contractor or any of Contractor's Subcontractors, agents or employees. Contractor assumes exclusively the responsibility for the acts of its agents, and employees as they relate to the services to be provided during the course and scope of their employment. Contractor, its Subcontractors, agents, and its employees shall not be entitled to any rights or privileges of District employees. District shall be permitted to monitor the Contractor's activities to determine compliance with the terms of this Contract.

6.1.2 As required by law, Contractor and all Subcontractors shall be properly licensed and regulated by the Contractors State License Board, 9821 Business Park Drive, Sacramento, California 95827, <http://www.cslb.ca.gov>.

6.1.3 As required by law, Contractor and all Subcontractors shall be properly registered as public works contractors by the Department of Industrial Relations at: <https://efiling.dir.ca.gov/PWCR/ActionServlet?action=displayPWCRRegistrationForm> or current URL.

6.1.4 Contractor represents that Contractor and all Subcontractors shall not be presently debarred, suspended, proposed for disbarment, declared ineligible or excluded pursuant to either Labor Code section 1777.1 or Labor Code section 1777.7.

6.1.5 [RESERVED]

6.1.6 Contractor represents that it has no existing interest and will not acquire any interest, direct or indirect, which could conflict in any manner or degree with the performance of Work required under this Contract and that no person having any such interest shall be employed by Contractor.

6.1.7 [RESERVED]

6.1.8 If Contractor intends to make any change in the name or legal nature of the Contractor's entity, Contractor must first notify the District in writing prior to

making any contemplated change. The District shall determine in writing if Contractor's intended change is permissible while performing this Contract.

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6.2 Project Inspection Card(s)

Contractor shall verify that forms DSA 152 (or the current version applicable at the time the Work is performed) are issued for the Project prior to the commencement of construction.

6.3 Contractor's Supervision

6.3.1 During progress of the Work, Contractor shall keep on the Premises, and at all other locations where any Work related to the Contract is being performed, an experienced and competent project manager and construction superintendent who are employees of the Contractor, to whom the District does not object and at least one of whom shall be fluent in English, written and verbal.

6.3.2 The project manager and construction superintendent shall both speak fluently the predominant language of the Contractor's employees.

6.3.3 Before commencing the Work herein, Contractor shall give written notice to District of the name of its project manager and construction superintendent. Neither the Contractor's project manager nor construction superintendent shall be changed except with prior written notice to District. If the Contractor's project manager and/or construction superintendent proves to be unsatisfactory to Contractor, or to District, any of the District's employees, agents, the Construction Manager, or the Architect, the unsatisfactory project manager and/or construction superintendent shall be replaced. However, Contractor shall notify District in writing before any change occurs, but no less than two (2) business days prior. Any replacement of the project manager and/or construction superintendent shall be made promptly and must be satisfactory to the District. The Contractor's project manager and construction superintendent shall each represent Contractor, and all directions given to Contractor's project manager and/or construction superintendent shall be as binding as if given to Contractor.

6.3.4 Contractor shall give efficient supervision to Work, using its best skill and attention. Contractor shall carefully study and compare all Contract Documents, Drawings, Specifications, and other instructions and shall at once report to District, Construction Manager, and Architect any error, inconsistency, or omission that Contractor or its employees and Subcontractors may discover, in writing, with a copy to District's Project Inspector(s). The Contractor shall have responsibility for discovery of errors, inconsistencies, or omissions.

6.4 Duty to Provide Fit Workers

6.4.1 Contractor and Subcontractor(s) shall at all times enforce strict discipline and good order among their employees and shall not employ or work any unfit person or anyone not skilled in work assigned to that person. It shall be the responsibility of Contractor to ensure compliance with this requirement. District may require Contractor to permanently remove unfit persons from Project Site.

6.4.2 Any person in the employ of Contractor or Subcontractor(s) whom District may deem incompetent or unfit shall be excluded from working on the Project and shall not again be employed on the Project except with the prior written consent of District.

6.4.3 The Contractor shall furnish labor that can work in harmony with all other elements of labor employed or to be employed in the Work.

6.4.4 Fingerprinting. Contractor shall comply with the provisions of Education Code section 45125.2 regarding the submission of employee fingerprints to the California Department of Justice and the completion of criminal background investigations of its employees, its subcontractor(s), and its subcontractors' employees. Contractor shall not permit any employee to have any contact with District pupils until such time as Contractor has verified in writing to the governing board of the District, (A) that such employee has not been convicted of a violent or serious felony, as defined in Education Code section 45122.1 and/or (B) that the prohibition does not apply to an employee as provided by Education Code section 45125.1(e)(2) or (3). Contractor shall fully complete and perform all tasks required pursuant to the Criminal Background Investigation/ Fingerprinting Certification.

6.5 Field Office

6.5.1 Contractor shall provide a temporary office on the Site for the District's use exclusively, during the term of the Contract.

6.6 Purchase of Materials and Equipment

The Contractor is required to order, obtain, and store materials and equipment sufficiently in advance of its Work at no additional cost or advance payment from District to assure that there will be no delays.

6.7 Documents on Work

6.7.1 Contractor shall at all times keep on the Site, or at another location as the District may authorize in writing, one legible copy of all Contract Documents, including Addenda and Change Orders, and Titles 19 and 24 of the California Code of Regulations, the specified edition(s) of the Uniform Building Code, all approved Drawings, Plans, Schedules, and Specifications, and all codes and documents referred to in the Specifications, and made part thereof. These documents shall be kept in good order and available to District, Construction Manager, Architect, Architect's representatives, the Project Inspector(s), and all authorities having jurisdiction. Contractor shall be acquainted with and comply with the provisions of these titles as they relate to this Project. (See particularly the duties of Contractor, Title 24, Part 1, California Code of Regulations, section 4-343.) Contractor shall also be acquainted with and comply with all California Code of Regulations provisions relating to conditions on this Project, particularly Titles 8 and 17. Contractor shall coordinate with Architect and Construction Manager and shall submit its verified report(s) according to the requirements of Title 24.

6.7.2 Daily Job Reports.

6.7.2.1 Contractor shall maintain, at a minimum, at least one (1) set of Daily Job Reports on the Project. These must be prepared by the Contractor's employee(s) who are present on Site, and must include, at a minimum, the following information:

6.7.2.1.1 A brief description of all Work performed on that day.

- 6.7.2.1.2** A summary of all other pertinent events and/or occurrences on that day.
- 6.7.2.1.3** The weather conditions on that day.
- 6.7.2.1.4** A list of all Subcontractor(s) working on that day, including DIR registration numbers.
- 6.7.2.1.5** A list of each Contractor employee working on that day and the total hours worked for each employee.
- 6.7.2.1.6** A complete list of all equipment on Site that day, whether in use or not.
- 6.7.2.1.7** A complete list of all materials, supplies, and equipment delivered on that day.
- 6.7.2.1.8** A complete list of all inspections and tests performed on that day.

6.7.2.2 Each day Contractor shall provide a copy of the previous day's Daily Job Report to the District or the Construction Manager.

6.8 Preservation of Records

Contractor shall maintain, and District shall have the right to inspect, Contractor's financial records for the Project, including, without limitation, Job Cost Reports for the Project in compliance with the criteria set forth herein. The District shall have the right to examine and audit all Daily Job Reports or other Project records of Contractor's project manager(s), project superintendent(s), and/or project foreperson(s), all certified payroll records and/or related documents including, without limitation, Job Cost Reports, payroll, payment, timekeeping and tracking documents; all books, estimates, records, contracts, documents, bid documents, bid cost data, subcontract job cost reports, and other data of the Contractor, any Subcontractor, and/or supplier, including computations and projections related to bidding, negotiating, pricing, or performing the Work or Contract modification, in order to evaluate the accuracy, completeness, and currency of the cost, manpower, coordination, supervision, or pricing data at no additional cost to the District. These documents may be duplicative and/or be in addition to any Bid Documents held in escrow by the District. The Contractor shall make available at its office at all reasonable times the materials described in this paragraph for the examination, audit, or reproduction until three (3) years after final payment under this Contract. Notwithstanding the provisions above, Contractor shall provide any records requested by any governmental agency, if available, after the time set forth above.

6.9 Integration of Work

6.9.1 Contractor shall do all cutting, fitting, patching, and preparation of Work as required to make its several parts come together properly, to fit it to receive or be received by work of other contractors, and to coordinate tolerances to various pieces of work, showing upon, or reasonably implied by, the Drawings and Specifications for the completed structure, and shall conform them as District and/or Architect may direct.

6.9.2 Contractor shall make its own layout of lines and elevations and shall be responsible for the accuracy of both Contractor's and Subcontractors' work resulting therefrom.

6.9.3 Contractor and all Subcontractors shall take all field dimensions required in performance of the Work, and shall verify all dimensions and conditions on the

Site. All dimensions affecting proper fabrication and installation of all Work must be verified prior to fabrication by taking field measurements of the true conditions. If there are any discrepancies between dimensions in drawings and existing conditions which will affect the Work, Contractor shall bring such discrepancies to the attention of the District and Architect for adjustment before proceeding with the Work. In doing so, it is recognized that Contractor is not acting in the capacity of a licensed design professional, and that Contractor's examination is made in good faith to facilitate construction and does not create an affirmative responsibility of a design professional to detect errors, omissions or inconsistencies in the Contract Documents or to ascertain compliance with applicable laws, building codes or regulations. However, nothing in this provision shall abrogate Contractor's responsibilities for discovering and reporting any error, inconsistency, or omission pursuant to the Contract within the Contractor's standard of care including, without limitation, any applicable laws, ordinance, rules, or regulations. Following receipt of written notice from Contractor, the District and/or Architect shall inform Contractor what action, if any, Contractor shall take with regard to such discrepancies.

6.9.4 All costs caused by noncompliant, defective, or delayed Work shall be borne by Contractor, inclusive of repair work. Schedule delays resulting from unauthorized work shall be Contractor's responsibility.

6.9.5 Contractor shall not endanger any work performed by it or anyone else by cutting, excavating, or otherwise altering work and shall not cut or alter work of any other contractor except with consent of District.

6.10 Notifications

6.10.1 Contractor shall notify the Architect and Project Inspector, in writing, of the commencement of construction of each and every aspect of the Work at least 48 hours in advance by submitting form DSA 156 (or the most current version applicable at the time the Work is performed) to the Project Inspector. Forms are available on the DSA's website at: <http://www.dgs.ca.gov/dsa/Forms.aspx>.

6.10.2 Contractor shall notify the Architect and Project Inspector, in writing, of the completion of construction of each and every aspect of the Work at least 48 hours in advance by submitting form DSA 156 (or current version) to the Project Inspector.

6.11 Obtaining of Permits, Licenses and Registrations

6.11.1 Contractor shall secure and pay for all permits (except DSA), licenses, registrations, approvals and certificates necessary for prosecution of Work, including but not limited to those listed in the Special Conditions, if any, before the date of the commencement of the Work or before the permits, licenses, registrations, approvals and certificates are legally required to continue the Work without interruption. The Contractor shall obtain and pay, only when legally required, for all licenses, registrations, approvals, permits, inspections, and inspection certificates required to be obtained from or issued by any authority having jurisdiction over any part of the Work included in the Contract. All final permits, licenses, registrations, approvals and certificates shall be delivered to District before demand is made for final payment.

6.11.2 General Permit For Storm Water Discharges Associated With Construction and Land Disturbance Activities.

6.11.2.1 Contractor acknowledges that all California school districts are obligated to develop and implement the following requirements for the discharge of storm water to surface waters from its construction and land disturbance activities pursuant to the Clean Water Act and Porter Cologne Water Quality Act. District has determined that the construction of this Project requires enrollment in the Construction Storm Water Permit. District has filed certain submittals referred to as Permit Registration Documents ("PRDS") with the Regional Water Control Board ("Storm Water Pollution Prevention Plan" or "SWPPP").

6.11.2.2 Contractor shall comply with any District SWPPP that is approved by the District and applicable to the Project, at no additional cost to the District. Contractor shall pay any fees and any penalties that may imposed by a regulatory agency for its non-compliance with the SWPPP during the course of Work.

6.11.2.3 Contractor shall provide a Qualified Storm Water Practitioner ("QSP") at no additional cost to the District, who shall be onsite and implement and monitor any and all SWPPP requirements applicable to the Project, including but not limited to:

6.11.2.3.1 All required visual observations, sampling, analysis, reporting and record keeping, including any Numeric Action Levels ("NALs"), if applicable;

6.11.2.3.2 Rain Event Action Plan ("REAP") at least forty eight (48) hours prior to any forecasted rain event requiring implementation of the REAP, including any erosion and sediment control measures needed to protect all exposed portions of the site, if applicable;

6.11.2.3.3 Active Treatment System ("ATS"), if applicable; and

6.11.2.3.4 Best management practices ("BMPs").

6.12 **Royalties and Patents**

6.12.1 Contractor shall obtain and pay, only when legally required, all royalties and license fees necessary for prosecution of Work before the earlier of the date of the commencement of the Work or the date that the license is legally required to continue the Work without interruption. Contractor shall defend suits or claims of infringement of patent, copyright, or other rights and shall hold the District, the Architect, and the Construction Manager harmless and indemnify them from loss on account thereof except when a particular design, process, or make or model of product is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process, or product is an infringement of a patent or copyright, the Contractor shall indemnify and defend the District, Architect and Construction Manager against any loss or damage unless the Contractor promptly informs the District of its information.

6.12.2 The review by the District or Architect of any method of construction, invention, appliance, process, article, device, or material of any kind shall be only its

adequacy for the Work and shall not approve use by the Contractor in violation of any patent or other rights of any person or entity.

6.13 Work to Comply With Applicable Laws and Regulations

6.13.1 Contractor shall give all notices and comply with the following specific laws, ordinances, rules, and regulations and all other applicable laws, ordinances, rules, and regulations bearing on conduct of Work as indicated and specified, including but not limited to the appropriate statutes and administrative code sections. If Contractor observes that Drawings and Specifications are at variance therewith, or should Contractor become aware of the development of conditions not covered by Contract Documents that may result in finished Work being at variance therewith, Contractor shall promptly notify District in writing and any changes deemed necessary by District shall be made as provided in Contract for changes in Work.

6.13.1.1 National Electrical Safety Code, U. S. Department of Commerce

6.13.1.2 National Board of Fire Underwriters' Regulations

6.13.1.3 International Building Code, latest addition, and the California Code of Regulations, title 24, and other amendments

6.13.1.4 Manual of Accident Prevention in Construction, latest edition, published by A.G.C. of America

6.13.1.5 Industrial Accident Commission's Safety Orders, State of California

6.13.1.6 Regulations of the State Fire Marshall (title 19, California Code of Regulations) and Pertinent Local Fire Safety Codes

6.13.1.7 Americans with Disabilities Act

6.13.1.8 Education Code of the State of California

6.13.1.9 Government Code of the State of California

6.13.1.10 Labor Code of the State of California, division 2, part 7, Public Works and Public Agencies

6.13.1.11 Public Contract Code of the State of California

6.13.1.12 California Art Preservation Act

6.13.1.13 U. S. Copyright Act

6.13.1.14 U. S. Visual Artists Rights Act

6.13.2 Contractor shall comply with all applicable mitigation measures, if any, adopted by any public agency with respect to this Project pursuant to the California Environmental Quality Act (Public Resources Code section 21000 et seq.).

6.13.3 If Contractor performs any Work that it knew, or through exercise of reasonable care should have known, to be contrary to any applicable laws, ordinance, rules, or regulations, Contractor shall bear all costs arising therefrom and arising from the correction of said Work.

6.13.4 Where Specifications or Drawings state that materials, processes, or procedures must be approved by the DSA, State Fire Marshall, or other body or agency, Contractor shall be responsible for satisfying requirements of such bodies or agencies applicable at the time the Work is performed, and as determined by those bodies or agencies.

6.13.5 [RESERVED]

6.14 Safety/Protection of Persons and Property

6.14.1 The Contractor will be solely and completely responsible for conditions of the Site, including safety of all persons and property during performance of the Work. This requirement will apply continuously and not be limited to normal working hours.

6.14.2 The wearing of hard hats will be mandatory at all times for all personnel on Site. Contractor shall supply sufficient hard hats to properly equip all employees and visitors.

6.14.3 Any construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the Site.

6.14.4 Implementation and maintenance of safety programs shall be the sole responsibility of the Contractor.

6.14.5 The Contractor shall furnish to the District a copy of the Contractor's safety plan within the time frame indicated in the Contract Documents and specifically adapted for the Project.

6.14.6 Contractor shall be responsible for all damages to persons or property that occur as a result of its fault or negligence in connection with the prosecution of this Contract and shall take all necessary measures and be responsible for the proper care and completion and final acceptance by District. All Work shall be solely at Contractor's risk with the exception of damage to the Work caused by "acts of God" as defined in Public Contract Code section 7105.

6.14.7 Contractor shall take, and require Subcontractors to take, all necessary precautions for safety of workers on the Project and shall comply with all applicable federal, state, local, and other safety laws, standards, orders, rules, regulations, and building codes to prevent accidents or injury to persons on, about, or adjacent to premises where Work is being performed and to provide a safe and healthful place of employment. Contractor shall furnish, erect, and properly maintain at all times, all necessary safety devices, safeguards, construction canopies, signs, nets, barriers, lights, and watchmen for protection of workers and the public and shall post danger signs warning against hazards created by such features in the course of construction.

6.14.8 Hazards Control – Contractor shall store volatile wastes in covered metal containers and remove them from the Site daily. Contractor shall prevent accumulation of wastes that create hazardous conditions. Contractor shall provide adequate ventilation during use of volatile or noxious substances.

6.14.9 Contractor shall designate a responsible member of its organization on the Project, whose duty shall be to post information regarding protection and obligations of workers and other notices required under occupational safety and health laws, to comply with reporting and other occupational safety requirements, and to protect the life, safety, and health of workers. Name and position of person so designated shall be reported to District by Contractor.

6.14.10 Contractor shall correct any violations of safety laws, rules, orders, standards, or regulations. Upon the issuance of a citation or notice of violation by the Division of Occupational Safety and Health, Contractor shall correct such violation promptly.

6.14.11 Contractor shall comply with any District storm water requirements that are approved by the District and applicable to the Project, at no additional cost to the District.

6.14.12 In an emergency affecting safety of life or of work or of adjoining property, Contractor, without special instruction or authorization, shall act, at its discretion, to prevent such threatened loss or injury. Any compensation claimed by Contractor on account of emergency work shall be determined by agreement.

6.14.13 All salvage materials will become the property of the Contractor and shall be removed from the Site unless otherwise called for in the Contract Documents. However, the District reserves the right to designate certain items of value that shall be turned over to the District unless otherwise directed by District.

6.14.14 All connections to public utilities and/or existing on-site services, including, without limitation, internet, phone and data connections, shall be made and maintained in such a manner as to not interfere with the continuing use of same by the District during the entire progress of the Work.

6.14.15 Contractor shall provide such heat, covering, and enclosures as are necessary to protect all Work, materials, equipment, appliances, and tools against damage by weather conditions, such as extreme heat, cold, rain, snow, dry winds, flooding, or dampness.

6.14.16 The Contractor shall protect and preserve the Work from all damage or accident, providing any temporary roofs, window and door coverings, boxings, or other construction as required by the Architect. The Contractor shall be responsible for existing structures, walks, roads, trees, landscaping, and/or improvements in working areas; and shall provide adequate protection therefore. If temporary removal is necessary of any of the above items, or damage occurs due to the Work, the Contractor shall replace same at his expense with same kind, quality, and size of Work or item damaged. This shall include any adjoining property of the District and others.

6.14.17 Contractor shall take adequate precautions to protect existing roads, sidewalks, curbs, pavements, utilities, adjoining property, and structures (including,

without limitation, protection from settlement or loss of lateral support), and to avoid damage thereto, and repair any damage thereto caused by construction operations.

6.14.18 Contractor shall confine apparatus, the storage of materials, and the operations of workers to limits indicated by law, ordinances, permits, or directions of Architect, and shall not interfere with the Work or unreasonably encumber Premises or overload any structure with materials. Contractor shall enforce all instructions of District and Architect regarding signs, advertising, fires, and smoking, and require that all workers comply with all regulations while on Project Site.

6.14.19 Contractor, Contractor's employees, Subcontractors, Subcontractors' employees, or any person associated with the Work shall conduct themselves in a manner appropriate for a school site. No verbal or physical contact with neighbors, students, and faculty, profanity, or inappropriate attire and/or logos, or behavior will be permitted. District may require Contractor to temporarily or permanently remove non-complying persons from Project Site.

6.14.20 Contractor shall take care to prevent disturbing or covering any survey markers, monuments, or other devices marking property boundaries or corners. If such markers are disturbed, Contractor shall have a civil engineer, registered as a professional engineer in California, replace them at no cost to District.

6.14.21 In the event that the Contractor enters into any agreement with owners of any adjacent property to enter upon the adjacent property for the purpose of performing the Work, Contractor shall fully indemnify, defend, and hold harmless each person, entity, firm, or agency that owns or has any interest in adjacent property. The form and content of the agreement of indemnification shall be approved by the District prior to the commencement of any Work on or about the adjacent property. The Contractor shall also indemnify the District as provided in the indemnification provision herein. These provisions shall be in addition to any other requirements of the owners of the adjacent property.

6.15 Working Evenings and Weekends

Contractor may be required to work increased hours, evenings, and/or weekends at no additional cost to the District. Contractor shall give the District seventy-two (72) hours' notice prior to performing any evening and/or weekend work. Contractor shall perform all evening and/or weekend work only upon District's approval and in compliance with all applicable rules, regulations, laws, and local ordinances including, without limitation, all noise and light limitations. Contractor shall reimburse the District for any increased or additional Inspector charges as a result of Contractor's increased hours, or evening and/or weekend work.

6.16 Cleaning Up

6.16.1 The Contractor shall provide all services, labor, materials, and equipment necessary for protecting and securing the Work, all school occupants, furnishings, equipment, and building structure from damage until its completion and final acceptance by District. Dust barriers shall be provided to isolate dust and dirt from construction operations. At completion of the Work and portions thereof, Contractor shall clean to the original state any areas beyond the Work area that become dust laden as a result of the Work. The Contractor must erect the necessary warning signs and barricades to ensure the safety of all school occupants. The Contractor at

all times must maintain good housekeeping practices to reduce the risk of fire damage and must make a fire extinguisher, fire blanket, and/or fire watch, as applicable, available at each location where cutting, braising, soldering, and/or welding is being performed or where there is an increased risk of fire.

6.16.2 Contractor at all times shall keep Premises, including property immediately adjacent thereto, free from debris such as waste, rubbish (including personal rubbish of workers, e.g., food wrappers, etc.), and excess materials and equipment caused by the Work. Contractor shall not leave debris under, in, or about the Premises (or surrounding property or neighborhood), but shall promptly remove same from the Premises on a daily basis. If Contractor fails to clean up, District may do so and the cost thereof shall be charged to Contractor. If Contract is for work on an existing facility, Contractor shall also perform specific clean-up on or about the Premises upon request by the District as it deems necessary for continued operations. Contractor shall comply with all related provisions of the Specifications.

6.16.3 If the Construction Manager, Architect, or District observes the accumulation of trash and debris, the District will give the Contractor a 24-hour written notice to mitigate the condition.

6.16.4 Should the Contractor fail to perform the required clean-up, or should the clean-up be deemed unsatisfactory by the District, the District may, at its sole discretion, then perform the clean-up. All cost associated with the clean-up work (including all travel, payroll burden, and costs for supervision) will be deducted from the Contract Price.

6.17 No Relief from Obligations Based on Review by Other Persons

6.17.1 Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents by act or omission of the District, Architect, Construction Manager, Project Inspector, or DSA or other entities having jurisdiction including, but not limited to, administration of the Contract, review of submittals, or by tests, observation, inspection, or permit/interconnection approvals.

7. SUBCONTRACTORS

7.1 Contractor shall provide the District with information for all Subcontracts as indicated in the Contractor's Submittals and Schedules Section herein.

7.2 No contractual relationship exists between the District and any Subcontractor, supplier, or sub-subcontractor by reason of this Contract.

7.3 Contractor agrees to bind every Subcontractor by terms of this Contract as far as those terms that are applicable to Subcontractor's work including, without limitation, all labor, wage & hour, apprentice and related provisions and requirements. If Contractor shall subcontract any part of this Contract, Contractor shall be as fully responsible to District for acts and omissions of any Subcontractor and of persons either directly or indirectly employed by any Subcontractor, including Subcontractor caused Project delays, as it is for acts and omissions of persons directly employed by Contractor. The divisions or sections of the Specifications and/or the arrangement of the drawings are not intended to control the Contractor in dividing the Work among Subcontractors or limit the work performed by any trade.

7.4 District's consent to, or approval of, or failure to object to, any Subcontractor under this Contract shall not in any way relieve Contractor of any obligations under this Contract and no such consent shall be deemed to waive any provisions of this Contract.

7.5 Contractor is directed to familiarize itself with sections 4100 through 4114 of the Public Contract Code of the State of California, as regards subletting and subcontracting, and to comply with all applicable requirements therein. In addition, Contractor is directed to familiarize itself with sections 1720 through 1861 of the Labor Code of the State of California, as regards the payment of prevailing wages and related issues, and to comply with all applicable requirements therein including, without limitation, section 1775 and the Contractor's and Subcontractors' obligations and liability for violations of prevailing wage law and other applicable laws.

7.6 No Contractor whose Bid is accepted shall, without consent of the awarding authority and in full compliance with section 4100 et seq. of the Public Contract Code, including, without limitation, sections 4107, 4107.5, and 4109 of the Public Contract Code, and section 1771.1 of the Labor Code, either:

7.6.1 Substitute any person as a Subcontractor in place of the Subcontractor designated in the original Bid; or

7.6.2 Permit any Subcontract to be assigned or transferred, or allow any portion of the Work to be performed by anyone other than the original Subcontractor listed in the Bid; or

7.6.3 Sublet or subcontract any portion of the Work in excess of one-half of one percent (0.5%) of the Contractor's total bid as to which his original bid did not designate a Subcontractor.

7.7 The Contractor shall be responsible for the coordination of the trades, Subcontractors, sub-subcontractors, and material or equipment suppliers working on the Project.

7.7.1 If the Contract is valued at \$1 million or more and uses, or plans to use, state bond funds, then Contractor is responsible for ensuring that first tier Subcontractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43, and/or C-46 licenses are prequalified by the District to work on the Project pursuant to Public Contract Code section 20111.6.

7.7.2 Contractor is responsible for ensuring that all Subcontractors are properly registered as public works contractors by the Department of Industrial Relations.

7.8 Contractor is solely responsible for settling any differences between the Contractor and its Subcontractor(s) or between Subcontractors.

7.9 Contractor must include in all of its subcontracts the assignment provisions as indicated in the Termination section of these General Conditions.

8. OTHER CONTRACTS/CONTRACTORS

8.1 District reserves the right to let other contracts, and/or to perform work with its own forces, in connection with the Project. Contractor shall afford other contractors reasonable opportunity for introduction and storage of their materials and execution of

their work and shall properly coordinate and connect Contractor's Work with the work of other contractors.

8.2 In addition to Contractor's obligation to protect its own Work, Contractor shall protect the work of any other contractor that Contractor encounters while working on the Project.

8.3 If any part of Contractor's Work depends for proper execution or results upon work of District or any other contractor, the Contractor shall inspect and, before proceeding with its Work, promptly report to the District in writing any defects in District's or any other contractor's work that render Contractor's Work unsuitable for proper execution and results. Contractor shall be held accountable for damages to District for District's or any other contractor's work that Contractor failed to inspect or should have inspected. Contractor's failure to inspect and report shall constitute Contractor's acceptance of all District's or any other contractor's work as fit and proper for reception of Contractor's Work, except as to defects that may develop in District's or any other contractor's work after execution of Contractor's Work and not caused by execution of Contractor's Work.

8.4 To ensure proper execution of its subsequent work, Contractor shall measure and inspect work already in place and shall at once report to the District in writing any discrepancy between that executed work and the Contract Documents.

8.5 Contractor shall ascertain to its own satisfaction the scope of the Project and nature of District's or any other contracts that have been or may be awarded by District in prosecution of the Project to the end that Contractor may perform this Contract in light of the other contracts, if any.

8.6 Nothing herein contained shall be interpreted as granting to Contractor exclusive occupancy of the Site, the Premises, or of the Project. Contractor shall not cause any unnecessary hindrance or delay to the use and/or operation(s) of the Premises and/or to District or any other contractor working on the Project. If simultaneous execution of any contract or Premises operation is likely to cause interference with performance of Contractor's Contract, Contractor shall coordinate with those contractor(s), person(s), and/or entity(s) and shall notify the District of the resolution.

9. DRAWINGS AND SPECIFICATIONS

9.1 A complete list of all Drawings that form a part of the Contract is to be found as an index on the Drawings themselves, and/or may be provided to the Contractor and/or in the Table of Contents.

9.2 Materials or Work described in words that so applied have a well-known technical or trade meaning shall be deemed to refer to recognized standards, unless noted otherwise.

9.3 Trade Name or Trade Term. It is not the intention of this Contract to go into detailed descriptions of any materials and/or methods commonly known to the trade under "trade name" or "trade term." The mere mention or notation of "trade name" or "trade term" shall be considered a sufficient notice to Contractor that it will be required to complete the work so named, complete, finished, and operable, with all its appurtenances, according to the best practices of the trade.

9.4 The naming of any material and/or equipment shall mean furnishing and installing of same, including all incidental and accessory items thereto and/or labor therefor, as per best practices of the trade(s) involved, unless specifically noted otherwise.

9.5 Contract Documents are complementary, and what is called for by one shall be binding as if called for by all. As such, Drawings and Specifications are intended to be fully cooperative and to agree. However, if Contractor observes that Drawings and Specifications are in conflict with the Contract Documents, Contractor shall promptly notify District and Architect in writing, and any necessary changes shall be made as provided in the Contract Documents.

9.6 In the case of discrepancy or ambiguity in the Contract Documents, the order of precedence in the Agreement shall prevail. However, in the case of discrepancy or ambiguity solely between and among the Drawings and Specifications, the discrepancy or ambiguity shall be resolved in favor of the interpretation that will provide District with the functionally complete and operable Project described in the Drawings and Specifications. In case of ambiguity, conflict, or lack of information, District will furnish clarifications with reasonable promptness.

9.7 Drawings and Specifications are intended to comply with all laws, ordinances, rules, and regulations of constituted authorities having jurisdiction, and where referred to in the Contract Documents, the laws, ordinances, rules, and regulations shall be considered as a part of the Contract within the limits specified. Contractor shall bear all expense of correcting work done contrary to said laws, ordinances, rules, and regulations.

9.8 As required by Section 4-317(c), Part 1, Title 24, CCR: "Should any existing conditions such as deterioration or non-complying construction be discovered which is not covered by the DSA-approved documents wherein the finished work will not comply with Title 24, California Code of Regulations, a construction change document, or a separate set of plans and specifications, detailing and specifying the required repair work shall be submitted to and approved by DSA before proceeding with the repair work."

9.9 Ownership of Drawings

All copies of Plans, Drawings, Designs, Specifications, and copies of other incidental architectural and engineering work, or copies of other Contract Documents furnished by District, are the property of District. They are not to be used by Contractor in other work and, with the exception of signed sets of Contract Documents, are to be returned to District on request at completion of Work, or may be used by District as it may require without any additional costs to District. Neither the Contractor nor any Subcontractor, or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by the Architect. District hereby grants the Contractor, Subcontractors, sub-subcontractors, and material or equipment suppliers a limited license to use applicable portions of the Drawings prepared for the Project in the execution of their Work under the Contract Documents.

10. CONTRACTOR'S SUBMITTALS AND SCHEDULES

Contractor's submittals shall comply with the provisions and requirements of the Specifications including, without limitation Submittals.

10.1 Schedule of Work, Schedule of Submittals, and Schedule of Values

10.1.1 Within **TEN (10)** calendar days after the date of the Notice to Proceed (unless otherwise specified in the Specifications), the Contractor shall prepare and submit to the District for review, in a form supported by sufficient data to substantiate its accuracy as the District may require:

10.1.1.1 Preliminary Schedule. A preliminary schedule of construction indicating the starting and completion dates of the various stages of the Work, including any information and following any form as may be specified in the Specifications. Once approved by District, this shall become the Construction Schedule. This schedule shall include and identify all tasks that are on the Project's critical path with a specific determination of the start and completion of each critical path task as well as all Contract milestones and each milestone's completion date(s) as may be required by the District.

10.1.1.1.1 The District is not required to approve a preliminary schedule of construction with early completion, i.e., one that shows early completion dates for the Work and/or milestones. Contractor shall not be entitled to extra compensation if the District approves a Construction Schedule with an early completion date and Contractor completes the Project beyond the date shown in the schedule but within the Contract Time. A Construction Schedule showing the Work completed in less than the Contract Time, the time between the early completion date and the end of the Contract Time shall be Float.

10.1.1.2 Preliminary Schedule of Values. A preliminary schedule of values for all of the Work, which must include quantities and prices of items aggregating the Contract Price and must subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Unless the Special Conditions contain different limits, this preliminary schedule of values shall include, at a minimum, the following information and the following structure:

10.1.1.2.1 Divided into at least the following categories:

- 10.1.1.2.1.1** Overhead and profit;
- 10.1.1.2.1.2** Supervision;
- 10.1.1.2.1.3** General conditions;
- 10.1.1.2.1.4** Layout;
- 10.1.1.2.1.5** Mobilization;
- 10.1.1.2.1.6** Submittals;
- 10.1.1.2.1.7** Bonds and insurance;
- 10.1.1.2.1.8** Close-out/Certification documentation;
- 10.1.1.2.1.9** Demolition;
- 10.1.1.2.1.10** Installation;
- 10.1.1.2.1.11** Rough-in;
- 10.1.1.2.1.12** Finishes;
- 10.1.1.2.1.13** Testing;
- 10.1.1.2.1.14** Punchlist and District acceptance.

10.1.1.2.2 And also divided by each of the following areas:

- 10.1.1.2.2.1** Site work;
- 10.1.1.2.2.2** By each building;
- 10.1.1.2.2.3** By each floor.

10.1.1.2.3 The preliminary schedule of values shall not provide for values any greater than the following percentages of the Contract value:

- 10.1.1.2.3.1** Mobilization and layout combined to equal not more than 1%;
- 10.1.1.2.3.2** Submittals, samples and shop drawings combined to equal not more than 3%;
- 10.1.1.2.3.3** Bonds and insurance combined to equal not more than 2%.
- 10.1.1.2.3.4** Closeout documentation shall have a value in the preliminary schedule of not less than 5%.

10.1.1.2.4 Notwithstanding any provision of the Contract Documents to the contrary, payment of the Contractor's overhead, supervision, general conditions costs, and profit, as reflected in the Cost Breakdown, shall be paid based on percentage complete, with the disbursement of Progress Payments and the Final Payment.

10.1.1.2.5 Contractor shall certify that the preliminary schedule of values as submitted to the District is accurate and reflects the costs as developed in preparing Contractor's bid. For example, without limiting the foregoing, Contractor shall not "front-load" the preliminary schedule of values with dollar amounts greater than the value of activities performed early in the Project.

10.1.1.2.6 The preliminary schedule of values shall be subject to the District's review and approval of the form and content thereof. In the event that the District objects to any portion of the preliminary schedule of values, the District shall notify the Contractor, in writing, of the District's objection(s) to the preliminary schedule of values. Within five (5) calendar days of the date of the District's written objection(s), Contractor shall submit a revised preliminary schedule of values to the District for review and approval. The foregoing procedure for the preparation, review and approval of the preliminary schedule of values shall continue until the District has approved the entirety of the preliminary schedule of values.

10.1.1.2.7 Once the preliminary schedule of values is approved by the District, this shall become the Schedule of Values. The Schedule of Values shall not be thereafter modified or amended by the Contractor without the prior consent and approval of the District, which may be granted or withheld in the sole discretion of the District.

10.1.1.3 Preliminary Schedule of Submittals. A preliminary schedule of submittals, including Shop Drawings, Product Data, and Samples submittals. Once approved by District, this shall become the Submittal Schedule. All submittals shall be forwarded to the District by the date indicated on the approved Submittal Schedule, unless an earlier date is necessary to maintain the Construction Schedule, in which case those submittals shall be forwarded to the District so as not to delay the Construction Schedule. Upon request by the District, Contractor shall provide an electronic copy of all submittals to the

District. All submittals shall be submitted no later than 90 days after the Notice to Proceed.

10.1.1.4 Safety Plan. Contractor's Safety Plan specifically adapted for the Project. Contractor's Safety Plan shall comply with the following requirements:

10.1.1.4.1 All applicable requirements of California Division of Occupational Safety and Health ("CalOSHA") and/or of the United States Occupational Safety and Health Administration ("OSHA").

10.1.1.4.2 All provisions regarding Project safety, including all applicable provisions in these General Conditions.

10.1.1.4.3 Contractor's Safety Plan shall be in English and in the language(s) of the Contractor's and its Subcontractors' employees.

10.1.1.5 Complete Registered Subcontractors List. The name, address, telephone number, facsimile number, California State Contractors License number, classification, DIR registration number and monetary value of all Subcontracts of any tier for parties furnishing labor, material, or equipment for completion of the Project.

10.1.2 Contractor must provide all schedules both in hard copy and electronically, in a format (e.g., Microsoft Project or Primavera) approved in advance by the District.

10.1.3 The District will review the schedules submitted and the Contractor shall make changes and corrections in the schedules as requested by the District and resubmit the schedules until approved by the District.

10.1.4 The District shall have the right at any time to revise the schedule of values if, in the District's sole opinion, the schedule of values does not accurately reflect the value of the Work performed.

10.1.5 All schedules must be approved by the District before Contractor can rely on them as a basis for payment.

10.2 Monthly Progress Schedule(s)

10.2.1 Contractor shall provide Monthly Progress Schedule(s) to the District. A Monthly Progress Schedule shall update the approved Construction Schedule or the last Monthly Progress Schedule, showing all work completed and to be completed as well as updating the Registered Subcontractors List. The monthly Progress Schedule shall be sent within the timeframe requested by the District and shall be in a format acceptable to the District and contain a written narrative of the progress of work that month and any changes, delays, or events that may affect the work. The process for District approval of the Monthly Progress Schedule shall be the same as the process for approval of the Construction Schedule.

10.2.2 Contractor shall submit Monthly Progress Schedule(s) with all payment applications.

10.2.3 Contractor must provide all schedules both in hard copy and electronically, in a format (e.g., Microsoft Project or Primavera) approved in advance by the District.

10.2.4 The District will review the schedules submitted and the Contractor shall make changes and corrections in the schedules as requested by the District and resubmit the schedules until approved by the District.

10.2.5 The District shall have the right at any time to revise the schedule of values if, in the District's sole opinion, the schedule of values does not accurately reflect the value of the Work performed.

10.2.6 All schedules must be approved by the District before Contractor can rely on them as a basis for payment.

10.3 Material Safety Data Sheets (MSDS)

Contractor is required to ensure Material Safety Data Sheets are available in a readily accessible place at the Site for any material requiring a Material Safety Data Sheet per the federal "Hazard Communication" standard, or employees' "right to know" law. The Contractor is also required to ensure proper labeling on substances brought onto the job site and that any person working with the material or within the general area of the material is informed of the hazards of the substance and follows proper handling and protection procedures. Two additional copies of the Material Safety Data Sheets shall also be submitted directly to the District.

10.4 Submittals

10.4.1 Architect's favorable review shall neither be construed as a complete check nor relieve the Contractor, Subcontractor, manufacturer, fabricator, or supplier from responsibility for any deficiency that may exist or from any departures or deviations from the requirements of the Contract Documents unless the Contractor has, in writing, called Architect's attention to the deviations at the time of submission and the Architect has given specific written response. "Favorable review" shall mean merely that Architect has no objection to Contractor using, upon Contractor's own full responsibility, plan or method of Work proposed, or furnishing materials or equipment proposed.

11. SITE ACCESS, CONDITIONS, AND REQUIREMENTS

11.1 Site Investigation

Before bidding on this Work, Contractor shall make a careful investigation of the Site and thoroughly familiarize itself with the requirements of the Contract. By the act of submitting a bid for the Work included in this Contract, Contractor shall be deemed to have made a complete study and investigation, and to be familiar with and accepted the existing conditions of the Site.

Prior to commencing the Work, Contractor and the District's representative shall survey the Site to document the condition of the Site. Contractor will record the survey in digital videotape format and provide an electronic copy to the District within fourteen (14) days of the survey. This electronic record shall serve as a basis for determining any damages caused by the Contractor during the Project. The Contractor may also

document any pre-existing conditions in writing, provided that both the Contractor and the District's representative agree on said conditions and sign a memorandum documenting the same.

11.2 Soils Investigation Report

11.2.1 When a soils investigation report obtained from test holes at Site or for the Project is available, that report may be available to the Contractor but shall not be a part of this Contract and shall not alleviate or excuse the Contractor's obligation to perform its own investigation. Any information obtained from that report or any information given on Drawings as to subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only, is not guaranteed, does not form a part of this Contract, and Contractor may not rely thereon. By submitting its bid, Contractor acknowledges that it has made visual examination of Site and has made whatever tests Contractor deems appropriate to determine underground condition of soil. Although any such report is not a part of this Contract, recommendations from the report may be included in the Drawings, Specifications, or other Contract Documents. It is Contractor's sole responsibility to thoroughly review all Contract Documents, Drawings, and Specifications.

11.2.2 Contractor agrees that no claim against District will be made by Contractor for damages and hereby waives any rights to damages if, during progress of Work, Contractor encounters subsurface or latent conditions at Site materially differing from those shown on Drawings or indicated in Specifications, or for unknown conditions of an unusual nature that differ materially from those ordinarily encountered in the work of the character provided for in Plans and Specifications, except as indicated in the provisions of these General Conditions regarding trenches, trenching, and/or existing utility lines.

11.3 Access to Work

District and its representatives shall at all times have access to Work wherever it is in preparation or progress, including storage and fabrication. Contractor shall provide safe and proper facilities for such access so that District's representatives may perform their functions.

11.4 Layout and Field Engineering

11.4.1 All field engineering required for layout of this Work and establishing grades for earthwork operations shall be furnished by Contractor at its expense. This Work shall be done by a qualified, California-registered civil engineer approved in writing by District and Architect. Any required Record and/or As-Built Drawings of Site development shall be prepared by the approved civil engineer.

11.4.2 The Contractor shall be responsible for having ascertained pertinent local conditions such as location, accessibility, and general character of the Site and for having satisfied itself as to the conditions under which the Work is to be performed. Contractor shall follow best practices, including but not limited to potholing to avoid utilities. District shall not be liable for any claim for allowances because of Contractor's error, failure to follow best practices, or negligence in acquainting itself with the conditions at the Site.

11.4.3 Contractor shall protect and preserve established benchmarks and monuments and shall make no changes in locations without the prior written approval of District. Contractor shall replace any benchmarks or monuments that are lost or destroyed subsequent to proper notification of District and with District's approval.

11.5 Utilities

Utilities shall be provided as indicated in the Specifications.

11.6 Sanitary Facilities

Sanitary facilities shall be provided as indicated in the Specifications.

11.7 Surveys

Contractor shall provide surveys done by a California-licensed civil engineer surveyor to determine locations of construction, grading, and site work as required to perform the Work.

11.8 Regional Notification Center

The Contractor, except in an emergency, shall contact the appropriate regional notification center at least two (2) days prior to commencing any excavation if the excavation will be conducted in an area or in a private easement that is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the District, and obtain an inquiry identification number from that notification center. No excavation shall be commenced and/or carried out by the Contractor unless an inquiry identification number has been assigned to the Contractor or any Subcontractor and the Contractor has given the District the identification number. Any damages arising from Contractor's failure to make appropriate notification shall be at the sole risk and expense of the Contractor. Any delays caused by failure to make appropriate notification shall be at the sole risk of the Contractor and shall not be considered for an extension of the Contract Time.

11.9 Existing Utility Lines

11.9.1 Pursuant to Government Code section 4215, District assumes the responsibility for removal, relocation, and protection of main or trunk utility lines and facilities located on the construction Site at the time of commencement of construction under this Contract with respect to any such utility facilities that are not identified in the Plans and Specifications. Contractor shall not be assessed for liquidated damages for delay in completion of the Project caused by failure of District or the owner of a utility to provide for removal or relocation of such utility facilities.

11.9.2 Locations of existing utilities provided by District shall not be considered exact, but approximate within a reasonable margin and shall not relieve Contractor of responsibilities to exercise reasonable care or costs of repair due to Contractor's failure to do so. District shall compensate Contractor for the costs of locating, repairing damage not due to the failure of Contractor to exercise reasonable care, and removing or relocating such utility facilities not indicated in the Plans and Specifications with reasonable accuracy, and for equipment necessarily idle during such work.

11.9.3 No provision herein shall be construed to preclude assessment against Contractor for any other delays in completion of the Work. Nothing in this Article shall be deemed to require District to indicate the presence of existing service laterals, appurtenances, or other utility lines, within the exception of main or trunk utility lines or whenever the presence of these utilities on the Site of the construction Project can be inferred from the presence of other visible facilities, such as buildings, meter junction boxes, on or adjacent to the Site of the construction.

11.9.4 If Contractor, while performing Work under this Contract, discovers utility facilities not identified by District in Contract Plans and Specifications, Contractor shall immediately notify the District and the utility in writing. The cost of repair for damage to above-mentioned visible facilities without prior written notification to the District shall be borne by the Contractor.

11.10 Notification

Contractor understands, acknowledges and agrees that the purpose for prompt notification to the District pursuant to these provisions is to allow the District to investigate the condition(s) so that the District shall have the opportunity to decide how the District desires to proceed as a result of the condition(s). Accordingly, failure of Contractor to promptly notify the District in writing, pursuant to these provisions, shall constitute Contractor's waiver of any claim for damages or delay incurred as a result of the condition(s).

11.11 Hazardous Materials

Contractor shall comply with all provisions and requirements of the Contract Documents related to hazardous materials including, without limitation, Hazardous Materials Procedures and Requirements.

11.12 No Signs

Neither the Contractor nor any other person or entity shall display any signs not required by law or the Contract Documents at the Site, fences trailers, offices, or elsewhere on the Site without specific prior written approval of the District.

12. TRENCHES

12.1 Trenches Greater Than Five Feet

Pursuant to Labor Code section 6705, if the Contract Price exceeds \$25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall, in advance of excavation, promptly submit to the District and/or a registered civil or structural engineer employed by the District or Architect, a detailed plan, stamped by a licensed engineer retained by the Contractor, showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

12.2 Excavation Safety

If such plan varies from the Shoring System Standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer, but in no case shall such plan be less effective than that required by the Construction Safety

Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted by the District or by the person to whom authority to accept has been delegated by the District.

12.3 No Tort Liability of District

Pursuant to Labor Code section 6705, nothing in this Article shall impose tort liability upon the District or any of its employees.

12.4 No Excavation without Permits

The Contractor shall not commence any excavation Work until it has secured all necessary permits including the required CalOSHA excavation/shoring permit. Any permits shall be prominently displayed on the Site prior to the commencement of any excavation.

12.5 Discovery of Hazardous Waste and/or Unusual Conditions

12.5.1 Pursuant to Public Contract Code section 7104, if the Work involves digging trenches or other excavations that extend deeper than four feet below the Surface, the Contractor shall promptly, and before the following conditions are disturbed, notify the District, in writing, of any:

12.5.1.1 Material that the Contractor believes may be material that is hazardous waste, as defined in section 25117 of the Health and Safety Code, is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

12.5.1.2 Subsurface or latent physical conditions at the Site differing from those indicated.

12.5.1.3 Unknown physical conditions at the Site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

12.5.2 The District shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work, shall issue a Change Order under the procedures described herein.

12.5.3 In the event that a dispute arises between District and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all work to be performed under the Contract. The Contractor shall retain any and all rights provided either by Contract or by law that pertain to the resolution of disputes and protests.

13. INSURANCE AND BONDS

13.1 Insurance

Unless different provisions and/or limits are indicated in the Special Conditions, all insurance required of Contractor and/or its Subcontractor(s) shall be at least as broad as the amounts and include the provisions set forth herein.

13.1.1 Commercial General Liability and Automobile Liability Insurance

13.1.1.1 Contractor shall procure and maintain, during the life of this Contract, Commercial General Liability Insurance and Automobile Liability Insurance that shall protect Contractor, District, State, Construction Manager(s), Project Inspector(s), and Architect(s) from all claims for bodily injury, property damage, personal injury, death, advertising injury, and medical payments arising from, or in connection with, operations under this Contract. This coverage shall be provided in a form at least as broad as Insurance Services (ISO) Form CG 0001 11188. Contractor shall ensure that Products Liability and Completed Operations coverage, Fire Damage Liability coverage, and Automobile Liability Insurance coverage including owned, non-owned, and hired automobiles, are included within the above policies and at the required limits, or Contractor shall procure and maintain these coverages separately.

13.1.1.2 Contractor's deductible or self-insured retention for its Commercial General Liability Insurance policy shall not exceed \$25,000 unless approved in writing by District.

13.1.1.3 All such policies shall be written on an occurrence form.

13.1.2 Excess Liability Insurance

13.1.2.1 If Contractor's underlying policy limits are less than required, subject to the District's sole discretion, Contractor may procure and maintain, during the life of this Contract, an Excess Liability Insurance Policy to meet the policy limit requirements of the required policies in order to satisfy, in the aggregate with its underlying policy, the insurance requirements herein..

13.1.2.2 There shall be no gap between the per occurrence amount of any underlying policy and the start of the coverage under the Excess Liability Insurance Policy. Any Excess Liability Insurance Policy shall be written on a following form and shall protect Contractor, District, State, Construction Manager(s), Project Manager(s), and Architect(s) in amounts and including the provisions as set forth in the Supplementary Conditions (if any) and/or Special Conditions, and that complies with all requirements for Commercial General Liability and Automobile Liability and Employers' Liability Insurance.

13.1.2.3 The District, in its sole discretion, may accept the Excess Liability Insurance Policy that brings Contractor's primary limits to the minimum requirements herein.

13.1.3 Subcontractor(s): Contractor shall require its Subcontractor(s), if any, to procure and maintain Commercial General Liability Insurance, Automobile Liability Insurance, and Excess Liability Insurance (if Subcontractor elects to satisfy, in part

the insurance required herein by procuring and maintaining an Excess Liability Insurance Policy) with forms of coverage and limits equal to the amounts required of the Contractor.

13.1.4 Workers' Compensation and Employers' Liability Insurance

13.1.4.1 In accordance with provisions of section 3700 of the California Labor Code, the Contractor and every Subcontractor shall be required to secure the payment of compensation to its employees.

13.1.4.2 Contractor shall procure and maintain, during the life of this Contract, Workers' Compensation Insurance and Employers' Liability Insurance for all of its employees engaged in work under this Contract, on/or at the Site of the Project. This coverage shall cover, at a minimum, medical and surgical treatment, disability benefits, rehabilitation therapy, and survivors' death benefits. Contractor shall require its Subcontractor(s), if any, to procure and maintain Workers' Compensation Insurance and Employers' Liability Insurance for all employees of Subcontractor(s). Any class of employee or employees not covered by a Subcontractor's insurance shall be covered by Contractor's insurance. If any class of employee or employee engaged in Work under this Contract, on or at the Site of the Project, is not protected under the Workers' Compensation Insurance, Contractor shall provide, or shall cause a Subcontractor to provide, adequate insurance coverage for the protection of any employee(s) not otherwise protected before any of those employee(s) commence work.

13.1.5 Builder's Risk Insurance: Builder's Risk "All Risk" Insurance

Contractor shall procure and maintain, during the life of this Contract, Builder's Risk (Course of Construction), or similar first party property coverage acceptable to the District, issued on a replacement cost value basis. The cost shall be consistent with the total replacement cost of all insurable Work of the Project included within the Contract Documents. Coverage is to insure against all risks of accidental physical loss and shall include without limitation the perils of vandalism and/or malicious mischief (both without any limitation regarding vacancy or occupancy), sprinkler leakage, civil authority, theft, sonic disturbance, earthquake, flood, collapse, wind, rain, dust, fire, war, terrorism, lightning, smoke, and rioting. Coverage shall include debris removal, demolition, increased costs due to enforcement of all applicable ordinances and/or laws in the repair and replacement of damaged and undamaged portions of the property, and reasonable costs for the Architect's and engineering services and expenses required as a result of any insured loss upon the Work and Project, including completed Work and Work in progress, to the full insurable value thereof.

13.1.6 Pollution Liability Insurance

13.1.6.1 Contractor shall procure and maintain Pollution Liability Insurance that shall protect Contractor, District, State, Construction Manager(s), Project Inspector(s), and Architect(s) from all claims for bodily injury, property damage, including natural resource damage, cleanup costs, removal, storage, disposal, and/or use of the pollutant arising from operations under this Contract, and defense, including costs and expenses incurred in the investigation, defense, or settlement of claims. Coverage shall apply to sudden and/or gradual pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids,

alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants, including asbestos. This coverage shall be provided in a form at least as broad as Insurance Services Offices, Inc. (ISO) Form CG 2415, or Contractor shall procure and maintain these coverages separately.

13.1.6.2 Contractor warrants that any retroactive date applicable to coverage under the policy shall predate the effective date of the Contract and that continuous coverage will be maintained or an extended reporting or discovery period will be exercised for a period of three (3) years, beginning from the time that the Work under the Contract is completed.

13.1.6.3 If Contractor is responsible for removing any pollutants from a site, then Contractor shall ensure that Any Auto, including owned, non-owned, and hired, is included within the above policies and at the required limits, to cover its automobile exposure from transporting the pollutants from the site to an approved disposal site. This coverage shall include the Motor Carrier Act Endorsement, MCS 90.

13.1.7 Proof of Insurance and Other Requirements: Endorsements and Certificates

13.1.7.1 Contractor shall not commence Work nor shall it allow any Subcontractor to commence Work under this Contract, until Contractor and its Subcontractor(s) have procured all required insurance and Contractor has delivered in duplicate to the District complete endorsements (or entire insurance policies) and certificates indicating the required coverages have been obtained, and the District has approved these documents.

13.1.7.2 Endorsements, certificates, and insurance policies shall include the following:

13.1.7.2.1 A clause stating the following, or other language acceptable to the District:

"This policy shall not be canceled until written notice to District, Architect, and Construction Manager stating date of the cancellation by the insurance carrier. Date of cancellation may not be less than thirty (30) days after date of mailing notice."

13.1.7.2.2 Language stating in particular those insured, extent of insurance, location and operation to which insurance applies, expiration date, to whom cancellation and reduction notice will be sent, and length of notice period.

13.1.7.2.3 All endorsements, certificates and insurance policies shall state that District, its trustees, employees and agents, the State of California, Construction Manager(s), Project Manager(s), Inspector(s) and Architect(s) are named additional insureds under all policies except Workers' Compensation Insurance and Employers' Liability Insurance.

13.1.7.2.4 All endorsements shall waive any right to subrogation against any of the named additional insureds.

13.1.7.2.5 Contractor's and Subcontractors' insurance policy(s) shall be primary and non-contributory to any insurance or self-insurance maintained by District, its trustees, employees and/or agents, the State of California, Construction Manager(s), Project Manager(s), Inspector(s), and/or Architect(s).

13.1.7.2.6 Contractor's insurance limit shall apply separately to each insured against whom a claim is made or suit is brought.

13.1.7.3 No policy shall be amended, canceled or modified, and the coverage amounts shall not be reduced, until Contractor or Contractor's broker has provided written notice to District, Architect(s), and Construction Manager(s) stating date of the amendment, modification, cancellation or reduction, and a description of the change. Date of amendment, modification, cancellation or reduction may not be less than thirty (30) days after date of mailing notice.

13.1.7.4 Insurance written on a "claims made" basis shall be retroactive to a date that coincides with or precedes Contractor's commencement of Work, including subsequent policies purchased as renewals or replacements. Said policy is to be renewed by the Contractor and all Subcontractors for a period of five (5) years following completion of the Work or termination of this Agreement. Such insurance must have the same coverage and limits as the policy that was in effect during the term of this Agreement, and will cover the Contractor and all Subcontractors for all claims made.

13.1.7.5 Unless otherwise stated in the Special Conditions, all of Contractor's insurance shall be with insurance companies with an A.M. Best rating of no less than **A: VII**.

13.1.7.6 The insurance requirements set forth herein shall in no way limit the Contractor's liability arising out of or relating to the performance of the Work or related activities.

13.1.7.7 Failure of Contractor and/or its Subcontractor(s) to comply with the insurance requirements herein shall be deemed a material breach of the Contract.

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13.1.8 Insurance Policy Limits

13.1.8.1 Unless different limits are indicated in the Special Conditions, the limits of insurance shall not be less than the following amounts:

Commercial General Liability	Product Liability and Completed Operations, Fire Damage Liability – Split Limit	\$2,000,000 per occurrence; \$4,000,000 aggregate
Automobile Liability	Any Auto – Combined Single Limit	\$1,000,000
Workers’ Compensation		Statutory limits pursuant to State law
Employers’ Liability		\$1,000,000
Builder’s Risk (Course of Construction)		Issued for the value and scope of Work indicated herein.
Pollution Liability		\$1,000,000 per claim; \$2,000,000 aggregate

13.1.8.2 If Contractor normally carries insurance in an amount greater than the minimum amounts required by District, that greater amount shall become the minimum required amount of insurance for purposes of the Contract. Therefore, Contractor hereby acknowledges and agrees that all insurance carried by it shall be deemed liability coverage for all actions it performs in connection with the Contract.

13.2 Contract Security - Bonds

13.2.1 Contractor shall furnish two surety bonds issued by a California admitted surety insurer as follows:

13.2.1.1 Performance Bond: A bond in an amount at least equal to one hundred percent (100%) of Contract Price as security for faithful performance of this Contract.

13.2.1.2 Payment Bond: A bond in an amount at least equal to one hundred percent (100%) of the Contract Price as security for payment of persons performing labor and/or furnishing materials in connection with this Contract.

13.2.2 Cost of bonds shall be included in the Bid and Contract Price.

13.2.3 All bonds related to this Project shall be in the forms set forth in these Contract Documents and shall comply with all requirements of the Contract Documents, including, without limitation, the bond forms.

14. WARRANTY/GUARANTEE/INDEMNITY

14.1 Warranty/Guarantee

14.1.1 The Contractor shall obtain and preserve for the benefit of the District, manufacturer's warranties on materials, fixtures, and equipment incorporated into the Work.

14.1.2 In addition to guarantees required elsewhere, Contractor shall, and hereby does guarantee and warrant all Work furnished on the job against all defects for a period of **TWO years** after the later of the following dates, unless a longer period is provided for in the Contract Documents:

14.1.2.1 The acceptance by the District's governing board of the Work, subject to these General Conditions, or

14.1.2.2 The date that commissioning for the Project, if any, was completed.

At the District's sole option, Contractor shall repair or replace any and all of that Work, together with any other Work that may be displaced in so doing, that may prove defective in workmanship and/or materials within a **TWO (2)** year period from date of completion as defined above, unless a longer period is provided for in the Contract Documents, without expense whatsoever to District. In the event of failure of Contractor and/or Surety to commence and pursue with diligence said replacements or repairs within ten (10) days after being notified in writing, Contractor and Surety hereby acknowledge and agree that District is authorized to proceed to have defects repaired and made good at expense of Contractor and/or Surety who hereby agree to pay costs and charges therefore immediately on demand.

14.1.3 If, in the opinion of District, defective work creates a dangerous condition or requires immediate correction or attention to prevent further loss to District or to prevent interruption of District operations, District will attempt to give the notice required above. If Contractor or Surety cannot be contacted or neither complies with District's request for correction within a reasonable time as determined by District, District may, notwithstanding the above provision, proceed to make any and all corrections and/or provide attentions the District believes are necessary. The costs of correction or attention shall be charged against Contractor and Surety of the guarantees provided in this Article or elsewhere in this Contract.

14.1.4 The above provisions do not in any way limit the guarantees on any items for which a longer guarantee is specified or on any items for which a manufacturer gives a guarantee for a longer period. Contractor shall furnish to District all appropriate guarantee or warranty certificates as indicated in the Specifications or upon request by District.

14.1.5 Nothing herein shall limit any other rights or remedies available to District.

14.2 Indemnity and Defense

14.2.1 To the furthest extent permitted by California law, the Contractor shall indemnify, keep and hold harmless the District, the Architect(s), and the Construction Manager(s), their respective consultants, separate contractors, board

members, officers, representatives, agents, and employees, in both individual and official capacities ("Indemnitees"), against all suits, claims, injury, damages, losses, and expenses ("Claims"), including but not limited to attorney's fees, caused by, arising out of, resulting from, or incidental to, in whole or in part, the performance of the Work under this Contract by the Contractor, its Subcontractors, vendors, or suppliers. However, the Contractor's indemnification and hold harmless obligation shall be reduced by the proportion of the Indemnitees' and/or Architect's liability to the extent the Claim(s) is/are caused by the sole negligence, active negligence, or willful misconduct of the Indemnitees, and/or defects in design furnished by the Architect, as found by a court or arbitrator of competent jurisdiction. This indemnification and hold harmless obligation of the Contractor shall not be construed to negate, abridge, or otherwise reduce any right or obligation of indemnity that would otherwise exist or arise as to any Indemnitee or other person described herein. This indemnification and hold harmless obligation includes, but is not limited to, any failure or alleged failure by Contractor to comply with any provision of law, any failure or alleged failure to timely and properly fulfill all of its obligations under the Contract Documents in strict accordance with their terms, and without limitation, any failure or alleged failure of Contractor's obligations regarding any stop payment notice actions or liens, including Civil Wage and Penalty Assessments and/or Orders by the DIR.

14.2.2 To the furthest extent permitted by California law, Contractor shall also defend Indemnitees, at its own expense, including but not limited to attorneys' fees and costs, against all Claims caused by, arising out of, resulting from, or incidental to, in whole or in part, the performance of the Work under this Contract by the Contractor, its Subcontractors, vendors, or suppliers. However, without impacting Contractor's obligation to provide an immediate and ongoing defense of Indemnitees, the Contractor's defense obligation shall be retroactively reduced by the proportion of the Indemnitees' and/or Architect's liability to the extent caused by the sole negligence, active negligence, or willful misconduct of the Indemnitees, and/or defects in design furnished by the Architect, as found by a court or arbitrator of competent jurisdiction. The District shall have the right to accept or reject any legal representation that Contractor proposes to defend the Indemnitees. If any Indemnitee provides its own defense due to failure to timely respond to tender of defense, rejection of tender of defense, or conflict of interest of proposed counsel, Contractor shall reimburse such Indemnitee for any expenditures. Contractor's defense obligation shall not be construed to negate, abridge, or otherwise reduce any right or obligation of defense that would otherwise exist as to any Indemnitee or other person described herein. Contractor's defense obligation includes, but is not limited to, any failure or alleged failure by Contractor to comply with any provision of law, any failure or alleged failure to timely and properly fulfill all of its obligations under the Contract Documents in strict accordance with their terms, and without limitation, any failure or alleged failure of Contractor's obligations regarding any stop payment notice actions or liens, including Civil Wage and Penalty Assessments and/or Orders by the DIR. The Contractor shall give prompt notice to the District in the event of any Claim(s).

14.2.3 Without limitation of the provisions herein, if the Contractor's obligation to indemnify and hold harmless the Indemnitees or its obligation to defend Indemnitees as provided herein shall be determined to be void or unenforceable, in whole or in part, it is the intention of the parties that these circumstances shall not otherwise affect the validity or enforceability of the Contractor's agreement to indemnify, defend, and hold harmless the rest of the Indemnitees, as provided herein. Further,

the Contractor shall be and remain fully liable on its agreements and obligations herein to the fullest extent permitted by law.

14.2.4 Pursuant to Public Contract Code section 9201, the District shall provide timely notification to Contractor of the receipt of any third-party Claim relating to this Contract. The District shall be entitled to recover its reasonable costs incurred in providing said notification.

14.2.5 In any and all Claims against any of the Indemnitees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the Contractor's indemnification obligation herein shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

14.2.6 The District may retain so much of the moneys due the Contractor as shall be considered necessary, until disposition of any such Claims or until the District, Architect(s) and Construction Manager(s) have received written agreement from the Contractor that they will unconditionally defend the District, Architect(s) and Construction Manager(s), their respective officers, agents and employees, and pay any damages due by reason of settlement or judgment.

14.2.7 The Contractor's defense and indemnification obligations hereunder shall survive the completion of Work, the warranty/guarantee period, and the termination of the Contract.

15. TIME

15.1 Notice to Proceed

15.1.1 District may issue a Notice to Proceed within ninety (90) days from the date of the Notice of Award. Once Contractor has received the Notice to Proceed, Contractor shall complete the Work within the period of time indicated in the Contract Documents.

15.1.2 In the event that the District desires to postpone issuing the Notice to Proceed beyond ninety (90) days from the date of the Notice of Award, it is expressly understood that with reasonable notice to the Contractor, the District may postpone issuing the Notice to Proceed. It is further expressly understood by Contractor that Contractor shall not be entitled to any claim of additional compensation as a result of the postponement of the issuance of the Notice to Proceed.

15.1.3 If the Contractor believes that a postponement of issuance of the Notice to Proceed will cause a hardship to Contractor, Contractor may terminate the Contract. Contractor's termination due to a postponement shall be by written notice to District within ten (10) days after receipt by Contractor of District's notice of postponement. It is further understood by Contractor that in the event that Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay Contractor for the Work that Contractor had performed at the time of notification of postponement. Should Contractor terminate the Contract as a result of a notice of postponement, District shall have the authority to award the Contract to the next lowest responsive responsible bidder.

15.2 Computation of Time / Adverse Weather

15.2.1 The Contractor will only be allowed a time extension for Adverse Weather conditions if requested by Contractor in compliance with the time extension request procedures and only if all of the following conditions are met:

15.2.1.1 The weather conditions constitute Adverse Weather, as defined herein;

15.2.1.2 Contractor can verify that the Adverse Weather caused delays in excess of five (5) hours of the indicated labor required to complete the scheduled tasks of Work on the day affected by the Adverse Weather;

15.2.1.3 The Contractor's crew is dismissed as a result of the Adverse Weather;

15.2.1.4 Said delay adversely affects the critical path in the Construction Schedule; and

15.2.1.5 Exceeds twelve (12) days of delay per year.

15.2.2 If the aforementioned conditions are met, a non-compensable day-for-day extension will only be allowed for those days in excess of those indicated herein.

15.2.3 The Contractor shall work seven (7) days per week, if necessary, irrespective of inclement weather, to maintain access and the Construction Schedule, and to protect the Work under construction from the effects of Adverse Weather, all at no further cost to the District.

15.2.4 The Contract Time has been determined with consideration given to the average climate weather conditions prevailing in the County in which the Project is located.

15.3 Hours of Work

15.3.1 Sufficient Forces

Contractor and Subcontractors shall continuously furnish sufficient and competent work forces with the required levels of familiarity with the Project and skill, training and experience to ensure the prosecution of the Work in accordance with the Construction Schedule.

15.3.2 Performance During Working Hours

Work shall be performed during regular working hours as permitted by the appropriate governmental agency except that in the event of an emergency, or when required to complete the Work in accordance with job progress, Work may be performed outside of regular working hours with the advance written consent of the District and approval of any required governmental agencies.

15.3.3 No Work during State Testing

Contractor shall, at no additional cost to the District and at the District's request, coordinate its Work to not disturb District students including, without limitation, not performing any Work when students at the Site are taking State or Federally-

required tests. The District or District's Representative will provide Contractor with a schedule of test dates concurrent with the District's issuance of the Notice to Proceed, or as soon as test dates are made available to the District.

15.4 Progress and Completion

15.4.1 Time of the Essence

Time limits stated in the Contract Documents are of the essence to the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

15.4.2 No Commencement Without Insurance or Bonds

The Contractor shall not commence operations on the Project or elsewhere prior to the effective date of insurance and bonds. The date of commencement of the Work shall not be changed by the effective date of such insurance or bonds. If Contractor commences Work without insurance and bonds, all Work is performed at Contractor's peril and shall not be compensable until and unless Contractor secures bonds and insurance pursuant to the terms of the Contract Documents and subject to District claim for damages.

15.5 Schedule

Contractor shall provide to District, Construction Manager, and Architect a schedule in conformance with the Contract Documents and as required in the Notice to Proceed and the Contractor's Submittals and Schedules section of these General Conditions.

15.6 Expeditious Completion

The Contractor shall proceed expeditiously with adequate forces and shall achieve Completion within the Contract Time.

16. EXTENSIONS OF TIME – LIQUIDATED DAMAGES

16.1 Liquidated Damages

Contractor and District hereby agree that the exact amount of damages for failure to complete the Work within the time specified is extremely difficult or impossible to determine. If the Work is not completed within the time specified in the Contract Documents, it is understood that the District will suffer damage. It being impractical and unfeasible to determine the amount of actual damage, it is agreed the Contractor shall pay to District as fixed and liquidated damages, and not as a penalty, the amount set forth in the Agreement for each calendar day of delay in completion. Contractor and its Surety shall be liable for the amount thereof pursuant to Government Code section 53069.85.

16.2 Excusable Delay

16.2.1 Contractor shall not be charged for liquidated damages because of any delays in completion of the Work which are not the fault of Contractor or its Subcontractors, including acts of God as defined in Public Contract Code section 7105, acts of enemy, epidemics, and quarantine restrictions. Contractor shall, within

five (5) calendar days of beginning of any delay, notify District in writing of causes of delay including documentation and facts explaining the delay and the direct correlation between the cause and effect. District shall review the facts and extent of any delay and shall grant extension(s) of time for completing Work when, in its judgment, the findings of fact justify an extension. Extension(s) of time shall apply only to that portion of Work affected by delay, and shall not apply to other portions of Work not so affected. An extension of time may only be granted if Contractor has timely submitted the Construction Schedule as required herein.

16.2.2 Contractor shall notify the District pursuant to the claims provisions in these General Conditions of any anticipated delay and its cause. Following submission of a claim, the District may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the Work might be delayed thereby.

16.2.3 In the event the Contractor requests an extension of Contract Time for unavoidable delay, such request shall be submitted in accordance with the provisions in the Contract Documents governing changes in Work. When requesting time, requests must be submitted with full justification and documentation. If the Contractor fails to submit justification, it waives its right to a time extension at a later date. Such justification must be based on the official Construction Schedule as updated at the time of occurrence of the delay or execution of Work related to any changes to the Scope of Work. Any claim for delay must include the following information as support, without limitation:

16.2.3.1 The duration of the activity relating to the changes in the Work and the resources (manpower, equipment, material, etc.) required to perform the activities within the stated duration.

16.2.3.2 Specific logical ties to the Contract Schedule for the proposed changes and/or delay showing the activity/activities in the Construction Schedule that are affected by the change and/or delay. In particular, Contractor must show an actual impact to the schedule, after making a good faith effort to mitigate the delay by rescheduling the work, by providing an analysis of the schedule ("Time Impact Analysis"). Such Time Impact Analysis shall describe in detail the cause and effect of the delay and the impact on the critical dates in the Project schedule. (A portion of any delay of seven (7) days or more must be provided.)

16.2.3.3 A recovery schedule must be submitted within twenty (20) calendar days of written notification to the District of causes of delay.

16.3 No Additional Compensation for Delays Within Contractor's Control

16.3.1 Contractor is aware that governmental agencies, including, without limitation, the Division of the State Architect, the Department of General Services, gas companies, electrical utility companies, water districts, and other agencies may have to approve Contractor-prepared drawings or approve a proposed installation. Accordingly, Contractor shall include in its bid, time for possible review of its drawings and for reasonable delays and damages that may be caused by such agencies. Thus, Contractor is not entitled to make a claim for damages or delays arising from the review of Contractor's drawings.

16.3.2 Contractor shall only be entitled to compensation for delay when all of the following conditions are met:

16.3.2.1 The District is responsible for the delay;

16.3.2.2 The delay is unreasonable under the circumstances involved;

16.3.2.3 The delay was not within the contemplation of the District and Contractor;

16.3.2.4 The delay could not have been avoided or mitigated by Contractor's reasonable diligence; and

16.3.2.5 Contractor timely complies with the claims procedure of the Contract Documents.

16.3.3 Where a change in the Work extends the Contract Time, Contractor may request and recover additional, actual direct costs, provided that Contractor can demonstrate such additional costs are:

16.3.3.1 Actually incurred performing the Work;

16.3.3.2 Not compensated by the Markup allowed; and

16.3.3.3 Directly result from the extended Contract Time.

Contractor shall comply with all required procedures, documentation and time requirements in the Contract Documents. Contractor may not seek or recover such costs using formulas (e.g. Eichleay, labor factors).

16.4 Float or Slack in the Schedule

Float or slack is the amount of time between the early start date and the late start date, or the early finish date and the late finish date, of any of the activities in the schedule. Float or slack is not for the exclusive use of or benefit of either the District or the Contractor, but its use shall be determined solely by the District.

17. CHANGES IN THE WORK

17.1 No Changes Without Authorization

17.1.1 There shall be no change whatsoever in the Drawings, Specifications, or in the Work without an executed Change Order or a written Construction Change Directive authorized by the District as herein provided. District shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the District's governing board has authorized the same and the cost thereof has been approved in writing by Change Order or Construction Change Directive in advance of the changed Work being performed. No extension of time for performance of the Work shall be allowed hereunder unless claim for such extension is made at the time changes in the Work are ordered, and such time duly adjusted and approved in writing in the Change Order or Construction Change Directive. Contractor shall be responsible for any costs incurred by the District for professional services and DSA fees and/or delay to

the Project Schedule, if any, for DSA to review any request for changes to the DSA approved plans and specifications for the convenience of the Contractor and/or to accommodate the Contractor's means and methods. The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications.

17.1.2 Contractor shall perform immediately all work that has been authorized by a fully executed Change Order or Construction Change Directive. Contractor shall be fully responsible for any and all delays and/or expenses caused by Contractor's failure to expeditiously perform this Work.

17.1.3 Should any Change Order result in an increase in the Contract Price or extend the Contract Time, the cost of or length of extension in that Change Order shall be agreed to, in writing, by the District in advance of the Work by Contractor, and shall be subject to the monetary limitations set forth in Public Contract Code section 20118.4. In the event that Contractor proceeds with any change in Work without a Change Order executed by the District or Construction Change Directive, Contractor waives any claim of additional compensation or time for that additional work. Under no circumstances shall Contractor be entitled to any claim of additional compensation or time not expressly requested by Contractor in a Proposed Change Order or approved by District in an executed Change Order.

17.1.4 A Change Order or Construction Change Directive will become effective when approved by the Board, notwithstanding that Contractor has not signed it. A Change Order or Construction Change Directive will become effective without Contractor's signature provided District indicates it as a "Unilateral Change Order". Any dispute as to the adjustment in the Contract Price or Contract Time, if any, of the Unilateral Change Order shall be resolved pursuant to the Payment and Claims and Disputes provisions herein.

17.1.5 Contractor understands, acknowledges, and agrees that the reason for District authorization is so that District may have an opportunity to analyze the Work and decide whether the District shall proceed with the Change Order or alter the Project so that a change in Work becomes unnecessary.

17.2 Architect Authority

The Architect will have authority to order minor changes in the Work not involving any adjustment in the Contract Price, or an extension of the Contract Time, or a change that is inconsistent with the intent of the Contract Documents. These changes shall be effected by written Change Order, Construction Change Directive, by Architect's response(s) to RFI(s), or by Architect's Supplemental Instructions ("ASI").

17.3 Change Orders

17.3.1 A Change Order is a written instrument prepared and issued by the District and/or the Architect and signed by the District (as authorized by the District's Governing Board), the Contractor, the Architect, and approved by the Project Inspector (if necessary) and DSA (if necessary), stating their agreement regarding all of the following:

17.3.1.1 A description of a change in the Work;

17.3.1.2 The amount of the adjustment in the Contract Price, if any; and

17.3.1.3 The extent of the adjustment in the Contract Time, if any.

17.4 **Construction Change Directives**

17.4.1 A Construction Change Directive is a written order prepared and issued by the District, the Construction Manager, and/or the Architect and signed by the District and the Architect, directing a change in the Work. The District may, as provided by law, by Construction Change Directive and without invalidating the Contract, order changes in the Work consisting of additions, deletions, or other revisions. The adjustment to the Contract Price or Time, if any, is subject to the provisions of this section regarding Changes in the Work. If all or a portion of the Project is being funded by funds requiring approval by the State Allocation Board ("SAB"), these revisions may be subject to compensation once approval of same is received and funded by the SAB, and funds are released by the Office of Public School Construction ("OPSC"). Any dispute as to the adjustment in the Contract Price, if any, of the Construction Change Directive or timing of payment shall be resolved pursuant to the Payment and Claims and Disputes provisions herein.

17.4.2 The District may issue a Construction Change Directive in the absence of agreement on the terms of a Change Order.

17.5 **Force Account Directives**

17.5.1 When work, for which a definite price has not been agreed upon in advance, is to be paid for on a force account basis, all direct costs necessarily incurred and paid by the Contractor for labor, material, and equipment used in the performance of that Work, shall be subject to the approval of the District and compensation will be determined as set forth herein.

17.5.2 The District will issue a Force Account Directive to proceed with the Work on a force account basis, and a not-to-exceed budget will be established by the District.

17.5.3 All requirements regarding direct cost for labor, labor burden, material, equipment, and markups on direct costs for overhead and profit described in this section shall apply to Force Account Directives. However, the District will only pay for actual costs verified in the field by the District or its authorized representative(s) on a daily basis.

17.5.4 The Contractor shall be responsible for all cost related to the administration of Force Account Directive. The markup for overhead and profit for Contractor modifications shall be full compensation to the Contractor to administer Force Account Directive, and Contractor shall not be entitled to separately recover additional amounts for overhead and/or profit.

17.5.5 The Contractor shall notify the District or its authorized representative(s) at least twenty-four (24) hours prior to proceeding with any of the force account work. Furthermore, the Contractor shall notify the District when it has consumed eighty percent (80%) of the budget, and shall not exceed the budget unless specifically authorized in writing by the District. The Contractor will not be compensated for force account work in the event that the Contractor fails to timely

notify the District regarding the commencement of force account work, or exceeding the force account budget.

17.5.6 The Contractor shall diligently proceed with the work, and on a daily basis, submit a daily force account report using Document 00 63 47, "Daily Force Account Report," no later than 5:00 p.m. each day. The report shall contain a detailed itemization of the daily labor, material, and equipment used on the force account work only. The names of the individuals performing the force account work shall be included on the daily force account reports. The type and model of equipment shall be identified and listed. The District will review the information contained in the reports, and sign the reports no later than the next work day, and return a copy of the report to the Contractor for their records. The District will not sign, nor will the Contractor receive compensation for work the District cannot verify. The Contractor will provide a weekly force account summary indicating the status of each Force Account Directive in terms of percent complete of the not-to-exceed budget and the estimated percent complete of the work.

17.5.7 In the event the Contractor and the District reach a written agreement on a set cost for the work while the work is proceeding based on a Force Account Directive, the Contractor's signed daily force account reports shall be discontinued and all previously signed reports shall be invalid.

17.6 Price Request

17.6.1 Definition of Price Request

A Price Request is a written request prepared by the Architect requesting the Contractor to submit to the District and the Architect an estimate of the effect of a proposed change in the Work on the Contract Price and the Contract Time.

17.6.2 Scope of Price Request

A Price Request shall contain adequate information, including any necessary Drawings and Specifications, to enable Contractor to provide the cost breakdowns required herein. The Contractor shall not be entitled to any additional compensation for preparing a response to a Price Request, whether ultimately accepted or not.

17.7 Proposed Change Order

17.7.1 Definition of Proposed Change Order

A Proposed Change Order ("PCO") is a written request prepared by the Contractor requesting that the District and the Architect issue a Change Order based upon a proposed change to the Work.

17.7.2 Changes in Contract Price

A PCO shall include breakdowns and backup documentation pursuant to the revisions herein and sufficient, in the District's judgment, to validate any change in Contract Price. In no case shall Contractor or any of its Subcontractors be permitted to reserve rights for additional compensation for Change Order Work.

17.7.3 Changes in Time

A PCO shall also include any changes in time required to complete the Project. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Construction Schedule as defined in the Contract Documents. The Contractor shall justify the proposed change in time by submittal of a schedule analysis that accurately shows the impact of the change on the critical path of the Construction Schedule ("Time Impact Analysis"). If Contractor fails to request a time extension in a PCO, including the Time Impact Analysis, then the Contractor is thereafter precluded from requesting, and waives any right to request, additional time and/or claim a delay. In no case shall Contractor or any of its Subcontractors be permitted to reserve rights for additional time for Change Order Work. A PCO that leaves the amount of time requested blank, or states that such time requested is "to be determined", is not permitted and shall also constitute a waiver of any right to request additional time and/or claim a delay.

17.7.4 Unknown and/or Unforeseen Conditions

If there is an Allowance, then Contractor must submit a Request for Allowance Expenditure Directive, including supporting documentation as described below, to receive authorization for the release of funds from the Allowance. Allowance Expenditure Directives shall be based on Contractor's costs, without overhead and profit, for products, delivery, installation, labor, insurance, payroll, taxes, bonding and equipment rental will be included in Allowance Expenditure Directive authorizing expenditure of funds from this Allowance. No overhead and profit shall be added to the Allowance Expenditure Directive. If cost of the unforeseen condition(s) exceed the Allowance, Contractor must submit a PCO for amounts in excess of the Allowance requesting an increase in Contract Price and/or Contract Time that is based at least partially on Contractor's assertion that Contractor has encountered unknown and/or unforeseen condition(s) on the Project, then Contractor shall base the PCO on provable information that, beyond a reasonable doubt and to the District's satisfaction, demonstrates that the unknown and/or unforeseen condition(s) were actually unknown and/or unforeseen and that the condition(s) were reasonably unknown and/or unforeseen. If not, the District shall deny the PCO as unsubstantiated, and the Contractor shall complete the Project without any increase in Contract Price and/or Contract Time based on that PCO.

17.7.5 Time to Submit Proposed Change Order

Contractor shall submit its PCO within five (5) working days of the date Contractor discovers, or reasonably should have discovered, the circumstances giving rise to the PCO, unless additional time to submit a PCO is granted in writing by the District. Time is of the essence in Contractor's submission of PCOs so that the District can promptly investigate the basis for the PCO. Accordingly, if Contractor fails to submit its PCO within this timeframe, Contractor waives, releases, and discharges any right to assert or claim any entitlement to an adjustment of the Contract Price and/or Time based on circumstances giving rise to the PCO.

17.7.6 Proposed Change Order Certification

In submitting a PCO, Contractor certifies and affirms that the cost and/or time request is submitted in good faith, that the cost and/or time request is accurate and in accordance with the provisions of the Contract Documents, and the Contractor

submits the cost and/or request for extension of time recognizing the significant civil penalties and treble damages which follow from making a false claim or presenting a false claim under Government Code section 12650 et seq.

It is expressly understood that the value of the extra Work or changes expressly includes any and all of the Contractor's costs and expenses, direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project including, without limitation, cumulative impacts. Contractor is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

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17.8 Format for Proposed Change Order

17.8.1 The following format shall be used as applicable by the District and the Contractor (e.g. Change Orders, PCO’s) to communicate proposed additions and deductions to the Contract, supported by attached documentation. Any spaces left blank will be deemed no change to cost or time.

	<u>WORK PERFORMED OTHER THAN BY CONTRACTOR</u>	<u>ADD</u>	<u>DEDUCT</u>
(a)	<u>Material</u> (attach suppliers’ invoice or itemized quantity and unit cost plus sales tax)		
(b)	<u>Add Labor</u> (attach itemized hours and rates, fully Burdened, and specify the hourly rate for each additional labor burden, for example, payroll taxes, fringe benefits, etc.)		
(c)	<u>Add Equipment</u> (attach suppliers’ invoice)		
(d)	<u>Subtotal</u>		
(e)	<u>Add Overhead and Profit for any and all tiers of Subcontractor</u> , the total not to exceed ten percent (10%) of Item (d)		
(f)	<u>Subtotal</u>		
(g)	<u>Add General Conditions Cost</u> (if Time is Compensable) (attach supporting documentation)		
(h)	<u>Subtotal</u>		
(i)	<u>Add Overhead and Profit for Contractor</u> , not to exceed five percent (5%) of Item (h)		
(j)	<u>Subtotal</u>		
(k)	<u>Add Bond and Insurance</u> , not to exceed two percent (2%) of Item (j)		
(l)	<u>TOTAL</u>		
(m)	<u>Time</u> (zero unless indicated; “TBD” not permitted)	<u>_____ Calendar Days</u>	

	<u>WORK PERFORMED BY CONTRACTOR</u>	<u>ADD</u>	<u>DEDUCT</u>
(a)	<u>Material</u> (attach itemized quantity and unit cost plus sales tax)		
(b)	<u>Add Labor</u> (attach itemized hours and rates, fully Burdened, and specify the hourly rate for each additional labor burden, for example, payroll taxes, fringe benefits, etc.)		
(c)	<u>Add Equipment</u> (attach suppliers’ invoice)		
(d)	<u>Add General Conditions Cost</u> (if Time is Compensable) (attach supporting documentation)		
(e)	<u>Subtotal</u>		
(f)	<u>Add Overhead and Profit for Contractor</u> , not to exceed fifteen percent (15%) of Item (e)		
(g)	<u>Subtotal</u>		
(h)	<u>Add Bond and Insurance</u> , not to exceed two percent (2%) of Item (g)		
(i)	<u>TOTAL</u>		
(j)	<u>Time</u> (zero unless indicated; “TBD” not permitted)	<u>_____ Calendar Days</u>	

17.8.2 Labor. Contractor shall be compensated for the costs of labor actually and directly utilized in the performance of the Work. Such labor costs shall be the actual cost, use of any formulas (e.g. labor factors) is not allowed, not to exceed prevailing wage rates in the locality of the Site and shall be in the labor classification(s) necessary for the performance of the Work, fully Burdened. Labor costs shall exclude costs incurred by the Contractor in preparing estimate(s) of the costs of the change in the Work, in the maintenance of records relating to the costs of the change in the Work, coordination and assembly of materials and information relating to the change in the Work or performance thereof, or the supervision and other overhead and general conditions costs associated with the change in the Work or performance thereof, including but not limited to the cost for the job superintendent. If applicable, District will pay Contractor the reasonable costs for room and board, supported with appropriate backup documentation, without markup for profit or overhead as provided by U.S. General Services Administration per diem rates for California lodging, meals and incidentals, <https://www.gsa.gov/travel/plan-book/per-diem-rates/per-diem-rates-lookup>.

17.8.3 Materials. Contractor shall be compensated for the costs of materials necessarily and actually used or consumed in connection with the performance of the change in the Work. Costs of materials may include reasonable costs of transportation from a source closest to the Site of the Work and delivery to the Site. If discounts by material suppliers are available for materials necessarily used in the performance of the change in the Work, they shall be credited to the District. If materials necessarily used in the performance of the change in the Work are obtained from a supplier or source owned in whole or in part by the Contractor, compensation therefor shall not exceed the current wholesale price for such materials. If, in the reasonable opinion of the District, the costs asserted by the Contractor for materials in connection with any change in the Work are excessive, or if the Contractor fails to provide satisfactory evidence of the actual costs of such materials from its supplier or vendor of the same, the costs of such materials and the District's obligation to pay for the same shall be limited to the then lowest wholesale price at which similar materials are available in the quantities required to perform the change in the Work. The District may elect to furnish materials for the change in the Work, in which event the Contractor shall not be compensated for the costs of furnishing such materials or any mark-up thereon.

17.8.4 Equipment. As a precondition to the District's duty to pay for Equipment rental or loading and transportation, Contractor shall provide satisfactory evidence of the actual costs of Equipment from the supplier, vendor or rental agency of same. Contractor shall be compensated for the actual cost of the necessary and direct use of Equipment in the performance of the change in the Work. Use of such Equipment in the performance of the change in the Work shall be compensated in increments of fifteen (15) minutes. Rental time for Equipment moved by its own power shall include time required to move such Equipment to the site of the Work from the nearest available rental source of the same. If Equipment is not moved to the Site by its own power, Contractor will be compensated for the loading and transportation costs in lieu of rental time. The foregoing notwithstanding, neither moving time or loading and transportation time shall be allowed if the Equipment is used for performance of any portion of the Work other than the change in the Work. Unless prior approval in writing is obtained by the Contractor from the Architect, the Project Inspector and the District, no costs or compensation shall be allowed for time while Construction Equipment is inoperative, idle or on standby, for any reason. Contractor shall not be entitled to an allowance or any other compensation for

Equipment or tools used in the performance of change in the Work where such Equipment or tools have a replacement value of \$500.00 or less. Equipment costs claimed by the Contractor in connection with the performance of any Work shall not exceed rental rates established by distributors or construction equipment rental agencies in the locality of the Site; any costs asserted which exceed such rental rates shall not be allowed or paid. Unless otherwise specifically approved in writing by the Architect, the Project Inspector and the District, the allowable rate for the use of Equipment in connection with the Work shall constitute full compensation to the Contractor for the cost of rental, fuel, power, oil, lubrication, supplies, necessary attachments, repairs or maintenance of any kind, depreciation, storage, insurance, labor (exclusive of labor costs of the Equipment operator), and any and all other costs incurred by the Contractor incidental to the use of such Equipment.

17.8.5 General Conditions Cost. The phrase "General Conditions Cost" shall mean, other than expressly limited or excluded herein, the costs of Contractor during the construction phase, including but not limited to: payroll costs for project manager for Work conducted at the Site, payroll costs for the superintendent and full-time general foremen, workers not included as direct labor costs engaged in support functions (e.g., loading/unloading, clean-up), costs of offices and temporary facilities including office materials, office supplies, office equipment, minor expenses, utilities, fuel, sanitary facilities and telephone services at the Site, costs of consultants not in the direct employ of Contractor or Subcontractors, and fees for permits and licenses.

17.8.6 Overhead and Profit. The phrase "Overhead and Profit" shall include field and office supervisors and assistants, watchperson, use of small tools, consumable, insurance other than construction bonds and insurance required herein, general conditions costs and home office expenses.

17.9 Change Order Certification

17.9.1 All Change Orders and PCOs include the following certification by the Contractor, either in the form specifically or incorporated by this reference:

17.9.1.1 The undersigned Contractor approves the foregoing as to the changes, if any, to the Contract Price specified for each item, and as to the extension of time allowed, if any, for completion of the entire Work as stated herein, and agrees to furnish all labor, materials, and service, and perform all work necessary to complete any additional work specified for the consideration stated herein. Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq. It is understood that the changes herein to the Contract shall only be effective when approved by the governing board of the District.

17.9.1.2 It is expressly understood that the value of the extra Work or changes expressly includes any and all of the Contractor's costs and expenses, direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project including, without limitation, cumulative impacts. Contractor is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

17.9.2 Accord and Satisfaction: Contractor's execution of any Change Order shall constitute a full accord and satisfaction, and release, of all Contractor (and if applicable, Subcontractor) claims for additional time, money or other relief arising from or relating to the subject matter of the change including, without limitation, impacts of all types, cumulative impacts, inefficiency, overtime, delay and any other type of claim.

17.10 Determination of Change Order Cost

17.10.1 The amount of the increase or decrease in the Contract Price from a Change Order, if any, shall be determined in one or more of the following ways as applicable to a specific situation and at the District's discretion:

17.10.1.1 District acceptance of a PCO;

17.10.1.2 By unit prices contained in Contractor's original bid;

17.10.1.3 By agreement between District and Contractor.

17.11 Deductive Change Orders

All deductive Change Order(s) must be prepared pursuant to the provisions herein. Where a portion of the Work is deleted from the Contract, the reasonable value of the deducted work less the value of work performed shall be considered the appropriate deduction. The value submitted on the Schedule of Values shall be used to calculate the credit amount unless the bid documentation is being held in escrow as part of the Contract Documents. Unit Prices, if any, may be used in District's discretion in calculating reasonable value. If Contractor offers a proposed amount for a deductive Change Order(s), Contractor shall include a minimum of five percent (5%) total profit and overhead to be deducted with the amount of the work of the Change Order(s). If Subcontractor work is involved, Subcontractors shall also include a minimum of five percent (5%) profit and overhead to be deducted with the amount of its deducted work. Any deviation from this provision shall not be allowed.

17.12 Addition or Deletion of Alternate Bid Item(s)

If the Bid Form and Proposal includes proposal(s) for Alternate Bid Item(s), during Contractor's performance of the Work, the District may elect to add or delete any such Alternate Bid Item(s) if not included in the Contract at the time of award. If the District elects to add or delete Alternate Bid Item(s) after Contract award, the cost or credit for such Alternate Bid Item(s) shall be as set forth in the Bid Form and Proposal unless the parties agree to a different price and the Contract Time shall be adjusted by the number of days allocated in the Contract Documents. If days are not allocated in the Contract Documents, the Contract Time shall be equitably adjusted.

17.13 Discounts, Rebates, and Refunds

For purposes of determining the cost, if any, of any change, addition, or omission to the Work hereunder, all trade discounts, rebates, refunds, and all returns from the sale of surplus materials and equipment shall accrue and be credited to the Contractor, and the Contractor shall make provisions so that such discounts, rebates, refunds, and returns may be secured, and the amount thereof shall be allowed as a reduction of the

Contractor's cost in determining the actual cost of construction for purposes of any change, addition, or omission in the Work as provided herein.

17.14 Accounting Records

With respect to portions of the Work performed by Change Orders and Construction Change Directives, the Contractor shall keep and maintain cost-accounting records satisfactory to the District, including, without limitation, Job Cost Reports as provided in these General Conditions, which shall be available to the District on the same terms as any other books and records the Contractor is required to maintain under the Contract Documents. Such records shall include without limitation hourly records for Labor and Equipment and itemized records of materials and Equipment used that day in connection with the performance of any Work. All records maintained hereunder shall be subject to inspection, review and/or reproduction by the District, the Architect or the Project Inspector upon request. In the event that the Contractor fails or refuses, for any reason, to maintain or make available for inspection, review and/or reproduction such records, the District's reasonable good faith determination of the extent of adjustment to the Contract Price shall be final, conclusive, dispositive and binding upon Contractor.

17.15 Notice Required

If the Contractor desires to make a claim for an increase in the Contract Price, or any extension in the Contract Time for completion, it shall notify the District pursuant to the provisions herein, including the Article on Claims and Disputes. No claim shall be considered unless made in accordance with this subparagraph. Contractor shall proceed to execute the Work even though the adjustment may not have been agreed upon. Any change in the Contract Price or extension of the Contract Time resulting from such claim shall be authorized by a Change Order.

17.16 Applicability to Subcontractors

Any requirements under this Article shall be equally applicable to Change Orders or Construction Change Directives issued to Subcontractors by the Contractor to the extent as required by the Contract Documents.

17.17 Alteration to Change Order Language

Contractor shall not alter Change Orders or reserve time in Change Orders. Change Orders altered in violation of this provision, if in conflict with the terms set forth herein, shall be construed in accordance with the terms set forth herein. Contractor shall execute finalized Change Orders and proceed under the provisions herein with proper notice.

17.18 Failure of Contractor to Execute Change Order

Contractor shall be in default of the Contract if Contractor fails to execute a Change Order when the Contractor agrees with the addition and/or deletion of the Work in that Change Order.

18. REQUEST FOR INFORMATION

18.1 Any Request for Information shall reference all applicable Contract Document(s), including Specification section(s), detail(s), page number(s), drawing

number(s), and sheet number(s), etc. The Contractor shall make suggestions and interpretations of the issue raised by each Request for Information. A Request for Information cannot modify the Contract Price, Contract Time, or the Contract Documents. Upon request by the District, Contractor shall provide an electronic copy of the Request for Information in addition to the hard copy.

18.2 The Contractor shall be responsible for any costs incurred for professional services that District may deduct from any amounts owing to the Contractor, if a Request for Information requests an interpretation or decision of a matter where the information sought is equally available to the party making the request. District, at its sole discretion, shall deduct from and/or invoice Contractor for all the professional services arising herein.

19. PAYMENTS

19.1 Contract Price

The Contract Price is stated in the Agreement and, including authorized adjustments, is the total amount payable by the District to the Contractor for performance of the Work under the Contract Documents.

19.2 Applications for Progress Payments

19.2.1 Procedure for Applications for Progress Payments

19.2.1.1 Application for Progress Payment

19.2.1.1.1 Not before the fifth (5th) day of each calendar month during the progress of the Work, Contractor shall submit to the District and the Architect an itemized Application for Payment for operations completed in accordance with the Schedule of Values. Such application shall be notarized, if required, and supported by the following or each portion thereof unless waived by the District in writing:

19.2.1.1.1.1 The amount paid to the date of the Application to the Contractor, to all its Subcontractors, and all others furnishing labor, material, or equipment for its Contract;

19.2.1.1.1.2 The amount being requested under the Application for Payment by the Contractor on its own behalf and separately stating the amount requested on behalf of each of the Subcontractors and all others furnishing labor, material, and equipment under the Contract;

19.2.1.1.1.3 The balance that will be due to each of such entities after said payment is made;

19.2.1.1.1.4 A certification that the As-Built Drawings and annotated Specifications are current;

19.2.1.1.1.5 Itemized breakdown of work done for the purpose of requesting partial payment;

19.2.1.1.1.6 An updated and acceptable construction schedule in conformance with the provisions herein;

19.2.1.1.1.7 The additions to and subtractions from the Contract Price and Contract Time;

19.2.1.1.1.8 A total of the retentions held;

19.2.1.1.1.9 Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the District may require from time to time;

19.2.1.1.1.10 The percentage of completion of the Contractor's Work by line item;

19.2.1.1.1.11 Schedule of Values updated from the preceding Application for Payment;

19.2.1.1.1.12 A duly completed and executed conditional waiver and release upon progress payment compliant with Civil Code section 8132 from the Contractor and each subcontractor of any tier and supplier to be paid from the current progress payment;

19.2.1.1.1.13 A duly completed and executed unconditional waiver and release upon progress payment compliant with Civil Code section 8134 from the Contractor and each subcontractor of any tier and supplier that was paid from the previous progress payment(s); and

19.2.1.1.1.14 A certification by the Contractor of the following:

The Contractor warrants title to all Work performed as of the date of this payment application has been completed in accordance with the Contract Documents for the Project. The Contractor further warrants that all amounts have been paid for work which previous Certificates for Payment were issued and payments received and all Work performed as of the date of this payment application is free and clear of liens, claims, security interests, or encumbrances in favor of the Contractor, Subcontractors, material and equipment suppliers, workers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work, except those of which the District has been informed. Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq.

19.2.1.1.1.15 The Contractor shall be subject to the False Claims Act set forth in Government Code section 12650 et seq. for information provided with any Application for Progress Payment.

19.2.1.1.1.16 All remaining certified payroll records ("CPR(s)") for each journeyman, apprentice, worker, or other employee employed by the Contractor and/or each Subcontractor in connection with the Work for the

period of the Application for Payment. As indicated herein, the District shall not make any payment to Contractor until:

19.2.1.1.1.16.1 Contractor and/or its Subcontractor(s) provide electronic CPRs directly to the DIR on no less than every 30 days while Work is being performed and within 30 days after the final day of Work performed on the Project for any journeyman, apprentice, worker or other employee was employed in connection with the Work, or within ten (10) days of any request by the District or the DIR to the requesting entity, and

19.2.1.1.1.16.2 Any delay in Contractor and/or its Subcontractor(s) providing CPRs in a timely manner may directly delay the Contractor's payment.

19.2.1.1.2 Applications received after June 20th will not be paid until the second week of July and applications received after December 12th will not be paid until the first week of January.

19.2.2 Prerequisites for Progress Payments

19.2.2.1 First Payment Request: The following items, if applicable, must be completed before the District will accept and/or process the Contractor's first payment request:

19.2.2.1.1 Installation of the Project sign;

19.2.2.1.2 Installation of field office;

19.2.2.1.3 Installation of temporary facilities and fencing;

19.2.2.1.4 Schedule of Values;

19.2.2.1.5 Contractor's Construction Schedule;

19.2.2.1.6 Schedule of unit prices, if applicable;

19.2.2.1.7 Submittal Schedule;

19.2.2.1.8 Receipt by Architect of all submittals due as of the date of the payment application;

19.2.2.1.9 Copies of necessary permits;

19.2.2.1.10 Copies of authorizations and licenses from governing authorities;

19.2.2.1.11 Initial progress report;

19.2.2.1.12 Surveyor qualifications;

19.2.2.1.13 Written acceptance of District's survey of rough grading, if applicable;

19.2.2.1.14 List of all Subcontractors, with names, license numbers, telephone numbers, and Scope of Work;

19.2.2.1.15 All bonds and insurance endorsements; and

19.2.2.1.16 Resumes of Contractor's project manager, and if applicable, job site secretary, record documents recorder, and job site superintendent.

19.2.2.2 Second Payment Request: The District will not process the second payment request until and unless all submittals and Shop Drawings have been accepted for review by the Architect.

19.2.2.3 No Waiver of Criteria: Any payments made to Contractor where criteria set forth herein have not been met shall not constitute a waiver of said criteria by District. Instead, such payment shall be construed as a good faith effort by District to resolve differences so Contractor may pay its Subcontractors and suppliers. Contractor agrees that failure to submit such items may constitute a breach of contract by Contractor and may subject Contractor to termination.

19.3 Progress Payments

19.3.1 District's Approval of Application for Payment

19.3.1.1 Upon receipt of an Application for Payment, The District shall act in accordance with both of the following:

19.3.1.1.1 Each Application for Payment shall be reviewed by the District as soon as practicable after receipt for the purpose of determining that the Application for Payment is a proper Application for Payment.

19.3.1.1.2 Any Application for Payment determined not to be a proper Application for Payment suitable for payment shall be returned to the Contractor as soon as practicable, but not later than seven (7) days, after receipt. An Application for Payment returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the Application for Payment is not proper. The number of days available to the District to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which the District exceeds this seven-day return requirement.

19.3.1.1.3 An Application for Payment shall be considered properly executed if funds are available for payment of the Application for Payment, and payment is not delayed due to an audit inquiry by the financial officer of the District.

19.3.1.2 The District's review of the Contractor's Application for Payment will be based on the District's and the Architect's observations at the Site and the data comprising the Application for Payment that the Work has progressed to the point indicated and that, to the best of the District's and the Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to:

19.3.1.2.1 Observation of the Work for general conformance with the Contract Documents,

19.3.1.2.2 Results of subsequent tests and inspections,

19.3.1.2.3 Minor deviations from the Contract Documents correctable prior to completion, and

19.3.1.2.4 Specific qualifications expressed by the Architect.

19.3.1.3 District's approval of the certified Application for Payment shall be based on Contractor complying with all requirements for a fully complete and valid certified Application for Payment.

19.3.2 Payments to Contractor

19.3.2.1 Within thirty (30) days after approval of the Application for Payment, Contractor shall be paid a sum equal to ninety-five percent (95%) of the value of the Work performed (as verified by Architect and Inspector and certified by Contractor) up to the last day of the previous month, less the aggregate of previous payments and amount to be withheld. The value of the Work completed shall be Contractor's best estimate. No inaccuracy or error in said estimate shall operate to release the Contractor, or any Surety upon any bond, from damages arising from such Work, or from the District's right to enforce each and every provision of this Contract, and the District shall have the right subsequently to correct any error made in any estimate for payment.

19.3.2.2 The Contractor shall not be entitled to have any payment requests processed, or be entitled to have any payment made for Work performed, so long as any lawful or proper direction given by the District concerning the Work, or any portion thereof, remains incomplete.

19.3.2.3 If the District fails to make any progress payment within thirty (30) days after receipt of an undisputed and properly submitted Application for Payment from the Contractor, the District shall pay interest to the Contractor equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.

19.3.3 No Waiver

No payment by District hereunder shall be interpreted so as to imply that District has inspected, approved, or accepted any part of the Work. Notwithstanding any payment, the District may enforce each and every provision of this Contract. The District may correct or require correction of any error subsequent to any payment.

19.4 Decisions to Withhold Payment

19.4.1 Reasons to Withhold Payment

The District may withhold payment in whole, or in part, to the extent reasonably necessary to protect the District if, in the District's opinion, the representations to the District required herein cannot be made. The District may withhold payment, in

whole, or in part, to such extent as may be necessary to protect the District from loss because of, but not limited to any of the following:

19.4.1.1 Defective Work not remedied within **FORTY-EIGHT (48)** hours of written notice to Contractor.

19.4.1.2 Stop Payment Notices or other liens served upon the District as a result of the Contract. Contractor agrees that the District may withhold up to 125% of the amount claimed in the Stop Payment Notice to answer the claim and to provide for the District's reasonable cost of any litigation pursuant to the stop payment notice.

19.4.1.3 Written notice to withhold payment from Contractor by payment and/or performance bond surety(ies).

19.4.1.4 Liquidated damages assessed against the Contractor.

19.4.1.5 The cost of completion of the Contract if there exists a reasonable doubt that the Work can be completed for the unpaid balance of the Contract Price or by the completion date.

19.4.1.6 Damage to the District or other contractor(s).

19.4.1.7 Unsatisfactory prosecution of the Work by the Contractor.

19.4.1.8 Failure to store and properly secure materials.

19.4.1.9 Failure of the Contractor to submit, on a timely basis, proper, sufficient, and acceptable documentation required by the Contract Documents, including, without limitation, a Construction Schedule, Schedule of Submittals, Schedule of Values, Monthly Progress Schedules, Shop Drawings, Product Data and samples, Proposed product lists, executed Change Orders, and/or verified reports.

19.4.1.10 Failure of the Contractor to maintain As-Built Drawings.

19.4.1.11 Erroneous estimates by the Contractor of the value of the Work performed, or other false statements in an Application for Payment.

19.4.1.12 Unauthorized deviations from the Contract Documents.

19.4.1.13 Failure of the Contractor to prosecute the Work in a timely manner in compliance with the Construction Schedule, established progress schedules, and/or completion dates.

19.4.1.14 Failure to provide acceptable electronic certified payroll records, as required by the Labor Code, by these Contract Documents, or by written request; for each journeyman, apprentice, worker, or other employee employed by the Contractor and/or by each Subcontractor in connection with the Work for the period of the Application for Payment or if payroll records are delinquent or inadequate.

19.4.1.15 Failure to properly pay prevailing wages as required in Labor Code section 1720 et seq., failure to comply with any other Labor Code requirements, and/or failure to comply with labor compliance monitoring and enforcement by the DIR.

19.4.1.16 Allowing an unregistered subcontractor, as described in Labor Code section 1725.5, to engage in the performance of any work under this Contract.

19.4.1.17 Failure to comply with any applicable federal statutes and regulations regarding minimum wages, withholding, payrolls and basic records, apprentice and trainee employment requirements, equal employment opportunity requirements, Copeland Act requirements, Davis-Bacon Act and related requirements, Contract Work Hours and Safety Standards Act requirements, if applicable.

19.4.1.18 Failure to properly maintain or clean up the Site.

19.4.1.19 Failure to timely indemnify, defend, or hold harmless the District.

19.4.1.20 Any payments due to the District, including but not limited to payments for failed tests, utilities changes, or permits.

19.4.1.21 Failure to pay Subcontractor(s) or supplier(s) as required by law and by the Contract Documents.

19.4.1.22 Failure to pay any royalty, license or similar fees.

19.4.1.23 Contractor is otherwise in breach, default, or in substantial violation of any provision of this Contract.

19.4.1.24 Failure to perform any implementation and/or monitoring required by any SWPPP for the Project and/or the imposition of any penalties or fines therefore whether imposed on the District or Contractor.

19.4.2 Reallocation of Withheld Amounts

19.4.2.1 District may, in its discretion, apply any withheld amount to pay outstanding claims or obligations as defined herein. In so doing, District shall make such payments on behalf of Contractor. If any payment is so made by District, then that amount shall be considered a payment made under Contract by District to Contractor and District shall not be liable to Contractor for any payment made in good faith. These payments may be made without prior judicial determination of claim or obligation. District will render Contractor an accounting of funds disbursed on behalf of Contractor.

19.4.2.2 If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision thereof, District may, after **FORTY-EIGHT (48)** hours' written notice to the Contractor and, without prejudice to any other remedy, make good such deficiencies. The District shall adjust the total Contract Price by reducing the amount thereof by the cost of making good such deficiencies. If District deems it inexpedient to correct Work that is damaged, defective, or not done in accordance with Contract provisions, an equitable reduction in the Contract Price (of at least one hundred fifty percent

(150%) of the estimated reasonable value of the nonconforming Work) shall be made therefor.

19.4.3 Payment After Cure

When Contractor removes the grounds for declining approval, payment shall be made for amounts withheld because of them. No interest shall be paid on any retainage or amounts withheld due to the failure of the Contractor to perform in accordance with the terms and conditions of the Contract Documents.

19.5 Subcontractor Payments

19.5.1 Payments to Subcontractors

No later than seven (7) days after receipt, or pursuant to Business and Professions Code section 7108.5 and Public Contract Code section 7107, the Contractor shall pay to each Subcontractor, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to its Sub-subcontractors in a similar manner.

19.5.2 No Obligation of District for Subcontractor Payment

The District shall have no obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.

19.5.3 Joint Checks

District shall have the right in its sole discretion, if necessary for the protection of the District, to issue joint checks made payable to the Contractor and Subcontractors and/or material or equipment suppliers. The joint check payees shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. In no event shall any joint check payment be construed to create any contract between the District and a Subcontractor of any tier, or a material or equipment supplier, any obligation from the District to such Subcontractor or a material or equipment supplier, or rights in such Subcontractor or a material or equipment supplier against the District.

20. COMPLETION OF THE WORK

20.1 Completion

20.1.1 District will accept completion of Contract and have the Notice of Completion recorded when the entire Work shall have been completed to the satisfaction of District.

20.1.2 The Work may only be accepted as complete by action of the governing board of the District.

20.1.3 District, at its sole option, may accept completion of Contract and have the Notice of Completion recorded when the entire Work shall have been completed to the satisfaction of District, except for minor corrective items, as distinguished

from incomplete items. If Contractor fails to complete all minor corrective items within fifteen (15) days after the date of the District's acceptance of completion, District shall withhold from the final payment one hundred fifty percent (150%) of an estimate of the amount sufficient to complete the corrective items, as determined by District, until the item(s) are completed.

20.1.4 At the end of the 15-day period, if there are any items remaining to be corrected, District may elect to proceed as provided herein related to adjustments to Contract Price, and/or District's right to perform the Work of the Contractor.

20.2 Close-Out/Certification Procedures

20.2.1 Punch List

The Contractor shall notify the Architect when Contractor considers the Work complete. Upon notification, Architect will prepare a list of minor items to be completed or corrected ("Punch List"). The Contractor and/or its Subcontractors shall proceed promptly to complete and correct items on the Punch List. Failure to include an item on Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

20.2.2 Close-Out/Certification Requirements

20.2.2.1 Utility Connections

Buildings shall be connected to water, gas, sewer, and electric services, complete and ready for use. Service connections shall be made and existing services reconnected.

20.2.2.2 Record Drawings and Record Specifications

20.2.2.2.1 Contractor shall provide exact Record Drawings of the Work ("As-Builts") and Record Specifications upon completion of the Project and as a condition precedent to approval of final payment.

20.2.2.2.2 Contractor shall obtain the Inspector's approval of the corrected prints and employ a competent draftsman to transfer the Record Drawings information to the most current version of AutoCAD that is, at that time, currently utilized for plan check submission by either the District, the Architect, OPSC, and/or DSA, and print a complete set of transparent sepias. When completed, Contractor shall deliver corrected sepias and diskette/CD/other data storage device acceptable to District with AutoCAD file to the District.

20.2.2.2.3 Contractor is liable and responsible for any and all inaccuracies in the Record Drawings and Record Specifications, even if inaccuracies become evident at a future date.

20.2.2.3 Construction Storm Water Permit, if applicable

Contractor shall submit to District all electronic or hard copy records required by the Construction Storm Water Permit, if applicable, within seven (7) days of Completion of the Project.

20.2.2.4 Maintenance Manuals: Contractor shall prepare all operation and maintenance manuals and date as indicated in the Specifications.

20.2.2.5 Source Programming: Contractor shall provide all source programming for all items in the Project.

20.2.2.6 Verified Reports: Contractor shall completely and accurately fill out and file forms DSA 6-C or DSA 152 (or current form), as appropriate. Refer to section 4-336 and section 4-343 of Part 1, Title 24 of the California Code of Regulations.

20.3 Final Inspection

20.3.1 Contractor shall comply with Punch List procedures as provided herein, and maintain the presence of a Project Superintendent and Project Manager until the Punch List is complete to ensure proper and timely completion of the Punch List. Under no circumstances shall Contractor demobilize its forces prior to completion of the Punch List without District's prior written approval. Upon receipt of Contractor's written notice that all of the Punch List items have been fully completed and the Work is ready for final inspection and District acceptance, Architect and Project Inspector will inspect the Work and shall submit to Contractor and District a final inspection report noting the Work, if any, required in order to complete in accordance with the Contract Documents. Absent unusual circumstances, this report shall consist of the Punch List items not yet satisfactorily completed.

20.3.2 Upon Contractor's completion of all items on the Punch List and any other uncompleted portions of the Work, the Contractor shall notify the District and Architect, who shall again inspect such Work. If the Architect finds the Work complete and acceptable under the Contract Documents, the Architect will notify Contractor, who shall then jointly submit to the Architect and the District its final Application for Payment.

20.3.3 Final Inspection Requirements

20.3.3.1 Before calling for final inspection, Contractor shall determine that the following have been performed:

20.3.3.1.1 The Work has been completed.

20.3.3.1.2 All life safety items are completed and in working order.

20.3.3.1.3 Mechanical and electrical Work including, without limitation, security system, data, and fire alarm, are complete and tested, fixtures are in place, connected, and ready for tryout.

20.3.3.1.4 Electrical circuits scheduled in panels and disconnect switches labeled.

20.3.3.1.5 Painting and special finishes complete.

20.3.3.1.6 Doors complete with hardware, cleaned of protective film, relieved of sticking or binding, and in working order.

- 20.3.3.1.7** Tops and bottoms of doors sealed.
- 20.3.3.1.8** Floors waxed and polished as specified.
- 20.3.3.1.9** Broken glass replaced and glass cleaned.
- 20.3.3.1.10** Grounds cleared of Contractor's equipment, raked clean of debris, and trash removed from Site.
- 20.3.3.1.11** Work cleaned, free of stains, scratches, and other foreign matter, and damaged and broken material replaced.
- 20.3.3.1.12** Finished and decorative work shall have marks, dirt, and superfluous labels removed.
- 20.3.3.1.13** Final cleanup, as provided herein.

20.4 Costs of Multiple Inspections

More than two (2) requests of the District to make a final inspection shall be considered an additional service of District, Architect, Construction Manager, and/or Project Inspector, and all subsequent costs will be invoiced to Contractor and if funds are available, withheld from remaining payments.

20.5 Partial Occupancy or Use Prior to Completion

20.5.1 District's Rights to Occupancy

The District may occupy or use any completed or partially completed portion of the Work at any stage, and such occupancy shall not constitute the District's Final Acceptance of any part of the Work. Neither the District's Final Acceptance, the making of Final Payment, any provision in Contract Documents, nor the use or occupancy of the Work, in whole or in part, by District shall constitute acceptance of Work not in accordance with the Contract Documents nor relieve the Contractor or the Contractor's Performance Bond Surety from liability with respect to any warranties or responsibility for faulty or defective Work or materials, equipment and workmanship incorporated therein. In the event that the District occupies or uses any completed or partially completed portion of the Work, the Contractor shall remain responsible for payments, security, maintenance, heat, utilities, damage to the Work, insurance, the period for correction of the Work, and the commencement of warranties required by the Contract Documents unless the Contractor requests in writing, and the District agrees, to otherwise divide those responsibilities. Any dispute as to responsibilities shall be resolved pursuant to the Claims and Disputes provisions herein, with the added provision that during the dispute process, the District shall have the right to occupy or use any portion of the Work that it needs or desires to use.

20.5.2 Inspection Prior to Occupancy or Use

Immediately prior to partial occupancy or use, the District, the Contractor, and the Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

20.5.3 No Waiver

Unless otherwise agreed upon, partial or entire occupancy or use of a portion or portions of the Work shall not constitute beneficial occupancy or District's acceptance of the Work not complying with the requirements of the Contract Documents.

21. FINAL PAYMENT AND RETENTION

21.1 Final Payment

Upon receipt and approval of a valid and final Application for Payment, the Architect will issue a final Certificate of Payment. The District shall thereupon jointly inspect the Work and either accept the Work as complete or notify the Architect and the Contractor in writing of reasons why the Work is not complete. Upon District's acceptance of the Work of the Contractor as fully complete by the Governing Board of the District (that, absent unusual circumstances, will occur when the Punch List items have been satisfactorily completed), the District shall record a Notice of Completion with the County Recorder, and the Contractor shall, upon receipt of final payment from the District, pay the amount due Subcontractors.

21.2 Prerequisites for Final Payment

The following conditions must be fulfilled prior to Final Payment:

21.2.1 A full release of all Stop Payment Notices served in connection with the Work shall be submitted by Contractor.

21.2.2 A duly completed and executed conditional waiver and release upon final payment compliant with Civil Code section 8136, from the Contractor and each subcontractor of any tier and supplier to be paid from the final payment.

21.2.3 A duly completed and executed unconditional waiver and release upon progress payment compliant with Civil Code section 8134, from the Contractor and each subcontractor of any tier and supplier that was paid from the previous progress payments.

21.2.4 A duly completed and executed Document 00 65 19.26, "AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS" from the Contractor.

21.2.5 The Contractor shall have made all corrections to the Work that are required to remedy any defects therein, to obtain compliance with the Contract Documents or any requirements of applicable codes and ordinances, or to fulfill any of the orders or directions of District required under the Contract Documents.

21.2.6 Each Subcontractor shall have delivered to the Contractor all written guarantees, warranties, applications, and bonds required by the Contract Documents for its portion of the Work.

21.2.7 Contractor must have completed all requirements set forth under "Close-Out/Certification Procedures," including, without limitation, submission of an approved set of complete Record Drawings.

21.2.8 Architect shall have issued its written approval that final payment can be made.

21.2.9 The Contractor shall have delivered to the District all manuals and materials required by the Contract Documents, which must be approved by the District.

21.2.10 The Contractor shall have completed final clean-up as provided herein.

21.3 Retention

21.3.1 The retention, less any amounts disputed by the District or that the District has the right to withhold pursuant to provisions herein, shall be paid:

21.3.1.1 After approval by the Architect of the Application and Certificate of Payment,

21.3.1.2 After the satisfaction of the conditions set forth herein, and

21.3.1.3 After forty-five (45) days after the recording of the Notice of Completion by District.

21.3.2 No interest shall be paid on any retention, or on any amounts withheld due to a failure of the Contractor to perform, in accordance with the terms and conditions of the Contract Documents, except as provided to the contrary in any Escrow Agreement between the District and the Contractor pursuant to Public Contract Code section 22300.

21.4 Substitution of Securities

The District will permit the substitution of securities in accordance with the provisions of Public Contract Code section 22300.

22. UNCOVERING OF WORK

If a portion of the Work is covered without Inspector or Architect approval or not in compliance with the Contract Documents, it must, if required in writing by the District, the Project Inspector, or the Architect, be uncovered for the Project Inspector's or the Architect's observation and be corrected, replaced, and/or recovered at the Contractor's expense without change in the Contract Price or Contract Time.

23. NONCONFORMING WORK AND CORRECTION OF WORK

23.1 Nonconforming Work

23.1.1 Contractor shall promptly remove from Premises all Work identified by District as failing to conform to the Contract Documents whether incorporated or not. Contractor shall promptly replace and re-execute its own Work to comply with the Contract Documents without additional expense to the District and shall bear the expense of making good all work of other contractors destroyed or damaged by any removal or replacement pursuant hereto and/or any delays to the District or other Contractors caused thereby.

23.1.2 If Contractor does not remove Work that District has identified as failing to conform to the Contract Documents within a reasonable time, not to exceed **FORTY-EIGHT (48)** hours, District may remove it and may store any material at Contractor's expense. If Contractor does not pay expense(s) of that removal within ten (10) days' time thereafter, District may, upon ten (10) days' written notice, sell any material at auction or at private sale and shall deduct all costs and expenses incurred by the District and/or District may withhold those amounts from payment(s) to Contractor.

23.2 Correction of Work

23.2.1 Correction of Rejected Work

Pursuant to the notice provisions herein, the Contractor shall immediately correct the Work rejected by the District, the Architect, or the Project Inspector as failing to conform to the requirements of the Contract Documents, whether observed before or after Completion and whether or not fabricated, installed, or completed. The Contractor shall bear costs of correcting the rejected Work, including additional testing, inspections, and compensation for the Inspector's or the Architect's services and expenses made necessary thereby.

23.2.2 One-Year Warranty Corrections

If, within one (1) year after the date of Completion of the Work or a designated portion thereof, or after the date for commencement of warranties established hereunder, or by the terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the District to do so. This period of one (1) year shall be extended with respect to portions of the Work first performed after Completion by the period of time between Completion and the actual performance of the Work. This obligation hereunder shall survive District's acceptance of the Work under the Contract and termination of the Contract. The District shall give such notice promptly after discovery of the condition.

23.3 District's Right to Perform Work

23.3.1 If the Contractor should neglect to prosecute the Work properly or fail to perform any provisions of this contract, the District, after **FORTY-EIGHT (48)** hours' written notice to the Contractor, may, without prejudice to any other remedy it may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.

23.3.2 If it is found at any time, before or after completion of the Work, that Contractor has varied from the Drawings and/or Specifications, including, but not limited to, variation in material, quality, form, or finish, or in the amount or value of the materials and labor used, District may require at its option:

23.3.2.1 That all such improper Work be removed, remade or replaced, and all work disturbed by these changes be made good by Contractor at no additional cost to the District;

23.3.2.2 That the District deduct from any amount due Contractor the sum of money equivalent to the difference in value between the work performed and that called for by the Drawings and Specifications; or

23.3.2.3 That the District exercise any other remedy it may have at law or under the Contract Documents, including but not limited to the District hiring its own forces or another contractor to replace the Contractor's nonconforming Work, in which case the District shall either issue a deductive Change Order, a Construction Change Directive, or invoice the Contractor for the cost of that work. Contractor shall pay any invoices within thirty (30) days of receipt of same or District may withhold those amounts from payment(s) to Contractor.

24. TERMINATION AND SUSPENSION

24.1 District's Request for Assurances

If District at any time reasonably believes Contractor is or may be in default under this Contract, District may in its sole discretion notify Contractor of this fact and request written assurances from Contractor of performance of Work and a written plan from Contractor to remedy any potential default under the terms this Contract that the District may advise Contractor of in writing. Contractor shall, within ten (10) calendar days of District's request, deliver a written cure plan that meets the District's requirements in its request for assurances. Contractor's failure to provide such written assurances of performance and the required written plan, within ten (10) calendar days of request, will constitute a material breach of this Contract sufficient to justify termination for cause.

24.2 District's Right to Terminate Contractor for Cause

24.2.1 Grounds for Termination: The District, in its sole discretion, may terminate the Contract and/or terminate the Contractor's right to perform the work of the Contract based upon any of the following:

24.2.1.1 Contractor refuses or fails to execute the Work or any separable part thereof with sufficient diligence as will ensure its completion within the time specified or any extension thereof, or

24.2.1.2 Contractor fails to complete said Work within the time specified or any extension thereof, or

24.2.1.3 Contractor persistently fails or refuses to perform Work or provide material of sufficient quality as to be in compliance with Contract Documents; or

24.2.1.4 Contractor persistently refuses, or repeatedly fails, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials to complete the Work in the time specified; or

24.2.1.5 Contractor fails to make prompt payment to Subcontractors, or for material, or for labor; or

24.2.1.6 Contractor persistently disregards laws, or ordinances, or instructions of District; or

24.2.1.7 Contractor fails to supply labor, including that of Subcontractors, that is sufficient to prosecute the Work or that can work in harmony with all other elements of labor employed or to be employed on the Work; or

24.2.1.8 Contractor or its Subcontractor(s) is/are otherwise in breach, default, or in substantial violation of any provision of this Contract, including but not limited to a lapse in licensing or registration.

24.2.2 Notification of Termination

24.2.2.1 Upon the occurrence at District's sole determination of any of the above conditions, District may, without prejudice to any other right or remedy, serve written notice upon Contractor and its Surety of District's termination of this Contract and/or the Contractor's right to perform the work of the Contract. This notice will contain the reasons for termination. Unless, within three (3) days after the service of the notice, any and all condition(s) shall cease, and any and all violation(s) shall cease, or arrangement satisfactory to District for the correction of the condition(s) and/or violation(s) be made, this Contract and/or the Contractor's right to perform the Work of the Contract shall cease and terminate. Upon termination, Contractor shall not be entitled to receive any further payment until the entire Work is finished.

24.2.2.2 Upon termination, District may immediately serve written notice of tender upon Surety whereby Surety shall have the right to take over and perform this Contract only if Surety:

24.2.2.2.1 Within three (3) days after service upon it of the notice of tender, gives District written notice of Surety's intention to take over and perform this Contract; and

24.2.2.2.2 Commences performance of this Contract within three (3) days from date of serving of its notice to District.

24.2.2.3 Surety shall not utilize Contractor in completing the Project if the District notifies Surety of the District's objection to Contractor's further participation in the completion of the Project. Surety expressly agrees that any contractor which Surety proposes to fulfill Surety's obligations is subject to District's approval. District's approval shall not be unreasonably withheld, conditioned or delayed.

24.2.2.4 If Surety fails to notify District or begin performance as indicated herein, District may take over the Work and execute the Work to completion by any method it may deem advisable at the expense of Contractor and/or its Surety. Contractor and/or its Surety shall be liable to District for any excess cost or other damages the District incurs thereby. Time is of the essence in this Contract. If the District takes over the Work as herein provided, District may, without liability for so doing, take possession of and utilize in completing the Work such materials, appliances, plan, and other property belonging to Contractor as may be on the Site of the Work, in bonded storage, or previously paid for.

24.3 Termination of Contractor for Convenience

24.3.1 District in its sole discretion may terminate the Contract in whole or in part upon three (3) days' written notice to the Contractor.

24.3.2 Upon notice, Contractor shall:

24.3.2.1 Cease operations as directed by the District in the notice;

24.3.2.2 Take necessary actions for the protection and preservation of the Work as soon as possible; and

24.3.2.3 Terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

24.3.3 Within 30 days of the notice, Contractor submit to the District a payment application for the actual cost for labor, materials, and services performed, including all Contractor's and Subcontractor(s)' mobilization and/or demobilization costs, that is unpaid. Contractor shall have no claims against the District except for the actual cost for labor, materials, and services performed that adequately documented through timesheets, invoices, receipts, or otherwise. District shall pay all undisputed invoice(s) for work performed until the notice of termination.

24.3.4 Under a termination for convenience, the District retains the right to all the options available to the District if there is a termination for cause.

24.4 Effect of Termination

24.4.1 Contractor shall, only if ordered to do so by the District, immediately remove from the Site all or any materials and personal property belonging to Contractor that have not been incorporated in the construction of the Work, or which are not in place in the Work. The District retains the right, but not the obligation, to keep and use any materials and personal property belonging to Contractor that have not been incorporated in the construction of the Work, or which are not in place in the Work. The Contractor and its Surety shall be liable upon the Performance Bond for all damages caused to the District by reason of the Contractor's failure to complete the Contract.

24.4.2 In the event that the District shall perform any portion of, or the whole of the Work, pursuant to the provisions of the General Conditions, the District shall not be liable nor account to the Contractor in any way for the time within which, or the manner in which, the Work is performed by the District or for any changes the District may make in the Work or for the money expended by the District in satisfying claims and/or suits and/or other obligations in connection with the Work.

24.4.3 In the event termination for cause is determined to have not been for cause, the termination shall be deemed to have been a termination for convenience effective as of the same date as the purported termination for cause.

24.4.4 In the event that the Contract is terminated for any reason, no allowances or compensation will be granted for the loss of any anticipated profit by the Contractor or any impact or impairment of Contractor's bonding capacity.

24.4.5 If the expense to the District to finish the Work exceeds the unpaid Contract Price, Contractor and Surety shall pay difference to District within twenty-one (21) days of District's request.

24.4.6 The District shall have the right (but shall have no obligation) to assume and/or assign to a general contractor or construction manager or other third party who is qualified and has sufficient resources to complete the Work, the rights of the Contractor under its subcontracts with any or all Subcontractors. In the event of an assumption or assignment by the District, no Subcontractor shall have any claim against the District or third party for Work performed by Subcontractor or other matters arising prior to termination of the Contract. The District or any third party, as the case may be, shall be liable only for obligations to the Subcontractor arising after assumption or assignment. Should the District so elect, the Contractor shall execute and deliver all documents and take all steps, including the legal assignment of its contractual rights, as the District may require, for the purpose of fully vesting in the District the rights and benefits of its Subcontractor under Subcontracts or other obligations or commitments. All payments due the Contractor hereunder shall be subject to a right of offset by the District for expenses and damages suffered by the District as a result of any default, acts, or omissions of the Contractor. Contractor must include this assignment provision in all of its contracts with its Subcontractors.

24.4.7 The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to District.

24.5 Emergency Termination of Public Contracts Act of 1949

24.5.1 This Contract is subject to termination as provided by sections 4410 and 4411 of the Government Code of the State of California, being a portion of the Emergency Termination of Public Contracts Act of 1949.

24.5.1.1 Section 4410 of the Government Code states:

In the event a national emergency occurs, and public work, being performed by contract, is stopped, directly or indirectly, because of the freezing or diversion of materials, equipment or labor, as the result of an order or a proclamation of the President of the United States, or of an order of any federal authority, and the circumstances or conditions are such that it is impracticable within a reasonable time to proceed with a substantial portion of the work, then the public agency and the contractor may, by written agreement, terminate said contract.

24.5.1.2 Section 4411 of the Government Code states:

Such an agreement shall include the terms and conditions of the termination of the contract and provision for the payment of compensation or money, if any, which either party shall pay to the other or any other person, under the facts and circumstances in the case.

24.5.2 Compensation to the Contractor shall be determined at the sole discretion of District on the basis of the reasonable value of the Work done, including preparatory work. As an exception to the foregoing and at the District's discretion, in the case of any fully completed separate item or portion of the Work for which there is a separate previously submitted unit price or item on the accepted schedule

of values, that price shall control. The District, at its sole discretion, may adopt the Contract Price as the reasonable value of the work done or any portion thereof.

24.6 Suspension of Work

24.6.1 District in its sole discretion may suspend, delay or interrupt the Work in whole or in part for such period of time as the District may determine upon three (3) days written notice to the Contractor.

24.6.1.1 An adjustment may be made for changes in the cost of performance of the Work caused by any such suspension, delay or interruption. No adjustment shall be made to the extent:

24.6.1.1.1 That performance is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor is responsible; or

24.6.1.1.2 That an equitable adjustment is made or denied under another provision of the Contract; or

24.6.1.1.3 That the suspension of Work was the direct or indirect result of Contractor's failure to perform any of its obligations hereunder.

24.6.1.2 Any adjustments in cost of performance may have a fixed or percentage fee as provided in the section on Format for Proposed Change Order herein. This amount shall be full compensation for all Contractor's and its Subcontractor(s)' changes in the cost of performance of the Contract caused by any such suspension, delay or interruption.

25. CLAIMS PROCESS

25.1 Obligation to File Claims for Disputed Work

25.1.1 Should Contractor otherwise seek extra time or compensation for any reason whatsoever ("Disputed Work"), then Contractor shall first follow procedures set forth in the Contract Documents including, without limitation, Articles 15, 16 and 17, all of which are conditions precedent to submitting a Claim pursuant to Article 25. A Notice of Delay or Proposed Change Order are less formal procedures that proceed the formal claim and do not constitute a Claim. A Claim also does not include correspondence, RFIs, vouchers, invoices, progress payment applications, or other routine or authorized form of requests for progress payments in compliance with the Contract. If a dispute remains, then Contractor shall give written notice to District that expressly invokes this Article 25 within the time limits set forth herein.

25.1.2 Contractor's sole and exclusive remedy for Disputed Work is to file a written claim setting forth Contractor's position as required herein within the time limits set forth herein.

25.2 Duty to Perform during Claim Process

Contractor and its subcontractors shall continue to perform its Work under the Contract including the disputed work, and shall not cause a delay of the Work during any dispute,

claim, negotiation, mediation, or arbitration proceeding, except by written agreement by the District.

25.3 Definition of Claim

25.3.1 Pursuant to Public Contract Code section 9204, the term "Claim" means a separate demand by the Contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

25.3.1.1 A time extension, including without limitation, for relief of damages or penalties for delay assessed by the District under the Contract;

25.3.1.2 Payment by the District of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the Contract and payment of which is not otherwise expressly provided for or to which Contractor is not otherwise entitled to; or

25.3.1.3 An amount of payment disputed by the District.

25.4 Claims Presentation

25.4.1 Form and Contents of Claim

25.4.1.1 If Contractor intends to submit a Claim for an increase in the Contract Price and/or Contract Time for any reason including, without limitation, the acts of District or its agents, Contractor shall, within thirty (30) days after the event giving rise to the Claim, give notice of the Claim ("Notice of Potential Claim") in writing specifically identifying Contractor is invoking this Article 25 Claims Presentation. The Notice of Potential Claim shall provide Contractor's preliminary request for an adjustment to the Contract Price and/or Contract Time, with a description of the grounds therefore.

25.4.1.2 Within thirty (30) days after serving the written Notice of Potential Claim, Contractor shall provide a Claim including an itemized statement of the details and amounts of its Claim for any increase in the Contract Price of Contract Time as provided below, including a Time Impact Analysis and any and all other documentation substantiating Contractor's claimed damages:

25.4.1.2.1 The issues, events, conditions, circumstances and/or causes giving rise to the dispute, and shall show, in detail, the cause and effect of same;

25.4.1.2.2 Citation to provisions in the Contract Documents, statute sections, and/or case law entitling Contractor to an increase in the Contract Price or Contract Time;

25.4.1.2.3 The pertinent dates and/or durations and actual and/or anticipated effects on the Contract Price, Contract Schedule milestones and/or Contract Time adjustments;

25.4.1.2.4 The Time Impact Analysis of all time delays that shows actual time impact on the critical path; and

25.4.1.2.5 The line-item costs for labor, material, and/or equipment, if applicable, for all cost impacts priced like a change order according to Article 17 and must be updated monthly as to cost and entitlement if a continuing claim.

25.4.1.3 The Claim shall include the following certification by the Contractor:

25.4.1.3.1 The undersigned Contractor certifies under penalty of perjury that the attached dispute is made in good faith; that the supporting data is accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the adjustment for which Contractor believes the District is liable; and that I am duly authorized to certify the dispute on behalf of the Contractor.

25.4.1.3.2 Furthermore, Contractor understands that the value of the attached dispute expressly includes any and all of the Contractor's costs and expenses, direct and indirect, resulting from the Work performed on the Project, additional time required on the Project and/or resulting from delay to the Project including, without limitation, cumulative impacts. Contractor may not separately recover for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

25.4.2 Contractor shall bear all costs incurred in the preparation and submission of a Claim.

25.4.3 Failure to timely submit a Claim and the requisite supporting documentation shall constitute a waiver of Contractor's claim(s) against the District and Contractor's Claim(s) for compensation or an extension of time shall be deemed waived, released, and discharged as to any entitlement for adjustment to Contract Price and/or Contract Time.

25.5 Claim Resolution pursuant to Public Contract Code section 9204

Contractor may request to waive the claims procedure under Public Contract Code section 9204 and proceed directly to the commencement of a civil action or binding arbitration. If Contractor chooses to proceed, Contractor shall comply with the following steps:

25.5.1 STEP 1:

25.5.1.1 Upon receipt of a Claim by registered or certified mail, return receipt requested, including the documents necessary to substantiate it, the District shall conduct a reasonable review of the Claim and, within a period not to exceed 45 days, shall provide the Contractor a written statement identifying what portion of the Claim is disputed and what portion is undisputed. Upon receipt of a Claim, the District and Contractor may, by mutual agreement, extend the time period to provide a written statement. If the District needs approval from its governing body to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the Claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of Claim sent by registered mail or certified mail, return receipt requested, the District shall have up to three (3) days following the next duly publicly noticed meeting of the governing body after the 45-day period, or

extension, expires to provide Contractor a written statement identifying the disputed portion and the undisputed portion.

25.5.1.1.1 Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the District issues its written statement. Amounts not paid in a timely manner as required by this section, section 25.4, shall bear interest at seven percent (7%) per annum.

25.5.1.2 Upon receipt of a Claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable. In this instance, District and Contractor must comply with the sections below regarding Public Contract Code section 20104 et seq. and Government Code Claim Act Claims.

25.5.1.3 If the District fails to issue a written statement, or to otherwise meet the time requirements of this section, this shall result in the Claim being deemed rejected in its entirety. A Claim that is denied by reason of the District's failure to have responded to a Claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the Claim or the responsibility or qualifications of Contractor.

25.5.2 STEP 2:

25.5.2.1 If Contractor disputes the District's written response, or if the District fails to respond to a Claim within the time prescribed, Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the District shall schedule a meet and confer conference within 30 days for settlement of the dispute. Within 10 business days following the conclusion of the meet and confer conference, if the Claim or any portion of the Claim remains in dispute, the District shall provide the Contractor a written statement identifying the portion of the Claim that remains in dispute and the portion that is undisputed.

25.5.2.1.1.1 Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the District issues its written statement. Amounts not paid in a timely manner as required by this section, section 25.4, shall bear interest at seven percent (7%) per annum.

25.5.3 STEP 3:

25.5.3.1 Any disputed portion of the Claim, as identified by Contractor in writing, shall be submitted to nonbinding mediation, with the District and Contractor sharing the associated costs equally. The District and Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the Claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures outside this section.

25.5.3.1.1 For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

25.5.3.2 Unless otherwise agreed to by the District and Contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Public Contract Code section 20104.4 to mediate after litigation has been commenced.

25.5.4 STEP 4:

25.5.4.1 If mediation under this section does not resolve the parties' dispute, the District may, but does not require arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program.

25.6 Subcontractor Pass-Through Claims

25.6.1 If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a District because privity of contract does not exist, the contractor may present to the District a Claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that Contractor present a Claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the Claim be presented to the District shall furnish reasonable documentation to support the Claim.

25.6.2 Within 45 days of receipt of this written request from a subcontractor, Contractor shall notify the subcontractor in writing as to whether the Contractor presented the Claim to the District and, if Contractor did not present the Claim, provide the subcontractor with a statement of the reasons for not having done so.

25.6.3 The Contractor shall bind all its Subcontractors to the provisions of this section and will hold the District harmless against Claims by Subcontractors.

25.7 Government Code Claim Act Claim

25.7.1 If a claim, or any portion thereof, remains in dispute upon satisfaction of all applicable Claim Resolution requirements the Contractor shall comply with all claims presentation requirements as provided in Chapter 1 (commencing with section 900) and Chapter 2 (commencing with section 910) of Part 3 of Division 3.6 of Title 1 of Government Code as a condition precedent to the Contractor's right to bring a civil action against the District.

25.7.2 Contractor shall bear all costs incurred in the preparation, submission and administration of a Claim. Any claims presented in accordance with the Government Code must affirmatively indicate Contractor's prior compliance with the claims procedure herein of the claims asserted.

25.7.3 For purposes of those provisions, the running of the time within which a claim pursuant to Public Contract Code section 20104.2 only must be presented to

the District shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

25.8 Claim Resolution pursuant to Public Contract Code section 20104 et seq.

25.8.1 In the event of a disagreement between the parties as to performance of the Work, the interpretation of this Contract, or payment or nonpayment for Work performed or not performed, the parties shall attempt to resolve all claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between Contractor and District by those procedures set forth in Public Contract Code section 20104, et seq., to the extent applicable.

25.8.1.1 Contractor shall file with the District any written Claim, including the documents necessary to substantiate it, upon the application for final payment.

25.8.1.2 For claims of less than fifty thousand dollars (\$50,000), the District shall respond in writing within forty-five (45) days of receipt of the Claim or may request in writing within thirty (30) days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or claims the District may have against the Contractor.

25.8.1.2.1 If additional information is required, it shall be requested and provided by mutual agreement of the parties.

25.8.1.2.2 District's written response to the documented Claim shall be submitted to the Contractor within fifteen (15) days after receipt of the further documentation or within a period of time no greater than that taken by the Contractor to produce the additional information, whichever is greater.

25.8.1.3 For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the District shall respond in writing to all written Claims within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or claims the District may have against the Contractor.

25.8.1.3.1 If additional information is required, it shall be requested and provided upon mutual agreement of the District and the Contractor.

25.8.1.3.2 The District's written response to the Claim, as further documented, shall be submitted to the Contractor within thirty (30) days after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor to produce the additional information or requested documentation, whichever is greater.

25.8.1.4 If Contractor disputes the District's written response, or the District fails to respond within the time prescribed, Contractor may so notify the District, in writing, either within fifteen (15) days of receipt of the District's response or within fifteen (15) days of the District's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer

for settlement of the issues in dispute. Upon a demand, the District shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.

25.8.1.5 Following the meet and confer conference, if the Claim or any portion of it remains in dispute, the Contractor may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions the running of the time within which a claim must be filed shall be tolled from the time the Contractor submits its written Claim until the time the Claim is denied, including any period of time utilized by the meet and confer process.

25.8.1.6 For any civil action filed to resolve claims filed pursuant to this section, within sixty (60) days, but no earlier than thirty (30) days, following the filing of responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within fifteen (15) days by both parties of a disinterested third person as mediator, shall be commenced within thirty (30) days of the submittal, and shall be concluded within fifteen (15) days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

25.8.1.7 If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of the Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of 1986, (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

25.8.1.8 The District shall not fail to pay money as to any portion of a Claim which is undisputed except as otherwise provided in the Contract Documents. In any suit filed pursuant to this section, the District shall pay interest due at the legal rate on any arbitration award or judgment. Interest shall begin to accrue on the date the suit is filed in a court of law.

25.8.2 Contractor shall bind its Subcontractors to the provisions of this Section and will hold the District harmless against disputes by Subcontractors.

25.9 Claim Procedure Compliance

25.9.1 Failure to submit and administer claims as required in Article 25 shall waive Contractor's right to claim on any specific issues not included in a timely submitted claim. Claim(s) not raised in a timely protest and timely claim submitted under this Article 25 may not be asserted in any subsequent litigation, Government Code Claim, or legal action.

25.9.2 District shall not be deemed to waive any provision under this Article 25, if at District's sole discretion, a claim is administered in a manner not in accord with this Article 25. Waivers or modifications of this Article 25 may only be made by a

signed change order approved as to form by legal counsel for both District and Contractor; oral or implied modifications shall be ineffective.

25.10 Claim Resolution Non-Applicability

25.10.1 The procedures for dispute and claim resolutions set forth in this Article shall not apply to the following:

25.10.1.1 Personal injury, wrongful death or property damage claims;

25.10.1.2 Latent defect or breach of warranty or guarantee to repair;

25.10.1.3 Stop payment notices;

25.10.1.4 District's rights set forth in the Article on Suspension and Termination;

25.10.1.5 Disputes arising out of labor compliance enforcement by the Department of Industrial Relations; or

25.10.1.6 District rights and obligations as a public entity set forth in applicable statutes; provided, however, that penalties imposed against a public entity by statutes, including, but not limited to, Public Contract Code sections 20104.50 and 7107, shall be subject to the Claim Resolution requirements provided in this Article.

25.11 Attorney's Fees

25.11.1 Should litigation be necessary to enforce any terms or provisions of this Agreement, then each party shall bear its own litigation and collection expenses, witness fees, court costs, and attorney's fees.

26. STATE LABOR, WAGE & HOUR, APPRENTICE, AND RELATED PROVISIONS

26.1 Labor Compliance and Enforcement

Since this Project is subject to labor compliance and enforcement by the Department of Industrial Relations ("DIR"), Contractor specifically acknowledges and understands that it shall perform the Work of this Agreement while complying with all the applicable provisions of Division 2, Part 7, Chapter 1, of the Labor Code and Title 8 of the California Code of Regulations, including, without limitation, the requirement that the Contractor and all Subcontractors shall timely furnish complete and accurate electronic certified payroll records directly to the DIR. The District may not issue payment if this requirement is not met.

26.2 Wage Rates, Travel, and Subsistence

26.2.1 Pursuant to the provisions of Article 2 (commencing at section 1770), Chapter 1, Part 7, Division 2, of the Labor Code, the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public work is to be performed for each craft, classification, or type of worker needed to execute this Contract are on file at the District's principal office and copies will be made available to any interested party on request. Contractor shall obtain and post a copy of these wage rates at the job site.

26.2.2 Holiday and overtime work, when permitted by law, shall be paid for at the general prevailing rate of per diem wages for holiday and overtime work on file with the Director of the Department of Industrial Relations, unless otherwise specified. The holidays upon which those rates shall be paid need not be specified by the District, but shall be all holidays recognized in the applicable collective bargaining agreement. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code.

26.2.3 Contractor shall pay and shall cause to be paid each worker engaged in Work on the Project the general prevailing rate of per diem wages determined by the Director of the Department of Industrial Relations, regardless of any contractual relationship which may be alleged to exist between Contractor or any Subcontractor and such workers.

26.2.4 If during the period this bid is required to remain open, the Director of the Department of Industrial Relations determines that there has been a change in any prevailing rate of per diem wages in the locality in which the Work under the Contract is to be performed, such change shall not alter the wage rates in the Notice to Bidders or the Contract subsequently awarded.

26.2.5 Pursuant to Labor Code section 1775, Contractor shall, as a penalty to District, forfeit the statutory amount (believed by the District to be currently up to two hundred dollars (\$200) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates, determined by the District and/or the Director, for the work or craft in which that worker is employed for any public work done under Contract by Contractor or by any Subcontractor under it. The difference between such prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by Contractor.

26.2.6 Any worker employed to perform Work on the Project, which Work is not covered by any classification listed in the general prevailing wage rate of per diem wages determined by the Director, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to Work to be performed by him, and such minimum wage rate shall be retroactive to time of initial employment of such person in such classification.

26.2.7 Pursuant to Labor Code section 1773.1, per diem wages are deemed to include employer payments for health and welfare, pension, vacation, travel time, subsistence pay, and apprenticeship or other training programs authorized by Labor Code section 3093, and similar purposes.

26.2.8 Contractor shall post at appropriate conspicuous points on the Site of Project, a schedule showing all determined minimum wage rates and all authorized deductions, if any, from unpaid wages actually earned. In addition, Contractor shall post a sign-in log for all workers and visitors to the Site, a list of all subcontractors of any tier on the Site, and the required Equal Employment Opportunity poster(s).

26.3 Hours of Work

26.3.1 As provided in article 3 (commencing at section 1810), chapter 1, part 7, division 2, of the Labor Code, eight (8) hours of labor shall constitute a legal day's

work. The time of service of any worker employed at any time by Contractor or by any Subcontractor on any subcontract under this Contract upon the Work or upon any part of the Work contemplated by this Contract shall be limited and restricted by Contractor to eight (8) hours per day, and forty (40) hours during any one week, except as hereinafter provided. Notwithstanding the provisions hereinabove set forth, Work performed by employees of Contractor in excess of eight (8) hours per day and forty (40) hours during any one week, shall be permitted upon this public work upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half times the basic rate of pay.

26.3.2 Contractor shall keep and shall cause each Subcontractor to keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by Contractor in connection with the Work or any part of the Work contemplated by this Contract. The record shall be kept open at all reasonable hours to the inspection of District and to the Division of Labor Standards Enforcement of the DIR.

26.3.3 Pursuant to Labor Code section 1813, Contractor shall as a penalty to the District forfeit the statutory amount (believed by the District to be currently twenty-five dollars (\$25)) for each worker employed in the execution of this Contract by Contractor or by any Subcontractor for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of the provisions of article 3 (commencing at section 1810), chapter 1, part 7, division 2, of the Labor Code.

26.3.4 Any Work necessary to be performed after regular working hours, or on Sundays or other holidays shall be performed without additional expense to the District.

26.4 Payroll Records

26.4.1 Contractor shall upload, and shall cause each Subcontractor performing any portion of the Work under this Contract to upload, an accurate and complete certified payroll record ("CPR") electronically using DIR's eCPR System by uploading the CPRs by electronic XML file or entering each record manually using the DIR's iform (or current form) online on no less than every 30 days while Work is being performed and within 30 days after the final day of Work performed on the Project and within ten (10) days of any request by the District or Labor Commissioner at <http://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html> or current application and URL, showing the name, address, social security number, work classification, straight-time, and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor and/or each Subcontractor in connection with the Work.

26.4.1.1 The CPRs enumerated hereunder shall be filed directly with the DIR on a weekly basis or to the requesting party, whether the District or DIR, within ten (10) days after receipt of each written request. The CPRs from the Contractor and each Subcontractor for each week shall be provided on or before Wednesday of the week following the week covered by the CPRs. District may not make any payment to Contractor until:

26.4.1.1.1 Contractor and/or its Subcontractor(s) provide CPRs acceptable to the DIR; and

26.4.1.1.2 Any delay in Contractor and/or its Subcontractor(s) providing CPRs to the DIR in a timely manner may directly delay Contractor's payment.

26.4.2 All CPRs shall be available for inspection at all reasonable hours at the principal office of Contractor on the following basis:

26.4.2.1 A certified copy of an employee's CPR shall be made available for inspection or furnished to the employee or his/her authorized representative on request.

26.4.2.2 CPRs shall be made available for inspection or furnished upon request to a representative of District, Division of Labor Standards Enforcement, Division of Apprenticeship Standards, and/or the DIR.

26.4.2.3 CPRs shall be made available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through the District, Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested CPRs have not been provided pursuant to the provisions herein, the requesting party shall, prior to being provided the records, reimburse the costs of preparation by Contractor, Subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of Contractor.

26.4.3 Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by District, Division of Apprenticeship Standards, or Division of Labor Standards Enforcement shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of Contractor awarded Contract or performing Contract shall not be marked or obliterated.

26.4.4 Contractor shall inform District of the location of the records enumerated hereunder, including the street address, city, and county, and shall, within five (5) working days, provide a notice of change of location and address.

26.4.5 In the event of noncompliance with the requirements of this section, Contractor shall have ten (10) days in which to comply subsequent to receipt of written notice specifying in what respects Contractor must comply with this section. Should noncompliance still be evident after the ten (10) day period, Contractor shall, as a penalty to District, forfeit up to one hundred dollars (\$100) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Labor Commissioner, these penalties shall be withheld from progress payments then due.

26.4.6 **[RESERVED]**

26.5 **[RESERVED]**

26.6 **Apprentices**

26.6.1 Contractor acknowledges and agrees that, if this Contract involves a dollar amount greater than, or a number of working days greater than that specified in Labor Code section 1777.5, then this Contract is governed by the provisions of Labor Code Section 1777.5. It shall be the responsibility of Contractor to ensure compliance with this Article and with Labor Code section 1777.5 for all apprenticeship occupations.

26.6.2 Apprentices of any crafts or trades may be employed and, when required by Labor Code section 1777.5, shall be employed provided they are properly registered in full compliance with the provisions of the Labor Code.

26.6.3 Every such apprentice shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he/she is employed, and shall be employed only at the work of the craft or trade to which she/he is registered.

26.6.4 Only apprentices, as defined in section 3077 of the Labor Code, who are in training under apprenticeship standards and written apprentice agreements under chapter 4 (commencing at section 3070), division 3, of the Labor Code, are eligible to be employed. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which he/she is training.

26.6.5 Pursuant to Labor Code section 1777.5, if that section applies to this Contract as indicated above, Contractor and any Subcontractors employing workers in any apprenticeable craft or trade in performing any Work under this Contract shall apply to the applicable joint apprenticeship committee for a certificate approving the Contractor or Subcontractor under the applicable apprenticeship standards and fixing the ratio of apprentices to journeymen employed in performing the Work.

26.6.6 Pursuant to Labor Code section 1777.5, if that section applies to this Contract as indicated above, Contractor and any Subcontractor may be required to make contributions to the apprenticeship program.

26.6.7 If Contractor or Subcontractor willfully fails to comply with Labor Code section 1777.5, then, upon a determination of noncompliance by the Administrator of Apprenticeship, it shall:

26.6.7.1 Be denied the right to bid on any subsequent project for one (1) year from the date of such determination;

26.6.7.2 Forfeit as a penalty to District the full amount as stated in Labor Code section 1777.7. Interpretation and enforcement of these provisions shall be in accordance with the rules and procedures of the California Apprenticeship Council and under the authority of the Chief of the Division of Apprenticeship Standards.

26.6.8 Contractor and all Subcontractors shall comply with Labor Code section 1777.6, which section forbids certain discriminatory practices in the employment of apprentices.

26.6.9 Contractor shall become fully acquainted with the law regarding apprentices prior to commencement of the Work. Special attention is directed to

sections 1777.5, 1777.6, and 1777.7 of the Labor Code, and title 8, California Code of Regulations, section 200 et seq. Questions may be directed to the State Division of Apprenticeship Standards, 455 Golden Gate Avenue, 9th floor, San Francisco, California 94102.

26.7 Non-Discrimination

26.7.1 Contractor herein agrees to comply with the provisions of the California Fair Employment and Housing Act as set forth in part 2.8 of division 3 of the California Government Code, commencing at section 12900; the Federal Civil Rights Act of 1964, as set forth in Public Law 88-352, and all amendments thereto; Executive Order 11246; and all administrative rules and regulations found to be applicable to Contractor and Subcontractor.

26.7.2 Special requirements for Federally Assisted Construction Contracts: During the performance of this Contract, Contractor agrees to incorporate in all subcontracts the provisions set forth in Chapter 60-1.4(b) of Title 41 published in Volume 33 No. 104 of the Federal Register dated May 28, 1968.

26.8 Labor First Aid

Contractor shall maintain emergency first aid treatment for Contractor's workers on the Project which complies with the Federal Occupational Safety and Health Act of 1970 (29 U.S.C. § 651 et seq.) and the California Occupational Safety and Health Act of 1973 (Lab. Code, § 6300 et seq.; 8 Cal. Code of Regs., § 330 et seq.).

27. [RESERVED]

28. MISCELLANEOUS

28.1 Assignment of Antitrust Actions

28.1.1 Section 7103.5(b) of the Public Contract Code states:

In entering into a public works contract or subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, which assignment shall be made and become effective at the time the awarding body tenders final payment to the Contractor, without further acknowledgment by the parties.

28.1.2 Section 4552 of the Government Code states:

In submitting a bid to a public purchasing body, the bidder offers and agrees that if the bid is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the bidder for sale to the purchasing

body pursuant to the bid. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the bidder.

28.1.3 Section 4553 of the Government Code states:

If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under this chapter, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

28.1.4 Section 4554 of the Government Code states:

Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under this part if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action.

28.1.5 Under this Article, "public purchasing body" is District and "bidder" is Contractor.

28.2 **Excise Taxes**

If, under Federal Excise Tax Law, any transaction hereunder constitutes a sale on which a Federal Excise Tax is imposed and the sale is exempt from such Federal Excise Tax because it is a sale to a State or Local Government for its exclusive use, District, upon request, will execute documents necessary to show (1) that District is a political subdivision of the State for the purposes of such exemption, and (2) that the sale is for the exclusive use of District. No Federal Excise Tax for such materials shall be included in any Contract Price.

28.3 **Taxes**

Contract Price is to include any and all applicable sales taxes or other taxes that may be due in accordance with section 7051 et seq. of the Revenue and Taxation Code, Regulation 1521 of the State Board of Equalization or any other tax code that may be applicable.

28.4 **Shipments**

Contractor is responsible for any or all damage or loss to shipments until delivered and accepted on Site, as indicated in the Contract Documents. There must be no charge for containers, packing, unpacking, drayage, or insurance. The total Contract Price shall be all inclusive (including sales tax) and no additional costs of any type will be considered.

28.5 **Compliance with Government Reporting Requirements**

If this Contract is subject to federal or other governmental reporting requirements because of federal or other governmental financing in whole or in part for the Project of

which it is part, or for any other reason, Contactor shall comply with those reporting requirements at the request of the District at no additional cost.

END OF DOCUMENT

SPECIAL CONDITIONS

THIS DOCUMENT MUST BE ADAPTED FOR EACH PROJECT – Delete any provision that is not applicable or if no change from the provision in the General Conditions.

*** THIS LIST OF SPECIAL CONDITION PROVISIONS IS FOR REFERENCE ONLY. REMOVE THIS PAGE BEFORE USING THIS DOCUMENT. ***

1. Mitigation Measures
2. Modernization Projects
3. Badge Policy for Contractors
4. Substitution for Specified Items
5. Weather Days
6. Owner-Controlled or Wrap-Up Insurance Program
7. Insurance Policy Limits
8. Permits, Certificates, Licenses, Fees, Approval
9. Project Labor Agreement/Payroll Records
10. As-Builts and Record Drawings
11. Disabled Veteran Business Enterprises
12. Construction Manager
13. Program Manager
14. Federal Funds - Wages
15. Federal Funds – Debarment
16. Federal Funds – Byrd Anti-Lobbying
17. Federal Funds – Procurement of recovered materials
18. Federal Funds - Domestic preferences for procurements
19. Preliminary Schedule of Values
20. COVID-19 Safety Requirements
21. COVID-19 Vaccination/Testing Requirements

SPECIAL CONDITIONS

1. Mitigation Measures

Contractor shall comply with all applicable mitigation measures, if any, adopted by any public agency with respect to this Project pursuant to the California Environmental Quality Act. (Public Resources Code section 21000 *et seq.*)

2. Modernization Projects

2.1 Access. Access to the school buildings and entry to buildings, classrooms, restrooms, mechanical rooms, electrical rooms, or other rooms, for construction purposes, must be coordinated with District and onsite District personnel before Work is to start. Unless agreed to otherwise in writing, only a school custodian will be allowed to unlock and lock doors in existing building(s). The custodian will be available only while school is in session. If a custodian is required to arrive before 7:00 a.m. or leave after 3:30 p.m. to accommodate Contractor's Work, the overtime wages for the custodian will be paid by the Contractor, unless at the discretion of the District, other arrangements are made in advance.

2.2 Keys. Upon request, the District may, at its own discretion, provide keys to the school site for the convenience of the Contractor. The Contractor agrees to pay all expenses to re-key the entire school site and all other affected District buildings if the keys are lost or stolen, or if any unauthorized party obtains a copy of the key or access to the school.

2.3 Maintaining Services. The Contractor is advised that Work is to be performed in spaces regularly scheduled for instruction. Interruption and/or periods of shutdown of public access, electrical service, water service, lighting, or other utilities shall be only as arranged in advance with the District. Contractor shall provide temporary services to all facilities interrupted by Contractor's Work.

2.4 Maintaining Utilities. The Contractor shall maintain in operation during duration of Contract, drainage lines, storm drains, sewers, water, gas, electrical, steam, and other utility service lines within working area.

2.5 Confidentiality. Contractor shall maintain the confidentiality of all information, documents, programs, procedures and all other items that Contractor encounters while performing the Work. This requirement shall be ongoing and shall survive the expiration or termination of this Contract and specifically includes, without limitation, all student, parent, and employee disciplinary information and health information.

2.6 Work during Instructional Time. By submitting its bid, Contractor affirms that Work may be performed during ongoing instruction in existing facilities. If so, Contractor agrees to cooperate to the best of its ability to minimize any disruption to school operations and any use of school facilities by the public up to, and including, rescheduling specific work activities, at no additional cost to District.

2.7 No Work during Student Testing. Contractor shall, at no additional cost to the District and at the District's request, coordinate its Work to not disturb District students including, without limitation, not performing any Work when students at the Site are taking State or Federally-required tests.

3. Badge Policy for Contractors

All Contractors doing work for the District will provide their workers with identification badges. These badges will be worn by all members of the Contractor's staff who are working in a District facility.

3.1 Badges must be filled out in full and contain the following information:

3.1.1 Name of Contractor

3.1.2 Name of Employee

3.1.3 Contractor's address and phone number

3.2 Badges are to be worn when the Contractor or his/her employees are on site and must be visible at all times. Contractors must inform their employees that they are required to allow District employees, the Architect, the Construction Manager, the Program Manager, or the Project Inspector to review the information on the badges upon request.

3.3 Continued failure to display identification badges as required by this policy may result in the individual being removed from the Project or assessment of fines against the Contractor.

4. Substitutions for Specified Items

Replace Section 1.7 in the General Conditions with the following provisions:

1.7.1 Whenever in the Specifications any materials, process, or article is indicated or specified by grade, patent, or proprietary name, or by name of manufacturer, that Specification shall be deemed to be followed by the words "or equal." Contractor may, unless otherwise stated, offer any material, process, or article that shall be substantially equal or better in every respect to that so indicated or specified.

1.7.1.1 If the material, process, or article offered by Contractor is not, in the opinion of the District, substantially equal or better in every respect to that specified, then Contractor shall furnish the material, process, or article specified in the Specifications without any additional compensation or change order.

1.7.1.2 This provision shall not be applicable with respect to any material, product, thing or service for which District made findings and gave notice in accordance with Public Contract Code section 3400(c); therefore, Contractor shall not be entitled to request a substitution with respect to those materials, products or services.

1.7.2 A request for a substitution shall be submitted as follows:

1.7.2.1 Contractor shall notify the District in writing of any request for a substitution at least ten (10) days prior to bid opening as indicated in the Instructions to Bidders.

1.7.2.2 Requests for Substitutions after award of the Contract shall be submitted within thirty-five (35) days of the date of the Notice of Award.

1.7.3 Within 35 days after the date of the Notice of Award, Contractor shall provide data substantiating a request for substitution of "an equal" item, including but not limited to the following:

1.7.3.1 All variations of the proposed substitute from the material specified including, but not limited to, principles of operation, materials, or construction finish, thickness or gauge of materials, dimensions, weight, and tolerances;

1.7.3.2 Available maintenance, repair or replacement services;

1.7.3.3 Increases or decreases in operating, maintenance, repair, replacement, and spare parts costs;

1.7.3.4 Whether or not acceptance of the substitute will require other changes in the Work (or in work performed by the District or others under Contract with the District); and

1.7.3.5 The time impact on any part of the Work resulting directly or indirectly from acceptance of the proposed substitute.

1.7.4 No substitutions shall be made until approved, in writing, by the District. The burden of proof as to equality of any material, process, or article shall rest with Contractor. The Contractor warrants that if substitutes are approved:

1.7.4.1 The proposed substitute is equal or superior in all respects to that specified, and that such proposed substitute is suitable and fit for the intended purpose and will perform adequately the function and achieve the results called for by the general design and the Contract Documents;

1.7.4.2 The Contractor provides the same warranties and guarantees for the substitute that would be provided for that specified;

1.7.4.3 The Contractor shall be fully responsible for the installation of the substitute and any changes in the Work required, either directly or indirectly, because of the acceptance of such substitute, with no increase in Contract Price or Contract Time. Incidental changes or extra component parts required to accommodate the substitute will be made by the Contractor without a change in the Contract Price or Contract Time;

1.7.4.4 The Contractor shall be responsible for any re-design costs occasioned by District's acceptance and/or approval of any substitute; and

1.7.4.5 The Contractor shall, in the event that a substitute is less costly than that specified, credit the District with one hundred percent (100%) of the net difference between the substitute and the originally specified material. In this event, the Contractor agrees to execute a deductive Change Order to reflect that credit.

1.7.5 In the event Contractor furnishes a material, process, or article more expensive than that specified, the difference in the cost of that material, process, or article so furnished shall be borne by Contractor.

1.7.6 In no event shall the District be liable for any increase in Contract Price or Contract Time due to any claimed delay in the evaluation of any proposed substitute or in the acceptance or rejection of any proposed substitute.

1.7.7 Contractor shall be responsible for any costs the District incurs for professional services, DSA fees, or delay to the Project Schedule, if applicable, while DSA reviews changes for the convenience of Contractor and/or to accommodate Contractor's means and methods. District may deduct those costs from any amounts owing to the Contractor for the review of the request for substitution, even if the request for substitution is not approved. District, at its sole discretion, shall deduct from the payments due to and/or invoice Contractor for all the professional services and/or DSA fees or delay to the Project Schedule, if applicable, while DSA reviews changes for the convenience of Contractor and/or to accommodate Contractor's means and methods arising herein.

5. Weather Days

Replace Section 15.2.1.5 in the General Conditions with the following:

15.2.1.5 The number of days of Adverse Weather exceeds the following parameters:

January		July	
February		August	
March		September	
April		October	
May		November	
June		December	

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6. Owner-Controlled or Wrap-Up Insurance Program

Contractor and all Subcontractors under the Contractor shall participate in and comply with the owner-controlled or wrap-up insurance program ("OCIP") as required by the District, OCIP Administrator, insurers, or designees, prior to the commencement of construction activities at the Project. In addition, Contractor shall procure and maintain, at its own expense, until completion and final acceptance of the Work at least the following insurance from insurance companies with an A.M. Best rating of no less than _____, except for those coverages provided by the OCIP as described in the OCIP Manual:

[Commercial General Liability]	Personal Injury Liability, Broad Form Property Damage including completed operations, and Explosion, Collapse and Underground Hazards	[E.G. \$5,000,000]
[Automobile Liability – Any Auto]	Bodily Injury and Property Damage	[E.G. \$5,000,000]
[Workers Compensation]		Statutory limits pursuant to State law
[Employers' Liability]		[E.G. \$1,000,000]

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7. Insurance Policy Limits

All of Contractor’s insurance shall be with insurance companies with an A.M. Best rating of no less than _____. The limits of insurance shall not be less than:

Commercial General Liability	Product Liability and Completed Operations, Fire Damage Liability – Split Limit	[E.G. CHOOSE ONE OF THREE OPTIONS: Option 1 - Low Risk Option: \$1,000,000 per occurrence; \$2,000,000 aggregate
		Option 2 - Intermediate Risk Option: \$2,000,000 per occurrence; \$4,000,000 aggregate
		Option 3 - High Risk Option: \$5,000,000 per occurrence; \$10,000,000 aggregate]
Automobile Liability – Any Auto	Combined Single Limit	[E.G. CHOOSE ONE OF TWO OPTIONS: Option 1: Personal vehicles: \$500,000 Commercial vehicles: \$1,000,000
		Option 2: Personal vehicles: \$100,000 per person/ \$300,000 per accident]
Workers’ Compensation		Statutory limits pursuant to State law
Employer’s Liability		\$1,000,000
Builder’s Risk (Course of Construction)		Issued for the value and scope of Work indicated herein
Pollution Liability		\$1,000,000 per claim; \$2,000,000 aggregate

8. Permits, Certificates, Licenses, Fees, Approvals

8.1 Payment for Permits, Certificates, Licenses, Fees, and Approvals. As required in the General Conditions, the Contractor shall secure and pay for all permits, licenses,

approvals, and certificates necessary for the prosecution of the Work with the exception of the following:

With respect to the above-listed items, Contractor shall be responsible for securing such items; however, District will be responsible for payment of these charges or fees. Contractor shall notify the District of the amount due with respect to such items and to whom the amount is payable. Contractor shall provide the District with an invoice and receipt with respect to such charges or fees.

9. Project Labor Agreement/Payroll Records

The District has entered into a Project Labor Agreement ("PLA"), which covers this Project.

Accordingly, the following provision is added as Section 26.4.6:

26.4.6 As Contractor and its subcontractors have agreed to be bound by the terms of the PLA entered into by the District [on or about / dated] _____, Contractor and its subcontractors may be excused from uploading CPRs electronically using DIR's eCPR System by uploading the CPRs by electronic XML file or entering each record manually using the DIR's iform (or current form) online at <http://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html> , or by using a more current application and URL. However, within ten (10) days of any request by the District or Labor Commissioner, Contractor and its subcontractors shall provide CPRs showing the name, address, social security number, work classification, straight time, and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor and/or each subcontractor in connection with the Work.

10. As-Builts and Record Drawings

10.1 When called for by Division 1, Contractor shall submit As-Built Drawings pursuant to the Contract Documents consisting of one set of computer-aided design and drafting ("CADD") files in the following format _____, plus one set of As-Built Drawings on vellum or mylar.

10.2 Contractor shall submit Record Drawings pursuant to the Contract Documents consisting of one set of computer-aided design and drafting ("CADD") files in the following format _____, plus one set of Record Drawings on vellum or mylar].

11. Disabled Veteran Business Enterprises

This Project uses or may plan to use funds allocated pursuant to the State of California School Facility Program ("Program") for the construction and/or modernization of school buildings. Therefore, Section 17076.11 of the Education Code requires the District to have a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%), per year, of the overall dollar amount expended each year by the District on projects that receive state funding. The Contractor must submit the Disabled Veteran Business Enterprise Participation Certification to the District with its executed Agreement, identifying the steps Contractor took to solicit DVBE participation in conjunction with this Contract.

12. Construction Manager

The District will use a Construction Manager on the Project that is the subject of this Contract. _____ is the Construction Manager for this Project.

13. Program Manager

_____ is the Program Manager designated for the Project that is the subject of this Contract.

14. Federal Funds - Wages

As this Project is funded in whole or in part by federal funds, Contractor and all Subcontractors are subject to civil or criminal prosecution for any violation of the federal False Claims Act set forth under section 1001 of title 18 and section 231 of title 31 of the United States Code.

The following provisions are added as Section 27 of the General Conditions:

27. FEDERAL LABOR, WAGE & HOUR, APPRENTICE, AND RELATED PROVISIONS

27.1 Minimum Wages

The Davis-Bacon Act and 29 CFR parts 1 through 7 shall apply if the Project is financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution.

27.1.1 All laborers and mechanics employed or working upon the Site of the Work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the Project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account, except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3) , the full amount of wages and bona fide fringe benefits, or cash equivalents thereof, due at time of payment computed at rates not less than those contained in the applicable wage determination of the Secretary of Labor regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of this section, including but not limited to paragraph 27.1.7; also, regular contributions made or costs incurred for more than a weekly period, but not less often than quarterly, under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of Work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing Work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that

the employer's payroll records accurately set forth the time spent in each classification in which Work is performed. The wage determination including any additional classification and wage rates conformed under this section, including but not limited to paragraph 27.1.6 and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its Subcontractors at the Site of the Work in a prominent and accessible place where it can be easily seen by the workers.

27.1.2 Any class of laborers or mechanics, including helpers, and which is to be employed under the Contract which is not listed in the wage determination shall be classified in conformance with the wage determination. An additional classification and wage rate and fringe benefits will not be approved unless when the following criteria have been met:

27.1.2.1 The Work to be performed by the classification requested is not performed by a classification in the wage determination; and

27.1.2.2 The classification is utilized in the area by the construction industry; and

27.1.2.3 The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

27.1.3 If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the District agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the Contractor to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210.

27.1.4 In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the District do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contractor shall provide the questions, including the views of all interested parties and the recommendation of the District, to the District for the District's review and referral to the Administrator for determination.

27.1.5 The wage rate (including fringe benefits where appropriate) determined pursuant to this section, shall be paid to all workers performing Work in the classification under this Contract from the first day on which Work is performed in the classification.

27.1.6 Whenever the minimum wage rate prescribed in any applicable wage determination for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

27.1.7 If the Contractor does not make payments to a trustee or other third person, the Contractor may consider, as part of the wages of any laborer or mechanic, the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. If the Secretary of Labor so requires, the

Contractor shall set aside in a separate account sufficient assets to meet obligations under the plan or program.

27.2 Withholding. District may, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this Contract or any other Federal contract with the same Contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any Subcontractor the full amount of wages required by the Contract. In the event of Contractor's or any Subcontractors' failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the Site of the Work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the Contract, the District may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as it deems necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

27.3 Payrolls and basic records.

27.3.1 Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the Work and preserved for a period of three years thereafter for all laborers and mechanics working at the Site of the Work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records that show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

27.3.2 The Contractor shall submit weekly for each week in which any Contract Work is performed a copy of all payrolls to the District. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information shall be submitted on a form acceptable to the District. Optional Form WH-347 is available for this purpose from the Wage and

Hour Division Web site at <https://www.dol.gov/whd/programs/dbra/wh347.htm> or its successor site. Contractor is responsible for the submission of copies of payrolls by all Subcontractors. Contractor and Subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the District, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. Contractor may require a Subcontractor to provide addresses and social security numbers to the Contractor for its own records, without weekly submission to the District or other government agency

27.3.3 Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or Subcontractor or his or her agent who pays or supervises the payment of the persons employed under the Contract and shall certify the following:

27.3.3.1 That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5,

27.3.3.2 That the appropriate information is being maintained under 29 CFR 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and

27.3.3.3 That such information is correct and complete;

27.3.3.4 That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the Contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and

27.3.3.5 That no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

27.3.3.6 That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of Work performed, as specified in the applicable wage determination incorporated into or applicable to the Contract.

27.3.3.7 The weekly submission of a properly executed certification in the form set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 27.3.3 of this section.

27.3.3.8 The falsification of any of the above certifications may subject the Contractor or one or more Subcontractors to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

27.3.3.9 The Contractor or Subcontractor shall make the records required under this section available for inspection, copying, or transcription by authorized representatives of the District or the federal Department of Labor, and shall permit representatives to interview employees during working hours on the job. If the Contractor or Subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the

suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

27.4 Apprentices and trainees

27.4.1 Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the Work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first ninety (90) days of probationary employment as an apprentice in an eligible apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job Site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of Work actually performed. In addition, any apprentice performing Work on the job Site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the Work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or Subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the Work performed until an acceptable program is approved.

27.4.2 Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to Work at less than the predetermined rate for the Work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job Site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in

accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of Work actually performed. In addition, any trainee performing Work on the job Site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the Work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the Work performed until an acceptable program is approved.

27.4.3 Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

27.5 Compliance with Copeland Act requirements. Contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this Contract.

27.6 Subcontracts. The Contractor or Subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the Federal agency may by appropriate instructions require, and also a clause requiring the Subcontractors to include these clauses in any lower tier subcontracts. The Contractor shall be responsible for the compliance by any Subcontractor or lower tier Subcontractor with all the Contract clauses in 29 CFR 5.5.

27.7 Contract termination: debarment. A breach of the Contract clauses in 29 CFR 5.5 may be grounds for termination of the Contract, and for debarment as a Contractor and a Subcontractor as provided in 29 CFR 5.12.

27.8 Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this Contract.

27.9 Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its Subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

27.10 Certification of eligibility.

27.10.1 By entering into this Contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is

a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

27.10.2 No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

27.10.3 Contractor shall be subject to the penalty for making false statements prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

27.11 Clauses Mandated by Contract Work Hours and Safety Standards Act.

As used in the following paragraphs, the terms laborers and mechanics include watchmen and guards.

27.11.1 Overtime requirements. No Contractor or Subcontractor contracting for any part of the Contract Work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such Work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

27.11.2 Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in the foregoing paragraph the Contractor and any Subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and Subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the foregoing paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to Work in excess of the standard workweek of forty hours without payment of the overtime wages required by the foregoing paragraph.

27.11.3 Withholding for unpaid wages and liquidated damages. The District may upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of Work performed by the Contractor or Subcontractor under the Contract or any other Federal contract with the same Contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or Subcontractor for unpaid wages and liquidated damages as provided in the foregoing paragraph.

27.11.4 Subcontracts. The Contractor or Subcontractor shall insert in any subcontracts the foregoing paragraphs concerning "Overtime requirements" and "Violation; liability for unpaid wages; liquidated damages" and also a clause requiring each Subcontractor to include these clauses in any lower tier subcontracts. Contractor shall be responsible for compliance by any Subcontractor or lower tier Subcontractor with the clauses set forth in paragraphs 27.11.1 through 27.11.4 of this section.

15. Federal Funds – Debarment

As this Project is funded in whole or in part by federal funds, the following provision is added as Section 6.1.5 of the General Conditions:

This Project uses or may plan to use federal funds. Consequently, Contractor is required to provide a signed "Federal Debarment" certification with its bid. This certification is required by the regulation implementing Executive Order 12549, Debarment and Suspension, 29 CFR Part 89, Section 98.510, Participants; responsibilities. The regulations were published as Part of VII of the May 26, 1988 Federal Register (pages 19160-19211).

16. Federal Funds – Byrd Anti-Lobbying

As this Project is funded in whole or in part by federal funds, the following provision is added as Section 6.1.7 of the General Conditions:

If the contract exceeds \$100,000, Contractor is required to provide a signed "Byrd Anti-Lobbying" certification with its bid ((31 U.S.C. 1352) (Appendix II to 2 CFR, Part 200)).

17. Federal Funds – Procurement of recovered materials

As this Project is funded in whole or in part by federal funds, the following provision is added as Section 6.13.5 of the General Conditions:

Contractor must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

18. Federal Funds - Domestic preferences for procurements

As this Project is funded in whole or in part by a federal grant made after November 12, 2020, the following provision is added as Section 1.8.10 of the General Conditions:

1.8.10 As appropriate and to the extent consistent with law, Contractor should, to the greatest extent practicable for the Project, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products). The requirements of this section must be included in all subcontracts and purchase orders for work or products for the Project.

1.8.10.1 "Produced in the United States" means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

1.8.10.2 "Manufactured products" means items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

19. Preliminary Schedule of Values

The preliminary schedule of values shall include, at a minimum, the following information and the following structure:

Replace Section 10.1.1.2.3 in the General Conditions with the following provisions:

10.1.1.2.3 The preliminary schedule of values shall not provide for values any greater than the following percentages of the Contract value:

10.1.1.2.3.1 Mobilization and layout combined to equal not more than **[2]**%;

10.1.1.2.3.2 Submittals, samples and shop drawings combined to equal not more than **[4]**%;

10.1.1.2.3.3 Bonds and insurance combined to equal not more than **[2.5]**%.

10.1.1.2.3.4 Closeout documentation shall have a value in the preliminary schedule of not less than **[10]**%.

20. COVID-19 Safety Requirements

Contractor shall, at its cost, timely comply with all applicable federal, State, and local requirements relating to COVID-19 or other public health emergency/epidemic/pandemic. Further, except to the extent the Order provides otherwise, Contractor and Contractor's personnel, subcontractors and suppliers shall continue to comply with all applicable terms in the California Department of Public Health's State Public Health Officer Orders.

21. COVID-19 Vaccination/Testing Requirements

Vaccination Requirements

Contractor shall fill out, sign, date and submit to District the COVID-19 Vaccination/Testing Certification Form, attached hereto as **Attachment "A."**

According to the August 11, 2021, California Department of Public Health ("CDPH") State Public Health Officer Order ("Order"), a person is "fully vaccinated" for COVID-19 if two weeks or more have passed since they have received the second dose in a 2-dose series (Pfizer-BioNTech or Moderna or vaccine authorized by the World Health Organization), or two weeks or more have passed since they received a single-dose vaccine (Johnson and Johnson[J&J]/Janssen).

Pursuant to the CDPH Guidance for Vaccine Records Guidelines & Standards, Contractor shall only accept the following as proof of vaccination:

(a) COVID-19 Vaccination Record Card (issued by the Department of Health and Human Services Centers for Disease Control & Prevention or

WHO Yellow Card which includes name of person vaccinated, type of vaccine provided and date last dose administered);

(b) a photo of a Vaccination Record Card as a separate document;

(c) a photo of a Vaccination Record Card stored on a phone or electronic device;

(d) documentation of COVID-19 vaccination from a health care provider;

(e) digital record that includes a QR code that when scanned by a SMART Health Card reader displays to the reader name, date of birth, vaccine dates and vaccine type; or

(f) documentation of vaccination from other contracted employers who follow these vaccination records guidelines and standards.

In the absence of knowledge to the contrary, Contractor may accept the documentation presented in (a) through (f) above as valid.

Contractor shall have a plan in place for tracking verified Contractor personnel vaccination status. Records of vaccination verification must be made available, upon request, to the local health jurisdiction for purposes of case investigation.

Contractor personnel, including any and all tiers of subcontractor, supplier, and any other personnel entering the Project site, who are not fully vaccinated, or for whom vaccine status is unknown or documentation is not provided, must be considered unvaccinated.

Weekly Testing Requirements

Contractor shall ensure that Contractor personnel, including any and all tiers of subcontractor, supplier, and any other worker entering the Project site, who are unvaccinated or who are not fully vaccinated are required to undergo diagnostic screening testing, as specified below:

(a) Contractor personnel may be tested with either antigen or molecular tests to satisfy this requirement, but unvaccinated or incompletely vaccinated workers must be tested at least once weekly with either PCR testing or antigen testing. Any PCR (molecular) or antigen test used must either have Emergency Use Authorization by the U.S. Food and Drug Administration or be operating per the Laboratory Developed Test requirements by the U.S. Centers for Medicare and Medicaid Services.

(b) Unvaccinated or not fully vaccinated Contractor personnel must also observe all other infection control requirements, and are not exempted from the testing requirement even if they have a medical contraindication to vaccination, since they are still potentially able to spread the illness. Previous history of COVID-19 from which the individual recovered more than 90 days earlier, or a previous positive antibody test for COVID-19, do not waive this requirement for testing.

Contractor shall have a plan in place for tracking test results and conducting workplace contact tracing, and must report results to local public health departments, if applicable.

[ATTACHMENT "A" ON NEXT PAGE]

ATTACHMENT "A"
COVID-19 VACCINATION/TESTING CERTIFICATION

Contractor: _____

The California Department of Public Health ("CDPH") requires, pursuant to its August 11, 2021, Order ("Order"), that all public and private schools serving students in transitional kindergarten through grade twelve, unless exempt, are required to verify the vaccine status of all K-12 school workers, effective October 15, 2021. Further, pursuant to the Order, all such schools are required to verify that all workers are either fully vaccinated or undergo weekly diagnostic testing.

In light of these CDPH requirements, Contractor certifies that the following entity:

_____ has verified that the Contractor personnel providing services at District's Project site(s):

- Have all been fully vaccinated in accordance with the CDPH Order.

- Have not all been fully vaccinated, but those who are unvaccinated or not fully vaccinated undergo weekly diagnostic testing in accordance with the CDPH Order.

- Have not been fully vaccinated and do not undergo weekly diagnostic testing in accordance with the CDPH Order.

Contractor understands that the District's Project site will need to comply with the CDPH Order's COVID-19 requirements for fully vaccinated personnel or unvaccinated personnel. Personnel who are not fully vaccinated or decline to state their vaccination status will be treated as unvaccinated, and Contractor will comply with the CDPH Order, and all applicable state and local laws for vaccinated and unvaccinated personnel.

CERTIFICATION

I, _____, certify that I am Contractor's _____ and that I have made a diligent effort to ascertain the facts with regard to the representations made herein.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

**HAZARDOUS MATERIALS
PROCEDURES & REQUIREMENTS**

1. Summary

This document includes information applicable to hazardous materials and hazardous waste abatement.

2. Notice of Hazardous Waste or Materials

- a. Contractor shall give notice in writing to the District, the Construction Manager, and the Architect promptly, before any of the following materials are disturbed, and in no event later than twenty-four (24) hours after first observance, of any:
 - (1) Material that Contractor believes may be a material that is hazardous waste or hazardous material, as defined in section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law;
 - (2) Other material that may present a substantial danger to persons or property exposed thereto in connection with Work at the site.
- b. Contractor's written notice shall indicate whether the hazardous waste or material was shown or indicated in the Contract Documents to be within the scope of Work, and whether the materials were brought to the site by Contractor, its Subcontractors, suppliers, or anyone else for whom Contractor is responsible. As used in this section the term "hazardous materials" shall include, without limitation, asbestos, lead, Polychlorinated biphenyl (PCB), petroleum and related hydrocarbons, and radioactive material.
- c. In response to Contractor's written notice, the District shall investigate the identified conditions.
- d. If the District determines that conditions do not involve hazardous materials or that no change in terms of Contract is justified, the District shall so notify Contractor in writing, stating reasons. If the District and Contractor cannot agree on whether conditions justify an adjustment in Contract Price or Contract Time, or on the extent of any adjustment, Contractor shall proceed with the Work as directed by the District.
- e. If after receipt of notice from the District, Contractor does not agree to resume Work based on a reasonable belief it is unsafe, or does not agree to resume Work under special conditions, then District may order such portion of Work that is in connection with such hazardous condition or such affected area to be deleted from the Work, or performed by others, or District may invoke its rights to terminate the Contract in whole or in part. District will determine entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Time as a result of deleting such portion of Work, or performing the Work by others.

- f. If Contractor stops Work in connection with any hazardous condition and in any area affected thereby, Contractor shall immediately redeploy its workers, equipment, and materials, as necessary, to other portions of the Work to minimize delay and disruption.

3. Additional Warranties and Representations

- a. Contractor represents and warrants that it, its employees, and its subcontractors and their employees, shall at all times have the required levels of familiarity with the Site and the Work, training, and ability to comply fully with all applicable laws and contractual requirements for safe and expeditious performance of the Work, including whatever training is or may be required regarding the activities to be performed (including, but not limited to, all training required to address adequately the actual or potential dangers of Contract performance).
- b. Contractor represents and warrants that it, its employees, and its subcontractors and their employees, shall at all times have and maintain in good standing any and all certifications and licenses required by applicable federal, state, and other governmental and quasi-governmental requirements applicable to the Work.
- c. Contractor represents and warrants that it has studied carefully all requirements of the Specifications regarding procedures for demolition, hazardous waste abatement, or safety practices, specified in the Contract, and prior to submitting its bid, has either (a) verified to its satisfaction that the specified procedures are adequate and sufficient to achieve the results intended by the Contract Documents, or (b) by way of approved "or equal" request or request for clarification and written Addenda, secured changes to the specified procedures sufficient to achieve the results intended by the Contract Documents. Contractor accepts the risk that any specified procedure will result in a completed Project in full compliance with the Contract Documents.

4. Monitoring and Testing

- a. District reserves the right, in its sole discretion, to conduct air monitoring, earth monitoring, Work monitoring, and any other tests (in addition to testing required under the agreement or applicable law), to monitor Contract requirements of safe and statutorily compliant work methods and (where applicable) safe re-entry level air standards under state and federal law upon completion of the job, and compliance of the work with periodic and final inspection by public and quasi-public entities having jurisdiction.
- b. Contractor acknowledges that District has the right to perform, or cause to be performed, various activities and tests including, but not limited to, pre-abatement, during abatement, and post-abatement air monitoring, that District shall have no obligation to perform said activities and tests, and that a portion of said activities and tests may take place prior to the completion of the Work by Contractor. In the event District elects to perform these activities and tests, Contractor shall afford District ample access to the Site and all areas of the Work as may be necessary for the performance of these activities and tests. Contractor will include the potential impact of these

activities or tests by District in the Contract Price and the Scheduled Completion Date.

- c. Notwithstanding District's rights granted by this paragraph, Contractor may retain its own industrial hygiene consultant at Contractor's own expense and may collect samples and may perform tests including, but not limited to, pre-abatement, during abatement, and post-abatement personal air monitoring, and District reserves the right to request documentation of all such activities and tests performed by Contractor relating to the Work and Contractor shall immediately provide that documentation upon request.

5. Compliance with Laws

- a. Contractor shall perform safe, expeditious, and orderly work in accordance with the best practices and the highest standards in the hazardous waste abatement, removal, and disposal industry, the applicable law, and the Contract Documents, including, but not limited to, all responsibilities relating to the preparation and return of waste shipment records, all requirements of the law, delivering of all requisite notices, and obtaining all necessary governmental and quasi-governmental approvals.
- b. Contractor represents that it is familiar with and shall comply with all laws applicable to the Work or completed Work including, but not limited to, all federal, state, and local laws, statutes, standards, rules, regulations, and ordinances applicable to the Work relating to:
 - (1) The protection of the public health, welfare and environment;
 - (2) Storage, handling, or use of asbestos, PCB, lead, petroleum based products, radioactive material, or other hazardous materials;
 - (3) The generation, processing, treatment, storage, transport, disposal, destruction, or other management of asbestos, PCB, lead, petroleum, radioactive material, or hazardous waste materials or other waste materials of any kind; and
 - (4) The protection of environmentally sensitive areas such as wetlands and coastal areas.

6. Disposal

- a. Contractor has the sole responsibility for determining current waste storage, handling, transportation, and disposal regulations for the job Site and for each waste disposal facility. Contractor must comply fully at its sole cost and expense with these regulations and any applicable law. District may, but is not obligated to, require submittals with this information for it to review consistent with the Contract Documents.
- b. Contractor shall develop and implement a system acceptable to District to track hazardous waste from the Site to disposal, including appropriate "Hazardous Waste Manifests" on the EPA form, so that District may track the volume of waste it put in each landfill and receive from each landfill a certificate of receipt.

- c. Contractor shall provide District with the name and address of each waste disposal facility prior to any disposal, and District shall have the express right to reject any proposed disposal facility. Contractor shall not use any disposal facility to which District has objected. Contractor shall document actual disposal or destruction of waste at a designated facility by completing a disposal certificate or certificate of destruction forwarding the original to the District.

7. Permits

- a. Before performing any of the Work, and at such other times as may be required by applicable law, Contractor shall deliver all requisite notices and obtain the approval of all governmental and quasi-governmental authorities having jurisdiction over the Work. Contractor shall submit evidence satisfactory to District that it and any disposal facility:
 - (1) have obtained all required permits, approvals, and the like in a timely manner both prior to commencement of the Work and thereafter as and when required by applicable law; and
 - (2) are in compliance with all such permits, approvals and the regulations.

For example, before commencing any work in connection with the Work involving asbestos-containing materials, or PCBs, or other hazardous materials subject to regulation, Contractor agrees to provide the required notice of intent to renovate or demolish to the appropriate state or federal agency having jurisdiction, by certified mail, return receipt requested, or by some other method of transmittal for which a return receipt is obtained, and to send a copy of that notice to District. Contractor shall not conduct any Work involving asbestos-containing materials or PCBs unless Contractor has first confirmed that the appropriate agency having jurisdiction is in receipt of the required notification. All permits, licenses, and bonds that are required by governmental or quasi-governmental authorities, and all fees, deposits, tap fees, offsite easements, and asbestos and PCB disposal facilities expenses necessary for the prosecution of the Work, shall be procured and paid for by Contractor. Contractor shall give all notices and comply with the all applicable laws bearing on the conduct of the Work as drawn and specified. If Contractor observes or reasonably should have observed that Plans and Specifications and other Contract Documents are at variance therewith, it shall be responsible for promptly notifying District in writing of such fact. If Contractor performs any Work contrary to applicable laws, it shall bear all costs arising therefrom.

- b. In the case of any permits or notices held in District's name or of necessity to be made in District's name, District shall cooperate with Contractor in securing the permit or giving the notice, but the Contractor shall prepare for District review and execution upon approval, all necessary applications, notices, and other materials.

8. Indemnification

To the fullest extent permitted by law, the indemnities and limitations of liability expressed throughout the Contract Documents apply with equal force and effect to any claims or liabilities imposed or existing by virtue of the removal, abatement, and disposal of hazardous waste. This includes, but is not limited to, liabilities connected to the selection and use of a waste disposal facility, a waste transporter, personal injury, property damage, loss of use of property, damage to the environment or natural resources, or "disposal" and "release" of materials associated with the Work (as defined in 42 U.S.C. § 9601 *et seq.*).

9. Termination

District shall have an absolute right to terminate for default immediately without notice and without an opportunity to cure should Contractor knowingly or recklessly commit a material breach of the terms of the Contract Documents, or any applicable law, on any matter involving the exposure of persons or property to hazardous waste. However, if the breach of contract exposing persons or property to hazardous waste is due solely to an ordinary, unintentional, and non-reckless failure to exercise reasonable care, then the procedures for termination for cause shall apply without modification.

END OF DOCUMENT

SUMMARY OF WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Site Access Conditions and Requirements;
- B. Special Conditions.

1.02 SUMMARY OF WORK COVERED BY CONTRACT DOCUMENTS

- A. Refer to G0.0 for description of work.

1.03 CONTRACTS

- A. Perform the Work under a single, fixed-price Contract.

1.04 WORK BY OTHERS

- A. Work on the Project that will be performed and completed prior to the start of the Work of this Contract:

[FILL IN OR MODIFY AS APPROPRIATE]

- (1) Asbestos removal/abatement.
- (2) Lead paint removal/abatement.

- B. Work on the Project that will be performed by others concurrent with the Work of this Contract:

- (1) _____
- (2) _____

1.05 CODES, REGULATIONS, AND STANDARDS

- A. The codes, regulations, and standards adopted by the state and federal agencies having jurisdiction shall govern minimum requirements for this Project. Where codes, regulations, and standards conflict with the Contract Documents, these conflicts shall be brought to the immediate attention of the District and the Architect.

- B. Codes, regulations, and standards shall be as published effective as of date of bid opening, unless otherwise specified or indicated.

1.06 PROJECT RECORD DOCUMENTS

- A. Contractor shall maintain on Site one set of the following record documents; Contractor shall record actual revisions to the Work:
 - (1) Contract Drawings.
 - (2) Specifications.
 - (3) Addenda.
 - (4) Change Orders and other modifications to the Contract.
 - (5) Reviewed shop drawings, product data, and samples.
 - (6) Field test records.
 - (7) Inspection certificates.
 - (8) Manufacturer's certificates.
- B. Contractor shall store Record Documents separate from documents used for construction. Provide files, racks, and secure storage for Record Documents and samples.
- C. Contractor shall record information concurrent with construction progress.
- D. Specifications: Contractor shall legibly mark and record at each product section of the Specifications the description of the actual product(s) installed, including the following:
 - (1) Manufacturer's name and product model and number.
 - (2) Product substitutions or alternates utilized.
 - (3) Changes made by Addenda and Change Orders and written directives.

1.07 EXAMINATION OF EXISTING CONDITIONS

- A. Contractor shall be held to have examined the Project Site and acquainted itself with the conditions of the Site and of the streets or roads approaching the Site.
- B. Prior to commencement of Work, Contractor shall survey the Site and existing buildings and improvements to observe existing damage and defects such as cracks, sags, broken, missing or damaged glazing, other building elements and Site improvements, and other damage.
- C. Should Contractor observe cracks, sags, and other damage to and defects of the Site and adjacent buildings, paving, and other items not indicated in the

Contract Documents, Contractor shall immediately report same to the District and the Architect.

1.08 CONTRACTOR'S USE OF PREMISES

- A. If unoccupied and only with District's prior written approval, Contractor may use the building(s) at the Project Site without limitation for its operations, storage, and office facilities for the performance of the Work. If the District chooses to beneficially occupy any building(s), Contractor must obtain the District's written approval for Contractor's use of spaces and types of operations to be performed within the building(s) while so occupied. Contractor's access to the building(s) shall be limited to the areas indicated.
- B. If the space at the Project Site is not sufficient for Contractor's operations, storage, office facilities and/or parking, Contractor shall arrange and pay for any additional facilities needed by Contractor.
- C. Contractor shall not interfere with use of or access to occupied portions of the building(s) or adjacent property.
- D. Contractor shall maintain corridors, stairs, halls, and other exit-ways of building clear and free of debris and obstructions at all times.
- E. No one other than those directly involved in the demolition and construction, or specifically designated by the District or the Architect shall be permitted in the areas of work during demolition and construction activities.
- F. The Contractor shall install the construction fence and maintain that it will be locked when not in use. Keys to this fencing will be provided to the District.

1.09 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

- A. The Drawings show above-grade and below-grade structures, utility lines, and other installations that are known or believed to exist in the area of the Work. Contractor shall locate these existing installations before proceeding with excavation and other operations that could damage same; maintain them in service, where appropriate; and repair damage to them caused by the performance of the Work. Should damage occur to these existing installations, the costs of repair shall be at the Contractor's expense and made to the District's satisfaction.
- B. Contractor shall be alert to the possibility of the existence of additional structures and utilities. If Contractor encounters additional structures and utilities, Contractor will immediately report to the District for disposition of same as indicated in the General Conditions.

1.10 UTILITY SHUTDOWNS AND INTERRUPTIONS

- A. Contractor shall give the District a minimum of three (3) days written notice in advance of any need to shut off existing utility services or to effect equipment interruptions. The District will set exact time and duration for shutdown, and will assist Contractor with shutdown. Work required to re-establish utility services shall be performed by the Contractor.

ALLOWANCE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-specified work.

1.2 RELATED SECTIONS

A. Document 01 10 00 (Summary of Work)

B. Document 01 29 00 (Payments and Completion)

C. Document 01 32 19 (Submittal Procedures)

1.3 ALLOWANCES

A. Included in the Contract, a stipulated sum/price of **[INSERT AMOUNT]** as an allowance for Unforeseen Conditions within the limits set forth in the Contract Documents. This Allowance shall not be utilized without written approval by the District.

B. Contractor's costs, without overhead and profit, for products, delivery, installation, labor, insurance, payroll, taxes, bonding and equipment rental will be included in Allowance Expenditure Directive authorizing expenditure of funds from this Allowance. No overhead and profit shall be added to the Allowance Expenditure Directive.

C. Funds will be drawn from Allowance only with District approval evidenced by an Allowance Expenditure Directive.

D. At Contract closeout, funds remaining in Allowance will be credited to District by Change Order.

E. Whenever costs are more than the Allowance, the amount covered by the Allowance will be approved at cost. The Contract Price shall be adjusted by Change Order for amounts in excess of the Allowance.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF DOCUMENT

ALTERNATES AND UNIT PRICING

PART 1 – ALTERNATES

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions;
- B. Special Conditions;
- C. Bid Form and Proposal;
- D. Instruction to Bidders.

1.02 DESCRIPTION

The items of work indicated below propose modifications to, substitutions for, additions to and/or deletions from the various parts of the Work specified in other Sections of the Specifications. The acceptance or rejection of any of the alternates is strictly at the option of the District subject to District's acceptance of Contractor's stated prices contained in this Proposal.

1.03 GENERAL

Where an item is omitted, or scope of Work is decreased, all Work pertaining to the item whether specifically stated or not, shall be omitted and where an item is added or modified or where scope of Work is increased, all Work pertaining to that required to render same ready for use on the Project in accordance with intention of Drawings and Specifications shall be included in an agreed upon price amount.

1.04 BASE BID

The Base Bid includes all work required to construct the Project completely and in accordance with the Contract Documents.

1.05 ALTERNATES

- A. Refer to G0.0 for description of Add and Deductive alternates.
- B. _____

The above Alternate descriptions are general in nature and for reference purposes only. The Contract Documents, including, without limitation, the Drawings and Specifications, must be referred to for the complete scope of Work.

PART 2 - UNIT PRICING

2.01 GENERAL

Contractor shall completely state all required figures based on Unit Prices listed below. Where scope of Work is decreased, all Work pertaining to the item, whether specifically stated or not, shall be omitted and where scope of Work is increased, all work pertaining to that item required to render same ready for use on the Project in accordance with intention of Drawings and Specifications shall be included in an agreed upon price amount.

2.02 UNIT PRICES

Furnish unit prices for each of the named items on a square foot, lineal foot, or per each basis, as applies. Unit prices shall include all labor, materials, services, profit, overhead, insurance, bonds, taxes, and all other incidental costs of Contractor, subcontractors, and supplier(s).

A. _____

B. _____

END OF DOCUMENT

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. General Requirements
- B. Additive and Deductive Alternates, As Occurs

1.2 GENERAL

- A. In order to allow the Owner to compare total costs where alternate materials and methods might be used, and to enable the Owner's decision prior to awarding the Contract, certain alternatives have been established as described in this Section.

1.3 RELATED WORK DESCRIBED ELSEWHERE

- A. Pertinent sections of these Specifications describe the materials and methods required under the various alternatives.

1.4 SUBMITTALS

- A. Reflect all alternatives described in this Section in the bid submitted for the work, on Bid Form provided.

1.5 PRODUCT HANDLING

- A. If the Owner elects to proceed on the basis of one or more of the alternatives, make all modifications to the work required in the furnishings and installation of the selected alternative or alternatives to the approval of the Architect and at no additional cost to the Owner other than as proposed on Contractor bid proposal.

PART 2 - PRODUCTS

2.1 ADDITIVE ALTERNATE 1: WATER-DAMAGED WALL REPAIR AT CLASSROOMS

- A. Base bid shall not include the cost associated with repairing the classroom walls as shown on drawings and as specified.
 - 1. Identify, as Additive Alternate 1, the cost associated with repairing the classroom walls as shown in drawings and as specified.

2.2 ADDITIVE ALTERNATE 2: SWITCHGEAR

- A. Base bid shall include the cost associated with providing preventative maintenance and refurbishment services on the existing main switchboard as shown in drawings and as specified.
 - 1. Identify, as Additive Alternate 2, the cost associated with reinstalling the meter in a new switchboard as shown on drawings and as specified.

2.3 DEDUCTIVE ALTERNATE 1: AUTOMATED ROLLING GATES

- A. Base bid shall include the cost associated with providing automated rolling gates as shown in drawings and as specified.
 - 1. Identify, as Deductive Alternate 2, the cost associated with deleting the automated rolling gates and replacing them with manual rolling gates.

2.4 DEDUCTIVE ALTERNATE 2: ORNAMENTAL FENCING

- A. Base bid shall include the cost associated with providing ornamental iron fencing along the length of Land Park Dr. as shown in drawings and as specified.
 - 1. Identify, as Deductive Alternate 2, the cost associated with deleting the ornamental iron fencing along the length of Land Park Dr. and replacing it with black vinyl chain link fencing.

PART 3 - EXECUTION

3.1 ADVANCE COORDINATION

- A. Immediately after award of Contract, thoroughly and clearly advise all necessary personnel and suppliers as to the nature and extent of alternatives selected by the Owner; use all means necessary to alert those personnel and suppliers involved as to all changes in the Work caused by Owner's selection of alternatives.

3.2 SURFACE CONDITIONS

- A. Prior to installation of the alternative items, verify that all surfaces have been modified as necessary to accept the installation and the manufacturer's current recommendations; in the event of discrepancy, immediately notify the Architect and proceed as directed.

END OF SECTION

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. General Requirements
- B. Definitions
- C. Product Options
- D. Substitution Procedures – Contractor’s Duties
- E. Substitution Procedures – Architect’s Duties

1.2 GENERAL REQUIREMENTS

- A. Provide products listed in Contract Documents, products by manufacturers listed in Contract Documents, and products meeting specified requirements.
 - 1. Contract Amount: Base on materials and products included in Contract Documents.
 - 2. Where listed in Contract Documents, materials and products by manufacturers not listed shall not be used without Owner’s and Architect’s approval of Contractor's written request for substitution.
- B. Procedures are described for requesting substitution of unlisted materials in lieu of materials named in Specifications or approved for use in addenda.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
 - 1. "Approved Equal" or "Equal" shall mean in the opinion of the Architect and/or Owner.
 - 2. AHJ – Authority Having Jurisdiction.
 - 3. DSA – Division of the State Architect.
 - 4. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 5. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 PRODUCT OPTIONS

- A. **Products Specified by Reference Standards or by Description:** Select product meeting referenced standard for products specified only by reference standard.
- B. **Named Manufacturers and Named Products:** Provide Products of the Basis of Design manufacturer named in compliance with specifications.
1. **Where another manufacturer is listed as an approved alternate manufacturer to the specified Basis of Design manufacturer, and a specific make and model is NOT provided, Contractor shall demonstrate compliance with the Basis of Design products supplied by listed alternate manufacturer by providing substitution documentation as required by this Section.**
 2. **If a specific make and model is provided with the Approved Alternate Manufacture(s) listed in each specification section, a substitution request will not be required, as the characteristics for those products have been compared by the Architect/Engineer and are considered equivalent.**
 3. Where the substituted manufacturers standard product is not equal to that specified, the substituted manufacturer shall provide custom or non-standard products, system components, fabrication and configuration as necessary to comply with specified criteria, whether or not such criteria are the substituted manufacturers standard or stock item.
 4. Consideration of whether a substituted product is equal to that specified will include all characteristics of the specified product, based on published data available from the specified manufacturer, whether listed in the specification or not. See Paragraph 1.5H, this Section for specific submittal procedures.
 5. Consideration of whether a substituted product is equal to that specified is solely the decision of the Architect.
 6. Provide substitution documentation as specified in this Section, submitted on the provided form in Section 01 25 00.10, "Substitution Request Form".
- C. Where product is specified followed by term "No Substitution Permitted", or similar phrase, do not submit alternate products for review. Any substitution request received will be returned rejected.

1.5 SUBSTITUTION PROCEDURES – CONTRACTOR’S DUTIES

- A. Substitutions, including requests for substitution during bidding period, will be considered in accordance with the General Conditions and this Section.
1. General Conditions, Section 4.8.1, and/or Supplemental Conditions specify time restrictions for submitting requests for Substitutions during the bidding period according to requirements specified in this Section.
 2. Submit all Requests for Substitutions within 35 days after Notice to Proceed. Substitutions received after 35 day period will be rejected.

3. Request for Substitution will only be considered when submitted within specified time period of Contract award, and when such request is accompanied by complete data substantiating compliance of proposed substitution with Contract Documents criteria and standard of quality.
- B. Substitutions may be considered when a Product becomes unavailable through no fault of the Contractor.
- C. Incomplete substitution requests will be rejected without explanation.
- D. **Substitutions are required for all substituted products.** Substitutions will not be considered for acceptance when:
1. They are indicated or implied on shop drawings or product data submittals only, without separate written request, or when acceptance will require revision to the Contract Documents.
 2. They are requested directly by a subcontractor or supplier.
 3. Acceptance will require substantial revision of Contract Documents.
- E. By submitting a request, the Contractor stipulates that the Contractor:
1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
 2. Will provide the same warranty or longer warranty for the Substitution as for the specified Product.
 3. Will coordinate installation and make other changes that may be required for Work to be complete in all respects, at no additional cost to the Owner.
 4. Unless specifically noted in the Request for Substitution, waives claims for additional costs or time extension which may subsequently become apparent.
 5. Will pay costs of changes to Contract Documents, Drawings, details and Specifications required by accepted substitutions.
- F. Any substitutions that change or affect the Structural, Access or Fire & Life Safety portions of the project construction documents shall be submitted as a CCD and approved by DSA prior to fabrication and installation.
- G. Contractor agrees to compensate Architect, at Architect's current billing rates, for review of Substitution requests that require modification of the Contract Documents.
1. Compensation shall be made by an adjustment to the Contract amount.
 2. Compensation as agreed upon shall be paid by the Contractor whether the change is approved or rejected.
 3. Where approval(s) are required by Division of State Architect (DSA), or agency having jurisdiction (AHJ), the Contractor shall pay all plan check fees or fees required to obtain approval.

4. The Contractor shall pay the Architect and its Consultants for all services rendered for drawings, calculations, review time, and/or DSA/AHJ plan check time for each substitute item(s) for approval.

H. Substitution Submittal Procedure and Documentation:

1. Procedure:
 - a. A maximum of one substitution request shall be submitted for any one item. Submit with same section name and number in specification. **Do not combine specification sections.**
 - b. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents and as follows.
 - c. Where necessary, arrange the product information to provide a side-by-side comparison of test data and other comparative data of the proposed substitution with the same test data and other comparative data in the specified item or product.
 - d. Substitution requests without such documentation will be rejected without review.
 - e. Where substitution request is rejected, provide submittal for specified product within five days of receipt of notice rejection.
 - f. Where decision cannot be made within the time required for orderly and uninterrupted work progress, provide the specified product.
2. Documentation – Submit all substitution requests on the provided form in Section 01 25 00.10, “Substitution Request Form”:
 - a. Substitutions shall be accepted in PDF format.
 - b. If physical copies of product data or samples are required, provide three copies of each, along with PDF submittal request.
 - c. Provide a typed, line by line comparison of the characteristics and attributes of the specified item with those of the proposed substitution.
 - d. For product data submitted, provide only those items that are applicable to the products being compared. Cross out, or otherwise note, any non-applicable items within the submittal to expedite review.
 - e. Show comparative documentation, illustrating compliance with requirements for substitutions and the following, as applicable (attach to Substitution Request Form in Section 01 25 00.10, if required):
 - 1) Specification Name and Number shall be clearly indicated in the Substitution Request Form.
 - 2) Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.

- 3) Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
- 4) Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
- 5) Product Data, including drawings and descriptions of products and fabrication and installation procedures.
- 6) Samples, where applicable or requested.
- 7) Certificates and qualification data, where applicable or requested.
- 8) Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
- 9) Research reports evidencing compliance with building code in effect for Project, from appropriate approval and testing agencies, e.g. ICC-ES, ASTM, UL, Warnock Hersey, etc.
- 10) Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - 1) Provide an indication of cost impacts, if any. If a possible cost increase is indicated, upon request, provide a Change Order Request for consideration and approval by the Owner..
 - 2) Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - 3) Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

I. Substitutions for Convenience are not allowed.

1.6 SUBSTITUTION PROCEDURES – ARCHITECT’S DUTIES

- A. The Architect will review Substitution Request upon receipt with reasonable promptness and will request any additional data necessary to accept or reject substitution request.

- B. Substitution Requests received after 9:00 AM on Friday will be logged as received on the following Monday at 8:00 AM.
- C. Architect will recommend that Owner accept or reject substitution request based on, but not limited to, the following items:
 - 1. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - 2. Substitution request is fully documented and properly submitted.
 - 3. Requested substitution will not adversely affect Contractor's construction schedule.
 - 4. Requested substitution will not adversely affect the desired aesthetics for the Project.
 - 5. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - 6. Requested substitution is compatible with other portions of the Work.
 - 7. Requested substitution has been coordinated with other portions of the Work.
 - 8. Requested substitution provides specified warranty.
 - 9. Requested substitution clearly indicates whether additional costs will be incurred by the Owner.
 - 10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- D. The decision to accept or reject substitution request will be made within a reasonable period after Architect receives final documentation data.
 - 1. Architect and Owner will determine acceptability of proposed substitutions and reserve right to reject proposals due to insufficient information.
 - 2. The Architect may reject any substitution request on the basis of aesthetics.
- E. If changes to the Contract Documents require reapproval by DSA , Architect/Engineer will indicate to the Contractor in their review response that addition costs must be incurred for re-approvals.
- F. If the Contractor accepts that additional costs to be borne by Contractor for changes to Contract Documents, Drawings, details and Specifications that are required by substitutions are acceptable, then Architect/Engineer will provide a cost proposal for consideration. Written acceptance of charges by Contractor is required prior to any cost being incurred by the Architect/Engineer.
- G. Substitutions with material effect on the project will be submitted for approval by DSA as a Construction Change Document (CCD) or Addendum prior to fabrication or installation.
- H. The Architect will notify Contractor, in writing on the Substitution Request Form, of decision to

accept or reject request.

PART 2 - PRODUCTS

A. NOT USED

PART 3 - EXECUTION

A. NOT USED

END OF SECTION

PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. Instructions to Bidders;
- B. General Conditions, including, without limitation, Substitutions For Specified Items; and
- C. Special Conditions.

1.02 SUBSTITUTIONS OF MATERIALS AND EQUIPMENT

- A. Catalog numbers and specific brands or trade names followed by the designation "or equal" are used in conjunction with material and equipment required by the Specifications to establish the standards of quality, utility, and appearance required. Substitutions which are equal in quality, utility, and appearance to those specified may be reviewed subject to the provisions of the General Conditions.
- B. Wherever more than one manufacturer's product is specified, the first-named product is the basis for the design used in the work and the use of alternative-named manufacturers' products or substitutes may require modifications in that design. If such alternatives are proposed by Contractor and are approved by the District and/or the Architect, Contractor shall assume all costs required to make necessary revisions and modifications of the design resulting from the substitutions requested by the Contractor.
- C. When materials and equipment are specified by first manufacturer's name and product number, second manufacturer's name and "or approved equal," supporting data for the second product, if proposed by Contractor, shall be submitted in accordance with the requirements for substitutions. The District's Board has found and determined that certain item(s) shall be used on this Project based on the purpose(s) indicated pursuant to Public Contract Code section 3400(c). These findings, as well as the products and brand or trade names, have been identified in the Notice to Bidders.
- D. The Contractor will not be allowed to substitute specified items unless the request for substitution is submitted as follows:
 - (1) District must receive any notice of request for substitution of a specified item a minimum of ten (10) calendar days prior to bid opening.

- (2) Within 35 days after the date of the Notice of Award, the Contractor shall submit data substantiating the request(s) for all substitution(s) containing sufficient information to assess acceptability of product or system and impact on Project, including, without limitation, the requirements specified in the Special Conditions and the technical Specifications. Insufficient information shall be grounds for rejection of substitution.
- E. If the District and/or Architect, in reviewing proposed substitute materials and equipment, require revisions or corrections to be made to previously accepted Shop Drawings and supplemental supporting data to be resubmitted, Contractor shall promptly do so. If any proposed substitution is judged by the District and/or Architect to be unacceptable, the specified material or equipment shall be provided.
- F. Samples may be required. Tests required by the District and/or Architect for the determination of quality and utility shall be made at the expense of Contractor, with acceptance of the test procedure first given by the District.
- G. In reviewing the supporting data submitted for substitutions, the District and/or Architect will use for purposes of comparison all the characteristics of the specified material or equipment as they appear in the manufacturer's published data even though all the characteristics may not have been particularly mentioned in the Contract Documents. If more than two (2) submissions of supporting data are required, the cost of reviewing the additional supporting data shall be borne by Contractor, and the District will deduct the costs from the Contract Price. The Contractor shall be responsible for any re-design costs occasioned by District's acceptance and/or approval of any substitute.
- H. The Contractor shall, in the event that a substitute is less costly than that specified, credit the District with one hundred percent (100%) of the net difference between the substitute and the originally specified material. In this event, the Contractor agrees to execute a deductive Change Order to reflect that credit. In the event Contractor furnishes a material, process, or article more expensive than that specified, the difference in the cost of that material, process, or article so furnished shall be borne by Contractor.
- I. In no event shall the District be liable for any increase in Contract Price or Contract Time due to any claimed delay in the evaluation of any proposed substitute or in the acceptance or rejection of any proposed substitute.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

DOCUMENT 01 26 00

CHANGES IN THE WORK

CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE PROVISIONS IN THE AGREEMENT, GENERAL CONDITIONS, AND SPECIAL CONDITIONS, IF USED, RELATED TO CHANGES AND/OR REQUESTS FOR CHANGES.

END OF DOCUMENT

DOCUMENT 01 29 00

**APPLICATION FOR PAYMENT AND
CONDITIONAL AND UNCONDITIONAL WAIVER AND RELEASE FORMS**

**CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS IN THE GENERAL
CONDITIONS RELATED TO APPLICATIONS FOR PAYMENT AND/OR PAYMENTS.**

**CONDITIONAL WAIVER AND RELEASE
ON PROGRESS PAYMENT
(CIVIL CODE SECTION 8132)**

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Through Date: _____

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following check is drawn:

Maker of Check: _____

Amount of Check: \$_____

Check Payable to: _____

Exceptions

This document does not affect any of the following:

- (1) Retentions.
- (2) Extras for which the claimant has not received payment.
- (3) The following progress payments for which the claimant has previously given a conditional waiver and release but has not received payment:

Date(s) of waiver and release: _____

Amount(s) of unpaid progress payment(s): \$_____

- (4) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

**UNCONDITIONAL WAIVER AND RELEASE
ON PROGRESS PAYMENT
(CIVIL CODE SECTION 8134)**

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Through Date: _____

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has received the following progress payment: \$_____

Exceptions

This document does not affect any of the following:

- (1) Retentions.
- (2) Extras for which the claimant has not received payment.
- (3) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

**CONDITIONAL WAIVER AND RELEASE
ON FINAL PAYMENT
(CIVIL CODE SECTION 8136)**

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following check is drawn:

Maker of Check: _____

Amount of Check: \$ _____

Check Payable to: _____

Exceptions

This document does not affect any of the following: _____

Disputed claims for extras in the amount of: \$ _____

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

**UNCONDITIONAL WAIVER AND RELEASE
ON FINAL PAYMENT
(CIVIL CODE SECTION 8138)**

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for all labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has been paid in full.

Exceptions

This document does not affect any of the following: _____

Disputed claims for extras in the amount of: \$_____

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

PROJECT MEETINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions; and
- B. Special Conditions.

1.02 PROGRESS MEETINGS:

- A. Contractor shall schedule and hold regular weekly progress meetings after a minimum of one week's prior written notice of the meeting date and time to all Invitees as indicated below.
- B. Location: Contractor's field office.
- C. The Contractor shall notify and invite the following entities ("Invitees"):
 - (1) District Representative.
 - (2) Contractor.
 - (3) Contractor's Project Manager.
 - (4) Contractor's Superintendent.
 - (5) Subcontractors, as appropriate to the agenda of the meeting.
 - (6) Suppliers, as appropriate to the agenda of the meeting.
 - (7) Construction Manager, if any.
 - (8) Architect
 - (9) Engineer(s), if any and as appropriate to the agenda of the meeting.
 - (10) Others, as appropriate to the agenda of the meeting.
- D. The District's and/or the Architect's Consultants will attend at their discretion, in response to the agenda.
- E. The District representative, the Construction Manager, and/or another District Agent shall take and distribute meeting notes to attendees and other concerned parties. If exceptions are taken to anything in the meeting notes,

those exceptions shall be stated in writing to the District within five (5) working days following District's distribution of the meeting notes.

1.03 PRE-INSTALLATION/PERFORMANCE MEETING:

- A. Contractor shall schedule a meeting prior to the start of each of the following portions of the Work: cutting and patching of plaster and roofing, and other weather-exposed and moisture-resistant products. Contractor shall invite all Invitees to this meeting, and others whose work may affect or be affected by the quality of the cutting and patching work.
- B. Contractor shall review in detail prior to this meeting, the manufacturer's requirements and specifications, applicable portions of the Contract Documents, Shop Drawings, and other submittals, and other related work. At this meeting, invitees shall review and resolve conflicts, incompatibilities, or inadequacies discovered or anticipated.
- C. Contractor shall review in detail Project conditions, schedule, requirements for performance, application, installation, and quality of completed Work, and protection of adjacent Work and property.
- D. Contractor shall review in detail means of protecting the completed Work during the remainder of the construction period.

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

SCHEDULING OF WORK

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions;
- B. Special Conditions;
- C. Summary of Work; and
- D. Submittals.

1.02 SECTION INCLUDES

- A. Scheduling of Work under this Contract shall be performed by Contractor in accordance with requirements of this Section.
 - (1) Development of schedule, cost and resource loading of the schedule, monthly payment requests, and project status reporting requirements of the Contract shall employ computerized Critical Path Method ("CPM") scheduling ("CPM Schedule").
 - (2) CPM Schedule shall be cost loaded based on Schedule of Values as approved by District.
 - (3) Submit schedules and reports as specified in the General Conditions.
- B. Upon Award of Contract, Contractor shall immediately commence development of Initial and Original CPM Schedules to ensure compliance with CPM Schedule submittal requirements.

1.03 CONSTRUCTION SCHEDULE

- A. Within ten (10) days of issuance of the Notice to Proceed and before request for first progress payment, the Contractor shall prepare and submit to the Project Manager a construction progress schedule conforming to the Milestone Schedule below.
- B. The Construction Schedule shall be continuously updated, and an updated schedule shall be submitted with each application for progress payment. Each revised schedule shall indicate the work actually accomplished during the previous period and the schedule for completion of the remaining work.

C. Milestone Schedule:

Preliminary Construction Schedule

Anticipated Notice of Intent to Award (NOITA)	XX/XX/XX
Anticipated Board Approval of Construction Contract	XX/XX/XX
Anticipated Notice to Proceed (NTP)	XX/XX/XX
Shop Drawings, Submittals, Materials Procurement	XX/XX/XX – XX/XX/XX

Site Construction Schedule

Last Day of 20XX School	XX/XX/XX
Mobilization and Start of Construction	XX/XX/XX
Construction	XX/XX/XX – XX/XX/XX
Punch List, Corrective Work & Final Cleaning	XX/XX/XX – XX/XX/XX

1.04 QUALIFICATIONS

- A. Contractor shall employ experienced scheduling personnel qualified to use the latest version of [i.e., Primavera Project Planner]. Experience level required is set forth below. Contractor may employ such personnel directly or may employ a consultant for this purpose.
 - (1) The written statement shall identify the individual who will perform CPM scheduling.
 - (2) Capability and experience shall be verified by description of construction projects on which individual has successfully applied computerized CPM.
 - (3) Required level of experience shall include at least two (2) projects of similar nature and scope with value not less than three fourths ($\frac{3}{4}$) of the Total Bid Price of this Project. The written statement shall provide contact persons for referenced projects with current telephone and address information.
- B. District reserves the right to approve or reject Contractor’s scheduler or consultant at any time. District reserves the right to refuse replacing of Contractor’s scheduler or consultant, if District believes replacement will negatively affect the scheduling of Work under this Contract.

1.05 GENERAL

- A. Progress Schedule shall be based on and incorporate milestone and completion dates specified in Contract Documents.
- B. Overall time of completion and time of completion for each milestone shown on Progress Schedule shall adhere to times in the Contract, unless an earlier (advanced) time of completion is requested by Contractor and agreed to by District. Any such agreement shall be formalized by a Change Order.

- (1) District is not required to accept an early completion schedule, i.e., one that shows an earlier completion date than the Contract Time.
 - (2) Contractor shall not be entitled to extra compensation in event agreement is reached on an earlier completion schedule and Contractor completes its Work, for whatever reason, beyond completion date shown in its early completion schedule but within the Contract Time.
 - (3) A schedule showing the work completed in less than the Contract Time, and that has been accepted by District, shall be considered to have Project Float. The Project Float is the time between the scheduled completion of the work and the Completion Date. Project Float is a resource available to both District and the Contractor.
- C. Ownership Project Float: Neither the District nor Contractor owns Project Float. The Project owns the Project Float. As such, liability for delay of the Completion Date rests with the party whose actions, last in time, actually cause delay to the Completion Date.
- (1) For example, if Party A uses some, but not all of the Project Float and Party B later uses remainder of the Project Float as well as additional time beyond the Project Float, Party B shall be liable for the time that represents a delay to the Completion Date.
 - (2) Party A would not be responsible for the time since it did not consume the entire Project Float and additional Project Float remained; therefore, the Completion Date was unaffected by Party A.
- D. Progress Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests. Responsibility for developing Contract CPM Schedule and monitoring actual progress as compared to Progress Schedule rests with Contractor.
- E. Failure of Progress Schedule to include any element of the Work, or any inaccuracy in Progress Schedule, will not relieve Contractor from responsibility for accomplishing the Work in accordance with the Contract. District's acceptance of schedule shall be for its use in monitoring and evaluating job progress, payment requests, and time extension requests and shall not, in any manner, impose a duty of care upon District, or act to relieve Contractor of its responsibility for means and methods of construction.
- F. Software: Use **[i.e., District Project Planner for Windows, latest version]**. Such software shall be compatible with Windows operating system. Contractor shall transmit contract file to District on compact disk at times requested by District.
- G. Transmit each item under the form approved by District.
- (1) Identify Project with District Contract number and name of Contractor.
 - (2) Provide space for Contractor's approval stamp and District's review stamps.

- (3) Submittals received from sources other than Contractor will be returned to the Contractor without District's review.

1.06 INITIAL CPM SCHEDULE

- A. Initial CPM Schedule submitted for review at the pre-construction conference shall serve as Contractor's schedule for up to ninety (90) calendar days after the Notice to Proceed.
- B. Indicate detailed plan for the Work to be completed in first ninety (90) days of the Contract; details of planned mobilization of plant and equipment; sequence of early operations; procurement of materials and equipment. Show Work beyond ninety (90) calendar days in summary form.
- C. Initial CPM Schedule shall be time scaled.
- D. Initial CPM Schedule shall be cost and resource loaded. Accepted cost and resource loaded schedule will be used as basis for monthly progress payments until acceptance of the Original CPM Schedule. Use of Initial CPM Schedule for progress payments shall not exceed ninety (90) calendar days.
- E. District and Contractor shall meet to review and discuss the Initial CPM Schedule within seven (7) calendar days after it has been submitted to District.
 - (1) District's review and comment on the schedule shall be limited to Contract conformance (with sequencing, coordination, and milestone requirements).
 - (2) Contractor shall make corrections to schedule necessary to comply with Contract requirements and shall adjust schedule to incorporate any missing information requested by District. Contractor shall resubmit Initial CPM Schedule if requested by District.
- F. If, during the first ninety (90) days after Notice to Proceed, the Contractor is of the opinion that any of the Work included on its Initial CPM Schedule has been impacted, the Contractor shall submit to District a written Time Impact Evaluation ("TIE") in accordance with Article 1.12 of this Section. The TIE shall be based on the most current update of the Initial CPM Schedule.

1.07 ORIGINAL CPM SCHEDULE

- A. Submit a detailed proposed Original CPM Schedule presenting an orderly and realistic plan for completion of the Work in conformance with requirements as specified herein.
- B. Progress Schedule shall include or comply with following requirements:
 - (1) Time scaled, cost and resource (labor and major equipment) loaded CPM schedule.

- (2) No activity on schedule shall have duration longer than fifteen (15) work days, with exception of submittal, approval, fabrication and procurement activities, unless otherwise approved by District.
 - (a) Activity durations shall be total number of actual work days required to perform that activity.
- (3) The start and completion dates of all items of Work, their major components, and milestone completion dates, if any.
- (4) District furnished materials and equipment, if any, identified as separate activities.
- (5) Activities for maintaining Project Record Documents.
- (6) Dependencies (or relationships) between activities.
- (7) Processing/approval of submittals and shop drawings for all material and equipment required per the Contract. Activities that are dependent on submittal acceptance or material delivery shall not be scheduled to start earlier than expected acceptance or delivery dates.
 - (a) Include time for submittals, re-submittals and reviews by District. Coordinate with accepted schedule for submission of Shop Drawings, samples, and other submittals.
 - (b) Contractor shall be responsible for all impacts resulting from re-submittal of Shop Drawings and submittals.
- (8) Procurement of major equipment, through receipt and inspection at jobsite, identified as separate activity.
 - (a) Include time for fabrication and delivery of manufactured products for the Work.
 - (b) Show dependencies between procurement and construction.
- (9) Activity description; what Work is to be accomplished and where.
- (10) The total cost of performing each activity shall be total of labor, material, and equipment, excluding overhead and profit of Contractor. Overhead and profit of the General Contractor shall be shown as a separate activity in the schedule. Sum of cost for all activities shall equal total Contract value.
- (11) Resources required (labor and major equipment) to perform each activity.
- (12) Responsibility code for each activity corresponding to Contractor or Subcontractor responsible for performing the Work.
- (13) Identify the activities which constitute the controlling operations or critical path. No more than twenty-five (25%) of the activities shall be

critical or near critical. Near critical is defined as float in the range of one (1) to (10) days.

- (14) Twenty (20) workdays for developing punch list(s), completion of punch-list items, and final clean up for the Work or any designated portion thereof. No other activities shall be scheduled during this period.
 - (15) Interface with the work of other contractors, District, and agencies such as, but not limited to, utility companies.
 - (16) Show detailed Subcontractor Work activities. In addition, furnish copies of Subcontractor schedules upon which CPM was built.
 - (a) Also furnish for each Subcontractor, as determined by District, submitted on Subcontractor letterhead, a statement certifying that Subcontractor concurs with Contractor's Original CPM Schedule and that Subcontractor's related schedules have been incorporated, including activity duration, cost and resource loading.
 - (b) Subcontractor schedules shall be independently derived and not a copy of Contractor's schedule.
 - (c) In addition to Contractor's schedule and resource loading, obtain from electrical, mechanical, and plumbing Subcontractors, and other Subcontractors as required by District, productivity calculations common to their trades, such as units per person day, feet of pipe per day per person, feet of wiring per day per person, and similar information.
 - (d) Furnish schedule for Contractor/Subcontractor CPM schedule meetings which shall be held prior to submission of Original CPM schedule to District. District shall be permitted to attend scheduled meetings as an observer.
 - (17) Activity durations shall be in Work days.
 - (18) Submit with the schedule a list of anticipated non-Work days, such as weekends and holidays. The Progress Schedule shall exclude in its Work day calendar all non-Work days on which Contractor anticipates critical Work will not be performed.
- C. Original CPM Schedule Review Meeting: Contractor shall, within sixty (60) days from the Notice to Proceed date, meet with District to review the Original CPM Schedule submittal.
- (1) Contractor shall have its Project Manager, Project Superintendent, Project Scheduler, and key Subcontractor representatives, as required by District, in attendance. The meeting will take place over a continuous one (1) day period.

- (2) District's review will be limited to submittal's conformance to Contract requirements including, but not limited to, coordination requirements. However, review may also include:
 - (a) Clarifications of Contract Requirements.
 - (b) Directions to include activities and information missing from submittal.
 - (c) Requests to Contractor to clarify its schedule.
- (3) Within five (5) days of the Schedule Review Meeting, Contractor shall respond in writing to all questions and comments expressed by District at the Meeting.

1.08 ADJUSTMENTS TO CPM SCHEDULE

- A. Adjustments to Original CPM Schedule: Contractor shall have adjusted the Original CPM Schedule submittal to address all review comments from original CPM Schedule review meeting and resubmit network diagrams and reports for District's review.
 - (1) District, within ten (10) days from date that Contractor submitted the revised schedule, will either:
 - (a) Accept schedule and cost and resource loaded activities as submitted, or
 - (b) Advise Contractor in writing to review any part or parts of schedule which either do not meet Contract requirements or are unsatisfactory for District to monitor Project's progress, resources, and status or evaluate monthly payment request by Contractor.
 - (2) District may accept schedule with conditions that the first monthly CPM Schedule update be revised to correct deficiencies identified.
 - (3) When schedule is accepted, it shall be considered the "Original CPM Schedule" which will then be immediately updated to reflect the current status of the work.
 - (4) District reserves right to require Contractor to adjust, add to, or clarify any portion of schedule which may later be discovered to be insufficient for monitoring of Work or approval of partial payment requests. No additional compensation will be provided for such adjustments, additions, or clarifications.
- B. Acceptance of Contractor's schedule by District will be based solely upon schedule's compliance with Contract requirements.
 - (1) By way of Contractor assigning activity durations and proposing sequence of Work, Contractor agrees to utilize sufficient and necessary

management and other resources to perform work in accordance with the schedule.

- (2) Upon submittal of schedule update, updated schedule shall be considered "current" CPM Schedule.
 - (3) Submission of Contractor's schedule to District shall not relieve Contractor of total responsibility for scheduling, sequencing, and pursuing Work to comply with requirements of Contract Documents, including adverse effects such as delays resulting from ill-timed Work.
- C. Submittal of Original CPM Schedule, and subsequent schedule updates, shall be understood to be Contractor's representation that the Schedule meets requirements of Contract Documents and that Work shall be executed in sequence indicated on the schedule.
- D. Contractor shall distribute Original CPM Schedule to Subcontractors for review and written acceptance, which shall be noted on Subcontractors' letterheads to Contractor and transmitted to District for the record.

1.09 MONTHLY CPM SCHEDULE UPDATE SUBMITTALS

- A. Following acceptance of Contractor's Original CPM Schedule, Contractor shall monitor progress of Work and adjust schedule each month to reflect actual progress and any anticipated changes to planned activities.
- (1) Each schedule update submitted shall be complete, including all information requested for the Original CPM Schedule submittal.
 - (2) Each update shall continue to show all Work activities including those already completed. These completed activities shall accurately reflect "as built" information by indicating when activities were actually started and completed.
- B. A meeting will be held on approximately the twenty-fifth (25th) of each month to review the schedule update submittal and progress payment application.
- (1) At this meeting, at a minimum, the following items will be reviewed: Percent (%) complete of each activity; Time Impact Evaluations for Change Orders and Time Extension Request; actual and anticipated activity sequence changes; actual and anticipated duration changes; and actual and anticipated Contractor delays.
 - (2) These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, these meetings shall be attended by Contractor's General Superintendent and Scheduler.
 - (3) Contractor shall plan on the meeting taking no less than four (4) hours.

- C. Within five (5) working days after monthly schedule update meeting, Contractor shall submit the updated CPM Schedule update.
- D. Within five (5) work days of receipt of above noted revised submittals, District will either accept or reject monthly schedule update submittal.
 - (1) If accepted, percent (%) complete shown in monthly update will be basis for Application for Payment by the Contractor. The schedule update shall be submitted as part of the Contractor's Application for Payment.
 - (2) If rejected, update shall be corrected and resubmitted by Contractor before the Application for Payment is submitted.
- E. Neither updating, changing or revising of any report, curve, schedule, or narrative submitted to District by Contractor under this Contract, nor District's review or acceptance of any such report, curve, schedule or narrative shall have the effect of amending or modifying in any way the Completion Date or milestone dates or of modifying or limiting in any way Contractor's obligations under this Contract.

1.10 SCHEDULE REVISIONS

- A. Updating the Schedule to reflect actual progress shall not be considered revisions to the Schedule. Since scheduling is a dynamic process, revisions to activity durations and sequences are expected on a monthly basis.
- B. To reflect revisions to the Schedule, the Contractor shall provide District with a written narrative with a full description and reasons for each Work activity revised. For revisions affecting the sequence of work, the Contractor shall provide a schedule diagram which compares the original sequence to the revised sequence of work. The Contractor shall provide the written narrative and schedule diagram for revisions two (2) working days in advance of the monthly schedule update meeting.
- C. Schedule revisions shall not be incorporated into any schedule update until the revisions have been reviewed by District. District may request further information and justification for schedule revisions and Contractor shall, within three (3) days, provide District with a complete written narrative response to District's request.
- D. If the Contractor's revision is still not accepted by District, and the Contractor disagrees with District's position, the Contractor has seven (7) calendar days from receipt of District's letter rejecting the revision to provide a written narrative providing full justification and explanation for the revision. The Contractor's failure to respond in writing within seven (7) calendar days of District's written rejection of a schedule revision shall be contractually interpreted as acceptance of District's position, and the Contractor waives its rights to subsequently dispute or file a claim regarding District's position.
- E. At District's discretion, the Contractor can be required to provide Subcontractor certifications of performance regarding proposed schedule revisions affecting said Subcontractors.

1.11 RECOVERY SCHEDULE

- A. If the Schedule Update shows a completion date twenty-one (21) calendar days beyond the Contract Completion Date, or individual milestone completion dates, the Contractor shall submit to District the proposed revisions to recover the lost time within seven (7) calendar days. As part of this submittal, the Contractor shall provide a written narrative for each revision made to recapture the lost time. If the revisions include sequence changes, the Contractor shall provide a schedule diagram comparing the original sequence to the revised sequence of work.
- B. The revisions shall not be incorporated into any schedule update until the revisions have been reviewed by District.
- C. If the Contractor's revisions are not accepted by District, District and the Contractor shall follow the procedures in paragraph 1.09.C, 1.09.D and 1.09.E above.
- D. At District's discretion, the Contractor can be required to provide Subcontractor certifications for revisions affecting said Subcontractors.

1.12 TIME IMPACT EVALUATION ("TIE") FOR CHANGE ORDERS, AND OTHER DELAYS

- A. When Contractor is directed to proceed with changed Work, the Contractor shall prepare and submit within fourteen (14) calendar days from the Notice to Proceed a TIE which includes both a written narrative and a schedule diagram depicting how the changed Work affects other schedule activities. The schedule diagram shall show how the Contractor proposes to incorporate the changed Work in the schedule and how it impacts the current schedule-update critical path. The Contractor is also responsible for requesting time extensions based on the TIE's impact on the critical path. The diagram must be tied to the main sequence of schedule activities to enable District to evaluate the impact of changed Work to the scheduled critical path.
- B. Contractor shall be required to comply with the requirements of Paragraph 1.09.A for all types of delays such as, but not limited to, Contractor/Subcontractor delays, adverse weather delays, strikes, procurement delays, fabrication delays, etc.
- C. Contractor shall be responsible for all costs associated with the preparation of TIEs, and the process of incorporating them into the current schedule update. The Contractor shall provide District with four (4) copies of each TIE.
- D. Once agreement has been reached on a TIE, the Contract Time will be adjusted accordingly. If agreement is not reached on a TIE, the Contract Time may be extended in an amount District allows, and the Contractor may submit a claim for additional time claimed by contractor.

1.13 TIME EXTENSIONS

- A. The Contractor is responsible for requesting time extensions for time impacts that, in the opinion of the Contractor, impact the critical path of the current

schedule update. Notice of time impacts shall be given in accord with the General Conditions.

- B. Where an event for which District is responsible impacts the projected Completion Date, the Contractor shall provide a written mitigation plan, including a schedule diagram, which explains how (e.g., increase crew size, overtime, etc.) the impact can be mitigated. The Contractor shall also include a detailed cost breakdown of the labor, equipment, and material the Contractor would expend to mitigate District-caused time impact. The Contractor shall submit its mitigation plan to District within fourteen (14) calendar days from the date of discovery of the impact. The Contractor is responsible for the cost to prepare the mitigation plan.
- C. Failure to request time, provide TIE, or provide the required mitigation plan will result in Contractor waiving its right to a time extension and cost to mitigate the delay.
- D. No time will be granted under this Contract for cumulative effect of changes.
- E. District will not be obligated to consider any time extension request unless the Contractor complies with the requirements of Contract Documents.
- F. Failure of the Contractor to perform in accordance with the current schedule update shall not be excused by submittal of time extension requests.
- G. If the Contractor does not submit a TIE within the required fourteen (14) calendar days for any issue, it is mutually agreed that the Contractor does not require a time extension for said issue.

1.14 SCHEDULE REPORTS

- A. Submit four (4) copies of the following reports with the Initial CPM Schedule, the Original CPM Schedule, and each monthly update.
- B. Required Reports:
 - (1) Two activity listing reports: one sorted by activity number and one by total Project Float. These reports shall also include each activity's early/late and actual start and finish dates, original and remaining duration, Project Float, responsibility code, and the logic relationship of activities.
 - (2) Cost report sorted by activity number including each activity's associated cost, percentage of Work accomplished, earned value- to date, previous payments, and amount earned for current update period.
 - (3) Schedule plots presenting time-scaled network diagram showing activities and their relationships with the controlling operations or critical path clearly highlighted.

- (4) Cash flow report calculated by early start, late start, and indicating actual progress. Provide an exhibit depicting this information in graphic form.
- (5) Planned versus actual resource (i.e., labor) histogram calculated by early start and late start.

C. Other Reports:

In addition to above reports, District may request, from month to month, any two of the following reports. Submit four (4) copies of all reports.

- (1) Activities by early start.
- (2) Activities by late start.
- (3) Activities grouped by Subcontractors or selected trades.
- (4) Activities with scheduled early start dates in a given time frame, such as fifteen (15) or thirty (30) day outlook.

D. Furnish District with report files on compact disks containing all schedule files for each report generated.

1.15 PROJECT STATUS REPORTING

- A. In addition to submittal requirements for CPM scheduling identified in this Section, Contractor shall provide a monthly project status report (i.e., written narrative report) to be submitted in conjunction with each CPM Schedule as specified herein. Status reporting shall be in form specified below.
- B. Contractor shall prepare monthly written narrative reports of status of Project for submission to District. Written status reports shall include:
- (1) Status of major Project components (percent (%) complete, amount of time ahead or behind schedule) and an explanation of how Project will be brought back on schedule if delays have occurred.
 - (2) Progress made on critical activities indicated on CPM Schedule.
 - (3) Explanations for any lack of work on critical path activities planned to be performed during last month.
 - (4) Explanations for any schedule changes, including changes to logic or to activity durations.
 - (5) List of critical activities scheduled to be performed next month.
 - (6) Status of major material and equipment procurement.
 - (7) Any delays encountered during reporting period.

- (8) Contractor shall provide printed report indicating actual versus planned resource loading for each trade and each activity. This report shall be provided on weekly and monthly basis.
 - (a) Actual resource shall be accumulated in field by Contractor, and shall be as noted on Contractor's daily reports. These reports will be basis for information provided in computer-generated monthly and weekly printed reports.
 - (b) Contractor shall explain all variances and mitigation measures.
- (9) Contractor may include any other information pertinent to status of Project. Contractor shall include additional status information requested by District at no additional cost.
- (10) Status reports, and the information contained therein, shall not be construed as claims, notice of claims, notice of delay, or requests for changes or compensation.

1.16 WEEKLY SCHEDULE REPORT

At the Weekly Progress Meeting, the Contractor shall provide and present a time-scaled three (3) week look-ahead schedule that is based and correlated by activity number to the current schedule (i.e., Initial, Original CPM, or Schedule Update).

1.17 DAILY CONSTRUCTION REPORTS

On a daily basis, Contractor shall submit a daily activity report to District for each workday, including weekends and holidays when worked. Contractor shall develop the daily construction reports on a computer-generated database capable of sorting daily Work, manpower, and man-hours by Contractor, Subcontractor, area, sub-area, and Change Order Work. Upon request of District, furnish computer disk of this data base. Obtain District's written approval of daily construction report data base format prior to implementation. Include in report:

- A. Project name and Project number.
- B. Contractor's name and address.
- C. Weather, temperature, and any unusual site conditions.
- D. Brief description and location of the day's scheduled activities and any special problems and accidents, including Work of Subcontractors. Descriptions shall be referenced to CPM scheduled activities.
- E. Worker quantities for its own Work force and for Subcontractors of any tier.
- F. Equipment, other than hand tools, utilized by Contractor and Subcontractors.

1.18 PERIODIC VERIFIED REPORTS

Contractor shall complete and verify construction reports on a form prescribed by the Division of the State Architect and file reports on the first day of February, May,

August, and November during the preceding quarter year; at the completion of the Contract; at the completion of the Work; at the suspension of Work for a period of more than one (1) month; whenever the services of Contractor or any of Contractor's Subcontractors are terminated for any reason; and at any time a special verified report is required by the Division of the State Architect. Refer to section 4-336 and section 4-343 of Part 1, Title 24 of the California Code of Regulations.

PART 2 – PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures
- B. Substitutions
- C. Submittals and Substitution Requests Requiring Agency Review
- D. Electronic Submittal Procedures.
- E. Product Data Submittals.
- F. Manufacturer's Instructions and Certificates
- G. Shop Drawing Submittals
- H. Physical Sample Submittals
- I. Construction Schedules
- J. Contractor Responsibilities
- K. Architect Responsibilities
- L. Deferred Approvals
- M. Electronic Documents for Contractor's Use
- N. Construction Photographs

1.2 DESCRIPTION

- A. Types of Submittals: Submittal procedures specified in this section include construction progress schedules, shop drawings, product data, samples, manufacturers' certificates, manufacturer's installation instructions, and agency deferred approvals.
- B. Intent: Architect's review of shop drawings is intended to be a preview of what the Contractor intends to provide, and will function as an effort to foresee unacceptable materials or assemblies and to avoid the possibility of their rejection at the Project Site. Architect will review submittals only for conformance with the design concept of the Project and with the information given in the Contract Documents.

- C. The Architect's review of shop drawings will be general and shall not be construed:
1. As permitting departure from the Contract requirements except as otherwise provided for under Section 01 25 00, "Substitution Procedures".
 1. As relieving Contractor of responsibility for omissions or errors, including details, dimensions, materials, etc.
 2. That review of a separate item indicates acceptance of an assembly in which the item functions. Architect will only review acceptance of an assembly in which the item functions. Architect will only review submittals required by Contract Documents for conformance with design concept of the Project and with the information given in the Contract Documents.

1.3 SUBMITTAL PROCEDURES

- A. Submit completed documentation in accordance with scheduling criteria where defined in contract documents.
- B. The documents will be reviewed by Architect for consistency with specified criteria. If necessary, Architect will return submittal to Contractor for corrections. Any corrections, if any, shall be made by Contractor and returned to Architect within 7 days.
- C. No contract time extensions will be granted for document modification caused by non-conformance with specified criteria.
- D. Transmit required submittals to Architect per criteria in the General Conditions and as specified.
- E. Transmit each Sample submittal with AIA Form G810 or other Architect-accepted form.
- F. All submittals shall be made electronically through the system agreed to by JKAE, the Owner and the Contractor. Only Samples for verification should be submitted physically – See Item 1.6 in this Section for "Electronic Submittal Procedures".
- G. Transmit submittals within time periods established by the General Conditions and as required to maintain orderly and sequential progress of the work.
- H. Maintain complete and current submittal log, indicating status of all submittals and re-submittals. Provide summary of submittal status at each periodic construction meeting.
- I. Failure to make timely submittals will not be reason for extension of Contract Time.
- J. Unless specifically requested, do not send submittals unless required by the project specifications. Submittals transmitted to Architect not required by specification will be returned without review.
- K. Sequentially number the submittals and transmittal forms as shown in each section requiring submittals with the project manual section number from which the submittal is being requested (e.g., 01 33 00A). Any required revisions and resubmittals shall be noted with an underscore and "R1", "R2", etc. (e.g. 01 33 00_R1).
- L. Provide submittals with the same number as indicated in the project specifications.

- M. **Do not combine specification sections within submittals.**
- N. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section name and number, as appropriate.
- O. Apply Contractor's stamp and signature or initial (electronically or physically) certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents. See General Conditions, Section 00 72 00, Paragraph 4.7.1.2.
- P. Unless otherwise authorized by the Architect, all of the submittals required by a specification section shall be submitted together at the same time. Electronic submittals of product data, shop drawings, etc. may be submitted ahead of physical color samples with approval of the Architect. Submittals that do not include all required submittals for a given specification section will be returned without review.
- Q. Schedule submittals to expedite the Project. Late submittals shall not be considered a valid reason for product substitution. Deliver Samples to architect at business address. Coordinate submission of related items.
- R. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work. If variations occur, submit a substitution request.
- S. Provide space for Contractor and Architect review stamps.
- T. Samples: Provide samples as specified in each Section.
- U. Manufacturer's Data: Provide descriptive data on all accessory items and operation.
- V. Installation Data: Submit descriptive data on installation procedures.
- W. Revise and resubmit submittals as required, identify all changes made since previous submittal.
 - 1. Provide re-submittals within seven days of receipt of returned submittal.
- X. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
- Y. Architect's review of submittals shall not relieve the Contractor for compliance with the Contract Documents, or for responsibility for deviations from Contract Documents.
 - 1. In review of submittals, Architect will not provide dimensions or elevations for field conditions, or for conditions available from a detailed review of documents.
- Z. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- AA. Distribute copies of reviewed submittals to concerned parties at no additional cost to Owner for duplication, blueprinting, mailing or other costs. Instruct parties to promptly report any inability to comply with provisions.

- BB. Architect will notify Contractor of availability of documents for pickup at Architect's office, and log such date as the date returned to Contractor. Architect is not obligated to transmit or deliver submittals to Contractor.

1.4 SUBSTITUTIONS

- A. Substitution requests will be considered in accordance with the General Conditions and must be submitted according to Section 01 25 00, "Substitution Procedures" on the provided substitution request form in Section 01 25 00.10.
- B. Substitutions submitted without following this procedure will be rejected.
- C. Substitutions will not be considered when indicated or implied on shop drawings or other forms of submittal without separate written request for substitution.

1.5 SUBMITTALS AND SUBSTITUTION REQUESTS REQUIRING AGENCY REVIEW

- A. Variations to Structural Safety, Fire and Life Safety and Access Compliance requirements require DSA review and approval.
- B. Architect will submit documents to DSA for review and comment in the form of a Construction Change Document (CCD). Architect will return documents to Contractor following DSA review and approval.
- C. Where required, Contractor shall make all changes or corrections required by DSA. Contractor shall pay all fees and provide all coordination and management necessary to obtain approval, including all meetings, correspondence and communications. Once corrections are made, Contractor shall return to Architect for resubmittal.
- D. After receiving DSA final approval, Architect will furnish Contractor a complete set of DSA approved documents in PDF format for Contractor's use in construction and for inspection by the Inspector of Record (IOR).

1.6 ELECTRONIC SUBMITTAL PROCEDURES

- A. All submittals shall be submitted electronically.
- B. Submittals shall be uploaded to the system agreed to by JKAE, the Owner and the Contractor in full size PDF format. Do not reduce Shop Drawings from original sheet size.
- C. One PDF copy of electronic submittals will be returned to the Contractor. Contractor may distribute submittals to the concerned parties electronically or physically. Any printing costs for physical distribution of submittals shall be borne by the Contractor. The Architect will not print copies for distribution.
- D. Follow all General Submittal Procedures as described above.

1.7 PRODUCT DATA SUBMITTALS

- A. Where specified in individual sections, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number for each product and supporting product data.
 - 1. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.
- B. Submit all product data electronically, in PDF format.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project. Mark out items that are not applicable to the project.
- D. After review, distribute in accordance with Submittal Procedures and provide copies for Project Record Documents as described in Section 01 77 00, "Closeout Requirements".
- E. Show dimensions and clearances required.

1.8 MANUFACTURER'S INSTRUCTIONS AND CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturers' certificates and printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.
- C. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- D. Certificates may be recent or previous test results on material or Product, but must address current regulatory requirements and be acceptable to Architect.

1.9 SHOP DRAWING SUBMITTALS

- A. Submit all shop drawings electronically, in PDF format.
- B. Provide the following information on each sheet:
 - 1. Project name and location.
 - 2. Contractor name and address.
 - 3. Subcontractor, manufacturer, or fabricator name and address.
 - 4. Date and scale of drawings
 - 5. Space for Contractor's and Architect's review and approval stamp.
- C. After review and distribution in accordance with Submittal Procedures, retain one copy of all

reviewed shop drawings at the job and label them "PROJECT RECORD DOCUMENTS" as described in Section 01 77 00, "Execution and Close-out Requirements".

1.10 PHYSICAL SAMPLE SUBMITTALS

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Provide units identical with final condition of proposed materials or products for the work. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes from the full range of manufacturers' standard colors textures, and patterns for Architect's selection.
- C. Submit the number of samples of selected finish color texture, and pattern as specified in individual specification Sections from the full range of manufacturers' standard colors, textures and patterns. Provide custom selections, as indicated in the Drawings and Specifications,
- D. Include identification on each sample, with full Project information.
- E. Submit the number or samples specified in individual specification Sections.
- F. If not specifically noted in individual specification Sections, submit a minimum of one copies of each submittal including samples and resubmittals, as the Architect will retain a one. (Architect retains the right to request more sample copies if needed)
- G. Samples and Color Charts shall be physical submittals with accurate representation of color and other physical characteristics.
 - 1. Initial Submittal: Using manufacturers standard sample delivery system, in the number indicated within this Section submit samples of colors and finishes from the full range of manufacturers' standard colors (and custom colors if specified), textures, and patterns for Architect initial selection.
 - 2. The Architect will notify Contractor of initial selection by Architect's Supplemental Instructions (ASI), or other mutually agreed to format.
 - 3. Following receipt of initial selection, submit the number of samples of selected finish color, texture, and pattern as specified in individual specification Sections, with a minimum of five samples provided.
- H. Follow all General Submittal Procedures as described above.

1.11 CONSTRUCTION SCHEDULES

- A. Submit Construction Schedule in accordance with the General Conditions and as specified in Section 01 32 16, "Construction Progress Schedule".
- B. Contractor shall engage at his own expense all necessary personnel skilled in preparation of time and cost application of network techniques for construction projects.
- C. Initial Schedule preparation:

1. Submit Initial Schedule within 14 days of date of Notice to Proceed.
2. Architect and Owner will meet with the Contractor to review and comment on the Contractor's Initial Schedule within five (5) days of its receipt.
3. The Contractor shall finalize and re-submit the schedule within five (5) days of the review meeting. Upon acceptance by the Owner, the accepted Initial Schedule will become the project Baseline Contract Schedule. The Baseline Schedule shall not be revised without written approval of the Owner.
4. Contractor's failure to incorporate all elements of work required for the performance of the contract or any inaccuracy in the Baseline Contract Schedule shall not excuse the Contractor from performing all work required for a completed project within the specified contract time period, notwithstanding the Owner's acceptance of the Baseline Contract Schedule.

D. Monthly and Periodic Interval Updates

1. The Contractor shall submit to the Owner each month, with one copy to the Architect, an updated Schedule of the work. The schedule shall be submitted no later than five (5) workdays from the status date.
2. The Updated Schedule shall include:
 - a. The Contractor's estimated percentage complete (progress) for each activity in progress.
 - b. Actual start/finish dates for activities.
 - c. Identification of errors, if any, from the previous updated schedule.
3. Submit updated schedule with each pay request, reflecting all adjustments in construction schedule and sequence.
4. Contractor shall submit a narrative report as part of his monthly review and update, in form agreed upon by Contractor and Architect. Narrative report shall include description of problem areas; current and anticipated delaying factors and their estimated impact on performance of other activities and completion dates; and an explanation of corrective action taken or proposed.
5. Provide three-week look-ahead schedule at each construction progress meeting.

E. Pay Requests will not be processed without submission of updated schedule.

F. **Schedule Format and Content:** Provide overall schedule in horizontal bar chart, critical path form, in PDF format, or other Architect approved format, for each building and site work, with separate line for each major work activity, and scheduled on a weekly basis. Integrate all portions of project to identify critical path. Where specified, prepare schedule based on Phases as shown on drawings and specified.

1. The data included on the bar chart shall consist of the activity number, activity description, early start and finish date, original duration, remaining duration, percent complete, resource units per day, and total float.

2. The schedule activities shall be coded to include activity responsibility and the area of work. Area codes shall distinguish construction activities related to individual buildings or areas within buildings (e.g. gymnasium classrooms, lobby, locker rooms), site work, increments, and phasing.
 - a. Coordinate durations with work by Rough Grading Package Contractor.
3. No activity in the schedule shall have a duration longer than twenty (20) workdays, with the exception of fabrication and procurement activities, unless otherwise approved by the Owner. Activity durations shall be the total number of actual days required to perform the work including consideration of weather impacts.
4. Group related and coordinated activities. Identify early/late start and finish dates, major milestones, float dates, and duration of each activity.
5. Identify all utility and service interruptions and connections, including disconnection of existing buildings.
6. Detailed network activities shall include, in addition, submittal and approval of shop drawings, procurement of critical materials and equipment, fabrication of special material and equipment and their installation and testing. All activities of the Owner that affect progress, and contract required dates for completion of all or parts of the work shall be shown.
7. If physical copies of schedules are provided, sheet size of diagrams shall be at least 30 by 42 inches. Each updated copy shall show a date of the last revision.
8. Initial submittal and complete revisions shall be submitted in PDF format and the same quantity as provided previously.

G. Float Time

1. Float or slack time is defined as the amount of time between the earliest start date and the latest start date or the amount of time between the earliest finish date and the latest finish date of a scheduled activity.
2. Float or slack time is not for the exclusive use or benefit of either the Contractor or the Owner. The Contractor acknowledges and agrees that actual delays affecting path of activities containing float, will not have any effect upon the Contract completion date, provided that the actual delay does not exceed the float time associated with those activities.

- H. For scheduling purposes, the Owner and campus will be officially closed on the following holidays during each school year:

<u>Holiday</u>	<u>Month</u>
New Year's Day	January
Martin Luther King Birthday	January
Lincolns Day	February
Presidents Day	February

Spring Break	April
Memorial Day	May
Independence Day	July
Labor Day	September
Veterans Day	November
Thanksgiving Break	November
Winter Break	December & January

1. It shall be the responsibility of the Contractor to confirm the month, day, and year for the above holidays with the Owner facilities management. Contractor shall coordinate and schedule his work accordingly. The project site will be available to the Contractor during the holidays but there is no guarantee that other Owner and campus facilities or services will be made available to the Contractor during the holiday schedule.

I. Construction Schedule Revisions

1. Updating the construction schedule to reflect actual progress shall not be considered to be a revision of the Schedule.
2. If during the process of schedule updating it becomes apparent that the Construction Schedule no longer represents the actual prosecution and progress of the work by more than 5 days, the Owner may require the Contractor to submit a revised schedule at no additional cost to the Owner. The Owner shall have the right to withhold progress payments from the Contractor at its discretion, if the Contractor fails to submit a timely, detailed and workable schedule showing recovery necessary to achieve scheduled completion.

J. Final Schedule: At the completion of the contract and prior to the release of any bonds or final payment by the Owner, the Contractor shall submit to the Owner, with copy to the Architect for approval, a final schedule, showing the actual job history.

K. Time Extension Requests: The monthly updated construction schedules submitted by the Contractor shall not show a completion date later than the Contract Time, subject to any time extensions approved by the Owner.

1. Contractor shall submit Time Extension Requests within 10 days of an event Contractor believes qualifies for a contract time extension, including contract modifications provided by Architect or Owner.
2. The Time Extension Request shall include a notification letter with a detailed narrative justifying the time extension requested.
3. Accompanying letter, provide schedule analysis entitled "Time Extension Request Schedule" incorporating narrative analysis into the latest (qualifying) update schedule.
4. Time Extension Request shall forecast the adjusted project completion date and impact to any intermediate milestones.

5. When Contractor does not submit a Time Extension Request within ten (10) working days, it is mutually agreed that the particular event, including ASI's, RFI response, or CCD/Change Order (including Proposed Change Order) or delay/disruption does not impact the construction schedule and hence no time extension is due to the Contractor.
6. The Owner shall not be under any obligation to consider any time extension request unless the requirements of the contract documents are complied with. The Owner shall not be responsible or liable to the Contractor for any constructive acceleration due to failure of the Owner to grant time extensions under the terms of this contract, should Contractor fail to comply with the time extension submission and justification requirements stated herein.

1.12 CONTRACTOR RESPONSIBILITIES

- A. Review shop drawings, product data and samples prior to submission. Reject and correct submittals that contain errors prior to submitting to Architect.
- B. Determine and verify:
 1. Field measurements.
 2. Field construction criteria.
 3. Catalog numbers and similar data.
 4. Conformance with specifications.
 5. Conformance with applicable codes.
- C. Submittals giving inadequate indication of contractor review and approval will be returned without review, for resubmission.
- D. Coordinate each submittal with requirements of the Work and of the Contract Documents.
- E. Notify the Architect in writing, at time of submission, of any deviations in the submittals from requirements of the Contract Documents. See Item 1.3 in this Section for Substitution Request requirements.
- F. Begin no fabrication or construction activity that requires submittals until return of submittals with Architect's stamp and initials or signature indicating finish review.
- G. After Architect's final review, distribute copies.
- H. Copying of Contract Documents for use as submittals is not acceptable. Contractor shall produce original documents for shop drawings and other submittals.
- I. Provide submittals within the following time periods and as required for the orderly progress of the work. Where no time period is established, provide submittals no later than the midpoint between notice of award and scheduled start date of the work related to the submittal. Where submittals are not submitted within specified limits, the Architect may delay certification of Payment Request until submittals are received.

1. Concrete, including Mix Designs: No later than 14 days after Notice to Proceed.
 2. Asphalt Paving, including Mix Designs: No later than 14 days after Notice to Proceed.
 3. Aggregate Base: No later than 14 days after Notice to Proceed.
 4. Mortar and Grout, including Mix Designs: No later than 14 days after Notice to Proceed.
 5. Concrete Masonry Units and related items: No later than 14 days after Notice to Proceed.
 6. Structural Steel: No later than 14 days after Notice to Proceed and as specified in Division 05.
 7. Metal Decking: No later than 14 days after Notice to Proceed and as specified in Division 05.
 8. Architectural Casework: No later than 60 days after Notice to Proceed.
 9. Firestopping: No later than 60 days after Notice to Proceed.
 10. Roofing and Sheet Metal: No later than 60 days after Notice to Proceed.
 11. Doors, Door and Window Frames: No later than 60 days after Notice to Proceed.
 12. Door Hardware: No later than 60 days after Notice to Proceed. In addition, provide Owner required keying information no later than 30 days before scheduled occupancy date. Coordinate all keying requirements with Owner.
 13. All HVAC, Fire Protection, Plumbing and Electrical Fixtures, Products and Equipment: No later than 60 days after Notice to Proceed.
- J. The Architect's action will be taken within a reasonable time period, while allowing sufficient time, in the Architect's professional judgment, to permit adequate review.
- K. Transmit each submittal separately with Architect accepted form.
1. Combine required material for a single specification Section into a single submittal. Incomplete or partial submittals will be returned without action for re-submittal in proper form.
 2. Do not combine data from more than one specification section or drawing component into a single submittal. Such submittals received will be returned without action for re-submittal in proper form.
 3. Submittals not reviewed by General Contractor will be returned without action for proper review and re-submittal.
 4. Unless otherwise specified, submit product data in quantity required by Contractor for construction, plus three copies for Architect's use. Architect will review a maximum of six (6) copies of submittal.
- L. Sequentially number the transmittal forms. Re-submittals to have original number with an alphabetic or numeric suffix.

- M. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.
- N. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.
- O. Schedule submittals to expedite the Project, and deliver to Architect at business address. Coordinate submission of related items.
- P. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
 - 1. Clearly identify, with bold clouding, or other graphic notation, all deviations from Contract Documents. Provide boxed note at clouded deviation specifically requesting approval of proposed change. Provide documentation of proposed change, including additional graphics and data as required by Architect.

1.13 ARCHITECT RESPONSIBILITIES

- A. Architect will review each submittal, mark with "Action" and where possible, return within a reasonable period of time from date of receipt. Where submittal must be held for coordination, Contractor will be so advised without delay. Action markings shall be interpreted as shown in the Architect’s submittal review stamp shown below:

JK ARCHITECTURE ENGINEERING	
<input type="checkbox"/> REVIEWED – NO EXCEPTIONS TAKEN	<input type="checkbox"/> MAKE CORRECTIONS NOTED
<input type="checkbox"/> REJECTED	<input type="checkbox"/> REVISE AND RESUBMIT
<input type="checkbox"/> SUBMIT SPECIFIED ITEM	<input type="checkbox"/> RETURNED WITHOUT REVIEW

This review is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Corrections or comments made on the shop drawings/submittal during this review do not relieve the Contractor from compliance with all of the requirements of the plans and specifications. Review of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for: dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination of, and with, the Work of all trades; and for performing all work in a safe and satisfactory manner.

DATE: _____ BY: _____

- B. Architect shall comply with previous provisions in this Section, as described herein
- C. See Section 01 25 00, “Substitution Procedures”, for Architect responsibilities for substitution requests.

1.14 DEFERRED APPROVALS

- A. Where shown on drawings and as specified in individual sections, submit documentation as required to obtain DSA approval of all deferred approval work.
- B. Submit deferred approval documentation under the provisions of Section 01 33 00 and as specified in the respective Sections.
 - 1. Comply with the requirements of Section 4-317(g), Chapter 4, Part 1, Title 24, CCR.
 - 2. Submit documentation prepared under the direct supervision of a California licensed Engineer in the applicable discipline. All structural deferred approvals shall be prepared by California licensed Structural Engineer.
 - a. Provide Deferred Approval Number and DSAProject Number on the cover of each submittal.
 - b. Provide document format with sufficient space for Architect and DSA/OSHPD agency review stamps.
 - 3. All deferred approvals shall be stamped and sealed by the responsible engineer, licensed as specified. In accordance with DSA Section 4-317(g), Part 1, Title 24, CCR. Architect will review and mark with notation indicating that the deferred submittal documents have been reviewed and that they have been found to be in general conformance with the design of the project.
 - 4. Clearly identify all deviations and proposed alternates to materials and systems shown on drawings and specified in this Project Manual.
 - 5. Drawings: Produce drawings on substantial bond paper using media of archive quality. Indicate dimensional locations of the various parts of the construction, sizes and type of members, connections, attachments, and openings.
 - 6. Specifications: Provide specifications in an approved format illustrating materials and systems proposed for use in design.
 - 7. Structural Calculations: Produce calculations in booklet form, 8-1/2 x 11 inch size, minimum of 3 wet signed and sealed copies.
 - 8. Provide sufficient information with respect to design criteria, analysis methodology and material capacity to adequately evaluate documentation for compliance with applicable sections of Title 24, CCR.
 - 9. Where required by DSA 4-336, provide verified reports for work done under deferred approvals.

1.15 ELECTRONIC DOCUMENTS FOR CONTRACTOR'S USE.

- 1. At Architect's sole discretion, and upon request, Architect will provide a file containing selected electronic file backgrounds for Contractor's use in shop drawing preparation.

2. Contractor shall sign Architect provided release form regarding such electronic file information.
3. Electronic files will be provided in AutoCAD format, in the Architects current version, as background views only, without dimensions, doors, notes and similar information. No seals, title blocks or approval stamps will be included on backgrounds.
4. Unless otherwise established, and at Architects sole discretion, only plan and section views of architectural, structural, mechanical, and electrical documents will be provided. Under no circumstances will the complete project AutoCAD file be provided.
5. The Architect will provide a single CD based file containing backgrounds for all discipline for the contractors use. Contractor shall be responsible for distribution of background files to subcontractors and vendors.
6. The Architect will prepare a cost for preparation of electronic file package. If the Contractor agrees to such cost, the cost will be processed as a deductive change order to the contract.

1.16 CONSTRUCTION PHOTOGRAPHS

- A. Submit photographs taken by a professional photographer to Architect with Application for Payment.
- B. Photograph Formats: Provide two 8 x 10 inch size prints of each view, black and white, glossy finish, mounted on 8 - 1/2 x 11 inch soft card stock, with left edge binding margin for three hole punch.
- C. Take a minimum of 3 exterior and 2 interior photographs of each building and site area indicating the relative progress of the Work. Take pictures at 5 days maximum prior to submitting.
- D. Identify photographs with date, time, orientation and project identification.

PART 2 - PRODUCTS

- A. NOT USED

PART 3 - EXECUTION

- A. NOT USED

END OF SECTION

SITE STANDARDS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including without limitation, Site Access, Conditions, and Regulations;
- B. Special Conditions;
- C. Drug-Free Workplace Certification;
- D. Tobacco-Free Environment Certification;
- E. Criminal Background Investigation/Fingerprinting Certification;
- F. Temporary Facilities and Controls.

1.02 REQUIREMENTS OF THE DISTRICT:

- A. Drug-Free Schools and Safety Requirements:
 - (1) All school sites and other District Facilities have been declared "Drug-Free Zones." No drugs, alcohol and/or smoking are allowed at any time in any buildings and/or grounds on District property. No students, staff, visitors, or contractors are to use drugs on these sites.
 - (2) Smoking and the use of tobacco products by all persons is prohibited on or in District property. District property includes school buildings, school grounds, school-owned vehicles and vehicles owned by others while on District property. Contractor shall post: "Non-Smoking Area" in a highly visible location in each work area, staging area, and parking area. Contractor may designate a smoking area outside of District property within the public right-of-way, provided that this area remains quiet and unobtrusive to adjacent neighbors. This smoking area is to be kept clean at all times.
 - (3) Contractor shall ensure that no alcohol, firearms, weapons, or controlled substances enter or are used at the Site. Contractor shall immediately remove from the Site and terminate the employment of any employee(s) found in violation of this provision.
- B. Language: Profanity or other unacceptable and/or loud language will not be tolerated, "Cat calls" or other derogatory language toward students, staff, volunteers, parents or public will not be allowed.

- C. Disturbing the Peace (Noise and Lighting):
- (1) Contractor shall observe the noise ordinance of the Site at all times including, without limitation, all applicable local, city, and/or state laws, ordinances, and/or regulations regarding noise and allowable noise levels.
 - (2) The use of radios, etc., shall be controlled to keep all sound at a level that cannot be heard beyond the immediate area of use. District reserves the right to prohibit the use of radios at the Site, except for mobile phones or other handheld communication radios.
 - (3) If portable lights are used after dark, all light must be located so as not to direct light into neighboring property.
- D. Traffic:
- (1) Driving on the Premises shall be limited to periods when students and public are not present. If driving or deliveries must be made during the school hours, two (2) or more ground guides shall lead the vehicle across the area of travel. In no case shall driving take place across playgrounds or other pedestrian paths during recess, lunch, and/or class period changes. The speed limit on-the Premises shall be five (5) miles per hour (maximum) or less if conditions require.
 - (2) All paths of travel for deliveries, including without limitation, material, equipment, and supply deliveries, shall be reviewed and approved by District in advance. Any damage will be repaired to the pre-damaged condition by the Contractor.
 - (3) District shall designate a construction entry to the Site. If Contractor requests, District determines it is required, and to the extent possible, District shall designate a staging area so as not to interfere with the normal functioning of school facilities. Location of gates and fencing shall be approved in advance with District and at Contractor's expense.
 - (4) Parking areas shall be reviewed and approved by District in advance. No parking is to occur under the drip line of trees or in softscape areas that could otherwise be damaged.
- E. All of the above shall be observed and complied with by the Contractor and all workers on the Site. Failure to follow these directives could result in individual(s) being suspended or removed from the work force at the discretion of the District. The same rules and regulations shall apply equally to delivery personnel, inspectors, consultants, and other visitors to the Site.

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Obtaining of Permits, Licenses and Registrations and Work to Comply with All Applicable Laws and Regulations;
- B. Special Conditions; and
- C. Quality Control.

1.02 DESCRIPTION:

This section covers the general requirements for regulatory requirements pertaining to the Work and is supplementary to all other regulatory requirements mentioned or referenced elsewhere in the Contract Documents.

1.03 REQUIREMENTS OF REGULATORY AGENCIES:

- A. All statutes, ordinances, laws, rules, codes, regulations, standards, and the lawful orders of all public authorities having jurisdiction over the Work, are hereby incorporated into these Contract Documents as if repeated in full herein and are intended to be included in any reference to Code or Building Code, unless otherwise specified, including, without limitation, the references in the list below. Contractor shall make available at the Site copies of all the listed documents applicable to the Work as the District and/or Architect may request, including, without limitation, applicable portions of the California Code of Regulations ("CCR").
 - (1) California Building Standards Administrative Code, Part 1, Title 24, CCR.
 - (2) California Building Code (CBC), Part 2, Title 24, CCR; (International Building Code volumes 1-2 and California Amendments).
 - (3) California Electrical Code (CEC), Part 3, Title 24, CCR; (National Electrical Code and California Amendments).
 - (4) California Mechanical Code (CMC), Part 4, Title 24, CCR; (Uniform Mechanical Code and California Amendments).
 - (5) California Plumbing Code (CPC), Part 5, Title 24, CCR; (Uniform Plumbing Code and California Amendments).

- (6) California Fire Code (CFC), Part 9, Title 24, CCR; (International Fire Code and California Amendments).
- (7) California Green Building Standards Code (CALGreen), Part 11, Title 24, CCR.
- (8) California Referenced Standards Code, Part 12, Title 24, CCR.
- (9) State Fire Marshal Regulations, Public Safety, Title 19, CCR.
- (10) Partial List of Applicable National Fire Protection Association (NFPA) Standards:
 - (a) NFPA 13 - Automatic Sprinkler System.
 - (b) NFPA 14 - Standpipes Systems.
 - (c) NFPA 17A - Wet Chemical System
 - (d) NFPA 24 - Private Fire Mains.
 - (e) (California Amended) NFPA 72 - National Fire Alarm Codes.
 - (f) NFPA 253 - Critical Radiant Flux of Floor Covering System.
 - (g) NFPA 2001 - Clean Agent Fire Extinguishing Systems.
- (11) California Division of the State Architect interpretation of Regulations ("DSA IR"), including, without limitation:
 - (a) DSA IR A-6 — Construction Change Document Submittal and Approval Processes.
 - (b) DSA IR A-7 — Project Inspector Certification and Approval.
 - (c) DSA IR A-8 — Project Inspector and Assistant Inspector Duties and Performance.
 - (d) DSA IR A-12 — Assistant Inspector Approval.
- (12) DSA Procedures ("DSA PR")
 - (a) DSA PR 13-01 – Construction Oversight Process
 - (b) DSA PR 13-02 – Project Certification Process

B. This Project shall be governed by applicable regulations, including, without limitation, the State of California's Administrative Regulations for the Division of the State Architect-Structural Safety (DSA/SS), Chapter 4, Part 1, Title 24, CCR, and the most current version on the date the bids are opened and as it pertains to school construction including, without limitation:

- (1) Test and testing laboratory per Section 4-335. District shall pay for the testing laboratory.
- (2) Special inspections per Section 4-333(c).
- (3) Deferred Approvals per section 4-317(g).
- (4) Verified reports per Sections 4-336 & 4-343(c).
- (5) Duties of the Architect & Engineers shall be per Sections 4-333(a) and 4-341.
- (6) Duties of the Contractor shall be per Section 4-343.
- (7) Duties of Project Inspector shall be per Section 4-334.
- (8) Addenda and Construction Change Documents per Section 4-338.

Contractor shall keep and make available all applicable parts of the most current version of Title 24 referred to in the plans and specifications at the Site during construction.

- C. Items of deferred approval shall be clearly marked on the first sheet of the Architect's and/or Engineer's approved Drawings. All items later submitted for approval shall be per Title 24 requirements to the DSA.
- (1) Contractor shall submit the following to Architect for review and endorsement:
 - (a) Product information on proposed material/system supplier.
 - (b) Drawings, specifications, and calculations prepared, signed, and stamped by an architect or engineer licensed in the State of California for that portion of the Work.
 - (c) All other requirements as may be required by DSA.
 - (2) Cost of preparing and submitting documentation per DSA Deferred Approval requirements including required modifications to Drawings and Specifications, whether or not indicated in the Contract Documents, shall be borne by Contractor.
 - (3) Contractor shall not begin fabrication and installation of deferred approval items without first obtaining DSA approval of Drawings and Specifications.
 - (4) Schedule of Work Subject to DSA Deferred Approval: Window wall systems exceeding 10 feet in span.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

ABBREVIATIONS AND ACRONYMS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions including without limitation, Definitions;
- B. Special Conditions.

1.02 DOCUMENT INCLUDES:

- A. Abbreviations used throughout the Contract Documents.
- B. Reference to a technical society, organization, or body is by abbreviation, as follows:

1.	AA	The Aluminum Association
2.	AASHTO	American Association of State Highway and Transportation Officials
3.	ABPA	Acoustical and Board Products Association
4.	ACI	American Concrete Institute
5.	AGA	American Gas Association
6.	AGC	Associated General Contractors of America
7.	AHC	Architectural Hardware Consultant
8.	AHRI	Air Conditioning, Heating, Refrigeration Institute
9.	AI	Asphalt Institute
10.	AIA	American Institute of Architects
11.	AISC	American Institute of Steel Construction
12.	AISI	American Iron and Steel Institute
13.	AMCA	Air Movement and Control Association
14.	ANSI	American National Standards Institute
15.	APA	APA – The Engineered Wood Association
16.	ASCE	American Society of Civil Engineers
17.	ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
18.	ASME	American Society of Mechanical Engineers
19.	ASTM	American Society of Testing and Materials International
20.	AWPA	American Wood Protection Association
21.	AWPI	American Wood Preservers Institute
22.	AWS	American Welding Society
23.	AWSC	American Welding Society Code
24.	AWI	Architectural Woodwork Institute
25.	AWWA	American Water Works Association
26.	BIA	The Brick Industry Association

27.	CCR	California Code of Regulations
28.	CLFMI	Chain Link Fence Manufacturers Institute
29.	CRA	California Redwood Association
30.	CRSI	Concrete Reinforcing Steel Institute
31.	CS	Commercial Standards
32.	CSI	Construction Specifications Institute
33.	CTI	Cooling Technology Institute
34.	FGIA	Fenestration and Glazing Industry Alliance
35.	FGMA	Flat Glass Manufacturers' Association
36.	FIA	Factory Insurance Association
37.	FM	Factory Mutual Global
38.	FS/FED SPEC	Federal Specification
39.	FTI	Facing Title Institute
40.	GA	Gypsum Association
41.	IAPMO	International Association of Plumbing and Mechanical Officials
42.	ICC	International Code Council
43.	IEEE	Institute of Electrical and Electronics Engineers
44.	IES	Illuminating Engineering Society
45.	MCAC	Mason Contractors Association of California
46.	MIMA	Mineral Wool Insulation Manufacturers Association
47.	MLMA	Metal Lath Manufacturers Association
48.	MS/MIL SPEC	Military Specifications
49.	NAAMM	National Association of Architectural Metal Manufacturers
50.	NBHA	National Builders Hardware Association
51.	NCMA	National Concrete Masonry Association
52.	NCSEA	National Council of Structural Engineers Associations
53.	NEC	National Electrical Code
54.	NEMA	National Electrical Manufacturers Association
55.	NIST	National Institute of Standards and Technology
56.	NSI	Natural Stone Institute
57.	NTMA	National Terrazzo and Mosaic Association, Inc.
58.	ORS	Office of Regulatory Services (California)
59.	OSHA	Occupational Safety and Health Act
60.	PCI	Precast/Prestressed Concrete Institute
61.	PCA	Portland Cement Association
62.	PCA	Painting Contractors Association
63.	PDI	Plumbing Drainage Institute
64.	PEI	Porcelain Enamel Institute, Inc.
65.	PG&E	Pacific Gas & Electric Company
66.	PS	Product Standards
67.	SDI	Steel Door Institute; Steel Deck Institute
68.	SJI	Steel Joist Institute
69.	SSPC	Society for Protective Coatings
70.	TCNA	Tile Council of North America, Inc.
71.	TPI	Truss Plate Institute
72.	UBC	Uniform Building Code
73.	UL	Underwriters Laboratories Code

74.	UMC	Uniform Mechanical Code
75.	USDA	United States Department of Agriculture
76.	VI	Vermiculite Institute
77.	WCLIB	West Coast Lumber Inspection Bureau
78.	WDMA	Window and Door Manufacturers Association
79.	WEUSER	Western Electric Utilities Service Engineering Requirements
80.	WIC	Woodwork Institute of California

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

DEFINITIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions including without limitation, Definitions;
- B. Special Conditions.

1.02 QUALITY ASSURANCE

- A. For products or workmanship specified by association, trade, or Federal Standards, Contractor shall comply with requirements of the standard, except when more rigid requirements are specified in the Contract Documents, or are required by applicable codes.
- B. Contractor shall conform to current reference standard publication date in effect on the date of bid opening.
- C. Contractor shall obtain copies of standards unless specifically required not to by the Contract Documents.
- D. Contractor shall maintain a copy of all standards at jobsite during submittals, planning, and progress of the specific Work, until final completion, unless specifically required not to by the Contract Documents.
- E. Should specified reference standards conflict with Contract Documents, Contractor shall request clarification from the District and/or the Architect before proceeding.
- F. The contractual relationship of the parties to the Contract shall not be altered from the contractual relationship as indicated in the Contract Documents by mention or inference otherwise in any referenced document.
- G. Governing Codes shall be as shown in the Contract Documents including, without limitation, the Specifications.

END OF DOCUMENT

REFERENCES**PART 1 - GENERAL****1.01 SCHEDULE OF REFERENCES:**

The following information is intended only for the general assistance of the Contractor, and the District does not represent that all of the information is current. It is the Contractor's responsibility to verify the correct information for each of the entities listed.

AA	The Aluminum Association 1400 Crystal Drive, Suite 430 Arlington, VA 22202 www.aluminum.org	703/358-2960
AABC	Associated Air Balance Council 2401 Pennsylvania Avenue NW, Suite 330 Washington, DC 20037 www.aabc.com	202/737-0202
AASHTO	American Association of State Highway and Transportation Officials 555 12th St. NW - Suite 1000 Washington, DC 20004 www.transportation.org	202/624-5800
AATCC	American Association of Textile Chemists and Colorists P.O. Box 12215 Research Triangle Park, NC 27709-2215 www.aatcc.org	919/549-8141
ACA	American Coatings Association 901 New York Ave., NW, Suite 300 West Washington, DC 20001 www.paint.org	202/462-6272
ACI	American Concrete Institute 38800 Country Club Dr. Farmington Hills, MI 48331-3439 www.concrete.org	248/848-3800
ACPA	American Concrete Pipe Association 5605 N. MacArthur Blvd., Suite 340 Irving, TX 75038 www.concrete-pipe.org	972/506-7216

ADC	Air Duct Council 1901 N. Roselle Road, Suite 800 Schaumburg, IL 60195 www.flexibleduct.org	847/706-6750
AF&PA	American Forest and Paper Association 1101 K Street, NW, Suite 700 Washington, DC 20005 www.afandpa.org	202/463-2700
AGA	American Gas Association 400 North Capitol Street, NW, Suite 450 Washington, DC 20001 www.aga.org	202/824-7000
AGC	Associate General Contractors of America 2300 Wilson Blvd., Suite 300 Arlington, VA 22201 www.agc.org	703/548-3118
AHA	American Hardboard Association 1210 West Northwest Highway Palatine, IL 60067 http://domensino.com/AHA/default.htm	847/934-8800
AI	Asphalt Institute 2696 Research Park Drive Lexington, KY 40511-8480 www.asphaltinstitute.org	859/288-4960
AIA	The American Institute of Architects 1735 New York Ave., NW Washington, DC 20006-5292 www.aia.org	202/626-7300
AISC	American Institute of Steel Construction 130 East Randolph Street, Suite 2000 Chicago, IL 60601 www.aisc.org	312.670.2400
AISI	American Iron and Steel Institute 25 Massachusetts Ave., NW, Suite 800 Washington, DC 20001 www.steel.org	202/452-7100
AITC	American Institute of Timber Construction 1010 South 336th Street, #210 Federal Way, WA 98003-7394 https://www.plib.org/aitc/	253/835-3344

ALI	Associated Laboratories, Inc. P.O. Box 152837 Dallas, TX 75315 www.assoc-labs.com	214/565-0593
ALSC	American Lumber Standards Committee, Inc. 7470 New Technology Way, Suite F Frederick, MD 21703 www.alsc.org	301/972-1700
AMCA	Air Movement and Control Association International, Inc. 30 W. University Drive Arlington Heights, IL 60004 www.amca.org	847/394-0150
AMPP (formerly SSPC)	Association for Materials Protection and Performance (merger of Society for Protective Coatings and National Association of Corrosion Engineers International) (formerly Steel Structures Painting Council) 800 Trumbull Drive Pittsburgh, PA 15205 www.sspc.org	412/281-2331 877/281-7772
ANLA	AmericanHort (merger of American Nursery & Landscape Association and OFA – The Association of Horticultural Professionals) 2130 Stella Court Columbus, OH 43215 www.americanhort.org	614/487-1117
ANSI	American National Standards Institute 1899 L Street, NW, 11th Floor Washington, DC 20036 www.ansi.org	202/293-8020
APA	APA-The Engineered Wood Association 7011 S. 19th Street Tacoma, WA 98466-5333 www.apawood.org	253/565-6600

APA	Architectural Precast Association 325 John Knox Rd, Suite L-103 Tallahassee, FL 32303 www.archprecast.org	850/205-5637
APCIA	American Property Casualty Insurance Association (merger of American Insurance Association (formerly the National Board of Fire Underwriters) with the Property Casualty Insurers Association of America) 555 12th St, NW, Suite 550 Washington DC 20004 www.apci.org	202/828-7100
AHRI	Air Conditioning and Refrigeration Institute (now Air- Conditioning, Heating, & Refrigeration Institute) 2311 Wilson Blvd, Suite 400 Arlington, VA 22201 www.ahrinet.org	703/524-8800
ARMA	Asphalt Roofing Manufacturers Association 2331 Rock Spring Road Forest Hill, MD 21050 www.asphaltroofing.org	443/640-1075
ASA	The Acoustical Society of America Suite 300 1305 Walt Whitman Road Melville, NY 11747-4300 https://acousticalsociety.org/	516/576-2360
ASCE	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191 www.asce.org	800/548-2723 703/295-6300
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 180 Technology Parkway Peachtree Corners, GA 30092 www.ashrae.org	800/527-4723 404/636-8400
ASLA	American Society of Landscape Architects 636 Eye Street, NW Washington, DC 20001-3736 www.asla.org	202/898-2444
ASME	American Society of Mechanical Engineers Two Park Avenue New York, NY 10016-5990 www.asme.org	800/834-2763

ASPE	American Society of Plumbing Engineers 6400 Shafer Court, Suite 350 Rosemont, IL 60018 http://aspe.org	847/296-0002
ASQ	American Society for Quality P.O. Box 3005 Milwaukee, WI 53201-3005 or 600 North Plankinton Avenue Milwaukee, WI 53203 http://asq.org	800/248-1946 414/272-8575
ASSE	American Society of Sanitary Engineering 18927 Hickory Creek Dr., Suite 220 Mokena, IL 60448 www.asse-plumbing.org	708/995-3019
ASTM	ASTM International 100 Barr Harbor Drive PO Box C700 West Conshohocken, PA, 19428-2959 www.astm.org	610/832-9500
AWCI	Association of the Wall and Ceiling Industry 513 West Broad Street, Suite 210 Falls Church, VA 22046 www.awci.org	703/538-1600
AWPA	American Wood Protection Association (formerly American Wood Preservers Institute) P.O. Box 361784 Birmingham, AL 35236-1784 www.awpa.com	205/733-4077
AWS	American Welding Society 8669 NW 36 Street, Suite 130 Miami, FL 33166 www.aws.org	800/443-9353 305/443-9353
AWI	Architectural Woodwork Institute 46179 Westlake Drive, Suite 120 Potomac Falls, VA 20165-5874 www.awinet.org	571/323-3636
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235 www.awwa.org	800/926-7337 303/794-7711

BHMA	Builders Hardware Manufacturers Association 355 Lexington Avenue, 15th Floor New York, NY 10017 www.buildershardware.com	212/297-2122
BIA	The Brick Industry Association 12007 Sunrise Valley Drive, Suite 430 Reston, VA 20191 www.gobrick.com	703/620-0010
CGA	Compressed Gas Association 8484 Westpark Drive, Suite 220 McLean, VA 22102 www.cganet.com	703/788-2700
CISCA	Ceilings & Interior Systems Construction Association 1010 Jorie Blvd, Suite 30 Oak Brook, IL 60523 www.cisca.org	630/584-1919
CISPI	Cast Iron Soil Pipe Institute 2401 Fieldcrest Dr. Mundelein, IL 60060 www.cispi.org	224/864-2910
CLFMI	Chain Link Fence Manufacturers Institute 10015 Old Columbia Road, Suite B-215 Columbia, MD 21046 chainlinkinfo.org	301/596-2583
CPA	Composite Panel Association 19465 Deerfield Avenue, Suite 306 Leesburg, VA 20176 www.compositepanel.org	703/724-1128
CPSC	Consumer Product Safety Commission 4330 East-West Highway Bethesda, MD 20814 www.cpsc.gov	800/638-2772
CRA	California Redwood Association 818 Grayson Road, Suite 201 Pleasant Hill, CA 94523 www.calredwood.org	925/935-1499

CRI	Carpet and Rug Institute 100 S. Hamilton Street Dalton, GA 30722-2048 www.carpet-rug.org	706/278-3176
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Road Schaumburg, IL 60173-4758 www.crsi.org	847/517-1200
CSI	The Construction Specifications Institute 123 North Pitt St, Suite 450 Alexandria, VA 22314 www.csinet.org	800/689-2900
CTIOA	Ceramic Tile Institute of America 12061 Jefferson Blvd. Culver City, CA 90230-6219 www.ctioa.org	310/574-7800
DHA	Decorative Hardwoods Association (formerly Hardwood Plywood & Veneer Association) 42777 Trade West Dr. Sterling, VA 20166 https://www.decorativehardwoods.org/	703/435-2900
DHI	Door and Hardware Institute (formerly National Builders Hardware Association) 2001 K Street NW, 3rd Floor North Washington, DC 20006 www.dhi.org	202/367-1134
DIPRA	Ductile Iron Pipe Research Association P.O. Box 190306 Birmingham, AL 35219 www.dipra.org	205/402-8700
DOC	U.S. Department of Commerce 1401 Constitution Ave., NW Washington, DC 20230 www.commerce.gov	202/482-2000
DOT	U.S. Department of Transportation 1200 New Jersey Avenue, SE Washington, DC 20590 www.dot.gov	855/368-4200
EJMA	Expansion Joint Manufacturers Association, Inc. 25 North Broadway Tarrytown, NY 10591 www.ejma.org	914/332-0040

EPA	Environmental Protection Agency Ariel Rios Building 1200 Pennsylvania Avenue, N.W. Washington, DC 20460 www.epa.gov	202/272-0167
FCICA	Floor Covering Installation Contractors Association 800 Roosevelt Rd., Bldg. C, Suite 312 Glen Ellyn, IL 60137 www.fcica.com	630/672-3702
FGIA	Fenestration and Glazing Industry Alliance 1900 E Golf Rd, Suite 1250 Schaumburg, IL 60173 https://fgiaonline.org/	847/303-5664
FM Global	Factory Mutual Insurance Company Amy Daley Global Practice Leader – Education, Public Entities, Health Care FM Global 270 Central Avenue Johnston, RI 02919-4949 www.fmglobal.com	401/275-3000 401/275-3029
FS	General Services Administration (GSA) Index of Federal Specifications, Standards and Commercial Item Descriptions 470 East L'Enfant Plaza, SW, Suite 8100 Washington, DC 20407 www.gsa.gov	202/619-8925
GA	The Gypsum Association 962 Wayne Ave., Suite 620 Silver Spring, MD 20910 www.gypsum.org	301/277-8686
HMA	Hardwood Manufacturers Association One Williamsburg Place, Suite 108 Warrendale, PA 15086 http://hmamembers.org	412/244-0440

IAPMO	International Association of Plumbing and Mechanical Officials (formerly the Western Plumbing Officials Association) 4755 E. Philadelphia St. Ontario, CA 91761 www.iapmo.org	909/472-4100
ICC	International Code Council 500 New Jersey Avenue, NW, 6th Floor Washington, DC 20001 www.iccsafe.org	888/422-7233
IEEE	Institute of Electrical and Electronics Engineers 3 Park Avenue, 17th Floor New York, NY 10016-5997 www.ieee.org	212/419-7900
IES	Illuminating Engineering Society 120 Wall Street, Floor 17 New York, NY 10005-4001 www.ies.org	212/248-5000
ITRK	Intertek Testing Services 3933 US Route 11 Cortland, NY 13045 www.intertek.com	607/753-6711
MCAA	Mechanical Contractors Association of America 1385 Piccard Drive Rockville, MD 20850 www.mcaa.org	301/869-5800
MMPA (formerly WMMPA)	Moulding & Millwork Producers Association (formerly Wood Moulding & Millwork Producers Association) 507 First Street Woodland, CA 95695 www.wmmpa.com	530/661-9591 800/550-7889
MSS	Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry, Inc. 127 Park Street, NE Vienna, VA 22180-4602 http://mss-hq.org	703/281-6613
NAAMM	National Association of Architectural Metal Manufacturers 800 Roosevelt Rd. Bldg. C, Suite 312 Glen Ellyn, IL 60137 www.naamm.org	630/942-6591

NAIMA	North American Insulation Manufacturers Association P.O. Box 1906 Alexandria, VA 22313 https://insulationinstitute.org/	703/684-0084
NALP	National Association of Landscape Professionals (formerly Professional Landcare Network) 12500 Fair Lakes Circle, Suite 200 Fairfax, VA 22033 https://www.landscapeprofessionals.org/	703/736-9666
NAPA	National Asphalt Pavement Association 6406 Ivy Lane, Suite 350 Greenbelt, MD 20770-1441 www.asphaltpavement.org	888/468-6499 301/731-4748
NCSPA	National Corrugated Steel Pipe Association 14070 Proton Road, Suite 100 Dallas, TX 75244 www.ncspa.org	972/850-1907
NCMA	National Concrete Masonry Association 13750 Sunrise Valley Drive Herndon, VA 20171-4662 www.ncma.org	703/713-1900
NEBB	National Environmental Balancing Bureau 8575 Grovemont Circle Gaithersburg, MD 20877 www.nebb.org	301/977-3698
NECA	National Electrical Contractors Association 1201 Pennsylvania Ave. NW Washington, D.C., 20004 www.necanet.org	202/991-6300
NEMA	National Electrical Manufacturers Association 1300 North 17th Street N, Suite 900 Rosslyn, VA 22209 www.nema.org	703/841-3200
NEII	National Elevator Industry, Inc. 5537 SW Urish Road Topeka, KS 66610 https://nationalelevatorindustry.org/	703/589-9985
NFPA	National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169-7471 www.nfpa.org	800/344-3555 855/274-8525

NGA (formerly GANA)	National Glass Association (merged with Glass Association of North America) 1945 Old Gallows Road Suite 750 Vienna, VA 22182 www.glass.org	866/342-5642 Ext 127
NHLA	National Hardwood Lumber Association PO Box 34518 Memphis, TN 38184 www.nhla.com	901/377-1818
NIA	National Insulation Association 516 Herndon Pkwy., Ste. D Herndon, VA 20170 www.insulation.org	703/464-6422
NRCA	National Roofing Contractors Association 10255 W. Higgins Road, Suite 600 Rosemont, IL 60018-5607 www.nrca.net	847/299-9070
NSF	NSF International 789 N. Dixboro Road Ann Arbor, MI 48113-0140 www.nsf.org	800/673-6275 734/769-8010
NSI	Natural Stone Institute (formerly Marble Institute of America) 380 E. Lorain St. Oberlin, OH 44074 https://www.naturalstoneinstitute.org/	440/250-9222
NTMA	National Terrazzo and Mosaic Association 209 N. Crockett Street, Suite 2 PO Box 2605 Fredericksburg, TX 78624 www.ntma.com	800/323-9736
OSHA	Occupational Safety and Health Act U.S. Department of Labor Occupational Safety & Health Administration 200 Constitution Ave., NW Washington, DC 20210 www.osha.gov	800/321-OSHA (6742)

PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077 or 200 Massachusetts Ave NW, Suite 200 Washington, DC 20001 www.cement.org	847/966-6200 202/408-9494
PCA	Painting Contractors Association (formerly Painting and Decorating Contractors of America) 2316 Millpark Drive Maryland Heights, MO 63043 https://www.pcapainted.org/	800/322-7322
PCI	Precast/Prestressed Concrete Institute 8770 W. Bryn Mawr Ave., Suite 1150 Chicago, IL 60631 www.pci.org	312/786-0300
PDI	Plumbing & Drainage Institute 800 Turnpike Street, Suite 300 North Andover, MA 01845 http://pdionline.org	978/557-0720 800/589-8956
PEI	Porcelain Enamel Institute, Inc. P.O. Box 920220 Norcross, GA 30010 www.porcelainenamel.com	770/676-9366
PG&E	Pacific Gas & Electric Company P.O. Box 997300 Sacramento, CA 95899-7300 www.pge.com	800/743-5000
PLIB	Pacific Lumber Inspection Bureau (formerly West Coast Lumber Inspection Bureau) 1010 South 336th Street, Suite 210 Federal Way, WA 98003-7394 https://www.plib.org/	253/835-3344
RFCI	Resilient Floor Covering Institute 115 Broad Street, Suite 201 La Grange, GA 30240 www.rfci.com	706/882-3833
SDI	Steel Deck Institute P.O. Box 426 Glenshaw, PA 15116 www.sdi.org	412/487-3325

SDI	Steel Door Institute 30200 Detroit Road Westlake, OH 44145 www.steeldoor.org	440/899-0010
SJI	Steel Joist Institute 140 West Evans Street, Suite 203 Florence, SC 29501 http://steeljoist.org	843/407-4091
SMA	Stucco Manufacturers Association 5753 E Santa Ana Cyn Rd, #G-156 Anaheim, CA 92807 www.stuccomfgassoc.com	714/473-9579
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association 4201 Lafayette Center Drive Chantilly, VA 20151-1219 www.smacna.org	703/803-2980
SPI	SPI: The Plastics Industry Trade Association, Inc. 1425 K St. NW, Suite 500 Washington, DC 20005 www.plasticsindustry.org	202/974-5200
TCA	The Tile Council of North America 100 Clemson Research Blvd. Anderson, SC 29625 www.tcnatile.com	864/646-8453
TPI	Truss Plate Institute 2670 Crain Highway, Suite 203 Waldorf, MD 20601 www.tpinst.org	240/587-5582
TPI	Turfgrass Producers International 444 E. Roosevelt Road #346 Lombard, IL 60148 www.turfgrasssod.org	800/405-8873 847/649-5555
TCIA	Tree Care Industry Association (formerly the National Arborist Association) 670 N Commercial Street, Suite 201 Manchester, NH 03101 www.tcia.org	603/314-5380 800/733-2622

TVI	The Vermiculite Institute c/o The Schundler Company 10 Central Street Nahant, MA 01908 www.vermiculiteinstitute.org	732/287-2244
UL	Underwriters Laboratories Inc. 333 Pfingsten Road Northbrook, IL 60062-2096 www.ul.com	847/272-8800 877/854-3577
UNI	Uni-Bell PVC Pipe Association 201 E. John Carpenter Freeway, Suite 750 Irving, TX 75062 www.uni-bell.org	972/243-3902
USDA	U.S. Department of Agriculture 1400 Independence Ave., S.W. Washington, DC 20250 www.usda.gov	202/720-2791
WA	Wallcoverings Association 35 E Wacker Dr., Suite 850 Chicago, IL 60601 www.wallcoverings.org	312/224-2574
WCMA	Window Covering Manufacturers Association 355 Lexington Avenue 15th Floor New York, NY 10017 www.wcmanet.org	212/297-2122
WDMA	Window & Door Manufacturers Association 2001 K Street NW, 3rd Floor North Washington, D.C. 20006 www.wdma.com	202/367-1157
WI	Woodwork Institute 1455 Response Road, Suite 110 Sacramento, CA 95815 www.wicnet.org	916/372-9943
WRI	Wire Reinforcement Institute 942 Main Street, Suite 300 Hartford, CT 06103 www.wirereinforcementinstitute.org	860/240-9545
WWCA	Western Wall & Ceiling Contractors Association 1910 N. Lime St. Orange, CA 92865 www.wwcca.org	714/221-5520

WWPA	Western Wood Products Association (formerly Redwood Inspection Service) 1500 SW First Ave., Suite 870 Portland, OR 97201 www.wwpa.org	503/224-3930
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PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Purchase of Materials and Equipment;
- B. Special Conditions;
- C. Imported Materials Certification.

1.02 MATERIAL AND EQUIPMENT

- A. Only items approved by the District and/or Design Professional shall be used.
- B. Contractor shall submit lists of products and other product information in accordance with the Contract Documents, including, without limitation, the provisions regarding the submittals.

1.03 MATERIAL AND EQUIPMENT COLORS

- A. The District and/or Architect will provide a schedule of colors.
- B. No individual color selections will be made until after approval of all pertinent materials and equipment and after receipt of appropriate samples in accordance with the Contract Documents, including, without limitation, the provisions regarding the submittals.
- C. Contractor shall request priority in writing for any item requiring advance ordering to maintain the approved Construction Schedule.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Contractor shall deliver manufactured materials in original packages, containers, or bundles (with seals unbroken), bearing name or identification mark of manufacturer.
- B. Contractor shall deliver fabrications in as large assemblies as practicable; where specified as shop-primed or shop-finished, package or crate as required to preserve such priming or finish intact and free from abrasion.
- C. Contractor shall store materials in such a manner as necessary to properly protect them from damage. Materials or equipment damaged by handling, weather, dirt, or from any other cause will not be accepted.

- D. Materials are not acceptable that have been warehoused for long periods of time, stored or transported in improper environment, improperly packaged, inadequately labeled, poorly protected, excessively shipped, deviated from normal distribution pattern, or reassembled.
- E. Contractor shall store material so as to cause no obstructions of sidewalks, roadways, access to the Site or buildings, and underground services. Contractor shall protect material and equipment furnished under Contract.
- F. Contractor may store materials on Site with prior written approval by the District, all material shall remain under Contractor's control and Contractor shall remain liable for any damage to the materials. Should the Project Site not have storage area available, the Contractor shall provide for off-site storage at a bonded warehouse and with appropriate insurance coverage at no cost to District.
- G. When any room in Project is used as a shop or storeroom, the Contractor shall be responsible for any repairs, patching, or cleaning necessary due to that use. Location of storage space shall be subject to prior written approval by District.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers listed in various sections of Contract Documents are names of those manufacturers that are believed to be capable of supplying one or more of items specified therein.
- B. The listing of a manufacturer does not imply that every product of that manufacturer is acceptable as meeting the requirements of the Contract Documents.

2.02 FACILITIES AND EQUIPMENT

Contractor shall provide, install, maintain, and operate a complete and adequate facility for handling, the execution, disposal, and distribution of material and equipment as required for proper and timely performance of Work connected with Contract.

2.03 MATERIAL REFERENCE STANDARDS

Where material is specified solely by reference to "standard specifications" and if requested by District, Contractor shall submit for review data on actual material proposed to be incorporated into Work of Contract listing name and address of vendor, manufacturer, or producer, and trade or brand names of those materials, and data substantiating compliance with standard specifications.

PART 3 - EXECUTION

3.01 WORKMANSHIP

- A. Where not more specifically described in any other Contract Documents, workmanship shall conform to methods and operations of best standards and accepted practices of trade or trades involved and shall include items of fabrication, construction, or installation regularly furnished or required for completion (including finish and for successful operation, as intended).
- B. Work shall be executed by tradespersons skilled in their respective lines of Work. When completed, parts shall have been durably and substantially built and present a neat appearance.

3.02 COORDINATION

- A. Contractor shall coordinate installation of Work so as to not interfere with installation of others. Adjustment or rework because of Contractor's failure to coordinate will be at no additional cost to District.
- B. Contractor shall examine in-place work for readiness, completeness, fitness to be concealed or to receive other work, and in compliance with Contract Documents. Concealing or covering Work constitutes acceptance of additional cost which will result should in-place Work be found unsuitable for receiving other Work or otherwise deviating from the requirements of the Contract Documents.

3.03 COMPLETENESS

Contractor shall provide all portions of the Work, unless clearly stated otherwise, installed complete and operational with all elements, accessories, anchorages, utility connections, etc., in manner to assure well-balanced performance, in accordance with manufacturer's recommendations and by Contract Documents. For example, electric water coolers require water, electricity, and drain services; roof drains require drain system; sinks fit within countertop, etc. Terms such as "installed complete," "operable condition," "for use intended," "connected to all utilities," "terminate with proper cap," "adequately anchored," "patch and refinish," "to match similar," should be assumed to apply in all cases, except where completeness of functional or operable condition is specifically stated as not required.

3.04 APPROVED INSTALLER OR APPLICATOR

Installation by a manufacturer's approved installer or applicator is an understood part of Specifications and only approved installer or applicator is to provide on-site Work where specified manufacturer has on-going program of approving (i.e. certifying, bonding, re-warranting) installers or applicators. Newly established relationships between a manufacturer and an installer or applicator who does not have other approved applicator work in progress or completed is not approved for this Project.

3.05 MANUFACTURER'S RECOMMENDATIONS

All installations shall be in accordance with manufacturer's published recommendations and specific written directions of manufacturer's representative. Should Contract Documents differ from recommendations of manufacturer or directions of his representative, Contractor shall analyze differences, make recommendations to the District and the Architect in writing, and shall not proceed until interpretation or clarification has been issued by the District and/or the Architect.

END OF DOCUMENT

QUALITY CONTROL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Inspector, Inspections and Tests, Uncovering of Work and Non-conforming of Work and Correction of Work;
- B. Special Conditions.

1.02 RELATED CODES:

- A. The Work is governed by requirements of Title 24, California Code of Regulations ("CCR"), and the Contractor shall keep a copy of these available at the job Site for ready reference during construction.
- B. The Division of the State Architect ("DSA") shall be notified at or before the start of construction.

1.03 OBSERVATION AND SUPERVISION:

- A. The District and Architect or their appointed representatives will review the Work and the Contractor shall provide facilities and access to the Work at all times as required to facilitate this review. Administration by the Architect and any consulting Structural Engineer will be in accordance with applicable regulations, including, without limitation, CCR, Part 1, Title 24, Section 4-341.
- B. One or more Project Inspector(s) approved by DSA and employed by or in contract with the District, referred to hereinafter as the "Project Inspector", will observe the work in accordance with CCR, Part 1, Title 24, Sections 4-333(b) and 4-342:
 - (1) The Project Inspector and Special Inspector(s) shall have access to the Work wherever it is in preparation or progress for ascertaining that the Work is in accordance with the Contract Documents and all applicable code sections. The Contractor shall provide facilities and operation of equipment as needed, and access as required and shall provide assistance for sampling or measuring materials.
 - (2) The Project Inspector will notify the District and Architect and call the attention of the Contractor to any observed failure of Work or material to conform to Contract Documents.
 - (3) The Project Inspector shall observe and monitor all testing and inspection activities required.

The Contractor shall conform with all applicable laws as indicated in the Contract Documents, including, without limitation, to CCR, Part 1, Title 24, Section 4-343. The Contractor shall supervise and direct the Work and maintain a competent superintendent on the job who is authorized to act in all matters pertaining to the Work. The Contractor's superintendent shall also inspect all materials, as they arrive, for compliance with the Contract Documents. Contractor shall reject defective Work or materials immediately upon delivery or failure of the Work or material to comply with the Contract Documents. The Contractor shall submit verified reports as indicated in the Contract Documents, including, without limitation, the Specifications and as required by Part 1, Title 24, Section 4-336.

1.04 TESTING AGENCIES:

- A. Testing agencies and tests shall be in conformance with the General Documents and the requirements of Part 1, Title 24, Section 4- 335.
- B. Testing and inspection in connection with earthwork shall be under the direction of the District's consulting soils engineer, if any, referred to hereinafter as the "Soils Engineer."
- C. Testing and inspection of construction materials and workmanship shall be performed by a qualified laboratory, referred to hereinafter as the "Testing Laboratory." The Testing Laboratory shall be under direction of an engineer registered in the State of California, shall conform to requirements of ASTM E329, and shall be employed by or in contract with the District.

1.05 TESTS AND INSPECTIONS:

- A. The Contractor shall be responsible for notifying the District and Project Inspector of all required tests and inspections. Contractor shall notify the District and Project Inspector at least seventy-two hours (72) hours in advance of performing any Work requiring testing or inspection.
- B. The Contractor shall provide access to Work to be tested and furnish incidental labor, equipment, and facilities to facilitate all inspections and tests.
- C. The District will pay for first inspections and tests required by the "CCR", and other inspections or tests that the District and/or the Architect may direct to have made, including the following principal items:
 - (1) Tests and observations for earthwork and paving.
 - (2) Tests for concrete mix designs, including tests of trial batches.
 - (3) Tests and inspections for structural steel work.
 - (4) Field tests for framing lumber moisture content.
 - (5) Additional tests directed by the District that establish that materials and installation comply with the Contract Documents.
 - (6) Tests and observations of welding and expansion anchors.

- D. The District may at its discretion, pay and then back charge the Contractor for:
 - (1) Retests or reinspections, if required, and tests or inspections required due to Contractor error or lack of required identifications of material.
 - (2) Uncovering of work in accordance with Contract Documents.
 - (3) Testing done on weekends, holidays, and overtime will be chargeable to the Contractor for the overtime portion.
 - (4) Testing done off Site.

- E. Testing and inspection reports and certifications:
 - (1) If initially received by Contractor, Contractor shall provide to each of the following a copy of the agency or laboratory report of each test or inspection or certification.
 - (a) The District;
 - (b) The Construction Manager, if any;
 - (c) The Architect;
 - (d) The Consulting Engineer, if any;
 - (e) Other engineers on the Project, as appropriate;
 - (f) The Project Inspector; and
 - (g) The Contractor.
 - (2) When the test or inspection is one required by the CCR, a copy of the report shall also be provided to the DSA.

PART 2 - PRODUCTS

2.01 TYPE OF TESTS AND INSPECTIONS

- A. Testing and inspection shall be in accordance with DSA Form 103 (or current version)
- B. Slump Test
ASTM C 143
- C. Concrete Tests

Testing agency shall test concrete used in the work per the following paragraphs:

- (1) Compressive Strength:

- (a) Minimum number of tests required: One (1) set of three (3) cylinders for each 100 cubic yards (Sec. 2604(h) 01) of concrete or major fraction thereof, placed in one (1) day. See Title 24, Section 2605(g).
- (b) Two cylinders of each set shall be tested at twenty-eight (28) days. One (1) cylinder shall be held in reserve and tested only when directed by the Architect or District.
- (c) Concrete shall test the minimum ultimate compressive strength in twenty-eight 28 days, as specified on the structural drawings.
- (d) In the event that the twenty-eight (28) day test falls below the minimum specified strength, the effective concrete in place shall be tested by taking cores in accordance with UBC Standard No. 26-13 and tested as required for cylinders.
- (e) In the event that the test on core specimens falls below the minimum specified strength, the concrete will be deemed defective and shall be removed and replaced upon such direction of the Architect, and in a manner acceptable to the Division of the State Architect.

D. Reinforcing, Steel

E. Structural Steel Per Title 24 and as noted:

- (1) Material: Steel per Table in Title 24, Section 2712.
- (2) Qualification of Welders (UBC Std. 27-6).
- (3) Shop fabrication (Section 2712(d). Structural steel only).
- (4) Shop and field welding (Section 2712(e)).

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions;
- B. Special Conditions;
- C. Site Standards; and
- D. Construction Waste Management and Disposal.

1.02 TEMPORARY UTILITIES:

- A. Electric Power and Lighting:
 - (1) Contractor will pay for power during the course of the Work. To the extent power is available in the building(s) or on the Site, Contractor may use the District's existing utilities by making prearranged payments to the District for the utilities used by Contractor and all Subcontractors. Contractor shall be responsible for providing temporary facilities required to deliver that power service from its existing location in the building(s) or on the Site to point of intended use.
 - (2) Contractor shall verify characteristics of power available in building(s) or on the Site. Contractor shall take all actions required to make modifications where power of higher voltage or different phases of current are required. Contractor shall be fully responsible for providing that service and shall pay all costs required therefor.
 - (3) Contractor shall furnish, wire for, install, and maintain temporary electrical lights wherever it is necessary to provide illumination for the proper performance and/or observation of the Work: a minimum of 20 foot-candles for rough work and 50 foot-candles for finish work.
 - (4) Contractor shall be responsible for maintaining existing lighting levels in the project vicinity should temporary outages or service interruptions occur.
- B. Heat and Ventilation:
 - (1) Contractor shall provide temporary heat to maintain environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation and curing of materials, and to

protect materials and finishes from damage due to improper temperature and humidity conditions. Portable heaters shall be standard units complete with controls.

- (2) Contractor shall provide forced ventilation and dehumidification, as required, of enclosed areas for proper installation and curing of materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors, and gases.
- (3) Contractor shall pay the costs of installation, maintenance, operation, and removal of temporary heat and ventilation, including costs for fuel consumed, required for the performance of the Work.

C. Water:

- (1) Contractor shall pay for water used during the course of the Work. Contractor shall coordinate and pay for installation or use of water meter in compliance with local water agency requirements. To the extent water is then available in the building(s) or on the Site, Contractor may use the District's existing utilities by making prearranged payments to the District for the utilities used by Contractor and all Subcontractors. Contractor shall be responsible for providing temporary facilities required to deliver such utility service from its existing location in the building(s), on the Site, or other location approved by the local water agency, to point of intended use.
- (2) Contractor shall use backflow preventers on water lines at point of connection to District's water supply. Backflow preventers shall comply with requirements of Uniform Plumbing Code.
- (3) Contractor shall make potable water available for human consumption.

D. Sanitary Facilities:

- (1) Contractor shall provide sanitary temporary facilities in no fewer numbers than required by law and such additional facilities as may be directed by the Inspector for the use of all workers. The facilities shall be maintained in a sanitary condition at all times and shall be left at the Site until removal is directed by the Inspector or Contractor completes all other work at the Site.
- (2) Use of toilet facilities in the Work under construction shall not be permitted except by consent of the Inspector and the District.

E. Telephone Service:

- (1) Contractor shall arrange with local telephone service company for telephone service as required for the performance of the Work. Contractor shall, at a minimum, provide in its field office one line for telephone and one line for fax machine.
- (2) Contractor shall pay the costs for telephone and fax lines installation, maintenance, service, and removal.

F. Fire Protection:

- (1) Contractor shall provide and maintain fire extinguishers and other equipment for fire protection. Such equipment shall be designated for use for fire protection only and shall comply with all requirements of the California Fire, State Fire Marshall and/or its designee.
- (2) Where on-site welding and burning of steel is unavoidable, Contractor shall provide protection for adjacent surfaces.

G. Trash Removal:

- (1) Contractor shall provide trash removal on a timely basis. Under no circumstance shall Contractor use District trash service.

H. Field Office:

- (1) If Contractor chooses to provide a field office, it shall be an acceptable construction trailer that is well-lit and ventilated. The construction trailer shall be equipped with shelves, desks, filing cabinet, chairs, and such other items of equipment needed. Trailer and equipment are the property of the Contractor and must be removed from the Site upon completion of the Work. Contractor may use the corridor adjacent to the construction area for an office area, if approved in writing by District.
- (2) Contractor shall provide any additional electric lighting and power required for the trailer. Contractor shall make adequate provisions for heating and cooling as required.

I. Temporary Facilities:

- (1)

1.03 CONSTRUCTION AIDS:

A. Plant and Equipment:

- (1) Contractor shall furnish, operate, and maintain a complete plant for fabricating, handling, conveying, installing, and erecting materials and equipment; and for conveyances for transporting workers. Include elevators, hoists, debris chutes, and other equipment, tools, and appliances necessary for performance of the Work.
- (2) Contractor shall maintain plant and equipment in safe and efficient operating condition. Damages due to defective plant and equipment, and uses made thereof, shall be repaired by Contractor at no expense to the District.

B. None of the District's tools and equipment shall be used by Contractor for the performance of the Work.

1.04 BARRIERS AND ENCLOSURES:

- A. Contractor shall obtain the District's written permission for locations and types of temporary barriers and enclosures, including fire-rated materials proposed for use, prior to their installation.
- B. Contractor shall provide and maintain temporary enclosures to prevent public entry and to protect persons using other buildings and portions of the Site and/or Premises, the public, and workers. Contractor shall also protect the Work and existing facilities from the elements, and adjacent construction and improvements, persons, and trees and plants from damage and injury from demolition and construction operations.
- C. Contractor shall provide site access to existing facilities for persons using other buildings and portions of the Site, the public, and for deliveries and other services and activities.
- D. Tree and Plant Protection:
 - (1) Contractor shall preserve and protect existing trees and plants on the Premises that are not designated or required to be removed, and those adjacent to the Premises.
 - (2) Contractor shall provide barriers to a minimum height of 4'-0" around drip line of each tree and plant, around each group of trees and plants, as applicable, in the proximity of demolition and construction operations, or as denoted on the Plans.
 - (3) Contractor shall not park trucks, store materials, perform Work or cross over landscaped areas. Contractor shall not dispose of paint thinners, water from cleaning, plastering or concrete operations, or other deleterious materials in landscaped areas, storm drain systems, or sewers. Plant materials damaged as a result of the performance of the Work shall, at the option of the District and at Contractor's expense, either be replaced with new plant materials equal in size to those damaged or by payment of an amount representing the value of the damaged materials as determined by the District.
 - (4) Contractor shall remove soil that has been contaminated during the performance of the Work by oil, solvents, and other materials which could be harmful to trees and plants, and replace with good soil, at Contractor's expense.
 - (5) Excavation around Trees:
 - (a) Excavation within drip lines of trees shall be done only where absolutely necessary and with written permission from the District.
 - (b) Where trenching for utilities is required within drip lines, tunneling under and around roots shall be by hand digging and shall be approved by the District. Main lateral roots and taproots shall not be cut. All roots 2 inches in diameter and

larger shall be tunneled under and heavily wrapped with wet burlap so as to prevent scarring or excessive drying. Smaller roots that interfere with installation of new work may be cut with prior approval by the District. Roots must first be cut with a Vermeer, or equivalent, root cutter prior to any trenching.

- (c) Where excavation for new construction is required within drip line of trees, hand excavation shall be employed to minimize damage to root system. Roots shall be relocated in backfill areas wherever possible. If encountered immediately adjacent to location of new construction, roots shall be cut approximately 6 inches back from new construction.
- (d) Approved excavations shall be carefully backfilled with the excavated materials approved for backfilling. Backfill shall conform to adjacent grades without dips, sunken areas, humps, or other surface irregularities. Do not use mechanical equipment to compact backfill. Tamp carefully using hand tools, refilling and tamping until Final Acceptance as necessary to offset settlement.
- (e) Exposed roots shall not be allowed to dry out before permanent backfill is placed. Temporary earth cover shall be provided, or roots shall be wrapped with four layers of wet, untreated burlap and temporarily supported and protected from damage until permanently relocated and covered with backfill.
- (f) Accidentally broken roots should be sawed cleanly 3 inches behind ragged end.

1.05 SECURITY:

The Contractor shall be responsible for project security for materials, tools, equipment, supplies, and completed and partially completed Work.

1.06 TEMPORARY CONTROLS:

A. Noise Control:

- (1) Contractor acknowledges that adjacent facilities may remain in operation during all or a portion of the Work period, and it shall take all reasonable precautions to minimize noise as required by applicable laws and the Contract Documents.
- (2) Notice of proposed noisy operations, including without limitation, operation of pneumatic demolition tools, concrete saws, and other equipment, shall be submitted to the District a minimum of forty-eight (48) hours in advance of their performance.

B. Noise and Vibration:

- (1) Equipment and impact tools shall have intake and exhaust mufflers.

- (2) Contractor shall cooperate with District to minimize and/or cease the use of noisy and vibratory equipment if that equipment becomes objectionable by its longevity.

C. Dust and Dirt:

- (1) Contractor shall conduct demolition and construction operations to minimize the generation of dust and dirt, and prevent dust and dirt from interfering with the progress of the Work and from accumulating in the Work and adjacent areas including, without limitation, occupied facilities.
- (2) Contractor shall periodically water exterior demolition and construction areas to minimize the generation of dust and dirt.
- (3) Contractor shall ensure that all hauling equipment and trucks carrying loads of soil and debris shall have their loads sprayed with water or covered with tarpaulins, and as otherwise required by local and state ordinance.
- (4) Contractor shall prevent dust and dirt from accumulating on walks, roadways, parking areas, and planting, and from washing into sewer and storm drain lines.

D. Water:

- (1) Contractor shall not permit surface and subsurface water, and other liquids, to accumulate in or about the vicinity of the Premises. Should accumulation develop, Contractor shall control the water or other liquid, and suitably dispose of it by means of temporary pumps, piping, drainage lines, troughs, ditches, dams, or other methods.

E. Pollution:

- (1) No burning of refuse, debris, or other materials shall be permitted on or in the vicinity of the Premises.
- (2) Contractor shall comply with applicable regulatory requirements and anti-pollution ordinances during the conduct of the Work including, without limitation, demolition, construction, and disposal operations.

F. Lighting:

- (1) If portable lights are used after dark, all light must be located so as not to direct light into neighboring property.

1.07 JOB SIGN(S):

A. General:

- (1) Contractor shall provide and maintain a Project identification sign with the design, text, and colors designated by the District and/or the Design Professional; locate sign as approved by the District.

- (2) Signs other than the specified Project sign and or signs required by law, for safety, or for egress, shall not be permitted, unless otherwise approved in advance by the District.

B. Materials:

- (1) Structure and Framing: Structurally sound, new or used wood or metal; wood shall be nominal 3/4-inch exterior grade plywood.
- (2) Sign Surface: Minimum 3/4-inch exterior grade plywood.
- (3) Rough Hardware: Galvanized.
- (4) Paint: Exterior quality, of type and colors selected by the District and/or the Design Professional.

C. Fabrication:

- (1) Contractor shall fabricate to provide smooth, even surface for painting.
- (2) Size: 4'-0" x 8'-0", unless otherwise indicated.
- (3) Contractor shall paint exposed surfaces of supports, framing, and surface material with exterior grade paint: one coat of primer and one coat of finish paint.
- (4) Text and Graphics: As indicated.

1.08 PUBLICITY RELEASES:

- A. Contractor shall not release any information, story, photograph, plan, or drawing relating information about the Project to anyone, including press and other public communications medium, including, without limitation, on website(s) without the written permission of the District.

PART 2 – PRODUCTS Not used.

PART 3 – EXECUTION Not used.

END OF DOCUMENT

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions;
- B. Special Conditions; and
- C. Temporary Facilities and Controls.

1.02 SECTION INCLUDES:

- A. Administrative and procedural requirements for the following:
 - (1) Salvaging non-hazardous construction waste.
 - (2) Recycling non-hazardous construction waste.
 - (3) Disposing of non-hazardous construction waste.

1.03 DEFINITIONS:

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.04 PERFORMANCE REQUIREMENTS:

- A. General: Develop waste management plan that results in end-of Project rates for salvage/recycling of sixty-five percent (65%) by weight (or by volume, but not a combination) of total waste generated by the Work.

1.05 SUBMITTALS:

- A. Waste Management Plan: Submit waste management plan within 30 days of date established for commencement of the Work.
- B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit copies of report. Include the following information:
 - (1) Material category.
 - (2) Generation point of waste.
 - (3) Total quantity of waste in tons or cubic yards.
 - (4) Quantity of waste salvaged, both estimated and actual in tons or cubic yards.
 - (5) Quantity of waste recycled, both estimated and actual in tons or cubic yards.
 - (6) Total quantity of waste recovered (salvaged plus recycled) in tons or cubic yards.
 - (7) Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- C. Waste Reduction Calculations: Before request for final payment, submit copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- E. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- F. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

- H. CHPS Submittal: CHPS letter template for Credit ME2.0 and ME2.1, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
- I. Qualification Data: For Waste Management Coordinator.
- J. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- K. Submittal procedures and quantities are specified in Document 01 33 00.

1.06 QUALITY ASSURANCE:

- A. Waste Management Coordinator Qualifications: LEED Accredited Professional by U.S. Green Building Council.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Waste Management Conference: Conduct conference at Project site to comply with requirements. Review methods and procedures related to waste management including, but not limited to, the following:
 - (1) Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
 - (2) Review requirements for documenting quantities of each type of waste and its disposition.
 - (3) Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - (4) Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - (5) Review waste management requirements for each trade.

1.07 WASTE MANAGEMENT PLAN:

- A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measurement throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
- (1) Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 - (2) Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - (3) Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - (4) Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - (5) Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 - (6) Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION

3.01 PLAN IMPLEMENTATION:

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- (1) Comply with Document 01 50 00 for operation, termination, and removal requirements.
- B. [Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.]
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

- (1) Distribute waste management plan to everyone concerned within 3 days of submittal return.
 - (2) Distribute waste management plan to entities when they first begin work on site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- (1) Designate and label specific areas of Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - (2) Comply with Document 01 50 00 for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING CONSTRUCTION WASTE:

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to the Contractor.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
- (1) Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project Site. Include list of acceptable and unacceptable materials at each container and bin.
 - (a) Inspect containers and bins for contamination and remove contaminated materials if found.
 - (2) Stockpile processed materials on site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - (3) Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - (4) Store components off the ground and protect from the weather.
 - (5) Remove recyclable waste off District property and transport to recycling receiver or processor.

- D. Packaging:
 - (1) Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - (2) Polystyrene Packaging: Separate and bag material.
 - (3) Pallets: As much as possible, require deliveries using pallets to remove pallets from Project Site. For pallets that remain on Site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - (4) Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- E. Site-Clearing Wastes: Chip brush, branches, and trees on site.
- F. Wood Materials:
 - (1) Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 - (2) Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- G. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.
 - (1) Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.03 DISPOSAL OF WASTE:

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project Site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - (1) Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on site.
 - (2) Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off District property and legally dispose of them.

END OF DOCUMENT

FIELD OFFICES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions;
- B. Special Conditions; and
- C. Temporary Facilities and Controls.

1.02 SECTION INCLUDES:

- A. Requirements for Field Offices and Field Office Trailers.

1.03 SUMMARY:

- A. General: Contractor shall provide District's Field Office Trailer and contents, for District's use exclusively, during the term of the Contract.
- B. Property: Trailer, furniture, furnishings, equipment, and the like, supplied by the Contractor with the Office Trailer shall remain the property of the Contractor; District property items installed, delivered, and the like by District within the Office Trailer will remain District's property.
- C. Modifications: District reserves the right to modify the trailer or contents, or both, as may be deemed proper by District.
- D. Condition: Trailer and contents shall be clean, neat, substantially finished, in good, proper, and safe condition for use, operation, and the like; the trailer and contents shall not be required to be new.
- E. Installation Timing: Provide safe, fully furnished, functional, proper, complete, and finished trailer properly ready for entire use, within fourteen (14) calendar days of District's notification of the issuance of Notice to Proceed.

1.04 SUBMITTALS:

- A. General: Submit submittals to District in quantity, format, type, and the like, as specified herein.
- B. Office Trailer Data: One (1) copy of manufacturer's descriptive data, technical descriptions, regulatory compliance, industry standards, installation, removal, and maintenance instructions.

- C. Equipment Data: Two (2) copies of manufacturer data for each type of equipment, if directed by District.
- D. Furniture and Furnishings Data: Two (2) copies of manufacturer data for each type of equipment, if directed by District.
- E. Plans: One (1) reproducible copy of appropriately scaled plans of trailer layout. Plans shall include, but not be limited to: lighting; furniture; equipment; telephone and electrical outlets; and the like.
- F. Product Samples: One (1) complete and entire unit of each type, if directed by District.

1.05 QUALITY ASSURANCE

- A. Standards: In the event that provisions of codes, regulations, safety orders, Contract Documents, referenced manufacturer's specifications, manufacturer's instructions, industry standards, and the like, are in conflict, the more restrictive and higher quality shall govern.
- B. Installer: Installer or Installers engaged by Contractor must have a minimum of five (5) years of documented and properly authenticated successful experience of specialization in the installation of the items or systems, or both, specified herein.
- C. Manufacturer: Contractor shall obtain products from nationally and industry recognized Manufacturer with five (5) years minimum, of immediately recent, continuous, documented and properly authenticated successful experience of specialization in the manufacture of the product specified herein.
- D. State Personnel Training: Provide proper training for maintenance and operations, including emergency procedures, and the like, as directed by District.
- E. Units: Shall be sound and free of defects, and shall not include any damage or defect that will impair the safety, installation, performance, or the durability of the entire Office Trailer and appurtenant systems.

1.06 REGULATORY REQUIREMENTS

- A. General: Work shall be executed in accordance with applicable Codes, Regulations, Statutes, Enactments, Rulings, Laws, each authority having jurisdiction, and including, but not limited to, Regulatory Requirements specified herein.
- B. California Building Standards Code ("CBSC").
- C. California Code of Regulations, Title 25, Chapter 3, Sub Chapter 2, Article 3 ("CCR").
- D. Coach Insignia: Trailer shall display California Commercial Coach Insignia; such insignia shall be deemed to show that the trailer is in accordance with the Construction and Fire Safety requirements of CCR.

PART 2 – PRODUCTS

2.01 FIELD OFFICE TRAILER

- A. General: Provide entire Field Office Trailer of type, function, operation, capacity, size, complete with controls, safety devices, accessories, and the like, for proper and durable installation. Partitions, walls, ceiling, and other interior and exterior surfaces shall be appropriately finished, including, but not limited to, trim, painting, wall base, floor covering, suspended or similar ceiling, and the like; provide systems, components, units, nuts, bolts, screws, anchoring devices, fastening devices, washers, accessories, adhesives, sealants, and other items of type, grade, and class required for the particular use, not identified but required for a complete, weather-tight, appropriately operating, and finished installation.
- B. Manufacturers: General Electric Capital Modular Space; The Space Place, Inc.; or equal.
- C. Program: Provide a wheel-mounted trailer with stairs, landings, platforms, ramps, and the like, in good, proper, safe, clean, and properly finished condition; with proper heavy duty locks, and other proper and effective security at all doors, windows, and the like. Trailer shall be maintained in good, proper, safe, clean, and properly finished condition during the Contract.
- (1) Nominal Trailer Size: Four hundred eighty (480) square feet, minimum.
 - (2) Stairs, Platform: Properly finished stairs, platforms, and ramps.
 - (3) Doors: Two (2), three (3) foot wide exterior doors with locksets; finished ramp, steps, and entry platform at each exterior door.
 - (4) Keys: Submit five (5) keys for each door, window, furniture unit, and the like. There shall be no other key copies or originals available; each key shall be identified for District; and shall be labeled, or tagged or both, as directed by District.
 - (5) HVAC:
 - (6) Lighting: Sixty-five (65) foot-candles illumination minimum at any point, at thirty (30) inches above finished floor throughout from fluorescent light source, exclusively, or as directed by District.
 - (7) Electrical Outlets: One (1) duplex outlet evenly spaced every twelve (12) linear horizontal feet of wall face, and electrical service ready for use.
 - (8) Telephones and Telephone Outlets: Two (2) telephone lines wired, connected to telephone utility service, and ready for use, and two (2) telephone instruments, each with two (2)-line capability, speed dial and hands-free feature. Locate each outlet as directed by District.

- (9) Voicemail Messaging System or Answering Machine: One (1) unit, two (2)-line; digital.

2.02 FIELD OFFICE TRAILER ITEMS

- A. General: Provide the Field Office Trailer with the following arranged into two (2) workstations:
 - (1) Desks: Two (2) desks: thirty-six (36) inches by sixty (60) inches; steel, laminated plastic top; locking, one (1) or two (2) file drawers single pedestal; steel; provide five (5) keys to District.
 - (2) Tables: Two (2) tables; thirty-six (36) inches by sixty (60) inches; twenty-nine (29) inches high; steel, laminated plastic top tables; one (1) at each desk.
 - (3) Chairs: Two (2) chairs: swivel; steel; with seat cushion and arms; one (1) at each desk.
 - (4) Waste Baskets: Two (2) waste baskets, one at each desk.
- B. Furniture and Equipment: Provide in the space located to effect efficient and logical use.
 - (1) File cabinet: One (1); four (4) drawer; lateral; steel locking.
 - (2) Plan Table: One (1) plan table: thirty-six (36) inches deep by seventy-two (72) inches wide by forty-two (42) inches high; adjustable; wood or steel; with lockable plan and pencil drawers.
 - (3) Drafting Stool: One (1) drafting stool; swiveling; steel; padded; adjustable; with footrest and casters.
 - (4) Bookshelf: One (1) bookshelf: thirty-six (36) inches deep by seventy-two (72) inches wide by forty-two (42) inches high; adjustable; wood or steel; with lockable plan and pencil drawer.
 - (5) Plan Rack: One (1) wheel mounted plan rack.
 - (6) Waste Baskets: One (1) large waste basket.
 - (7) Coat/Hat Hanger: Wall mounted with minimum capacity for four (4) garments and ten (10) hats.
 - (8) Document Management System: Shall include an integrated high-volume printer, copier, and facsimile machine, including stand, base, and storage cabinet; and shall include the following features:
 - (a) Type: Laser, dry electrostatic transfer, plain paper, digital, multi-function imaging system.
 - (b) Network: Ethernet or Token Ring network ready, Plug-and-Play.

- (c) Print, send/receive facsimile from any connected workstation.
 - (d) Resolution: Six hundred (600) dots per inch by six hundred (600) dots per inch, minimum.
 - (e) Print Speed: Twenty (20) pages per minute, minimum.
 - (f) Copies: Twenty (20) copies per minute, minimum.
 - (g) Document Handler: Forty (40) sheet, minimum
 - (h) Collator: Forty (40) bin, minimum, with stapling.
 - (i) Duplexing: Capable.
 - (j) Paper Size: Capable of handling paper sizes to eleven (11) inches by seventeen (17) inches.
 - (k) Paper Cassettes: One (1) each for eight and one half (8.5) inches by eleven (11) inches, eight and one half (8.5) inches by fourteen (14) inches, and eleven (11) inches by seventeen (17) inches paper sizes; minimum two hundred fifty (250) sheets per cassette.
 - (l) Reduction/Enlargement: Capable of reduction to twenty-five percent (25%) and enlargement to two hundred percent (200%).
 - (m) Facsimile Electronic Storage: Capable of storing minimum of fifty (50) speed dial numbers, group faxing and broadcast faxing.
 - (n) Facsimile Scanning: Capable of scanning into memory a minimum of one hundred (100) pages with maximum scan time of three (3) seconds per page.
 - (o) Halftone: Sixty-four (64) levels.
 - (p) Redial: Automatic and Manual.
- (9) Maintenance: Contractor shall purchase service agreements for each unit of equipment for the duration of the project plus two (2) months, and shall maintain all equipment in proper working condition. Service agreements shall include provision for replacement of toner cartridges and other items required to effect proper unit use. Service agreements shall also provide for:
- (a) Unlimited Service Calls.
 - (b) Same Day Response.
 - (c) All parts, labor, preventative maintenance and mileage.

- (d) All chemicals, such as toner, fixing agent, and the like.
 - (e) System training and setup.
- (10) Portable Toilets: Two (2); each shall include a urinal; each unit shall be a properly enclosed chemical unit conforming to ANSI Z4.3.
- (a) Location: As directed by District.
 - (b) Maintenance: Maintain each unit and surrounding areas in a clean, hygienic and orderly manner, at all time. Empty, clean, and sanitize each unit each day at a location and time as directed by District.
 - (c) Removal: Relocate, or remove from the site, each Portable Toilet. Upon such directive by District, the Contractor shall forthwith relocate or remove each Portable Toilet and submit the affected areas to a condition which existed prior to the installation of each Portable Toilet, within three (3) calendar days, or as directed by District in writing, at no cost to District.

2.03 UTILITY AND SERVICES

- A. Telephone Service: Contractor shall provide and interface the entire telephone service, and shall properly and timely pay for telephone service for District's non-long-distance use.
- B. Electrical Service: Provide all proper connections and continuously pay for service for the duration of the Work.

2.04 FINISHES

- A. General: Manufacturer standard finish system over surfaces properly cleaned, pretreated, and prepared to obtain proper bond; all visible surfaces shall be coated.
- B. Finish: Color as selected by District from manufacturer standard palette.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. General: Properly prepare area and affected items to receive the Work. Set Work accurately in location, alignment, and elevation; rigidly, securely, and firmly anchor to appropriate structure; install plumb, straight, square, level, true, without racking, rigidly anchored to proper solid blocking, substrate, and the like; provide appropriate type and quantity of reinforcements, fasteners, adhesives, self-adhesive and other tapes; lubricants, coatings, accessories, and the like, as required for a complete, structurally rigid, stable, sound, and appropriately finished installation, in accordance with manufacturer's published instructions, and as indicated. The more restrictive and higher quality requirement shall govern. Moving parts shall be properly secured, without binding, looseness, noise, and the like.

- B. Installation: Install in accordance with 25 CCR 3.2.3 and as directed by District; jack up trailer and level both ways; mount on proper concrete piers with all load off wheels; provide required tie down and accessories per Section 4368 of referenced CCR, and as directed by District.
- C. Rejected Work: Work, materials, unit, items, systems, and the like, not accepted by District shall be deemed rejected, and shall forthwith be removed and replaced with proper and new Work, materials, unit, items, systems, and the like at no cost to District.
- D. Standard: Comply with manufacturer's published instructions, or with instructions as shown or indicated; the more restrictive and higher quality requirement shall govern.
- E. Location: As directed by District.
- F. Fire Resistance: Construct and install in accordance with UL requirements.
- G. Maintenance: Contractor shall maintain trailer and adjacent areas in a safe, clean and hygienic condition throughout the duration of the Work, and as directed by District. Properly repair or replace furniture or other items, as directed by District. Properly remove unsafe, damaged, or broken furniture, or similar items, and replace with safe and proper items. Contractor shall pay cost of all services, repair, and maintenance, or replacement of each item.
- H. Janitorial Service: Provide professional janitorial services, including, but not limited to, trash, waste paper baskets, fill paper dispensers; clean and dust all furniture, files, and the like; sweep and mop resilient and similar flooring; and vacuum carpeting and similar flooring.
 - (1) Frequency: Two (2) times per week, minimum.
- I. Removal: Properly remove the Office Trailer and contents from the Site upon completion of the Contract, or as directed by District in writing. Forthwith properly patch and repair affected areas; replace damaged items with new items. Carefully and properly inventory, clean, pack, store, and protect District property; submit District property to District at a date, time and location as directed by District.

END OF DOCUMENT

SECTION 01 57 13

EROSION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. General: Provide all materials, equipment and labor necessary to furnish and install straw wattles at locations shown on the Drawings and on Contractors Storm Water Pollution Prevention Plan.
- B. Storm Water Pollution Prevention Plan: Contractor will be required to prepare a Storm Water Pollution Prevention Plan (SWPPP), and submit to the State Water Resource Control Board to obtain Notice of Intent approval and a WDID number. Comply with State Water Resources Control Board requirements. The SWPPP shall be provided by the Contractor prior to the start of work. The SWPPP shall be tailored to the contractor's approach to the work in this contract. The SWPPP shall be prepared by a Qualified SWPPP Developer (QSD). The Contractor shall as a minimum address:
 - 1. Cut and fill operations.
 - 2. Temporary stockpiles.
 - 3. Vehicle and equipment storage, maintenance and fueling operations.
 - 4. Concrete, plaster, mortar and paint disposal.
 - 5. Dust control.
 - 6. Tracking of dirt, mud on off-site streets.
 - 7. Erosion Controls
 - 8. Sediment Controls

1.02 QUALITY ASSURANCE

- . General: Comply with governing codes and regulations.

1.03 SUBMITTALS

- A. SWPPP: Contractors Qualified SWPPP Developer (QSD) shall submit to the State Water Resources Control Board via Storm water Multi Application and Report Tracking System (SMARTS) and obtain a Notice of Intent and WDID number prior to beginning work on site.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Straw Wattles: Shall be new manufactured straw roles in compliance with state requirements for sediment control.
- A. Filter Bag: Shall be as required by local jurisdiction.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All BMPS shall be installed per the drawings, CASQA standards and as required by the SWPPP.

3.02 MAINTENANCE AND REMOVAL:

- A. General: Maintain and repair existing and new erosion control facilities throughout the construction period. Remove silt build up at straw wattles and/or silt fences as needed. Repair damage to earth slopes and banks. Erosion control measures shall be left in place until hydroseed is placed.
- B. Monitoring: Based on determined Risk Level of Contractor's SWPPP provide monitoring of erosion and sediment control measures before, during and after storm events. Site monitoring shall be performed by a Qualified SWPPP Practitioner. Update SWPPP continuously throughout construction period and provide reporting and testing as required by the current NPDES permit. Testing and reporting of turbidity and ph will be required for a project determined to be Risk Level 2. Contractor's QSD/QSP will be required to prepare AdHoc reports of all testing on the State Water Resources Control Board's SMARTS database
- C. Cleaning: Keep area clean of debris.
- D. Remove all sediment control measures following site stabilization.
- E. The Contractor's QSD and QSP will be responsible for preparing and gaining approval of the annual report(s) and Notice of Termination on the State Water Resources Control Board's SMARTS database following project completion.

END OF SECTION

OWNER-FURNISHED PRODUCTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions;
- B. Special Conditions; and
- C. Materials and Equipment.

1.02 SECTION INCLUDES

- A. Requirements for the following:
 - (1) Installing Owner-furnished materials and equipment.
 - (2) Providing necessary utilities, connections and rough-ins.

1.03 DEFINITIONS

- A. Owner: District, who is providing/furnishing materials and equipment.
- B. Installing Contactor: Contractor, who is installing the materials and equipment furnished by the Owner.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Receive, store and handle products in accordance with the manufacturer's instructions.
- B. Protect equipment items as required to prevent damage during storage and construction.

PART 2 – PRODUCTS

2.01 GENERAL PRODUCT REQUIREMENTS

- A. Installing Contractor's Responsibilities:
 - (1) Verify mounting and utility requirements for Owner-furnished materials and equipment items.
 - (2) Provide mounting and utility rough in for all items where required.

- (a) Rough in locations, sizes, capacities, and similar type items shall be as indicated and required by product manufacturer.
- B. Owner and Installing Contractor(s) Responsibilities:
- (1) Owner-Furnished/Contractor Installed ("OFICI"): Furnished by the Owner; installed by the Installing Contractor.
 - (a) General: Owner and Installing Contractor(s) will coordinate deliveries of materials and equipment to coincide with the construction schedule.
 - (b) Owner will furnish specified materials and equipment delivered to the site. Owner/vendor's representative shall be present on Site at the time of delivery to comply with the contract requirements and Specifications Section 01 43 00, Materials and Equipment, Article 1.04.
 - (c) The Owner furnishing specified materials and equipment is responsible to provide manufacturer guarantees as required by the Contract to the Installing Contractor.
 - (d) The Installing Contractor shall:
 - 1) Review, verify and accept the approved manufacturer's submittal/Shop Drawings for all materials and equipment required to be installed by the Installer Contractor and furnished by the Owner. Any discrepancies, including but not limited to possible space conflicts, should be brought to the attention of the Project Manager and/or Program Manager, if applicable.
 - 2) Coordinate timely delivery. Installing Contractor shall receive materials and equipment at Site when delivered and give written receipt at time of delivery, noting visible defects or omissions; if such declaration is not given, the Installing Contractor shall assume responsibility for such defects and omissions.
 - 3) Store materials and equipment until ready for installation and protect from loss and damage. Installing Contractor is responsible for providing adequate storage space.
 - 4) Coordinate with other bid package contractors and field measurement to ensure complete installation.
 - 5) Uncrate, assemble, and set in place.
 - 6) Provide adequate supports.
 - 7) Install materials and equipment in accordance with manufacturer's recommendations, instructions, and

Shop Drawings, supply labor and material required, and make mechanical, plumbing, and electrical connections required to operate equipment.

- 8) Be certified by equipment manufacturer for installation of the specific equipment supplied by the Owner.
- 9) Provide anchorage and/or bracing as required for seismic restraint per Title 24, UBC Standard 27-11 and all other applicable codes.
- 10) Provide the contract-required warranty and guarantee for all work, materials and equipment, and installation upon its completion and acceptance by the District. Guarantee includes all costs associated with the removal, shipping to and from the Site, and re-installation of any equipment found to be defective.

C. Compatibility with Space and Service Requirements:

- (1) Equipment items shall be compatible with space limitations indicated and as shown on the Contract Documents and specified in other sections of the Specifications.
- (2) Modifications to equipment items required to conform to space limitations specified for rough in shall not cause additional cost to the District.

D. Manufacturer's printed descriptions, specifications, and instructions shall govern the Work unless specifically indicated or specified otherwise.

2.02 FURNISHED MATERIALS AND EQUIPMENT

- A. All furnished materials and equipment are indicated or scheduled on the Contract Documents.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install equipment items in accordance with the manufacturer's instructions.
- B. Set equipment items securely in place, rigidly or flexibly mounted in accordance with manufacturers' directions.
- C. Make electrical and mechanical connections as indicated and required.
- D. Touch-up and restore damaged or defaced finishes to the Owner's satisfaction.

3.02 CLEANING AND PROTECTION

- A. Repair or replace items not acceptable to the Architect or Owner.

- B. Upon completion of installation, clean equipment items in accordance with manufacturer's recommendations, and protect from damage until final acceptance of the Work by the Owner.

END OF DOCUMENT

SECTION 01 66 00

PRODUCT DELIVERY, STORAGE AND HANDLING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Site Access, Conditions and Requirements;
- B. Special Conditions.

1.02 PRODUCTS

- A. Products are as defined in the General Conditions.
- B. Contractor shall not use and/or reuse materials and/or equipment removed from existing Premises, except as specifically permitted by the Contract Documents.
- C. Contractor shall provide interchangeable components of the same manufacturer, for similar components.

1.03 TRANSPORTATION AND HANDLING

- A. Contractor shall transport and handle Products in accordance with manufacturer's instructions.
- B. Contractor shall promptly inspect shipments to confirm that Products comply with requirements, quantities are correct, and products are undamaged.
- C. Contractor shall provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

1.04 STORAGE AND PROTECTION

- A. Contractor shall store and protect Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Contractor shall store sensitive products in weather-tight, climate controlled enclosures.
- B. For exterior storage of fabricated Products, Contractor shall place on sloped supports, above ground.
- C. Contractor shall provide off-site storage and protection when Site does not permit on-site storage or protection.

- D. Contractor shall cover products subject to deterioration with impervious sheet covering and provide ventilation to avoid condensation.
- E. Contractor shall store loose granular materials on solid flat surfaces in a well-drained area and prevent mixing with foreign matter.
- F. Contractor shall provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
- G. Contractor shall arrange storage of Products to permit access for inspection and periodically inspect to assure Products are undamaged and are maintained under specified conditions.

PART 2 – PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

CUTTING AND PATCHING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Inspector, Inspections, and Tests, Integration of Work, Nonconforming Work, and Correction of Work, and Uncovering Work;
- B. Special Conditions;
- C. Hazardous Materials Procedures and Requirements;
- D. Hazardous Materials Certification;
- E. Lead-Based Paint Certification;
- F. Imported Materials Certification.

1.02 CUTTING AND PATCHING:

- A. Contractor shall be responsible for all cutting, fitting, and patching, including associated excavation and backfill, required to complete the Work or to:
 - (1) Make several parts fit together properly.
 - (2) Uncover portions of Work to provide for installation of ill-timed Work.
 - (3) Remove and replace defective Work.
 - (4) Remove and replace Work not conforming to requirements of Contract Documents.
 - (5) Remove Samples of installed Work as specified for testing.
 - (6) Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.
 - (7) Attaching new materials to existing remodeling areas – including painting (or other finishes) to match existing conditions.
- B. In addition to Contract requirements, upon written instructions from the District, Contractor shall uncover Work to provide for observations of covered Work in accordance with the Contract Documents; remove samples of installed materials for testing as directed by District; and remove Work to provide for alteration of existing Work.

- C. Contractor shall not cut or alter Work, or any part of it, in such a way that endangers or compromises the integrity of the Work, the Project, or work of others.

1.03 SUBMITTALS:

- A. Prior to any cutting or alterations that may affect the structural safety of Project, or work of others, and well in advance of executing such cutting or alterations, Contractor shall submit written notice to District pursuant to the applicable notice provisions of the Contract Documents, requesting consent to proceed with the cutting or alteration, including the following:
 - (1) The work of the District or other trades.
 - (2) Structural value or integrity of any element of Project.
 - (3) Integrity or effectiveness of weather-exposed or weather-resistant elements or systems.
 - (4) Efficiency, operational life, maintenance or safety of operational elements.
 - (5) Visual qualities of sight-exposed elements.
- B. Contractor's Request shall also include:
 - (1) Identification of Project.
 - (2) Description of affected Work.
 - (3) Necessity for cutting, alteration, or excavations.
 - (4) Effects of Work on District, other trades, or structural or weatherproof integrity of Project.
 - (5) Description of proposed Work:
 - (a) Scope of cutting, patching, alteration, or excavation.
 - (b) Trades that will execute Work.
 - (c) Products proposed to be used.
 - (d) Extent of refinishing to be done.
 - (6) Alternates to cutting and patching.
 - (7) Cost proposal, when applicable.
 - (8) The scheduled date the Contractor intends to perform the Work and the duration of time to complete the Work.

- (9) Written permission of District or other District contractor(s) whose work will be affected.

1.04 QUALITY ASSURANCE:

- A. Contractor shall ensure that cutting, fitting, and patching shall achieve security, strength, weather protection, appearance for aesthetic match, efficiency, operational life, maintenance, safety of operational elements, and the continuity of existing fire ratings.
- B. Contractor shall ensure that cutting, fitting, and patching shall successfully duplicate undisturbed adjacent profiles, materials, textures, finishes, colors, and that materials shall match existing construction. Where there is dispute as to whether duplication is successful or has been achieved to a reasonable degree, the District's decision shall be final.

1.05 PAYMENT FOR COSTS:

- A. Cost caused by ill-timed or defective Work or Work not conforming to Contract Documents, including costs for additional services of the District, its consultants, including but not limited to the Construction Manager, the Architect, the Project Inspector(s), Engineers, and Agents, will be paid by Contractor and/or deducted from the Contract by the District.
- B. District shall only pay for cost of Work if it is part of the original Contract Price or if a change has been made to the contract in compliance with the provisions of the General Conditions. Cost of Work performed upon instructions from the District, other than defective or nonconforming Work, will be paid by District on approval of written Change Order. Contractor shall provide written cost proposals prior to proceeding with cutting and patching.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Contractor shall provide for replacement and restoration of Work removed. Contractor shall comply with the Contract Documents and with the Industry Standard(s), for the type of Work, and the Specification requirements for each specific product involved. If not specified, Contractor shall first recommend a product of a manufacturer or appropriate trade association for approval by the District.
- B. Materials to be cut and patched include those damaged by the performance of the Work.

PART 3 – EXECUTION

3.01 INSPECTION:

- A. Contractor shall inspect existing conditions of the Site and the Work, including elements subject to movement or damage during cutting and patching, excavating and backfilling. After uncovering Work, Contractor shall inspect conditions affecting installation of new products.

- B. Contractor shall report unsatisfactory or questionable conditions in writing to District as indicated in the General Conditions and shall proceed with Work as indicated in the General Conditions by District.

3.02 PREPARATION:

- A. Contractor shall provide shoring, bracing and supports as required to maintain structural integrity for all portions of the Project, including all requirements of the Project.
- B. Contractor shall provide devices and methods to protect other portions of Project from damage.
- C. Contractor shall, provide all necessary protection from weather and extremes of temperature and humidity for the Project, including without limitation, any work that may be exposed by cutting and patching Work. Contractor shall keep excavations free from water.

3.03 ERECTION, INSTALLATION AND APPLICATION:

- A. With respect to performance, Contractor shall:
 - (1) Execute fitting and adjustment of products to provide finished installation to comply with and match specified tolerances and finishes.
 - (2) Execute cutting and demolition by methods that will prevent damage to other Work, and provide proper surfaces to receive installation of repairs and new Work.
 - (3) Execute cutting, demolition excavating, and backfilling by methods that will prevent damage to other Work and damage from settlement.
- B. Contractor shall employ original installer or fabricator to perform cutting and patching for:
 - (1) Weather-exposed surfaces and moisture-resistant elements such as roofing, sheet metal, sealants, waterproofing, and other trades.
 - (2) Sight-exposed finished surfaces.
- C. Contractor shall execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes as shown or specified in the Contract Documents including, without limitation, the Drawings and Specifications.
- D. Contractor shall fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Contractor shall conform to all Code requirements for penetrations or the Drawings and Specifications, whichever calls for a higher quality or more thorough requirement. Contractor shall maintain integrity of both rated and non-rated fire walls, ceilings, floors, etc.
- E. Contractor shall restore Work which has been cut or removed. Contractor shall install new products to provide completed Work in accordance with

requirements of the Contract Documents and as required to match surrounding areas and surfaces.

- F. Contractor shall refinish all continuous surfaces to nearest intersection as necessary to match the existing finish to any new finish.

END OF DOCUMENT

CONTRACT CLOSEOUT AND FINAL CLEANING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Completion of Work;
- B. Special Conditions;
- C. Temporary Facilities and Controls.

1.02 CLOSEOUT PROCEDURES

Contractor shall comply with all closeout provisions as indicated in the General Conditions.

1.03 FINAL CLEANING

- A. Contractor shall execute final cleaning prior to final inspection.
- B. Contractor shall clean interior and exterior glass and all surfaces exposed to view; remove temporary labels, tape, stains, and foreign substances, polish transparent and glossy surfaces, wax and polish new vinyl floor surfaces, vacuum carpeted and soft surfaces.
- C. Contractor shall clean equipment and fixtures to a sanitary condition.
- D. Contractor shall replace filters of operating equipment.
- E. Contractor shall clean debris from roofs, gutters, down spouts, and drainage systems.
- F. Contractor shall clean Site, sweep paved areas, and rake clean landscaped surfaces.
- G. Contractor shall remove waste and surplus materials, rubbish, and construction facilities from the Site and surrounding areas.

1.04 ADJUSTING

Contractor shall adjust operating products and equipment to ensure smooth and unhindered operation.

1.05 RECORD DOCUMENTS AND SHOP DRAWINGS

- A. Contractor shall legibly mark each item to record actual construction, including:
 - (1) Measured depths of foundation in relation to finish floor datum.
 - (2) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permit surface improvements.
 - (3) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - (4) Field changes of dimension and detail.
 - (5) Details not on original Contract Drawings
 - (6) Changes made by modification(s).
 - (7) References to related Shop Drawings and modifications.
- B. Contractor will provide one set of Record Drawings to District.
- C. Contractor shall submit all required documents to District and/or Architect prior to or with its final Application for Payment.

1.06 INSTRUCTION OF DISTRICT PERSONNEL

- A. Before final inspection, at agreed upon times, Contractor shall instruct District's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. For equipment requiring seasonal operation, Contractor shall perform instructions for other seasons within six months or by the change of season.
- C. Contractor shall use operation and maintenance manuals as basis for instruction. Contractor shall review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- D. Contractor shall prepare and insert additional data in Operation and Maintenance Manual when the need for such data becomes apparent during instruction.
- E. Contractor shall review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

1.07 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Contractor shall provide products, spare parts, maintenance, and extra materials in quantities specified in the Specifications and in Manufacturer's recommendations.

- B. Contractor shall provide District with all required Operation and Maintenance Data at one time. Partial or piecemeal submissions of Operation and Maintenance Data will not be accepted.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

SECTION 01 77 19
CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Substantial Completion and Punchlist Procedures
- B. Final Completion Procedures
- C. Project Record Documents
- D. Operation and Maintenance Data
- E. Warrantees
- F. Spare Parts and Maintenance Materials
- G. Final Cleaning
- H. Adjusting and Training (cross references provided)

1.2 SUBSTANTIAL COMPLETION AND PUNCH LIST PROCEDURES

- A. When Contractor considers the Work or a designated portion thereof is substantially complete, notify Architect, with list of items to be completed or corrected, and request Punch List Inspection.
 - 1. Punch List Format: Pre-approved by Owner and Architect - tabular form with each space listed required.
- B. Within a reasonable time Architect, Architect's Consultants will conduct an inspection in order to determine Architect, Architect's Consultants will conduct an inspection in order to determine acceptance of work and identify items remaining to complete.
- C. The Architect will prepare a Punch List of such items and transmit to Contractor.
- D. Should Architect determine Work is not substantially complete, Contractor will be promptly notified in writing, giving reasons.
- E. Contractor shall remedy deficiencies and send a second written notice of substantial completion; Architect, Architect's Consultants will re-inspect Work.
- F. If Architect determines that punch list items remaining are sufficiently minor, and that Owner can occupy work and use it for its intended purpose, then Architect will prepare a Notice of Substantial Completion for Owner's signature.

1. If work is not substantially complete, Contractor shall continue construction until such time as project status justifies subsequent inspection. Architect and Project Manager and Architect's Consultant costs incurred in such subsequent inspections will be paid by Contractor by Owner-Contractor contract adjustment.
2. Contractor shall complete all items on Punch List within 30 days, or as stated on Notice of Substantial Completion.

1.3 FINAL COMPLETION PROCEDURES

- A. At such time as Contractor believes project is complete and following completion of Punch List items, notify Architect and request Final Inspection
 1. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect Final inspection.
 2. Upon receipt of request for final inspection, Architect will perform a Final Inspection and recommend actions as defined by the General Conditions.
 3. If Architect determines work is acceptable under the Contract Documents, Contractor shall submit Final Application for Payment and close-out documents.
- B. Contractor shall provide all close-out documents required by Contract Documents, per Section 01 77 19, "Closeout Requirements", and as required in this Section, with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor, within ten days of the last day of the contract period.
 1. Close out documents include, but are not necessarily limited to:
 - a. Project Record Set: Indicate actual work on Drawings and in Project Manual; indicate actual products used in Project Manual, including manufacturer, model number and options.
 - a. Operational and maintenance manuals and data.
 - b. Warranties and Guarantees.
 - c. Keys and keying schedules.
 - d. Spare parts, extra stock and materials.
 - e. All jurisdictional approval documents, including Final Verified reports (DSA 6 Forms, certification of fire alarm and related documents.

1.4 FINAL PAYMENT

- A. When, in the opinion of the Architect, the project is complete (after all punch list items are complete as described in Item 1.2 Substantial Completion), the Architect will advise the Owner and the Owner will file the Notice of Completion with the County Recorder.

- B. Should there be items not available due to delays in delivery, or should work remain incomplete, the Architect and the Owner may require the Contractor to post a certified check in an agreed upon amount sufficient to cover such incomplete or uncorrected items. Such certified check shall be held until completion of all incomplete Work.
- C. The final payment, including retention, outlined in Section 01 20 00, "Price and Payment Procedures" shall be held by the Owner until forty (40) days after the date of recording of the Notice of Completion by the County Recorder. If no stop notices or encumbrances are filed and if all required forms have been filed and approved by DSA and work is complete, the retention shall be paid the contractor. Assessed liquidated damages and extra services provided by the Architect and Inspector of Record due to additional inspections of incomplete work shall be deducted from the retention.
- D. Final payment to the Contractor will not be made until all requirements have been met and all documents set forth herein have been received, including but not limited to: Record Drawings, Warranties, Operation and Maintenance Manuals, Demonstration/Training and extra stock.
- E. Final Application for Payment Coordinate with Section 01 20 00, "Price and Payment Procedures".
 - 1. After final submittals have been submitted and approved, Contractor shall submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
 - 2. When requested by Architect, provide evidence of payment, lien releases and consent of surety to make final payment to Contractor.
 - 3. The District's Board will take an action to accept the project and authorize the filing of a Notice of Completion.

1.5 RECORD PROJECT DOCUMENTS

- A. Record Drawings: Upon completion of the Work, submit one set of reproducible drawings made from DSA approved stamped originals from the Architect for preparation of Record Set. In addition, provide scanned copy of the final set.
 - 1. Neatly and accurately transfer data from record job set prints specified in Section 01 50 00, "Temporary Facilities & Controls".
 - 2. Mark Record Prints to show the actual installation where installation varies from that shown originally.
 - a. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - b. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - 3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing

actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.

4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
 6. Graphic quality shall be equal to that of the original document.
 7. Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 8. Record CAD Drawings: Organize CAD information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.
 9. Provide Revit files, if applies.
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
1. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - a. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - b. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - c. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - d. Note related Change Orders, Record Product Data, and Record Drawings where applicable.
 2. Miscellaneous Record Submittals:
 - a. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- C. Final Submittals:
1. Cost of Record Set reproducibles and all preparation shall be paid by Contractor at no additional cost to Owner.
 2. Sign and date Record Job Sets and Record Sets, certifying that the information and data added is accurate and complete.

3. Record drawings and specifications not complying with specified criteria shall be rejected.
4. Prior to submission for final payment, review Record Drawing Set and Project Manual(s) with Architect and obtain approval of the scope of transfer. Architect will provide a list of corrections required. If corrections are required, update Record Set with all requested updates and resubmit to Architect. Following approval, submit Record Job Sets and Record Set to Architect with claim for final Application for Payment.
5. Coordinate preparation of Record Job Sets and Record Drawing Set and Project Manual(s) with work under separate contract. Coordinate preparation of interim Job Record Sets and Record Sets to coincide with completion of work areas. At completion of project, assemble all interim sets into final composite Job Record Set, Record Set and Record Project Manual(s).

1.6 OPERATION AND MAINTENANCE DATA

- A. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", with title of project, and subject matter of binders
 1. Binders shall be three-ring with durable plastic covers, bound in 8-1/2 x 11 inch text pages, clearly identified regarding extent of contents. 11 x 17 pages, shall be double folded, to align with 8 1/2 x 11 format.
 1. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
 2. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, type on 24 pound white paper.
 - a. **Part 1:** Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
 - b. **Part 2:** Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - 1) Significant design criteria.
 - 2) List of equipment, including trade names, model or type numbers.
 - 3) Parts list for each component.
 - 4) Operating instructions.
 - 5) Maintenance instructions for equipment and systems.
 - 6) Cleaning instructions.
 - 7) Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
 - c. **Part 3:** Project documents and certificates, including the following:

- 1) Shop drawings.
 - 2) Provide product data.
 - 3) Certificates.
 - 4) Photocopies of warranties.
- d. Provide a separate volume for each of the following systems, with a table of contents and index tabs for each volume:
- 1) Electrically operated items.
 - 2) Mechanical equipment and controls.
 - 3) Electrical equipment and controls.
- B. Submit one copy of completed Volumes in final form to Architect 15 days prior to final inspection. This copy will be returned after final inspection, with Architect comments.
- C. Revise content of documents as required prior to final submittal.
- D. Submit final volumes, one hard copy set each , with corresponding electronic format set, in PDF format, revised, within 15 days after final inspection.

1.7 WARRANTIES

- A. Compile required and incidental warranties required by Contract Documents.
- B. These warranties shall be in addition to and not a limitation of other rights Owner may have against Contractor under Contract Documents and which may be prescribed by law, regardless of wording of warranty.
- C. Provide duplicate notarized copies.
- D. Assemble documents executed by subcontractors, installers, suppliers, and manufacturers.
- E. Provide table of contents and assemble in binder with durable plastic cover, clearly identified regarding extent of contents.
- F. Electronic Format: Submit warranties on electronic media in PDF format.
- G. Warranty Form: Use form acceptable to Owner; completed form shall not detract from or confuse interpretations of Contract Documents. (See Section 00 65 36)
1. General Contractor shall sign warranty.
 2. Subcontractor and installer shall sign warranty where specified.
 - a. Provide required manufacturer's warranties for waterproofing and roofing systems countersigned by subcontractor and installer.

- H. Submit final warranties prior to final application for payment.
 - 1. For equipment put into use with Owner's permission during construction, submit within ten days after first operation.
 - 2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.
- I. Provide information for Owner's personnel regarding proper procedure in case of failure and instances that might affect validity of warranty.
- J. Size: 8-1/2" by 11" for three-ring binder; fold larger sheets to fit 8 1/2" x 11 format.
- K. Warrantees - General Requirements:
 - 1. Warranties are intended to protect Owner against failure of work and against deficient, defective and faulty materials and workmanship, regardless of sources.
 - 2. Limitations: Warranties are not intended to cover failures that result from:
 - a. Unusual or abnormal phenomena of the elements.
 - b. Owner's misuse, maltreatment or improper maintenance of work.
 - c. Vandalism after substantial completion.
 - d. Insurrection or acts of aggression including war.
 - 3. Related Damages and Losses: Remove and replace work which is damaged as result of failure, or which must be removed and replaced to provide access for correction of warranted work.
 - 4. Warranty Reinstatement: After correction of warranted work, reinstate warranty for corrected work to date of original warranty expiration, but not less than half original warranty period.
 - 5. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.
 - 6. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.
 - 7. Rejection of Warranties: Owner reserves right to reject unsolicited and coincidental product warranties that detract from or confuse interpretations of Contract Documents.

1.8 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.

- B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

1.9 FINAL CLEANING

- A. Contactor shall conduct all final cleaning required to comply with requirements of this Section prior to final inspection.
- B. Use cleaning materials which do not create hazards to health or property and which will not damage surfaces. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
- C. Employ experienced workers or professional cleaners for final cleaning. Comply with instructions of manufacturer for surface being cleaned.
- D. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner
- E. Contractor shall clean all completed interior work, including but not necessarily limited to, surfaces exposed to view in final construction, all cabinet/casework interiors and surfaces, and all equipment and fixtures.
 - 1. Remove temporary labels, stains and foreign substances. Where stain cannot be removed, replace item to the satisfaction of the Project Manager and Architect.
 - 2. Polish transparent and glossy surfaces.
 - 3. Wet wipe painted and prefinished surfaces. Do not leave residue or wipe marks.
 - 4. Where HVAC system was operated during construction, clean permanent filters and replace disposable filters immediately prior to final inspection. Clean ducts, blowers and coils if units were operated without filters during construction.
 - 5. Perform final cleaning of all plumbing and electrical components. Polish all glossy surfaces, wet wipe all other finished exposed surfaces and elements.
- F. Clean all completed building exterior surfaces and site work, including but not necessarily limited to, surfaces exposed to view in final construction, all roof surfaces, all site paving surfaces, and all equipment and fixtures.
 - 1. Remove temporary labels, stains and foreign substances from exterior surfaces.
 - 2. Polish exterior signage components and similar glossy surfaces.
 - 3. Remove dirt and dust from all exterior surfaces by approved means. Clean all sealant joints and similar applications.
 - 4. Remove debris, construction products, fasteners, and trash from all roof surfaces.
 - 5. Rake grounds that are neither paved nor planted to a smooth even-textured surface.

6. Clean all paving surfaces as necessary to remove construction dust and dirt, including debris from joints using approved methods. Remove all construction stains by approved means. Remove asphalt and seal coat splatter from curb faces.

G. Remove waste and surplus materials, rubbish, and construction facilities from the site and legally dispose of.

1.10 ADJUSTING AND TRAINING

A. Adjust operating products and equipment to ensure smooth and unhindered operation and provide adequate training for continued maintenance. See Section 01 75 00 "Starting and Adjusting" and Section 01 79 00, "Demonstration and Testing".

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

OPERATION AND MAINTENANCE DATA

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Completion of the Work;
- B. Special Conditions.

1.02 QUALITY ASSURANCE:

Contractor shall prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.03 FORMAT:

- A. Contractor shall prepare data in the form of an instructional manual entitled "OPERATIONS AND MAINTENANCE MANUAL & INSTRUCTIONS" ("Manual").
- B. Binders: Contractor shall use commercial quality, 8-1/2 by 11 inch, three-side rings, with durable plastic covers; two inch maximum ring size. When multiple binders are used, Contractor shall correlate data into related consistent groupings.
- C. Cover: Contractor shall identify each binder with typed or printed title "OPERATION AND MAINTENANCE MANUAL & INSTRUCTIONS"; and shall list title of Project and identify subject matter of contents.
- D. Contractor shall arrange content by systems process flow under section numbers and sequence of Table of Contents of the Contract Documents.
- E. Contractor shall provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- F. Text: The content shall include Manufacturer's printed data, or typewritten data on 24 pound paper.
- G. Drawings: Contractor shall provide with reinforced punched binder tab and shall bind in with text; folding larger drawings to size of text pages.

1.04 CONTENTS, EACH VOLUME:

- A. Table of Contents: Contractor shall provide title of Project; names, addresses, and telephone numbers of the Architect, any engineers, subconsultants, Subcontractor(s), and Contractor with name of responsible parties; and schedule of products and systems, indexed to content of the volume.

- B. For Each Product or System: Contractor shall list names, addresses, and telephone numbers of Subcontractor(s) and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Contractor shall mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- D. Drawings: Contractor shall supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Contractor shall not use Project Record Documents as maintenance drawings.
- E. Text: Contractor shall include any and all information as required to supplement product data. Contractor shall provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- F. Warranties and Bonds: Contractor shall bind in one copy of each.

1.05 MANUAL FOR MATERIALS AND FINISHES:

- A. Building Products, Applied Materials, and Finishes: Contractor shall include product data, with catalog number, size, composition, and color and texture designations. Contractor shall provide information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Contractor shall include Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Weather Exposed Products: Contractor shall include product data listing applicable reference standards, chemical composition, and details of installation. Contractor shall provide recommendations for inspections, maintenance, and repair.
- D. Additional Requirements: Contractor shall include all additional requirements as specified in the Specifications.
- E. Contractor shall provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.06 MANUAL FOR EQUIPMENT AND SYSTEMS:

- A. Each Item of Equipment and Each System: Contractor shall include description of unit or system, and component parts and identify function, normal operating characteristics, and limiting conditions. Contractor shall include performance curves, with engineering data and tests, and complete nomenclature, and commercial number of replaceable parts.
- B. Panelboard Circuit Directories: Contractor shall provide electrical service characteristics, controls, and communications.

- C. Contractor shall include color coded wiring diagrams as installed.
- D. Operating Procedures: Contractor shall include start-up, break-in, and routine normal operating instructions and sequences. Contractor shall include regulation, control, stopping, shut-down, and emergency instructions. Contractor shall include summer, winter, and any special operating instructions.
- E. Maintenance Requirements: Contractor shall include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- F. Contractor shall provide servicing and lubrication schedule, and list of lubricants required.
- G. Contractor shall include manufacturer's printed operation and maintenance instructions.
- H. Contractor shall include sequence of operation by controls manufacturer.
- I. Contractor shall provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Contractor shall provide control diagrams by controls manufacturer as installed.
- K. Contractor shall provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- L. Contractor shall provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- M. Contractor shall provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- N. Additional Requirements: Contractor shall include all additional requirements as specified in Specification(s).
- O. Contractor shall provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.07 SUBMITTAL:

- A. Contractor shall submit to the District for review two (2) copies of preliminary draft or proposed formats and outlines of the contents of the Manual within thirty (30) days of Contractor's start of Work.
- B. For equipment, or component parts of equipment put into service during construction and to be operated by District, Contractor shall submit draft content for that portion of the Manual within ten (10) days after acceptance of that equipment or component.

- C. Contractor shall submit two (2) copies of a complete Manual in final form prior to final Application for Payment. Copy will be returned with Architect/Engineer comments. Contractor must revise the content of the Manual as required by District prior to District's approval of Contractor's final Application for Payment.
- D. Contractor must submit two (2) copies of revised Manual in final form within ten (10) days after final inspection.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

WARRANTIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Warranty/Guarantee Information;
- B. Special Conditions.

1.02 FORMAT

- A. Binders: Contractor shall use commercial quality, 8-1/2 by 11 inch, three-side rings, with durable plastic covers; two inch maximum ring size.
- B. Cover: Contractor shall identify each binder with typed or printed title "WARRANTIES" and shall list title of Project.
- C. Table of Contents: Contractor shall provide title of Project; name, address, and telephone number of Contractor and equipment supplier; and name of responsible principal. Contractor shall identify each item with the number and title of the specific Specification, document, provision, or section in which the name of the product or work item is specified.
- D. Contractor shall separate each warranty with index tab sheets keyed to the Table of Contents listing, providing full information and using separate typed sheets as necessary. Contractor shall list each applicable and/or responsible Subcontractor(s), supplier(s), and/or manufacturer(s), with name, address, and telephone number of each responsible principal(s).

1.03 PREPARATION:

- A. Contractor shall obtain warranties, executed in duplicate by each applicable and/or responsible subcontractor(s), supplier(s), and manufacturer(s), within ten (10) days after completion of the applicable item or work. Except for items put into use with District's permission, Contractor shall leave date of beginning of time of warranty blank until the date of completion is determined.
- B. Contractor shall verify that documents are in proper form, contain full information, and are notarized, when required.
- C. Contractor shall co-execute submittals when required.
- D. Contractor shall retain warranties until time specified for submittal.

1.04 TIME OF SUBMITTALS:

- A. For equipment or component parts of equipment put into service during construction with District's permission, Contractor shall submit a draft warranty for that equipment or component within ten (10) days after acceptance of that equipment or component.
- B. Contractor shall submit for District approval all warranties and related documents within ten (10) days after date of completion. Contractor must revise the warranties as required by the District prior to District's approval of Contractor's final Application for Payment.
- C. For items of work delayed beyond date of completion, Contractor shall provide an updated submittal within ten (10) days after acceptance, listing the date of acceptance as start of warranty period.

PART 2 - PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

RECORD DOCUMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Documents on Work;
- B. Special Conditions.

PART 2 - RECORD DRAWINGS

2.01 GENERAL:

- A. As indicated in the Contract Documents, the District will provide Contractor with one set of reproducible, full size original Contract Drawings (mylars).
- B. Contractor shall maintain at each Project Site one set of marked-up plans and shall transfer all changes and information to those marked-up plans, as often as required in the Contract Documents, but in no case less than once each month. Contractor shall submit to the Project Inspector one set of reproducible vellums of the Project Record Drawings ("As-Builts") showing all changes incorporated into the Work since the preceding monthly submittal. The As-Builts shall be available at the Project Site. The Contractor shall submit reproducible vellums at the conclusion of the Project following review of the blueline prints.
- C. Label and date each Record Drawing "RECORD DOCUMENT" in legibly printed letters.
- D. All deviations in construction, including but not limited to pipe and conduit locations and deviations caused by without limitation Change Orders, Construction Claim Directives, RFI's, and Addenda, shall be accurately and legibly recorded by Contractor.
- E. Locations and changes shall be done by Contractor in a neat and legible manner and, where applicable, indicated by drawing a "cloud" around the changed or additional information.

2.02 RECORD DRAWING INFORMATION:

- A. Contractor shall record the following information:
 - (1) Locations of Work buried under or outside each building, including, without limitation, all utilities, plumbing and electrical lines, and conduits.

- (2) Actual numbering of each electrical circuit to match panel schedule.
- (3) Locations of significant Work concealed inside each building whose general locations are changed from those shown on the Contract Drawings.
- (4) Locations of all items, not necessarily concealed, which vary from the Contract Documents.
- (5) Installed location of all cathodic protection anodes.
- (6) Deviations from the sizes, locations, and other features of installations shown in the Contract Documents.
- (7) Locations of underground work, points of connection with existing utilities, changes in direction, valves, manholes, catch basins, capped stubouts, invert elevations, etc.
- (8) Sufficient information to locate Work concealed in each building with reasonable ease and accuracy.

In some instances, this information may be recorded by dimension. In other instances, it may be recorded in relation to the spaces in the building near which it was installed.

- B. Contractor shall provide additional drawings as necessary for clarification.
- C. Contractor shall provide reproducible record drawings, made from final Shop Drawings marked "No Exceptions Taken" or "Approved as Noted."
- D. After review and approval of the marked-up specifications by the Project Inspector, Contractor shall provide electronic copies of the drawings (in PDF format) with one file with all of the sheets and one set of individual sheet files at the conclusion of the Project.

PART 3 - RECORD SPECIFICATIONS

3.01 GENERAL:

- A. Contractor shall mark each section legibly to record manufacturer, trade name, catalog number, and supplier of each Product and item of equipment actually installed.
- B. After review and approval of the marked-up specifications by the Project Inspector, Contractor shall provide one electronic copy of the specifications (in PDF format) at the conclusion of the Project.

PART 4 - MAINTENANCE OF RECORD DOCUMENTS

4.01 GENERAL

- A. Contractor shall store Record Documents apart from documents used for construction as follows:

- (1) Provide files and racks for storage of Record Documents.
- (2) Maintain Record Documents in a clean, dry, legible condition and in good order.

B. Contractor shall not use Record Documents for construction purposes.

PART 5 – PRODUCTS Not Used.

END OF DOCUMENT

SECTION 02 41 00

SITE DEMOLITION

PART 1 – GENERAL

1.01 SUMMARY

A. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 01 50 00 - Construction Facilities and Temporary Controls.
3. Section 01 50 13 - Construction Waste Management and Disposal.
4. Section 31 00 00 - Earthwork.
5. Section 31 13 16 - Tree Protection.

1.02 REGULATORY REQUIREMENTS

- A. Conform to applicable jurisdictional authority regulations and codes for disposal of debris.
- B. Coordinate clearing Work with utility companies
- C. Maintain emergency access ways at all times.
- D. Contractor shall comply with all applicable laws and ordinances regarding hazardous materials, including contaminated soils, hazardous material transformers, and similar materials or components.

1.03 SUBMITTALS:

- A. Schedule: Submit a detailed sequence of demolition and removal work, including dates for shutoff, capping, and continuance of utility services.
- B. Procedures: Submit written procedures documenting the proposed methods to be used to control dust and noise.

1.04 EXISTING CONDITIONS

- A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
- B. Conduct demolition to minimize interference with adjacent structures or items to remain. Maintain protected egress and access at all times.

1.05 PROTECTION

- A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
- B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
- C. Safety Precautions Prevent damage to existing elements identified to remain or to be salvaged, and prevent injury to the public and workmen engaged on site. Demolish roofs, walls and other building elements in such manner that demolished materials fall within foundation lines of building. Do not allow demolition debris to accumulate on site. Pull down hazardous work at end of each day; do not leave standing or hanging overnight, or over weekends.
 - 1. Protect existing items which are not indicated to be altered. Protect utilities designated to remain from damage.
 - 2. Protect trees, plant growth, and features designated to remain as final landscaping as shown on drawings.
 - 3. Protect benchmarks from damage or displacement.
- D. Trees: Carefully protect existing trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.
- E. Fire Safety: The contractor shall conform to chapter 33 of the California Fire Code (CFC), "Fire Safety During Construction and Demolition", at all times during the construction process. A copy of this chapter can be provided.
- F. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
- G. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
- H. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
- I. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.

PART 2 - PRODUCTS

Not Used

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine conditions of work in place before beginning work, report defects.
- B. Report existence of hazardous materials or unsafe structural conditions.

3.02 PREPARATION

- A. Scheduling:
 - 1. General: Coordinate and schedule demolition work as required by the Owner and as necessary to facilitate construction progress.
- B. Hazardous Materials:
 - 1. General: Identify chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations, and notify such jurisdictional agencies as may be required. Collect and legally dispose of such materials at official disposal locations away from the site.
 - 2. Asbestos: If asbestos or materials containing asbestos are encountered, stop work immediately and contact the Owner. Do not proceed with demolition until directed by Owner.
- C. Utility and Service Termination
 - 1. Locate and identify existing utility, service and irrigation system components affected by work of this contract. Review existing record drawings, conduct site investigations, contact Underground Service Alert and other qualified cable/pipe/line locator services, and implement all other means necessary to define the location of underground systems.
 - 2. Prior to beginning any demolition, properly disconnect all water, gas and electrical power supply at appropriate disconnect locations. Obtain all necessary releases and approvals from serving utility companies.
 - 3. Prior to demolition or disconnect, obtain Owner's approval that such system does not impact facilities or systems beyond the extent of this contract.
 - 4. Mark location of disconnected systems. Identify and indicate stub-out locations on Project Record Documents.
- D. Verify that existing plant life and features designated to remain are tagged or identified.
 - 1. The Architect will mark the features, trees, and shrubs to remain within the construction area. Contractor shall not commence clearing and grubbing operations until authorized by the Owner and all protective measures are in place.

- E. Coordinate the time and duration of all system disconnects with Owner.

3.03 DEMOLITION

A. General Requirements

1. Clear areas required for access to site and execution of Work, including pavements, structures, foundations, vegetation, trash and debris.
2. Coordinate with Owner the time of day and route to remove demolished materials from premises.
3. Remove demolished materials from site as work progresses. Upon completion of work, leave areas of work in clean condition.
4. Remove all buried debris, rubble, trash, or other material not deemed suitable by the Geotechnical Engineer.
5. Fill all voids or excavations resulting from clearing, demolition, or removal of vegetation with specified fill material.

B. Fixture and Equipment Removal:

1. Remove existing fixtures and equipment as identified and shown on drawings and required by Architect.
2. Verify all service connections to fixtures and equipment designated for removal have been properly disconnected.
3. Remove all conductors from conduit at all abandoned circuits.

3.04 UTILITY AND BUILDING SERVICES REMOVAL AND RE-INSTALLATION

- A. Where crossing paths and potential points of interference with existing utility services are shown or can be reasonably inferred from surface conditions or evidence of subsurface systems, such as meter boxes, vaults, relief vents, cleanouts and similar components.
 1. Review all contract documents showing crossing paths and potential points of interference.
 2. Pothe or determine by other means the accurate depth and location of such utilities.
 3. Incorporate all costs required to complete work under this contract, including additional trenching, re-routing of existing and new utilities, and all means necessary to construct work under this contract.
 4. No additional cost to the Owner will be allowed for work necessary to accommodate utility conflicts where such crossing paths are shown on contract drawings or can be reasonably inferred from surface conditions or components.
- B. Remove all conductors from conduit at all abandoned electrical circuits.
- C. Seal off ends of all piping, drains and other components as directed by Architect and serving utility.
- D. Where necessary to maintain service to existing utility and building systems, relocate or redirect all conduit and conductors, piping, drains, and associated system components.

1. Re-circuit all electrical as required.
 2. Re-circuit all landscape irrigation valving and control systems as required.
 3. Temporarily terminate landscape system components in approved boxes or with approved caps, suitable for re-connection or extension.
 4. Extend or otherwise modify all site drainage systems, including catch basins, drain inlets and piping. Fine grade to maintain proper drainage flow pattern to drains.
- E. Demolish structure in an orderly and careful manner.
1. Use of explosives prohibited.

3.05 SITE PAVEMENT REMOVAL

- A. Remove sidewalk and curb where required for new construction as specified and as indicated on the Drawings.
1. Remove all paving by saw-cutting.
 2. Remove concrete paving and curbing at locations shown on drawings. Locate closest adjacent expansion or weakened plane joint to define start of removal or saw-cutting.
- B. Remove asphalt concrete paving areas where required for new construction as specified and as indicated on the Drawings.
1. Remove all paving by saw-cutting.
 2. Remove paving assembly as required to expose subgrade.

3.06 LANDSCAPE AND IRRIGATION SYSTEMS DEMOLITION AND RENOVATION

- A. Clearing, grubbing, and planting demolition.
1. Remove grass and grass roots to a minimum depth of two inches below existing grade.
 2. Remove all shrubs, plants and other vegetation within the area of the work unless designated to remain. Grub and remove all roots of all vegetation to a depth of 24 inches below existing grade.
 3. Remove only those trees which are specifically designated for removal, or as shown on the drawings, within the construction area. Remove all stumps. Remove root ball and root systems larger than 1 inch in diameter to a depth of two feet below existing or finished grades, whichever is lower and a minimum of five feet beyond the edge of paving, structure, wall or walkway.
 4. Hand cut existing tree roots over 1 inch in diameter as necessary for trenching or other new construction, apply multiple coats of emulsified asphalt sealant especially made for horticultural use on cut or damaged plant tissues to cut faces and adjacent surfaces. Cover exposed roots with wet burlap to prevent roots from dying out until backfilling is complete.
 5. Disking and mixing of vegetation, trash, debris, and other deleterious materials with surface soils prior to grading is not permitted.
 6. Remove all buried debris, organic material, rubble, trash, or other material not deemed suitable by the Geotechnical Engineer.
 7. Fill all voids or excavations resulting from clearing, demolition, or removal of vegetation with fill material in compliance with Section 31 00 00.

8. Selected equipment of such sizes and capacities that the existing environment is disturbed as little as possible, and to afford ease of mobility within limited and relatively confined work areas. Make every effort to preserve the topography in its natural state.
9. Keep drains, catch basins, surface drainage courses and related drainage system components clear of debris and construction materials.
10. Remove irrigation piping and appurtenances as necessary within area of work, unless noted otherwise to remain. Replace irrigation piping and appurtenances to irrigate new and/or existing landscaping. Contractor shall be responsible for temporary landscape irrigation until such time that irrigation system is restored and operational.

3.07 DISPOSAL

Demolished materials become property of the Contractor and shall be removed from premises, except those items specifically listed to be retained by Owner.

- A. Dispose of all demolished material, trash, debris, and other materials not used in the work in accordance with the regulations of jurisdictional authority.
- B. It is recommended that all materials that are of a recyclable nature, be transported to a suitable legal recycling facility instead of a dump or refuse facility (unless they are one-in-the same).
- C. Burning and Burying of Materials: NOT ALLOWED.
- D. Haul Routes:
 1. Obtain permits as required by jurisdictional agencies. Establish haul routes in advance, post flagmen for the safety of the public and workmen.
 2. Keep streets free of mud, rubbish, etc.; assume responsibility for damage resulting from hauling operations; hold Owner free of liability in connection therewith.
- E. Remove demolished materials and debris from site on a daily basis.

3.08 CLEANING

- A. Upon completion of work of this Section promptly remove from the working area all scraps, debris.
- B. Clean excess material from surface of all remaining paved surfaces and utility structures.
- C. Power wash all concrete surfaces to remove stains, dried mud, tire marks, and rust spots.

END OF SECTION

SECTION 02 41 19
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. General description of scope
 - 1. Demolition and removal of selected portions of buildings or structures.
 - 1) Refer to Demolition Drawings, all disciplines.
 - 2. Demolition and removal, disconnecting, capping and sealing, and abandoning in place of selected site and building elements.
 - 3. Salvage of existing items to be reused or recycled.
 - 4. Hazardous material remediation
 - 5. Abandoning in-place and/or removing below-grade construction.

1.2 RELATED SECTIONS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 00 and 01 Specification Sections, apply to this Section.
- B. Section 01 21 00 – Allowances
- C. Section 01 22 00 - Unit Prices
- D. Section 00 31 26 - Hazardous Material Information
- E. Section 01 10 00 - Summary of Work - for use of the premises and phasing requirements
- F. Section 01 32 00 - Construction Progress Documentation
- G. Section 01 32 33 - Photographic Documentation
- H. Section 02 41 19 - Selective Demolition - for partial demolition of buildings, structures, and site improvements.
- I. Section 01 45 00 - Quality Control
- J. Section 01 56 39 - Temporary Tree and Plant Protection
- K. Section 01 50 00 - Temporary Facilities and Controls
- L. Section 01 73 00 - Execution Requirements
- M. Section 01 74 19 - Construction Waste Management and Disposal
- N. Section 01 77 19 - Closeout Requirements
- O. Section 31 00 00 - Earthwork
- P. Section 02 41 16 – Structure Demolition for full demolition of buildings, structures, and site improvements
- Q. Section 31 10 00 - Site Clearing

- R. Section 31 11 00 - Clearing and Grubbing
- S. Section 31 12 00 - Selective Clearing
- T. Section 31 20 00 - Earth Moving
- U. Section 31 22 00 - Site Grading
- V. Section 31 22 13 - Rough Grading
- W. Section 31 22 16 - Fine Grading
- X. Section 31 23 16.26 - Rock Removal
- Y. Section 31 23 23 - Fill
- Z. Section 31 23 29 - Dewatering
- AA. Section 31 23 33 - Trenching and Backfilling

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 STANDARDS AND REFERENCES (Current Edition for All Standards Listed)

- A. ASSE A10.6 – Safety and Health Program Requirements for Demolition Operations
- B. 40 CFR 82 – Protection of Stratospheric Ozone
- C. All applicable EPA notification regulations.
- D. All applicable OSHA regulations.
- E. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations
- F. Resilient Floor Covering Institute (RFCI) - Recommended Work Practices for the Removal of Resilient Floor Coverings

Website Link: <https://rikett.net/wp-content/uploads/2016/05/RFCI-Recommended-Work-Practices-for-the-Removal-of-Resilient-Flooring.pdf>

1.5 SUBMITTALS

- A. Submittals: Provide submittals per Section 01 33 00, “Submittal Procedures”.
- B. Qualification Data: For refrigerant recovery technician.

- C. Engineering Survey: Submit engineering survey of condition of building.
- D. Proposed Protection Measures:
 - 1. Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property.
 - 2. Indicate proposed locations and construction of barriers.
 - 3. Adjacent Buildings: Where damage to adjacent structures is possible, detail special measures proposed to protect adjacent buildings to remain, including means of egress from those buildings.
- E. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services: Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- F. Building Demolition Plans: Drawings shall indicate the following:
 - 1. Locations of temporary protection, and means of egress protection, if applies, for adjacent occupied buildings.
- G. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of work.
- H. Pre demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations.
 - 1. Submit before the Work begins.
 - 2. Comply with Section 01 32 33, "Photographic Documentation.
- I. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.
- J. Closeout Submittals:
 - 1. Submittals: Provide submittals per Section 01 77 19, "Closeout Requirements"
 - 2. Inventory: Submit a list of items that have been removed and salvaged.
 - 3. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

- 1. Comply with ANSI A10.6 and NFPA 241.

2. Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
3. Comply with all OSHA regulations.
4. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

1.7 PRE-INSTALLATION CONFERENCE

- A. Pre-demolition Conference: Conduct conference at Project site.
 1. Inspect and discuss condition of construction to be selectively demolished.
 2. Review structural load limitations of existing structure.
 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 5. Review areas where existing construction is to remain and requires protection.

1.8 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.9 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 1. Hazardous materials will be removed by Owner before start of the Work.
 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use – See Section 00 31 26, “Hazardous Material Information”. Examine report to become aware of locations where hazardous materials are present.
 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.

3. Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there.
- F. Storage or sale of removed items or materials on-site is not permitted.
- G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 1. Maintain fire-protection facilities in service during selective demolition operations.

1.10 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.11 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

- C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- F. Survey of Existing Conditions: Record existing conditions by use of measured drawings
 - 1. Comply with requirements specified in Section 01 32 33, "Photographic Documentation."
 - 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
 - 3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off utilities with utility companies.
 - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.

- d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
- e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00, "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 5. Maintain fire watch during and for at least 1 hours after flame-cutting operations
 6. Maintain adequate ventilation when using cutting torches.
 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 10. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19, "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."
- F. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
 - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
 - 2. Remove existing roofing system down to substrate.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site. Recycle or dispose of them according to Section 01 74 19, "Construction Waste Management and Disposal."
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Section 01 74 19, "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes the following, but is not necessarily limited to:
 - 1. Concrete Formwork.
 - 2. Reinforcement of Concrete.
 - 3. Concrete Placing and Finishing.
 - 4. Concrete Flatwork.

- B. Related Sections:
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Section 06 10 00 – Rough Carpentry.

- C. Related Documents:
 - 1. Drawings and general provisions of Contract, including General and Supplementary Conditions of Division 1 Specification Sections, apply to this Section.

1.02 REFERENCES

- A. Chapter 19A, California Building Code (CBC), edition as noted on the drawings.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal Weight, Heavy Weight and Mass Concrete.
- C. ACI 301 - Specifications for Structural Concrete for Buildings.
- D. ACI 304R - Guide for Measuring, Mixing, Transporting and Placing Concrete.
- E. ACI 305R - Hot Weather Concreting.
- F. ACI 306R - Cold Weather Concreting.
- G. ACI 308 - Standard Practice for Curing Concrete.
- H. ACI 309R - Guide for Consolidation of Concrete.
- I. ACI 318 - Building Code Requirements for Structural Concrete.
- J. ASTM A615 / A615M – 09b - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- K. ASTM C33 / C33M-08 - Concrete Aggregates.
- L. ASTM C94 / C94M –09a - Ready-Mixed Concrete.
- M. ASTM C114- 09b - Methods of Chemical Analysis of Hydraulic Cement.
- N. ASTM C150 / C150M-09 - Portland Cement.
- O. ASTM C260-06 - Air Entraining Admixtures.
- P. ASTM C494 / C49M-08a - Water Reducing Admixtures.

1.03 SUBMITTALS & SUBSTITUTIONS

- A. General: Submit in accordance with Conditions of the Contract and Division 1 Specification sections.
- B. Manufacturer's Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, chemical floor hardeners, and others as may be requested by the Architect.
- C. Shop Drawings:
 - 1. Shop drawings sheet size shall be 24" x 30" minimum and shall not be a reproduction of the construction documents.
 - 2. Reinforcing Steel: The correctness of the bending diagrams is the responsibility of the Contractor. Identify such shop drawings with a reference thereon to sheet and detail numbers from the contract drawings. No reinforcing steel shall be fabricated without approved shop drawings.
 - 3. Proposed location of construction and cold joints when different or in addition to those shown on the drawings.
 - 4. Construction joint layout per paragraph 3.05.
 - 5. Clearly identify and cloud any deviations from the Contract Documents and provide reason for the deviation.
- D. Concrete Mix Design: Submit proposed mix design prepared by concrete supplier. Mix design must be submitted to Owner for review and acceptance by a recognized independent testing lab, for all structural concrete.
- E. Historical test data on all proposed mix designs including 28-day strength reports, and verification of aggregate and concrete shrinkage.
- F. Substitutions from the products listed in this Section shall be identified and a comparison provided for review. Substitutions will not be accepted if a comparison or commentary is not provided.

1.04 QUALITY ASSURANCE

- A. All Concrete for the project shall be controlled concrete of specified strengths, of uniform color, and free from defects liable to adversely affect strength, durability or appearance of the structure or its components.
- B. Requirements of Regulatory Agencies: The quality and design of structural concrete shall comply with the requirements of the California Building Code, except where more stringent requirements are specified.
- C. Workmanship: Materials and methods used for the production and placement of concrete shall be such as to assure the specified quality and shall conform to applicable requirements of the Building

Code for Reinforced Concrete (ACI 318) of the American Concrete Institute, except as otherwise specified in this Section.

1. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Project Inspector. Work not so inspected is subject to uncovering and replacement.
 2. Proper installation of partitions and equipment requires the floor finish to be level and smooth throughout. Extreme care shall be exercised during all floating and troweling operations to check levels often.
 3. Any concrete work which does not comply with tolerances and elevations shown on drawings will be cause for rejection of all work affected, and, if so rejected, such work shall be removed and replaced at no increase in cost to the District.
- D. Repair of Defective Concrete Surfaces shall be done in the following manner when, in the opinion of the Architect, such defects may be repaired and at no additional cost to the District.
1. Minor rock pockets, voids, spalls, cracks shall be repaired with 1:2 cement mortar or cut out and patched. Prepare surfaces and bond cement mortar with concrete adhesive as hereinafter specified. Pockets deeper than ½-inch or exposing reinforcing will require a specific repair and DSA approval.
 2. Floor surfaces which exceed the allowable variation in plane or level (when an 8'-0" long straightedge is laid on the finished surface, the surface varies more than 3/16" in 8'-0") shall be ground and/or filled to obtain the level and plane required. Fill materials, where required, shall be of type approved by the Architect.
 3. Surfaces which are not plumb and square or which do not conform to the lines and levels indicated shall be chipped, ground, filled or trued as required to obtain the desired results.
- E. Uniformity of Concrete: All aggregates shall be measured by weight and the proportion of water to cement shall be accurately controlled by either automatic measuring devices or calibrated containers. All concrete placed shall be uniform strength and color appearance as well as surface texture.
- F. Screeds shall be provided at all construction joints as required to ensure installation of concrete to lines and elevations noted.
- G. Concrete Preplacement Inspection: Concrete shall not be poured until the forms, reinforcement, and preparations are complete and have been reviewed by the Project Inspector.
- H. Ready-Mixed Concrete: ASTM C94 / C94M-09a except as otherwise specified herein. Mix and deliver in accordance with the requirements set forth in ASTM C94 and ACI 301. Continuous Batch Plant inspection is required per CBC Section 1705A.3.3. Contractor may request waiver of batch plant inspection in accordance with CBC Section 1705A.3.3.1 provided the following is met:

1. Approved Testing Laboratory shall check the first batching for each class of concrete and furnish mix proportions to the Licensed Weighmaster.
 2. Licensed Weighmaster to positively identify materials as to quantity and to certify to each load by ticket.
 3. Ticket shall be transmitted to Project Inspector by truck driver with load identified thereon. Project Inspector will not accept load without load ticket identifying mix and will keep daily record of pours, identifying each truck, its load and time of receipt and will transmit two copies of record to DSA.
 4. Do not add water at the site to concrete mixes with a maximum specified WCR unless the water content at batch time provides for a WCR less than specified and this provision, including the quantity of water which may be added at the site, is specifically noted on the Mix Design and Certification by the mix preparer.
 5. At end of project, Weighmaster shall furnish affidavit to DSA on form satisfactory to DSA, certifying that all concrete furnished conforms in every particular and to proportions established by mix designs.
- I. Tests: For structural concrete, the Testing Lab shall take four (4) test cylinders of concrete not less than once each day, not less than once for every 50 cubic yards of concrete, or not less than 2,000 square feet of slab or wall surface area. Cylinders shall be made and stored as per instructions given by the testing laboratory and shall be in accordance with ASTM Specifications C-31 / C31M-09 and C-39 / C39M-09a. Cylinders shall be tested for ultimate compressive strength of concrete with one cylinder tested at the age of 7 days and two (from the same batch) to be tested at the age of 28 days, with one cylinder held as a spare for future testing if needed. Tests shall be made by a recognized test laboratory selected by the Owner and approved by the Architect.
1. Cylinders not meeting the required design stresses shall indicate defective concrete and such concrete shall be removed and replaced at no increase in cost to the Owner. Core tests requested by the Contractor to establish design stresses, when cylinder tests indicate defective concrete, shall be paid for by the Contractor.

1.05 JOB CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required by construction activities.

PART 2 – PRODUCTS

2.01 FORM MATERIALS

- A. Plywood Forms shall be exterior plyform, in large sheets of adequate thickness to support the imposed loads, but in no case less than 5/8" thick.
- B. Lumber Forms may be used for concrete surfaces that are unexposed and require no further surface applied materials. Lumber, if used, shall be clean and sound 2 x 12 No. 2 grade or better Douglas fir.
- C. Form Coating: Form shall be coated with nongrain-raising and nonstaining types of form coating

that will not leave a residual matter on the face of the concrete or adversely affect proper bonding of any subsequent paint or other surface applications.

1. Form coating containing mineral oils or other nondrying materials will not be permitted for any concrete work.
- D. Form Ties: Snap off metal of fixed length: leaving no metal within 1-1/2 inches of surface and no fractures, spalls or other surface defects larger than one-inch diameter; manufactured by Burke, Dayton Superior, or accepted equal.
- E. Spreaders: Metal (no wood permitted).
- F. Form Release Agent: Colorless, nonstaining, free from Lass; chemically active agent that shall not impair bonding of paint or other coatings intended for use.

2.02 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A615 / A615M -09b with Supplement S1, marked "S", Grade 60 for #4 bar and larger, Grade 40 for bars smaller than #4.
- B. Furnish 6x6 W1.4xW1.4 welded wire fabric in flat sheets; rolls will not be allowed.
- C. Wire Ties for tying reinforcing steel shall be #16 annealed wire.
- D. Bar Supports: Comply with CRSI "Recommended Practice for Placing Bar Supports, Specifications and Nomenclature, Latest Edition", except as otherwise specified. Wood is not permitted as supports for reinforcing.
- E. Spacers and Chairs: As manufactured by Kalman Steel Company, Concrete Engineering Company, or approved equal.

2.03 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150 / C150M-09, Type II, low alkali. All cement used shall be of one manufacturer.
 1. Use Type IIA cement if pumping of concrete is selected and permitted for placing of concrete.
 2. All cement shall contain not more than 0.6 percent total alkali when calculated as sodium oxide as determined by "Methods of Chemical Analysis of Hydraulic Cement", ASTM C114-09b.
- B. Fly Ash: Western Fly Ash, conforming to ASTM C618 for Class N or Class F materials (Class C is not permitted). Not more than 15% (by weight) may be substituted for portland cement.
- C. Water: Clean and free from deleterious amounts of acids, alkalis, salts and organic matter.

- D. Concrete Aggregates: ASTM C33 / C33M-08 except as otherwise specified hereinafter. All aggregates shall be nonreactive and nondegenerative, and shall consist of sound crushed rock, washed gravel, or a combination of both.
1. Modify fine aggregates when air entrained concrete is used in accordance to Paragraph 4.2.4 of ASTM C33 / C33M-08.
 2. Aggregate sources shall be approved by the Architect. Aggregate shall result in shrinkage of concrete not exceeding .048 percent at 28 days. Testing lab shall verify aggregate and concrete shrinkage.
 3. Do not use fine or coarse aggregates that contain substances that are known to cause spalling or adverse reactions in the concrete.
- E. Admixtures: Except for admixtures noted below, no other admixtures shall be used without written approval from the Architect. Where such agents are permitted, they shall be a type approved and used only as directed by the Architect and at no increase in cost to the Owner. Agents including calcium chloride will not be permitted for use in concrete under any circumstances.
1. Air Entraining Agents: ASTM C260. Use where specified. The maximum entrained air content shall be no more than 4 percent + 1 percent by volume unless noted otherwise. Approved air entraining agents are Sika AER, Master Builders Micro Air, Darex AEA, and Protex AEA.
 2. Water Reducing Admixtures: ASTM C494 and ACI 318, Section 3.6. Use where specified. Approved agent is Master Builders Pozzolith 322-N, used at the rate of 5+2 fluid ounces per 100 pounds of cement.

2.04 CRUSHED ROCK BASE:

- A. Under all new concrete ramps and paving, or as otherwise indicated on the Drawings, provide a minimum of 4 inches of crushed rock fill. Crushed rock fill shall be clean gravel of 1" max. size and have no material passing through a No. 4 sieve.

2.05 JOINT MATERIAL:

- A. Provide 3/8" wide fiber expansion joint material, Model No. 320-F, as manufactured by W.R. Meadows or equal.
- B. Provide Snap-Cap as manufactured by W.R. Meadows or equal. Snap-Cap shall have a top plastic edge that can be used for leveling concrete. Once concrete has set up, top edge of Snap-Cap can be pulled free and discarded. Joint shall then be sealed.
- C. Joint sealing material shall be a two-component, self-leveling, polyurethane elastomeric sealant. Product shall be Sikaflex 2cSL as manufactured Sika Corporation, or equal. Color shall be chosen from the full range of manufacturer's standard colors.

2.06 RELATED MATERIALS

- A. Concrete Adhesive and Bonding Agent: "Concresive #1001-LPL" (1-1/2 hour maximum pot life), an epoxy polysulfide type concrete adhesive as manufactured by Master Builders or equal.
- B. Liquid Curing Compound: W.R. Meadows, Product: "Vocomp-20" or equal.
- C. Bonding Adhesive: Burke, Bondcrete-S; use as a modifier for patching and overlays up to 1/2" thick or equal.
- D. Vapor Barrier: Stego Wrap, 15 mil. vapor barrier system, with a Class A rating, and perm rating not to exceed 0.01 perms; by Stego Industries of San Juan Capistrano, CA (877) 464-7834, VaporGuard by Reef Industries (713) 507-4250., Sundance 15 mil Vapor Barrier by Sundance Inc. (855) 300-7156, or 15 mil Husky, Yellow Guard, Vapor Barrier by Poly-America (800) 527-3322.. No substitutions will be accepted. System to include Stego Mastic, Stego "Crete Claw Tape" and pipe boots, or accepted equal by the specified manufacturers. Conform to ASTM 1745.
- E. Doweling Epoxy: Hilti "HIT-HY 200" (ICC-ES ESR-3187), Simpson Strong-Tie "SET-XP" Epoxy (ICC-ES ESR-2508), or accepted equal.
 - 1. Anchor rods shall be furnished with a 45-degree chisel point on one end to allow for easy insertion into adhesive filled hole and manufactured to meet the requirements of ASTM A36. Nuts and washers shall be furnished to meet the requirements of the anchor rod specifications noted above.
 - 2. Install per manufacturer's recommendation; use stainless steel for all exterior work.
 - 3. Testing required as noted in the Structural Drawings.
- F. Drilled-in Concrete Anchors: Hilti "Kwik Bolt TZ2" (ICC-ES ESR-4266), Simpson Strong-Tie "Strong-Bolt 2" (ICC-ES ESR-3037), or accepted equal.
 - 1. Install per manufacturer's recommendation; use stainless steel for all exterior work.
 - 2. Testing required as noted in the Structural Drawings.
- G. Patching Mortar: Meadow-Crete GPS, one-component, trowel applied, polymer enhanced, shrinkage-compensated, fiber reinforced, cementitious repair mortar for horizontal, vertical and overhead applications as manufactured by W.R. Meadows or accepted equal.
- H. Non-shrink Grout: Masterflow 713 Plus by Master Builders or accepted equal. Premixed, non-metallic, no chlorides, non-staining and non-shrinking per CRD-C621, Corps of Engineers Specification and ASTM C 1107, Grades B and C.

2.07 CONCRETE DESIGN

- A. Designed Strength and Classes of Concrete:
1. Class "A" concrete of 1-1/2" max. size aggregate shall have 3,500 psi 28 day strength with a maximum water to cementitious materials ratio of 0.55. No additional air entrainment is required. Use for footings and other concrete of like nature. (Class "B" concrete may be used in lieu of Class "A" at Contractor's option.).
 2. Class "B" concrete of 1" max. size aggregate shall have 4,000 psi 28 day strength with a maximum water to cementitious materials ratio of 0.45. Use for interior structural concrete less than 8" min. thickness including interior floor slabs and curbs.
- B. Slump of Concrete: The slump of concrete at point of placement as determined by the Standard Test Method for Slump of Hydraulic Cement Concrete ASTM Designation C-143 / C143M-09 shall be as follows:
1. Class "A": 3.5" plus or minus 1" (4.5" maximum).
 2. Class "B": 4" plus or minus 1" (5" maximum).
- C. Laboratory Mix Design: Concrete designs shall be reviewed by the Testing Laboratory. The concrete mix designs reviewed by the Testing Laboratory and approved by the Project Architect or Structural Engineer shall be used by the Contractor. Contractor shall provide samples of aggregates as required by the laboratory to review the mix designs.
- D. Water Reducing Admixture: Unless noted otherwise, all concrete shall contain a water reducing admixture.

2.07 CONCRETE MIXING

- A. Ready-Mixed Concrete: ASTM C94 / C94M-09a except as otherwise specified herein.
1. Transit-mixed concrete shall be mixed for a period of not less than 10 minutes at a peripheral drum speed of approximately 200 feet per minute, and mixing shall be continued until discharge is complete. At least 3 minutes of the mixing period shall be at the job. Transit mixers shall be equipped with water measuring devices consisting of either accurately calibrated water tanks or water meters.
 2. When outside air temperature is between 85 degrees and 90 degrees, reduce mixing and delivery time from 90 minutes to 75 minutes. When outside air temperature is above 90 degrees, reduce mixing and delivery time to 60 minutes
- B. Job Mixing: Non-structural concrete only. The capacity of the mixer shall be such that it will handle one or more full sack batches. No split sack batches will be permitted except when all materials are weighed. The rated capacity of the mixer shall not be exceeded. The mixing drum shall be equipped with an automatic timing and locking device and with an accurate water gauge for measuring the amount of water used. Mixing time of each batch shall be at least 1-1/2 minutes after all ingredients are in the mixer.

PART 3 – EXECUTION**3.01 FORMS**

- A. Build and Erect Forms to conform to the required shapes, patterns, lines, grades and dimensions indicated. Forms shall be substantial and tight to prevent any leakage of mortar, properly braced and tied together to maintain their position and shape. Forms shall not deflect under the dead load weight of the plastic concrete or construction loads. Joints in forming material shall be butted tightly and shall bear on solid construction. Provide tool edges where indicated. Completed form work to be checked for grade and alignment to tolerances not exceeding 1/8" in 10'-0" for top of forms and not more than 1/4" in 10'-0" for vertical face.
- B. Cast-in Items: Set in formwork all new sleeves, inserts, anchors, and similar items furnished and required under the work of other sections. Brace, anchor and support cast-in-items to prevent displacements and distortions.
- C. Clean forms after each use and coat with release agent as required.
- D. Space clamps, ties, hangers and other form accessories so that working capacities are not exceeded by loads imposed from concrete or concreting operations.
- E. Build openings into vertical forms at regular intervals if necessary to facilitate concrete placement, and at bottoms of forms to permit cleaning and inspection.
- F. Build in securely braced temporary bulkheads, keyed as required, at approved locations of construction joints.
- G. Slope tie-wires downward to outside of wall.
- H. During and immediately after concrete placing, tighten forms, posts and shores. Readjust to maintain grades, levels and camber.
- I. No metal or wood stakes are allowed in areas to be concreted.

3.02 REINFORCEMENT FABRICATION

- A. Steel reinforcement shall not be bent or straightened in a manner that will injure the material. Bars with kinks or bends not shown on the Drawings shall not be used. Heating of the bars for bending will not be permitted.
 - 1. Spacers and chairs shall be as specified or detailed and spaced such that steel reinforcement will be carried without deflection.
 - 2. Concrete blocks may be used to support bottom layer of steel in floor slabs on grade.

3. Bars shall be in long lengths with laps and splices as shown. Offset laps 5'-0" minimum in adjacent bars. Place steel with clearances and cover as shown. Bar laps shall be as indicated on the drawings. Tie all laps and all intersections with specified wire. Maintain clear space between parallel bars not less than 1-1/2 times nominal diameter for round bars, or twice side dimension for square bars, but in no case shall clear space be less than 1-1/2", nor less than 1-1/2 times maximum size concrete aggregate.
 4. Reinforcing dowels for slabs shall be placed as detailed. Grease one penetration so that pour will not bond to dowel. Sleeves may be used if approved by the Architect before installation. Install dowels through all construction and expansion joints for all slabs on grade.
 5. Install welded wire fabric in lengths as long as possible. Lap adjoining pieces at least one full mesh and lace splices with wire ties. Offset laps of adjoining widths to prevent continuous laps in either direction.
 6. Cut bars true to length with ends square and free of burrs.
- B. Drawing Notes: Refer to notes on Drawings for additional reinforcement requirements.
- C. Welding of reinforcing bar shall be performed only where indicated on plans and in compliance with AWS D1.4. All welding of reinforcement is to be inspected in accordance with CBC Table 1705A.2.1, Item 5(b).

3.03 CONCRETE PLACEMENT

- A. Surrounding Conditions: Before any concrete is placed, the following items of work shall have been completed in the area of placing.
1. Forms shall have been erected, adequately braced, cleaned, sealed, lubricated if required, and bulkheaded where placing is to stop.
 - a. Any wood forms other than plywood shall be thoroughly water soaked before placing any concrete. The wetting of forms shall be started at least 12 hours before concreting.
 2. Reinforcing steel shall have been placed, tied, supported, and, at the time the concrete is placed around it, shall be cleaned of rust, scale, mill scale or other coatings that will destroy or reduce bond.
 3. Embedded work of all trades shall be in place in the forms and adequately tied and braced.
 4. The entire place of deposit shall have been cleaned of dirt, chips, sawdust, rubbish, debris, hardened concrete and other foreign matter before concrete is deposited therein. No wooden ties nor blocking shall be left in concrete except where indicated for attachment of other work.

5. Concrete surfaces to which fresh concrete is to be bonded shall be saw cut and broken away as indicated. Surfaces shall be brush cleaned to remove all dust and foreign matter and to expose the aggregate, and then coated with the bonding adhesive herein specified.
- B. Conveying Concrete from mixer to forms shall be as rapid as possible.
1. Ready-mixed concrete shall be mixed and delivered in accordance with ASTM C94 / C94M-09a. A delivery ticket shall be furnished for each load of ready-mix or transit-mix concrete. A copy of each delivery ticket shall be handed to the job superintendent at the time of delivery and unloading. A record copy of the delivery tickets shall be forwarded to the Architect for his files.
 2. Conveying equipment shall be of a sufficient capacity to ensure a practically continuous flow of concrete to the placing point without separation or loss of materials. Carts and buggies shall be equipped with pneumatic tires. Runway supports shall not bear on reinforcing or fresh concrete. All conveying equipment shall be thoroughly cleaned before beginning and at frequent intervals during the placing of the concrete.
 - a. Chutes, if employed, shall slope not less than 4" or more than 6" per foot of horizontal run.
 3. Exercise care not to spill concrete on forms and reinforcing steel during the conveying operations. Where such spillage or splattering occurs, the surfaces shall be thoroughly cleaned before concrete hardens.
- C. Placing Concrete: Notify the Architect at least 48 hours in advance of beginning of pouring operations. Under no circumstances shall concrete that has partially hardened be deposited on the work. No concrete shall be placed during rainy weather without the Architect's approval.
1. The Project Inspector shall keep a record on the site of the time and date of placing the concrete in each portion of the structure in accordance with CBC Section 1705A.3.6. The record shall be kept until the completion of the structure and a copy provided to the Architect and DSA.
 2. Before starting new pour on or against concrete that has hardened, forms shall be retightened and the hardened concrete roughened and thoroughly cleaned of foreign matter and any laitance by sandblasting. Just ahead of the new pour, slush joints with a 2" layer of grout of the designated concrete mix minus 50 percent of the large aggregate.
 3. Reinforcing steel exposed to the sun shall be cooled by a water spray prior to the placing of concrete.
 4. No adjustment of steel reinforcement will be permitted during the placement of concrete.
 5. Concrete shall be scheduled so that the placing is a continuous operation for the completion of each section between predetermined construction joints. If a planned concreting operation cannot be carried on continuously, the concreting shall stop at temporary bulkheads. Locate where resulting construction joints shall be as shown on the Drawings or

as approved by the Architect. Prior to placing of concrete for any concrete slabs, the moisture content of the subgrade below the slabs shall be adjusted to at least optimum moisture.

6. Deposit the concrete in forms as nearly as practicable in its final position to avoid flowing and maintain until completion of the unit an approximate horizontal plastic surface. Thoroughly compact all concrete during placing operations, thoroughly around reinforcement, embedded fixtures or accessories, and into the corners of forms to eliminate air pockets and honeycombing. Compacting shall be done with mechanical vibrators. Vibrators shall not be used to cause concrete to flow horizontally. Thoroughly compact concrete to the forms to release the air and secure full contact of the concrete with the forms.
7. Hot Weather Concreting: Concrete placing and finishing operations during hot weather shall be done as quickly as possible. Ample personnel shall be available to handle and place the concrete immediately after its mixing or delivery to the site of the work. Concrete shall be placed in layers thin enough and over areas small enough to ensure complete bond and union of adjacent layers, and thus prevent "cold joints".
 - a. At air temperatures of 80 degrees Fahrenheit or above the following precautions should be taken:
 - 1) In no case shall the temperature of the concrete exceed 90 degrees Fahrenheit when placed in the work.
 - 2) If necessary to produce and maintain concrete at an acceptable temperature, chopped or crushed ice shall be added directly into the mixer up to 50 percent by weight of the mixing water used, the weight of the ice being included in batch weight of the mixing water. The ice shall be added at such a rate and in such a manner that it will be completely melted by the time concrete is mixed.
 - 3) Stockpiled aggregates shall be saturated and kept surface moist by continuous fog spray or by intermittent sprinkling.
 - 4) Forms, reinforcement, and subgrade surfaces shall be wet down immediately before concrete is placed in contact therewith. Remove all excess water before placing concrete. Wetting down of areas around the work to cool the surrounding air and increase the humidity is recommended.
8. Cold Weather Requirements: Do not place concrete when ambient temperature is below 40 degrees Fahrenheit and falling.

3.04 CONCRETE FINISHING

- A. All Concrete Work, except as otherwise specified, shall be of a quality that will present a finished appearance upon the stripping of the forms. Only a minimum of patching and finishing should be necessary as required to fill holes left by form ties and to remove any fins or minor irregularities left by the joints in the forms. Except as otherwise specified, all concrete surfaces shall be finished as follows:
- B. Final Tooling: Tool edges of paving, gutters, curbs and joints formed in fresh concrete with a jointing tool to a radius of 1/4". Repeat tooling of edges and joints after applying surface finishes. Eliminate tools marks on all concrete surfaces.

3.05 CONSTRUCTION JOINTS

- A. Control joints shall be saw cut into concrete as soon as concrete slab can be walked on. Do not wait until the following day to saw cut concrete slab control joints.
- B. Construct contraction, construction, and isolation joints true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to the centerline unless otherwise indicated.
- C. Joints at Existing Concrete: All joints between existing concrete and new concrete are to include dowels at a minimum of #4 bars @ 4'-0" on center, 18" maximum from the ends, epoxy set into existing concrete a minimum of 6" in length at the centerline of existing concrete slab.
- D. Contraction Joints (Control Joints): Provide weakened-plane contraction joints, sectioning concrete into areas indicated. Construct contraction joints for a depth equal to at least 1/4 of the concrete thickness. Form in fresh concrete by grooving and finishing each edge of joint with a radiused jointer tool. Joints to be spaced at 10' on center maximum or as shown on the drawings.
- E. Construction Joints: Set construction joints at side and end terminations of concrete placement and at locations where placement operations are stopped for more than 1/2 hour, unless placement ends at isolation joints.
 - 1. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys. Use Burke "Keyed Kold Joint Header Form", or approved equal. Embed keys at least 1 1/2" into concrete.
 - 2. Continue reinforcement across construction joints.
 - 3. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- F. Isolation Joints (Expansion Joints): Form isolation joints of preformed joint filler strips abutting concrete curbs, catch basin, manholes, inlets, structures, walks, other fixed objects, and where indicated.
 - 1. Extend joint fillers full width and depth of joint, not less than 1/2" or more than 1" below finished surface where a joint sealant is indicated. Place top of removable joint filler flush with finished concrete surface.

2. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary, removable performed cap.
3. After concrete has set up, remove cap exposing top edge of fiber joint filler, and apply joint sealant.

3.06 PUMPING OF CONCRETE may be permitted for concrete, providing:

- A. The Contractor engages a testing laboratory to design concrete mixes for pumping. Trial batches shall be made and tested as required hereinbefore for typical concrete.
- B. The quality and proportioning of aggregates for pumping conditions shall be determined in accordance with ACI, Recommended Practice 613. Aggregate proportioning must be tailored to the particular pump intended for use.
- C. When starting a pump operation, actual pumping of concrete shall be preceded by a mortar mix (concrete without coarse aggregate) for the purpose of lubrication.
- D. All mortar and concrete leakage resulting from pumping operations shall be removed from formwork, reinforcing steel and any finished surface.

3.07 CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperature. Comply with the recommendations of ACI 306R for cold weather protection and ACI 305R for hot weather protection during curing.
- B. Evaporation control is to be implemented in hot, dry and windy weather by protecting concrete from rapid moisture loss before and during finishing operations with an evaporation control material. Apply in accordance with manufacturer's instructions after screeding and bull floating, but not before floating.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination.
 1. For moisture-curing, keep surfaces continuously moist for not less than 7 days with water, a continuous water-fog spray, or absorptive cover kept wet continuously wet.
 2. For moisture-retaining-cover, cover concrete with moisture retaining cover with side and end laps sealed.
 3. For curing compound, apply in accordance with manufacturer's instructions. Recoat areas subjected to rainfall within 3-hours after initial application.

- C. Forms shall remain in place for not less than the following periods of time. These periods represent minimum cumulative number of days during which temperature of air in contact with concrete is 60 degrees F and above.
1. Vertical forms of foundations and walls: 5 days.
 2. Slab edge screens or forms: 7 days.
 3. Concrete columns and beam soffits: 28 days.

3.08 CLEANING AND PROTECTION

- A. Clean all surfaces and leave in satisfactory condition to receive final finish surface treatment.
- B. Protect concrete surfaces from damage by tools, equipment, material and workmen. No traffic, shoring or other loading will be permitted until concrete has hardened sufficiently to prevent injury to finish and strength, but at least 14 days.
1. Remove surface stains and spillage of materials as they occur.
 2. Sweep concrete and wash free of stains, discolorations, dirt, and other foreign material prior to final inspection.

3.09 INSPECTION

- A. Approval of reinforcing steel, after installation, must be received from Project Inspector. Architect, Structural Engineer, and DSA must be notified 48 hours in advance of beginning concrete placement operations. Inspection of welding will be done by laboratory.
- B. There will be initial or preliminary inspection of the finished concrete slabs by the Project Inspector and/or Architect for overall finish.
- C. Slabs shall be measured for FF and FL as required by 3.02-C and findings submitted to Architect.
- D. New pours will be reviewed for cracks. If during this inspection, cracked sections are found and determined unacceptable by the District, that section should be removed and replaced.
- E. Final concrete inspection: Prior to occupancy, concrete will be reviewed by Owner and Architect. If any cracks, spalls, exposed finish layer separation, etc. are identified, that section(s) shall be removed and replaced.

END OF SECTION

SECTION 03 54 00

PORTLAND CEMENT-BASED UNDERLAYMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Preparation of floor surface.
- B. Self-leveling portland cement-based underlayment.

1.2 RELATED SECTIONS:

- A. Section 06 10 00 - Rough Carpentry
- B. Work may be required to be coordinated with other sections

1.3 REFERENCES (Current Edition for All Standards Listed)

- A. ACI 302.1R - Guide to Concrete Floor and Slab Construction
- B. ASTM C150 / C150M – Standard Specification for Portland Cement
- C. ASTM C109 / C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
- D. ASTM C191 - Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle
- E. ASTM C348, Flexural Strength of Hydraulic-Cement Mortars
- F. ASTM F2170, Relative Humidity in Concrete Floor Slabs Using in situ Probes
- G. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

1.4 REGULATORY REQUIREMENTS

- A. Comply with applicable air resources requirements in preparing substrate and installing work of this section.

1.5 SUBMITTALS

- A. Submit under provisions of Submittals: Provide submittals per Section 01 33 00, “Submittal Procedures”.
- A. Product Data
 - 1. Submit complete list of proposed materials, including manufacturers recommendations for specific application and equipment.

2. Submit manufacturers written certification of suitability of specified underlayment for the intended use and finish flooring.
3. Submit written certification that underlayment is free of asbestos containing materials, in any form.

1.6 QUALITY ASSURANCE

- A. Installation of the specified product must be completed by a factory-trained substrate prep. certified installer, using mixing equipment and tools approved by the manufacturer.
- B. Provide written certification contractor has installed specified product in similar applications within the past 2 years.
- C. Product must have a hydraulic cement-based inorganic binder content as the primary binder which includes portland cement per ASTM C150 / C150M. Gypsum-based products are not acceptable.
- A. Manufacturer Experience: Provide products of this section by companies which have successfully specialized in production of this type of work for not less than 10 years. Contact Manufacturer Representative prior to installation.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Maintain proper temperature and curing environment as necessary for underlayment to achieve designated strengths within specified time period.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in original packaging, labeled with product identification, manufacturer, batch number and shelf life.
- B. Store products in a dry area with temperature maintained between 50° and 85°F (10° and 29°C) and protect from direct sunlight.
- C. Handle products in accordance with manufacturer's printed recommendations.

1.9 PROJECT CONDITIONS

- A. Do not install material below 50°F (10°C) surface and air temperatures. These temperatures must also be maintained during and for 48 hours after the installation of products included in this section. Install quickly if the substrate is warm and follow warm weather instructions available from the manufacturer.

PART 2 - PRODUCTS

2.1 HYDRAULIC CEMENT SELF LEVELING UNDERLAYMENT

- A. Basis of Design: Characteristics of specific products indicated to establish required level of quality, appearance, and performance.

B. Manufacturer: Ardex Americas

Address: 400 Ardex Park Drive, Aliquippa, PA 15001

Website: <https://www.ardexamericas.com>. Phone: (888) 512-7339

1. Type: Self Leveling, portland cement, fluid applied.
2. Series: ARDEX K-15, Premium Self-Leveling Underlayment.

Product Website Link: <https://www.ardexamericas.com/product/ardex-k-15/>

3. Primer:

- a. Standard Absorbant Concrete Substrate: ARDEX P51 Primer

Product Website Link: <https://www.ardexamericas.com/product/ardex-p-51/>

- b. Note: Extremely Absorbent Concrete: May require two applications of ARDEX P 51™ to minimize the potential for pinholes forming in the ARDEX K 15

- c. Wood and Other Non-Porous Substrates (burnished concrete, terrazzo, well-bonded ceramic, quarry and porcelain tiles, epoxy coating systems and non-water soluble adhesive residue on concrete and concrete treated with silicate compound:

ARDEX P 82 Ultra Prime

Product Website Link: <https://www.ardexamericas.com/product/ardex-p-82/>

- d. Metal Substrate: ARDEX EP 2000 Substrate Preparation Epoxy Prime

Product Website Link: <https://www.ardexamericas.com/product/ardex-ep-2000/>

- e. Metal Substrate: ARDEX EP 2000 Substrate Preparation Epoxy Prime

Product Website Link: <https://www.ardexamericas.com/product/ardex-ep-2000/>

C. Performance and Physical Properties: Meet or exceed the following values for material cured at 73° F +/- 3°F (23° C +/- 3°C) and 50% +/- 5% relative humidity:

1. Application: Barrel Mix or Pump
2. Flow Time: 10 minutes
3. Initial Set: Approximately 30 minutes per ASTM C191.
4. Final Set: Approximately 90 minutes per ASTM C191.
5. Walkable: 2 to 3 hours
6. Compressive Strength: 5,500 psi (385 kg/cm²) at 28 days, ASTM C109 / C109M
7. Flexural Strength: 1,200 psi (84 kg/cm²) at 28 days, ASTM C348

8. VOC: 0

D. Substitutions: Provide per Section 01 25 00, "Substitution Procedures"

E. Accessory Materials:

1. Admixtures: Provide manufacturers recommended admixture suitable for substrate.
2. Crack Repair Material: Provide manufacturers recommended filler suitable for substrate, including use of epoxy fillers.

2.2 WATER: Water shall be clean, potable, and sufficiently cool (not warmer than 70°F).

2.3 OTHER MATERIALS

A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

- A. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence. Do not proceed with installation until unsatisfactory conditions are corrected.
- A. Prior to proceeding please refer to ASTM F710, "Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring". All concrete subfloors must be sound, solid, clean, and free of all oil, grease, dirt, curing compounds and any substance that might act as a bond breaker before priming. Mechanically clean if necessary using shot blasting or other. Acid etching and the use of sweeping compounds and solvents are not acceptable. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
1. Verify surfaces are in suitable condition to begin preparation and installation of underlayment.
 2. Evaluate existing moisture condition of substrate per manufacturers recommended procedures. Verify existing moisture levels are suitable for installation of underlayment. Substrates shall be inspected in accordance with ASTM F2170 and corrected for moisture or any other conditions that could affect the performance of the underlayment or the finished floor covering.
- B. In the event of discrepancy, immediately notify the Architect.
- C. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
- D. Crack and Joint Preparation:

1. Moving Joints and Moving Cracks – honor all expansion, isolation joints and moving cracks up through the underlayment. A flexible sealing compound such as ARDEX ARDISEAL™ Rapid Plus Semi-Rigid Joint Sealant may be installed.
2. Saw Cuts, Dormant Control Joints and Dormant Cracks – fill all dormant control joints and dormant cracks with ARDEX ARDIFIX™ Low Viscosity Rigid Polyurethane Crack & Joint Repair or ARDEX FEATHER FINISH® Self-Drying, Cement-Based Finish Underlayment as recommended by the manufacturer.

E. Wooden subfloors:

1. The wood subfloor either must be solid hardwood flooring; a minimum of ¾" (19 mm) tongue-and-groove, APA-rated Type 1, exterior exposure plywood; or an approved OSB equivalent. The wood subfloor must be constructed according to prevailing building codes and must be solid and securely fixed to provide a rigid base free of undue flex.
2. Any boards exhibiting movement must be refastened to create a sound, solid subfloor. The wood must be clean and free of all foreign matter. If necessary, sand down to bare wood. Vacuum to remove all dust.
3. Do not use solvent, strippers or cleaners.
4. Open joints should be filled with ARDEX FEATHER FINISH®, or approved equal. It is the responsibility of the installation contractor to ensure that the wood subfloor is thoroughly clean and properly anchored prior to the installation of any self-leveling material.

F. Metal subfloors:

1. Metal subfloors must be rigid, well supported, properly anchored and free of undue flex and vibration. They must also be clean and free of all rust, corrosion and foreign matter.
2. Non-lead metal substrates must be mechanically cleaned and profiled to create a bonding surface. Please note that care must be taken when mechanically preparing thin metal foils so that the metal foil is not compromised.
3. Use an #80 or #100 grit sanding screen to mechanically profile the metal surface. A hand or floor sander may be used. After sanding, thoroughly deep vacuum to remove all loose material, and then wipe the metal using a clean, white cloth dampened with 91% isopropyl alcohol.
4. Repeat wiping using a new cloth on each pass until the degree of discoloration on the cloth remains consistent on subsequent passes (typically, approx. 5 – 7 passes).
5. Lightly shot blasting also is suitable. From this point until the metal has been primed, disposable shoe covers should be worn by anyone traversing the surface of the prepared metal.
6. Allow 15 – 20 minutes for residual alcohol to evaporate before proceeding. Contact the Technical Service Department for guidelines on preparing lead substrates.

- G. Adhesive residues on concrete must first be tested to make certain they are not water-soluble. Water-soluble adhesives must be completely mechanically removed down to clean concrete. Non-water-soluble adhesives should be prepared to a thin, well-bonded residue using the wet-scraping technique as recommended by the Resilient Floor Covering Institute (www.rfci.com). The prepared residue should appear as nothing more than a transparent stain on the concrete after scraping.
- H. Non-porous subfloors such as ceramic, porcelain and quarry tile, burnished concrete, epoxy coating systems as well as terrazzo should be clean and free of all waxes, sealers, dust, dirt, debris and any other contaminant that may act as a bond breaker. If necessary, clean by mechanical methods such as shot blasting.

3.2 PROTECTION

- A. Erect and maintain temporary partitions to prevent spread of dust, odors and noise to adjacent occupied spaces.
- B. Protect existing materials and surfaces.

3.3 INSTALLATION

- B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.
- C. Priming: For Basis of Design, or equal: When using ARDEX P 51, It is critical to ensure that the ARDEX P 51 is dry prior to proceeding with the next installation step. To determine if the ARDEX P 51 is dry after a minimum of 30 minutes (max. 24 hours), pour water onto the surface of the primer in several areas and rub it with your finger. If the water remains clear, the primer is dry. If the water turns cloudy or milky, additional drying time is needed.
 1. Primer for standard absorbent concrete subfloors: Dilute manuf. recommended product 1:1 with water and apply evenly with a soft push broom. Do not leave any bare spots. Remove all puddles and excess primer. Allow to dry to a clear, thin film (min. 30 minutes, max. 24 hours). Underlayment shall not be applied until the primer is dry.
 2. Primer for extremely absorbent concrete subfloors: Make an initial application of manuf. recommended product mixed with 3 parts water using a soft push broom. Do not leave any bare spots. Remove all puddles and excess primer. Allow to dry thoroughly (1 to 3 hours) before proceeding with the standard application of primer as described above for standard absorbent concrete.
 3. Primer for non-porous subfloors such as burnished concrete, terrazzo, well-bonded ceramic, porcelain and quarry tile, epoxy coating systems, wooden subfloors and non-water soluble adhesive residues over concrete: Prime with manuf. recommended product. Follow the mixing instructions on the container and apply with a short-nap or sponge paint roller, leaving a thin coat of primer no heavier than a coat of paint. Do not leave any bare spots. Remove all puddles and excess primer. Allow to dry to a clear, slightly tacky film (minimum 3 hours, maximum 24 hours). Underlayment shall not be installed until primer is dry. Note: If a suitable acrylic curing compound has been used on the concrete, test the surface for porosity.
 4. For wood substrates, once the manuf. recommended primer is applied, install 3.4 galvanized, expanded diamond metal lath mesh, stapling approximately every 6 inches (15.2 cm). Do not walk on wet primer.

5. Primer for metal substrates: Prime the prepared subfloor with manuf. recommended product and immediately broadcast fine sand to refusal into the fresh epoxy. After a 16-hour cure remove all excess sand. Remove all excess sand prior to proceeding:
 - a. Do not sweep. Using a rubber squeegee, consolidate excess sand into piles.
 - b. Shovel the piles of sand into barrels.
 - c. Vacuum remaining sand using a heavy-duty, bucket-style (Shop-Vac®-style) vacuum and HEPA dust extraction vacuum system.
- D. Mixing: Comply with manufacturer's printed instructions.
- E. Application – Basis of Design, or equal: Comply with manufacturer's printed instructions and the following:
 1. Installations over metal and other non-porous substrates should be limited to a thickness of ½” (12.7 mm) unless otherwise approved by the ARDEX Technical Services Department. For all other substrates, ARDEX K 15® must be installed at a minimum thickness of 1/8” (3 mm) over the highest point in the floor, which typically results in an average thickness of ¼” (6 mm) or more over the entire floor. ARDEX K 15® can be installed up to 1 ½” (4 cm) over large areas neat, and up to 5” (12.7 cm) with the addition of proper aggregate. ARDEX K 15® can also be featheredged to match existing elevations. If a true featheredge is needed, ARDEX recommends using ARDEX FEATHER FINISH® for transitions.
 2. Pour or pump the liquid ARDEX K 15® and spread into place with the ARDEX T-4 Spreader. Immediately use the ARDEX T-5 Smoother to smooth the surface. Wear nonmetallic cleats to avoid leaving marks in the liquid ARDEX K 15®.
 3. Wood subfloors require the use of the mesh-reinforced ARDEX K 15® + E 25™ Resilient Emulsion Underlayment System. After priming, install 3.4 galvanized diamond metal lath by stapling to the wooden subfloor approximately every 6 inches to center.
 4. Metal subfloors require the use of ARDEX K 15® + E 25™ Resilient Emulsion Underlayment System.
- F. Curing: Comply with manufacturer's printed instructions.

3.4 TOLERANCES

- A. Install surface in compliance with the following tolerances:
 1. Flat: 1/8 inch in 10 feet.

3.5 FIELD QUALITY CONTROL

- A. Where specified, field sampling of the underlayment is to be done by taking an entire unopened bag of the product being installed to an independent testing facility to perform compressive strength testing in accordance with ASTM C109 / C109M: air-cure only. There are no in situ test procedures for the evaluation of compressive strength.

3.6 PROTECTION

- A. Protect as necessary until surface is ready to receive floor finish.

END OF SECTION

SECTION 04 05 13
MASONRY MORTAR AND GROUTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Mortar and grout for masonry.

1.2 RELATED WORK

- A. Section 01 45 29 - Testing Laboratory Services.
- B. Section 04 22 00 - Reinforced Unit Masonry System.

1.3 REFERENCES

- A. California Building Code (CBC) 2022 edition, as adopted by Authority Having Jurisdiction (AHJ).
- B. ASTM C99 - Ready-Mixed Concrete
- C. ASTM C144 - Aggregate for Masonry Mortar.
- D. ASTM C150 - Portland Cement.
- E. ASTM C207 - Hydrated Lime for Masonry Purposes.
- F. ASTM C270 - Mortar for Unit Masonry.
- G. ASTM C404 - Aggregates for Masonry Grout.
- H. ASTM C476 - Grout for Masonry.
- I. ASTM C1019 - Sampling and Testing Grout.
- J. ASTM C1586 - Standard Guide for Quality Assurance of Mortars.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01 60 00.
- B. Store and protect products under provisions of Section 01 60 00.
- C. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Provide data on admixtures, including product characteristics, compatibility and limitations.
- C. *Provide and pay for grout mix designs, prepared by the Testing Laboratory under provisions of Section 01 45 29.*
- D. Mix designs: Include the following information in grout and mix design data:
 - 1. Design
 - a. Project name, address, site location, and location of mix design usage.
 - b. Contractor, Sub-Contractor, Supplier and Plant Location.
 - c. Mix Number.
 - d. Specified compressive strength, maximum aggregate size, slump, and placement method.
 - e. Application and location in structure.
 - f. Signature and stamp of licensed civil engineer responsible for mix design.
 - 2. Materials
 - a. Design Method.
 - b. Slump.
 - c. Cement: Type, amount, and compliance with specified criteria statement.
 - d. Aggregates: Source(s), gradations (individual and combined).
 - e. Admixtures: Brand, classification, dosage, addition method.
 - f. Water source.
 - g. Test Results, Batch Quantities, Yield (calculations).
 - 3. All other considerations relative to placement, curing, finishing and testing.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperatures to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Mortar Aggregate: ASTM C144 and Section 2103A.8, Part 2, Title 24, CCR with not less than 3 percent passing #100 sieve.
- B. Grout Aggregate: ASTM C404 and Section 2103A.12, Part 2, Title 24, CCR.
 - 1. Coarse Aggregate: 100 percent passing 3/8 inch sieve and not more than 5 percent passing #8 sieve.
 - 2. Fine Aggregate: Washed, natural sand; not more than 2 percent by weight deleterious substances; 5 percent minimum passing # 100 sieve.
- C. Portland Cement: ASTM C150 and Section 1903A, Chapter 19A, Part 2, Title 24, CCR, Type I or II, free alkali content 0.06 percent maximum, gray color. Use Type II where soil contact will occur.
- D. Hydrated Lime: ASTM C207, Type S.
- E. Water: Clean and potable.
- F. Admixtures:
 - 1. Grout Admixtures: Sika, Grout Aid .
 - 2. Mortar: No admixtures permitted, *except colorant*.

2.2 MORTAR MIXES

- A. Mortar for Reinforced Masonry: ASTM C270, Section 2103A.8, Chapter 21A, Part 2, Title 24, CCR.
 - 1. Provide Type S or M as indicated on Structural Drawings, minimum compressive strength as indicated on the drawings.
- B. Proportions - Type S:
 - 1. 1 Part Portland Cement.
 - 2. Not less than 1/4 part nor more than 1/2 part lime.
 - 3. Mortar Aggregate: Not less than 2-1/4 and not more than 3 times the sum of the separate volumes of cementitious materials.
- C. Proportions - Type M:
 - 1. 1 Part Portland Cement.
 - 2. 1/4 part lime.
 - 3. Mortar Aggregate: Not less than 2-1/4 and not more than 3 times the sum of the separate volumes of cementitious materials.

2.3 MORTAR MIXING

- A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270 and Section 2103A.8, Part 2, Title 24, CCR and the following
 - 1. Use mixer with capacity for batches using full sack volumes of cement.
 - 2. Charge the mixer in the following sequence:
 - a. 1/2 quantity of sand, water, and admixture and colorant.
 - b. Full quantity of cement; Partial sack batches are prohibited.
 - c. 1/2 quantity of sand, water, and admixture and colorant.
 - d. Full quantity of lime.
 - e. Additional water as required for workable mix.
- B. If water is lost by evaporation, retemper only within one hour of mixing or prior to cement reaching initial set, which ever occurs first.

2.4 GROUT MIXES

- A. Engineered Masonry: Comply with ASTM C476 and Section 2103A.12, Part 2, Title 24, CCR.
 - 1. Type: Coarse grout for concrete masonry units.
 - 2. Slump: 8-11 inches slump at all grouting applications.
 - 3. Strength: Minimum compressive strength as indicated on the Drawings.
- B. Coarse grout proportions (based on loose volume):
 - 1. 1 Part Portland Cement.
 - 2. Fine Aggregate: 2-1/4 to 3 times the sum of the volumes of the cementitious materials.
 - 3. Coarse Aggregate: 1 to 2 times the sum of the volumes of the cementitious materials.
 - 4. 0 to 1/10 part hydrated lime or lime putty.
 - 5. Grout admixture: Proportion per manufacturer's instructions and as shown on structural drawings.

2.5 GROUT MIXING

- A. Mix grout concrete in accordance with ASTM C94, Section 2103A.12, Chapter 21A, Part 2, Title 24, CCR.
- B. Add admixtures in accordance with manufacturer's instructions. Provide uniformity of mix.

- C. Do not use anti-freeze compounds to lower the freezing point of grout.

2.6 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

2.7 SOURCE QUALITY CONTROL

- A. Provide for testing under the provisions of Section 01 45 29.
- B. Cement: Section 1916A.1, Part 2, Title 24, CCR.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection
 - 1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
 - 2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
 - 3. In the event of discrepancy, immediately notify the Architect.
 - 4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 INSTALLATION

- A. Install mortar and grout to requirements of the specific masonry Sections.

3.3 FIELD QUALITY CONTROL

- A. Test mortar and grout in accordance with Section 01 45 29, including Section 2105A.5, Chapter 21A, Part 2, Title 24, CCR *UBC Section 2105*.
- B. Testing of Mortar Mixes:
 - 1. Mortar Test: For each type of mortar, provide mortar tests per ASTM C 1586 .
 - 2. For the first three days of masonry work, prepare three test specimens for each masonry crew.
 - 3. Following the first three days of grouting, prepare one masonry sample per week for each masonry crew. Prepare additional specimens when changes in job conditions or materials occur.
- C. Testing of Grout Mixes:

1. Grout Test: For each grout strength, provide grout sample field tests per ASTM C 1019.
2. For the first three days of grouting, prepare three test specimens for each masonry crew.
3. Following the first three days of grouting, prepare one masonry sample per week for each masonry crew. Prepare additional specimens when changes in job conditions or materials occur.

END OF SECTION

SECTION 04 21 13
BRICK VENEER MASONRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Clay solid brick veneer units.
- B. Reinforcement, anchorage, and accessories.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Section 05 50 00 - Metal Fabrications: Placement of fabricated metal items built into masonry.

1.3 REFERENCES

- A. ASTM C 216 - Standard Specification for Facing Brick.

1.4 QUALIFICATIONS

- A. Installer: Company specializing in performing the work of this Section with minimum 5 years documented experience.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Samples: Submit 6 samples indicating surface texture and color of brick.
- C. Certification: Submit certification from manufacturer confirming compliance with criteria established by referenced standard and this section.
- D. Shop Drawings: Accompanying samples, provide shop drawings of all veneer work showing proposed attachment method, materials used, and relationship of veneer to adjacent materials.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01 60 00.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate work under provisions of Section 01 31 13.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.2 BRICK VENEER MASONRY UNITS:

- A. Type: Solid Brick Units per ASTM C 216 and CBC *UBC* Section 2103.2.
- B. Grade: Grade MW.
- C. Weight Classification:
 - 1. All units: Light Weight (105 maximum pcf).
- D. Size, Color, and Finish
 - 1. Veneer: Match existing brick veneer
 - 2. Provide closed end units at all outside corners and ends.
- E. Fire Rating
 - 1. Where masonry units are components in fire rated assemblies, provide written certification of compliance with UL material listing requirements or other approved material certification methods.

2.4 ACCESSORIES, REINFORCEMENT AND ANCHORAGE

- A. Bar Reinforcing: Per ASTM A 615, Section 2103, CBC and Specification Section 03300.
- C. Veneer Anchorage - Wood Framing:
 - 1. Manufacturer: Burke Concrete Accessories, Inc. or approved equal.
 - 2. Series: Burke Fleming Anchor System.
 - 3. Slot Channel: 22 gauge, formed galvanized steel.
 - 4. Anchors: Veneer ties, formed 14 gauge steel, galvanized, with hook for engaging reinforcing wire.
- D. Veneer Reinforcing Wire Reinforcing: Hot dipped galvanized, 9 gage.
- E. Underlayment: K-Lath or equal, Aqua-K-Lath, standard, double Grade D underlayment complying with FS-UU-B-790, Type 1 and CBC Section 1404.2. Provide double wire furring line system.
- F. Mortar and Grout: Per Section 04 05 13.

2.5 SOURCE QUALITY CONTROL AND TESTING

- A. Provide for testing under the provisions of Section 01 45 00.
- B. Masonry Units: Section 2105.3, CBC; *Part 2, Title 24, CCR*.

2.6 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection

1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
3. Verify that built-in items are in proper location, and ready for roughing into masonry work.
4. In the event of discrepancy, immediately notify the Architect.
5. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied to other Sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Lay concrete masonry units to match existing.
- D. Joint Tooling:
 1. Tool exterior wall joints concave.
 2. Tool joints tight and flush at locations where waterproofing or tile finish occurs.
- E. Surface preparation for waterproofing membranes:
 1. Provide smooth mortar parge coat at all below grade block surfaces receiving waterproofing systems, free of ridges, gaps, holes or other surface imperfections.

3.4 VENEER REINFORCEMENT AND ANCHORAGE

A. Masonry Veneer on Wood Framing

1. Comply with requirements of CBC Section 1403, *Chapter 14, part 2, Title 24, CCR*.
2. Install underlayment over sheathing, fastened using corrosion resistant fasteners. Lap all joints 4 inches. Stretch tight and tack in place.

3. Install anchor slots vertically at 16 inches on center. Attach to studs with galvanized 10d nails at 12 inches on center. Attach to studs with galvanized #10 x 2 inch wood screws at 16 inches on center.
4. Place anchors in slots at maximum 16 inches on center and located to fall within horizontal veneer joint. Space anchor so that each anchor supports a maximum of two square feet of wall veneer area. .
5. Fasten with galvanized 16d box nail driven in tight behind each anchor.
6. Run continuous 9 gauge galvanized steel wire through anchor hook lip horizontally. Engage anchor and place in middle third of mortar joint. Where laps occur, lap wire minimum 6 inches, centered between anchors.
7. Ensure that isolators are properly placed to separate dissimilar metals.
8. Veneer Grouting: Construct with 1 inch grout space.

B. Masonry Veneer On Concrete

1. Install dovetail anchor slots vertically at 16 inches on center with approved fastener at 12 inches on center.
2. Place anchors in slots at maximum 16 inches on center and located to fall within horizontal veneer joint. Space anchor so that each anchor supports a maximum of two square feet of wall veneer area.
3. Fasten anchor as recommended by manufacturer.
4. Run continuous 9 gauge galvanized steel wire through anchor hook lip horizontally. Engage anchor and place in middle third of mortar joint. Where laps occur, lap wire minimum 6 inches, centered between anchors.
5. Ensure that isolators are properly placed to separate dissimilar metals.
6. Veneer Grouting: Construct with 1 inch grout space.

C. Masonry Veneer On Steel Stud Framing.

1. *Install dovetail anchor slots vertically at 16 inches on center with approved fasteners.*
2. *Place anchors in slots at maximum 16 inches on center and located to fall within horizontal veneer joint. Space anchor so that each anchor supports a maximum of two square feet of wall veneer area. .*
3. *Fasten anchor as recommended by manufacturer.*
4. *Run continuous 9 gauge galvanized steel wire through SeismiClip Interlock channel horizontally. Engage anchor and place in middle third of mortar joint. Where laps occur, lap wire minimum 6 inches, centered between anchors.*
5. *Ensure that isolators are properly placed to separate dissimilar metals.*
6. *Veneer Grouting: Construct with 1 inch grout space.*

3.5 PLACING AND BONDING

- A. Lay masonry in accordance with Section 2104A California Building Code; *Part 2, Title 24, CCR*.
- B. Perform jobsite cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- C. Lay concrete brick masonry units with full head and bed joints.
- D. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
- E. Interlock intersections and external corners.
- F. Remove excess mortar as Work progresses.
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Permit mortar to cure 3 days before placing grout.

3.6 GROUTING

- A. Wet masonry unit surfaces in contact with grout just prior to grout placement.
- B. Provide fine grout.
- C. Grout hollow unit masonry using low lift grouting techniques.
- D. When grouting is stopped for more than one hour, terminate grout 1/2 inch below top of upper masonry unit to form a positive key for subsequent grout placement.
- E. Low Lift Grouting
 - 1. Install masonry units to a maximum height of 24 inches.
 - 2. Remove all overhanging mortar and mortar droppings.
 - 3. Place first lift of grout and rod for grout consolidation. Place subsequent lifts in not more than 24 inch increments and rod for grout consolidation.
 - 4. At concrete brick veneer, conform to requirements of CBC Section 2104A; *Part 2, Title 24, CCR*.
- F. High Lift Grouting is not permitted.

3.7 BUILT - IN WORK

- A. As work progresses, build in anchor bolts, plates, and other items furnished by other Sections.
- B. Build in items plumb and level.
- C. Do NOT build in pipes or ducts unless specifically detailed.
- D. Do NOT build in organic materials subject to deterioration.

3.8 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (measured at precision face only).
- B. Maximum Variation From Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more (measured at precision face only).
- C. Maximum Variation From Plumb: 1/4 inch per story non-cumulative (measured at precision face only).
- D. Maximum Variation From Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet (measured at precision face only).
- E. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.9 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, grounds, and other penetrations. Coordinate with other Sections of work to provide correct size, shape, and location.
- B. Obtain Architect approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.10 CLEANING

- A. Clean work under provisions of Section 01 77 19.
- B. Remove excess mortar and mortar smears.
- C. Replace defective mortar. Match adjacent work.
- D. Use non-metallic tools in cleaning operations.
- E. Do not use acid cleaning agents.

3.11 PROTECTION OF FINISHED WORK

- A. Protect finish installation under provisions of Section 01 50 00.
- B. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

3.12 FIELD QUALITY ASSURANCE

- A. Perform testing and inspection under the provisions of Section 01 45 00.
- B. Masonry Inspection: Provide inspection and testing per CBC Section 2105.
- C. Special Inspection: Provide continuous special inspection of veneer installation in accordance with California Building Code.

END OF SECTION

SECTION 05 05 23

ADHESIVE AND MECHANICAL FASTENERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Adhesive anchors
- B. Adhesive dowels
- C. Mechanical anchors

1.02 RELATED SECTIONS

- A. Section 05 12 00 - Structural Steel Framing
- B. Section 03 20 00 - Concrete Reinforcement - Concrete Reinforcement

1.03 REFERENCES

- A. ASTM F436 - Standard Specification for Hardened Steel Washers 2011.
- B. ASTM F844 - Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use 2019.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- D. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel 2021, with Editorial Revision.
- E. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts 2021a.
- F. ASTM F844 ANSI B18.22.1 - American National Standard for Plain Washers; 1981.

1.04 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit for each type of adhesive and mechanical anchor. Include current ICC-ESR report.

1.05 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver threaded rods and dowels to project site in bundles, tagged and marked.
- B. Store threaded rods and dowels under cover and elevated above grade to prevent damage and accumulation of dirt and rust.
- C. Store adhesive system and mechanical fasteners in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Provide stainless steel fasteners for exterior use and wet locations or when installed into exterior walls.
- B. All Thread Rods: ASTM A572/A572M GR. 50, unless otherwise noted.

- C. Steel Nuts: ASTM A563 Grade A, unless otherwise noted.
- D. Heavy Hex Nuts: ASTM A563, Grade DH.
- E. Plain Unhardened washers: ASTM F844.
- F. Hardened Washers: ASTM F436.
- G. Dowels: ASTM A615/A615M, Grade 60, unless otherwise noted.

2.02 ADHESIVES

A. Adhesives:

- 1. For use in Concrete:
 - a. Manufacturers:
 - 1) Hilti: HIT RE 500-V3; ICC-ESR-3814; www.us.hilti.com.
 - 2) Hilti: HIT-HY 200; ICC-ESR-3187; www.us.hilti.com.
 - 3) Simpson Strong-Tie: SET-3G; ICC-ESR-4057; www.strongtie.com.
 - 4) Dewalt: Pure 110+; ICC-ESR-3298; www.dewalt.com.

2.03 MECHANICAL ANCHORS

A. Expansion/Wedge Anchors:

- 1. Concrete Anchorage:
 - a. Manufacturers:
 - 1) Hilti: KB-TZ2; ICC-ESR-4266; www.us.hilti.com.
 - 2) Hilti: KB1; IAPMO-ER-678; www.us.hilti.com.
 - 3) Simpson Strong-Tie Co.: Strong-Bolt 2; ICC-ESR-3037; www.strongtie.com.
 - 4) Dewalt: Power-Stud+SD2; ICC-ESR-2502; www.dewalt.com.

B. Screw Anchors:

- 1. Manufacturers:
 - a. Hilti: HUS-EZ; ICC-ESR-3027; www.us.hilti.com.
 - b. Simpson Strong-Tie: Titen-HD; ICC-ESR-2713; www.strongtie.com.
 - c. Dewalt: Screw-Bolt+; ICC-ESR-3889; www.dewalt.com.

C. Powder Actuated Fasteners:

- 1. Manufacturers:
 - a. Hilti; ICC-ESR-2269; www.us.hilti.com
 - 1) Concrete base material: X-P
 - 2) Steel base material: X-U

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install anchors in accordance with the latest ICC-ESR report and the manufacturer instructions.
- B. Locate reinforcement and confirm final anchor locations prior to fabricating plates, members or other steel assemblies attached with post-installed anchors.
- C. If reinforcing steel is encountered during drilling, abandon and shift the hole location to avoid reinforcement. Provide a minimum of 2 diameters or 1 inch, whichever is larger, of sound concrete between the anchor or dowel and abandoned hole. Do not cut reinforcing.

1. If the anchor cannot be shifted, notify the Architect.
- D. Install anchors to the embedment depth noted on the drawings. Embedment depths noted are the effective embedment per manufacturer.

3.02 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Division 1.
- B. Testing of anchors and dowels is to occur no sooner than 24 hours after installation.
- C. Replace anchors that fail during testing and retest. If more than 10% of the tested anchors fail to achieve specified test load, test 100% of anchors.
 1. Additional testing due to test failures to be paid for by Contractor.
- D. Adhesive anchors and dowels:
 1. Provide periodic special inspection in accordance with Section 1705A.3 of the California Building Code and the ICC-ESR report.
 2. Verify adhesive system, expiration date, anchor diameter and anchor grade.
 3. Verify hole diameter and location. Observe cleanliness of hole and anchor, adhesive application and anchor embedment.
 4. Tension test anchors and dowels to load and frequency as specified on the drawings.
- E. Mechanical Anchors:
 1. Wedge Anchors, Sleeve Anchors, Undercut Anchors, and Screw Anchors:
 - a. Provide periodic special inspection in accordance with Section 1705A.3 of the California Building Code and the ICC-ESR report.
 - b. Verify anchor diameter and anchor grade.
 - c. Verify hole diameter and location. Observe cleanliness of hole and anchor, and anchor embedment.
 - d. Test anchors to the manufacturer's recommended installation torque or recommended torque in the ICC-ESR report at the frequency specified on the drawings.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Structural steel framing members.
- B. Base plates, shear stud connectors and fasteners.
- C. Grouting under base plates.

1.02 RELATED REQUIREMENTS

- A. Section 05 05 23 - ADHESIVE AND MECHANICAL FASTENERS

1.03 REFERENCE STANDARDS

- A. AISC 341 - Seismic Provisions for Structural Steel Buildings 2016 (Revised 2020).
- B. AISC (MAN) - Steel Construction Manual 2017.
- C. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges 2022.
- D. AISC 360 - Specification for Structural Steel Buildings 2016.
- E. ANSI B18.22.1 - Plain Washers; American National Standards Institute; 1965.
- F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2022.
- H. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished 2018.
- I. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- J. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- K. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications 2023.
- L. ASTM A194/A194M - Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both 2022a.
- M. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.
- N. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- O. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.
- P. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric) 2021a.
- Q. Vanadium Structural Steel 2021, with Editorial Revision.
- R. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings 2020.

- S. ASTM A992/A992M - Standard Specification for Structural Steel Shapes 2022.
- T. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions 2019.
- U. ASTM F844 - Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use 2019.
- V. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength 2020.
- W. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2022.
- X. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.
- Y. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
- Z. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- AA. AWS D1.8/D1.8M - Structural Welding Code - Seismic Supplement 2016.
- BB. BCCA - Buy Clean California Act, Public Contract Code Sections 3500-3505 2021.
- CC. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections 2020.
- DD. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate grade of steel, profiles, sizes, spacing, lengths and locations of structural members, openings, shop surface treatments, attachments, fasteners, welds, dimensional information, items to be galvanized, and AESS items.
 - 2. Indicate cuts, connections, holes and cambers.
 - 3. Indicate welded connections with AWS A2.4 welding symbols. Indicate size, type and net weld lengths.
 - a. Identify shop and field welds.
 - b. Identify Demand Critical (DCW) welds requiring specialty filler metal.
 - 4. Include complete details, schedules, procedures, and diagrams for fabrication and assembly.
 - 5. Do not reproduce construction documents.
- C. Manufacturer's Product Data: Provide for welding electrodes and filler metals, bolts, nuts, washers, direct tension indicators, turnbuckles, clevises, couplers, and blind bolts.
 - 1. Identify locations of use for welding electrodes.
 - 2. Provide data indicating capacity of turnbuckles, clevises, and couplers.
 - 3. Provide current ICC-ESR report for blind bolts indicating design capacities and acceptance for use under static and seismic loads.

- D. Manufacturer's Certificate of Conformance: Certify that fasteners, welding electrodes, shear stud connectors, grout, and primer meet or exceed specified requirements. Submit for independent testing agency review.
- E. Mill Test Reports: Indicate structural strength, and other properties required by the ASTM specification, including destructive test analysis and non-destructive test analysis. Submit for independent testing agency review.
 - 1. Provide for all structural steel, bolts and fasteners, and shear stud connectors.
- F. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work. Submit for independent testing agency review.
- G. Welding Procedure Specification (WPS) and, as required, WPS Qualification Records: Submit to Architect and to independent testing agency for review. Submit only for welds applicable to project.
- H. AISC Certification Statement: Provide documentation showing steel fabricator and erector are AISC Certified.
- I. Environmental Product Declaration (EPD)
 - 1. Submit for all hot-rolled steel sections, hollow structural sections and structural steel plate used in the Project.
 - 2. EPD to be a mill specific Type III EPD conforming to ISO 14025, 14040 and 14044 and having at least cradle to grave scope without fabrication. EPD to be developed according to the guidelines of the UL Environment Product Category Rule (PCR) for Designated Steel Construction Products

1.05 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC "Steel Construction Manual", AISC "Code of Standard Practice for Steel Buildings and Bridges" and AISC 341 "Seismic Provisions for Structural Steel Buildings".
- B. Maintain one copy of each document on site.
- C. Fabricator: Company specializing in performing the work of this section with minimum 5 years of documented experience who participates in the AISC Certification program and is designated and is designated an AISC Certified Plant, Category BU at time of bid.
- D. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.8/D1.8M to perform type of welds required.
- E. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience who participates in the AISC Certification program and is designated an AISC Certified Erector, Category ACSE.
- F. Welders: Qualified in accordance with AWS D1.1/D1.1M and AWS D1.8/D1.8M to perform type of welds required.
- G. Fabricator and erector to comply with Quality Control (QC) requirements of Chapter N of AISC 360, Chapter J of AISC 341, and as modified by Chapter 17A of the CBC.
- H. An independent testing agency, as specified in Division 1, is to provide Quality Assurance (QA) tasks per Chapter N of AISC 360, Chapter J of AISC 341, and as modified by Chapter 17A of the CBC.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.
- B. Store materials to permit easy access for inspection and identification.
- C. Store materials supported off the ground.
- D. Protect materials from rust corrosion, keep free of dirt, grease and other foreign matter.

PART 2 - PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Conform to UL (FRD) Assembly Design as designated in 07 81 00 - Applied Fire Protection for restrained ratings with no load restrictions.

2.02 MATERIALS

- A. Global Warming Potential (GWP): per BCCA.
 - 1. Hot-rolled Structural Steel Sections: 1.01 metric tons CO₂ equivalent per metric ton of steel.
 - 2. Hollow Structural Sections: 1.71 metric tons CO₂ equivalent per metric ton of steel.
 - 3. Steel Plate: 1.49 metric tons CO₂ equivalent per metric ton of steel.
- B. Steel Angles and Channels: ASTM A36/A36M.
- C. Steel W Shapes and Tees: ASTM A992/A992M.
 - 1. Heavy Sections, with flanges 1 1/2 inches thick and thicker. Provide with charpy v-notch values in accordance with AISC 360, Section A3.1c and AISC 341, Chapter A3.3.
- D. Steel Plates: ASTM A36/A36M or ASTM A572/A572M, Grade 50 (345) as indicated on the drawings.
 - 1. Plates 2 inches thick and thicker: Provide with charpy v-notch values in accordance with AISC 360 Section A3.1d and AISC 341, Chapter A3.3.
- E. Cold-Formed Structural Tubing (HSS): ASTM A500/A500M, Grade B.
- F. Pipe: ASTM A53/A53M, Grade B, Finish black.
- G. Stainless Steel Shapes, Plates and Bars: ASTM A276/A276M, Type 304L.
- H. Shear Stud Connectors: Made from ASTM A108 Grade 1010 through 1020 bars and in accordance with AWS D1.1/D1.1M.
- I. Threaded Stud Connectors: Made from ASTM A 108 Grade 1015 bars and in accordance with AWS D1.1/D1.1M.
- J. Machine Bolts and Nuts: Carbon steel, ASTM A307, Grade A, with ASTM A563/A563M nuts.
- K. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, Grade A325 with matching compatible ASTM A563/A563M nuts and ASTM F436/F436M washers.
- L. Tension Control Bolts: Twist-off type; ASTM F3125/F3125M, Type 1, Grade F1852. Permitted in lieu of bolts at pretensioned, non-galvanized locations, unless otherwise noted on drawings.
- M. Coupler: Capacity to meet or exceed ultimate tension capacity of threaded rod being coupled.
- N. Stainless Steel Bolts: ASTM A193/A193M, B8M Class 1.
- O. Anchor Rods / Anchor Bolts: ASTM F1554, Grade 55 with weldable supplement S1, plain, with matching ASTM A563/A563M nuts and ASTM F436 Type 1 washers.

- P. All-Thread and Partially Threaded Rod: ASTM A 572/A 572M, Grade 50.
- Q. High-Strength All-Thread and Partially Threaded Rod: ASTM A193/A193M, B7 GR105.
- R. Stainless Steel All-Thread and Partially Threaded Rod: ASTM A193/A193M, B8M Class 2.
- S. Unhardened Flat Washers: ASTM F844 and ANSI B 18.22.1.
- T. Beveled Washers: ASTM F436.
- U. Stainless Steel Washers: ASTM A276/A276M, Type 304.
- V. Stainless Steel Nuts: ASTM A194/A194M, GR8M.
- W. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
 - 1. Electrodes to be low hydrogen types E7XTX, E7XTXX or E70XXX as applicable.
 - 2. At the following locations, electrodes to meet the requirements of AWS D1.8/D1.8M, Clause 6.3.1 through 6.3.8, with Charpy V-Notch (CVN) test values of a minimum 20 foot-pounds at 0 degrees fahrenheit and 40 foot-pounds at 70 degrees fahrenheit. Where service temperatures are expected to be below 50 degrees fahrenheit Where service temperatures are expected to be below 50 degrees fahrenheit, including unconditioned penthouses, unconditioned spaces and exterior framing, electrodes to meet the CVN properties per Clause 6.3.6. .
 - a. Welds of the Seismic Force Resisting System (SFRS) and Demand Critical (DCW) welds as indicated on drawings and occurring at:
 - 1) Complete penetration welds
 - 2) Beam to column moment connections: Including flange, web, doubler plates, base plates, and continuity plate fillet and partial joint penetration welds.
 - 3) Brace connections: Including brace, gusset, base plates, beam stiffener plates, and continuity plate fillet and partial joint penetration welds.
 - 4) Collectors: Including shear tab, flange, and web welds.
- X. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch (13.7 MPa).
 - 2. Minimum Compressive Strength at 28 Days: 8,000 pounds per square inch (55 MPa).
- Y. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction. Primer to be compatible with finish materials.
- Z. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction. Primer to be compatible with finish materials.

2.03 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Provide camber for beams and girders as indicated on the drawings.
 - 1. Provide natural camber up, unless otherwise noted, except at cantilevers. At cantilevers provide camber such that tip of cantilever is above final elevation.
- C. Where weld size not noted in symbol, provide weld size (E) minimum per AWS prequalified welded joints.
- D. At exterior painted assemblies provide seal welding of edges of all overlapping or contacting surfaces of parts.

- E. At galvanized assemblies:
 - 1. Provide seal welding of edges of all overlapping or contacting surfaces of parts.
 - 2. Provide vent holes as required. Submit locations for review and approval.
 - 3. Do not field weld any galvanized member. All welding to be completed prior to galvanizing.

2.04 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP -1 and SP-2 or Sp-3, in accordance with paint manufacturer's recommendations.
- B. Shop prime structural steel members in accordance with manufacturer's instructions. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, galvanized, or at faying surfaces of slip critical bolted connections.
- C. Faying Surfaces of Slip Critical Joints: Provide Class A typical and Class C at hot-dip galvanized surfaces, in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using ASTM A325 or A490 Bolts". Slip critical joints identified as "SC" on the drawings.
- D. Galvanize structural steel members to comply with ASTM A123/A123M.
- E. Hot-dip galvanized ASTM F1554 rods to be in accordance with ASTM F2329.
- F. Fasteners exposed to exterior to have galvanized finish per ASTM A153/A153M.

2.05 SOURCE QUALITY CONTROL

- A. An independent testing agency will perform source Quality Assurance (QA) and testing and inspections per this section, as specified in Division 1.
- B. Fabricator is to provide source Quality Control (QC) as required by the standards specified in this section.
- C. Material Verification: Verify materials in accordance with the California Building Code Section 1705.A, AISC 360 Section N5 and AISC 341 Section J6.
- D. Welded Connections and Procedures: Provide review, visual inspection and non-destructive testing in accordance with the California Building Code Section 1705, AISC 360 Section N5.4 and N5.5 and AISC 341 Section J6.
- E. Stud Connections: Provide testing and inspection of welded stud connections in accordance with AWS D1.1/D1.1M Clause 7.
- F. Reinforcing Steel: Provide inspection and testing of reinforcing steel welding per Section 03 20 00 - Concrete Reinforcement.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

- A. Erect structural steel in compliance with AISC 303.
- B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

- C. Coordinate work and cooperate with independent testing agency to allow all tests and inspection procedures to be properly provided.
- D. Provide anchor rods, nuts, plate washers and 1/8 inch thick minimum anchor bolt setting templates as required by work of other sections.
- E. Install bolts in accordance with RCSC "Specification for Structural Joints Using High-Strength Bolts" as follows:
 - 1. Bolted connections: Pretensioned, unless otherwise noted.
 - 2. Slip Critical: Pretensioned with specified faying surface, where noted on the drawings.
 - 3. Bolts installed through HSS members (outside face to outside face): Snug tightened.
 - 4. Bolts installed in long-slotted holes: Finger-tight and double-nut or mar threads to prevent backoff of nut. Provide 0 to 1/16 inch max gap between plies of joint, not fully tightened, to allow movement in the connection.
- F. Provide beveled washers under bolt heads or nuts resting on surfaces exceeding 5 percent slope relative to the head or nut.
- G. Perform welding in accordance with AWS D1.1/D1.1M, AWS D1.8/D1.8M and AISC 341.
- H. Weld shear stud connectors in accordance with AWS D1.1/D1.1M and the manufacturers instructions.
- I. Do not field cut or alter structural members without approval of Architect.
- J. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- K. Repair galvanized steel in accordance with ASTM A780/A780M.
- L. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.
- M. Post-installed anchor installation:
 - 1. Install anchors in accordance with the latest ICC-ESR report and the manufacturer instructions.
 - 2. Locate reinforcement and confirm final anchor locations prior to fabricating plates, members or other steel assemblies attached with post-installed anchors.
 - 3. If reinforcing steel is encountered during drilling:
 - a. Do not cut reinforcing. Notify the Architect and provide suggested anchor layout to avoid reinforcing steel.
 - 4. Install anchors to the embedment depth noted on the drawings. Embedment depths noted are the effective embedment per manufacturer.

3.03 TOLERANCES

- A. Comply with the AISC S303 "Code of Standard Practice for Steel Buildings and Bridges"

3.04 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field Quality Assurance (QA) and tests and inspections per this section, as specified in Division 1.
- B. Erector is to provide field Quality Control (QC) as required by the standards specified in this section.

- C. Bolts: Provide special inspection in accordance with the California Building Code Section 1705, AISC 360 Section N5.6 and AISC 341 Section J7.
- D. Welded Connections and Procedures: Provide review, visual inspection and non-destructive testing in accordance with the California Building Code Section 1705, AISC 360 Section N5.4 and N5.5, and AISC 341 Section J6.
- E. Stud Connectors: Provide inspection and testing of stud connectors in accordance with AWS D1.1/D1.1M, Clause 7.
- F. Reinforcing Steel: Provide inspection and testing of reinforcing steel welding per Section 03 20 00 - Concrete Reinforcement.
- G. Grout: Review mixing of grout under base plates and sample using four 2-inch mortar cubes. Test for ultimate compressive strength at 1, 7 and 28 days after placing and hold the fourth cube until the end of the project. Sample one set minimum for each day that grout is placed.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.1. SECTION INCLUDES

- A. Shop fabricated metal items and miscellaneous metal work.
- B. Standard steel pipe railings
- C. Downspouts
- D. Misc. Metals - Refer to Schedule at end of this Section.

1.2. RELATED SECTIONS:

- A. Section 05 50 00 - Metal Fabrications
- B. Section 06 10 00 - Rough Carpentry
- C. Section 06 20 23 - Interior Finish Carpentry
- D. Section 09 91 00 – Painting
- E. Work may be required to be coordinated with other sections

1.3. STANDARDS AND REFERENCES: (Latest Edition Unless Noted Otherwise)

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- E. ASTM A240/A240M – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
- F. ASTM A283/A283M – Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates

- G. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
- H. ASTM A480/A480M – Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
- I. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- J. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- K. ASTM A879/A879M – Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface
- L. ASTM A1008/A1008M – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable
- M. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- N. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- O. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
- P. ASTM E894 - Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings
- Q. ASTM E935 - Standard Test Methods For Performance Of Permanent Metal Railing Systems And Rails For Buildings
- R. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- S. ASTM F594 - Standard Specification for Stainless Steel Nuts
- T. ASTM F1941/F1941M - Standard Specification for Electrodeposited Coatings on Mechanical Fasteners, Inch and Metric
- U. ASTM F2329/F2329M – Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners
- V. AWS A2.0 - Standard Welding Symbols.
- W. AWS D1.1/D1.1M - Structural Welding Code – Steel.
- X. CCR, Title 24, 2021 ICC, With State of California Amendments – 2022 California Building Code (CBC), Part 2, Vols. 1 and 2.

Y. ICC AC193 - Mechanical Anchors in Concrete Elements

1.4 SUBMITTALS:

- A. Submittals: Provide submittals per Section 01 33 00, "Submittal Procedures".
- B. Product Data: Provide data on material, finishes and attachment.
- C. Shop Drawings: Submit shop drawings indicating profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevation, and details where applicable. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.
- D. Verify that field measurements are as indicated on shop drawings.
- E. Manufacturer's descriptive data: Submit for manufacturer's items.
- F. Welding certificates.
- G. Mill Certificates: Certify that products furnished comply with requirements.
- H. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- I. Research Reports: For post-installed anchors, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
- J. Closeout Submittals per Section 01 77 00, "Closeout Procedures":
 - 1. Product Test Reports: For tests on railings performed by a qualified testing agency, in accordance with ASTM E894 and ASTM E935.
 - a. recycled content plus one-half the pre-consumer recycled content, based on cost.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Manufacturer shall have produced the specified system or products for a period of one (1) year prior to beginning work of this section and shall have the capability to produce the specified products to the delivery and quantity criteria of the project.
- B. Staff:
 - 1. Use only personnel who are thoroughly trained and experienced in the skills required and have installed similar applications of the specified products within one year prior to beginning work of this section.
 - 2. Use only staff who are completely familiar with the manufacturers' recommended methods of installation as well as the requirements of this work.

- C. Welders' Certificates: Submit under provisions of Section 01 33 00, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.
- D. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver all parts ready for erection; store in close proximity to final locations.
- B. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.

1.7 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication.

1.9 WARRANTY – FABRICATED STEEL LADDERS

- A. Manufacturer has responsibility for an extended Corrective Period for work of this Section for a period of 5 years commencing on the shipment date of the product against all the conditions indicated below, and when notified in writing from Owner, manufacturer shall promptly and without inconvenience and cost to Owner correct said deficiencies.
 - 1. Defects in materials and workmanship.
 - 2. Deterioration of material and surface performance below minimum OSHA standards as certified by independent third-party testing laboratory. Ordinary wear and tear, unusual abuse or neglect excepted.
 - 3. Within the warranty period, the manufacturer shall, at its option, repair, replace, or refund the purchase price of defective ladder.
- B. Manufacturer shall be notified immediately of defective products and be given a reasonable opportunity to inspect the goods prior to return.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS - RAILINGS

- A. Structural Performance: Railings, including attachment to building construction, withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 250 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F ambient; 180 deg F, material surfaces

2.2 METALS -GENERAL REQUIREMENTS

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
 - 1. Provide type of bracket with predrilled hole for exposed bolt anchorage and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.3 MATERIALS - GENERAL

- A. Plates, Shapes, and Bars: ASTM A36/A36M.
- A. Steel Sections: Channels, plates, angles, etc. ASTM A36/A36M.
- B. Steel Tubing: ASTM A500/A500M (cold formed), Grade A.
- C. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

1. Provide galvanized finish for exterior installations and where indicated.
- D. Cast Iron Fittings: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.
- E. Sheet Steel: ASTM A653/A653M, gage and profile indicated, galvanized to G90 finish in accordance with ASTM A653/A653M.
- F. Downspouts: 3” diameter, steel pipe, ASTM A53/A53M, Grade B, Schedule 40, galvanized, unless otherwise shown or specified.
- G. Steel Bolts, Nuts, and Washers: ASTM A307.
- H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
 1. Solder: 50% pig lead and 50% block tin.
 2. Flux: Rosin, muriatic acid neutralized with zinc or an approved soldering paste.
- I. Galvanizing: Hot-dip process ASTM A123/A123M typical and ASTM A123/A123M for threaded fasteners performed after fabrication into largest practical section. Weight of coating not less than 2 oz. per sq. ft. of surface. Where damaged, repair surface with one coat of hot process galvanizing repair compound, "Galvalloy", Galvweldalloy", or approved equal.
- J. Primer: All metal fabrications shall be shop-primed per the requirements in Section 09 91 00, "Painting".
- K. Dissimilar Materials: Separate dissimilar surfaces in contact with or in close proximity to non-compatible metals, concrete masonry, or plaster with neoprene gasket; or other approved means.
- L. Expansion Bolts: Hilti "Kwik Bolt TZ2" Expansion Anchor Bolts, galvanized unless otherwise indicated.

Product Website Link: [Kwik Bolt TZ2 Wedge anchor - Mechanical Anchors - Hilti USAolt-tz.html](https://www.hilti.com/usa/anchors/kwik-bolt-tz2-wedge-anchor-mechanical-anchors-hilti-usa/olt-tz.html)

- M. Non-shrink Grout:

1. Series: Sika Grout 212, or equal.

Product Website Link: <https://usa.sika.com/en/construction/repair-protection/grouts/cementitious-grouts/sikagrout-212.html>

2. Master Builders, MasterFlow 928, or equal.

Product Website Link: <https://www.master-builders-solutions.com/en-us/products/grouts/cementitious-grouts/masterflow-928>

3. Provide Substitution Requests per Section 01 25 00, "Substitution Procedures".

2.4 STEEL RAILING SYSTEM

- A. Steel Pipe: ASTM A53/A53M, Grade A
- B. Rails and Posts: Size, shape and spacing as shown on the Drawings, welded joints.
 - 1. Handrail: 1 ½ inch normal pipe size (NPS) (1 7/8 inch OD/1 ½" I.D.), Schedule 40, welded joints.
- C. Fittings: Elbows, T-shapes, wall brackets; bent or mitered tube steel.
- D. Metal Pipe Support Mounting: Provide solid steel rod, bent as shown on drawings. Fabricate as required to provide 1-1/2 inch clear dimension from face of wall surface to railing inside surface.
 - 1. Mounting: Adjustable brackets and flanges for mounting as detailed at stair assemblies. Modify bracket as required to provide 1-1/2 inch clear dimension from face of wall surface to railing inside surface.
- E. Splice Connectors: Steel welding inserts.

2.5 FABRICATION

- A. Verify dimensions on site prior to shop fabrication.
- B. Fabricate items with joints tightly fitted and secured.
- C. Fit and shop assemble in largest practical sections, for delivery to jobsite.
- D. Grind exposed welds flush and smooth adjacent finished surfaces. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.
- F. Make exposed joints butt tight, flush and hairline.
- G. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.

2.6 MISCELLANEOUS MATERIALS - RAILINGS

- A. Handrail Brackets: Cast-iron
- B. Provide cast-metal brackets with flange tapped for concealed anchorage to threaded hanger bolt.
- C. Provide either formed- or cast-metal brackets with predrilled hole for exposed bolt anchorage.

- D. Provide formed-steel brackets with predrilled hole for bolted anchorage and with snap-on cover that matches rail finish and conceals bracket base and bolt head.
- E. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- F. Etching Cleaner for Galvanized Metal: Compatible with coating system specified.
- G. Galvanizing Repair Paint: High-zinc-dust-content paint compatible with coating system specified.
- H. Shop Primers: Provide primers that comply with Section 09 91 00, "Painting"
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
 - 2. Epoxy Zinc-Rich Primer: Compatible with topcoat.
 - 3. Shop Primer for Galvanized Steel: Cementitious galvanized metal primer Vinyl wash primer Water-based galvanized metal primer.
- I. Intermediate Coats and Topcoats: Provide products that comply with Section 09 91 00, "Painting"
 - 1. Epoxy Intermediate Coat: Compatible with primer and topcoat.
 - 2. Polyurethane Topcoat: Compatible with undercoat.
- J. Non-shrink, Non-metallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- K. Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
 - 1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.
- L. Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
- M. Water-Resistant Product: At exterior locations , provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.7 FASTENERS

A. Fastener Materials:

1. Ungalvanized-Steel Railing Components: Plated-steel fasteners complying with ASTM F1941/F1941M, Class Fe/Zn 5 for electrodeposited zinc coating where concealed; Type 304 stainless steel fasteners where exposed.
2. Hot-Dip Galvanized-Steel Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.
3. Dissimilar Metal Railing Components: Type 304 stainless steel fasteners.
4. Finish exposed fasteners to match appearance, including color and texture, of railings.

B. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
3. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

C. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction

1. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless otherwise indicated
2. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.
3. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, in accordance with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193
4. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
5. Material for Exterior Locations: Alloy Group 2 (Type 316) stainless steel bolts, ASTM F593 and nuts, ASTM F594.

2.8 FINISH

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact bond with concrete or where field welding is required.
- C. Prime paint interior items as described in Section 09 91 00, "Painting".
- D. Galvanize exterior items and scheduled interior items to minimum 2.00 oz/sq ft zinc coating.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Obtain Architect's approval prior to site cutting or making adjustments not scheduled.
- B. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is scheduled.
- B. Make provision for erection loads with temporary bracing. Keep work in alignment.
- C. Supply items required to be cast into concrete with setting templates, for installation under appropriate Sections.
- D. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.
- E. Do not begin installation until supporting structure is complete and installation will not interfere with supporting structure work.
- F. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

3.3 INSTALLATION, GENERAL

- A. Perform cutting, drilling, and fitting required for installing railings.
 - 1. Fit exposed connections together to form tight, hairline joints.
 - 2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
 - 3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.

4. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 5. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
1. Coat concealed surfaces of metals that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.4 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws, using plastic cement filler colored to match finish of railings.
- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article, whether welding is performed in the shop or in the field.
- C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve, extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; and locate joint within 6 inches of post.

3.5 ANCHORING POSTS

- A. Use stainless steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-shrink, nonmetallic grout mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout mixed and placed to comply with anchoring material manufacturer's written instructions.

- C. Cover anchorage joint with flange of same metal as post, attached to post with setscrews
- D. Leave anchorage joint exposed with anchoring material flush with adjacent surface.
- E. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
- F. Weld flanges to posts and bolt to metal-supporting surfaces.
- G. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.6 ATTACHING RAILINGS

- A. Anchor railing ends to concrete and masonry with flanges connected to railing ends and anchored to wall construction with anchors and bolts.
- B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and connected to railing ends, using nonwelded connections].
- C. Attach handrails to walls with wall brackets Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface.
- D. Use type of bracket with predrilled hole for exposed bolt anchorage
- E. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- F. Secure wall brackets and railing end flanges to building construction as follows:
- G. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
- H. For hollow masonry anchorage, use toggle bolts.
- I. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
- J. For steel-framed partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.
- K. For steel-framed partitions, fasten brackets directly to steel framing or concealed steel reinforcements using self-tapping screws of size and type required to support structural loads.
- L. For steel-framed partitions, fasten brackets with toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.7 REPAIR

3.7.1 Touchup Painting:

- 3.7.2 Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 91 00, "Painting".

3.8 FIELD QUALITY CONTROL

- 3.8.1 Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and to prepare test reports. Payment for these services will be made by Owner
- 3.8.2 Extent and Testing Methodology: Testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Test railings in accordance with ASTM E894 and ASTM E935 for compliance with performance requirements.
- 3.8.3 Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and comply with specified requirements.
- 3.8.4 Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

3.9 CLEANING

- 3.9.1 Clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.
- 3.9.2 Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

3.10 PROTECTION

- 3.10.1 Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- 3.10.2 Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

- 3.11 SCHEDULE Provide and install items listed in Schedule and shown on Drawings with anchorage and attachment necessary for installation. The following Schedule lists principal items only. Refer to drawing details for items not specifically scheduled.

1. Miscellaneous plates or angles not attached to structural steel; complete with anchorage for embedment.
2. Steel Fabricated Ladders

3. 3" Dia., SCH 40 Downspouts
4. Standard Steel Pipe Railings - 1 1/2" I.D./1 7/8" O.D. Sch. 40
5. Other Misc. Metal Fabrications indicated in drawings, not specifically described.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Structural dimension lumber framing.
- B. Nonstructural dimension lumber framing.
- C. Rough opening framing for doors, windows, and roof openings.
- D. Sheathing.
- E. Roof-mounted curbs.
- F. Roofing nailers.
- G. Roofing cant strips.
- H. Preservative treated wood materials.
- I. Fire retardant treated wood materials.
- J. Miscellaneous framing and sheathing.
- K. Concealed wood blocking, nailers, and supports.
- L. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

- A. Section 05 05 23 - ADHESIVE AND MECHANICAL FASTENERS
- B. Section 05 1200 - Structural Steel Framing: Steel beams and columns for support of wood framing.
- C. Section 06 18 00 - Glued-Laminated Construction.

1.03 REFERENCE STANDARDS

- A. ASME B18.2.1 - Square and Hex Bolts and Screws, Inch Series; 1996.
- B. ASME B18.2.3.8M - Metric Lag Screws; 1981.
- C. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- E. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength; 2004.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- G. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2017).
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023.
- I. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings 2018.

- J. ASTM F 844 - Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use; 2004e1.
- K. ASTM F 1667 - Standard Specification for Driven Fasteners: Nails, Spikes and Staples; 2005.
- L. AWWA U1 - Use Category System: User Specification for Treated Wood 2021.
- M. PS 1 - Structural Plywood 2009 (Revised 2019).
- N. PS 20 - American Softwood Lumber Standard 2021.

1.04 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials, application instructions, and fasteners.
- C. Samples: For rough carpentry members that will be exposed to view, submit two samples, ___ by ___ inch (___ by ___ mm) in size illustrating wood grain, color, and general appearance.
- D. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Douglas Fir-Larch, unless otherwise indicated.
 - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Provide sustainably harvested wood; see Division 1 for requirements.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: As indicated on drawings.
- C. Stud Framing (2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm)):
 - 1. Species: Douglas Fir-Larch.
 - 2. Grade: No. 1.
- D. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 (50 by 150 mm through 100 by 400 mm)):
 - 1. Species: Douglas Fir-Larch.
 - 2. Grade: No. 1, unless otherwise noted on drawings.

- E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 EXPOSED DIMENSION LUMBER

- A. Sizes: Nominal sizes as indicated on drawings.
- B. Surfacing: S4S.
- C. Moisture Content: S-dry or MC19.

2.04 CONSTRUCTION PANELS

- A. Roof Sheathing: PS 2 type, APA Rated Structural 1 Sheathing.
 - 1. Bond Classification: Exterior.
 - 2. Span Rating: 32. Unless otherwise indicated on drawings.
 - 3. Performance Category: 1/2 PERF CAT.
- B. Wall Sheathing: PS 2 type.
 - 1. Bond Classification: Exposure 1.
 - 2. Grade: Structural I Sheathing.
 - 3. Span Rating: 24.
 - 4. Performance Category: 1/2 PERF CAT.
 - 5. Edge Profile: Square edge.

2.05 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Fasteners: Hot-dipped galvanized steel per ASTM A 153/A 153M steel where exposed to weather, high humidity and preservative-treated wood locations, electro-galvanized or unfinished steel elsewhere.
 - 2. Bolts and Nuts: Carbon steel, ASTM A307, Grade A, with ASTM A563 nuts.
 - a. Threaded length of bolts are not to exceed 25 percent of the full bearing length in the wood member.
 - 3. Lag Screws: ASTM A307, Grade A.
 - 4. Unhardened Flat Washers: ASTM F844 and ANSI B 18.22.1.
 - 5. Nails and Staples: ASTM F1667.
 - 6. Wood Screws: Simpson Strong-Drive wood screws, U.O.N.
 - 7. Post-Installed Concrete Anchors: As noted on drawings.
- B. Steel Plates: ASTM A36/A36M.
- C. Metal Framing Connectors: Hot dipped galvanized steel, sized to suit framing conditions, and as noted on drawings.
 - 1. For contact with preservative treated wood in exposed locations, provide minimum G185 (Z550) galvanizing complying with ASTM A653/A653M.
 - 2. Manufacturers:
 - a. Simpson Strong-Tie Company, Inc.: www.strongtie.com.

2.06 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Preservative Treatment:
 - 1. Products:
 - a. Lonza Group; www.wolmanizedwood.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - 1. Kiln dry lumber after treatment to maximum moisture content of 15 percent.
 - a. Treat lumber exposed to weather.
 - 2. Treat lumber in contact with roofing, flashing, or waterproofing.
 - 3. Treat lumber in contact with masonry or concrete.
 - 4. Treat lumber less than 18 inches (450 mm) above grade.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, and similar supports to allow attachment of other construction.
- E. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

- F. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes, AWC (WFCM) Wood Frame Construction Manual.
- G. Install horizontal spanning members with crown edge up and not less than 3 inches (76 mm) of bearing at each end.
- H. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- I. Provide bridging at framing in excess of 8 feet (2.3 m) span at mid-span. Fit solid blocking at ends of members.
- J. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.
- K. Do not cut, drill, or notch wood members unless otherwise noted on drawings.
- L. Re-tighten all bolted connections before final acceptance, or in the case of concealed locations, immediately before the area is sealed off.
- M. For bolt installation, provide holes 1/16-inch larger than nominal diameter of bolt.
- N. Use malleable iron washers under bolt heads when in contact with wood.
- O. For lag screw installation, drill lead hole for shank to a depth equal to the length of the unthreaded portion, using a drill bit of the same diameter as the lag screw. Extend the lead hole for the threaded portion of the lag screw using a bit whose diameter is 60 percent of the lag screw diameter.
 - 1. Insert lag screws by turning, do not drive with hammer. Beeswax may be used to facilitate installation.
- P. Use flat washers under head of lag screws when in contact with wood.

3.04 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to authorities having jurisdiction may be used in lieu of solid wood blocking.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.05 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at each roof opening except where prefabricated curbs are specified and where specifically indicated otherwise; form corners by alternating lapping side members.

3.06 INSTALLATION OF CONSTRUCTION PANELS

- A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 - 1. At edges provide solid edge blocking where joints occur between roof framing members.
 - 2. Nail panels to framing; staples are not permitted unless noted on drawings.
 - 3. Use ring shank nails.
- B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.

3.07 TOLERANCES

- A. Framing Members: 1/4 inch (6 mm) from true position, maximum.
- B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

3.08 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Division 1.
- B. Inspect nailing, bolting, anchorages and holdowns.
- C. Inspect fastening of wood sheathing for shear walls, shear panels, and diaphragms. Verify the sheathing grade and thickness, the nominal framing member sizes at adjoining panel edges, the nail or staple size, the number of fasteners lines and the fastener spacing in each line.

END OF SECTION

SECTION 06 18 00**GLUED-LAMINATED CONSTRUCTION****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Glue laminated wood beams and columns.
- B. Preservative treatment of wood.
- C. Steel hardware and attachment brackets.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry.

1.03 REFERENCE STANDARDS

- A. AITC A190.1 - American National Standard for Wood Products - Structural Glued Laminated Timber 2007.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood 2021.
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).

1.04 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials, application technique and resultant performance information.
- C. Shop Drawings: Indicate framing system, sizes and spacing of members, loads and cambers, bearing and anchor details, bridging and bracing, framed openings and material properties.

1.05 QUALITY ASSURANCE

- A. Manufacturer/Fabricator Qualifications: Company specializing in manufacture of glue laminated structural units with three years of documented experience, and certified by AITC in accordance with AITC A190.1.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect members to AITC requirements for not wrapped.
- B. Leave individual wrapping in place until finishing occurs.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Glued-Laminated Structural Units:
 - 1. Standard Structures, Inc.: www.standardstructures.com.
 - 2. Boise Cascade: www.bc.com.
 - 3. Substitutions: See Division 1 - Product Requirements; See Section 01 6000 - Product Requirements.

2.02 GLUED-LAMINATED UNITS

- A. Glued-Laminated Units: Fabricate in accordance with AITC 117 Industrial grade.
 - 1. Verify dimensions and site conditions prior to fabrication.
 - 2. Cut and fit members accurately to length to achieve tight joint fit.
 - 3. Fabricate member with camber built in.
 - 4. Do not splice or join members in locations other than those indicated without permission.
 - 5. After end trimming, seal with penetrating sealer in accordance with AITC requirements.

2.03 MATERIALS

- A. Steel Connections and Brackets: ASTM A36/A36M weldable quality, galvanize per ASTM A123/A123M.
- B. Laminating Adhesive: wet use type, AITC A190.1.
- C. Wood Sealer: Manufacturer's standard translucent that will not interfere with application of wood stain and transparent or paint finish.

2.04 WOOD TREATMENT

- A. Preservative Pressure Treatment:
 - 1. Manufacturers:
 - a. Lonza Group: www.wolmanizedwood.com/#sle.
 - b. Osmose Utilities Services, Inc: www.osmose.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Preservative Pressure Treatment of Glued-Laminated Structural Units: AWWA U1, Use Category UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention (to 4.0 kg/cu m retention).
 - a. Kiln dry lumber after treatment and before lamination to maximum moisture content of 19 percent.
 - 3. Marking: Marked each piece with stamp of an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.

2.05 FABRICATION

- A. Fabricate glue laminated structural members in accordance with AITC Industrial grade for concealed beams and Architectural grade for exposed beams.
- B. Welding: Perform welding in accordance with AWS D1.1/D1.1M.
- C. Verify dimensions and site conditions prior to fabrication.
- D. Cut and fit members accurately to length to achieve tight joint fit.
- E. Fabricate member with camber built in, as indicated on the drawings.
- F. Do not splice or join members in locations other than those indicated without permission.
- G. Fabricate steel hardware and connections with joints neatly fitted, welded, and ground smooth.
- H. After end trimming, seal with penetrating sealer in accordance with AITC requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that supports are ready to receive units.
- B. Verify sufficient end bearing area.

3.02 PREPARATION

- A. Coordinate placement of bearing items.

3.03 ERECTION

- A. Lift members using protective straps to prevent visible damage.
- B. Set structural members level and plumb, in correct positions or sloped where indicated.
- C. Provide temporary bracing and anchorage to hold members in place until permanently secured.
- D. Fit members together accurately without trimming, cutting, splicing, or other unauthorized modification.

3.04 TOLERANCES

- A. Framing Members: 1/2 inch (12 mm) maximum from true position.

END OF SECTION

SECTION 06 20 23
INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Interior Millwork, Standing and Running Trim.
- B. Standard and ADA Accessible Locker Room Benches
- C. Repair of existing millwork

1.2 RELATED SECTIONS:

- A. Section 06 10 00 - Rough Carpentry
- B. Section 07 92 00 – Joint Protection
- C. Section 09 21 16 - Gypsum Board
- D. Section 09 28 13 - Cementitious Backer Boards
- E. Section 09 91 00 - Painting
- G. Work may be required to be coordinated with other sections.

1.3 STANDARDS AND REFERENCES (Current Edition for All Standards Listed)

- A. American Forest & Paper Association
- B. Sustainable Forestry Initiative. 2010-2014.
- C. American National Standards Institute
- D. American Plywood Association (APA), Engineered Wood Construction Guide.
- E. ANSI A135.4: Basic Hardboard
- F. ANSI A135.5: Prefinished Hardboard Paneling
- G. ANSI A208.1: Particleboard
- H. ANSI A208.2: Medium Density Fiberboard (MDF) for Interior Applications
- I. American Tree Farm System
- J. AFF Standard-2010-2015: Standards of Sustainability for Forest Certification

- K. American Wood Protection Association
- L. AWWA U1: Use Category System: User Specification for Treated Wood - available in PDF at www.awpa.com
- M. ASTM International
 - 1. ASTM D 3498 - Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems
 - 2. ASTM D 6007 - Test Method for Determining Formaldehyde Concentrations in Air from Wood Products Using a Small-Scale Chamber
 - 3. ASTM E 84 - Test Method for Surface-Burning Characteristics of Building Materials
 - 4. ASTM E 1333-15 - Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber
- N. Builders Hardware Manufacturers Association
 - 1. BHMA A156.9: Cabinet Hardware (ANSI)
 - 2. BHMA A156.16: Auxiliary Hardware (ANSI)
- O. California Air Resources Board
- P. Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products.
- Q. California Department of Public Health
- R. Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers. 2010.
- S. Forest Stewardship Council U.S.
 - 1. FSC STD-01-001 - FSC Principles and Criteria for Forest Stewardship v5-2 - available in PDF at www.fscus.org
 - 2. FSC STD-40-004 - FSC Standard for Chain of Custody Certification v2-1 - available in PDF at www.fscus.org
- T. Hardwood Plywood & Veneer Association
- U. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood (ANSI)
- V. International Organization for Standardization/International Electrotechnical Commission
- W. ISO/IEC Guide 59 - Code of Good Practice for Standardization
- X. Moulding & Millwork Producers Association

1. MMPA WM 2: Vinyl Wrapped Interior Moulding and Millwork
 2. MMPA WM 4: General Requirements for Wood Moulding
 3. MMPA WM 9: Interior Wood Plank Paneling
- Y. HWM/Series Hardwood Moulding Patterns.
- Z. WM/Series Softwood Moulding Patterns.
- AA. National Electrical Manufacturers Association
1. NEMA LD 3-2005: High Pressure Decorative Laminates (ANSI) - available in PDF at www.nema.org
- BB. National Hardwood Lumber Association
- CC. Rules for the Measurement and Inspection of Hardwood & Cypress, Plus NHLA Sales Code & Inspection Regulations. - available in PDF at www.natlhardwood.org
- DD. National Lumber Grades Authority
- EE. Standard Grading Rules for Canadian Lumber. 2014 - available in PDF at <http://nlga.org>
- FF. Northeastern Lumber Manufacturers' Association
- GG. Standard Grading Rules for Northeastern Lumber. 2013 - available in PDF at www.nelma.org
- HH. Southern Pine Inspection Bureau
- II. Standard Grading Rules for Southern Pine Lumber..
- JJ. U.S. Department of Commerce, National Institute of Standards and Technology
- KK. DOC PS 1: Structural Plywood - available in PDF at www.apawood.org and www.nist.gov
- LL. DOC PS 20 - American Softwood Lumber Standard - available in PDF at www.alsc.org and www.nist.gov
- MM. West Coast Lumber Inspection Bureau
- NN. Standard No. 17 - Grading Rules for West Coast Lumber - available in PDF at www.wclib.org
- OO. Western Wood Products Association
- PP. Woodwork Institute (WI), North American Architectural Woodwork Standards (NAAWS) 3.1, 2017 Edition with 2020 errata.
- QQ. World Trade Organization
- RR. WTO Agreement on Technical Barriers to Trade.

- SS. Western Wood Products Association (WWPA) - Western Lumber Grading Rules
- TT. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
- UU. Industry Standard For Interior Architectural Wood Flush Doors, Window and Door Manufacturers Association (WDMA).
- VV. Redwood Inspection Service (CRA-RIS) Standard Specifications for Grades of California Redwood Lumber.

1.4 SUBMITTALS

- A. Submittals: Provide submittals per Section 01 33 00, "Submittal Procedures".
- B. Submit shop drawings indicating details, erection data associated with the work of other trades; location; materials, species of wood; quality grade; type of finish; profiles, dimensions; fastenings and clearances. Detail drawings shall be three inches equals one foot (3" = 1') or larger finishes, and accessories.
- C. Samples
 - 1. Color and material approval prior to installation.
- D. The mill shall take and be responsible for all field measurements required for the proper fabrication and installation of the work. Show all field dimensions beyond control of mill.
- E. Report any major discrepancy between the Drawings and the field dimensions to the Architect before fabrication of the work.
- F. Coordinate dimensions and installation requirements of Owner furnished equipment.
- G. Certification:
 - 1. Grade mark and mill identification of the association having jurisdiction shall appear distinctly legible on the back of each piece of lumber and plywood. No marks shall appear on exposed faces of work to receive transparent or semi-transparent finishes.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with North American Architectural Woodwork Standards (NAAWS) and as required by this Section.
- B. Installer's Qualifications: Use only journeymen finish carpenters who are thoroughly trained and experienced in the skills required for the cutting and fitting of trim and finish materials.
- C. Installation Acceptance: All rejected work shall be removed and replaced with no additional cost to the Owner.
- D. The mill shall take and be responsible for all field measurements required for the proper fabrication and installation of the work. Show all field dimensions beyond control of mill.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery:
 - 1. Deliver products to site under provisions of Section 01 60 00, "Product Requirements"
 - 2. Do not deliver material to site until required temperature and relative humidity conditions have been stabilized and will be maintained in installation areas.
- B. Storage, Handling and Protection:
 - 1. Store and protect products under provisions of Section 01 60 00, "Product Requirements"
 - 2. Provide all work or materials necessary to store, cover and protect all materials specified to be furnished and installed under this Section. Store all materials under cover in a well-ventilated enclosure and protect against extreme changes in temperature and humidity. Avoid any marring and keep the materials clean during handling and installation operations. Protect exposed finish work and materials after their erection from damage of any character. Work damaged through neglect or failure to provide protection shall be repaired or replaced by the Contractor without additional cost to the Owner.
- C. Store materials in ventilated, interior locations under constant minimum temperatures of 60 degrees F and maximum relative humidity of 55 percent.
- D. Deliver work in this section only at such time as the work is ready and suitable for installation.
- E. Comply with requirements of NAAWS Section 2, Care and Storage.

PART 2 - PRODUCTS

2.1 INTERIOR MILLWORK

- A. All Material Grades and Construction shall be WI custom grade, including all supplements, unless specified or indicated otherwise. Semi-exposed and other components shall be as permitted by WI standards for construction quality specified herein except as otherwise detailed or specified. Moisture content shall be in accordance with WI Standards for millwork.
- B. Standing and running trim, panel frames, and miscellaneous millwork.
 - 1. Species: White Birch, WDMA Grade 1 (Premium) Grade
 - 2. Grade: Transparent Finish, per WIC section 5.
 - 3. Surface: S4S
 - 4. Moisture Content: Certified Kiln Dry.
 - 5. Finish: Transparent per Section 09 91 00, "Painting" Standing and running trim, panel frames, and miscellaneous millwork.
 - 1. Species: Douglas Fir.
 - a. Grade: Superior Finish per WWPA
 - b. Surface: S4S

- c. Moisture Content: Certified Kiln Dry.
 - d. Finish: Transparent per Section 09 91 00, "Painting" Standing and running trim, panel frames, and miscellaneous millwork.
- D. Standing and running trim, panel frames, and miscellaneous millwork. Paint grade.
- 1. Species: Poplar.
 - 2. Grade: Premium, per AWS, Section 3.
 - 3. Moisture Content: Maximum 12 percent, minimum 6 percent.
 - 4. Finish: Per Section 09 91 00 - Painting

FASTENERS, FILLERS AND ADHESIVES:

- A. Nails: Interior: Finish nail, bright finish, length as required to suit application.
- A. Bolts, Nuts, Washers, Blind Fasteners, Lags, and Screws: Size and type to suit application; finish as for nails.
- B. Provide fasteners of size and type to suit application and complying with AWS Architectural Woodwork Standards.
- B. Wood Filler: Tinted to match surface finish color.
- C. Adhesives:
 - 1. For Interior Work: CS 35-61 Type II (water-resistant). Shall withstand cold-soak tests specified in PS 51-71.

2.4 LUMBER

- A. Sleepers and toe kicks: Douglas fir, pressure treated when in direct contact with concrete slab-on-grade.
- B. Uses not otherwise specified: Hardwood or softwood; grade in accordance with AWS Section 2 and 3 as required for use.

2.5 FABRICATION

- A. Mill components to profiles as specified and as shown on architectural drawings.
- B. Fabricate all components to WI Custom quality and standards, unless noted otherwise.

2.6 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

2.7 HARDWOOD BENCHES – ADA ACCESSIBLE

A. Seat:

1. Material: Maple
2. Size: 48wide inch x 20 inch deep x 1 ¼” thick
3. Finish: Clear heavy varnish.

B. Bracket:

1. Manufacturer: Rangine Corporation, Needham, Massachusetts 02494 | Tel: 781-455-8700, 800-826-6006 Fax: 781-455-8702 | www.rakks.com
2. Product: Rakks double arm floor mounted bench bracket
 - a. 2” x 3” T aluminum, 18” tall
3. Finish: Clear anodized.

C. Substitutions: Provide per Section 01 25 00, “Substitution Procedures”

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection

1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
3. In the event of discrepancy, immediately notify the Architect.
4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 PREPARATION

- A. Before installation, apply approved sealer to all unexposed surfaces per Section 09900.
- B. Before installation, seal all edges of paneling with approved sealer per Section 09900.

3.3 INSTALLATION

- A. Install work in accordance with AWS Section 6 Premium quality standards and as specified.
- B. Set and secure materials and components in place, plumb and level.
- C. Install components and trim with fasteners as shown or required.
- D. Interior millwork
 - 1. Install millwork with mitered corners. Vertically scarf all intermediate joints.
 - 2. Set fasteners for filler with proper size tool. Do not damage surface. Use of staples or T-nails not permitted.
 - 3. Install shower bench as shown on drawings.

END OF SECTION

SECTION 06 41 00
ARCHITECTURAL CASEWORK

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Special fabricated cabinet units.
2. Countertops.
3. Preparation for utilities.
4. Cabinet hardware.

B. Related Sections:

1. A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. 06 10 00 - Rough Carpentry.
3. 09 65 00 - Resilient Flooring.
4. 09 65 13 - Resilient Base and Transition Strips.
5. 09 68 16 - Carpeting.

1.02 REFERENCES

- A. North American Architectural Woodwork Standards (NAAWS).
- B. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- C. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- D. ASTM C615 - Standard Specification for Granite Dimension Stone.
- E. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2.

1.03 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Include materials, component profiles, fastening methods, assembly methods, joint details, accessory listings, and schedule of finishes. Provide WI Certified Compliance label on first page of each set. Shop drawings will be rejected until reviewed by the assigned Woodwork Institute inspector and label has been issued.
- C. Product Data: Manufacture literature for all hardware to be provided.
- D. Samples:
 1. Finishes for color selection.

2. Hardware: drawer pulls, hinges, locks and other hardware accessories.
3. Identification tag and fasteners.
4. Submit two physical samples and product data sheets of drawer pulls, hinges, locks, ID tags, and other specified hardware accessories, illustrating hardware type and finish.

1.04 QUALITY ASSURANCE

- A. Manufacture casework items in accordance with quality standards of the NAAWS.
- B. All millwork and the installation of millwork shall be monitored for compliance under the scope of the WI Certified Compliance Program (CCP).
- C. Provide WI Inspection Service at the millwork fabricator. Provide to Architect a written report showing the results of the inspection.
- D. Issue WI Certified Compliance Certificate to Architect prior to delivery of millwork and provide WI Certified Compliance Labels on all items of casework and countertops.
- E. Provide WI Reinspection Service at the job site prior to installation. Provide to Architect a written report showing the results of the reinspection.
- F. Self-Certification by the millwork fabricator or inspection by other than an authorized representative of The Woodwork Institute is not acceptable.
- G. Upon completion of the installation, provide a WI Certified Compliance Certificate.
- H. Regulatory Requirements
 1. Conform to CBC requirements for flame spread classification.
 2. Conform to Flame Spread Classifications of Interior Millwork contained within the Appendix of the NAAWS for flame spread ratings as tested according to ASTM E84.
- I. Mockup
 1. Prepare mockup under provisions of Section 01 33 00.
 2. Provide full size base cabinet and upper cabinet of each type indicated, in specified finish with hardware installed.
 3. Units will be examined to ascertain quality and conformity to NAAWS.
 4. Units will establish a minimum standard of quality for this work.
 5. Approved units may be used as part of the Work.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage, and deter their erection from damage of any character. Work damages through neglect or failure to provide protection shall be made good by the contractor and without additional cost to the Owner.

1.06 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on shop drawings.
- B. Field verify existing finish floor conditions to ensure specified finish countertop heights and knee space clearances at accessible stations are maintained. If shimming is required to level units, this shall be taken into account in base cabinet construction.

1.07 COORDINATION

- A. Coordinate the work with electrical rough-in, to assure orderly and efficient sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. See schedule of manufacturers, patterns, and colors.
- B. Active member of the Woodwork Institute licensed by WI to provide WI Certified Compliance Certificates and Labels for the products and materials specified in this section
www.woodworkinstitute.com.
- C. Substitutions: Under provisions of Section 01 25 13.

2.02 MATERIALS

- A. Individual cabinets are indicated on the drawings by the NAAWS Appendix Cabinet Design Series (CDS) numbering system.
- B. Wood materials shall be Forest Stewardship Council (FSC) certified.
- C. Composite wood shall be free of added urea formaldehyde.
- D. Modular Casework - Laminated Plastic Covered
 - 1. Fabricate in accordance with Section 10 of the NAAWS:
 - a. NAAWS Grade: Custom
 - b. Type: Type 1
 - c. Construction: Style A-Frameless
 - d. Joinery: Frameless
 - e. Cabinet Backs: Dadoed (Detail 2C and 78 of Millwork Man.) Type A. Type B for glass
 - f. Cabinet Door Type: Type A. Type B for glass
 - g. Shelves:
 - All shelving less than 25" to be 3/4-inch-thick melamine covered Industrial Board.
 - All shelves between 25" to 34" to be 1" inch thick melamine covered Industrial Board.
 - All shelves between 34" to 46" to be 3/4" inch thick HPL covered Veneer Core DF Plywood.
 - All shelves over 46" to be 1" inch thick HPL covered Veneer Core DF Plywood.
 - h. Shelf Edge Bands:
 - 1mm PVC in color to match shelf at three concealed sides. 3mm PVC at exposed leading edge.
 - i. Door and Drawer Edge Bands:
 - 3 mm PVC radiused 1/8 inch at edge. Solid color as selected by Architect.
 - j. Exposed Surfaces (including shelves and interior of open front cabinets):
 - .045-inch thick high pressure plastic laminate.
 - k. Semi-Exposed Surfaces (behind doors and inside drawers):

Low pressure decorative polyester or melamine laminate ALA-85.

1. Security and Dust Panels: Particle board, 3/4 inch thick at all lockable drawers.

E. Countertops - Laminated Plastic

1. Fabricate in accordance with Section 11 of the NAAWS:
 - a. NAAWS Grade: Premium
 - b. Core Thickness: .075 inch minimum
 - c. Laminate Thickness: 1.50 inch or .042 inch for postformed use
 - d. Edge Covering: --
 - e. Backsplash: Square butt
 - f. Top of Back Splash: Square self-edge
 - g. Colors and Pattern: To be selected by Designer

G. Hardware

1. Finish: Satin Aluminum.
2. Shelf Standards: Knape and Vogt 255ZC (bright zinc plated).
3. Shelf Supports: Knape and Vogt 256ZC (bright zinc plated).
4. Shelf Fastener Supports: Knape and Vogt 243ZC (bright zinc plated) 2 each shelf.
5. Shelf Supports: Hettich "Sekura" or approved equal all metal construction with 80 lb load rating. Retention pins only required at front shelf support clips. Rear clips may be non-retention pin type. Clips set in drilled holes spaced 32 mm on center.
6. Drawer and Door Pulls: 5 inch Epco 'U-shaped' wire pulls, Hafele, or approved equal. Pulls shall comply with CCR Section 11178.6(4) and 11258.4.
7. Cabinet Locks: National Lock C8123, Corbin 0737, K and V 986, or equal. Install on all cases unless otherwise noted.
8. Drawer Slides for Drawers 24 inch Wide or Less: Accuride 7432.
9. Drawer Slides for Drawers over 24 inch wide: Accuride 3640.
10. Drawer slides for File Drawers: Grant No. 329 heavy duty ball bearing full extension slides with 100 lbs. capacity at large flat file drawers use Accuride No. 3640, 200 lbs., full extension, ball bearing, rail mount slides.
11. Hinges: Rockford Process Control, No. 851, heavy duty wrap-around, tight pin butts of steel, 2-3/4-inch minimum width with companion magnetic door catch capable of a minimum 10-pound pull capacity. Hinges per leaf: 3 feet 0-inch-high doors – two (2) hinges, 3 feet 0 inch to 5 feet 0-inch-high doors – three (3) hinges, 5 feet 0 inch to 7 feet 4-inch-high doors – four (4) hinges, 7 feet 0 inch to 8 feet 0 inch – five (5) hinges.
12. Magnetic Door Catch: Ives 326, or Hafele 246.43 .758.
13. Sliding Door Track Assemblies: Grant 2023N sheaves and Grant 2011 track.
14. Grommets: Hafele No. 429.99.128, 3-inch diameter or as noted on drawings.
15. Seismic Shelf Lip: 1/4 inch thick by 3-inch-high acrylic plastic or PVC edging of color selected by Architect. Ease all edges of plastic.

16. Remainder of hardware required shall be as listed in the Hardware Supplement to Sections 14 and 15 of the Manual of Millwork.

17. Substitutions: Under the provisions of Section 01 25 13.

2.08 FABRICATION

- A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- C. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal contact surfaces of cut edges.
- D. Provide all supports and required inserts for laboratory type sink units.
- E. Install plastic grommets in the field in plastic laminate casework and Owner furnished furniture as directed by the Owner's Representative and/or Architect.
- F. Install seismic shelf lips on all exposed edges of open laboratory shelving with flathead countersunk wood screws spaced 6 inches on center. Finish exposed screw heads to match color of shelf lip.
- G. Install one (1) adjustable shelf for each 1 foot 0 inch of height for all wall mounted cabinets.
- H. Provide stretcher at top face of all door and drawer fronts.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Verify adequacy of backing and support framing.

3.02 INSTALLATION

- A. Set and secure casework in place rigid, plumb, and level.
- B. Install casework in accordance with Section 10 and the Appendix of the NAAWS.

3.03 ADJUSTING AND CLEANING

- A. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.
- B. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF SECTION

SECTION 06 61 16

SOLID SURFACING FABRICATIONS

PART 1 - GENERAL

1.0. SECTION INCLUDES

- A. Solid surfacing countertops and fabrications.
- B. Coordination with fixtures and components specified in other sections.

1.1. REFERENCES

- A. AWS – Architectural Woodwork Standards, 1st Edition, 2009.
- B. National Sanitation Foundation standards.
- C. ASTM C 501 - Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abrader.
- D. ASTM D 256 - Impact Resistance of Plastics and Electrical Insulating Materials.
- E. ASTM D 570 - Water Absorption of Plastics.
- F. ASTM D 638 - Tensile Properties of Plastics.
- G. ASTM D 696 - Coefficient of Linear Thermal Expansion of Plastics.
- H. ASTM D 2583 - Indentation Hardness of Rigid Plastics by Means of a Barcol Impresser.
- I. ASTM E 84- Surface Burning Characteristics of Building Materials.
- J. National Electrical Manufacturers Association (NEMA) LD.3 High Pressure Decorative Laminates.

1.2. SUBMITTALS

- A. Provide submittals under provisions of Section 01 33 00.
- B. Product and Material Data
 - 1. Include materials, component profiles, fastening methods, assembly methods, joint details, accessory listings, and schedule of finishes. Include seaming plan of all countertop materials.
 - 2. Coordinate with fittings, including sinks and faucets specified in other Sections.
- C. Provide Woodwork Institute (WI) Certified Compliance documents as specified.
 - 1. Provide WI Certified Compliance label on shop drawings.
 - 2. Provide WI Certified Compliance Certificate prior to delivery to job site.

3. Provide WI Certified Compliance Label on all casework and countertops.
- D. Samples**
1. Prior to fabricating mock-up, provide color chip/sample of solid surfacing for Architects color review.
 2. Prior to fabricating mock-up, provide minimum 4 x 4 inch samples of each color and finish.
 3. Incorporate all selections in mock-up.

1.3. QUALITY ASSURANCE

- A. Provide fabricator specializing in the fabrication of specified solid surfacing countertops, be accredited by manufacturer, with a minimum of five years documented experience, including completion of projects of similar scope within past 12 months.
- B. Perform work in accordance with WI Architectural Woodwork Standards (AWS), Section 10 Casework, Section 11 Countertops, and as required by this Section.
 1. Where more restrictive than referenced standards, comply with requirements of this Section.
- C. Issue a WI Certified Compliance Certificate prior to delivery certifying that products fully meet all the requirements of the AWS Grade specified.
- D. After completion, issue a WI Certified Compliance Certificate for Installation certifying that products fully meet all the requirements of the AWS Grade specified.
- E. Review all fixtures and fittings specified in other sections to verify fit and alignment. Countertop fabricator is responsible for coordinating all components, including plumbing and electrical components, into a fully functional assembly complying with specified criteria.

1.4. MOCKUP

- A. Prepare mockup under provisions of Section 01 45 00.
- B. Provide full size countertop for each type indicated, in specified finish.
- C. Units will be examined to ascertain quality and conformity to AWS standards and specification.
- D. Units will establish a minimum standard of quality for this work.
- E. Approved units may be used as part of the Work.

1.5. DELIVERY AND STORAGE

- A. Deliver work in this section only at such time as the work is ready and suitable for installation.
- B. Comply with requirements of AWS, Section 2 and 11, and manufacturers published criteria.

1.6. CONTRACTORS GUARANTY

- A. Provide Owner with written Guarantee on Contractor's letterhead and signed by General Contractor and cast plastic fabricator.
- B. Provide guarantee for a time period of three years, commencing from the date of final acceptance of the project.
- C. Provide guarantee against defects in fabrication and performance, including cracking and spalling of surface from contact with hot or cold materials, and against staining in excess of the specified limits.
- D. Restore the affected areas to the standard of the original specifications as soon as weather permits.

1.7. MANUFACTURERS WARRANTY

- A. Provide Owner with manufacturers commercial guarantee written on company letterhead, warranting repair or replacement of cast plastic components.
- B. Provide warranty covering cost of labor in such repair or replacement activities.
- C. Provide warranty against manufacturing defects for a period of 10 years after installation.

2. PART 2 - PRODUCTS

2.0. SOLID SURFACE

- A. Manufacturer: As indicated on Wall and Finish Materials Legend in drawings
- B. Type: Cast acrylic Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment; not coated, laminated or of composite construction; meeting following criteria:
 - 1. Provide solid surfacing conforming to AWS Section 10 and 11, Premium grade, modified as specified in this Section.
- C. Configuration:
 - 1. Thickness: Minimum 1/2 inch, with additional thickness as shown on drawings.
 - 2. Edge: As shown on drawings.
 - 3. Splash: As shown on drawings.
- D. Product and Performance Characteristics:

1.	Tensile Strength	6000 psi min	ASTM D638
2.	Tensile Modulus	1.5 x 106 psi min	ASTM D638

3.	Tensile Elongation	0.4% min.	ASTM D638
4.	Flexural Strength	10000 psi min	ASTM D790
5.	Flexural Modulus	1.2 x 106 psi min	ASTM D790
6.	Hardness	>85-Rockwell "M" scale min.	ASTM D785
7.	Thermal Expansion	2.2 x 10 ⁻⁵ in./in./°F	ASTM E228
8.	Fungi and Bacteria	Does not support microbial growth	ASTM G21 & G22
9.	Microbial Resistance	Highly resistant to mold growth	UL 2824
10.	Ball Impact	No fracture - 1/2 lb. Ball: 6 mm slab - 36" drop 12 mm slab - 144" drop	NEMA LD 3, Method 3.8
11.	Weatherability	ΔE*94<5 in 1,000 hrs	ASTM G155
12.	Flammability	ASTM E84, NFPA 255 & UL 723	
		<u>6 mm</u>	<u>12 mm</u>
13.	Flame Spread	<25	<25
14.	Smoke Developed	<25	<25
15.	Class	A	A NFPA 101®, Life Safety Code

E. Chemical Reagent Resistance: Provide chemical and stain resistance as published by manufacturer for Arctic White color. After exposure to the published reagents, both covered and uncovered, any stain shall be removed by scrubbing with a wet Scotch Brite pad and bleaching cleanser. There shall be no permanent marring or crazing of surface.

F. Accessories:

1. Adhesives: Color matched adhesive as recommended by manufacturer.
2. Sealants: Silicone type, acid resistant, as recommended by top manufacturer for fixture applications.

G. Finish:

1. Finish: Medium Gloss.

H. Accessories:

1. Adhesives: Color matched adhesive as recommended by manufacturer.
2. Sealants: Silicone type, acid resistant, as recommended by top manufacturer for fixture applications.

I. Other Materials

1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

2.1. FABRICATION

- A. Fabricate solid surfacing conforming to AWS Premium grade.
- B. Fabricate solid surfacing conforming to AWS Premium grade and manufacturers recommendations.
- C. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.
- D. Form joints between components using manufacturer's recommended joint adhesive without conspicuous joints.
- E. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.
- F. Rout and finish component edges with clean, sharp returns.
 1. Rout cutouts, radii and contours to template.
 2. Smooth edges.
- G. Countertop Pattern and configuration:
 1. As shown on drawings
 2. Provide waterfall /no-drip/drip groove perimeter edge
 3. Provide coved /butt back splash with waterfall/square top edge

3. PART 3 - EXECUTION

3.0. SURFACE CONDITIONS

- A. Inspection
 1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
 2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
 3. In the event of discrepancy, immediately notify the Architect.
 4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.1. INSTALLATION - COUNTERTOPS

- A. Set and secure countertops in accordance with AWS, Section 11.
- B. Set all counters level, square and in true alignment. Counters shall fit tightly to walls and upon completion of installation shall show no marks, indentations, or other defects. Furnish all fillers, trim and molding required for finished installation.
- C. Install countertops in accordance with manufacturer's procedures and recommendations.

3.2. CLEANING

- A. Clean surfacing and fixtures per manufacturer's instructions and per Section 01 77 19.

END OF SECTION

SECTION 07 13 26

SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1. SECTION INCLUDES:

- A. Modified Bituminous Sheet Waterproofing.
 - 1. General underlayment.
 - 2. Roofing underlayment.
 - 3. Flexible membrane flashing.

1.2. RELATED SECTIONS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 06 10 00 - Rough Carpentry (plywood sheathing)
- C. Section 07 21 00 – Thermal and Acoustical Insulation
- D. Section 07 62 00 – Sheet Metal Flashing and Trim
- E. Section 07 72 00 - Roof Accessories
- F. Section 07 92 00 - Joint Protection
- G. Work may be required to be coordinated with other sections

1.3. REFERENCES (Current Edition of All Referenced Standards)

- A. ASTM International
 - 1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants
 - 2. ASTM C1193 – Standard Guide for Use of Joint Sealants
 - 3. ASTM D412- Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
 - 4. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
 - 5. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
 - 6. ASTM D3767 - Standard Practice for Rubber - Measurement of Dimensions.
 - 7. ASTM D4541 – Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
 - 8. ASTM D5957 - Standard Guide for Flood Testing Horizontal Waterproofing Installations
 - 9. ASTM D6506 - Standard Specification for Asphalt Based Protection Board for Below-Grade Waterproofing

10. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials
 11. ASTM E96/ E96M - Standard Test Methods for Water Vapor Transmission of Materials
 12. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
 13. ASTM E1677 - Specification for Air Retarder Material or System for Framed Building Walls
 14. ASTM E1186 – Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
 15. ASTM E2112 - Standard Practice for Installation of Exterior Windows and Doors
 16. ASTM E2178 - Test Method for Air Permeance of Building Materials
 17. ASTM E2266 Standard Guide for Design and Construction of Low-Rise Frame Building Wall Systems to Resist Water Intrusion
 18. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
 19. ASTM G90 – Standard Practice for Performing Accelerated Outdoor Weathering of Materials Using Concentrated Natural Sunlight
- B. American Association of Textile Chemists & Colorists (AATCC)
1. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test
- C. CCR, Title 24, 2021 ICC, With State of California Amendments – 2022 California Building Code (CBC), Part 2, Vols. 1 and 2
- D. CCR, Title 24, 2022 CALGreen Code, Part 11
- E. EMMA/EMMAQUA test.
- F. ICC-ES ESR-3121 – Self-Adhering Membrane
- G. NRCA (National Roofing Contractors Association) - Waterproofing Manual.
- H. Underwriters Laboratory (UL) Fire Resistance Directory

1.4. SUBMITTALS.

- A. Submit product data under provisions of Section 01 33 00, “Submittal Procedures”.
- B. Submit product data for all materials used in system, including primers, membrane material, flexible flashing, and joint and crack sealants. Provide written certification of current VOC approval of all products used in system.
- C. Accompanying product data, submit complete installation methods, with temperature range for application of waterproofing membrane.
- D. Accompanying product data, submit letter certifying compatibility and acceptability of specified substrate, including preparation, for selected waterproofing system.

1.5. QUALIFICATIONS & QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturers.

1.6. PRE-INSTALLATION CONFERENCE

- A. Preinstallation Conference: Conduct conference at Owner-directed location.
 - 1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.7. MOCKUPS

- A. Build mockups to verify selections made under sample submittals and to set quality standards for installation.
- B. Build for each typical waterproofing installation including accessories to demonstrate surface preparation, crack and joint treatments, inside and outside corner treatments, and protection.
- C. Description: Each type of wall installation.
- D. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- E. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8. ENVIRONMENTAL REQUIREMENTS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
 - 1. Do not apply waterproofing in snow, rain, fog, or mist.
- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.9. REGULATORY REQUIREMENTS:

- 1. Products listed in this specification must meet the following requirements, where applicable:
 - a. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
 - b. Underwriters Laboratories Inc. Classified Sheathing Material Fire Resistance Classification with Roof Designs: P225, P227, P230, P237, P259, P508, P510, P512, P514, P701, P711, P717, P722, P723, P732, P734, P736, P742, P803, P814, P818, P824
 - c. ICC-ES ESR-3121, per AC 48 Acceptance Criteria for Roof Underlayments used in Severe Climate Areas.
 - d. CalGreen Code, Section 4.504, "Pollutant Control"(VOC limits).

1.10. WARRANTY

- A. Contractor's Guarantee:

1. Provide Owner with written Guarantee on Contractor's letterhead and signed by General Contractor and waterproofing system subcontractor.
2. Provide guarantee for a time period of three years, commencing from the date of final acceptance of the project, against the following defects or failures:
 - a. Membrane delamination from substrate.
 - b. Free water penetration through membrane and substrate.
 - c. Water vapor transmission through membrane in excess of specified characteristics.
3. Make inspections and emergency repairs to defects or leaks in the waterproofing system within twenty-four (24) hours of receipt of notice from the Owner.
4. Restore the affected areas to the standard of the original specifications as soon as weather permits.

PART 2 - PRODUCTS

2.1 MANUFACTURERS - MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet: Minimum 60-mil. nominal thickness, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated on one side to a 4-mil- thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction (AHJ).
 1. Acceptable Products, or equal:
 - a. For General Waterproofing:
 - 1) GCP Applied Technologies,
Product Representative. Matt Miller,
Phone - (408) 421-1334.
Product: Bituthene 4000, or equal.
Product Website Link: <https://gcpat.com/en/solutions/products/bituthene-post-applied-waterproofing/bituthene-4000-membrane>
 - 2) Carlisle Coatings and Waterproofing Inc.,
Phone - (800) 527-7092.
Product: CCW MiraDRI 860/861, or equal.
Product Website Link:
<https://www.carlisleccw.com/category.aspx?category=150>
 - 3) Henry Company, Blueskin
Phone - (800) 486-1278.
Product: WP 200, or equal.

Product Website Link: <https://henry.com/residential-and-light-commercial/foundation-and-below-grade/blueskin-wp200>.

- b. For Roofing Underlayment – Ice and Water Shield:
- 1) GCP Applied Technologies,
Product Representative. Matt Miller,
Phone - (408) 421-1334
Product: Ice and Water Shield HT, or equal.
Product Website Link <https://gcpat.com/en/solutions/products/grace-ice-water-shield-roofing-underlayment/grace-ice-water-shield-ht-us-version>
 - 2) Imetco,
Phone - (800) 646-3826
Product: Imetco, “Aquablock 60”, or equal.
Product Website Link: <https://imetco.com/products/roof-cladding-systems/roof-underlayments/>
- c. For Flexible Membrane Flashing At Penetrations and Around Openings:
- 1) GCP Applied Technologies,
Product Representative. Matt Miller,
Phone - (408) 421-1334
 - a) Product: GCP, “Vycor 40”, or equal.
Product Website Link: <https://ca.gcpat.com/en/solutions/products/vycor-weather-barrier-flashing-tapes/vycor-v40>
 - b) Product: GCP, “Perm A Barrier Wall Flashing”, or equal.
Product Website Link: <https://gcpat.com/en/solutions/products/perm-a-barrier-air-barrier-system/perm-a-barrier-wall-flashing>
 - 2) DuPont,
Phone: (833) 338-7668
 - a) DuPont, “FlexWrap”, or equal: Flexible membrane flashing materials for window openings and penetrations.
Product Website Link: <https://www.dupont.com/products/dupont-flexwrap.html>
 - b) DuPont, “StraightFlash”, or equal: Straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.
Product Website Link: <https://www.dupont.com/products/dupont-straightflash.html>
 - c) DuPont, “VersaFlange”, or equal: Self-adhered window and door flashing for non-flanged and brick mold windows and doors. It features specially

designed release papers with dual-sided butyl adhesive, scored backing and a forgiving initial tack, enabling quick and easier installation

Product Website Link: <https://www.orepac.com/media/1787/duPont-versaflange-pis-43-d100373-enna.pdf>

2. Substitutions per Section 01 25 00, "Substitution Procedures"

2.2 MATERIALS:

- B. Self-Adhering Sheet Membrane Underlayment shall comply with the following characteristics:
 1. Material: Cold applied, self-adhering membrane composed of an innovative and proprietary rubberized asphalt adhesive and interwound with a disposable release sheet. An embossed, slip resistant surface is provided on the high-performance film with UV barrier properties.
 2. Membrane Thickness: 60 mils (1.02 mm) per ASTM D3767 Method A.
 3. Membrane Tensile Strength: MD 33 lbf/in, CD 31 lbf/inch per ASTM D412 Die C Modified.
 4. Membrane Elongation: 250% per ASTM D412 Die C Modified.
 5. Low Temperature Flexibility: Unaffected at -20 degrees F (-29 degrees C) per ASTM D1970.
 6. Adhesion to Plywood: 5.0 lb/in. width (876 N/m) per ASTM D903.
 7. Maximum Permeance: 0.05 perms (2.9 ng/sgms Pa) per ASTM E96.
 8. Maximum Material Weight Installed: 0.22 pounds/sqft (1.1 kg/sqm) per ASTM D461.
 9. Service Temperature: 260 degrees F (115.6 degrees C) per ASTM D1204
 10. Compatibility: Suitable for use under all types of sloped roofing with the exception high altitude climates where zinc, copper or Cor-Ten roof coverings are used.
 11. Adhesive: Rubberized asphalt adhesive containing post-consumer recycled content, contains no calcium carbonate, sand or fly ash.
 12. Exposure: Can be left exposed for a maximum of 120 days from date of installation per ASTM G90 – EMMAQUA test.
 13. Primer: Water-Based Perm-A-Barrier WB Primer by GCP Applied Technologies, Inc. Website: <https://gcpat.com/en/solutions/products/perm-a-barrier-air-barrier-system/perm-a-barrier-wb-primer>
 14. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.3 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
 1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid waterborne primer recommended for substrate by sheet-waterproofing material manufacturer.

- C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.
- D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
- E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.
- F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch, predrilled at 9-inch centers.
- G. Protection Course: ASTM D6506, semi-rigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:
 - 1. Thickness: Nominal 1/8 inch.
 - 2. Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for protection course type.

PART 3 - EXECUTION

3.1. INSPECTION

- A. Prior to work of this Section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
- B. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
- C. In the event of discrepancy, immediately notify the Architect.
- D. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. PREPARATION

- A. Clean and prepare surfaces to receive waterproofing, in accordance with manufacturer's instructions.
- B. Apply recommended system components to seal penetrations, small cracks, and honeycomb in substrate.
- C. Protect adjacent surfaces not designated to receive waterproofing.
- D. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

3.3. WATERPROOF MEMBRANE UNDERLAYMENT INSTALLATION:

- A. Prepare substrate as recommended by manufacturer.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

- C. Installation: Where applies, install roofing underlayment on sloped surfaces at locations indicated on the Drawings, but not less than at hips, ridges, eaves, valleys, sidewalls and chimneys, and surfaces over interior space within 36 inches from the inside face of the exterior wall. Strictly comply with manufacturer's installation instructions including but not limited to the following:
- D. Schedule installation such that underlayment is covered by roofing within the published exposure limit of the underlayment.
- E. Do not install underlayment on wet or frozen substrates.
- F. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
- G. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.
- H. Remove dust, dirt, loose materials and protrusions from deck surface.
- I. Install membrane on clean, dry, continuous structural deck. Fill voids and damaged or unsupported areas prior to installation.
- J. Install membrane such that all laps shed water. Work from the low point to the high point of the roof at all times. Apply the membrane in valleys before the membrane is applied to the eaves. Following placement along the eaves, continue application of the membrane up the roof. Membrane may be installed either vertically or horizontally after the first horizontal course.
- K. Side laps minimum 3-1/2 inches (89 mm) and end laps minimum 6 inches (152 mm) following lap lines marked on underlayment.
- L. Patch penetrations and damage using manufacturer's recommended methods.
- M. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Re-prime areas exposed for more than 24 hours.
- N. Two-Ply Application: Install sheets to form a membrane with lap widths not less than 50 percent of sheet widths, to provide a minimum of two thicknesses of sheet membrane over areas to receive waterproofing.
- O. Horizontal Application: Apply sheets from low to high points of decks to ensure that laps shed water.
- P. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.
- Q. Seal edges of sheet-waterproofing terminations with mastic.
- R. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.
- S. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fish-mouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.
- T. Immediately install protection course with butted joints over waterproofing membrane.

- U. Molded-sheet drainage panels may be used in place of a separate protection course to vertical applications when approved by waterproofing manufacturer and installed immediately.

3.4. FLASHING (for use with non-flanged windows – all cladding types)

- A. Follow manufactures written instructions, provide compatible primers to substrates where required.
- B. Conceal water-resistive barrier system components under exterior wall claddings and finishes, do not leave them exposed to ultraviolet light.
- C. Provide self-adhered flashing under all sheet metal flashings, and install in a continuous watertight manner with the building water-resistant barrier membrane.
- D. Provide high heat-resistant type self-adhered flashings and self-adhered membrane under sheet metal flashings exposed to high heat conditions such as under sheet metal copings exposed to the sun.
- E. Handroll self-adhered membranes and flashings with a rolling tool and use required pressure to eliminate blisters and wrinkles, and to ensure well-adhered, watertight laps.
- F. Sequence the installation of horizontal self-adhered flashings and membranes to avoid reverse laps and to promote drainage.
- G. Cut 9-inch wide flexible membrane flashing a minimum of 12 inches longer than width of sill rough opening.
- H. Cover horizontal sill by aligning flexible membrane flashing edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- I. Fan flexible membrane flashing at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanically fastening flexible membrane flashing is not required.
- J. Apply 9-inch wide strips of straightflash membrane flashing at jambs. Align flashing with interior edge of jamb framing. Start straightflash membrane flashing at head of opening and lap sill flashing down to the sill.
- K. Spray-apply primer to top 6 inches of jambs and exposed sheathing.
- L. Install flexible membrane flashing at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.
- M. Coordinate flashing with window installation.
- N. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.
- O. Position weather barrier head flap across head flashing. Adhere using 4-inch wide straightflash membrane flashing over the 45-degree seams.
- P. Tape top of window in accordance with manufacturer recommendations.
- Q. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C1193.

3.5. THRU-WALL FLASHING INSTALLATION

- A. Apply primer per manufacturer's written instructions – see Section 07 25 00, "Weather Barriers".
- B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.
- C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.
- D. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.
- E. Roll flashing into place. Ensure continuous and direct contact with substrate.
- F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.
- G. Trim exterior edge of membrane 1-inch and secure metal drip edge per manufacturer's written instructions.
- H. Terminate membrane on vertical wall. Terminate into reglet, counterflashing or with termination bar.
- I. Apply sealant bead at each termination.

3.6. THRU-WALL FLASHING/WEATHER BARRIER INTERFACE AT BASE OF WALL

- A. Overlap thru-wall flashing with weather barrier by 6-inches.
- B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.
- C. Seal vertical and horizontal seams with tape or sealing membrane.

3.7. THRU-WALL FLASHING/WEATHER BARRIER INTERFACE AT SHELF ANGLE

- A. Seal weather barrier to bottom of shelf angle with sealing membrane.
- B. Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.
- C. Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

3.8. THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT WINDOW HEAD

- A. Cut flap in weather barrier at window head.
- B. Prime exposed sheathing.
- C. Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.
- D. Install end dams bedded in sealant.
- E. Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.
- F. Apply sealant along thru-wall flashing edges.
- G. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.
- H. Tape diagonal cuts of weather barrier.
- I. Secure weather barrier flap with fasteners.

3.9. FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components; and to furnish daily reports to Architect.
- B. Flood Testing: Flood test each deck area for leaks, according to procedures in ASTM D5957, after completing waterproofing but before placing overlying construction. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
 - 1. Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and a maximum depth of 4 inches. Maintain 2 inches of clearance from top of sheet flashings.
 - 2. Flood each area for 72 hours.
 - 3. Testing agency shall observe flood testing and examine underside of decks and terminations for evidence of leaks during flood testing.
 - 4. After flood testing, repair leaks, repeat flood tests, and make further repairs until waterproofing installation is watertight.
- C. Electronic Leak-Detection Testing:
 - 1. Testing agency shall test for leaks using an electronic leak-detection method that locates discontinuities in the waterproofing membrane.
 - 2. Testing agency shall perform tests on abutting or overlapping smaller areas as necessary to cover entire test area.
 - 3. Testing agency shall create a conductive electronic field over the area of waterproofing to be tested and electronically determine locations of discontinuities or leaks, if any, in the waterproofing.
 - 4. Testing agency shall provide survey report indicating locations of discontinuities, if any.
- D. Waterproofing will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.10. PROTECTION, REPAIR, AND CLEANING

- A. Thoroughly inspect and repair defects in water-resistive barrier system components, from spinners and shiners (removed or abandoned fasteners that miss supports), unsealed holes from removed fasteners, scaffold tie-backs, tears, delaminations, and any other condition that would allow bulk water intrusion beyond the water-resistive barrier system into the building, before concealment with wall claddings.
- B. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- C. Do not permit foot or vehicular traffic on unprotected membrane.
- D. Protect waterproofing from damage and wear during remainder of construction period.
- E. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is

subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

- F. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION

SECTION 07 21 00
THERMAL AND ACOUSTICAL INSULATION

PART 1 - GENERAL

1.1. SECTION INCLUDES

- A. Batt acoustical insulation for interior wall and ceiling construction.
- B. Batt thermal insulation for exterior wall and ceiling construction.

1.2. RELATED SECTIONS

- A. Section 05 12 00 - Structural Steel
- B. Section 06 10 00 - Rough Carpentry
- C. Section 07 13 26 – Self-Adhering Sheet Waterproofing.
- D. Section 07 62 00 - Sheet Metal Flashing and Trim.
- E. Work may be required to be coordinated with other sections

1.3. REFERENCES (Current Edition for All Standards Listed)

- A. American Associate of Textile Chemists and Colorists (AATCC) - Test Method 127
- B. American Society For Testing and Materials (ASTM) International:
 - 1. ASTM C177 - Standard Test Method For Steady-State Heat Flux Measurements And Thermal Transmission Properties By Means Of The Guarded-Hot-Plate Apparatus
 - 2. ASTM C203 - Standard Test Methods for Breaking Load and Flexural Properties of Block Type Thermal Insulation.
 - 3. ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board.
 - 4. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
 - 5. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 6. ASTM C578 -Standard Specification For Rigid, Cellular Polystyrene Thermal Insulation
 - 1) ASTM C612 - Standard Specification For Mineral Fiber Block And Board Thermal Insulation.
 - 2) ASTM C665 - Standard Specification For Mineral-Fiber Blanket Thermal Insulation For Light Frame Construction And Manufactured Housing.
 - 7. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

8. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 9. ASTM D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
 10. ASTM E84 - Standard Test Method For Surface Burning Characteristics Of Building Materials
 11. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
 12. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
 13. ASTM2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
- C. Air Barrier Association of America (ABAA):
- D. 2022 California Building Code (CBC), Title 24 – Sections as referenced.
- E. Factory Mutual Global (FMG) - FMG 4470
- F. International Code Council - Evaluation Service:
1. ICC-ES AC12 - Acceptance Criteria for Foam Plastic Insulation
 2. ICC-ES AC71 - Foam Plastic Sheathing Panels Used as Weather-Resistive Barriers.
 3. ICC-ES Evaluation Report ESR-3398 - Johns Manville AP Foil-Faced Sheathing.
- G. National Fire Protection Association (NFPA):
1. NFPA 259 - Standard Test Method for Potential Heat of Building.
 2. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components Underwriters Laboratories (UL and ULC): Audit manual - File R10167.
- H. FMG 4470 – Approval Standard for Class 1 Insulated Steel Deck Roofs.
- I. Underwriter’s Laboratory UL File No. R101067 (for John Mansville product specified, or equal)

1.4. SUBMITTALS

- A. Materials List:
1. Submit materials list in accordance with Section 01 33 00, “Submittal Procedures”.
 2. Prepare complete materials list identifying specific insulation types and applications.
 3. Provide agency approval documentation, including ICBO ES reports, State Fire Marshal Listing, or other approvals.
- B. Product Data: Submit manufacturer’s product data sheets including the following:
1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.

- C. ICC-ES Evaluation Report: Submit current ESR-3398, Johns Manville AP Foil-Faced Sheathing.
- D. Samples: Submit 12 inch square insulation panel.

1.5. PERFORMANCE REQUIREMENTS

- A. Comply with CBC, Title 24, Part 2, Chapter 7, fire resistivity ratings.

1.6. QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by insulation system manufacturer to install manufacturer's product.
- B. Manufacturer Qualifications: A qualified manufacturer that has ASTM C1289, NFPA 285, and ASTM E84 listing for continuous insulation system identical to that used for this Project.
- C. Preconstruction Meeting: Before installation, conduct conference at Project site. Comply with requirements for pre-installation conferences in Section 01 31 00, "Project Management Coordination" Review methods and procedures related to continuous insulation construction and including the following:
 - 1. Meet with Owner, Architect, Installer, manufacturer's representative, and installers that interface with or affect the installation of continuous insulation sheathing.
 - 2. Review metal wall framing and roofing assemblies for potential interference and conflicts.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review continuous insulation sheathing guidelines as require by Manufacturer's installation manual.
 - 5. Review governing regulations and requirements for insurance and certificates if applicable.

1.7. DELIVERY, STORAGE, AND HANDLING

- A. Deliver insulation materials to project site with original packaging unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and installing with other components.
- B. Store materials in clean, dry area in manufacturer's unopened packaging until ready for installation and in accordance with manufacturer's instructions and temperature recommendations. Packaging shall be intact with no exposed foam or loose flaps, labels and feet/legs must be securely affixed.
- C. Handle and store insulation materials in a manner to avoid damaging materials.

1.8. PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit system to be installed according to manufacturer's written instructions and warranty requirements.

1.9. DELIVERY, STORAGE, AND HANDLING

- A. Protection:

1. Deliver, store and handle all products in a manner to prevent damage and deterioration.
2. Use all means necessary to protect the installed work and materials of all other trades.
3. Deliver all materials in unopened bundles, labeled with date of manufacturer and testing agency approval.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

- A. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance.
- B. The Architect will consider requests for substitutions, under the provisions of 01 25 00, "Substitution Procedures".

2.2. FIBERGLASS BATT ACOUSTICAL INSULATION

- A. Manufacturer: Johns Manville, www.jm.com, or equal.
- B. Type: Glass fiber batt, friction fit, unfaced.
- C. Construction:
 1. Blanket: Glass Fiber, Type 1 per ASTM C665
 - a. Provide formaldehyde free insulation with acrylic binder.
 - b. Provide minimum 25 percent total recycled content, with minimum 18 percent post-consumer recycled content.
 2. Facing: None.
 3. Thickness: At interior walls – R-11, unfaced.
- D. Fire/Habitability Criteria:
 1. Flame Spread Classification: Maximum 25 per ASTM E84
 2. Smoke Developed Classification: Maximum of 50 per ASTM E84
 3. Thermal Resistance: Minimum R-11 per ASTM C177 or C518.
- A. Substitutions for all products listed this Section per Section 01 25 00, "Substitution Procedures"

2.3. FIBERGLASS BATT THERMAL INSULATION & ACCESSORIES

- A. Manufacturer: Johns Manville, www.jm.com, or equal.
 1. Within Closed Wall Cavity: R-19 pre-formed kraft-faced fiberglass batts at all exterior walls.
 2. Exterior Wall Batt Insulation Exposed to Spaces Above Ceiling: R-19 Preformed foil-faced fiberglass batts at all exterior walls.
 3. In All Exterior Soffits: Unfaced batts, in thicknesses sufficient to fill the entire cavity – see drawings.

4. At Mechanical Curbs – As described in drawings – see architectural roof details and mechanical roof details for reference.
 5. Where Required At Mech Curbs: Wire mesh, 1 ½” x 17 ga. poultry netting.
 6. Nails, Staples and Self-Tapping Screws – Steel wire, electroplated – size and length to meet required conditions, or as specifically noted in details.
 7. Vapor Retarder: Vapor-relief strips, as recommended by insulation manufacturer.
 - a. See Section 07 25 00, “Weather Barriers” for exterior weather barriers.
 8. Accessories: Provide as recommended by installation manufacturer for all insulation types listed and substrates.
- B. Construction:
1. Blanket: Glass Fiber per ASTM C665.
 2. Exposed Facer: Provide reinforced foil facing, with stapling flange, with maximum 25 flame spread classification and maximum 450 smoke contributed classification where facer is not in substantial contact with the unexposed surface of the ceiling finish. Required in Type 1/11 Buildings
 3. Concealed Facer: un-faced insulation without fire and smoke rating where facer is in substantial direct contact with unexposed surface of wall finish. Kraft paper using this exception only acceptable only in Type III/IV/V buildings.
- C. Fire/Habitability Criteria
1. Flame Spread Classification: Maximum 25 per ASTM E84
 2. Smoke Developed Classification: Maximum of 50 per ASTM E84
 3. Thermal Resistance: R-19 value, per ASTM C177 or C518.
 4. Perm Rating (Foil facer): Maximum 0.02 grains/hr./sf/in Hg per ASTM C665.
 5. Perm Rating (Kraft facer): Maximum 1.0 grains/hr./sf/in Hg per ASTM C665.
- D. Substitutions for all products listed this Section per Section 01 25 00, “Substitution Procedures”.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:
1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
 2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
 3. In the event of discrepancy, immediately notify the Architect.
 4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 INSTALLATION

- A. Install insulation in accordance with insulation manufacturer's instructions and as specified.
- B. Install faced insulation with facing to occupied room side. Install non-rated facing in contact with unexposed surface of finish materials.
 - 1. At floors over unconditioned crawl space, install insulation with facing towards crawl space.
- C. Do not install insulation over recessed light fixtures.
- D. Trim insulation neatly to fit spaces. Fit insulation into crevices, spaces at outlet boxes and similar penetrations.
- E. Maintain continuous foil faced vapor barrier. Provide fire resistive tape at all edges or penetrations of foil faced insulation, including batt ends.
- F. Where wall insulation cavity exceeds 8 feet high, provide blocking or other approved support at 8 feet on center.
- G. Wire Lacing Support Method:
 - 1. Provide wire lacing method at floor and roof insulation where spacing of framing members exceeds batt width.
 - 2. Provide wire lacing diagonally at bottom of joist cavity, fastened 16 inches on center, staggered, and fastened to each joist in an approved manner.
 - 3. Adjust lacing as necessary to provide taut and consistent support for insulation batts.
 - 4. Install insulation on lacing supports. Provide additional wire lacing at unsupported ends of batts.
 - 5. Tape all batt ends and penetrations.

END OF SECTION

SECTION 07 32 13
CLAY ROOF TILES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Clay Roofing Tiles.
- B. Flashing and Underlayment.
- C. Fastening system.

1.2 REFERENCES

- A. ASTM C 1167 - Standard Specification For Clay Roof Tiles.
- B. NRCA - Roofing and Waterproofing Manual.
- C. UL - Fire Hazard Classifications.

1.3 DESIGN CRITERIA

- A. **1.6.1** Roof System Design Requirements:
 - 1. **1.6.1.3** Provide Roof System suitable for installation over solid plywood sheathing at all other buildings.

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Submit product data indicating clay tile, underlayment, fastening system and accessories.
- C. Provide letter of certification, signed by roofing installer, that all products used in completed roof assembly are asbestos free.
- D. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- E. Samples: Submit two samples of complete color range specified, full size.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing specified or similar products, with minimum five years prior documented experience.
- B. Applicator: Company specializing in applying clay tile roofing with minimum 5 years documented experience and approved by materials manufacturer.

1.6 SOURCE QUALITY CONTROL

- A. Provide testing of concrete tile in accordance with DSA IR 32-2 and UBC Standard 15-5.

1.7 REGULATORY REQUIREMENTS

- A. Comply with requirements of Chapter 15, CCR, Title 24, Part 2, and DSA Interpretation of Regulations, IR M-7, dated 9/1/1999.

1.8 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference one week prior to commencing work of this Section, under provisions of Section 01 31 13. Attendance by material manufacturer's representative is mandatory.
- B. Review installation procedures and coordination required with related work.

1.9 GUARANTEE

- A. Contractor's Guarantee:
 - 1. Provide Owner with written Guarantee per Section 00 65 36 (00 65 36 A201 Basis) on Contractor's letterhead, and signed by General Contractor and roofing system subcontractor.
 - 2. Provide guarantee for a time period of five years, commencing from the date of final acceptance of the project, against the following defects:
 - a. Water penetration through roof tile assembly, including flashings, resulting from improper installation or material.
 - 3. Make inspections and emergency repairs to defects or leaks in the roof system within twenty-four (24) hours of receipt of notice from the Owner.
 - 4. Restore the affected areas to the standard of the original specifications as soon as weather permits.

1.10 EXTRA MATERIALS

- A. Provide Owner with extra tile, as specified, sufficient to re-roof 100 square feet of surface. Deliver tile to Owner as directed, in satisfactory containers.

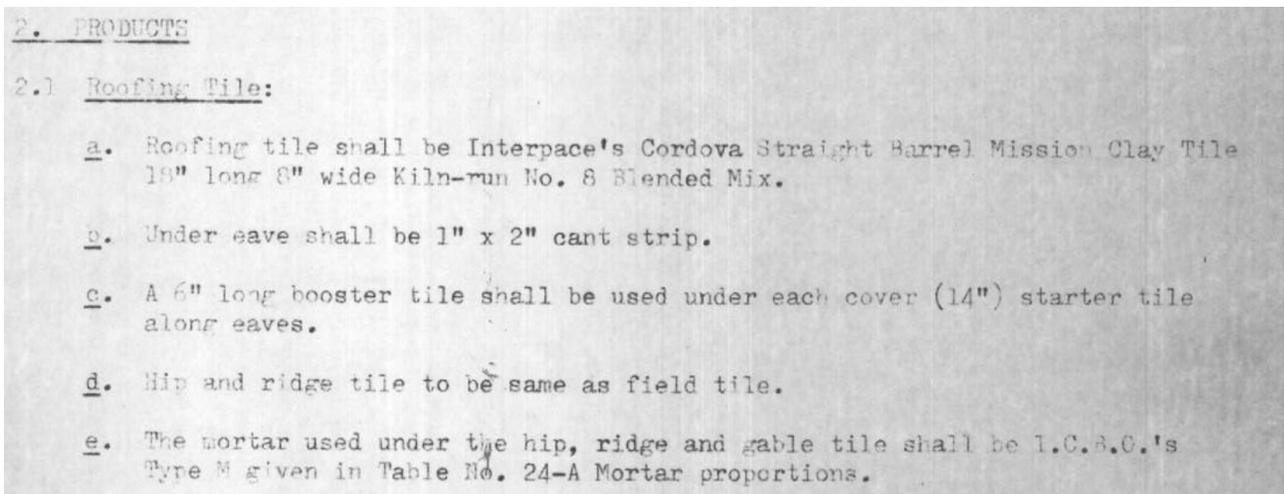
PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.2 ROOFING TILE

- A. GC shall match original roofing material. The following is an excerpt from the original DSA approved specification:



- B. Type: Two piece, barrel tile, tapered.

C. Characteristics

1. Weight: 9.30 pounds per square foot; for 3 inch heap lap . for 4 inch heap lap, 10.60 pounds per square foot.

D. Accessories:

1. Bird Stops: Provide integral clay bird stops at all eave conditions.

E. Approval:

1. ICBO Evaluation Service Number: ER 4642.
2. Conform to UBC Standard 15-5.
3. Conform to specified strength criteria in compliance with Chapter 15, CCR, Title 24, Part 2.

4. Fire Resistance Rating: Conform to Class A fire rating per UBC Standard 15-2. Provide test data demonstrating compliance as installed over project substrate.

F. Accessory Products

1. Insulation Fasteners: Provide fastener as required to comply with UL90 roof uplift listing, fluorocarbon finish, length as recommended by manufacturer to penetrate metal deck, with approved backer plate.
2. "Z" Clip: Provide galvanized steel "Z" clip, 20 gage, galvanized to G120 coating class.
3. Z-Clip Fasteners: Provide threaded mechanical fastener, fluorocarbon coated, length as recommended by manufacturer to penetrate metal deck.

2.3 UNDERLAYMENT MATERIALS

- A. Underlayment: Provide MBTechnology, www.mbtechnology.com, LayfastSBS TU 70 or equal SBS modified bitumen ply sheet underlayment, approved for use in Class A roofing systems, complying with ASTM D 226. Or equal

2.5 FASTENING SYSTEM AND BATTENS

- A. Manufacturer: Newport Fastener or equal www.newportfastener.com/.

2.6 ALTERNATE FASTENER TO TILE TYE SYSTEM

- A. Roof Tile Fasteners: Provide stainless steel ring shank nails, 11 gage minimum, 5/16 inch diameter head minimum, and of sufficient length to penetrate into sheathing or support members 3 / 4 inch.

2.7 MORTAR

- A. Where shown on drawings, provide mortar mix as recommended by the roofing tile manufacturer and conforming to Chapter 15, CCR, Title 24, Part 2 criteria.
- B. Provide integral color as selected by Architect.

2.8 FLASHING

- A. Provide dead soft 1100 alloy aluminum flashing sheet, for all vent and counterflashing penetrations through tile. Dead soft aluminum products available from Harlen Metals, ALL Roofing Materials, phone 1-800-625-5766, Bay City Metals, www.baycitiesmetalproducts.com and Bay Wholesale, phone 415-992-9943. Use of **lead** flashing products not acceptable.

2.9 ELASTOMERIC FLASHING

- A. Manufacturer: MFM Building Products, <http://www.mfmbp.com/>.
 1. Alternate Manufacturer: Polyken, or equal.

- B. Type: Rubberized Asphalt, with aluminum film facer.
- C. Series: MFM "Peel and Seal".
- D. Characteristics:
 - 1. Thickness: 0.040 inches (40 mils) nominal.
 - 2. Width: 18 inch.
 - 3. Facing Color: White

2.10 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for a complete and proper installation of tile roofing, as selected by the Contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:
 - 1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
 - 2. Verify that tile roofing may be installed in complete accordance with all pertinent codes and regulations, the original design, and the manufacturer's current recommendations.
 - 3. In the event of discrepancy, immediately notify the Architect.
 - 4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 COORDINATION

- A. Coordinate tile installation to minimize roof deck weather exposure.
- B. Blend tile layout in accordance with manufacturers recommendations and as required to avoid shading and streaking.
- C. *Verify insulation and deck brackets are properly aligned for tile fastening system installation.*

3.3 INSTALLATION

- A. Underlayment:

1. Install two layers of specified underlayment over substrate and under all tile roofing. Shingle lap all edges.
 2. Install all underlayment in as specified and per approved submittals.
 3. Mop lap edges of upper layer with steep roof asphalt emulsion or plastic cement.
 4. Install battens as recommended by tile manufacturer and per Chapter 15, CCR, Title 24, Part 2 *IBC Chapter 15*.
 5. Elastomeric Flashing.
 - a. Prepare substrate as recommended by manufacturer. Prime and detail as required for specific conditions.
 - b. Install elastomeric flashing as shown on drawings and at gutters, valleys, ridges, hips, and roof edge/wall flashing transitions.
 - c. Install membrane as an underlayment flashing, lapping all joints shingle fashion a minimum of three inches. Detail edge seam as recommended by manufacturer.
 - d. Shingle lap flashing with underlayment and flashings, coordinating placement and sequence to assure overlapping transitions.
- A. Tile Installation: Refer to table 1507.3.7
- Design Wind Speed -100 mph
Mean Roof Height – 13'6"
Roof Slope – 9:12
1. Lay tile to straight lines at right angles to eaves. Center pan rows on roof surface.
 2. Lay pan tile rows *10-1/2" on center with a uniform 14" exposure and 4" laps*.
 3. Cover tile shall be laid with *14" exposure*.
 4. Lay field cover tile laps dry.
 5. Roof Tile Edges And Termination:
 - a. Fasten all tile per Chapter 15, CCR, Title 24, Part 2. Nail all rake tiles with two nails. Provide approved nose clips at all eave course tile.
 - b. Double cover tiles at eaves using a booster tile set in cement mortar or approved tile adhesive.
 - c. Install first three courses of cover tiles at eaves, and all ridge, hip and rake tiles, with concealed bead of approved roof tile adhesive at lap.
 - d. Install rake tile and first row of cover tiles after gable roll in cement mortar. Where tile joins hips and ridges, fill voids with cement mortar.

- e. Immerse all tile in contact with mortar in water for three minutes before laying to assure an adequate bond with mortar.
6. Use mortar sparingly and only to provide proper bedding for tiles in special situations; unless noted otherwise, do not mortar lap joints between field tiles.
7. Use mortar where required as a bedding material. Avoid slopping of mortar onto exposed portions of the roof. Prevent accumulation of mortar.
8. Perform all cutting of tiles in a manner to provide neat edges and a uniformly straight line.
9. Finish tile roofs as a completely weatherproof and waterproof system requiring no further normal maintenance.

B. Flashing :

1. Install counterflashing at tile terminations using specified soft aluminum flashing. Conform to tile profile. Provide di-electric coating at all flashing conditions in contact with galvanized metal.
2. Install roof vent in compliance with manufacturers recommendations and ICBO ES report. Paint per Section 09 91 00.

3.5 FIELD QUALITY CONTROL

- A. The Owner's inspection service will provide continuous inspection of underlayment and roof tile anchorage.

3.6 CLEAN UP

- A. Promptly upon completion of this portion of the work, remove from the site all tools, equipment, surplus materials of this section, tile ends, and debris resulting from the concrete tile roofing installation.

END OF SECTION

SECTION 075419

POLYVINYL-CHLORIDE (PVC/TPA) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Mechanically fastened thermoplastic PVC/TPA roofing system on wood or metal deck, including:
2. Roof insulation cover board.
3. Walkway material.

B. Related Sections:

1. Division 06 Section " [Rough Carpentry] [Miscellaneous Rough Carpentry]" for wood nailers, curbs, and blocking.
2. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
3. Division 07 Section "Roof Accessories" for manufactured roof curbs and supports, hatches, and manufactured penetration flashings.
4. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with

statement indicating that products to be provided meet the requirements of the Contract Documents.

- B. Qualification Data: For Installer, Manufacturer, and Roofing Inspector.
 - 1. Include letter from Manufacturer written for this Project indicating approval of Installer.
- C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing membrane, flashing sheets, adhesives, and sealants.
- D. Warranties: Unexecuted sample copies of special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.
- B. Warranties: Manufacturer and contractor warranties.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section, UL listed for roofing systems identical to that specified for this Project, with minimum five years experience in manufacture of specified products in successful use in similar applications.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
 - 1. An authorized full-time technical employee of the manufacturer.
- D. Preinstallation Roofing Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

- B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 3. Remove temporary plugs from roof drains at end of each day.
 4. Remove and discard temporary seals before beginning work on adjoining roofing.

1.10 WARRANTY

- A. Warranty, General: Warranties specified shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Manufacturer's Warranty: Manufacturer's standard or customized form, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
1. Manufacturer's warranty includes roofing membrane, base flashings, fasteners, roofing membrane accessories and other components of roofing system specified in this Section.
 2. A single manufacturer will provide warranty for both single ply and built-up roof systems specified.
 3. Warranty Period: 20 years from date of Substantial Completion.
- C. Installer's Warranty: Submit roofing Installer's warranty, on warranty form, signed by Installer, covering the Work of this Section and related Sections indicated above, including all components of membrane roofing such as single ply roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
1. Warranty Period: Two years from date of Substantial Completion.
- D. Extended Roof System Warranty: Warranties specified in this Section include the following components and systems specified in other sections supplied by the roofing system Manufacturer, and installed by the roofing system Installer:
1. Sheet metal flashing and trim, including roof penetration flashings.
 2. Manufactured copings, roof edge, counterflashings, and reglets.
 3. Roof curbs, hatches, and penetration flashings.

4. Roof and parapet expansion joint assemblies.
5. Metal roof, wall, and soffit panels and trim.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Basis-of-Design Manufacturer/Product:** The roof system specified in this Section is based upon products of Tremco, Inc. or Equal.
- B. **Source Limitations:** Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. **General Performance:** Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
 1. **Accelerated Weathering:** Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 2. **Impact Resistance:** Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- B. **Material Compatibility:** Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
- C. **Flashings and Fastening:** Comply with requirements of Division 07 Sections "Sheet Metal Flashing and Trim" and "Roof Specialties." Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
 1. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
 2. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.
- D. **Exterior Fire-Test Exposure:** ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- E. **Solar Reflectance Index:** Not less than 78 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- F. **Energy Performance:** Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

2.3 THERMOPLASTIC MEMBRANE MATERIALS

- A. Thermoplastic PVC/TPA sheet, ASTM D4434 Type IV internally fabric reinforced, Energy Star qualified, CRRC listed, and California Title 24 Energy Code compliant. The PVC/TPA sheet is comprised of an elastomeric tri-polymer alloy that is a blend of CPE, Elvaloy, and PVC.
1. Basis of design product: Tremco, TPA Roof Membrane or Equal.
 2. Tensile Strength at 0 deg. F (-18 deg. C), minimum, ASTM D 751: 300 lbf/in.
 3. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D 751: 100 lbf.
 4. Elongation at 0 deg. F (-18 deg. C), minimum at fabric break, ASTM D 751: 25 percent.
 5. Minimum Thickness, nominal, ASTM D 751: 60 mils.
 6. Exposed Face Color: White.
 7. Reflectance, ASTM C 1549: 86 percent.
 8. Thermal Emittance, ASTM C 1371: 0.86.
 9. Solar Reflectance Index (SRI), ASTM E 1980: 108.
 10. Recycled Content, minimum: 25 percent preconsumer.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC/TPA sheet membrane.

2.4 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Membrane Bonding Adhesive:
1. Elastomeric solvent-based contact-type adhesive for bonding TPA single ply membranes and flashings to substrates..
 - a. TPA Single Ply Bonding Adhesive or Equal.
 - b. Density at 77 deg. F (25 deg. C), minimum, ASTM D 1475: 7.0 lb/gal.
 - c. Percent solids, minimum: 25 percent.
- C. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 mm by 3 mm) thick; with anchors.

- D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to membrane roofing system manufacturer.
- E. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.5 ROOF INSULATION MATERIALS

- A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Global-approved roof insulation.
- B. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- C. Roof Insulation:
 - 1. Board Insulation, Polyisocyanurate: CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces, ASTM C1289 Type II Class 1.
 - a. Compressive Strength, ASTM D1621: [Grade 2: 20 psi (138 kPa)] [Grade 3: 25 psi (172 kPa)].
 - b. Conditioned Thermal Resistance at 75 deg. F (24 deg. C): 14.4 at 2.5 inches (50.8 mm) thick.
- D. Glass-mat-faced, pre-primed, gypsum panel coverboard, ASTM C 1177/C 1177M.
 - 1. Basis of design product: DensDeck or equal.
 - 2. Thickness: 1/2 inch.

2.6 WALKWAY MATERIALS

- A. Walkway roll, reinforced PVC/TPA membrane roll with serrated slip-resistant surface, fabricated for heat welding to compatible PVC/TPA membrane surface.
 - 1. TPA Walkway Roll or Equal.
 - 2. Roll Size: 36 inches by 60 feet.
 - 3. Thickness: 0.080 inch.
 - 4. Color: Grey.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 - 2. Wood Roof Deck: Verify that wood deck is securely fastened with no projecting fasteners.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's recommendations.

3.4 INSULATION INSTALLATION

- A. Cover Boards: Install cover boards straight lines with end joints staggered between rows. Loosely butt cover boards together and mechanically fasten to roof deck.
 - 1. Mechanically fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.
 - 2. Mechanically fasten cover boards, minimum 8 fasteners per 4' x 8' board.

3.5 MECHANICALLY FASTENED MEMBRANE ROOFING INSTALLATION

- A. Mechanically fasten membrane roofing over area to receive roofing and install according to roofing system manufacturer's written instructions.
 - 1. Install sheet according to ASTM D 5082.

- B. Start installation of membrane roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Mechanically fasten or adhere membrane roofing securely at terminations, penetrations, and perimeter of roofing.
- E. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- F. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
 - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
 - 4. Install T patches where sheets intersect.
- G. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

- B. Walkways will not be installed over seams in single ply membrane.

3.8 FIELD QUALITY CONTROL

- A. **Manufacturer Inspector:** Manufacturer will employ technical personnel to inspect the roof while it is being installed. Roof will be inspected a minimum of 3 times per week while in progress with jobsite reports, including photos, sent to all of the project stakeholders.
- B. **Final Roof Inspection:** Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075419

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1. SECTION INCLUDES

- A. Reglets and counter-flashings.
- B. Closure panels at edges of roof (above roof decking), as indicated in Drawings.
- C. Steel pipe downspouts shall be provided under Section 05 50 00, "Metal Fabrications" – coordinate associated work with that section.
- D. Misc. other sheet metal flashings and trims not specifically described above – coordinate with work provide in sections listed in Article 1.2 "Related Sections".

1.2. RELATED SECTIONS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 03 30 00 - Cast-In-Place Concrete.
- C. Section 05 50 00 - Metal Fabrications
- G. Section 06 10 00 - Rough Carpentry
- H. Section 07 13 26 - Self-Adhering Sheet Waterproofing
- I. Section 07 21 00 - Thermal and Acoustical Insulation
- J. Section 07 72 00 - Roof Accessories
- K. Section 07 92 00 - Joint Sealants
- L. Section 08 11 00 - Hollow Metal Doors and Frames
- M. Section 08 31 13 - Access Doors and Frames
- N. Section 08 41 00 - Aluminum Storefronts, Entrances & Windows
- O. Section 09 29 00 - Gypsum Board & Cementitious Backerboard
- P. Division 22 – Coordination with Plumbing Items.
- Q. Division 24 – Coordination with Mechanical Items

- R. Divisions 26 – 28 – Coordination with Electrical Items.
- S. Coordination with other sections not listed may be required.

1.3 STANDARDS AND REFERENCES (Current Edition for All Standards Listed)

- A. .ANSI SPRI ED-1 – Design Standard for Edge Systems Used with Low Slope Roofing Systems.
- B. ASTM B32 - Standard Specification for Solder Metal
- C. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
- D. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- F. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
- G. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free
- H. FS O-F-506 – Federal Specification: Flux Soldering: Past and Liquid.
- I. NRCA (National Roofing Contractors Association)-Roofing Manual.
- J. SMACNA - Architectural Sheet Metal Manual.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00, “Submittal Requirements”.
- B. Describe material profile, jointing pattern, jointing details, fastening methods, and installation details.
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00, “Submittal Requirements”.

1.5 QUALITY ASSURANCE

- A. Fabricator: Company specializing in sheet metal flashing work with 5 years minimum experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products under provisions of Section 01 50 00, “Temporary Facilities and Controls”.

- B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation.
- C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

1.7 MOCKUPS

- A. Provide mockups for Architect's review and approval of critical transitions (corners, edge conditions, etc.)
- B. Provide mockups of all profiles listed in drawing for Architect's approval for size, gauge, and color.
- C. Mockups may be included in final work.

1.8 WARRANTY

- A. Warranty Submittals: Provide submittals per Section 01 77 19, "Closeout Requirements"
- B. Contractor's Guarantee:
 - 1. Provide Owner with written Guarantee on Contractor's letterhead and signed by General Contractor and flashing system subcontractor.
 - 2. Provide guarantee against the following defects for a time period of three years, commencing from the date of final acceptance of the project.
 - 3. Flashing blow-off or permanent deformation from wind.
 - 4. Water intrusion through flashing joints into building interior.
 - 5. Make inspections and emergency repairs to defects or leaks in the roof system within twenty-four (24) hours of receipt of notice from the Owner.
 - 6. Restore the affected areas to the standard of the original specifications as soon as weather permits.

PART 2 - PRODUCTS

2.1 SHEET MATERIALS

- A. Galvanized Steel:
 - 1. Classification: Per ASTM A653/A653M and A924/A924M.
- B. Finish: Hot Dip galvanized, G90 coating. See Section 09 91 00, "Painting" for preparation, primers and finishes related to galvanized sheet metal.

- C. Gauge As specified and shown on drawings. If not shown on drawings, provide minimum 22 gauge.
- D. Coordinate work with downspouts provided under Section 05 50 00, "Metal Fabrications", including straps, fasteners, etc. required for full installation of downspouts.
- E. Manufacture and install copings, roof edge flashings, etc. tested according to ANSI/SPRI ES-1 and capable of resisting the established design pressure.

2.2 ACCESSORIES

- A. Fasteners: Galvanized steel with soft neoprene washers at exposed fasteners. Finish exposed fasteners same as flashing metal.
- B. Sealant: Type specified in Section 07 92 00, "Joint Protection".
- C. Self-Adhered Membranes, Flexible Membrane Flashing, and Flashing Cement: As specified in 07 13 26, "Self-Adhering Sheet Waterproofing".
- D. Solder: ASTM B 32; type with less than 0.2% lead.
- E. Flux: FS O-F-506.
- F. Provide water resistant underlayment per Section 07 13 26, "Self-Adhering Sheet Waterproofing".
- G. Provide elastomeric flashing per Section 07 13 26, "Self-Adhering Sheet Waterproofing".
- H. Prefabricated Components
 - 1. Prefabricated Reglet Assembly:
 - 2. Manufacturer and Series: Fry, www.fryreglet.com , or equal, Type as required for condition shown on drawings.
 - 3. For purpose of establishing required level of quality, characteristics of products manufactured by Fry are specified.
- I. Counter-Flashing: Galvanized Steel, with wind-locks at 32 inches on center and at each corner. Provide prefinished counter-flashing where adjacent to prefinished metal roofing or siding
- J. Corners: Provide factory prefabricated corner assemblies.
- K. Through Wall Flashing: Provide factory prefabricated Manufactured through-wall flashing
- L. Components
 - 1. Provide sheet metal work as shown on Drawings and not specified under other Sections. Fabricate as indicated. Where specific details are not shown, fabricate according to applicable SMACNA "Architectural Sheet Metal Manual" criteria.

2. Form sections true to shape, accurate in size, square, and free from distortion or defects. Match profiles at connections. Provide ribs, cleats, and reinforcement necessary to make sections rigid and substantial. Allow for expansion and contraction.
3. Unless noted otherwise, fabricate cleats and starter strips of same material as sheet, minimum 2 inches wide, interlocked with fabrication.
4. Form pieces in longest practical lengths. Locate joints of fasciae, roof edges, and other sheet metal work exposed to view with respect to panel joints or other architectural features as indicated on Drawings, or as directed by Architect.
5. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip and cleat interlock.
6. Generally, provide shop joints single locked and soldered, or lapped, riveted and soldered. Provide field joints designed to permit expansion, with joint covers or lapped joints with "S" clips. Do not solder.
7. Provide lapped, riveted and soldered joints at gutter conditions.
8. Provide all concealed stiffeners and bracing at roof edge trim, fascia and gutter cover as required by Architect.
9. Provide 10 gage x 1-1/2 inch wide gutter bracket support, wrapping completely around gutter, located at 32 inches on center and fastened to solid blocking with 2 No. 12 wood screws. Provide 16 gage x 1-1/2 inch gutter strap at 32 inches on center, extending minimum 6 inches under roofing system.
10. Provide gutter flashing in compliance with SMACNA Chapter 1, including "rectangular Gutter Design criteria" page 1.8, 5th edition. Provide fully welded two, three and four way gutter intersections, with expansion joints fabricated and located per Figure 1-5 and 1-6.
11. Form material with flat lock seams unless noted otherwise. Overlap seams in direction of flow with finished width of lock seams and soldered lap seams not less than 1 inches, and finished width of unsoldered lap seams not less than 3 inches.
12. Where specified, solder and seal metal joints. After soldering, remove flux. Wipe and wash solder joints clean. Provide smooth even surface on exposed soldering on finished surfaces.
13. Provide shop formed transition and corner pieces with locked and soldered corners. Locate field joints not less than one foot nor more than three feet from actual corner. Shortest length dimension of any corner piece leg shall not be less than one foot.
14. Locate parapet coping expansion joints 20 feet on center maximum, and as otherwise required to permit expansion and contraction.
15. Fabricate flashing assemblies as specified in this Section and as shown on Drawings.

2.3. FINISH

- A. Paint flashing applications as specified below in off-site shop location.

2.4. OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
3. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
4. Verify roof membrane, elastomeric flashing, waterproof underlayment and base flashings are in place, sealed, and secure.
5. In the event of discrepancy, immediately notify the Architect.
6. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

B. Preparation

1. Field measure site conditions prior to fabricating work.
2. Install starter and edge strips, and cleats before starting installation.
3. Except at prefinished material specified in Section 07 41 13, "Metal Roof Panels", pre-paint all copings, gutters, expansion joint flashings, counter-flashings and related flashing assemblies when visible from any location in final project. Pre-paint in off-site shop location, complying with paint system specified in Section 09 91 00, "Painting - Interior and Exterior". Touch up after installation.
4. Installation
5. Support all flashings with firm and stable attachments, anchored into solid backing as required.

6. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
7. Where required by installation, solder metal joints watertight for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.
8. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations approved by Architect.
9. Insert flashings into reglets to form tight fit. Secure in place in accordance with the manufacturer's instructions.
10. Coping Installation:
 - a. Install coping with cleats and clips as specified and as shown on drawings. Provide continuous cleat at exterior surface. Provide approved fasteners at inside (roof) surface at 24 inches on center.
 - b. Install coping intermediate joints per Schedule, Article 3.4 of this Section. Locate as shoe.
 - c. Provide waterproof underlayment over wall framing and under coping flashing. Provide elastomeric flashing at all coping joints, extending 12 inches each side of joint. Coordinate with plaster underlayment installation.
11. Gutter, Scupper, And Downspout Installation:
 - a. Secure gutters and covers and downspouts in place as detailed.
12. Coordinate with waterproof membrane underlayment installation as specified in Section 07 13 00.
13. Connect downspouts to downspout boots and seal connection.

C. Roof Membrane Flashing:

1. Provide and install in coordination with roofing work, all flashing, counter-flashing, sleeves, and related components as required to provide a watertight installation.
2. Set sheet metal installed on or adjoining roofing in continuous bed of approved roofing cement.
3. Aluminum Components Installation:
 4. Provide di-electric separation at all components, including fasteners.
 5. Provide expansion sleeves at end of radiused components. Do not splice at mid-point of radius.
 6. Attach coping with welded connections, mechanical fasteners, clips, and brackets. Do not solder.

D. Fabrication Schedule:

1. Coping:
2. Material and Gauge: Galvanized Steel:
3. Flashing with an exposed vertical face of 8" or less: 24 gauge.
4. Flashing with an exposed vertical face of 8" to 10": 22 gauge.
5. Flashing with an exposed vertical face of 10" to 15": 20 gauge.
6. Finish: As specified in this Section.
7. SMACNA Reference: Table 3-1, with J9 drive cleat, flat lock seam joint design, C1 corner, and E1 edge.
 - a. Prefabricated and Fabricated Reglet Counterflashing:
8. Material and Gauge: Galvanized steel, 22 gauge, painted.
9. Finish: As specified in this Section, painted.
10. Miscellaneous flashing, roof flashing, metal flashing assemblies and counterflashing:
11. Material and Gauge: Galvanized Steel:
12. Flashing with an exposed vertical face of 8" or less: 24 gauge.
 - a. Flashing with an exposed vertical face of 8" to 10": 22 gauge.
13. Flashing with an exposed vertical face of 10" to 15": 20 gauge.
14. Finish: As specified in this Section, painted
15. Gutters:
 - a. Material and Gauge: Galvanized steel, 22 gauge.
 - b. Finish: As specified in this Section, painted.
 - c. SMACNA Reference: Concealed Hanging Gutters, Figure 1-15C, with minimum 4 inch flashing flange beneath roof flashing system
 - d. Provide downspout connection per SMACNA Figure 1-33, with basket strainer.
16. Steel Pipe Downspout:
 - a. Material and Gauge: ASTM A 53, Grade B, Schedule 40, galvanized, unless otherwise shown or specified.
 - b. Finish: Painted per Section 09 91 00, "Painting".

END OF SECTION

SECTION 07 71 23
GUTTERS AND RELATED FLASHINGS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Galvanized steel gutters.
2. Downspouts.
3. Related flashing.

B. Related Sections

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 05 50 00 - Metal Fabrications.
3. Section 07 62 00 - Sheet Metal Flashing and Trim.
4. Section 07 52 16 – SBS Modified Bituminous Membrane Roofing.
5. Section 07 90 00 - Sealants.
6. Section 09 91 00 - Painting: Field painting of metal surfaces.

1.02 REFERENCES

- A. ASTM A924 / A924M-16ae1 – Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- B. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- C. SMACNA - Architectural Sheet Metal Manual, current edition.
- D. AWS - American Welding Society.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, welding methods, fastening methods, expansion joint layouts, downspout layout and installation details.
- C. Samples: Submit two samples, 12 inches long illustrating component design, finish, color, and configuration.

1.05 QUALITY ASSURANCE

- A. Conform to SMACNA Manual for architectural sheet metal flashing and installation details.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01 66 00.
- B. Stack pre-formed material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

1.07 COORDINATION

- A. Coordinate painting portions prior to installation and the work with downspout discharge pipe inlet.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Galvanized Steel: ASTM A924 / A924M-09a, Grade A, G90 zinc coating.
- B. Schedule 10 galvanized pipe.

2.02 COMPONENTS

- A. Gutters: 18-gauge core steel. Minimum size shall be 6"x6" or as otherwise shown on drawings.
- B. Downspouts: Finished grade to bottom of gutter shall be schedule 10 galvanized pipe, round shape only, 3" minimum diameter or size as shown on drawings.

2.03 ACCESSORIES

- A. Anchorage Devices: SMACNA requirements.
- B. Gutter Supports: Straps.
- C. Fasteners: Galvanized steel or stainless steel and as specified in Section 05 50 00. Finish exposed fasteners same as flashing metal.
- D. Clean out Tee: Smith 4510 cleanout tee with countersunk plug and round access cover. 4", 5" or sized as required to coordinate with downspout and underground piping sizes.
- E. Touch-up Primer: Cold applied zinc-rich type.
- F. Protective Back Coating: FS TT-C-494, bituminous.
- G. Sealant: Type as specified under Section 07 90 00.

- H. Conductor-Head Guards: 20-gauge bronze or nonmagnetic stainless-steel mesh or fabricated units, with salvaged edges and noncorrosive fasteners. Select materials for compatibility with gutters and downspouts.
- I. Overflow Drain: 18 ga. galvanized sheet metal. Approximately 2 inches high by 2 inch diameter.

2.04 FABRICATION

- A. Form gutters of profiles and size indicated, to SMACNA requirements.
- B. Gutters shall be fascia mounted whenever possible. See drawings for additional mounting information.
- C. Fabricate with required connection pieces.
- D. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- E. Hem all exposed edges of metal.
- F. Welding process shall be Metallic Inert Gas (MIG).
- G. Weld all shop formed metal joints. Grind exposed joints flush with adjacent surfaces and apply touch-up primer as specified.
- H. Butt weld all field assembled gutter sections. Grind exposed joints flush with adjacent surfaces and apply touch-up primer as specified.
- I. Fabricate gutter sections with SMACNA butt type expansion joints at 40 feet maximum with a minimum of one (1) downspout in each 40 foot section. Provide additional downspouts as necessary to accommodate expansion joint locations.
- J. All joints shall be watertight per SMACNA standards.
- K. All downspouts shall have fully welded joints and be ground smooth. Provide T-shaped bracket welded to back of downspout for bolting to building. See drawings for additional information.
- L. All downspouts that spill to grade shall have a 45-degree elbow of same pipe profile fully welded to bottom of downspout.
- M. All downspouts connecting to underground storm drainage systems shall be provided with a cleanout tee at grade.
- N. At all individual gutter sections, provide an overflow drain at opposite end of gutter from downspout. Overflow drain shall be fully welded to gutter bottom. I.D. shall match the I.D. for the downspout outlet.

2.05 FINISHES

- A. Field paint gutters under provisions of Section 09 91 00.
- B. Apply bituminous protective backing on surfaces in contact with dissimilar materials.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.

3.02 INSTALLATION

- A. Install gutters and downspouts as shown on drawings. Install expansion joints, additional downspouts and accessories as specified.
- B. Field assemble (weld) gutter sections at “ground level” wherever possible and lift into place as one unit.
- C. All downspout sections shall be fully welded, ground smooth, primed and painted. All downspouts shall be mechanically fastened to building at top, bottom, and maximum 6 feet on center.
- D. Install gutters level and straight in line with building. Shim horizontally and vertically as required to level. Installed gutter to have no ponding water more than 1/4” deep.
- E. Water test all gutters and downspouts for leaks and ponding in presence of IOR.
- F. At all welded connections, end caps, overflows, and outlets, provide bituminous coating minimum 1 inch each side of joint.
- G. Provide 3-inch closure plate at all gutter expansion joint locations.

END OF SECTION

SECTION 07 90 00

JOINT SEALERS

PART 1 – GENERAL

1.01 SUMMARY

A. SECTION INCLUDE

1. Preparing sealant substrate surfaces.
2. Concrete Joint Sealants.
3. Sealant and backing.
4. Fireproof Firestopping and fire-safing materials and accessories.

B. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 00 72 13: General Conditions.
3. Section 03 30 00: Cast-In-Place Concrete.
4. Section 07 62 00: Flashing and Sheet Metal: Sealants used in conjunction with metal flashings.
5. Section 07 71 23: Gutters and Related Flashings.
6. Section 09 29 00: Gypsum Board Systems.
7. Division 22: Mechanical.
8. Division 26: Electrical.
9. Section 32 16 00: Site Concrete.

C. REFERENCES

1. ASTM C834 Standard Specification for Latex Sealants.
2. ASTM C920 Standard Specification for Elastomeric Joint Sealants.
3. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
4. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
5. ASTM E814 Standard Test Method for Fire Tests of Penetration Firestop Systems.
6. FM (Factory Mutual) - Fire Hazard Classifications.
7. UL - Fire Hazard Classifications.
8. UL 263 – Standard for Fire Tests of Building Construction and Materials.
9. UL 723 - Test for Surface Burning Characteristics of Building Materials.
10. UL 1479 - Fire Tests of Through-Penetration Firestops.
11. FS TT S 00227 Sealing Compound: Elastomeric Type, Multi-Component.
12. FS TT S 00230 Sealing Compound: Elastomeric Type, Single Component.
13. FS TT S 001543 Sealing Compound, Silicone Rubber Base.

1.02 SUBMITTALS

- A. Submit manufacturer's product data under provisions of Section 01 33 00 for each product required.

- B. Submit product data indicating sealant chemical characteristics, performance criteria, limitations, and color availability.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit standard color ranges of exposed materials for Architect selection.
- E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.03 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years' experience.
- B. Applicator: Company specializing in applying the work of this section with minimum three years' experience, with projects of a similar size and type.
- C. Conform to Sealant Waterproofing and Restoration Institute requirements for materials and installation.
- D. Prior to installation of joint sealants, field test adhesion to joint substrates.
 - 1. Install joint sealants in 5-foot joint lengths. Allow to cure before testing. Test adhesion by pulling sealant out of joint.
 - 2. Perform field tests for each type of elastomeric sealant and joint substrate.
 - 3. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
 - 4. Report whether or not sealant in joint connected to pulled out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
 - 5. Sealants not evidencing adhesive failure from testing, in absence of other indications of non-compliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrate during testing.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent curing sealants in enclosed building spaces.
- B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- C. Do not install sealants under adverse weather conditions or when temperatures are above or below manufacturer's recommended limitations for installation.
- D. Deliver materials in the unopened, original containers or unopened packages with manufacturer's name, labels, product identification, color, expiration period, curing time and mixing instructions for multi-component materials.

1.05 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with all Sections referencing this Section.

1.06 WARRANTY

- A. Provide two-year warranty for materials and workmanship under provisions of Section 01 33 00.
- B. Warranty: Include coverage of installed sealants and accessories which fail to achieve airtight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 – PRODUCTS

2.01 SEALANTS

- A. Silicone Sealant: Silicone Sealant (use at concrete, masonry, or glazing applications): FS TT S 01543, Class A, low modulus type; Spectrum I as manufactured by Tremco, Inc.
- B. Interior Building Sealant: Acrylic-emulsion; one-part, non-sag, mildew-resistant. Complying with ASTM C834, formulated to be paintable; Pecora Corp. “AC-20”, Sonneborn “Sonolac”, Tremco Inc. “Tremco Acrylic Latex 834” or approved equal.
- C. Sanitary Sealant: One-part mildew-resistant silicone; ASTM C920 Type S; Grade NS Class 25; Uses NT, G, A and O; formulated with fungicide for sealing interior joints with nonporous substrates around ceramic tile, showers, sinks and plumbing fixtures; Dow Corning Corp. “786 Mildew Resistant”, or approved equal.
- D. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, non-skinning, non-staining, gun-able, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound; Pecora Corp. “BA-98”, Tremco Inc. “Tremco Acoustical Sealant” or approved equal.
- E. Acoustical Sealant for Exposed Joints: Nonoxidizing, skin-able, paintable, gun-able sealant recommended for sealing interior exposed joints to reduce transmission of airborne sound; Pecora Corp. “AC-20”, USG “Sheetrock Acoustical Sealant” or approved equal.
- F. Concrete Expansion Joints: Joint sealing material shall be a two-component, self-leveling, polyurethane elastomeric sealant. Product shall be Sikaflex 2cSL as manufactured Sika Corporation, or equal. Color shall be chosen from the full range of manufacturer’s standard colors.
- G. Vertical Building Expansion Joints: Joint sealing material shall be a one-component, polyurethane-based non-sag elastomeric sealant. Product shall be Sikaflex Construction Sealant as manufactured Sika Corporation, Pecora Corp. “DynaTrol II” or approved equal. Color shall be chosen from the full range of manufacturer’s standard colors.
- H. Sheet Metal Flashings, Trims, Gutters, & Joints: Joint sealing material shall be a two-component, self-leveling, polyurethane elastomeric sealant. Product shall be Sikaflex 2cSL as manufactured Sika Corporation, or equal. Color shall be chosen from the full range of manufacturer’s standard colors. Provide Sikaflex 260 Primer at all stainless steel and/or galvanized substrate location for proper adhesion of Sikaflex 2cSL.
- I. Substitutions: Under provisions of Section 01 33 00.

J. Color of sealant shall be as selected by Architect.

2.02 FIRESTOPPING SEALANTS (consider moving to own section)

A. Firestopping Material: One-Piece insert conforming to the following:

1. All fire stopping shall be one part, two stage intumescent sealants and putty.
2. All fire stopping sealants shall be capable of maintain an effective barrier against flame, heat, and smoke in compliance with the requirements of ASTM E814, UL 1479, ASTM E119, UL 723, ASTM E84 and UL 263.
3. Fire stopping materials shall be classified in the Underwriters Laboratories (UL) Fire Resistance Directory or listed in the Warnock Hersey International Directory.
4. Fire stopping materials shall be paintable or capable of receiving finish materials in those areas which are exposed to view and which are scheduled to receive finishes.
5. Acceptable Manufacturers: Hilti Firestop Systems, International Protective Coating Corporation "Flamesafe" Systems, 3M Fire Protection Products or approved equal.
6. Substitutions: Under provisions of Section 01 25 13.

2.03 ACCESSORIES

- A. Primer: Non staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Noncorrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Non-staining; compatible with sealant and primer; such as round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width. Materials impregnated with oil, bitumen or similar materials shall not be used. Sealant shall not adhere to back-up material.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- E. Solvents: cleaning agents or other accessory materials shall be as recommended by the sealant manufacturer.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and joint openings are ready to receive work and field measurements are as shown on Drawings and recommended by the manufacturer.
- B. Beginning of installation means installer accepts existing surfaces.

3.02 PREPARATION

- A. Clean and prime joints in accordance with manufacturer's instructions.
- B. Remove loose materials and foreign matter which might impair adhesion of sealant.
- C. Verify that joint backing and release tapes are compatible with sealant.

- D. Perform preparation in accordance with sealant manufacturer's recommendations.
- E. Protect elements surrounding the work of this Section from damage or disfiguration.
- F. Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or acid washing to produce a clean, sound substrate. Remove loose particles remaining from cleaning operations by vacuuming or blowing out joints.
- G. Clean metal, glass, glazed surfaces of ceramic tile and other non-porous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealants.

3.03 INSTALLATION

- A. Install sealant in accordance with manufacturer's instructions.
- B. Caulk all exterior joints and openings in the building envelope that are observable sources of air infiltration.
- C. Measure joint dimensions and size materials to achieve required width/depth ratios.
- D. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width. Roll the material into the joint to avoid lengthwise stretching. Do not twist or braid rod stock.
- E. Install bond breaker where joint backing is not used.
- F. Prime surfaces to receive joint sealant with primer recommended by sealant manufacturer.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges. Apply masking tape where required to protect adjacent surfaces from sealant application.
- H. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- I. Tool joints concave.
- J. At all surface-mounted light fixtures mounted on gypsum board ceilings, contractor shall caulk light fixture body to ceiling finish to eliminate gap between metal body and fixture. Coordinate locations with drawings.
- K. Firestopping:
 - 1. Apply materials in exact accordance with manufacturer's latest published instructions, requirements, specifications, details and approved submittals.
 - 2. Installation shall be in accordance with the appropriate UL Fire Resistance Directory or Listing with the appropriate Warnock Hersey International Listing.
 - 3. Seal holes or voids made by penetrating items to ensure an effective fire and smoke barrier.
 - 4. Seal intersections and penetrations of floors, ceilings, walls and columns.
 - 5. Seal around cutouts for lights, cabinets, pipes, plumbing, HVAC ducts and electrical boxes, etc.

6. Where floor openings are four inches or more in width and subject to traffic or loading, install cover plate systems capable of supporting same loading as floor.
7. Interface with Other Projects: Coordinate and cooperate with adjacent, contiguous and related materials trades, (such as concrete, drywall, plumbing, conduit, electrical wiring, communication systems) to ensure a proper and timely installation.
8. Seal steel deck flute openings.

3.04 CLEANING AND REPAIRING

- A. Clean work under provisions of Section 01 77 00.
- B. Clean adjacent soiled surfaces. Use a solvent or cleaning agent as recommended by the sealant manufacturer.
- C. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.05 PROTECTION OF FINISHED WORK

- A. Protect finished installation under provisions of Section 01 66 00.
- B. Protect sealants until cured.
- C. Do not paint sealants until sealant is fully cured.
- D. Do not paint silicone sealant.

END OF SECTION

SECTION 08 11 00

METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Non-rated and fire rated rolled steel doors, panels, and frames.
2. Louvers.

B. Referenced Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
4. Section 08 43 00 - Storefronts.
5. Section 08 71 00 - Door Hardware.
6. Section 08 80 00 - Glazing.

1.02 REFERENCES

- A. ANSI A250 .8 – Recommended Specification for Standard Steel Doors and Frames.
- B. ANSI A250.3 - Test Procedure and Acceptance Criteria for Factory-Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
- C. ANSI A250 .10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- D. ASTM A653 - Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot- Dip Process.
- E. ASTM A924 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- F. CEC - California Energy Commission.
- G. NFPA 80 - Fire Doors and Windows.
- H. SDI-105 - Recommended Erection Instructions for Steel Frames.
- I. DHI - Door and Hardware Institute.
- J. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2 and Part 6.
- K. UL 9 - Fire Tests of Window Assemblies.

L. UL 10C - Fire Tests of Door Assemblies.

1.03 QUALITY ASSURANCE

A. Conform to requirements of ANSI A250.8.

B. Fire rated door, panel and frame construction to conform to UL 9 and UL 10C.

C. Installed frame and door assembly to conform to NFPA 80 for fire rated class indicated on Drawings.

D. Installed exterior frame and door assembly to be weather tight

E. Manufacturer shall have both fabrication and assembly plant located within the continental United States or Canada. Products that are either fabricated or assembled outside the continental United States or Canada are not acceptable.

1.04 SYSTEM REQUIREMENTS

A. Performance Requirements

1. Thermal Performance: Glazed exterior borrowed lite, side lite and transom lite frames shall have an overall minimum u-value of 1.19 as rated in accordance with the default table method approved by the California Energy Commission (CEC). Provide Label Certificate FC-1, Figure 3-3, from the Nonresidential Compliance Manual documenting compliance with the CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 6, Section 116, Table 116-A.
2. Solar Heat Gain Coefficient: Glazed exterior borrowed lite, side lite and transom lite frames shall have an overall maximum solar heat gain coefficient of 0.68 as rated in accordance with default table method approved by the California Energy Commission (CEC). Provide Label Certificate FC-1, Figure 3-3, from the Nonresidential Compliance Manual documenting compliance with the CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 6, Section 116, Table 116-B.

A. Regulatory Requirements

1. Conform to CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 2 for fire rated frames and doors.
2. Conform to CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 6, for u- value and solar heat gain coefficient.

1.05 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 33 00.

B. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.

C. Indicate door elevations, internal reinforcement, closure method, and cut outs for glazing and louvers.

- D. Submit Label Certificate FC-1, Figure 3-3, from the Nonresidential Compliance Manual documenting compliance with the CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 6, Section 116, Table 116-A and 116-8.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect, and handle products under provisions of Section 016200.
- B. Store products on site under cover.
- C. Place products on at least 4-inch wood sills to prevent rust and damage.
- D. Protect doors and frames with resilient packaging.

1.08 SEQUENCING AND SCHEDULING

- A. Sequence work under the provisions of Section 01 32 13.
- B. Schedule work under the provisions of Section 01 32 13.
- C. Schedule delivery of all doors and frames so as not to delay progress of other trades.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Amweld Building Products, Inc., www.amweld.com.
- B. Curries Mfg. Inc., www.curries.com.
- C. Door Components, Inc., www.doorcomponents.com.
- D. Fleming, www.flemingdoor.com.
- E. Krieger Steel Products Company, www.kriegersteel.com.
- F. Republic Builders Products Corporation, www.republicdoor.com.
- G. Curries, www.curries.com.
- H. Ceco, www.cecodoor.com.
- I. Steelcraft; An Allegion Company
- J. Substitutions: Under provisions of Section 01 25 13.

2.02 MATERIALS

A. Doors, Panels and Frames

1. Steel: Commercial quality cold rolled steel conforming to ASTM A653 galvanized to A60 or G60 coating class or Type 8, A40 (ZF120) according to ASTM A924 with minimized spangle, mill phosphatized.
2. Exterior Doors: ANSI A250.8, Level 3, extra heavy-duty, Model 2, continuous welded seam, minimum 0.053-inch-thick faces (16 GA. Minimum).
3. Interior Doors: ANSI A250.8, Level 2 heavy duty, Model 1, minimum 0.042-inch-thick faces (18 GA. Minimum).
4. Exterior Frames: ANSI A250 .8, Level 3, 0.067-inch-thick material (14 GA. Minimum), core thickness.
5. Interior Frames: ANSI A250 .8, Level 2, 0.053-inch-thick material (16 GA. Minimum), core thickness.
6. Panels: Same materials and construction as specified for doors.

B. Door Core

1. Exterior Core: Polystyrene insulation.
2. Interior Door Core: Impregnated cardboard honeycomb.

C. Closer Channels

1. Close top and bottom edge of exterior door flush with inverted steel channel closure. Weld all joints watertight.

D. Frame Anchors

1. Masonry Anchors: Adjustable T-strap, 0.053-inch-thick steel, corrugated, 2-inch x 10-inch size. Fire rated frames to have UL listed perforated strap anchor permanently anchored to frame.
2. Metal Stud Anchor: Z type anchor, welded to frame, 0.053-inch-thick steel, UL listed as required for fire rating.
3. Wood Stud Anchor: U shaped anchor, welded to frame, 1 inch wide, 0.053-inch-thick steel, with 2 pre-punched holes in nailing flange. UL listed as required for fire rating.
4. Existing Wall Anchor: 0.053-inch-thick pipe spacer with 2-inch x 0.053-inch-thick steel plate sized to accommodate a 3/8 diameter countersunk flathead expansion anchor. UL listed as required for fire rating.
5. Floor Clip: Angle anchor, full width of frame, 0.067-inch-thick steel.

E. Protective Coatings

1. Bituminous Coating: Fibered asphalt-based corrosion proofing and sound deadener compound. Equivalent to Transcoat 101-F, www.oilservice.com.
2. Primer: Clean and treat with three stage iron phosphate process. Provide baked-on shop coat of EPA compliant gray synthetic rust - inhibitive enamel primer meeting acceptance criteria of ANSI 250.10.

F. Hardware Reinforcement

1. Fabricate frames and doors with hardware reinforcement plates welded in place.
2. Hinge reinforcing shall be full width of frame profile.
3. Provide spacers for all thru-bolted hardware.
4. Reinforcement components shall be the following minimum thickness:
5. Hinge (door and frame) 3/16 inch
6. Mortise Lock or Deadbolt 0.093 inch
7. Bored Lock or Deadbolt 0.093 inch
8. Flush Bolt Front 0.093 inch
9. Surface Bolt 0.093 inch
10. Surface Applied Closer 0.093 inch
11. Hold Open Arm 0.093 inch
12. Pull Plates and Bars 0.067 inch
13. Surface Exit Device 0.093 inch
14. Floor Checking Hinge 0.167 inch
15. Pivot Hinge 0.167 inch

2.03 ACCESSORIES

- A. Door Louvers: 18-gauge, non-vision, inverted split “Y louver with 12-gauge security grille two sides, prime coat finish for field painting. Provide optional galvanized attached mesh insect screen. Size as shown on Drawings.
 1. Anemostat security door louvers, model #PLSL.
 2. Air Louvers Inc., Model 1500-A.
- B. Rubber Silencers: Resilient rubber as supplied by Section 08 71 00.
- C. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamperproof screws at door installations, square butt at light frames.

2.03 FABRICATION

- A. When shipping limitations so dictate, frames for large openings shall be fabricated in sections designed for splicing.
- B. All spliced joints shall occur on the interior side of exterior frames.
- C. Fabricate frames as full profile welded units.
- D. All face, rabbet and soffit joints between abutting members shall be continuously welded and finished smooth when exposed to exterior.
- E. Corner joints shall have all contact edges closed tight, with faces mitered and continuously welded.
- F. Frames with multiple openings shall have mullion members fabricated with no visible seams or joints. All face, rabbet and soffit joints between abutted members shall be continuously welded and finished smooth when exposed to exterior.

- G. Provide 3/8-inch back bend return on frames where gypsum board wall material occurs whether on one or both sides.
- H. Mullions for Double Doors: Removable type supplied by Section 08 71 00.
- I. Dust cover boxes or mortar guards of 0.016-inch-thick steel shall be provided at all hardware mortises on frames.
- J. Reinforce frames wider than 48 inches with roll formed, 0.093-inch-thick steel channels fitted tightly and welded into frame head, inverted U-shape profile.
- K. Prepare frame for silencers except for frames which receive weatherstripping. Provide three (3) single rubber silencers for single doors on strike side, and two (2) single silencers on frame head at double doors without mullions.
- L. Provide steel spreader temporarily attached to feet of both jambs as a brace during shipping and handling. Spreader is not to be used for installation purposes.
- M. Attach fire rated label to each frame and door unit.
- O. Manufacturing Tolerances
 - 1. Manufacturing tolerance shall be maintained within the following limits:
 - 2. Frame width +1/16 inch -1/32 inch
 - 3. Frame height +-3/64 inch
 - 4. Frame face +-1/32 inch
 - 5. Frame stop +-1/32 inch
 - 6. Frame rabbet +-1/64 inch
 - 7. Frame depth +-1/32 inch
 - 8. Frame throat +-1/16 inch
 - 9. Door width and height +-3/64 inch
 - 10. Door thickness +-1/16 inch
 - 11. Hardware location +-1/32 inch
 - 12. Door flatness +-1/16 inch

2.4 FINISHES

- A. Primer: Baked on rust-inhibitive enamel.
- B. Finish: Site paint under provisions of Section 09 91 00.
- C. Coat inside of frame profile for frames installed in masonry construction with bituminous coating to a thickness of 1/16 inch. Coating may be factory or site applied. Do not apply coating to fire rated frames.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install frames in accordance with SDI-105.
- B. Install doors in accordance with DHI.
- C. Install fire doors and frames in accordance with NFPA 80.
- D. Installation of exterior doors and frames to be weathertight and waterproof.
- E. Seal penetration of all surface applied screws on exterior face of frames at glass stops and hardware attachments.
- F. Coordinate with wall construction and details for anchor placement. Provide anchors as follows:
- G. Frames up to 7 feet 6 inches height - 4 anchors each jamb.
- H. Frames 7 feet 6 inches to 8 feet 0-inch height - 5 anchors each jamb, plus an additional anchor for each 2 feet or fraction thereof over 8 feet 0 inch.
- I. Frames for double doors; minimum of two (2) anchors in head approximately 12 inches from each jamb.
- J. Borrowed lite frames; two (2) anchors each jamb plus 1 for each 18 inches or fraction thereof over 3 feet 0 inch. Minimum two (2) anchors in head and sill approximately 12 inches from each jamb plus 1 for each 30 inches of length or fraction thereof.
- K. Floor anchors - one (1) anchor each jamb for interior doors. Where wall construction will not allow placement of floor anchor, provide one (1) additional jamb anchor as close to floor as possible.
- L. Existing wall anchors shall be welded to provide non-removable condition. Welded bolt head to be ground, dressed and finished smooth.
- M. Frames installed in masonry walls to be fully grouted with masonry grout.
- N. Exposed field welds to be finished smooth and touched up.
- O. Primed or painted surfaces which are scratched or marred shall be touched up.
- P. Hardware to be applied in accordance with hardware manufacturer's templates and instructions.
- Q. Coordinate installation of glass and glazing.
- R. Install door louvers.
- S. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.

3.02 CONSTRUCTION

A. INSTALLATION TOLERANCES

1. Edge clearance for swinging doors shall not exceed the following:
 - a. Between door and frame at head and jamb: 1/8 inch.
 - b. Between edge of pair of doors: 1/8 inch.
 - c. At door sill with threshold. (From bottom of door to top of threshold): 3/8 inch.
 - d. At door sill with no threshold: 1/2 inch.
 - e. At door bottom and rigid floor covering per NFPA 80: 1/2 inch.
 - f. At door bottom and nominal floor covering per NFPA 80: 5/8 inch.

2. Frame installation tolerance shall not exceed the following:
 - a. Squareness $\pm 1/16$ inch.
 - b. Alignment $\pm 1/16$ inch.
 - c. Plumbness $\pm 1/16$ inch.
 - d. Diagonal Distortion $\pm 1/32$ inch.

END OF SECTION

SECTION 08 31 00

ACCESS DOORS AND PANELS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Steel access panels, except those specified under Divisions 22 - Plumbing, 23 - HVAC, or 26 - Electrical.

B. Related Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 06 10 00 - Rough Carpentry.
3. Section 09 29 00 - Gypsum Board.
4. Section 09 30 00 - Ceramic Tiling.
5. Section 09 91 00 - Painting and Coating.
6. Division 22 - Plumbing.
7. Division 23 - HVAC.
8. Division 26 - Electrical.
9. Division 27 - Communications.

1.02 SUBMITTALS

A. Shop Drawings:

- B. Indicate sizes, materials, thickness, fabrication methods, panel door and frame reinforcement, anchorage, and installation details.

- C. Provide layout drawings, indicating dimensioned locations of proposed access panels, size of each panel, and installation details. Determine and indicate required access panels in finished surfaces, whether furnished under this section or as part of Work of Divisions 22-Plumbing, 23- HVAC, and 26- Electrical.

1.03 QUALITY ASSURANCE

- A. Panels shall be provided with UL listings and labels.

- B. Access panels and frames shall be products of one (1) manufacturer.

- C. Coordinate access panels with plumbing, HVAC, and electrical work.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Panels and Frames: Provide protection as required by manufacturer to protect panels from damage during storage.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Access Panels:

<u>Non-Rated</u>	<u>Milcor</u>	<u>Karp</u>	<u>Nystrom</u>
Ceramic Tile	MS	DSC214M	NT
Plaster	K	DSC214M	NP
Drywall, Plaster Veneer	DW	DSC214M	NW
<u>Fire Rated</u>			
Ceramic Tile	MS	KRP150FR	IT
Plaster	M	KRP150PR	IP
Drywall, Plaster Veneer	M	KRP150FR	IW

- B. Or approved equal.
- C. Unless otherwise indicated, provide brushed stainless-steel finish for panels installed in ceramic tile. Provide prime coat finish suitable for field painting for panels installed in other finishes.
- D. Access Panels shall be 18 gauge minimum with vandal-proof lock operated by Allen wrench or another special tool. Exposed fastenings shall be secured with vandal-proof screws.
- E. Ceiling Access Doors.
1. Provide exterior type single-door by Dur-Red Products, Model TCA, 30 inches by 36 inches in size.
 - a. Door Leaf: 1-inch-thick core rigid fiberglass with 20-gauge steel outer shell.
 - b. Finish: Primer grey and painted minimum two (2) coats of paint. Color to match adjacent ceiling color finish.
 2. Install ceiling access door where access to the enclosed attic spaces is required and/or as shown in the drawings. If not shown in the drawings, provide one ceiling access panel in each enclosed drywall ceiling room. Where ceiling is rated, the ceiling access door shall meet or exceed the rating of the ceiling. All ceiling access doors shall receive keyed locks.

PART 3 – EXECUTION

3.01 GENERAL

- A. Provide access panels in finish construction, where indicated on Drawings, wherever required for access to concealed mechanical and electrical equipment, and where required by codes. Panels indicated on architectural Drawings shall be furnished under this section. Required panels for access

to equipment, but not indicated on architectural Drawings, shall be furnished as part of Work requiring access.

3.02 INSTALLATION

- C. Install panels accurately in location, perfect alignment, plumb, straight and true. Brace to prevent displacement by adjacent Work.
- B. Examine panels after installation for proper opening, closing and clearances. Replace damaged or defective panels.

3.03 CLEANING

- A. Remove rubbish, debris and waste materials and legally dispose of off Project site.

3.04 PROTECTION

- A. Protect Work of this section until Substantial Completion.

END OF SECTION

08 34 56
SECURITY GATES

PART 1 GENERAL

1.01 INCLUDED IN THIS SECTION

- A. Pre-wired gate operator for horizontal sliding gates, including all selected attachments and accessory equipment.
- B. For further information, call Brad Richards at the manufacturer at (206) 491-9207 brad.richards@niceforyou.com or visit the website at www.hysecurity.com.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Fencing: See section 32 31 13.
- B. Cast in place concrete: See section 03 30 00.
- C. Electrical service and connections: See section 26 05 13.

1.03 SUBMITTALS

- A. Shop drawings: Submit shop drawings under the provisions of Section 01 33 00. Submit drawings showing connections to adjacent construction, range of travel, and all electrical and mechanical connections to the operator. All underground runs of electrical lines and inductive vehicle obstruction loop locations shall be indicated on drawings. Drawings shall also show the size and location of the concrete mounting pad.
- B. Installation instructions: Submit two copies of manufacturer's installation instructions for this specific project.
- C. Submit manufacturer's completed warranty registration form to Project Manager.
- D. Project list: Submit list of product installations comparable to the subject job. Include date of product installation, installer, and owner's name and location of the project.
- E. Test reports:
 - 1. Submit affidavits from the manufacturer demonstrating that the gate operator mechanism has been tested to 200,000 cycles without breakdown.
 - 2. Each operator shall bear a label indicating that the operator mechanism has been tested. Operator is tested for full power and pressure of all hydraulic components, full stress tests of all mechanical components and electrical tests of all overload devices.

1.04 QUALITY ASSURANCE

- A. Manufacturer: A company specializing in the manufacture of gate operators of the type specified, with a minimum of five years' experience manufacturing operators of this type and design.
- B. Installer: Must have a minimum of three years' experience installing similar equipment, provide proof of attending a HySecurity Technical Training within the previous three years, or obtain other significant manufacturer endorsement of technical aptitude, if required, during the submittal process.

1.05 CODES AND REGULATORY REQUIREMENTS

- A. Operators shall be built to UL 325 standards and be listed by a nationally recognized testing laboratory. Complete all electrical work according to local codes and National Electrical Code. All fieldwork shall be performed in a neat and professional manner, completed to journeyman standards.
- B. Current safety standards require the use of multiple external sensors to be capable of stopping and/or reversing the gate in either direction upon sensing an obstruction. See also 2.2D.
- C. Vehicular gates should never be used by pedestrians. A separate pedestrian gate must always be provided when foot traffic is present.

- D. Gate must have physical stops to prevent over travel in both the open and close directions.
- E. Current safety standards require gate operators to be designed and labeled for specific usage classes.
 - 1. HySecurity SlideDriver™ II model SD40 is listed for use in UL 325 Usage Classes I, II, III, and IV.

1.06 PRODUCT DELIVERY AND STORAGE

- A. Comply with 01 60 00.
- B. Store products upright in the original shipping containers, covered, ventilated and protected from all weather conditions.

1.07 WARRANTY

- A. Provide a warranty against all defects in materials or workmanship for five years or 500,000 gate cycles (whichever occurs first) after the date of installation. Defective materials shall be replaced at manufacturer's discretion with new or reconditioned materials furnished by the manufacturer, at no cost to the owner. Freight, labor and other incidental costs are not covered under the factory warranty, but may be covered by a separate service agreement between installing company and the owner.
 - 1. To ensure validation of warranty, complete warranty registration form online at www.hysecurity.com/warranty. Warranty registration form is also included in the printed materials shipped with the operator.

PART 2 PRODUCTS

2.01 GATE OPERATORS

- A. HySecurity gate operator SlideDriver II model SD40 with SmartTouch 725™ Controller, or other comparable operator, as approved by the architect or specifier. Substitute operators that are approved will be published in an addendum, not less than ten days prior to bid opening. Requests for substitution will include the amount of savings to be passed on to the owner.

2.02 OPERATION

- A. Operation shall be by means of a metal rail passing between a pair of aluminum alloy wheels with polyurethane treads. Operator drive wheels will be driven using hydraulic motors, and system shall not include belts, gears, pulleys, roller chains or sprockets to transfer power from operator to gate panel. The operator shall generate a minimum horizontal pull of 300 lb (136 kg) without the drive wheels slipping and without distortion of supporting arms. Operator shall be capable of handling gates weighing up to 4,000 lb (1,800 kg). The operator shall be controlled by an electronic contactor which will control gate starting and stopping. The maximum gate velocity of the SD40 shall be 1 ft/s (304 mm/s). Upon starting, the gate operator will accelerate the gate to 1 ft/s (304 mm/s), whereupon a limit switch or sensor will stop the electric motor, ending gate travel. Two adjustable hydraulic brake valves (one for each direction) assist in slowing the gate to a precise stop.
- B. Minimum standard mechanical components:
 - 1. Supporting arms: Cast aluminum. Arms shall incorporate a low-speed sleeve bearing acting on arm pivot pins. (item 2 below)
 - 2. Arm pivot pins: 3/4" (19 mm) diameter, stainless steel, with integral tabs for ease of removal.
 - 3. Tension spring: 2 – 2 1/2" (51mm - 63 mm) medium to heavy duty, minimum 500 lb (226 kg) capacity.
 - 4. Tension adjustment: Finger tightened nut, not requiring the use of tools.
 - 5. Drive release: Must instantly release tension on both drive wheels and disengage them from contact with drive rail in a single motion, for manual operation.

6. Limit sensors or switches: Fully adjustable,
 - a. Switches - toggle types, with stripped ends to control panel.
 - b. Sensors – hall effect, jacketed cable, stripped ends to control panel.
 7. Chassis: 1/4" (6 mm) steel base plate and 12 Ga. (3 mm) sides and back welded and ground smooth.
 8. Cover: 16 Ga. (1 mm) zinc substrate steel with textured powder coat finish. All joints welded, filled and ground smooth. Finished corners square and true with no visible joints.
 9. Finish: Zinc substrate with textured powder coat finish, tested to withstand 1,000 hour salt spray test.
 10. Drive wheels: Two 6" diam (152 mm) AdvanceDrive™ wheels. Aluminum alloy with polyurethane over mold.
 11. Drive rail: Shall be extruded 6061 T6, not less than 1/8" (3 mm) thick. Drive rail shall incorporate roll pins for ease of replacement or splicing. Pins shall enable a perfect butt splice.
 12. Hydraulic hose: Shall be 3/8" (9.5 mm) reinforced, synthetic, abrasion resistant, rated to 3,000 psi or greater (20.6 MPa).
 13. Hydraulic valves: Shall be individually replaceable cartridge type, in an integrated hydraulic manifold.
 14. Hose fittings: At manifold shall be quick-disconnect type, others shall be swivel type.
 15. Hydraulic fluid: High performance type with a viscosity index greater than 375 and temperature range -40° F to 158° F (-40° C to 70° C).
 16. 0 – 3000 psi pressure transducer with a digital readout on the control board shall be standard. The hydraulic fluid reservoir shall be formed from a single piece of metal, non-welded, and shall be powder painted on the inside and the outside, to prevent fluid contamination.
- C. Minimum standard electrical components:
1. Pump motor: 1 hp, 3450 RPM, single or three phase motor.
 2. All components shall have overload protection.
 3. Electrical enclosure: metal, with hinged plastic lid for protection from intrusion of foreign objects.
 4. 1 directional valve control solenoid, 1 unloader valve control solenoid.
 5. Multi-function button to wake menu screen without opening the lid.
 6. Controls: SmartTouch 725 Controller containing:
 - a. inherent entrapment monitoring (UL 325, Type A);
 - b. built in audible “warn before operate” system;
 - c. built in timer to close;
 - d. 32 character OLED display for reporting of functions and codes with 7 button user interface;
 - e. multiple programmable options for output relays or sensor inputs;
 - f. two user programmable inputs;
 - g. two user programmable monitored sensor inputs;
 - h. anti-tailgate mode;
 - i. menu configuration, event logging and system diagnostics easily accessible with a USB flash drive or HySecurity’s Installer Phone App;*
 - j. embedded web server capable of sending alerts, faults and errors via e-mail;*
 - k. web based user interface allowing secure login to operator for remote operations and diagnostics;*
 - l. four inputs for Hy5B vehicle detector loops;
 - m. OXI antenna/receiver input for use with NICE OXI receivers and fobs;
 - n. one electromechanical and two solid state relays;
 - o. HS-1 for I/O Expansion Module;

- p. RS485 and ethernet for network connections;*
- q. USB port for firmware updates and troubleshooting logs;
- r. sequenced and dual gate connections;
- s. BlueBUS input for use with NICE BlueBUS devices;
- t. emergency input programmable for emergency open or close remote or radio input;
- u. open, close, stop inputs for remote or radio inputs.

*corrections models omit these items.

- 7. I/O Expansion Module with additional:
 - a. one configurable electromechanical relay;
 - b. four configurable solid state relays;
 - c. four configurable inputs.
- 8. Power supply, 24 VDC, 5 A output, variable voltage input.
- D. Required external sensors: See 1.5B. Specify photo eyes or gate edges or a combination thereof to be installed such that the gate will reverse in either direction upon sensing an obstruction.
- E. Optional control devices: card reader, free egress vehicle detectors, vehicle obstruction loop detectors, various emergency vehicle open devices as dictated by local code.
- F. Optional alert devices: Flashing lights or rotating beacon. Configurable audible beacon included as standard.
- G. Stop switch, accessible from outside.
- H. Other options:
 - 1. Through Beam or Reflective type photo eyes.
 - 2. Gate edge and transmitter radio reversing device.
 - 3. Hy5B plug in type vehicle detectors.
 - 4. Key operated cable manual release (secure side of gate).
 - 5. Fire and emergency access lock box with cable manual release.
 - 6. 115/208-230 60 hz VAC single phase, 110/220 50 hz VAC single phase, 208-230/460 60 hz VAC three phase, and 220/380/440 50 hz VAC three phase available.
 - 7. HySecurity factory drive rail.
 - 8. Lock for operator cover.
 - 9. 12 inch base riser.

2.03 FACTORY TESTING

- A. Fully assemble and test, at the factory, each gate operator to assure smooth operation, sequencing and electrical connection integrity.
- B. Proof test with simulated physical and electrical loads to exceed the fully rated capacity of the operator components.
- C. Inspect and test all hydraulics are leak free.
- D. All testing data shall be individually logged and recorded by serial number.
- E. Check all mechanical connections for tightness and alignment. Check all welds for completeness and continuity.
- F. Inspect finishes for completeness. Touch up imperfections prior to shipment.
- G. Check all hydraulic hoses and electrical wires to assure that chafing cannot occur during shipping or operation.

PART 3 EXECUTION

3.01 SITE EXAMINATION

- A. Locate concrete mounting pad in accordance with approved shop drawings and in compliance with local building codes.
- B. Make sure that gate is operating smoothly under manual conditions before installation of gate operators. Do not proceed until gate panel is aligned and operates without binding.

3.02 INSTALLATION

- A. Install gate operator in accordance with the safety regulations and the manufacturer's product literature and installation instructions, current at the time of installation. Coordinate locations of operators with contract drawings; other trades and shop drawings.
- B. Installer shall ensure that the electrical service to the operator is at least 20A. Electrical wiring to conform to NEC and manufacturer's installation instructions.

3.03 FIELD QUALITY CONTROL

- A. Test operator through ten full open and close cycles and adjust for operation without binding, scraping or uneven motion. Test limit sensors for proper open and close limit positions.
- B. All anchor bolts shall be fully tightened in the finished installation.
- C. Owner, or owner's representative, shall complete "check list" with installing contractor prior to final acceptance of the installation and submit completed warranty documentation to manufacturer.

3.04 CONTINUED SERVICE AND DOCUMENTATION

- A. Train owner's personnel on how to safely shut off electrical power, release and manually operate the gate. Additionally, demonstrate the general maintenance of the gate operator and accessories and provide one copy each of User Guide and Quick Start Guide for the owner's use. Manuals will identify parts of the equipment for future procurement. Direct maintenance personnel to the technical support sections on HySecurity's website at support.hysecurity.com.

NOTE: HySecurity reserves the right to change these specifications at any time, without notice and without prejudice. Call (800) 321-9947 if you are not sure that you have the latest edition.

CAUTION: Operators manufactured by HySecurity are intended for use in controlling vehicular traffic and are not intended to be used by pedestrians or to control pedestrian traffic. **Always install a separate pedestrian gate.**

END OF SECTION

SECTION 08 41 13
ALUMIMUM-FRAMED STOREFRONTS, ENTRANCES AND WINDOWS

PART 1 - GENERAL

1.1. SUMMARY

A. Section Includes:

1. Architectural Exterior Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units – including framed exterior fixed windows, where noted in plans
2. Architectural Interior Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, etc.
3. Aluminum framed entrance system.

1.2. RELATED SECTIONS:

- A. Section 05 12 00 – Structural Steel Framing
- B. Section 06 10 00 - Rough Carpentry
- C. Section 07 92 00 - Joint Protection
- D. Section 08 81 00 - Glass Glazing

1.3. REFERENCES (Current Edition for All Standards Listed)

A. American Architectural Manufacturer's Association (AAMA):

1. AAMA 501.4 – Recommended Static Test Method For Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Inter-story Drifts
2. AAMA 501.2: Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems
3. AAMA 501.4 – Recommended Static Test Method For Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Inter-Story Drifts
4. AAMA 501.5 – Test Method for Thermal Cycling of Exterior Walls.
5. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls, and Sloped Glazing Systems
6. AAMA 505 - Dry Shrinkage and Composite Performance Thermal Cycling Test Procedure.
7. AAMA 506 - Voluntary Specifications for Impact and Cycle Testing of Fenestration Products
8. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.

9. AAMA Specification 701/702 – Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals.
10. AAMA Specification 1503 – Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
11. AAMA Specification 1801 - Voluntary Specification for the Acoustical Rating of Exterior Windows, Doors, Skylights and Glazed Wall Sections
12. AAMA - AFPA “Anodic Finishes/Painted Aluminum”.
13. AAMA TIR-A8 – Structural Performance of Thermal Barrier Framing System
- B. American Society of Civil Engineers (ASCE):
 1. ASCE 7, Section 6.5, "Method 2-Analytical Procedure"
- C. American Society for Testing and Materials (ASTM):
 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 2. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
 3. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
 4. ASTM C920 - Standard Specification for Elastomeric Joint Sealants
 5. ASTM C1401 - Standard Guide for Structural Sealant Glazing
 6. ASTM C1184 - Standard Specification for Structural Silicone Sealants
 7. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 8. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
 9. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
 10. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
 11. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
 12. ASTM E1105 – Standard for Water Penetration
 13. ASTM E1425 - Standard Practice for Determining the Acoustical Performance of Windows, Doors, Skylight, and Glazed Wall Systems
 14. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials

15. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- D. National Fenestration Rating Council (NFRC):
 1. NFRC 700 – Product Certification Program
 2. NFRC 705 – Component Modeling Approach Product Certification Program
- E. CCR, Title 24, 2018 ICC, With State of California Amendments – 2019 California Building Code (CBC), Part 2, Vols. 1 and 2
- F. CPSC 16 CFR 1201 – Safety Standard For Architectural Glazing Materials
- G. CSA-A440/A440.1 - Windows / User Selection Guide to CSA Standard A440-00, Windows
- H. GANA Glazing Manual.
- I. GSA-TS01 - US General Services Administration - Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loading.

1.4. SUBMITTALS

- A. Submittals: Provide submittals per Division 01, “Submittal Procedures”
 1. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-framed storefront system indicated.
 2. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.
 3. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.
 4. Samples For Verification: For aluminum-framed storefront system and components required.
 5. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type of aluminum-framed storefront.
 6. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
 - a. Joinery.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
 - f. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with

doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

g. See Section 08 71 00, "Door Hardware".

1) Recycled Content:

- a) Provide documentation that aluminum has a minimum of 50% mixed pre- and post-consumer recycled content with a sample document illustrating project specific information that will be provided after product shipment.
- b) Once product has shipped, provide project specific recycled content information, including:
 - 1) Indicate recycled content; indicate percentage of pre- and post-consumer recycled content per unit of product.
 - 2) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - 3) Indicate location recovery of recycled content.
 - 4) Indicate location of manufacturing facility.

2) Environmental Product Declaration (EPD):

- a) Include a Type III Product-Specific EPD created from a Product Category Rule.

3) Material Ingredient Reporting:

- a) Include documentation for material reporting that has a complete list of chemical ingredients to at least 100 ppm (0.01%) that covers 100% of the product.

1.5. QUALITY ASSURANCE

- A. **Installer Qualifications:** An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.
- B. **Manufacturer Qualifications:** A manufacturer capable of providing aluminum framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. **Source Limitations:** Obtain aluminum framed storefront system through one source from a single manufacturer.
- D. **Product Options:** Drawings indicate size, profiles, and dimensional requirements of aluminum framed storefront system and are based on the specific system indicated. Refer to Section 01 60 00, "Product Requirements." Do not modify size and dimensional requirements.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.6. PRE-INSTALLATION CONFERENCE

- A. Conduct conference at Project site to comply with requirements in Section 01 31 00, "Project Management Coordination".
- A. Kawneer's Material Transparency Summary (MTS), or equal.

1.7. DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

1.8. PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of aluminum framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.9. WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials, fabrication or installation within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Adhesive or cohesive sealant failures.
 - e. Water leakage through fixed glazing and framing areas.
 - f. Failure of operating components.
 - 2. Warranty period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Submit and provide with manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials, fabrication or installation within specified warranty period. Warranty does not include normal weathering.
 - 1. Warranty period: 10 years from date of Substantial Completion

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, the following manufacturer shall be the Basis of Design, or equal.
 - Kawneer Company Inc.
 - Address: 555 Guthridge Ct. Technology Park/Atlanta Norcross, GA 30092

Website: <https://www.kawneer.com>

Architectural Sales Representative - Northern Calif. Kawneer

Craig Gauger

Phone: (916) 716-7396

E-mail: craig.gauger@arconic.com

B. Basis-of-Design Product - Kawneer Company Inc.:

a. Basis-of-Design Product:

1) Kawneer Company Inc., or equal.

b) Interior:

(1) Trifab™ 400 (Non-Thermal) Framing System, or equal

2) System Dimensions: 1-3/4" x 4" (44.5 mm x 101.6 mm)

3) Glass –

a) Interior: Center, 1/4" glazing

b) See Section 08 81 00, "Glass and Glazing" for glazing types

B. Substitutions: Provide per Division 01, "Substitution Procedures"

2.2 MATERIALS – STOREFRONT SYSTEM:

- a. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" wall thickness at any location for the main frame and complying with ASTM B221: 6063-T6 alloy and temper.
- b. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components.
- c. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- d. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- e. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- f. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.
- g. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with non-staining, nonferrous shims for aligning system components.
- h. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.3 GLAZING SYSTEMS:

- A. Glazing: As specified in Section 08 81 00, "Glass & Glazing".
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- A. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
 - 1. Sealants - See Section 07 62 00, "Joint Sealants".
 - 2. Structural Sealant – Minimum Standard: ASTM C1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
 - a. Color: Black
 - 3. Weatherseal Sealant: Provide ASTM C920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
 - a. Color: Matching structural sealant.
 - 4. Glazed assemblies shall bear NFRC permanent and temporary labels or label certificates in accordance with NFRC 700 or 705. **Note: Default temporary labels are unacceptable for this project.**

2.4 ENTRANCE DOOR SYSTEMS

- A. Basis-of-Design Product:
 - 1. Kawneer Company Inc., or equal.
 - a. Entrance Doors: 500 Swing Door: wide stile, 1 ¾ inch depth, high traffic applications.
 - b. The door stile and rail face dimensions of the 500 entrance door will be as follows

Door	Vertical Stile	Top Rail	Bottom Rail
500	5" (127 mm)	6" (127 mm)	10" (166 mm)
 - c. Major portions of the door members to be 0.125" (3.2) nominal in thickness and glazing molding to be 0.05" (1.3) thick.
 - d. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
 - e. Provide adjustable glass jacks to help center the glass in the door opening.
- B. Entrance Door Hardware:

1. As specified in Section 08 71 00, "Door Hardware."
 - a. Steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely aluminum-framed entrance doors.

C. Weatherstripping:

1. Meeting stiles on pairs of doors shall be equipped with an adjustable astragal utilizing wool pile with polymeric fin.
2. The door weathering on a single acting offset pivot or butt hung door and frame (single or pairs) shall be Kawneer Sealair weathering, or equal, comprised of a thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing.
3. Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners (Necessary to meet specified performance tests).
4. Threshold: Extruded aluminum, one piece per door opening, with ribbed surface.

D. Door Materials

1. Aluminum Extrusions: Alloy and temper recommended by sliding aluminum-framed glass door manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.090" wall thickness at any location for the main frame and sash members.
2. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with sliding aluminum-framed glass door members, trim hardware, anchors, and other components.
3. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B633 for SC3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
4. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B456 for Type SC3 severe service conditions, or zinc-coated steel or iron complying with ASTM B633 for SC3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
5. Weather Seals: Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

2.5 ACCESSORY MATERIALS:

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Section 07 92 00, "Joint Protection
- B. Bituminous Paint: Cold-applied, asphalt-mastic paint, containing no asbestos; formulated for 30 mil thickness per coat.

2.6 FABRICATION – STOREFRONT SYSTEM

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fit joints; make joints flush, hairline and weatherproof.

3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 4. Physical and thermal isolation of glazing from framing members.
 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 6. Provisions for field replacement of glazing.
 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- C. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- D. Storefront Framing: Fabricate components for assembly using manufactures standard installation instructions.
- E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.7 FABRICATION – ENTRANCES:

- A. Fabricate aluminum-framed glass entrance doors in sizes indicated. Include a complete system for assembling components and anchoring doors.
- B. Fabricate aluminum-framed glass doors that are re-glazable without dismantling perimeter framing.
 1. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/8" (29 mm) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
 2. Accurately fit and secure joints and corners. Make joints hairline in appearance.
 3. Prepare components with internal reinforcement for door hardware.
 4. Arrange fasteners and attachments to conceal from view.
- C. Weather Stripping: Provide weather stripping locked into extruded grooves in door panels or frames as indicated on manufactures drawings and details.
- D. Aluminum Finishes
 1. Comply with AAMA-AFPA "Anodic Finishes/Painted Aluminum" for recommendations for applying and designating finishes.
 2. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
 3. Factory Finishing:

- a. Kawneer Permanodic, or equal, AA-M10C22A31, AAMA 611, Architectural Class II Clear Anodic Coating (Color #17 Clear)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight framed aluminum storefront system installation.
- B. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum framed storefront system, accessories, and other components.
- B. Install aluminum framed storefront system and entrances level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- D. Install aluminum framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within sliding door to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 FIELD QUALITY CONTROL

- A. Field Tests – Exterior Storefront System:
 1. Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
 - a. Testing: Testing shall be performed by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements. Testing Standard per AAMA 503, including reference to ASTM E783 for Air Infiltration Test and ASTM E1105 Water Infiltration Test.
 - 1) Air Infiltration Tests: Conduct tests in accordance with ASTM E783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², whichever is greater.

- 2) Water Infiltration Tests: Conduct tests in accordance with ASTM E1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.24 psf (300 Pa).
- b. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Clean aluminum surfaces immediately after installing aluminum framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

SECTION 08 56 19
PASS THRU WINDOWS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Pass-through windows.
- B. Anchors, brackets, and attachments.
- C. Hardware.

1.2 REFERENCES

- A. AAMA 101-93, Voluntary Specifications for Aluminum and Vinyl (PVC) Prime Windows and Glass Doors.
- B. AAMA 2605.2, Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
- C. Uniform Building Code, Chapters 16 and 24.
- D. ASTM B 221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Profiles, and Tube.
- E. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- F. FS TT-P-645 - Primer, Paint, Zinc Chromate, Alkyd Type.

1.3 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Product Data: Submit Manufacturer's technical product data substantiating that products comply.
- C. Shop drawings: Submit for fabrication and installation of windows. Include details, elevations and installation requirement of finish hardware and cleaning. Show recorded field measurements on shop drawings.
- D. Certification: Provide printed data in sufficient detail to indicate compliance with the contract documents.
- E. Submit two samples illustrating prefinished aluminum surface.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver windows in crate to provide protection during transit and job storage.
- B. Inspect windows upon delivery for damage. Unless minor defects can be made to meet the Architect's specifications and satisfaction, damaged parts should be removed and replaced.

- C. Store windows at building site under cover in dry location. Provide wrapping to protect prefinished aluminum surfaces.

1.5 WARRANTY

- A. Provide manufacturer's standard warranty under provisions of Section 01 77 19.
- B. Warranty: All material and workmanship shall be warranted against defects for a period of one (1) year from the original date of purchase.

PART 2 - PRODUCTS

2.1 PASS-THRU WINDOW COMPONENTS

- A. Basis of Design: Design is based on aluminum, interior sliding service window manufactured by **C.R. Laurence Co., Inc. (800) 421-6144**. The Architect will consider requests for substitutions, under the provisions of Section 01 25 00.
- B. Type: Sliding service window.
- C. Model: Daisy XX
- D. Construction:
 - 1. Sizes: Custom to suit on-site conditions.
 - a. Window W1: Coordinate with (e) steel frame
 - b. Window W3: Coordinate with Storefront framing
 - 2. Frames: Type 6063-T5 aluminium extrusions.
 - 3. Glazing: Tempered glass per Section 08 81 00. Glass not included, to be supplied by others.
 - 4. Lock: Slide Bolt lock.
 - 5. Track:
 - a. Overhead track – D6
 - b. No bottom track
 - 6. Finish: Duranodic Bronze.

2.2 FABRICATION

- A. Prepare components to receive anchor devices. Fabricate anchorage items.
- B. Arrange fasteners, attachments, and jointing to ensure concealment from view.
- C. Prepare components with internal reinforcement for hardware.
- D. Protection of Contact Surfaces: Paint aluminum surfaces in contact with dissimilar metals or with incompatible materials. Isolated with nonabsorbative tape or gaskets.

2.3 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection
 - 1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
 - 2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
 - 3. In the event of discrepancy, immediately notify the Architect.
 - 4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 INSTALLATION

- A. Install window in accordance with manufacturer's printed instructions and recommendations. Repair damaged units as directed (if approved by the manufacturer and the architect) or replace with new units.

3.3 CLEANING

- A. Clean frame and glazing surfaces after installation, complying with requirements contained in the manufacturer's instructions. Remove excess glazing sealant compounds, dirt or other substances.

3.4 PROTECTION

- A. Institute protective measures required throughout the remainder of the construction period to ensure that all the windows do not incur any damage or deterioration, other than normal weathering, at the time of acceptance.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following, but is not necessarily limited to:
 - 1. Door Hardware, including electric hardware.
 - 2. Storefront and Entrance door hardware.
 - 3. Gate Hardware.
 - 4. Digital keypad access control devices.
 - 5. Thresholds, gasketing and weather-stripping.
 - 6. Door silencers or mutes.
- C. Related Sections:
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Section 08 11 00 – Metal Doors and Frames.
 - 5. Section 08 43 00 – Storefronts.
 - 6. Section 32 31 13 – Chain Link Fences.
 - 7. Section 32 31 19 – Decorative Metal Fences and Gates (for hinge/closer units).
- D. Related Documents
 - 1. Drawings and general provisions of Contract, including General and Supplementary Conditions of Division 1 Specification Sections, apply to this Section.

1.02 REFERENCES

- A. 2022 California Building Code, CCR, Title 24.
- B. BHMA – Builders' Hardware Manufacturers Association
- C. CCR – California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.
- D. DHI – Door and Hardware Institute

- E. NFPA - National Fire Protection Association.
 - 1. NFPA 80 – Standard for Fire Doors and Other Opening Protectives
 - 2. NFPA 105 – Standard for Smoke Door Assemblies and Other Opening Protectives
- F. UL - Underwriters Laboratories.
 - 1. UL 10C – Standard for Positive Pressure Fire Tests of Door Assemblies
 - 2. UL 305 – Standard for Panic Hardware
- G. WHI - Warnock Hersey Incorporated
- H. SDI - Steel Door Institute

1.03 SUBMITTALS & SUBSTITUTIONS

- A. General: Submit in accordance with Conditions of the Contract and Division 1 Specification sections.
- B. Submit product data (catalog cuts) including manufacturers' technical product information for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Submit six (6) copies of schedule organized vertically into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
 - 1. Include a Cover Sheet with;
 - a. Job Name, location, telephone number.
 - b. Architects name, location and telephone number.
 - c. Contractor’s name, location, telephone number and job number.
 - d. Suppliers name, location, telephone number and job number.
 - e. Hardware consultant's name, location and telephone number.
 - 2. Job Index information included;
 - a. Numerical door number index including; door number, hardware heading number and page number.
 - b. Complete keying information (referred to DHI hand-book "Keying Systems and Nomenclature"). Provision should be made in the schedule to provide keying information when available; if it is not available at the time the preliminary schedule is submitted.
 - c. Manufacturers' names and abbreviations for all materials.
 - d. Explanation of abbreviations, symbols, and codes used in the schedule.
 - e. Mounting locations for hardware.
 - f. Clarification statements or questions.
 - g. Catalog cuts and manufacturer’s technical data and instructions.
 - 3. Vertical schedule format sample:
 - a. Single or pair with opening number and location.
 - b. Degree of opening

- c. Hand of door(s)
 - d. Door and frame dimensions and door thickness.
 - e. Label requirements if any.
 - f. Door by frame material.
 - g. (Optional) Hardware item line #.
 - h. Keypad Symbol.
 - i. Quantity.
 - j. Product description.
 - k. Product Number.
 - l. Fastenings and other pertinent information.
 - m. Hardware finish codes per ANSI A156.18.
 - n. Manufacture abbreviation.
- D. Make substitution requests in accordance with Division 1. Substitution requests must be made prior to bid date. Include product data and indicate benefit to the project. Furnish samples of any proposed substitution.
- E. Wiring Diagrams: Provide product data and wiring and riser diagrams for all electrical products listed in the Hardware Schedule portion of this section.
- F. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- G. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- H. Furnish as-built/as-installed schedule with close-out documents, including keying schedule and transcript, wiring/riser diagrams, manufacturers' installation and adjustment and maintenance information.
- I. Fire Door Assembly Testing: Submit a written record of each fire door assembly to the Owner to be made available to the Authority Having Jurisdiction (AHJ) for future building inspections.
- J. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

1.04 QUALITY ASSURANCE

- A. Obtain each type of hardware (latch and lock sets, hinges, closers, exit devices, etc.) from a single manufacturer.
- B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

1. Responsible for detailing, scheduling and ordering of finish hardware.
 2. Meet with Owner to finalize keying requirements and to obtain final instructions in writing. To maintain the integrity of patented key systems, provide a letter of authorization from the specified manufacturer indicating that supplier has authorization to purchase the key system directly from the manufacturer.
 3. Stock parts for products supplied and are capable of repairing and replacing hardware items found defective within warranty periods.
- C. Hardware Installer: Company specializing in the installation of commercial door hardware with five years documented experience.
- D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not.
1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".
- E. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- F. Product packaging to be labelled in compliance with CA Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986.
- G. Pre-Installation Conference
1. Schedule a pre-installation conference at least one week prior to beginning work of this section.
 2. Attendance: Architect, Construction Manager, Contractor, Security Contractor, Hardware Supplier, Installer, Key Owner Personnel, and Project Inspector.
 3. Agenda: Review hardware schedule, products, installation procedures and coordination required with related work. Review Owner's keying standards.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery of packaged hardware items to the appropriate locations (shop or field) for installation.
- B. Hardware items shall be individually packaged in manufacturers' original containers, complete with proper fasteners. Clearly mark packages on outside to indicate contents and locations in hardware schedule and in work.
- C. Provide locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, etc.
- D. Contractor to inventory door hardware jointly with representatives of hardware supplier and hardware installer until each all are satisfied that count is correct.

1.06 WARRANTY

- A. Provide warranties of respective manufacturers’ regular terms of sale from day of final acceptance as follows:
1. Locksets: “L” Series (3) years – “ND” Ten (10) years.
 2. Electronic: One (1) year.
 3. Closers: Thirty (30) years –1260 twenty (20) years –Concealed High Security fifteen (15) years except electronic closers shall be two (2) years.
 4. Exit devices: Three (3) years.
 5. All other hardware: Two (2) years.

1.07 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

<u>Item</u>	<u>Manufacturer</u>	<u>Acceptable Substitutes</u>
Hinges	Ives	Hager, Stanley, McKinney
Locks, Latches & Cylinders	Schlage	Or Approved Equal
Exit Devices	Von Duprin	Or Approved Equal
Closers	LCN	Or Approved Equal
Push, Pulls & Protection Plates	Ives	Trimco, BBW, DCI
Flush Bolts	Ives	Trimco, BBW, DCI
Dust Proof Strikes	Ives	Trimco, BBW, DCI
Coordinators	Ives	Trimco, BBW, DCI
Stops	Ives	Trimco, BBW, DCI
Overhead Stops	Glynn-Johnson	Or Approved Equal
Thresholds	Zero	Pemko, National Guard

Seals & Bottoms Zero Pemko, National Guard

2.02 MATERIALS

A. Hinges: Ives as scheduled.

1. Ives 5BB1HW x NRP (Heavy use exterior doors) 630 finish.
Ives 5BB1HW (Interior doors) 652 finish.
2. Hinges shall be sized in accordance with the following:
 - a. Height:
 - 1) Doors up to 42" wide: 4-1/2" inches.
 - 2) Doors 43" to 48" wide: 5 inches.
 - b. Width: Sufficient to clear frame and trim when door swings 180 degrees.
 - c. Number of Hinges: Furnish 3 hinges per leaf to 7'-5" in height. Add one for each additional 2 feet in height.
3. Exterior out-swinging door butts shall be non-ferrous material and shall have stainless steel hinge pins. All doors to have non-rising pins.
4. Furnish non-removable pins (NRP) at all exterior out-swing doors and interior key lock doors with reverse bevels.

B. Continuous Hinges: Ives as scheduled.

1. SL-224HD (Heavy use exterior doors & Remodels) 628 finish.

C. Heavy Duty Cylindrical Locks and Latches: Schlage "ND" Series as scheduled with "Rhodes" design, fastened with through-bolts and threaded chassis hubs.

1. Bathroom (Student – multi use) ND94
2. Administration ND91
- 3.. Bathroom (Typical) ND94
4. Janitor / Storage room ND96
5. Bathroom (Faculty - single compartment toilet) L9485 x 06A x L283-722
6. Provide cylindrical locksets exceeding the ANSI/BHMA A156.2 Grade 1 performance standards for strength, security, and durability in the categories below:
 - a. Abusive Locked Lever Torque Test – minimum 3,100 inch-pounds without gaining access
 - b. Offset lever pull – minimum 1,600-foot pounds without gaining access
 - c. Vertical lever impact – minimum 100 impacts without gaining access
7. Cycle life - tested to minimum 16 million cycles per ANSI/BHMA A156.2 Cycle Test with no visible lever sag or use of performance aids such as set screws or spacers
8. Cylinders: Refer to "KEYING" article, herein.
9. Provide solid steel anti-rotation through bolts and posts to control excessive rotation of lever.
10. Provide lockset that allows lock function to be changed to over twenty other common functions by swapping easily accessible parts.

11. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
12. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
13. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
14. Provide wired electrified options as scheduled in the hardware sets.
 - a. 12 through 24-volt DC operating capability, auto-detecting
 - b. Selectable EL (fail safe)/EU (fail secure) operating mode via switch on chassis
 - c. 0.230A (230mA) maximum current draw
 - d. 0.010A (10mA) holding current
 - e. Modular / "plug in" request to exit switch
15. Lever Trim: Solid cast levers without plastic inserts, and wrought roses on both sides.

D. Exit devices: Von Duprin as scheduled.

1. CD98NL-AX x 990NL (Single Door) 626 finish
2. 98L-AX-2-F-996L x 2 KR9954 Mullion 154(F Rated Pairs) 626 finish
 - a. No vertical rods allowed.
 - b. Use -2 Function to meet AB 211
 - c. MT54 Mullion Storage at Pairs
3. Provide certificate by independent testing laboratory that device has completed over 1,000,000 cycles and can still meet ANSI/BHMA A156.3 - 2001 standards.
4. All internal parts shall be of cold-rolled steel with zinc dichromate coating.
5. Non-handed basic device design with center case interchangeable with all functions.
6. All devices shall have quiet return fluid dampeners.
7. All latch bolts shall be deadlocking with ¾" throw and have a self-lubricating coating to reduce friction and wear.
8. Device shall bear UL label for fire and or panic as may be required.
9. All surface strikes shall be roller type and utilize a plate underneath to prevent movement.
10. Lever Trim: "Breakaway" design, forged brass or bronze escutcheon with a minimum of .130" thickness, match lockset lever design.
11. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key.
 - a. MT54 Mullion Storage at Pairs
12. Furnish glass bead kits for vision lites where required.
13. All Exit Devices to be sex-bolted to the doors.
14. Panic Hardware shall comply with CBC Section 11B.404.2.7 and shall be mounted between 34" and 44" above the finished floor surface.
 - a. Provide exit devices UL certified to meet maximum 5-pound requirements according to the California Building Code section 11B-309.4, and UL listed for Panic Exterior Fire Exit Hardware.

E. Closers: LCN as scheduled. Place closers inside building, stairs, room, etc.

1. P4041XP 689 finish
 - a. Hold open arms or cush closers are not allowed.

2. Door closer cylinders shall be of high strength cast iron construction with double heat-treated pinion shaft to provide low wear operating capabilities of internal parts throughout the life of the installation. All door closers shall be tested to ANSI/BHMA A156.4 test requirements by a BHMA certified testing laboratory. A written certification showing successful completion of a minimum of 10,000,000 cycles must be provided.
3. All door closers shall be fully hydraulic and have full rack and pinion action with a shaft diameter of a minimum of 11/16 inch and piston diameter of 1 inch to ensure longevity and durability under all closer applications.
4. All parallel arm closers shall incorporate one-piece solid forged steel arms with bronze bushings. 1-9/16" steel stud shoulder bolts, shall be incorporated in regular arms, hold-open arms, arms with hold open and stop built in. All other closers to have forged steel main arms for strength, durability, and aesthetics for versatility of trim accommodation, high strength and long life.
5. All parallel arm closers so detailed shall provide advanced backcheck for doors subject to severe abuse or extreme wind conditions. This advanced backcheck shall be located to begin cushioning the opening swing of the door at approximately 45 degrees. The intensity of the backcheck shall be fully adjustable by tamper resistant non-critical screw valve.
6. Closers shall be installed to permit doors to swing 180 degrees.
7. All closers shall utilize a stable fluid withstanding temperature range of 120 degrees F. to -30 degrees F. without requiring seasonal adjustment of closer speed to properly close the door.
8. Provide the manufactures drop plates, brackets and spacers as required at narrow head rails and special frame conditions. NO wood plates or spacers will be allowed. Door frames shall be reinforced at all mounting locations.
9. Maximum effort to operate closers shall not exceed 5 lbs., such pull or push effort being applied at right angles to hinged doors. Compensating devices or automatic door operators may be utilized to meet the above standards. When fire doors are required, the maximum effort to operate the closer may be increased but shall not exceed 15 lbs. when specifically approved by fire marshal. All closers shall be adjusted to operate with the minimum amount of opening force and still close and latch the door. These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position. Per 11B- 404.2.8.1, door shall take at least 5 seconds to move from an open position of 90 degrees to a position of 12 degrees from the latch jamb.

F. Flush Bolts & Dust Proof Strikes: Ives as scheduled.

1. FB51 (Manual) (metal doors) (Storage & Utility rooms) 626 finish
2. FB61P (Manual) (wood doors) (Storage & Utility rooms) 626 finish
 - a. Manual flush bolts only permitted on storage or mechanical openings as scheduled.
 - b. Provide dust proof strikes at openings using bottom bolts.
 - c. Automatic flush bolts allowed only where required by Fire Code.

G. Door Stops: Ives as scheduled.

1. FS18S (Exterior Floor) 626 finish
2. FS 436/438 (Interior Floor) 626 finish
3. WS 406CVX (Wall) 626 finish
4. WS406CCV (Inswing push-button locks) 626 finish
 - a. Allow for maximum swing of doors
 - b. Backing required at wall holders

5. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
6. Do not install floor stops more than four (4) inches from the face of the wall or partition (CBC Section 11B-307).
7. Overhead stops shall be made of stainless steel and non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.

H. Door Holders: Ives as scheduled.

1. WS452-4 Series Automatic Holder (Door) 626 finish
2. FS40 Series Automatic Holder (Wall) 626 finish
 - a. Backing required at wall holders
 - b. Allow for maximum door swing

I. Protection Plates: Ives as scheduled.

1. Kick Plate: 8400-10" x 2" LDW 630 finish
2. Mop Plate: 8400-5" x 2" LDW 630 finish
3. Push / Pull Plate: 8200 x 8302-6x 4x16 630 finish
4. Lock Protector: LP-13, LP-12 626 finish
5. Fabricate either kick, armor, or mop plates with four beveled edges. Provide kick plates 10" high and 2" LDW. Sizes of armor and mop plates shall be listed in the Hardware Schedule. Furnish with machine or wood screws of bronze or stainless to match other hardware.

J. Thresholds: As Scheduled and per details.

1. Thresholds shall not exceed 1/2" in height, with a beveled surface of 1:2 maximum slope.
2. Set thresholds in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 7 "Thermal and Moisture Protection".
3. Use 1/4" fasteners, red-head flat-head sleeve anchors (SS/FHSL).
4. Thresholds shall comply with CBC Section 11B-404.2.5.

K. Seals and Surface Applied Hardware: Zero as scheduled.

1. Smoke Seal: 488S-BK Black
 2. Weather Seal: 488S-BK 628 finish
- and-
- 8780N Factory
 3. Door Sweep: 328AA 689 finish
 4. 139SS (Wood doors) (Use only where required by fire code) 630
 - a. Astragal by door manufacturer at HM door
 5. Drip Guard: 17D x 4" PDW (Exterior doors exposed to rain) 628
 6. Door Bottom: Use automatic door bottoms only if required by code.
 7. Provide silicone gasket at all rated and exterior doors.
 8. Fire-rated Doors, Resilient Seals: UL10C Classified complies with NFPA 80 & NFPA 252. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements.
 9. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C Classified complies with

NFPA 80 & NFPA 252. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required.

10. Smoke & Draft Control Doors, Provide UL10C Classified complies with NFPA 80 & NFPA 252 for use on "S" labeled Positive Pressure door assemblies.

L. Door Shoes & Door Top Caps: Provide door shoes at all exterior wood doors and top caps at all exterior out-swing doors.

M. Silencers: Ives as scheduled.

1. 654A, 655A, 623A Black
2. Furnish silencers for interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where sound or light seals occurs, or for fire-resistive-rated door assemblies.

N. Keying: Schlage as scheduled.

1. Furnish a Proprietary Schlage master key system as directed by the owner. Key system to be designated and combination-d by the Schlage Master Key Department even if pinned by the Authorized Key Center, Authorized Security Center or a local authorized commercial dealer. This is to be a Schlage Primus keying system. SCUSD to verify all keyways. Provide as follows:
 - a. 6 pin x Standard Core plug (D Series) 626 finish
 - b. 6 pin x Rim type x IC Core (Exit Device) 626 finish
 - c. 6 pin x 1-1/4" Mortise x IC Core (KR Mullions and CD) 626 finish
2. A detailed keying schedule is to be prepared by the owner and/or architect in consultation with a representative of Allegion or an Authorized Key Center or Authorized Security Center. Each keyed cylinder on every keyed lock is to be listed separately showing the door #, key group (in BHMA terminology), cylinder type, finish and location on the door.
3. Establish a new master key system for this project as directed by the keying schedule.
4. Furnish all cylinders in the Schlage conventional style except the exit device and removable mullion cylinders which will be supplied in Schlage Full Size Interchangeable Core (FSIC). Pack change keys independently (PKI).
5. Furnish PrimusXP "Classic" keyway Patent Protected Schlage cylinders where noted. Furnish all other cylinders in matching conventional "Classic" keyway. Furnish Patent Protected Schlage keys for all cylinders. (e.g., Primus XP Classic Keyway for patent protected / Maximum control) (with mix of conventional "Classic" keyway)
6. Furnish construction keying for doors requiring locking during construction.
 - a. For FSIC systems provide 23-030-ICX Full Size Construction Cores
 - b. For FSIC systems provide ten 48-101-ICX Construction Keys
 - c. For FSIC systems provide two 48-056-ICX Control Keys (const.)
 - d. For FSIC systems provide two control keys for installing the permanent cores (49- 056 for "Classic" keyways, 48-052-XP for "Classic Primus") (49-003 for "Everest Conventional", 48-005-XP for "Everest Primus")

O. Fasteners

1. Screws for strikes, face plates and similar items shall be flat head, countersunk type, provide machine screws for metal and standard wood screws for wood.

2. Screws for butt hinges shall be flathead, countersunk, full-thread type.
3. Fastening of closer bases or closer shoes to doors shall be by means of sex bolts and spray painted to match closer finish.
4. Provide expansion anchors for attaching hardware items to concrete or masonry.
5. All exposed fasteners shall have a Phillips head.
6. Finish of exposed screws to match surface finish of hardware or other adjacent work.
7. All Exit Devices and Lock Protectors shall be fastened to the door by the means of sex bolts or through bolts.

2.04 FINISHES

- A. Generally, to be satin chrome US26D (626 on bronze and 652 on steel) unless otherwise noted.
- B. Furnish push plates, pull plates and kick or armor plates in satin stainless steel US32D (630) unless otherwise noted.
- C. Door closers shall be powder-coated to match other hardware, unless otherwise noted.
- D. Aluminum items to be finished anodized aluminum except thresholds which can be furnished as standard mill finish.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that doors and frames are square and plumb and ready to receive work and dimensions are as instructed by the manufacturer.
- B. Beginning of installation means acceptance of existing conditions.
- C. Fire-Rated Door Assembly Inspection: Upon completion of the installation, all fire door assemblies shall be inspected to confirm proper operation of the closing device and latching device and that only the manufacturer's furnished fasteners are used for installation and that it meets all criteria of a fire door assembly per NFPA 80 (Standard for Fire Doors and Other Opening Protectives) A written record shall be maintained and transmitted to the Owner to be made available to the Authority Having Jurisdiction (AHJ). The inspection of the swinging fire doors shall be performed by a certified FDAI (Fire Door Assembly Inspector) with knowledge and understanding of the operating components of the type of door being subjected to the inspection. The record shall list each fire door assembly throughout the project and include each door number, an itemized list of hardware set components at each door opening, and each door location in the facility.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and requirements of DHI.
- B. Use the templates provided by hardware item manufacturer.

- C. Mounting heights for hardware shall be as recommended by the Door and Hardware Institute. Operating hardware will to be located between 34" and 44" AFF.
 - D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
 - E. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
 - F. Set thresholds for exterior doors in full bed of butyl-rubber sealant.
 - G. If hand of door is changed during construction, make necessary changes in hardware at no additional cost.
 - H. Hardware Installer shall coordinate with security contractor to route cable to connect electrified locks, panic hardware and fire exit hardware to power transfers or electric hinges at the time these items are installed so as to avoid disassembly and reinstallation of hardware.
 - I. Hardware Installer shall also be present with the security contractor when the power is turned on for the testing of the electronic hardware applications. Installer shall make adjustments to solenoids, latches, vertical rods and closers to insure proper and secure operation.
 - J. All wiring for electro-mechanical hardware mounted on the door shall be connected through the power transfer and terminated in the interface junction box specified for in the Electrical Section.
 - K. Conductors shall be minimum 18 gage stranded, multicolored. A minimum 12 in. loop of conductors shall be coiled in the interface junction box. Each conductor shall be permanently marked with its function.
 - L. If a power supply is specified in the hardware sets, all conductors shall be terminated in the power supply. Make all connections required for proper operation between the power supply and the electro-mechanical hardware. Provide the proper size conductors as specified in the manufacturer's technical documentation.
- J. Hardware Locations
- 1. Conform to CCR, Title 24, Part 2; and ADAAG; and the drawings for access-compliant positioning requirements for the disabled.

3.03 ADJUSTING AND CLEANING

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. Clean adjacent surface soiled by hardware installation.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy, return to that work area and make final check and adjustment of all hardware items in

such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

- D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware finishes, during the final adjustment of hardware.
- E. Continued Maintenance Service: Approximately six months after the completion of the project, the Contractor accompanied by the Architectural Hardware Consultant, shall return to the project and re-adjust every item of hardware to restore proper functions of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.05 FIELD QUALITY CONTROL

- A. Contractor is responsible for providing the services of an Architectural Hardware Consultant (AHC) or a proprietary product technician to inspect installation and certify that hardware and its installation have been furnished and installed in accordance with manufacturers' instructions and as specified herein.

3.06 SCHEDULE

- A. The items listed in the following schedule shall conform to the requirements of the foregoing specifications.
- B. While the hardware schedule is intended to cover all doors, and other movable parts of the building, and establish type and standard of quality, the contractor is responsible for examining the Plans and Specifications and furnishing proper hardware for all openings whether listed or not. If there are any omissions in hardware groups in regard to regular doors they shall be called to the attention of the Architect prior to bid opening for instruction; otherwise, list will be considered Complete. No extras will be allowed for omissions.
- C. The Door Schedule on the Drawings indicates which hardware set is used with each door.

Manufacturers Abbreviations (Mfr.)

GLY	=	Glynn-Johnson Corporation	Overhead Door Stops
IVE	=	Ives	Hinges, Pivots, Bolts, Coordinators, Dust Proof Push Pull & Kick Plates, Door Stops &
Strikes, Silencers			
LCN	=	LCN	Door Closers
SCE	=	Schlage Electronics	Electronic Door Components
SCH	=	Schlage Lock Company	Locks, Latches & Cylinders
VON	=	Von Duprin	Exit Devices
ZER	=	Zero International	Thresholds, Gasketing & Weather-stripping

HARDWARE GROUP NO. 001 - INTERIOR / OFFICE, CONFERENCE DOORS D5, D1

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3 EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1 EA	VANDL OFFICE LOCK	ND91LD RHO	626	SCH
1 EA	PRIMUS K-I-L CYL.	20-765-XP	626	SCH
1 EA	FLOOR STOP	FS436	626	IVE
3 EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 002 - INTERIOR / STORAGE DOOR D4

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3 EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1 EA	VANDL STOREROOM	ND96LD RHO	626	SCH
1 EA	PRIMUS K-I-L CYL.	20-765-XP	626	SCH
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS TKTX	630	IVE
1 EA	FLOOR STOP	FS436	626	IVE
3 EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 003 - BOYS GIRLS GANG TOILET ROOMS DOORS D3 D2

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	CLASSROOM DEADBOLT	B663T	626	SCH
1 EA	FSIC CORE	BY DISTRICT	626	SCH
1 EA	PUSH PLATE	8200 6" X 16"	630	IVE
1 EA	PULL PLATE	8302 8" 4" X 16"	630	IVE
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN
1 EA	WALL STOP	WS406/407CVX	630	IVE
1 EA	GASKETING	188SBK PSA	BK	ZER

HARDWARE GROUP NO. 004

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	GORILLA HINGE	GUARDIAN 2060.100	600	MIS
1	EA	REMOVABLE MULLION	KR1654 STAB	689	VON
1	EA	PANIC HARDWARE	CD-PA-AX-98-EO W/CYL HOLE-990- WH	626	VON
1	EA	PANIC HARDWARE	CD-PA-AX-98-EO-WH	626	VON
1	EA	PRIMUS RIM CYLINDER	20-757-XP	626	SCH
2	EA	PRIMUS MORT. CYL.	20-771-XP XQ11-948	626	SCH
1	EA	DOOR PULL	VR910 DT	630	IVE
1	EA	DOOR PULL	VR910 NL	630	IVE
2	EA	SURFACE CLOSER	4040XP EDA SRI	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA (IF REQUIRED)	689	LCN
2	EA	FLOOR STOP	FS18S	BLK	IVE

HARDWARE GROUP NO. 005 *Locking achieved by welded chain refer to A0.0.2

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	GORILLA HINGE	GUARDIAN 2060.100	600	MIS
1	EA	DOOR PULL	VR910 DT	630	IVE
1	EA	SURFACE CLOSER	4040XP EDA SRI	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA (IF REQUIRED)	689	LCN

END OF SECTION

SECTION 08 81 00
GLASS GLAZING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Glass and glazing for windows and doors.

1.2 RELATED SECTIONS:

- A. Section 08 11 00 - Metal Doors and Frames.
- B. Section 08 41 13 - Aluminum Storefronts, Entrances.

1.3 STANDARDS AND REFERENCES: (Latest Edition Unless Noted Otherwise)

- A. ASTM C 162 – Standard Terminology of Glass and Glass Products
- B. ASTM C-1036 - Standard Specification for Flat Glass.
- C. ASTM C 1172 – Standard Specification for Laminated Architectural Flat Glass
- D. ASTM C 1376 – Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass
- E. ASTM E 2188 – Standard Test Method for Insulating Glass Unit Performance
- F. ASTM E 2189 – Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units
- G. ASTM E 2190 – Standard Specification for Insulating Glass Unit Performance and Evaluation
- H. Glass Association of North America (GANA) (formerly FGMA) - Glazing Manual.
- I. Title 24, Part 2, Chapter 24, current edition.

1.4 QUALITY ASSURANCE

- A. Conform to GANA Glazing Manual for glazing installation methods.
- B. Manufacturer: Manufacturer shall have produced the specified system or products for a period of one (1) year prior to beginning work of this section and shall have the capability to produce the specified products to the delivery and quantity criteria of the project.
- C. Staff:
 - 1. Use only personnel who are thoroughly trained and experienced in the skills required and have installed similar applications of the specified products within one year prior to beginning work of this section.
 - 2. Use only staff who are completely familiar with the manufacturers' recommended methods of installation as well as the requirements of this work.

1.5 SUBMITTALS

- A. Submit in accordance with the provisions of Section 01 33 00, "Submittal Procedures".

- B. Materials List: Provide complete list of all proposed materials and accessories, including product data on performance criteria.
- C. Samples: None.
- D. Shop Drawings: Provide complete shop drawings indicating glass type, installation method, and materials used.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products to site under provisions of the General Conditions.
- B. Store and protect products under provisions of the General Conditions.
- C. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance.

2.2 GLASS PRODUCTS

2.3 TEMPERED VISION GLASS – SINGLE PANE

- A. Acceptable Manufacturer: Vitro Architectural Glass, or equal
Phone - (800) 377-5267
Website: <http://www.vitroglazings.com>
- B. Substitutions: Provide per Division 01, "Substitution Procedures"
- C. Characteristics:
 - 1. Total Thickness: 1/4 inch minimum, and as required by code.
 - 2. Characteristics: Type 3 Clear
 - 3. Strength/Type: Fully Tempered (Kind FT) per ASTM C 1048 and ASTM C 1036. Permanently label all tempered glass.
 - 4. Light Transmission: 89% visible light.
 - 5. Shading Coefficient: 0.94.
 - 6. Safety Standards: Comply with Chapter 24, Part 2, Title 24, CCR safety glazing requirements.

2.7 DESIGN CRITERIA

- A. Provide glass thickness, edge support, "bite," and other engineering criteria per referenced standards and Chapter 24, Title 24, Part 2, CCR.

- B. Provide glass that has been produced, fabricated, and installed to withstand normal thermal movement and wind loading, without failure, including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials and other defects in the work.
 - 1. Normal thermal movement is defined as that resulting from a consequent temperature range of +10 degrees F to +180 degrees F within glass and glass framing members.
- C. Provide safety glazing complying with at all locations as required by CBC, Chapter 24, Section 2406.
 - 1. Provide permanent etched or ceramic fired label on all safety glazing, visible after installation.

2.8 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene or EPDM with a Shore A Durometer value of 85 +_ 5.
- B. Spacer Shims: Neoprene with a Shore A Durometer value of 50.
- C. Foam Glazing Tapes / Beads: Provide manufacturers recommended system, UV Stabilized, black color.
- D. Glazing putty/sealant: Provide DOW or equal, Series 795 structural silicone sealant for repair of window system glazing. Color as selected by Architect from standard color line.

2.10 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection prior to work of this section, carefully inspect previously installed work.
- B. Verify all such work is complete to the point where this installation may properly commence.
- C. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
 - 1. Verify surfaces of glazing channels or recesses are clean and free of obstructions.
 - 2. Verify insulating glass unit sealant is compatible with window system glazing methods
- D. In the event of discrepancy, immediately notify the Architect.
- E. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 GLASS INSTALLATION

- A. General
 - 1. Install all glass at proper ambient temperatures.

2. Do not glaze assemblies when damp or wet due to rain, dew, condensation, or other moisture sources.
 3. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners.
 4. Do not impact glass with metal framing.
 5. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar.
 6. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening.
 7. Remove from project and dispose of glass units with edge damage or other imperfections of the type that, when installed, weaken glass and impair performance and appearance.
 8. Install all glass within ambient temperature limits established by glass manufacturer.
 9. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.
- B. Install all glass products in accordance with referenced codes, standards, and approved submittals. Install per recommendations of manufacturer, and as specified in related sections.
- C. Install in accordance with Listing and labeling requirements.

3.3 PROTECTION AND CLEANING

- A. Protect glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply tape or marking of any kind to glass surface. Remove non-code required and non-permanent labels.
- B. Remove tape after work is completed.
- C. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.
- D. Examine glass surfaces adjacent to or below exterior plaster, concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for buildup of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer. Remove tape after work is completed.
- E. Do not store materials or any kind against interior or exterior surfaces of glass or glass frame. Remove tape after work is completed.
- F. Immediately prior to completion of the Work, clean all glass using manufacturers approved methods.

3.4 REPLACEMENT

- A. Immediately remove all glass delivered to site with manufacturing or fabrication defects.
- B. Remove and replace all glass broken, cracked, abraded or damaged in any other way during construction period due to construction, vandalism, natural occurrences or other causes.
- C. Remove and replace all glass broken, cracked, abraded or damaged in any other way during construction period due to construction, vandalism, natural occurrences or other causes.

1. Comply with scratch tolerances specified below for all glass.
- D. Immediately remove all glass delivered to site with manufacturing or fabrication defects defined as follows:
1. Based on inspection from a distance of 6 feet, pinholes exceeding 1/16 inch in diameter are not acceptable.
 2. Based on inspection from a distance of 6 feet, clusters of pinholes less than 1/16 inch in diameter shall not occur in the central 80 percent of the glass.
 3. Based on inspection from a distance of 10 feet, scratches exceeding 2 inches are not acceptable, except scratches up to 3 inches in length will be acceptable if located a maximum of 3 inches of glass edge.
 4. Concentrated scratched or abraded areas are not acceptable at any part of glass panel.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Standard gypsum board
- B. Gypsum board finish and joint treatment – Levels 1 through 4

1.2 RELATED SECTIONS

- B. Section 05 40 00 - Cold-Formed Metal Framing
- C. Section 06 10 00 - Rough Carpentry
- D. Section 06 16 43 - Exterior Gypsum Sheathing
- E. Section 07 13 26 - Self-Adhering Sheet Waterproofing
- F. Section 07 21 00 - Thermal and Acoustical Insulation
- G. Section 07 25 00 - Weather Barriers
- H. Section 07 92 00 – Joint Protection
- I. Section 08 11 00 - Hollow Metal Doors and Frames
- J. Section 08 31 13 - Access Doors and Frames.
- K. Section 09 30 13 - Ceramic Tiling
- L. Section 09 70 16 - Vinyl -Coated Fabric Wall Coverings
- M. Section 09 78 26 - Fiberglass Reinforced Wall Panels (FRP)
- N. Section 09 91 00 - Painting - Interior and Exterior
- O. Section 10 28 13 - Toilet Accessories
- P. Section 10 44 00 – Fire Protection Specialties
- Q. Work may be required to be coordinated with other sections

1.3 STANDARDS AND REFERENCES (Current Edition for All Standards Listed)

- A. ASTM C514-04- Standard Specification for Nails for the Application of Gypsum Board
- A. ASTM C 645 – Standard Specification for Nonstructural Steel Framing Members
- B. ASTM C754 – Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
- C. ASTM C840 – Standard Specification for Application and Finishing of Gypsum Board
- D. ASTM C955 – Standard Specification for Cold-Formed Steel Structural Framing Members
- E. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs

- F. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
- G. ASTM C1177 – Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
- H. ASTM C1396/C1396M - Standard Specification for Gypsum Board
- I. ASTM D3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- J. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials
- K. Gypsum Association GA-214 – “Recommended Levels of Finish for Gypsum Board, Glass Mat & Fiber-Reinforced Gypsum Panels”
- L. Gypsum Association GA-216 - Application and Finishing of Gypsum Board Products.
- M. Conform to CBC Chapter 7 / CBC Chapter 7A, Part 2, Title 24, CCR for fire rated assemblies.
- N. Conform to CBC Chapter 25 / CBC Chapter 25A, Part 2, Title 24, CCR for finish materials installation.
- O. Conform to DSA Interpretation of Regulations document IR 25-3.13 for gypsum board ceiling suspension.

1.4 SUBMITTALS

- A. Provide submittals under provisions per Section 01 33 00, “Submittal Procedures”.
- B. Submit product data indicating materials, joint toppings, joint tape, and finish materials, and accessories.
- C. Submit 2' x 2' sample of machine applied drywall texture finish.
- D. Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Provide company who has produced the specified products for a period of 5 years prior to beginning work of this Section and maintains the capability to provide the specified products in compliance with the delivery and quantity criteria for the Project.
- B. Installer: For installation of work, use only personnel who are thoroughly trained and experienced in the skills required, have installed similar applications of the specified products within one year prior to beginning work of this Section, and who are completely familiar with the manufacturers' recommended methods of installation as well as the requirements of this work.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Building Temperature and Ventilation: Do not install wallboard and joint compounds if building temperature is below 55 degrees F and proper ventilation is not provided to eliminate excessive moisture from building.

1.7 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver: All materials shall be delivered in original packages or bundles with the manufacturer's labels intact and legible.
- B. Handling and Storage: Materials shall be kept dry, stacked off the ground and properly supported and protected from weather. Protect all edges and surfaces. Stack wallboard flat.
- C. Protect work in progress as well as work of other trades. Clean surfaces that have been spotted during wallboard application.
- D. Contractor shall remove and reinstall all existing conduit, wiremold, light fixtures, fire alarm devices, etc. as required to perform work as listed in this specification. Suspend all wiring as required during work where equipment cannot be disconnected.

1.9 MOCKUPS/TEST INSTALLATIONS

- A. Provide minimum 8'-0" x 8'-0" in place wall texture mock-up for Architect approval of texture.
- B. Mock up portion can remain for inclusion in final work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance.
 - 1. United States Gypsum Co., USG. Phone - (800) 874-4968
 - 2. Georgia Pacific Building Products – Phone - (800) 225-6119
- B. Alternate: National Gypsum Company – Phone (704) 365-7300
- C. Substitutions per Section 01 25 00, “Substitution Procedures”.

2.2 GYPSUM BOARD

- A. Board Type:
 - 1. Non-Rated Gypsum Board:
 - a. Equal to USG, Sheetrock® Brand, “Regular” Gypsum Board, per ASTM C1396.
 - 1) Thickness: 5/8 inch.
 - 2) Facing: Paper.
 - 3) Edge: Tapered.
 - 2. Rated Gypsum Board:
 - a. Equal to USG, Sheetrock® Brand, “Type X, Fire-Rated” Gypsum Board, per ASTM C1396.
 - 1) Thickness: 5/8 inch.

- 2) Facing: Paper.
- 3) Edge: Tapered.
3. Moisture and Mold-Resistant Gypsum Board
 - a. Provide on entire wall where moisture will be present such as toilet rooms, janitor rooms, kitchens, behind new ceramic wall tile and other areas where water will be present. Also provide within 5 feet of all sinks and drinking fountains. Impact-resistant for use in corridors:
 - b. Equal to USG, Sheetrock® Brand, Mold Tough Fire Code Core, Type X, per ASTM C473, ASTM D3273, ASTM C1396 and ASTM C630.
 - 1) Thickness: 5/8 inch.
 - 2) Facing: Fiberglass.
 - 3) Edge: Tapered and Wrapped Edges.
 - c. Acceptable Alternate: Georgia Pacific Building Products, “Dens Armor Plus High Performance” Gypsum Board, per ASTM C1396.
 - 1) Thickness: 1/2 inch.
 - 2) Facing: Fiberglass.
 - 3) Edge: Tapered.
4. Mold and Abuse-Resistant Gypsum Board
 - a. Impact-resistant for use in corridors:
 - b. Equal to USG, Sheetrock® Brand, VHI Abuse-Resistant FireCode Core (Type X) per ASTM C36.
 - 1) Edge: SW Tapered.
 - 2) Thickness: 5/8 inch.
 - 3) Per ASTM ASTM C36
5. Acoustic
 - a. Equal to Certainteed, Silent FX, Quick Cut Acoustical Gyp. Board
 - b. 5/8” thick

2.3 ACCESSORIES

- A. Acoustical Sealant: USG, Tremco, or equal, Non-hardening, non-skinning, conforming to ASTM C557 and C919, for use in conjunction with non-rated gypsum board assemblies.
- B. Drywall Joint and Edge Accessories:
 1. Corner Bead: USG or approved alternate, paper faced metal.
 2. Edge Trim: USG GA 216; Type "J" bead. or approved alternate, paper faced metal.
 3. Expansion Joint: USG 093 or approved alternate, metal.
 4. Drywall Reveal: Fry, DRM Series, reveal dimension as shown on drawings.
- C. Joint and Finishing Systems:

1. Provide systems produced by same manufacturer as boards.
 2. Joint Materials: GA 216; reinforcing tape, joint compound, adhesive, water, and fasteners.
 3. Joint Systems: USG Ready Mixed Compounds, complying with ASTM C475, vinyl based, certified asbestos free.
 4. Finishing System Materials: USG Multi-Purpose or approved alternate, complying with ASTM C475, non-aggregate, vinyl based, certified asbestos free.
 5. Primer: Manufacturer's approved primer, compatible with finishes specified in other Sections.
- D. Fasteners:
1. Gypsum Board Screws: Self-drilling, self-tapping steel screws.
 - a. For steel framing less than 0.03 inch thick: Comply with ASTM C1002.
 - b. For steel framing from 0.033 inch thick to 0.112 inch thick: Comply with ASTM C954.
 - c. Per GA 216 provide:
 - 1) Type S at light gauge steel,
 - 2) Type S-12 at heavy gauge steel (20 gauge and heavier steel framing, but not more than 12 gauge)
 - 3) Type W at wood framing,
 - 4) Type G screws at gypsum panel to gypsum panel
 - d. Not less than 1-1/4" long at 5/8" sheathing thickness per Table 1, GA 253.
- E. Adhesive: Manufacturer's approved adhesive for attachment to concrete surfaces.
- F. joint Compound: Durabond as manufactured by USG, or equal. For use at all locations where gypsum board is in direct contact with concrete curbs.
- G. Electrical Box Sealer: Lowry's "Electrical Box Pads", 6" x 8" x 1-1/8" resilient sealer pads. Covers per Electrical specification and drawings.
- H. Underlayment Membrane: Membrane complying with ANSI A 108.2-3.8.
- I. Metal Furring Components:
1. Resilient Channels: Clark Dietrich, Series RC-1, 1/2inch depth.
 2. Wall Furring Channels: Provide USG Metal Furring Channel, 20 gage, corrosion resistant steel.

2.4 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
- B. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
- C. Verify framing members are properly installed and will comply with specified tolerances.
- D. Verify that openings, curbs, pipes, sleeves, ducts, and vents are solidly set, and blocking and backing is in place.
- E. Do not proceed with installation of wallboard until deficiencies are corrected and surfaces to receive wallboard are acceptable.
- F. In the event of discrepancy, immediately notify the Architect.
- G. The Painting Contractor shall not be required to accept the gypsum wallboard installation until after he has applied sealer. At that time he shall inspect the installation and report to the General Contractor, with a letter to the Architect, of any surface damage, defects or uneven walls. Uneven walls shall mean those that are not straight, plumb or of an even, true plane. All such discrepancies shall be the responsibility of gypsum wallboard installer, and shall be corrected by him prior to application of further wall decoration.
- H. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
- I. Beginning of installation means acceptance of existing surfaces substrate.
- J. At all existing gyp. board surfaces to be refinished as shown on the drawings, Contractor shall rough sand all surfaces prior to skim coat for acceptable adhesion.

3.2 PREPARATION

- A. Insulation Coordination:
 - 1. Verify insulation is fitted tightly within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and to items passing through partitions.
 - 2. Install insulation specified in this Section as a component in rated floor/ceiling and roof/ceiling systems.

3.3 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with manufacturer's instructions and designated system number for fire rated assemblies.
 - 1. Unless noted otherwise, utilize water resistant type for wall surfaces within four feet of the outermost edge of any plumbing fixture or moisture generating equipment. Extend water resistant gypsum board full height.
 - 2. Do not use water resistant gypsum board on ceiling applications.
 - 3. Do not use water resistant gypsum board at any shower/locker room applications, wall or ceiling.

- B. Prior to installation of any gypsum board product, Contractor shall review locations of all toilet room accessories with owner to place all backing required.
- C. Install gypsum board in accordance with GA 216, and ASTM C840.
- D. Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- E. Use screws when fastening gypsum board to metal furring or framing, or 1x framing.
- F. Use screws when fastening gypsum board to wood furring or framing.
- G. Fasteners for all vertical gypsum boards shall be placed at 8” at the perimeter and 12” in field U.O.N. on drawings.
- H. Treat cut edges and holes in moisture resistant gypsum board with sealant.
- I. Place control joints consistent with lines of building spaces as indicated by Architect.
- J. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.
- K. Contractor shall provide new mud ring extensions for all electrical switch and outlets to allow device to flush with face of new gypsum board surface.
- L. At all locations where gypsum board extends past bottom sill plate and contacts face of curb, apply Durabond product to back side of gypsum board per manufacturer’s recommendations to secure to face of concrete curb. Provide moderate pressure and temporary nailing or shoring to ensure adequate bond.
- M. Where gypsum board extends across concrete curbs, install with specified adhesive, consisting of vertical beads placed at 4 inches on center full height. Bond to curb with rollers exerting sufficient pressure to assure full contact and surface alignment with board at framing above.
- N. Use screws of proper length when fastening gypsum board to framing, spaced at 8 inches on center maximum at each support.
- O. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
- P. Double Layer Applications: Place second layer parallel to first layer. Offset joints of second layer from joints of first layer a minimum of one stud spacing, and as required by referenced test standard.
- Q. Edge and Trim Installation:
 - 1. Install corner beads at all external corners. Use longest practical length.
 - 2. Install corner beads at all conditions where gypsum board abuts dissimilar materials.
 - 3. Install angle reinforcement at interior corners.
 - 4. Tape and finish joint reinforcement as specified.
- R. Install acoustical sealant at wall edge perimeter, including floor edge, and at all penetrations where fire stopping is not required.

3.4 GYPSUM BOARD FINISH AND JOINT TREATMENT

- A. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

- B. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.
- C. Comply with descriptions and Finish Levels as specified and in accordance with referenced standard.
- D. LEVEL 1 Finish: Gypsum board located above ceiling areas, plenums, and similar surfaces not visible in completed construction:
 - 1. Embed tape at all joints and interior angles in joint compound.
 - 2. Apply one separate coat of joint compound over all joints, angles, fastener heads, and accessories.
 - 3. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
- E. LEVEL 1 Finish: Gypsum board designated to receive rigid FRP or solid paneling.
 - 1. Embed tape at all joints and interior angles in joint compound.
 - 2. Apply two separate coats of joint compound over all joints, angles, fastener heads, and accessories.
 - 3. All joint compound shall be smooth and free of tool marks and ridges.
 - 4. Apply uniform coat of approved primer over entire surface with roller.
- F. LEVEL 3 Finish - Knock-Down Finish: Gypsum board designated to receive flat paint finish.
 - 1. Embed tape at all joints and interior angles in joint compound.
 - 2. Apply three separate coats of joint compound over all joints, angles, fastener heads, and accessories. Apply uniform coat of approved primer over entire surface with roller.
 - 3. Apply texture coating over entire surface. Finish in "Knock-Down" texture as illustrated in USG Construction Handbook. Surface shall be smooth and free of tool marks and ridges.
 - 4. Apply uniform coat of approved primer over entire surface with roller.
- G. LEVEL 4 Finish - Orange Peel: Gypsum board surfaces receiving eggshell, semi-gloss or gloss paint finish.
 - 1. Embed tape at all joints and interior angles in joint compound.
 - 2. Apply three separate coats of joint compound over all joints, angles, fastener heads, and accessories. Apply uniform coat of approved primer over entire surface with roller.
 - 3. Apply texture coating over entire surface. Finish in "Orange Peel" texture as illustrated in USG Construction Handbook. Surface shall be smooth and free of tool marks and ridges.
 - 4. Apply uniform coat of approved primer over entire surface with roller.

3.5 TOLERANCES

- A. Comply with the following tolerances for level, plumb and flat. Where substrate framing will not comply with specified tolerances, correct deficiencies as required.
 - 1. Level and Plumb: Plus or minus 1/4 inch in 10 feet, non-cumulative.
 - 2. Flatness: No gaps exceeding 1/8 inch at any point under a 10 foot straight edge placed on surface in any orientation.

3.6 ACOUSTICAL ACCESSORIES INSTALLATION

- A. Install acoustical sealant within partitions in accordance with manufacturer's instructions.
- B. Install resilient sealer pads over backs and sides of electrical junction boxes.

3.7 ADJUST AND CLEAN

- A. **Cleaning and Repair:** Clean surfaces that have been spotted or soiled during wallboard application. Contractor shall clean all light fixture lenses, fire alarm devices, electrical outlets, as performing work.
- B. **Defective Work:** Remove and replace defective work which cannot be satisfactorily repaired, at the direction of the Architect, with no additional cost to the Owner.
- C. **Protection:** Protect installed work against damage from other construction work.

3.8 CLEAN-UP

- A. Upon completion of the work under this Section, remove all surplus material, rubbish and debris from the premises and leave floors "broom clean".

END OF SECTION

SECTION 09 28 13
CEMENTITIOUS BACKING BOARDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Gypsum board.
 - 1. Cementitious backer boards

1.2 RELATED SECTIONS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 01 81 13 LEEDv4-v4.1 Requirements
- C. Section 07 13 26 - Self-Adhering Sheet Waterproofing
- D. Section 07 21 00 - Thermal and Acoustical Insulation
- E. Section 08 11 00 - Hollow Metal Doors and Frames
- F. Section 08 31 13 - Access Doors and Frames.
- G. Section 09 30 13 - Ceramic Tiling
- H. Section 09 72 18 - Fiberglass Reinforced Wall Panels (FRP)
- I. Section 09 70 00 - Vinyl Wall Covering
- J. Work may be required to be coordinated with other sections

1.3 STANDARDS AND REFERENCES (Current Edition for All Standards Listed)

- A. ASTM C 645 – Standard Specification for Nonstructural Steel Framing Members
- A. ASTM C754 – Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
- B. ASTM D 3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- C. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials
- D. ANSI A118.9 - Specifications for Test Methods and Specifications for Cementitious Backer Units
- E. Conform to CBC Chapter 7 / CBC Chapter 7A, Part 2, Title 24, CCR for fire rated assemblies.
- F. Conform to CBC Chapter 25 / CBC Chapter 25A, Part 2, Title 24, CCR for finish materials installation.
- G. Conform to DSA Interpretation of Regulations document IR 25-3.13 for gypsum board ceiling suspension.

1.4 SUBMITTALS

- A. Provide submittals under provisions per Section 01 33 00, “Submittal Procedures”.
- B. Submit product data indicating materials, joint toppings and finish materials, and accessories.
- C. Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Provide company who has produced the specified products for a period of 5 years prior to beginning work of this Section and maintains the capability to provide the specified products in compliance with the delivery and quantity criteria for the Project.
- B. Installer: For installation of work, use only personnel who are thoroughly trained and experienced in the skills required, have installed similar applications of the specified products within one year prior to beginning work of this Section, and who are completely familiar with the manufacturers' recommended methods of installation as well as the requirements of this work.

1.6 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance.
 - 1. United States Gypsum Co., USG. Phone - (800) 874-4968
 - 2. Georgia Pacific Building Products – Phone - (800) 225-6119
 - 3. Substitutions per Section 01 62 00, “Product Options”.
- B. Series: USG, Durock Cement Board, per ANSI A118.9.
 - 1. Characteristics:
 - a. Thickness: 1/2 inch or as indicated.
 - b. Edge: Smooth wrapped edge.
- C. Series: Custom Building Products, Wonderboard Lite Backer Board, per ANSI A118.9.
 - a. Thickness: 7/16 inch or as indicated.
 - b. Edge: Smooth wrapped edge.
- D. Characteristics:

1. Indentation Resistance: 2300 psi, 1 inch disc at 0.02 inch indentation per ASTM D2394.
 2. Water Absorption: 10 percent maximum at 24 hours per ASTM C473.
 3. Flexural Strength: 750 psi per ASTM C947.
 4. Fire and Life Safety Criteria:
 - a. Surface Burning/Smoke contributed: Maximum values of 5/0 per ASTM E84.
 - b. Listing: UL Listed as a component in rated wall and floor assemblies per ASTM E119.
- E. Fasteners:
1. Cementitious Backer Unit Screws: corrosion resistant, type and length as required by manufacturer, installation and UL Listing criteria. Nails not permitted.

2.2 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
- B. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
- C. Verify framing members are properly installed and will comply with specified tolerances.
- D. Verify that openings, curbs, pipes, sleeves, ducts, and vents are solidly set, and blocking and backing is in place.
- E. Do not proceed with installation of cementitious backer boards until deficiencies are corrected and surfaces to receive backer boards are acceptable.
- F. In the event of discrepancy, immediately notify the Architect.
- G. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
- H. Beginning of installation means acceptance of existing surfaces substrate.
- I. At all existing gyp. board surfaces to be refinished as shown on the drawings, Contractor shall rough sand all surfaces prior to skim coat for acceptable adhesion.

3.2 PREPARATION

- A. Insulation Coordination:

1. Verify insulation is fitted tightly within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and to items passing through partitions.
2. Install insulation specified in this Section as a component in rated floor/ceiling and roof/ceiling systems.

3.3 CEMENTITIOUS BACKER BOARD INSTALLATION

- A. Install backer board in accordance with manufacturer's recommendations, including USG Document SA-934, "Moisture-Resistant Assemblies".
- B. Apply specified underlayment membrane to framing with approved adhesive or tape. Lap membrane 4 inches in shingle fashion at all joints.
- C. Install backer board with joints over supports. Space ends and edges 1/8 inch apart.
- D. Install backer board using screws at maximum 8 inches on center at each support.
- E. Prefill all joints with approved latex fortified mortar meeting ANSI 118.4. Tape all joints and level.
 1. Apply uniform coat of approved primer over entire surface with roller.

3.4 TOLERANCES

- A. Comply with the following tolerances for level, plumb and flat. Where substrate framing will not comply with specified tolerances, correct deficiencies as required.
 1. Level and Plumb: Plus or minus 1/4 inch in 10 feet, non-cumulative.
 2. Flatness: No gaps exceeding 1/8 inch at any point under a 10 foot straight edge placed on surface in any orientation.

END OF SECTION

SECTION 09 30 13
CERAMIC TILING

PART 1 - GENERAL

1.1. SECTION INCLUDES

- A. Ceramic tile.
- B. Grout, mortar bed and setting materials.
- C. Waterproof underlayment and membranes.
- D. Crack isolation/sound isolation/cleavage membranes.

1.2. RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry
- B. Section 07 92 00 – Joint Protection
- C. Section 09 21 16 - Gypsum Board
- D. Section 09 28 13 - Cementitious Backer Boards

1.3 STANDARDS AND REFERENCES: (Latest Edition Unless Noted Otherwise)

- A. TCA (Tile Council of America) - Handbook for Ceramic Tile Installation.
 - 1. thin-set application method TCA W242 U.O.N.
- B. ANSI A108/A118/A136.1– Installation of Ceramic Tile
- C. ANSI/TCA A118.4 - American National Standard Specifications for the Installation of Ceramic Tile.
- D. ANSI A137.1 – Standard Specifications For Ceramic Tile.
- E. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar
- F. ASTM C150 / C150M - Standard Specification for Portland Cement.
- G. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete
- H. ASTM D226 / D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
- I. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
- J. ISO 13007 - Standards for Adhesives & Grouts

1.4 SUBMITTALS

- A. Provide submittals per Section 01 33 00, “Submittal Procedures”.
- B. Material Information and Shop Drawings:
 - 1. Submit complete list of all proposed materials.

2. Submit shop drawings indicating tile layout, perimeter conditions, junctions with dissimilar materials, thresholds, and setting details, including details of all joints between tile and adjoining materials.
- C. Samples:
1. Submit 2 samples of specified colors and patterns of each tile, grout, and accessory units of the specified items.
- D. Certification:
1. Prior to installation of tile in any one area, submit written certification to Architect certifying that surfaces are properly prepared for specified installation, and that all depressions and abutting edges are properly spaced and aligned to permit installation in pattern shown on drawings.
 2. Submit certification that selected sealant specified in Section 07 92 00, "Joint Protection", will achieve manufacturer's published adhesion values on specified tile.
- E. Maintenance and Operations – submit under the provisions of Section 01 77 19, "Closeout Requirements"
1. Submit manufacturer's installation instructions.
 2. Submit maintenance data.
 3. Include recommended cleaning and stain removal methods, and cleaning materials.

1.5 QUALITY ASSURANCE

- A. Conform to ANSI/TCA A108, A118, A136 & A137.1.
- B. Conform to Tile Council of North America (TCNA) Handbook for Ceramic Tile Installation, latest edition.
- C. Manufacturer:
1. Company specializing in the manufacture of products specified in this Section.
 2. Manufacturer shall have produced tile products of similar type for a period of five (5) years prior to beginning work of this section and shall have the capability to produce the specified products to the delivery and quantity criteria of the project.
- D. Staff
1. Installer: Company specializing in applying the work of this Section with minimum three (3) years' experience.
 2. Use only personnel thoroughly trained and experienced in the skills required, have installed similar applications of the specified products within one year prior to beginning work of this section, and are completely familiar with the manufacturers' recommended methods of installation as well as the requirements of this work.
 3. Staff installing specified grout shall have attended manufacturer's training sessions and have installed specified grout within the past 12 months prior to beginning work.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install adhesives in a closed, unventilated environment.

- B. Maintain 50 degrees F during installation of mortar materials.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01 60 00, "Product Requirements".
- B. Store and protect products under provisions of Section 01 60 00, "Product Requirements".
- C. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.8 WARRANTY

- A. Special Warranty: Provide for correcting failures of waterproofing to resist water penetration, except where failures are the result of structural failures of the building. Hairline cracking of concrete due to temperature or shrinkage is not considered structural failure.
 - 1. Repair and pay for or replace damaged materials and surfaces.
 - 2. Special Warranty: Two years from Notice of Completion.

1.9 EXTRA STOCK

- A. Field Tile: Provide additional 5% or minimum 1 full box, whichever is greater, of extra tile of each type, size, and color used.
- B. Accent Tile: Provide two extra tile of each type, size, and color used.

2 PRODUCTS

2.1 CERAMIC TILE – WALLS

- A. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance.
 - 1. All tile for like applications shall be the product of a single manufacturer as indicated below.
 - a. Product Characteristics - Interior Wall Tile:
 - b. Manufacturer: Dal-Tile, or equal
 - c. Series and Color: Grout Joints: Nominal 1/16 inch, all joints equal, except at expansion joint conditions. Provide minimum 1/8 inch wide joint at all expansion joint conditions.
 - e. Provide surface bullnose trim at all open edges or ends. Unglazed or cut tile edges unacceptable.
- B. Substitutions: Refer to Section 01 25 00, "Substitution Procedures".

2.2 TILE MATERIAL

- A. Repair work: Ceramic Tile to match existing size, texture and color. If no matching color is available, Architect will make a selection from the tile manufacturer's full range of colors.
- B. New Ceramic Wall Tile: ANSI/TCA A137.1, conforming to the following:
 - 1. Size Refer to Finish Schedule

2. Edge Cushioned
3. Surface Finish Refer to finish schedule
4. Color As selected by Architect from Manufacturer's full range of colors and finish textures. Refer to finish schedule.

2.3 LATEX THINSET BOND COAT AT FLOOR AND WALLS: Thinset bond coat, consisting of cementitious mortar conforming to ANSI A118.4.

A. Manufacturers (District standards shown):

1. Floors – - Laticrete International, Inc. “Latopox 210 Adhesive”, or equal, Phone - (800) 243-4788. Website link <https://laticrete.com/tile-and-stone-installation/adhesives-and-mortars/epoxy-adhesives/latapoxy-210-adhesive>
2. Walls – Basis of Design: Laticrete International, Inc. “15 Premium Mastic” per ANSI A136.1, or equal, Phone - (800) 243-4788. Website link <https://laticrete.com/tile-and-stone-installation/adhesives-and-mortars/mastic/15-premium-mastic>
3. Acceptable Alternates:
 - a. MAPEI, Type 1 Mastic-ANSI A136.1 and ISO 13007; DT1E.
 - b. Ardex D-14.

B. Substitutions: Refer to Section 01 25 00, “Substitution Procedures”

2.4 PORTLAND CEMENT THICKSET MORTAR BED - FLOOR

A. Mortar Bed (District Standard – Basis of Design):

1. Manufacturer: Mortar - Laticrete “#226 Thick Bed Mortar”, or equal, Phone - (800) 243-4788. Website Link - <https://laticrete.com/tile-and-stone-installation/thick-bed-mortars-and-screeds/226-thick-bed-mortar>
2. Manufacturer - Mortar Admix For Use With 226 Thick Bed Mortar – Laticrete “#3701 Mortar Admix”, or equal. Website Link: <https://laticrete.com/tile-and-stone-installation/thick-bed-mortars-and-screeds/3701-mortar-admix>
3. Acceptable Alternate:
 - a. Manufacturer – Laticrete, “#3701 Fortified Mortar Bed”, or equal. Website Link: <https://laticrete.com/tile-and-stone-installation/thick-bed-mortars-and-screeds/3701-mortar-admix>

B. Substitutions: Refer to Section 01 25 00, “Substitution Procedures”

2.5 GROUT – WALLS

A. Epoxy Grout - Basis of Design:

1. Manufacturer – Basis of Design: 100% solids epoxy, Laticrete SpectraLock 2000 IG or Laticrete SpectraLOCK PRO Grout or equal. Phone - (800) 243-4788. Website Link: <https://laticrete.com/tile-and-stone-installation/grouts/epoxy-grouts/spectralock-premium-grout>
2. Manufacturer – Acceptable Alternate: MAPEI; Kerapoxy CQ - ANSI A118.3 and ISO 13007; RG. Website Link: <https://www.mapeihome.com/kerapoxy-cq-so>

3. Materials:
 - a. ANSI A118.7, epoxy cementitious type, uniform in color, resistive to shrinkage.
 - b. Color: Refer to finish schedule
 - c. All grouts shall be produced by same manufacturer.
 - d. Mix and proportion pre-mix grout materials in accordance with manufacturer's instructions.

B. Substitutions: Refer to Section 01 25 00, "Substitution Procedures"

2.6 SEALERS AND FINISHES

A. Grout Sealer:

1. Bostik Construction Products, Grout Sealant and Colorant, or equal, Phone (800) 726-7845. Website link: <https://www.bostik.com/us/Bostik-products/Bostik-Grout-Sealer-Colorant>
2. Acceptable Alternative: Miracle Sealants 511 Impregnator, or equal - Phone (800) 350-1901. Website link - <https://www.rustoleum.com/product-catalog/consumer-brands/miracle-sealants/seal-protect/511-impregnator>
3. Substitutions: Refer to Section 01 25 00, "Substitution Procedures"

B. Floor Sealer (Under Epoxy Set Floors): Curing hardener sealer vapor retarder to prevent bond failure of flooring systems – Basis of Design - Creteseal, "CS2000", or equal. Phone - (800) 278-4273, website link <http://www.creteseal.com/creteseal-products/>

2.7 ACCESSORIES

A. Sealants:

1. Interior sealants: Unless noted otherwise, provide sealants as manufactured by grout manufacturer.
2. Match adjacent grout color.

B. Reinforcing Mesh:

1. 2 x 2 inch square x 16 gauge welded wire mesh, galvanized - per ASTM A82 and A185.

C. Organic Adhesive:

1. Type 1 organic adhesive, complying with ANSI A136.1 and approved by CTI for application.

D. Cleavage Membrane:

1. Provide asphalt felt, Type I (No. 15), ASTM D226 / D226M, or 4.0 mil. thick polyethylene film, ASTM C171 and D4397

2.8 WATERPROOFING AND CRACK ISOLATION MEMBRANES

A. Thin-set Joint Isolation Membrane:

1. Manufacturer: Noble Company, The, "NobleSeal CIS" or "Dal-Seal CIS", or equal, preformed sheet CPE membrane, 30 mil thickness, with facing. Provide all manufacturer's recommended accessories.

2.9 ACCESSORY TILE

A. General

1. All accessory tile shall be in matching size, color, and finish.
2. Stretcher tile can be the standard size of the manufacturer.
3. Provide surface bullnose trim at all open edges or ends. Unglazed or cut tile edges unacceptable.
4. Provide surface bullnose trim at all tile abutting jamb conditions and extending beyond frame.
5. Provide full curved stretcher tile for all outside corners.

2.10 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspection:

1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
 - a. Verify joints in concrete substrate occur only at sealant expansion joint locations as specified for ceramic tile.
 - b. Where non-documented substrate cracks occur, obtain direction from Architect.
3. In the event of discrepancy, immediately notify the Architect.
4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
5. Beginning of installation means installer accepts condition of existing substrate.

3.2 PREPARATION

- A. Protect surrounding work from damage or disfiguration.
- B. Vacuum clean existing substrate and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Apply sealer to surfaces as recommended by adhesive manufacturer.

3.3 INSTALLATION – GENERAL

- A. Install all tile in accordance with TCA Handbook, latest edition, for Ceramic Tile Installation.
- B. Request tile pattern from Architect if not shown. Do not interrupt tile pattern through openings.
- C. Cut and fit tile tight to penetrations through tile and provide caulk joint. Form corners and bases neatly. Align floor, base, and wall joints.
- D. Place tile joints uniform in width. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- E. Sound tiles after setting and replace any hollow units.
- F. Allow tile to set for a minimum of 48 hours prior to grouting.
- G. Provide control joints around all dissimilar materials, penetrations, transition at wall to ceiling and walls to floor, inside corners, over existing building joints and in field at TCA recommended intervals. All control joints shall extend through setting bed and be caulked with sanded sealant to match grout joints.
- H. Jointing Pattern at Interior Corners: Unless otherwise shown, tile color shall not wrap at interior corners. Start with alternate color to not interrupt pattern. See pattern detail in drawings for pattern reference.

3.4 MEMBRANE INSTALLATION

- A. Verify slab preparation complies with criteria specified in Section 03 30 00, “Cast-In-Place Concrete”
 - 1. Remove all sealers, curing compounds and other materials affecting proper bond of membranes with bead blast abrasive equipment.
- B. Cleavage Membrane: Unless otherwise shown on drawings, where mortar bed is installed over concrete slab on grade at interior applications, provide specified cleavage membrane.
- C. Waterproofing Membrane Installation:
 - 1. Apply waterproofing membrane per manufacturers recommendations.
 - a. Apply thinset waterproofing membrane using approved mortar system.
 - 2. Provide preformed corners. Seal all penetrations with specified sealant.
 - 3. Detail all joints as required by manufacturer and approved submittal.
 - 4. Extend membrane up wall surface as shown on drawings. Coordinate with wall underlayment.
 - 5. At expansion joints, continue sheet material in looped fashion through joint to accommodate anticipated joint movement.
 - 6. Allow sufficient time for all seams, transitions and setting beds to cure before installing subsequent materials. Do not install tile over waterproofing until waterproofing has been tested to determine that it is watertight.
- D. Joint isolation membrane installation:
 - 1. Install at all cracks in concrete slab substrates, control and expansion joints, and at all transitions between dissimilar materials.

2. Extend each side of crack or joint a minimum of 4 times diagonal tile dimension.
3. Apply using approved latex modified mortar system.
4. At expansion joints, continue sheet material in looped fashion through joint to accommodate anticipated joint movement.

3.5 MORTAR AND GROUT MIXES

- A. Mix and proportion cementitious materials for mortar and grout mixes in accordance with manufacturers requirements.
 1. Do not mix more bond coat than can be used within one hour.
 2. If bond coat mixture begins to skin, discard and make new batch.

3.6 TILE INSTALLATION

- A. Interior Tile Installation:
- B. Install wall tile at cementitious backer board per Section 09 28 13, "Cementitious Backer Boards" and TCNA Method W244C, and per ANSI A108.5.
 - a. Provide portland cement leveling coat as required to provide surface complying with 1/8 inch in 8 feet tolerance.
 2. Install wall tile at concrete curb per TCNA Method W211/222, and per ANSI A108.1B.
 3. Install mortar bed and floor tile per TCNA F114.
 4. Grout all wall joints with specified grout per ANSI A108.10 Installation of expansion and control joint assemblies.
 5. Provide expansion joints complying with TCNA Detail EJ171 at the following specified locations and as located and shown on drawings:
 - a. At wall tile to paver/floor tile joints.
 - b. At all expansion and control joints in substrate. Where tile joint does not occur directly over substrate joint, provide sealant joint on each side of joint.
 - c. At tile joint at inside vertical corners.
 - d. At interior applications, at approximately 24 feet on center each way in floor and wall tile surfaces. Adjust to 12 feet at toilet tile conditions, and 8 feet for dark tile in sunlight areas.
 - e. Where material transitions occur, comply with expansion/control joint criteria.
 - f. At conditions where tile extends through doorways, extend wall cove/floor tile sealant joint across doorway.
 - g. At floor drain/tile edge, column penetrations, tile terminations against frames and other restraining elements.
 - h. At tile terminations against curbs, paving or other restraining elements.

3.7 CLEANING

- A. Clean tile surfaces in accordance with Section 01 73 00, "Execution Requirements" and the tile and grout manufacturer's instructions; remove all traces of grout scum.

- B. Do not use muriatic acid compounds.
- C. Do not allow traffic on tile for a minimum of 72 hours after installation.
- D. Provide damp cure of all installations per manufacturer's recommendations and per ANSI A108.
 - 1. Do not damp cure latex modified grout systems unless recommended by manufacturer.
- E. Sealing
 - 1. Seal all interior toilet floor, base, and wall ceramic tile applications.
 - a. Do not seal epoxy grout applications.
 - 2. Seal per manufacturer's recommendations.

3.8 PROTECTION

- A. Protect finished installation under provisions of Section 01 76 00, "Protecting Installed Construction"
- B. Provide non-staining protective coverings for all tile in traffic area.
- C. Do not permit traffic over finished floor surface.
- D. Remove and replace any products that are cracked, scraped, or otherwise damaged after installation and before acceptance by Owner.

3.9 FIELD QUALITY CONTROL

- A. Tolerances
 - 1. Grout joint alignment with adjacent edge: 1/8" in 10 feet.
 - 2. Row and column alignment: 1/8" in 10 feet deviation.
 - 3. Alignment with adjacent tile: 1/16" +/-.
 - 4. Level, plane and/or vertical: 1/8" in 10 feet deviation.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Acoustical Panels, including systems designated as a component of a fire rated assembly.
- B. Perimeter Trim.
- C. Work may be required to be coordinated with other sections
- D. Bracing Solutions other than DSA's IR-25

1.2 RELATED SECTIONS

- A. 06 10 00 - Rough Carpentry
- B. 09 21 16 - Gypsum Board

1.3 STANDARDS & REFERENCES (Current Edition for All Standards Listed, Unless Noted Otherwise)

- A. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E 580 Installation of Ceiling Suspension Systems for Acoustical tile and Lay-in Panels in areas Subject to Earthquake Ground Motions
- C. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- D. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- E. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- F. ASTM E 1264 Classification for Acoustical Ceiling Products.
- G. CCR, Title 24, 2021 ICC, With State of California Amendments – 2022 California Building Code (CBC), Part 2, Vols. 1 and 2
- H. HCAI/DSA OPM 0544 Preapproval for bracing Suspended Ceilings. Note submit the total document and simply cross out pages that do not apply in the .pdf Do not seek to unbundle the OPM as that will invalidate it by your losing the watermark.
https://www.bracelok.com/s/GRIDLOK_preapproval_for_submitting_to_DSAHCAI.pdf If in doubt contact www.bracelok.com
- I. HCAI/DSA OPM 0377 Preapproval for bracing partition walls Note submit the total document and simply cross out the ages that do not apply on the .pdf. Do not seek to unbundle the OPM as this will invalidate it by your losing the watermark. If in doubt contact www.bracelok.com
https://static1.squarespace.com/static/5be269a1da02bcc88113fbdf/t/621427896cbfef7b6586cb1a/1645488020788/BRACELOK_preapproval_for_submitting_to_DSA%2BHCAI.pdf

1.4 SUBMITTALS

- A. Provide submittals under provisions of Section 01 33 00, "Submittal Procedures".
- B. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
- C. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel;
- D. Shop Drawings: Indicate on shop drawings, grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system, and complete suspension system details. Layout and details of acoustical ceilings. Show items coordinated with or supported by the ceilings.
- E. Certifications: Provide manufacturer's certification of compliance with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

1.5 QUALITY ASSURANCE

- A. Installer: Company with three years minimum documented experience with projects under the jurisdiction of DSA.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy.
- B. Building areas to receive ceilings shall be free of construction dust and debris

1.7 SYSTEM DESCRIPTION

- A. Installed System: Conform to ASTM C635 and C636.
- B. Ceiling Suspension System complying with requirements of Chapter 16A, Part 2, Title 24, CCR, including 1615A.1.1.6, modifications to ASCE 7, Section 13.5.6 and DSA 25.2-13.
- C. Seismic Bracing Design preference to replace DSA IR 25.1 GRIDLOK preapproved for all DSA projects OPM 0544

1.8 SEQUENCING/SCHEDULING

- A. Do not install acoustical ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Schedule installation of acoustic units after interior wet work is dry.

1.9 WARRANTY

- A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
 - 1. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
 - 2. Grid System: Rusting and manufacturer's defects

B. Warranty Period:

1. Acoustical panels: Ten (10) year from date of substantial completion.
2. Grid: Ten years from date of substantial completion.

1.10 EXTRA STOCK

- A. Provide extra quantity of acoustic units under provisions of Section 01 77 19.
- B. Acoustical Panel: Provide two (2) unopened boxes of each type of acoustical panel.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.2 CEILING SUSPENSION SYSTEM (ICC-ESR-1308)

- A. Prelude XL by Armstrong, Donn DX by USG, 1200 Seismic Series by Chicago Metallic Corporation, or equal. Edge moldings: "L" shaped.
 1. Free end – Berc 2 seismic clip.
 2. Face Dimension: 15/16 inches.
 3. Duty Rating: Heavy Duty per ASTM C635 and ASTM E580.
 - a. Support/Fastening System: Components of size and type as shown in the drawings as required to rigidly secure acoustic ceiling system with maximum deflection of 1/360. Use perimeter attachment clips as required to allow 3/4 inch movement and retain the panel in place.
 4. Code Compliance: Comply with applicable portions of Chapter 16A, Part 2, Title 24, CCR, including 1615A.1.16, modifications to ASCE 7, Section 13.5.6.
 5. Fire Resistance Rating: Non-rated assembly.
 6. Color: Painted finish, White.
 7. Compression Strut: Provide vertical compression strut at grid as shown on drawings and per DSA IR 25.2-13.

2.3 ACOUSTIC PANELS:

- A. Manufacturer: Armstrong World Industries, www.armstrong.com, USG www.usg.com, or equal.
 1. Acoustical Ceiling Panels:
 - a. Panel Name: Armstrong Fine Fissured High NRC 1811, USG Radar Climaplus HiNRC 22311, CertainTeed Fine Fissured HHF 497 HNRC, or equal.
 - b. Panel Size: 2-foot by 4-foot.
 - c. Panel Thickness: 3/4 inch.

- d. Edge Detail: Lay-in.
- e. Light Reflectance: 0.82 minimum, complying with ASTM E1477.
- f. CAC: Minimum 40, UL Classified, complying with ASTM E1414.
- g. NRC: Minimum 0.70, UL Classified, complying with ASTM C423.
- h. Color: White.
- i. Recycled Content: Minimum 37 percent.

2.4 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the Contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection
 - 1. Prior to work of this Section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
 - 2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
 - a. Verify hanger layout will not interfere with other work.
 - 3. In the event of discrepancy, immediately notify the Architect.
 - 4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 CEILING GRID INSTALLATION

- A. Install system in accordance with ASTM C635, C636 and E580 as modified by CBC Section 1615A.1.16, including required vertical compression struts.
- B. Install system capable of supporting imposed loads to a deflection of 1/360 maximum.
- C. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
- D. Crimp or tightly twist wire ends around wire support. Do not leave ends angled away from line of wire support.
- E. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
- F. Where ducts or other equipment prevent the regular spacing of hangers, install independent framing below ductwork or equipment from which hangers may be attached. Hangers are prohibited from being attached to any non-structural building element.
- G. Locate system on room axis leaving equal border units according to reflected ceiling plan.

- H. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions. Where round obstructions occur, provide preformed closers to match edge molding.

3.3 ACOUSTIC UNIT INSTALLATION

- A. Install acoustic units level, in uniform plane, and free from twist, warp and dents.
- B. Install panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.
- C. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.
- D. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces. Field paint field cut edges exposed to view.

3.4 ADJUSTING AND CLEANING

- A. Replace damaged and broken panels.
- B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.
 - 1. Where approved by Architect, touch up paint may be used to hide minor scratches and nicks in the surface.
- C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.5 TOLERANCES

- A. Variation from Flat and Level Surface: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Resilient sheet flooring
 - 1. Luxury Vinyl Tile (LVT)
 - 2. Resilient Vinyl Flooring (SV)

1.2 RELATED SECTIONS:

- A. Section 03 30 00 - Cast-In-Place Concrete.
- B. Section 09 60 10 - Concrete Moisture Control Coating.
- C. Section 09 65 13 - Resilient Base and Transition Strips

1.3 STANDARDS AND REFERENCES: (Latest Edition Unless Noted Otherwise)

- A. American Association of Textile Chemists and Colorists (AATCC)::
 - 1. AATCC-134 - Static Generation Propensity (Conductive)
 - 2. AATCC-134 - Static Generation Propensity (Dissipative)
- B. American National Standards Institute (ANSI)::
 - 1. ANSI/ESD S7.1 - Standard Test Method for Static Protective Flooring Materials
 - 2. ANSI/ESD S20.20 - Electrostatic Discharge Control Program Standard
- C. American Society for Testing and Materials (ASTM)::
 - 1. ASTM D2047 – Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine
 - 2. ASTM D4541– Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
 - 4. ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials
 - 5. ASTM E648 – Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - 6. ASTM E662 (NFPA 258) – Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - 7. ASTM F137 - Standard Test Method for Flexibility of Resilient Floor Covering with Cylinder Mandrel Apparatus

8. ASTM F141 – Standard Terminology Relating to Resilient Floor Coverings
 9. ASTM F150 – Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring
 10. ASTM F386 - Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces
 11. ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 12. ASTM F925 - Standard Test Method for Resistance to Chemicals of Resilient Flooring.
 13. ASTM F970/F970M - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading
 14. ASTM F 1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing
 15. ASTM F1482 - Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring
 16. ASTM F1514 - Standard Test Method for Measuring Heat Stability of Resilient Flooring by Color Change
 17. ASTM F1515 - Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change
 18. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile
 19. ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 20. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing
 21. ASTM F1914 - Standard Test Method for Short-Term Indentation and Residual Indentation or Resilient Floor Covering
 22. ASTM F2055 - Standard Test Method for Size and Squareness of Resilient Floor Tile by Dial Gauge Method
 23. ASTM F2170 -Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs using in situ Probes
 24. ASTM F2199 - Standard Test Method for Determining Dimensional Stability of Resilient Floor Tile After Exposure to Heat
- D. National Fire Protection Association (NFPA):
1. NFPA 253- Standard Method of Test for Critical Radiant Flux of Flooring Covering Systems Using a Radiant Heat Energy Source
 2. NFPA 258 - Recommended Practice for Determining Smoke Generation of Solid Materials

1.4 SUBMITTALS

A. General – All Products:

1. Provide submittals under provisions of Section 01 33 00, “Submittal Procedures”.
2. Product data

- a. Submit manufacturer's technical data sheet, care & maintenance document, submittal and/or warranty for each material and accessory proposed for use
 - b. Submit manufacturer's installation instructions.
 3. Samples:
 - a. Submit two samples, illustrating color and pattern for each material specified.
 4. Installation:
 - a. See Section 3.3, "Substrate Preparation" - Submit testing data, including test location mapping, to Architect prior to beginning flooring installation.
- B. Closeout Submittals:
1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Section 01 77 19 – "Closeout Requirements". Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives. Verify moisture mitigations systems are compatible with product per manuf. requirements.
- B. Manufacturer Qualifications: Provide resilient flooring materials manufactured in the United States of America by a firm with a minimum of 5 years' experience with resilient flooring materials of type equivalent to those specified.
 1. Provide resilient flooring products, including wall base, accessories and subfloor preparation products from one manufacturer to ensure color matching and compatibility.
 2. Manufacturer shall be capable of providing technical training and technical field service representation.
- C. Installer Qualifications: Installer must be professional, licensed, insured and acceptable to manufacturer of resilient flooring materials. Project Managers or Field Supervisors must be INSTALL (International Standards & Training Alliance) certified, CFI (Certified Floorcovering Installers) Certified and/or an FCICA (The Flooring Contractors Association) CIM (Certified Installation Manager) for the requirements of the project.
- D. Applicator: Company specializing in flooring systems with 5 years documented experience, trained and approved by the flooring system manufacturer.

1.6 PRE-INSTALLATION CONFERENCES

- A. Pre-Installation Meetings: Conduct an on-site pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01 31 00, "Project Management Coordination" or Section 01 31 13, "Project Coordination".
- B. Pre-installation Testing: Conduct pre-installation testing as follows: [Specify testing (i.e. moisture tests, bond test, pH test, etc).

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's recommendations. Protect from damage due to weather, excessive temperatures, and construction operations.
- B. Deliver materials sufficiently in advance of installation to condition materials to the required temperature for 48-hours prior to installation.
- C. Special Requirements for LVT product:
 - 1. Deliver the flooring to the installation site in original packaging. Indicate the project name and handling instructions on the outside of the boxes.
 - 2. Advise the carrier of any damaged material and indicate it on the packing slip.
 - 3. Store the flooring inside, sheltered from extreme hot or cold temperatures. Place the material on a smooth level floor or where there is uniform solid support in a clean, dry well-ventilated area. Unstack the pallets. The long-term storage temperature must be maintained between 18°C (65°F) and 24°C (75°F). Protect adhesive and flooring material from freezing, extreme heat and direct sun exposure.
 - 4. Acclimatize the subfloor, all flooring material and adhesive for 48 hours before, during and after the installation by maintaining the room temperature between 18°C (65°F) and 24°C (75°F). The pallets should be unstacked 24 hours prior to use.
 - 5. Afterwards, maintain the room temperature between 18°C (65°F) and 29°C (85°F). Protect the material from direct sources of heat such as air vents and other types of heaters.
 - 6. Install the flooring after all other finishing work, including painting, have been completed.

1.8 PROJECT CONDITIONS

- A. All Materials
 - 1. Store materials for three days prior to installation in area of installation to achieve temperature stability.
 - 2. Maintain temperature and humidity at service levels or the ambient temperature must remain steady ($\pm 10^\circ$ F) and be between 65° F and 85° F for at least 48-hours prior to, during and after installation.
 - 3. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and after installation.
- B. LVT: See iD Latitude Luxury Vinyl Tile and Plank installation instructions for complete details.
- C. Sheet Vinyl Special Requirements:
 - 1. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65°F and a maximum temperature of 85°F for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55°F in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances. Refer to manufacturer provided manual for requirements.

1.9 MOCKUPS/TEST INSTALLATIONS

- A. Test Installations/ Mock-ups: Install at the project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Owner's and Consultant's acceptance of finish color, texture and pattern, and workmanship standards.
- B. Mock-Up Size: 10 ft. x 10 ft. area, minimum. Mock up can be included in the final installation.
- C. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
- D. Incorporation: Mock-up may be incorporated into the final construction with Owner's approval.

1.10 SEQUENCING AND SCHEDULING

- A. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.
- B. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test.

1.11 WARRANTY

- A. Provide manufacturer's standard limited commercial warranty to cover manufacturing defects.
 - 1. LVT: Limited 20-year warranty.
 - 2. Sheet Vinyl: Limited 20-year warranty.

1.12 EXTRA STOCK

- A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials from same production run as products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - 1. Quantity: Furnish quantity of flooring units equal to 5 % of amount installed.
 - 2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra material.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance.

2.2 LUXURY VINYL TILE FLOORING

- A. Manufacturer:

Basis of Design: Tarkett North America, 30000 Aurora Rd., Solon, Ohio 44139

- 1. Tarkett Luxury Vinyl Tile, or approved equal.

Phone – General Contact: (800) 899-8916

Product Representative: Michael Mihous.

Phone - (916) 806-8502, e-mail - Michael.Milhous@tarkett.com

2. Substitutions per Section 01 25 00, "Substitution Procedures.

B. Product: iD Latitude - Abstract

1. Materials Characteristics: composite with homogeneous polymeric calendared layers with a 20 mil PVC wear layer. Techtonic polyurethane coating technology.
 - a. Size: 18" x 18"
 - b. Color / Pattern: Refer to Interiors Finishes Legend and Flooring Plans
 - c. Finish: Techtonic
 - d. Edge treatment: Square Edge
 - e. Wearlayer Thickness: .020" (0.5 mm)
 - f. Overall thickness: 0.120" (3.0 mm)
 - g. Flammability: (ASTM E648, CRF): ≥ 0.45 W/cm² (Class 1)
2. Adhesive:
 - a. Tarkett RollSmart Adhesive: Coverage: 350 – 400 sq. per gallon (3/8" Nap Paint Roller used with a paint tray)
 - b. Tarkett 959 Vinyl Tile Adhesive Coverage: Porous Substrate: 150-175 sq. ft. per gallon Non-porous: 250-300 sq. ft. per gallon
 - c. Tarkett 959HM High Moisture Substrate Adhesive: Porous Substrate: 125-150 sq. ft. per gallon, Non-porous: 250-300 sq. ft. per gallon
 - d. LVT Rollable: Coverage: 350 – 400 sq. per gallon, (3/8" Nap Paint Roller used with a paint tray)
 - e. Tarkett 975 Two-Part Urethane Adhesive: Porous & Non-Porous Substrate: 225-250 sq. ft. per gallon
 - f. Tarkett 996 Two-Part Epoxy Adhesive: Porous & Non-Porous Substrate: 225-250 sq. ft. per gallon
3. Other Materials:
 - a. Subfloor repairs: use a good-quality Portland cement-based compound modified with latex that has a minimal resistance to compression of 246 kg/cm² (3 50 lbs/sq. in.) to fill, smooth or level subfloor imperfections.
 - b. Self-levelling underlayment: use a Portland cement-based self-levelling underlayment modified with a polymer that has a minimal resistance to compression of 246 kg/cm² (3,500 lbs/sq. in.).
4. Maintenance:
 - a. 72 hours after installation is completed, initial maintenance procedures must be implemented in accordance with manufacturer's requirements. Refer to iD Latitude Maintenance Instructions for complete maintenance details.

2.4 RESILIENT SHEET VINYL FLOORING

A. Manufacturer:

Basis of Design: Tarkett North America, 30000 Aurora Rd., Solon, Ohio 44139

2. Homogeneous sheet flooring or approved equal.

Phone – General Contact: (800) 899-8916

Product Representative: Michael Mihous.

Phone - (916) 806-8502, e-mail - Michael.Milhous@tarkett.com

2. Substitutions per Section 01 25 00, “Substitution Procedures.

C. Product: iQ Granit

1. Materials Characteristics: Homogeneous flooring composed of a 0.080” (2 mm) thick construction that is abrasion resistant and requires no wax.

a. Size: 6’-6” wide roll

b. Color: Refer to Interiors Finishes Legend

c. Finish: Techtonic

d. Edge treatment: Square Edge

e. Wearlayer Thickness: .020" (0.5 mm)

f. Overall thickness: 0.120” (3.0 mm)

g. Flammability: ASTM E648 Flooring Radiant Panel): Class 1

h. Performance standards: ASTM F1913, Standard Specification for Vinyl Sheet Floor Covering without Backing and ASTM F1700 Standard Specification for Solid Vinyl Tile.

2. Adhesive:

a. Tarkett 925 Adhesive Coverage: Porous Substrate: 250-300 sq. ft./gal. Non-porous Substrate: 250-300 sq. ft. per gallon

b. Tarkett 975 Two-Part Urethane Adhesive Coverage: Porous & Non-porous Substrate: 225-250 sq. ft. per gallon

c. Tarkett 996 Two-Part Epoxy Adhesive Coverage: Porous & Non-porous Substrate: 225-250 sq. ft. per gallon

d. Tarkett RollSmart Adhesive Coverage: Porous & Non-porous Substrate: 350 - 400 sq. ft. per gallon (3/8" Nap Paint Roller used with a paint tray)

e. Tarkett Cold Weld Liquid Coverage: 175 – 200 lin. ft. per. 4.5 oz.

3. Other Materials:

a. Subfloor repairs: use a good-quality Portland cement-based compound modified with latex that has a minimal resistance to compression of 246 kg/cm² (3 50 lbs/sq. in.) to fill, smooth or level subfloor imperfections.

b. Self-levelling underlayment: use a Portland cement-based self-levelling underlayment modified with a polymer that has a minimal resistance to compression of 246 kg/cm² (3,500 lbs/sq. in.).

4. Maintenance:

- b. 72 hours after installation is completed, initial maintenance procedures must be implemented in accordance with manufacturer's requirements. Refer to iQ Flooring Maintenance Instructions for complete maintenance details.

2.4 ACCESSORY MATERIALS

- A. Subfloor Filler, if not otherwise specified:
 - 1. Portland cement based, Ardex, or approved equal.
Product Website: <http://www.ardex.com/>
 - 2. Verify with flooring material manufacturer recommendations for use of all products listed. Use of gypsum-based filler is prohibited.
- B. Substitutions per Section 01 25 00, "Substitution Procedures".

2.6 RESILIENT BASE FOR LVT

- A. Provide style to fit job conditions and as approved by the Architect.
 - 1. See Section 09 65 13, "Resilient Base and Transition Strips".

2.7 TRANSITION/REDUCERS/EDGE STRIPS, If Applicable.

- A. Provide style to fit job conditions and as approved by the Architect.
 - 1. See Section 09 65 13, "Resilient Base and Transition Strips".

2.8 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the Contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (i.e. moisture tests, bond test, pH test, etc.). See Section 09 61 43, "Water Vapor Emission Testing".
- B. Visually inspect flooring materials, adhesives and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim.
- C. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
- D. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.

- E. Report conditions contrary to contract requirements that would prevent a proper installation to Contractor, Architect and Owner. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- F. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- G. Ensure installers or installation teams are properly trained per the requirements of all manufacturers listed.
- H. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
 - 1. Verify that surfaces comply with specified tolerances.
 - 2. Verify concrete floors comply with specified moisture content criteria acceptable to the flooring manufacturer, and do not exhibit negative alkalinity, carbonization, or dusting.
- I. Ensure substrate meets the requirements of ASTM F710 and ASTM F710, where applicable
- J. Provide a secure storage area that is maintained permanently or temporarily at normal operating temperature and humidity conditions between 65° F and 85° F and between 40% and 65% relative humidity, for at least 48-hours prior to and during the application of the flooring, so the flooring contractor can acclimate the flooring materials per manufacturer's instructions.
 - 1. Provide an installation area that is weather tight and maintained either permanently or temporarily at ambient service temperature and humidity.
 - 2. Ensure areas with direct prolonged exposure to sunlight are protected with protective UVA/UVB restrictive coatings or films.
 - 3. Areas of the flooring that are subject to direct sunlight through doors or windows should have them covered using blinds, curtains, cardboard or similar for the time of the installation and 72-hours after the installation to allow the adhesive to cure. Note: These areas should be installed using wet adhesives only.
 - 4. Do not conduct initial maintenance until adhesive has cured per the adhesive technical data.

3.2 EXAMINATION

- A. General: Follow guidelines laid out manufacturer installation guidelines for substrate preparation.
- B. Inspect all substrates to ensure they are clean, smooth, permanently dry, flat, and structurally sound. Confirm all areas are properly sealed and acclimated per manufacturer's requirements.
- C. In accordance with manufacturer's installation requirements, visually inspect material for size, color or visual defects prior to installing. Any material that is incorrect or visually defective shall not be installed.
- D. Special Requirements for LVT product:
 - 1. Examine the subfloor before installation to ensure that the surface is clean, dry, smooth, structurally sound and free from foreign substances that may adversely affect adhesion or cause discoloration. Furthermore, ensure that the subfloor is free of paint, varnish, adhesive, oil, grease, solvent and other foreign substances, including treatment compounds,

sealers and curing compounds that may adversely affect adhesion or alter the appearance or durability of the rubber flooring.

2. Verify the surface to ensure there is no powder, scaling or mold. If there is, remove it with a mechanical sander and level with a good-quality cement-based Portland primer.
3. Slabs that have been either using a curing agent or a sealer will have to be treated to ensure that the adhesion has not been impaired.
4. Do not install on cement slabs that have been subjected to adhesive chemical abatement, unless an approved remediation system was used afterwards.
5. Report and rectify all unsatisfactory conditions. Do not start flooring installation until all rectifications have been completed.

3.3 SUBSTRATE PREPARATION

- A. See “Submittals”, Section 1.3, “Submittals” for required installation submittal – to be submitted prior to installation of materials.
- B. All work required ensuring substrate or subfloor meets manufacturers’ guidelines are the responsibility of the general contractor. Evaluate existing floor surface. Prepare surface and apply underlayment to all floor surfaces exhibiting the following characteristics:
 1. Cracks, gouges or holes exceeding 1/16 inch in any dimension.
 2. Cracks with adjacent surfaces exceeding 1/16 inch in height.
 3. All expansion, weakened plane, or construction joints.
 4. All surfaces exhibiting rough or abraded texture exceeding 1/16 inch amplitude.
 5. All surfaces with gap exceeding 3/16 inch under 10 foot metal straight edge.
- C. Prepare existing concrete substrate as recommended by manufacturer, including mechanical shot-blasting or equivalent.
- D. Acid etching is not acceptable.
- E. Prepare existing cracks in substrate as recommended by manufacturer.
- F. Apply filler and trowel to leave a smooth, flat, hard surface.
- G. Prohibit traffic from area until filler is cured. Vacuum clean substrate.
- H. Wood substrate prep. notes in Flexco specs. noted at beginning of section.
- I. Substrates must be free of visible water or moisture, dust, sealers, paint, sweeping compounds, curing compounds, residual adhesives and adhesive removers, concrete hardeners or densifiers, solvents, wax, oil, grease, asphalt, visible alkaline salts or excessive efflorescence, mold, mildew and any other extraneous coating, film, material or foreign matter.
- J. Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with S-453 Level Strong™ cement based self-leveling compound
- K. Subfloor Preparation Moisture Mitigation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, mitigate moisture and other defects with Armstrong Flooring S-454 Prime Strong™ acrylic primer for

porous substrates and S-455 Prime Strong™ acrylic primer for non-porous substrates] as recommended by the flooring manufacturer

- L. Subfloor Cleaning: The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers and other foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents. Spray paints, permanent markers and other indelible ink markers must not be used to write on the back of the flooring material or used to mark the concrete slab as they could bleed through, telegraphing up to the surface and permanently staining the flooring material. If these contaminants are present on the substrate they must be mechanically removed prior to the installation of the flooring material.
- M. It is recommended that all substrates have a floor flatness of FF32 and/or flatness tolerance of 1/8" in 6' or 3/16" in 10'.
- N. Acclimate all products to be used during the installation in the installation environment prior to installation according to the manufacturers written instructions.
- O. Mechanically remove contamination on the substrate that may cause damage to the flooring material, this includes paint, permanent and non-permanent markers, pens, crayons, etc. Leaving these on the substrate or marking with them on the back of the material could cause bleed through and damage the flooring.
- P. Fill cracks, holes, depressions and irregularities in the substrate to prevent transferring through to the surface of the resilient flooring.
- Q. Check panels for sources of discoloration such as contamination from paint, varnish, stain overspray or spills, plumbing sealers, asphalt, heater fuel, markers or potential staining agents such as wood or bark not visible on the surface, edge sealers, logo markings, printed nail patterns and synthetic patches.
- R. Vacuum or broom-clean surfaces to be covered immediately before the application of flooring.
- S. Concrete pH Testing: Perform pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained.
 - 1. Moisture Testing:
 - a. Perform moisture testing per the requirements in ASTM F2170.
 - b. Conduct alkalinity and anhydrous calcium chloride testing using prepackaged kit systems approved by flooring manufacturer. Contractor shall employ an independent testing service or lab for moisture testing procedure, including placement and removal. Testing service shall be acceptable to Architect.
 - c. Provide test at coverage rate required by flooring manufacturer, with minimum of 3 tests/first 1,000 square feet and 1 test per each 1,000 square feet after. Distribute uniformly throughout building. Prepare map or diagram of test locations in each building.
 - d. Conduct one set of tests 60 days prior to scheduled flooring installation. Submit test results to Architect within 48 hours of test receipt.

- e. Conduct second set of tests 14 days prior to scheduled flooring installation. Submit test results to Architect within 48 hours of test receipt.
2. Alkalinity Testing
 - a. Conduct alkalinity testing of slab surface immediately following removal of calcium chloride test kit, in accordance with ASTM F710 procedure.
- T. For LVT Product:
 1. Level all rough surfaces and fill cracks and marks with a Portland cement-based patching compound modified with latex.
 2. Mechanically remove all surface contaminants such as paint, oil, grease, varnish, adhesive as well as various other products such as treatment compounds.
 3. Measure the humidity and pH levels in the cement in compliance with the following standards before installation:
 - a. ASTM F 2170, Relative Humidity (RH) test using in situ probes. The maximum allowable reading is 95% RH for M95.0 and MS160.
 - b. ASTM F 710, pH levels (test procedure 5.3.1). The readings should be between 8 and 10.
 - c. The ASTM test frequency recommendation is 3 measures for the first 1,000 sq. ft. and one measure for each additional 1,000 sq. ft. .
 4. Ensure Moisture, Relative Humidity and pH tests have all been conducted and measurements meet manufacturer's recommendations.
 5. In case of doubt, test the adhesion on the cement subfloor or other surface that will be covered by the flooring. Do the test using the specified flooring and recommended adhesive.

3.4 INSTALLATION – RESILIENT FLOORING MATERIALS – GENERAL REQUIREMENTS:

- A. Install in accordance with manufacturers' instructions and recommendations.
- B. Spread only enough adhesive to permit installation of materials before initial set.
- C. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- D. Install reducer strips at exposed edges or where flooring material changes to another type. Trim reducer width as required to achieve proper thickness at edges of abutting flooring.
- E. Install pattern with all joints aligned.

3.5 INSTALLATION - SPECIAL REQUIREMENTS FOR SHEET VINYL FLOORING WITH INTEGRAL COVE BASE:

- A. General Requirements:
 1. Scribe, cut, and fit or flash cove to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
 2. Prepare sealed seams with special seam adhesive supplied for this purpose. Use methods and sequence of work in conformance with written instructions of the flooring manufacturer. Finish all seams flush and free from voids, recesses, and raised areas.

3. Lay flooring to provide a minimum number of seams. Avoid cross seams, filler pieces, and strips. Match edges for color shading and pattern at the seams in compliance with the manufacturer's recommendations.
 4. Provide integral flash cove wall base where shown on the drawings, including cove fillet support strip and top edge cap trim. Construct flash cove base in accordance with the flooring manufacturer's instructions. seam adhesive as specified for those on the floor.
- B. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.
- C. Accessories:
1. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths as long as practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.
 2. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
 3. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.
 4. Apply overlap edge strips where shown on the drawings, before flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations.

3.6 PROTECTION AND CLEANING

- A. Perform initial and on-going cleaning and maintenance according to the latest edition of manuals provided by manufacturer.
- B. Protect newly installed material with construction grade paper or protective boards, such as Masonite or Ram Board, to protect material from damage by other trades. Be sure all construction debris is swept up and removed prior to the protective material being installed and does not get trapped underneath. Limit usage and foot traffic according to the adhesive's requirements. When moving appliances or heavy furniture, protect wall base from scuffing and tearing using temporary floor protection.
- C. Prohibit traffic on floor finish for 48 hours after installation.
- D. Remove excess adhesive from floor, base, and wall surfaces without damage.
- E. Clean up installation area and sweep, dust or wipe material to remove any dirt, dust or debris.
- F. Conduct initial maintenance per the manufacturer's recommended procedures stated in the Maintenance Documents.

3.7 CLOSEOUT ACTIVITIES

- A. General: Follow all federal, state and local requirements.
- B. Provide closeout documentation as described in Article 1.3, "Submittals"

END OF SECTION

SECTION 09 65 13
RESILIENT BASE AND TRANSITION STRIPS

PART 1 - GENERAL

1.1. SECTION INCLUDES

- A. Resilient base

1.2. RELATED SECTIONS:

- A. Section 03 30 00 - Cast-In-Place Concrete
- B. Section 09 21 16 - Gypsum Board
- C. Section 09 28 13 - Cementitious Backer Boards
- D. Section 09 65 00 – Resilient Flooring
- E. Work may be required to be coordinated with other sections

1.3. REFERENCES

- A. ASTM F1861 – Standard Specification for Resilient Wall Base

1.4. SUBMITTALS

- A. Provide submittals under provisions of Section 01 33 00, “Submittal Procedures”.
- B. Product data
 - 1. Submit product data for materials and accessories.
 - 2. Submit manufacturer's installation instructions.
 - 3. Provide typical detail of inside/outside corner installation of resilient base.
- C. Samples:
 - 1. Submit two samples, illustrating color and pattern for each material specified.

1.5. OPERATION AND MAINTENANCE DATA

- 1. Submit cleaning and maintenance data under the provisions of Section 01 77 19 – “Closeout Requirements”

1.6. QUALITY CONTROL

- A. Applicator: Company specializing in flooring, including resilient base with 5 years documented experience, trained and approved by manufacturer.

1.7. ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.8. EXTRA STOCK

- A. Base: Provide 50 linear feet of base, in each color and style selected, with 4 each matching outside and inside corners, from same run as installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Manufacturer – Rubber Base:
 - a. Basis of Design: Tarkett (formerly Johnsonite), Duracove Thermoplastic Rubber Wall Base – Type TP. Website: https://commercial.tarkett.com/en_US/collection-C001189-duracove-thermoplastic-rubber-1-8-type-tp
 - 2. Substitutions: Provide per Section 01 33 00, “Submittal Procedures”.
 - 3. Acceptable Alternatives:
 - a. Roppe, 700 Series Thermoplastic Wall Base. Website: <https://roppe.com/700-series-wall-base/>
 - b. Tarkett (formerly Johnsonite), Duracove Thermoplastic Rubber Wall Base – Type TP. Website: https://commercial.tarkett.com/en_US/collection-C001189-duracove-thermoplastic-rubber-1-8-type-tp
 - c. Burke Flooring, BurkeBase TP. Website: <http://www.burkeflooring.com/products/wall-base/commercial-wallbase/>
 - 4. Materials:
 - a. Material Standard: Comply with ASTM F1861, Type TP, Group 1 (Solid).
 - b. Type: thermoplastic rubber.
 - c. Series: Pinnacle
 - d. Coved Toe.
 - e. Accessories: Provide pre-molded inside and outside corners matching base profile.
 - f. Size:
 - 1) RB-1: 4 inch high x stock coil lengths
 - 2) RB-2: 6 inch high x stock coil lengths
 - g. Color: Refer to Interior Finishes Schedule
 - h. Adhesives shall be approved by the resilient base manufacturer.
- B. Manufacturer – Transition Strips: Refer to detail 3/A8.6.1 and Interior Finishes Schedule
 - 1. Transitions/Reducers/Edge Strips:
 - 1) Basis of Design: Roppe, vinyl transition strips as indicated in drawings. Website: <http://search.kofflersales.com/roppe-vinyl-transition-strips>
 - 2) Tarkett (formerly Johnsonite), vinyl transition strips as indicated in drawings. Website: https://commercial.tarkett.com/en_US/collection-C000736-reducers

- 3) Burke Flooring, Mercer Vinyl Mouldings, as indicated in drawings, or equal.
Website: <http://www.burkeflooring.com/products/mouldings-transitions/mercervinyl-mouldings/>
- b. Material: Vinyl
 - 1) Adhesives shall be approved by the transition strip manufacturer.
- c. Color: Refer to Interior Finishes Schedule
2. Edge Strip:
 - a. Tarkett MetalEdge resilient transitional mouldings transition strips as indicated in drawings.

Website: https://www.tarkettexchange.com/m/3919b86dea7691b6/original/DS_TNA_METALEDGE_METALEDGE_TRIM.pdf
 - b. Material: PVC
 - 1) Adhesives shall be approved by manufacturer.
 - c. Color: Refer to Interior Finishes Schedule
- C. Manufacturer – Stair Nosing:
 - a. Basis of Design: Tarkett Flexible Vinyl Stair Nosing for Visually Impaired
 2. Substitutions: Provide per Section 01 33 00, “Submittal Procedures”.
 5. Materials:
 - a. Material Standard: Comply with ASTM F-2169 Standard Specification for Resilient Stair Treads, Type TV, Class 1 and 2, Group 1 and 2. Standard formulation exceeds ASTM E648 Class 1 Flammability requirements.
 - b. Type: PVC
 - c. Style: VIRC� XX B, overlap lip with 2” contrasting visually impaired strip
 - d. Color: Refer to Interior Finishes Schedule
 - e. Adhesives:
 - 1) Tarkett 946 Premium Contact Adhesive for Non-porous Substrate:
 - 2) Tarkett 930 Two-part Epoxy Nose Caulk with #530 Caulking Gun at a ¼” diameter bead.
- D. Other Materials
- E. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the Contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection

1. Prior to work of this Section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
 - a. Verify that surfaces comply with specified tolerances.
 - b. Verify concrete floors comply with specified moisture content criteria acceptable to the flooring manufacturer, and do not exhibit negative alkalinity, carbonization, or dusting.
3. In the event of discrepancy, immediately notify the Architect.
4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 PREPARATION

- A. Prepare existing cracks in substrate as recommended by manufacturer.
- B. Apply filler and trowel to leave a smooth, flat, hard surface.

3.3 INSTALLATION -BASE MATERIAL

- A. Install in complete lengths, fit joints tight and vertical. Do not piece. Maintain minimum measurement of 18 inches between joints.
- B. Use pre-molded units at all outside and inside corners.
- C. Install base on solid backing. Bond tight to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.
- E. Install using a constant level line at top of base.

3.4 PROTECTION AND CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean floor and base surfaces.

END OF SECTION

SECTION 09 67 23

FLUID-APPLIED FLOORING - EPOXY

PART 1 – GENERAL

1.01 1.1 SUMMARY

A. Section Includes

1. Trowel applied monolithic epoxy {urethane} flooring [for kitchen and food processing use].
2. Perimeter edging and integral 1/2-inch coved base.

A. Related Sections

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 03 54 00 - Portland Cement Based Underlayment.
3. Section 09 65 13 - Resilient Base and Transition Strips.

1.02 REFERENCES

- A. ASTM D2240 – Standard Test Method for Rubber Property - Durometer Hardness.
- B. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- C. ASTM E648 - Critical Radiant Flux of Floor Covering Systems
- D. ADA Standards – ADA Title [II] [III] Regulations and the ADA Standards for Accessible Design.
- E. CBC-8 - CBC Chapter 8, Interior Finishes
- F. CBC-11B - CBC Chapter 11B, Access to Public Buildings, Public Accommodations, Commercial Facilities and Publicly Funded Housing
- G. California Fire Code (CFC)
- H. NFPA 101 - Life Safety Code
- I. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
- J. SMAQMD – Sacramento Metropolitan Air Quality Management District Regulations.

1.03 SUBMITTALS

A. Action Submittals

1. Product Data for each system component and accessory item
2. Certified Copies of Field Quality Assurance Test Reports
3. Shop Drawings showing traffic areas that will receive non-slip finish and equipment and fixture layout that will receive standard smooth finish.

B. Information Submittals

1. Manufacturer's Installation Instructions
2. Certificates of Compliance regarding specified performance requirements

C. Closeout Submittals

1. Manufacturer's Maintenance Instructions

1.04 QUALITY ASSURANCE

- A. Flooring system components shall be compliance with VOC content limits in SMAQMD [APCD-67.0].
- B. Installed flooring system shall have ASTM C1028, Coefficient of Friction, as follows.
 1. Dry/Level Surfaces: 0.6, minimum.
 2. Wet/Sloped Surfaces: 0.8, minimum.
- C. Installed flooring system shall be CBC-8, Section 803.1, Class A interior finish with the following surface burning characteristics.
 1. ASTM E84 Flame Spread: 25, maximum.
 2. ASTM E84 Smoke Developed: 450, maximum.
 3. ASTM E648, Critical Radiant Flux: NFPA 253, Class II, minimum 0.22 watts per square centimeter.
- D. Manufacturer: company with minimum 15 –years' experience manufacturing poured epoxy flooring for commercial projects similar in scale and complexity to those required for this Project.
- E. Installer: company with minimum five (5) years' experience installing poured epoxy flooring for commercial and DSA inspected Projects similar in scale and complexity to those required for this Project.
 1. Installer: approved by the materials manufacturer.
 2. Installer shall have completed at least five (5) comparable projects that are more than two (2) years old; submit list with names and telephone numbers of knowledgeable client contacts.
- F. Field Sample. For each color and finish of fluid applied flooring, install a Field Sample with one corner as an exploded view showing each step in the process of surface preparation and installation.
 1. Size: minimum 4- by 5-feet.
 2. Location: acceptable to Architect.

3. Modify materials and methods of installation for each Field Sample as required to obtain Architect's approval.
4. Document materials and methods used to obtain Architect's approval of each Field Sample. Maintain at least one copy of these documents in a readily accessible location on Site while this work is in progress.
5. Maintain access to and protect Field Sample from damage while this work is in progress.
6. Upon acceptance of related work, Field Sample that remains in acceptable condition may remain as part of the work.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in un-opened containers, factory mixed and packaged.
- B. Store materials in a dry, secure area.

1.06 PROJECT REQUIREMENTS

- A. Do not install flooring when temperature is below 60 degrees F or above 90 degrees F.
- B. Maintain this temperature range, 24 hours before, during and 72 hours after installation of flooring.
- C. Restrict traffic from area where flooring is being installed or is curing.

1.07 WARRANTY -EXTENDED

- A. Manufacturer shall warrant installed flooring to be and to remain free from defect for a period of at least 3-years from Date of Substantial Completion. Upon written notice from Owner, manufacturer shall promptly, without cost, and with least practicable inconvenience to Owner correct such defects.
- B. Evidence of defect in material, installation or both shall be delamination from substrate or degradation of surface finish individually or in combination.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products of the following manufacturers form the basis of design and quality intended for this Project.
 1. Crossfield Products Corp., Compton, CA. Product: Dex-O-Tex
 2. [Stonhard, Inc., Maple Shade, NJ]
 3. Tnemec Company, Kansas City, MO
 4. [[Tera-Lite, Inc./Revolan Systems, San Jose, CA.]]
 5. {Sherwin Williams - General Polymers, Cincinnati, OH}
 6. Prime Coat Coating Systems, Waukegan IL.
 7. BASF, Product: MasterTop 1245 CLAD (formerly Selby 425)
 8. Or equal, approved in accordance with Division 01 requirements for substitutions.

- B. Resinous Flooring (EXP-2): Dex-O-Tex, Tek-Crete SL B (self-leveling) urethane mortar, Broadcast aggregate, meet or exceed the following physical properties when tested in accordance with the cited referenced standard test method.
1. Thickness: ¼ inch [1/8 inch]
 2. Compressive Strength (ASTM C579)
 3. Tensile Strength (ASTM C307)
 4. Flexural Modulus of Elasticity (ASTM C580)
 5. Water Absorption (MIL D3134)
 6. Surface Hardness (ASTM D2240)
 7. Abrasion Resistance (ASTM D1044)
 8. Impact Resistance (MIL-D-3134, Para 4.7.3): 0.024-inch max.
 9. Adhesion Impact Resistance (Gardner Impact Tester): No chipping, cracking, or delamination and not more than 0.014-inch indentation Adhesion (A.C.I. Comm. No. 503.1): 400 psi (100 percent failure in concrete)
 10. Electrical Conductivity (NFPA 56A): Di-electric
 11. Flammability-Critical Radiant Flux (ASTM E648): Greater than 1.07 watts/cm²
 12. Colors: Per Interior Finishes Legend.
 13. Skid Resistant Epoxy Coating with aluminum Oxide: Posi-Tred O.
 14. [Color quartz Topcoat: Terracolor aggregate.]
 15. Tek-Crete SL B: Aggregate; natural mineral aggregate.
 16. Tek-Crete SL B: Top Coat; pigmented sealer; Dex-O-Tex Quik-Glaze
 17. Dex-O-Tex Cheminert SC Membrane under flooring system.
 18. Antimicrobial Additive: anti-microbial biocide.
 19. Integral Cove Base and Top Coat: Tek-Crete VRT
 20. Vapor Control System: where moisture readings exceed 3 lbs/1000sq ft./24 hour period; Dex-O-Tex VaporControl Primer 200.
- C. Epoxy Flooring (EXP-1): Dex-O-Tex, Terracolor, decorative high build decorative troweled mortar resurfacing system utilizing a clear 100% solids epoxy binder resin and a chemical resistant grout and seal coats.
1. Physical Properties: Provide flooring system that meet or exceed the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.
 - a. Thickness: ¼ inch
 - b. Compressive Strength (ASTM C 579): 10,716 psi
 - c. Tensile Strength (ASTM C 307): 1,843 psi
 - d. Surface Hardness (ASTM D-2240): Durometer "D" 81
 - e. Abrasion Resistance (ASTM D 1044): 0.0 gr.
 - f. Indentation (MIL-D-3134): <1.0 percent
 - g. Impact Resistance (Gardner Impact Tester): No chipping, cracking, or delamination
 - h. Adhesion (A.G.I. Comm. No. 503.1):>400 psi (100 percent failure in concrete)
 - i. Electrical Conductivity (NFPA 56A): Di-electric
 - j. Flammability (ASTM E-648/NFPA 253/FTMS 372): Greater than 1.07 watts/cm² (Class I)

2.02 ACCESSORIES

- A. Waterproofing Membrane: Type recommended or produced by manufacturer for flooring system, for type of service and floor condition indicated. Fluid-Applied, Dex-O-Tex Cheminert SC Membrane or equal.
 - 1. Primer: manufacturer's standard.
 - 2. [Option: Fabric reinforcement place in wet membrane and top coated.]
- B. Anti-Microbial Additive: Incorporate antimicrobial chemical additive to prevent growth of most bacteria, fungi, algae and actinomycetes.
- C. Vapor Control System: per Section 09 05 61 Common Work Results for Flooring Preparation [Tera-Lite III; Aquafin Vaportight Coat-SG3, epoxy-based].
- D. Primer: manufacturer's bond coat.
- E. Floor transitions: Saw cut concrete and chamfer (Key in edge) to match level of existing flooring [Specified in Section 096513.36].

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify Site conditions are ready for the work of this Section. Notify Architect and Inspector of Record at least 48-hours prior to installation of testing and at conclusion of tests.
 - 1. Concrete shall be cured minimum 28 days prior to application of sealer.
 - 2. Conduct ASTM F1869 calcium chloride dome tests to verify that concrete floors are dry within moisture vapor emissions limits of flooring system manufacturer. Set one test for each 1,000 sf. of floor area but at least in four (4) in each different areas or location.
 - 3. Conduct ASTM F710 alkalinity testing of concrete substrate; pH levels shall not exceed the recommendations of the floor coating manufacturer, the adhesive manufacturer, or both.
 - 4. Conduct Relative Humidity Test Method in accordance with ASTM F 2170 with a Wagner Rapid RH probe to verify relative humidity and surface pH, ASTM F710, of concrete floor slabs, the method
 - a. Requires drilling holes at diameter not to exceed outside diameter of probe by more than 0.04 inch to depth equal to 40 percent of slab's thickness (elevated structural slab shall be tested at depth equal to 20 percent of slab thickness).
 - b. Place probe to full depth of test hole, place cap over probe.
 - c. Permit test site to acclimate, or equilibrate, for 72 hours prior to taking relative humidity readings.
 - d. Remove cap and press button on the probe to obtain reading.
 - e. Relative humidity readings for substrates receiving non-permeable flooring are 75 percent or lower.
 - f. Testing shall require three (3) tests in first 1,000 square feet, with one additional test per each additional 1,000 square feet of concrete slab surface.
 - g. Alkalinity testing: follow procedures per ASTM F710, ranges shall not exceed those recommended by the flooring manufacturer.

- B. Do not begin installation until unsatisfactory conditions are corrected. Beginning installation means acceptance of existing conditions and preparatory work of others.

3.02 PREPARATION:

- A. Install Vapor Emission Treatment Systems per Section 090561.13 where tests reveal presence of more than acceptable moisture level in accordance with Test Method ASTM F 1869 and ASTM F 2170.
- B. Clean substrate; remove dirt, oil, grease, construction markings, and foreign matter that could adversely affect floor coating appearance or performance.
 - 1. Surface shall be free of soil, dust, base material, oil, grease, paint, curing compounds and other foreign matter.
 - 2. Surface shall be cleaned and allowed to dry thoroughly. Cleanse dirty or contaminated floors with approved cleaner as per manufacturer's instructions. Rinse thoroughly with clean water.
 - 3. Contaminated Concrete Surfaces: clean concrete surfaces by sandblasting, steel shot-blasted, scarified, water blasted, or other approved technique by the flooring manufacturer.
- C. Repair minor defects. The substrate was prepared under Section 03 54 00; remove ridges, fill depressions and repair cracks as required by floor coating manufacturer to execute specified warranty.
 - 1. Apply, trowel and float filler to leave a smooth, flat, hard surface, free of bumps or depressions of any size.
 - 2. Prohibit traffic from area until filler is cured.
- D. Vacuum clean substrate.
- E. Apply primer as recommended by the materials manufacturer.
- F. Install waterproof membrane per manufacturer's recommendations.

3.03 INSTALLATION

- A. Mix components according to manufacturer's recommendations.
- B. Apply primer (bonding coat) per manufacturer's recommendation.
- C. Trowel apply ¼ inch thick body coat. Build up in minimum of two (2) coats.
- D. Body Coat: Over prepared surface, screed mortar mix at nominal ¼ inch thickness. Allow material flow out and being to settle. Back roll with a spike roller or looped roller to distribute material smooth even finish.
- E. Slip Resistant Finish:
 - 1. Broadcast slip resistant finish into wet coating at rate recommended by manufacturer to achieve specified coefficient of friction. Backroll to encapsulate and distribute aggregate.

2. Remove Excess Aggregate: Remove all loose or unsound aggregate from the cured surface. Vacuum up all dust and fine particles from the surface, remove any ridge lines and detail all imperfection in the textured surface.
 3. In kitchen and food service areas, scheduled for this flooring, apply slip resistant finish only in traffic areas of floor. Do not apply slip resistant finish in locations that will be under equipment, furnishings or fixtures and similar difficult to clean locations.
 4. Power sand to remove trowel marks.
- F. Sealer: apply two (2) seal coats using the base coat liquid components. Sand between coats. Apply the first seal coat. Let the surface set. Mix and place the second seal coat similarly to the first coat, application rate approximately 125 sq. ft. per gallon. During second seal coat broadcast a graded silica aggregate for anti-skid and backroll.
- G. Pigmented Sealer for Tek-Crete SL B: Dex-O-Tex Quik-Glaze, apply over slurry mortar.
- H. Integral Base Application: Apply vertical areas with same materials or base material specified. Height of integral base application: 6 inches, including ½ inch coved radius, unless otherwise indicated. Mask off base to provide a straight, neat, level top edge.
- I. Apply clear sealer, or pigmented where scheduled, top coat per manufacturer’s instructions.

3.04 PROTECTION

- A. Protect finished installation from traffic until curing is complete.

END OF SECTION

REVISION SUMMARY
SECTION 09 68 00

CARPET

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Broadloom and carpet tile.
2. Integrated walk-off mats
3. Subfloor testing and preparation.
4. Installation of vapor retarder.

B. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 00 72 00: Exhibit C: Abatement of Hazardous Materials.
3. Section 03 31 00 – Structural Concrete (for floor flatness and floor levelness).
4. Section 07 26 00: Vapor Retarders
5. Section 09 21 16: Gypsum Board Systems: Wall materials to receive base.
6. Section 09 65 00: Resilient Flooring.
7. Section 09 65 13: Resilient Base and Transition Strips

1.02 REFERENCES

- A. ANSI/ASTM E648-15e1 - Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
- B. ASTM F1869-16 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

1.03 QUALITY ASSURANCE

A. Manufacturer, Contractor, and Installer Qualifications:

1. Manufacturer: Company specializing in contract flooring with ten-years minimum experience.
2. Flooring Contractor: Company with five years minimum documented experience, approved by manufacturer for the installation of the specified products and shall have access to all manufacturers required technical, maintenance, specifications and related documents.
3. Installer:
 - a. Floor covering installer must be factory trained and certified for the installation of the specific products being installed.
 - b. Installer to provide project inspector proof of certification prior to starting work.
 - c. Certified installer must be present on job site while work is in progress.

4. Testing Laboratory:
 - a. Certified, bonded, qualified and experienced agency to perform pH and Relative Humidity (RH) emission tests.
 - b. Interior floor finish and interior floor covering materials shall be tested by an agency in accordance with ASTM E648 Or NFPA 253 and identified by a hanging tag or other suitable methods so as to identify the manufacturer or supplier and style and shall indicate the interior floor finish or floor covering classification in accordance with CBC Section 804.2.
 - i. The minimum critical flux shall be not less than Class II in Groups A, B, E and S.
- B. Pre-Floor Covering Installation Meeting:
 1. Contactor to notify Construction Manager with a minimum of 5-days' notice when anticipated to be ready for pre-floor covering installation meeting. (After subfloor preparation is complete and ready for floor covering installation.)
 2. Contractor, installer, and manufacturer representative are required to attend pre-floor covering meeting. Contractor is responsible for coordinating and scheduling their attendance.
 3. Construction Manager will schedule meeting with Contractor team, Project Inspector, and Architect.
 4. Purpose of Meeting: To review subfloor preparation, verification of readiness for floor covering installation and use of correct products, verification of the acclamation of correct finish materials and review installation requirements.
- C. Manufacturer's Field Services:
 1. Manufacturer representative to attend the "Pre-Flooring" meeting.
 2. Upon Owner or Architect's request, and with at least 72-hour notice, provide manufacturer's representative site visit(s) for inspection of product installation.
 3. At the Owner's request, manufacturer representative to attend operation and maintenance training meeting for Owner's custodial staff prior to acceptance of floor covering installation.

1.04 SUBMITTALS

- A. Provide a complete submittal package with all components required within this section. Submit per Section 01 33 00.
 1. Product Data: Provide product data describing physical and performance characteristics, sizes, patterns, colors, material safety data sheets, and method of seaming and manufacture's installation instructions for all proposed products.
 2. Shop Drawings:
 - a. Provide a floor plan indicating all proposed seam locations and integrated walk-off mats. Indicate method of joining seams, and direction of carpet.
 3. Samples:
 - a. Submit two (2) samples for color selection illustrating color and pattern for floor material with samples of matching walk-off mats, rubber base and transition material proposed for installation.
 - b. Submit sample of solvent welded seam.

4. Maintenance Data: Submit manufacturers recommend cleaning and maintenance data. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
5. Recycled Content Percentage Submittals
6. Submit a statement signed by the manufacturer's Executive Officer or independent certification third-party that the provided carpet materials have the specified recycled material percentage.
7. Submit documentation of manufacturer's take-back program for carpet. Including:
 - a. Confirmation that the new carpet being installed will be accepted (at the point of future replacement) through a manufacturer's operated program for recycling or reuse;
 - b. Written description of such a process for the recycling and/or recovery of used/worn products;
 - c. Contact information for the take-back program.
8. Existing Carpet Recycling Plan and Recycling Certification. Submit documentation describing the reclamation plan for existing carpet. Include appropriate contact information, overview of procedures, and limitations and conditions applicable to the project Carpet recycling options consist of:
 1. Repurposing - reusing the product in another application such as facilitating the donation of used carpeting to charities and other nonprofit organizations.
 2. Closed Loop Recycling - turning waste materials into new materials of the same value, such as vinyl backing into vinyl backing and nylon yarn into nylon carpet yarn.
 3. Open Loop Recycling – creating other product types from reclaimed carpet. For example, turning nylon face fiber into automotive parts or carpet padding, including nylon face fiber in recycled backings
 4. Waste-to-Energy - using carpet for waste-to-energy. In the case of waste-to-energy, manufacturer shall justify why carpet cannot be recycled as this method should be a last resort.
 5. Landfill or incineration – are not approved disposal methods
 6. At the completion of the project, a certificate shall be furnished verifying the reclamation of the carpet and the pounds of material diverted from the landfill.

1.05 OPERATION AND MAINTENANCE DATA

- A. Submit cleaning and maintenance data under provisions of Section 01 33 00.
- B. Include maintenance procedures, recommended maintenance materials, and suggested schedule and products for cleaning.
- C. Provide in-service training with Owner's custodial staff prior to acceptance of flooring for proper care and maintenance of carpet. Also review and provide recommended type of furniture casters and glides.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

- B. Storage and Protection: Store materials protected for exposure to harmful weather conditions and at a temperature and humidity conditions recommended by manufacturer. Materials should be stored in areas that are fully enclosed, weather tight with the permanent HVAC system set at a uniform temperature of at least 68 degrees F (20 degrees C) for 72 hours prior to, during and after installation.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain minimum 70 F ambient temperature at floor level three days prior to, during, and 24 hours after installation of materials.
- C. Prior to testing for moisture vapor emission rate, space shall be enclosed, fully weather-tight, wet-work in space shall be completed and nominally dry, work above ceilings finished. The test site should be at the same temperature and humidity expected during normal use.
- D. Maintain lighting at a minimum uniform level of 50 or more-foot candles in areas where the floor system is being installed.
- E. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- F. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weather tight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants.
- G. Floor temperature should be 60 °F minimum for proper adhesive curing and performance.
- H. If subfloor is contaminated with an oily residue either from removal of "cutback" during asbestos abatement or from a previous end use such as metal fabrication, this residue MUST be totally removed or covered prior to applying modular adhesive and carpet.

1.08 CONCRETE SUBFLOOR TESTING

- A. Testing for internal relative humidity of concrete slabs must be conducted in accordance with the current version of ASTM F2170, not to exceed manufacturer's requirements (ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes).
- B. The Flooring Contractor shall verify in writing to the Owner, a minimum of thirty (30) days prior to scheduled carpet installation, the following substrate conditions:
 - 1. Moisture: Initial emission rate, as tested with in-situ probes, per ASTM F 2170.
 - 2. Alkalinity: pH level. Testing the pH at the surface of a concrete slab must be conducted in accordance with the current version of ASTM F710, not to exceed manufacturer's requirements (ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.)
- C. High Moisture and /or Alkalinity Readings:
 - 1. Modernization Construction (Existing Concrete Slab)
 - a. If the Contractor's test results indicate that the slab relative humidity (RH) readings are below those of flooring manufacturer's requirement, then the Owner's representative will initiate independent testing to confirm results.

- 1) If the independent test results do not substantiate the Contractor's findings, then the Contractor will be directed to proceed with the Vapor Retarder installation and the retesting cost will be back charged to the contractor.
 - 2) If the independent test results confirm the Contractor's findings, then the Contractor shall initiate a credit to the Owner for the cost of installation of the Vapor Retarders as specified in section 07 26 00 that were not installed.
- D. Comply with manufacturer's written requisites for field conditions including but not limited to testing for moisture, confirmation of vapor retarder, floor prep, bond test, photo documentation, etc.

1.09 EXTRA MATERIALS

- A. Provide a minimum of 4 square yards of each color installed. In addition, provide all usable scraps one sq. yd. or larger in size. Remnants shall be packaged, identified and delivered to the Owners Representative, who will retain any he chooses for future repairs before they are removed from the job site.
- B. Provide a minimum of 10 lineal feet of base and transition pieces of each material and color specified or 2 % whichever is greater.

1.10 WARRANTY

- A. Manufacturer's Warranty: Twenty (20) year minimum manufacturer warranty commencing on recordation date of the Notice of Completion.
 1. Should carpet, tend to creep, bulge, be defective in manufacturing, or show a substantial amount of wear - carpet shall be replaced with new carpeting at no cost to the Owner. Manufacturer to submit written warranty covering the following:
 - a. 20 Year minimum, non-prorated Guarantee shall also include:
 - 1) No resiliency loss of backing.
 - 2) No zippering.
 - 3) Static protection (will not lose static property—will not give static discharge above 3.5KV).
 - 4) No edge ravel or zippering.
 - 5) Delamination.
 - 6) Surface wear (maintains at least 90% surface pile weight).
 - 7) No staining.
 - 8) Dimensional Stability.
 - 9) Moisture Resistance.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Carpet (Vinyl Cushioned Tufted Textile) and integrated walk-off mats: Color as selected by Owner Representative from Manufacturer's standard range. No other substitutions will be allowed. Refer to Interior Finishes Legend for color selections
 1. Tandus Flooring – Broadloom Roll.

- a. “Aftermath II” Series, 6’-0” roll, glue down. Powerbond cushion RS vinyl backing system and seam sealer.
 - b. “2nd Power II” Series, 6’-0” roll, glue down. Powerbond cushion RS vinyl backing system and seam sealer.
 - c. “Plexus Color IV” Series, 6’-0” roll, glue down. Powerbond cushion RS vinyl backing system and seam sealer.
2. Walk-Off System
- a. “Abrasive Action II” walk-off system at all exterior doors in carpeted rooms.
- D. Leveling and Patching Compounds: White premix latex; type recommended by carpet manufacturer. Install as recommended by manufacturer for specific application.
- E. Primer: Tandus Centiva: C-36E primer.
- F. Adhesives: Low VOC, waterproof, and as recommended by product manufacturer.
1. Tandus Centiva: C-16E Adhesive

PART 3 – EXECUTION

3.01 EXAMINATION

A. Modernization Construction (Existing Concrete Slab)

1. If existing flooring was determined to be asbestos containing and required abatement, verify that the abatement work has been accepted by the Owner’s representative prior to commencing work.
2. Testing for internal relative humidity of concrete slabs must be conducted in accordance with the current version of ASTM F2170, not to exceed manufacturer’s requirements (ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes).

3.02 PREPARATION

A. Modernization Construction (Existing Concrete Slab)

1. Remove existing finishes, adhesives, and other materials as necessary to properly prepare existing substrates. (Refer to asbestos abatement procedures.)
2. Install underlayment where flooring is being installed on a wooden subfloor per the manufacturer’s instructions.
3. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
4. Fill low spots, cracks, joints, holes and other defects with filler prior to flooring installation.
5. Apply, trowel, and float filler to leave a smooth, flat, hard surface.
6. Prohibit traffic from area until filler is cured.
7. Prepare floor substrate to be smooth, rigid, flat, level, permanently dry, clean and free of foreign materials such as dirt, paint, grease, oils, solvent, curing and hardening compounds, sealers, asphalt and old adhesive residue. Vacuum clean substrate.
8. Apply primer to concrete surfaces.

3.03 CARPET INSTALLATION

- A. Install in accordance with manufacturers' instructions and recommendations with fully welded seams.
- B. Install flooring square with room axis and in accordance with approved shop drawing.
- C. Layout roll-goods in a manner to minimize seams and avoid seams in traffic areas. End butt joints shall be kept to a minimum, shall be staggered, and shall occur where approved on detail plan layout. Use the largest sections possible to minimize seams. Avoid cross seams, filler pieces and strips. Match edges for color shading and pattern at the seams in compliance with the manufacturer recommendations.
- D. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- E. Scribe, cut, fit flooring to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture, including pipes, outlets, edgings, thresholds, nosing and cabinets.
- F. Install edge strips at unprotected or exposed edges, and where flooring terminates.
- G. Install flooring on covers for telephone and electrical ducts, and similar items occurring within finish floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers.
- H. Adhere carpet to prepared substrate without producing open cracks, voids, raising and puckering at joints, telegraphing to adhesive spreader marks, or other surface imperfections in completed installation.
- I. Fully solvent weld all seams. Seams shall be unnoticeable in finished installation.
- J. Verify carpet match before cutting to ensure minimal variation between dye lots.
- K. Double cut carpet, to allow intended seam and pattern match. Make cuts straight, true, and unfrayed.
- L. Lay carpet on floors with run of pile in same direction as anticipated traffic.
- M. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.
- N. Complete installation shall conform to the Carpet Installation Standard of Carpet and Rug Institute (CRI).

3.03 INTEGRATED WALK-OFF MAT INSTALLATION

- A. Install in accordance with manufacturers' instructions and recommendations.
- B. Install modular tile like any "dry-back" modular with a full-spread wet adhesive.
- C. Installation instructions for Tandus Floorcoverings' Powerbond Non-RS (dry-back) Modules can be used as "reference only."
- D. Adhesives below are offered to install modular tile product based upon application and intended use:
 - 1. #024 Solvent Free Outdoor Adhesive (Tandus SKU/Style # 919).
 - 2. #002 Premium Grade Multi-Purpose Adhesive (Tandus SKU/Style # 920).
 - 3. PS100 Pressure Sensitive Releasable Adhesive (Tandus SKU/Style # 923).
- E. Modular tile should be securely attached to the sub-floor in compliance with ADA Accessibility Guidelines, latest edition, for Building & Facilities, Section 4.5.3.

- F. Provide integrated walk-off mats at all exterior door location where carpet is indicated to be installed. The walk-off mats shall extend a minimum of the door width plus six inches (6") and six feet (6'-0") in the direction of travel or as indicated on the drawings.

3.04 INSTALLATION - BASE MATERIAL

- A. Install resilient wall base on entire wall perimeter including toe spaces and open ends of cabinets. Set all bases in adhesive as recommended by the manufacturer. All joints in bases shall be plumb, flush, tight and inconspicuous. Seat top edge and back of base firmly against the wall. Wrap base around all outside corners and no seams within 12" of corners. Interior corners shall be mitered and tightly fitted.

3.05 PROTECTION

- A. Prohibit traffic from carpet areas for 24 hours after installation.
- B. Protect flooring from damages by other trades prior to owner occupancy.

3.06 FINAL CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage. Remove and dispose of all small scraps, cartons, and rubbish upon completion of the work. Remove all loose threads with sharp scissors.
- B. Clean carpet of all spots with proper spot remover, and vacuum carpet surfaces.

END OF SECTION

SECTION 09 70 00
DIGITALLY PRINTED VINYL WALL COVERINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Vinyl wallcovering on gypsum board. Refer to DWC-1 per Interior Finishes Legend.

1.2 RELATED SECTIONS

- A. Section 09 21 16 - Gypsum Board
- B. Section 09 91 00 - Painting

1.3 REFERENCES:

- A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- B. WA-101-2011 - Quality Standard for Polymer Coated Fabric Wallcovering.
- C. UL 723 - Test for Surface Burning Characteristics of Building Materials
- D. NFPA 101 - Life Safety Code
- E. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth

1.4 SUBMITTALS

- A. Provide one Color Proof for approval prior to manufacture of a full size miniature mural.
- B. Submit one full size miniature strike-off for approval prior to the manufacture of full size mural.
- C. Submit manufacturers' product data and installation instructions for each digitally printed wallcovering mural, adhesive and accessory required.
 - 1. Include data on physical properties, fire hazard classification and fire detection characteristics of wallcovering.
 - 2. Include manufacturer's recommendations for maximum permissible moisture content of substrates.
- D. Submit manufacturer's written product certification that all furnished wallcovering ground meets or exceeds the specification requirements. Include certified copies of tests specified.
- E. Submit wallcovering ground manufacturer's written instructions for recommended maintenance of each type of wallcovering required.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Provide each type of digitally printed vinyl wallcovering mural required produced by one manufacturer whose published product literature clearly indicates compliance of wallcovering ground with specified requirements.
- B. Applicator: Installation by skilled commercial wallcovering applicators with no less than three years of documented experience installing wallcovering murals of the types and extent specified for the project.

1.6 PRODUCT DELIVERY STORAGE AND HANDLING

- A. Deliver vinyl wallcovering and adhesive to the job site in unbroken or undamaged containers and clearly marked with the supplier's identification label. Store vinyl wall coverings in a flat position to avoid damage to roll ends. Store materials in a clean, dry storage area with temperature maintained above 55 Degrees F with normal humidity. **DO NOT CROSS STACK THIS MATERIAL.**

1.7 PROJECT CONDITIONS

- A. Do not apply digitally printed wallcovering mural when surface and ambient temperatures are outside the temperature ranges required by the wallcovering manufacturer.
- B. Provide continuous ventilation and heating facilities to maintain substrate surface and ambient temperatures above 60 degrees F unless required otherwise by manufacturer's instructions.
- C. Apply adhesive only when substrate surface temperature or ambient temperature is above 60 degrees F, or relative humidity is below 40 percent.
- D. Maintain constant recommended temperature and humidity for at least 72 hours prior to, throughout the installation period and for 72 hours after wallcovering installation completion.
- E. Provide not less than an 80 foot candles per square foot lighting level minimum measured mid height at substrate surfaces.

1.8 WARRANTIES

- A. Furnish a written warranty against defective workmanship that may develop within one (1) year from date of installation and 5 years against manufacturing defects.

PART 2 - PRODUCTS

2.1 VINYL WALLCOVERING

- A. Manufacturer: **Koroseal** Digitally Printed Wallcovering Murals manufactured by Koroseal Interior Products, LLC., or approved equal
 - 1. Contact: Lurline P. Hodnett, CSI, CDT, IIDA, LEED AP, Specification Representative, Phone - (559) 250-2430, LHodnett@koroseal.com.
 - 2. Substitutions per Section 01 25 00, "Substitution Procedures"
- B. Material:
 - 1. Wallcovering: Koroseal Digital Surfaces Wallcovering. Type II conforming to Federal Specification CCC-W-408A and WA-101-A using test methods given in Federal Specification CCC-T-191 b excepted as otherwise specified.
 - a. Total Weight: 21 ounces per linear yard.
 - b. Backing Weight: 3.1 ounces per linear yard.
 - c. Vinyl Weight: 17.9 ounces per linear yard
 - d. Thickness: 0.018 to 0.026 inches
 - e. Fabric backing and content: Poly-Cotton Woven

- f. Fire Hazard Classification: Provide materials that comply with Class A fire rating when tested in accordance with ASTM E84.
 - g. Underwriters Laboratories approval: Provide materials that have been tested and approved by Underwriters Laboratories.
 - h. Smoke Toxicity: Provide materials that have been tested for smoke toxicity and approved for use by New York City Materials and Equipment Acceptance Division (MEA).
 - i. Fire Detection Characteristics: Provide materials that have been laboratory tested for the Early Warning Effect® in accordance with ASTM E 603. Submit test results certifying that when one square foot section of the material is heated to 300 degrees F, the wallcovering emits an odorless, colorless non-toxic vapor that will activate an ionization smoke detector.
 - j. Low Emissions: Provide materials that meet the requirements of California Integrated Waste Management Board's Special Environmental Requirements Specification CA 01350 for low emitting materials.
2. Digital Image: Owner/Architect to provide digital file of image. Refer to Detail 3/A8.1.4.
 3. Accessories
 - a. Adhesives: Koroseal A-848-B Heavy-Duty Premixed vinyl adhesive.
 - b. Substrate Primer/Sealer: White pigmented alkyd or acrylic/latex base primer specifically formulated for use with vinyl wallcoverings.
 4. Protective coating: The vinyl wallcovering shall have a protective coating applied to its surface to minimize migration of stains into the vinyl and, therefore, offer stain protection from a variety of staining agents and provide greater ease of clean ability.

2.2 GYPSUM BOARD FINISH

- A. The recommended finish level before commercial-grade wall covering is applied for final decoration is Level 3. The prepared surface shall be coated with a drywall primer prior to the application of final finishes. See above for substrate primer/sealer.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Installer shall inspect all areas and conditions under which vinyl wallcoverings are to be installed. Installer shall notify the contractor and architect in writing of any conditions detrimental to the proper and timely completion of the installation; work will proceed only when conditions have been corrected and accepted by the installer.
- B. Substrate shall be checked with a suitable "Moisture Meter." Moisture shall not exceed 4%.

3.2 SURFACE PREPARATION

- A. Wall surfaces shall be free from defects and imperfections that could show through the finished covered surface.
- B. Sand-finished plaster shall be smoothed cinder or cement blocks shall be plastered, or otherwise rendered smooth and old wallcoverings shall be removed.

- C. For new drywall construction, manufacturer recommended primer should be used before application of wallcovering for ease of future removal when redecorating.
- D. Glossy surfaces shall either be sanded to dull surface or a coat of manufacturer's recommended primer applied prior to installation of wallcovering.
- E. If there is any evidence of mildew, it must be removed, and the wall surface treated to inhibit further mildew growth.
- F. All painted surfaces should be evaluated for the possibility of pigment bleed-through. If there is any possibility, a coat of sealer, recommended by the manufacturer, should be applied before application of the wallcovering.
- G. Do not install vinyl wallcovering over oil-based wood stains as a bleed-through may occur.

3.3 INSTALLATION

- A. Wallcovering shall be installed by experienced workers and contractors in strict accordance with the manufacturer's instructions using vinyl wallcovering adhesive recommended by the manufacturer (WHEAT PASTE SHALL NOT BE USED). It is absolutely imperative that installer read the manufacturer's instruction sheet in each roll before installing the vinyl wallcovering. Permanent building light shall be available for installation.
- B. Allow digitally printed vinyl wallcovering mural to acclimatize to the area of installation a minimum of 24 hours before installation.
- C. Before cutting, examine image and color and determine that they are the correct image and color as specified for the correct location.
- D. Read and follow the instructions in the manufacturer's installation sheet contained in each roll of the digitally printed vinyl wallcovering mural.
- E. Use adhesive recommended by the wallcovering manufacturer.
- F. Install each panel in sequence as indicated on the drawings.
- G. If there are variations in color or image that are considered to be excessive, notify the manufacturer's representative for an inspection before any further wallcovering is installed.
- H. Smooth wallcovering to the hanging surface using a stiff bristled sweep brush to eliminate air bubbles, wrinkles, gaps and overlaps.
- I. Remove excess adhesive along finished seams immediately after each wallcovering strip applied. Use clean warm water, a natural sponge and clean towels. Change water often to maintain water cleanliness.

3.4 CLEAN-UP COMPLETION

- A. Upon completion of work, remove surplus materials, rubbish and debris, resulting from the wallcovering installation. Leave areas in neat, clean and order condition.

END OF SECTION

SECTION 09 78 26
FIBERGLASS REINFORCED WALL PANELS (FRP)

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Protective, Prefinished Wall Surfacing, FRP and associated trim.

1.2 RELATED SECTIONS

- A. Section 01 81 13 LEEDv4-v4.1 Requirements
- B. Section 05 40 00 - Cold-Formed Metal Framing
- C. Section 06 10 00 - Rough Carpentry
- D. Section 09 21 16 - Gypsum Board
- E. Section 09 28 13 - Cementitious Backer Boards
- F. Section 09 91 00 - Painting

1.3 STANDARDS AND REFERENCES (Current Edition for All Standards Listed)

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00, "Submittal Procedures".
- B. Submit samples under provisions of Section 01 33 00, "Submittal Procedures".
- C. Submit four samples of wall covering 8x10 inch in size illustrating each color, finish, and texture.

1.5 QUALITY ASSURANCE

- A. Applicator: Company specializing in installing wall surfacing with 3 years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Provide continuous ventilation and heating facilities to maintain substrate surface and ambient temperatures above 60 degrees F, unless required otherwise by manufacturer's instructions.
- C. Do not apply adhesive when substrate surface temperature or ambient temperature is below 60 degrees F or relative humidity is above 40 percent.
- D. Maintain these conditions 24 hours before, during, and after installation of adhesive wall covering.
- E. Provide lighting level of 80 ft candles measured mid - height at substrate surfaces.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01 60 00, “Product Requirements”.
- A. Inspect materials on site to verify acceptance.
- B. Store and protect products under provisions of Section Section 01 60 00, “Product Requirements”.
- C. Protect packaged adhesive from temperature cycling.

1.8 EXTRA STOCK

- A. Provide 25 square feet of each color of wall material.
- B. Package and label material by room number; store where directed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.
- B. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance.

2.2 PROTECTIVE WALL COVERING

- A. Manufacturer - Basis of Design:
 - 1. Marlite, Standard FRP, or approved equal.
Address: 23525 W Eames Street, Channahon, IL 60410
Phone – (815) 467-8600 or (800) 435-0080. Website - www.marlite.com.
 - 2. Type: Prefinished protective wall covering.
 - 3. Series/Style: Standard FRP.
Product Link: <https://www.marlite.com/designer-wall-systems-standard-frp.aspx>
- B. Manufacturer – Acceptable Alternative
 - 1. Crane Composites or equal
Address: 15120 Marquardt Ave, Santa Fe Springs, CA 90670
Phone - (562) 926-7308. Website - www.cranecomposites.com
 - 2. Type: Reinforced polyester resin panel.
 - 3. Series/Style: Glasbord, with Surfaseal finish.
Product Link: <https://www.cranecomposites.com/BP/glasbord.html>
- C. Substitutions: Provide per Section 01 25 00, “Substitution Procedures”.
- D. Materials:

1. Construction:
 - a. Nominal thickness: 0.090 inches thick (embossed)
 - b. Size: 48 inches width by maximum sheet length available, height as shown on drawings.
 2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E84. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - c. Fire/Habitability Criteria:
 - 1) Flame Spread: Class 1 per ASTM E84.
 - 2) Smoke Density: Class 1 per ASTM E84.
 - 3) Listing: UL Classified and Labeled.
 3. Chemical and Stain Resistance: In compliance with manufacturers literature.
 4. Color: White
 5. Finish: Pebbled
- E. Substitutions: Provide per Section 01 25 00, "Substitution Procedures"

2.3 ACCESSORIES

- A. Accessory Moldings and Sealant:
 1. Provide Marlite PVC trim to match panel color
- B. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
 1. Color: Match panels.
- C. Exposed Fasteners: Provide color matched nylon drive rivets recommended by panel manufacturer.
- D. Concealed Mounting Splines: Continuous, H-shaped aluminum extrusions designed to fit into grooves routed in edges of factory-laminated panels and to be fastened to substrate.
- E. Adhesive: Type recommended by wall covering manufacturer to suit substrate, UL Classified for installation, water-based type. Use of contact adhesive not permitted.
- F. Sealant: Provide color matched silicone sealant. Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 07 92 00 "Joint Protection".
- G. Adhesive: Type recommended by wall covering manufacturer to suit substrate, UL Classified for installation, water-based type. Use of contact adhesive not permitted.

- H. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

2.4 OTHER MATERIALS

- A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspection
 1. Prior to work of this Section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
 2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
 - a. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch per foot.
 3. In the event of discrepancy, immediately notify the Architect.
 4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 PREPARATION

- A. Remove wallpaper, vinyl wall covering, loose or soluble paint, and other materials that might interfere with adhesive bond.
- B. Verify drywall surfaces are ready to receive panels.
- C. Fill cracks and smooth irregularities with filler; sand smooth.
- D. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation. Apply approved stain blocker to marks which may bleed.
- E. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- F. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- G. Remove electrical, telephone, and wall plates and covers.
- H. Vacuum clean surfaces free of loose particles.

- I. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.
 - 1. Mark plumb lines on substrate at panel joint locations for accurate installation.
 - 2. Locate trim accessories to allow clearance at panel edges according to manufacturer's written instructions.
- J. Apply one coat of primer/sealer to substrate surfaces. Allow to dry. Lightly sand smooth. Vacuum clean.

3.3 INSTALLATION

- A. Install panels in accordance with manufacturer's instructions. Pre-drill holes for all fasteners.
- B. Provide fasteners and adhesive as recommended by manufacturer.
- C. Apply adhesive and wall covering in accordance with manufacturer's instructions.
- D. Install panels in a full spread of adhesive.
- E. Begin panel layout at center of wall. Install edging and dividers in longest lengths possible. Miter interior corner joints. Butt vertical divider joints into continuous horizontal trim.
 - 1. Install panels equally spaced, joints maximum of 48 inches on center, to height as shown on drawings.
- F. Install panels with fasteners. Layout fastener locations and mark on face of panels so that fasteners are accurately aligned.
 - 1. Pre-drill oversized fastener holes in panels and center fasteners in holes.
 - 2. Apply sealant to fastener holes before installing fasteners.
- G. Install factory-laminated panels using concealed mounting splines in panel joints.
- H. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface by using roller device recommended by manufacturer.
- I. Provide expansion gap at sheet edges and joints.
- J. Install panels before installation of bases, cabinets, hardware, or items attached to or spaced slightly from wall surface. Do not install wall covering more than 1/4 inch below top of resilient base.
- K. Install trim accessories with adhesive. Do not fasten through panels.
- L. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- M. Maintain uniform space between panels and wall fixtures. Fill space with sealant.

- N. Maintain uniform space between adjacent panels and between panels and floors, ceilings, and fixtures. Fill space with sealant.
- A. Install sanitary silicone sealant, clear, as specified in Section 07 92 00, "Joint Protection" at all aluminum moldings. Remove excess sealant and smears as paneling is installed.
- O. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.
- P. Re-install cover plates at electrical devices, HVAC registers, and other finishing items at panel locations.

3.4 CLEANING

- A. Clean wall covering of excess adhesive, dust, dirt, and other contaminants in accordance with manufacturers recommendations.
- B. Replace wall plates and accessories removed prior to work of this Section.

3.5 PROTECTION

- A. Protect finished installation under provisions of Section 01 76 00, "Protecting Installed Construction".

END OF SECTION

SECTION 09 91 00
PAINTING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Surface preparation.
2. Products and application.
3. Surface finish schedule.

B. Related Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. 05 50 00 – Metal Fabrications.
3. 07 60 00 – Flashings and Sheet Metal.
4. 07 71 23 – Gutters and Related Flashings.
5. 08 11 00 – Metal Doors and Frames.
6. 08 31 00 – Access Doors and Panels.
7. 09 29 00 - Gypsum Board.
8. 09 51 00 – Acoustical Ceilings.
9. Division 21 – Fire Protection.
10. Division 22 – Plumbing.
11. Division 23 – Mechanical.

1.02 REFERENCES

- A. ASTM D16 – Standard Terminology for Paint, Related Coatings, Materials, and Applications.

1.03 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this Section

1.04 SYSTEM DESCRIPTION

- A. Preparation of all surfaces to receive final finish.
- B. Painting and finishing work of this section using coating systems of materials including primers, sealers, fillers, and other applied materials whether used as prime, intermediate, or finish coats.
- C. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.
- D. Painting and finishing all exterior and interior surfaces of materials including structural, mechanical, and electrical work on site, in building spaces, and above or on the roof.

- E. Paint exposed surfaces except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces.

1.05 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Provide manufacturer's technical information and instructions for application of each material proposed for use by catalog number.
- C. List each material by catalog number and cross-reference specific coating with specified finish system.
- D. Provide manufacturer's certificate that products proposed meet or exceed specified materials.
- E. Submit samples under provisions of Section 01 33 00.
- F. Submit two (2) samples 8-1/2 x 11 inch in size of each paint color and texture applied to cardboard. Resubmit samples until acceptable color, sheen and texture is obtained.
- G. On same species and quality of wood to be installed, submit two (2) 4 x 8-inch samples showing system to be used

1.06 QUALITY ASSURANCE

- A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with five (5) years' experience.
- B. Applicator: Company specializing in commercial painting and finishing with five (5) years documented experience
- C. Regulatory Requirements
 - 1. Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this specification, comply with the more stringent provisions.
 - 2. Comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA).
 - 3. Coats: The number of coats specified is the minimum number acceptable. If full coverage is not obtained with the specified number of coats, apply such additional coats as are necessary to produce the required finish.
 - 4. Employ coats and undercoats for all types of finishes in strict accordance with the recommendations of the paint manufacturer.
 - 5. Provide primers and undercoat paint produced by the same manufacturer as the finish coat.
- D. Field Samples
 - 1. Provide field samples under provisions of Section 01 33 00.
 - 2. On wall surfaces and other exterior and interior components, duplicate specified finishes on at least 100 sq. ft. of surface area.
 - 3. Provide full-coat finishes until required coverage, sheen; color and texture are obtained.
 - 4. Simulate finished lighting conditions for review of field samples.

5. After finishes are accepted, the accepted surface may remain as part of the work and will be used to evaluate subsequent coating systems applications of a similar nature.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site and store and protect under provisions of Section 01 66 00.
- B. Deliver products to site in sealed and labelled containers; inspect-to verify acceptance.
- C. Full unopened 1 GAL can (new) - Container labelling to include paint Formula, manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing. Paint containers not displaying product identification will not be acceptable.
- D. Store paint materials at minimum ambient temperature of 50 degrees F and a maximum of 90 degrees F, in well-ventilated area, unless required otherwise by manufacturer's instructions.
- E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.08 PROJECT CONDITIONS

A. Environmental Requirements

1. Provide continuous ventilation and heating facilities to maintain interior surface and ambient temperatures above 50 degrees F with a maximum humidity level of 50 percent for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
2. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.
3. Minimum Application Temperatures for Latex Paints: 50 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
4. Minimum Application Temperature for Varnish and Urethane Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
5. Provide lighting level of 80 feet candles measured mid-height at substrate surface.

1.09 OWNER'S INSTRUCTIONS

A Extra Material

1. If product used was SCUSD Paint shop's #1 choice listed in these technical specs, please provide 1-quart only unopened container of each color and surface texture to Owner along with physical draw down and formula; however, if any other product other than our first choice is used, do not provide any attic stock and instead only provide physical draws with formula for each color used.
 - a. Separate draw downs and formula are required for each paint product, color, and sheen used.
2. Label each container with paint mixture formula, color, texture, and room locations in addition to the manufacturer's label.

1.12 WARRANTY

- A. All "Deep Tone" colors shall be warranted for 10-year color retention with a delta loss of no more than 75 cie lab units.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Unless specifically identified otherwise, product designations included at end of section are those of the Dunn Edwards, www.dunnedwards.com and shall serve as the standard for kind, quality, and function.
- B. Subject to compliance with requirements, other manufacturers offering equivalent products are:
 - 1. Dunn Edwards, www.dunnedwards.com.
 - 2. Kelly Moore, <https://kellymoore.com/professional/contractors/>
 - 3. Sherwin Williams, <https://www.sherwin-williams.com/painting-contractors/project-solutions/commercial>
- C. Substitutions: Under provisions of Section 01 25 13.

2.02 MATERIALS

- A. Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
- B. Good flow and brushing properties; capable of drying or curing free of streaks or sags.
- C. "Deep Tone" colors to be composed of 100 percent acrylic pigments, factory ground, with a colored base.
- D. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
- E. Chemical Components of Interior Paints and Coatings: Shall not exceed the limitations of Green Seal's Standard GS-11 for VOC content and the following restrictions:
 - 1. Flat Paints and Coatings: VOC content of not more than 50 g/L.
 - 2. Non-Flat Paints and Coatings: VOC content of not more than 150 g/L.
 - 3. Anticorrosive Coatings: VOC content of not more than 250 g/L.
- F. Varnishes and Sanding Sealers: VOC content of not more than 350 g/L.
- G. Stains: VOC content of not more than 250 g/L.
- H. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
- I. Restricted Components: Paints and coatings shall not contain any of the following:
 - 1. Acrolein.
 - 2. Acrylonitrile.
 - 3. Antimony.
 - 4. Benzene.
 - 5. Butyl benzyl phthalate.
 - 6. Cadmium.
 - 7. Di (2-ethylhexyl) phthalate.
 - 8. Di-n-butyl phthalate.
 - 9. Di-n-octyl phthalate.

10. 1, 2-dichlorobenzene.
11. Diethyl phthalate.
12. Dimethyl phthalate.
13. Ethylbenzene.
14. Formaldehyde.
15. Hexavalent chromium.
16. Isophorone.
17. Lead.
18. Mercury.
19. Methyl ethyl ketone.
20. Methyl isobutyl ketone.
21. Methylene chloride.
22. Naphthalene.
23. Toluene (methylbenzene).
24. 1, 1, 1-trichloroethane.
25. Vinyl chloride.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 1. Plaster and Gypsum Wallboard 12 percent.
 2. Masonry, Concrete, and Concrete Unit Masonry 12 percent.
 3. Interior Located Wood 15 percent, measured in accordance with ASTM 02016.
 4. Exterior Located Wood 15 percent, measured in accordance with ASTM 02016.
 - a. Beginning of installation means acceptance of existing surfaces.

3.02 PREPARATION

- A. Work Not to Be Painted
 1. Painting is not required on surfaces in concealed and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces and duct shafts.
 2. Do not paint metal surfaces such as stainless steel, chromium plate, brass, bronze, and similar finished metal surfaces.
 3. Do not paint anodized aluminum or other surfaces which are specified to be factory pre-finished.

4. Do not paint sandblasted or architecturally finished concrete surfaces.
5. Do not paint prefinished acoustic materials or acoustic suspension systems.
6. Do not paint over Underwriters Laboratories, Factory Mutual or other code-required labels or identifications.
7. Do not paint exterior hot-dipped galvanized materials/products as specified elsewhere.

B. Surface Preparation

1. Remove all tacks, stickers, staples adhesive glue, picture hangers, protruding nails, tape and adhesive glue, and all other foreign materials from surfaces prior to priming or painting. Mask off and protect existing room identification tags including Asbestos tags on door frames.
2. All exterior surfaces to be painted will be pressure washed to remove all loose paint, blisters, bridged cracks, surface-chalk and loose debris at no less than 3200-PSI, or sand blasted.
3. If prior is not possible, washing all surfaces with TSP made by Synco or Jasco, by hand means, scraping and sanding of all surfaces is required prior to pre-priming for proper patching and painting of surfaces.
4. Prior to any painting, any wood or metal deficiencies should be replaced including but not limited to, doors, facial boards, overhang wood, siding, trim etc.
5. All glossy surfaces WILL be sanded prior to any paint application. NO EXCEPTIONS.
6. Clean all roofing tar from facial boards and metal flashing etc.
7. All factory primed new material wood, metal etc, will be sanded prior to priming and painting.
8. All surfaces to be patched will be pre-primed with the proper material as per manufacture specifications for substrate.
9. Any efflorescence will be primed as per Dunn-Edwards EFF-Stop concrete and masonry filler manufactures specifications.
10. Wash all doors, casings and other surfaces with TSP made by Synco or Jasco to remove oily dirt, dust, smoke, and other residues that could prevent proper adhesion of any paint products.
11. For all fillers and patching compounds used, surfaces will be primed before, after application, and before finish paint being applied.
12. Do not paint over all murals until artist waiver is filled out and provided. Please check with the SCUSD Paint Shop Supervisor before project starts.
13. All prep work will be done like the SCUSD standard NO EXCEPTIONS. This includes patching, scraping, sanding, caulking, and removal of all drips, sags, runs and removal of all foreign matter on or in painted surface.
14. All interior window trim, door trim, cabinets, cubbyholes, pin-board, counter tops in addition, wall panel joints shall be caulked.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry.
- C. Apply prime coat to surfaces which are to be painted or finished.
- D. Apply each coat to uniform finish.

- E. Sand lightly between coats to achieve required finish.
- F. Allow applied coat to dry according to the Manufacturers Specifications before the next coat is applied.
- G. The number of coats specified is the minimum that shall be applied. Apply additional coats when undercoats, stains or other conditions show through final paint coat, until paint film is of uniform finish, color and appearance.
- H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Prime back surfaces of interior and exterior woodwork with primer paint.
- J. Prime back surfaces of interior woodwork scheduled to-receive stain or varnish finish with water-based Urethane varnish.
- K. Paint mill finished door seals to match door or frame.
- L. Paint primed steel glazing stops in doors to match door or frame.
- M. Cloudiness, spotting, lap marks, brush marks, runs, sags, spikes and other surface imperfections will not be acceptable.
- N. Where spray application is used, apply each coat of the required thickness. Do not double back to build up film thickness of two (2) coats in one pass.
- O. Where roller application is used, roll and redistribute paint to an even and fine texture. Leave no evidence of roller laps, irregularity of texture, skid marks, or other surface imperfections.
- P. Finishing Mechanical and Electrical Equipment:
 - 1. Refer to Division 23 and Division 26 for schedule of color coding and identification banding of equipment, ductwork, piping, and conduit.
 - 2. Paint shop primed equipment. Do not paint shop prefinished items.
 - 3. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 - 4. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished.
 - 5. Replace identification markings on mechanical or electrical equipment when painted accidentally.
 - 6. Paint interior surfaces of air ducts, and connector and baseboard heating cabinets that are visible through grilles and louvers with one (1) coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers, grilles, and connector and baseboard cabinets to match face panels.
 - 7. Paint exposed conduit and electrical equipment occurring in finished areas with existing matching wall color.
 - 8. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
 - 9. Color code equipment, piping, conduit, and exposed ductwork in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.

10. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.
11. Paint grilles, registers, and diffusers which do not match color of adjacent surface.
12. Paint all mechanical and electrical equipment, vents, fans, and the like occurring on roof.
13. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators; linkages; sensing devices; and motor shafts.
14. Do not paint over labels or equipment identification markings.
15. Do not paint mechanical room specialties such as compressors, boilers, pumps, control panels, etc.
16. Do not paint switch plates, light fixtures, and fixture lenses.

3.04 CONSTRUCTION

A. Priming:

1. All new or bare galvanized metal will first be etched and then primed with appropriate galvanized latex or oil base primer, use cleaner and primer measures as per manufactures specification.
2. All door and Casings may be sprayed. Doors may also be tight rolled with a 3/8th inch nap roller. All casings to be brushed or laid off with a brush. ABSOLUTELY NO EXCEPTIONS.
3. All holes and cracks are to be filled with the proper exterior patching compound and latex caulking with silicone.
4. All rusty ferrous and ferrous metal are to be primed with a rust-inhibitive red, gray or white oxide all galvanized metal will be primed with a galvanized primer.

B. Finish Coat

1. All existing walls and overhangs to be coated with 100% acrylic exterior eggshell exterior paint.
2. All fascia boards to be coated with 100% acrylic exterior semi-gloss paint.
3. All metal poles, ungalvanized OR painted handrails, and iron gates are to be finished in water-borne alkyd urethane semi-gloss finish paint.
4. All doors and casings to have water-borne alkyd urethane finish, including tops, bottoms, and proper edges of doors and casings according to trade standards. All doors can be sprayed or tight rolled with a 3/8th inch nap roller or sprayed. All Casings must have sprayed or brushed finishes. NO EXCEPTIONS.
5. All concrete pillars are to be done in water-borne alkyd urethane semi-gloss paint.
6. All trim finishes are to be done in water-borne alkyd urethane semi-gloss paint.
7. All colors and product material to be used are to be APPROVED by the SCUSD paint shop Supervisor before application NO EXCEPTIONS.
8. Interior lower walls below door header to be painted with water-borne alkyd urethane.
9. Interior doors, door trim and painted cabinets to be painted with water-borne alkyd urethane.
9. Interior kitchens and baths to be painted with water-borne alkyd urethane.

3.05 REPAIR/RESTORATION

A. PATCHING

1. After completion of painting in any one room or area, repair surfaces damaged by other trades.
2. Touch-up or re-finish as required to produce intended appearance

3.06 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 45 00.
- B. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary.
- C. The Owner will engage the services of an independent testing agency to sample paint material being used.
- D. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
- E. The testing agency will perform appropriate quantitative materials analysis and other characteristic testing of materials as required by the Owner.
- F. If test results show materials being used and their installation do not comply with specified requirements or manufacturer's recommendations, the Contractor may be directed to stop painting, remove noncomplying paint, pay for testing and repaint surfaces to acceptable condition.

3.07 CLEANING

- A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
- B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
- C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site

3.08 PROTECTION OF COMPLETED WORK

- A. Protect finished installation under provisions of Division 01.
- B. Erect barriers and post warning signs. Maintain in place until coatings are fully dry.
- C. Confirm that no dust generating activities will occur following application of coatings.

3.09 SCHEDULES

- A. Color Schedule Guidelines
 1. Paint and finish colors shall be selected by the Architect from manufacturer's entire range to match District standard colors or compliment those colors with the approval of the SCUSD Paint Shop Supervisor.
 2. Access doors, registers, exposed piping, electrical conduit and mechanical/electrical panels: Generally, the same color as adjacent walls.
 3. Exterior and interior steel doors, frames and trim: Generally, a contrasting color to adjacent walls.
 4. Doors generally are all the same color, but of a contrasting color from frame and trim.
 5. Exterior and interior steel fabrications: Generally, a contrasting color to adjacent walls.
 6. Exposed interior mechanical/ductwork: Generally, a contrasting color to adjacent walls or ceiling.

7. Ceilings are generally to be painted a different color than walls.
 8. Approximately 20 percent of overall painting work will be required to be "Deep Tone" colors. This work will require one (1) additional coat of paint beyond that as specified.
 9. All existing walls and overhangs to be painted should be colored as either the SCUSD (SPECIAL HEATHER) or to match existing body color.
 10. All fascia boards should be painted using 1 of the 5 standard SCUSD trim colors. Please check with SCUSD Paint Shop Supervisor for correct formula.
 11. Interior kitchens and baths to be painted to match existing paint finish material.
 12. All pin boards if not replaced or re-covered with appropriate material, shall be patched then painted with SCUSD approved pin board paint and color.
- B. Exterior Painting Schedule
1. Concrete Substrates, Masonry, Clay, Stucco, Non-Traffic Surfaces:
 - a. Prime Coat: Primer, alkali resistant, waterbased, interior/exterior, Dunn-Edwards, Eff-Stop Premium, ESPR00.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, eggshell, Dunn-Edwards, Evershield, EVSH30, 100% acrylic, (Gloss Level 3).
Or
 - d. Topcoat: Latex, exterior, low sheen, Dunn-Edwards, Evershield, EVSH40, 100% acrylic, (Gloss Level 4).
Or
 - e. Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3).
Or
 - f. Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
Or
 - g. Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5).
 2. CMU Substrates:
 - a. Prime Coat: Block filler, latex, interior/exterior, Dunn-Edwards, Smooth BLOCFIL Select SBSL00 or Eff-Stop Premium ESPR00.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, eggshell, Dunn-Edwards, Evershield, EVSH30, 100% acrylic, (Gloss Level 3).
Or

- d. Topcoat: Latex, exterior, low sheen, Dunn-Edwards, Evershield, EVSH40, 100% acrylic, (Gloss Level 4).
- 3. Wood Substrates:
 - a. Prime Coat: Primer, waterbased, exterior, Dunn-Edwards, Ultra-Grip Premium UGPR00 or EZ-Prime Premium EZPR00
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, eggshell, Dunn-Edwards, Evershield, EVSH30, 100% acrylic, (Gloss Level 3).
Or
 - d. Topcoat: Latex, exterior, low sheen, Dunn-Edwards, Evershield, EVSH40, 100% acrylic, (Gloss Level 4).
Or
 - e. Topcoat: Latex, exterior, semi-gloss, Dunn-Edwards, Evershield, EVSH50, 100% acrylic, (Gloss Level 5).
- 4. Ferrous Metal Substrates:
 - a. Waterborne Urethane Alkyd Enamel System:
 - 1) Prime Coat: Primer, rust inhibitive, waterborne alkyd, interior/exterior, Dunn-Edwards, Bloc-Rust Premium BRPR00 Series or Enduraprime rust preventative primer ENPR00.
 - 2) Intermediate Coat: Waterborne urethane alkyd, interior/exterior matching topcoat.
 - 3) Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3).
Or
 - 4) Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
Or
 - 5) Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5)
- 5. Non-Ferrous Metal Substrates:
 - a. Waterborne Urethane Alkyd Enamel over a Latex Primer System:
 - 1) Prime Coat: Primer, waterbased, interior/exterior, Dunn-Edwards Ultrashield Galvanized Metal Primer ULGM00.
 - 2) Intermediate Coat: Waterborne urethane alkyd, interior/exterior, matching topcoat.
 - 3) Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3).
Or
 - 4) Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
Or

- 5) Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5)

C. Interior Painting Schedule

1. Gypsum Board Substrates:

- a. Prime Coat: Primer sealer, latex, interior, Dunn-Edwards, Vinylastic Select VNSL00.
- b. Intermediate Coat: Latex, interior, matching topcoat
- c. Topcoat: Latex, interior/exterior, eggshell, Dunn-Edwards, Evershield, EVSH30, (Gloss Level 3).
Or
- d. Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3).
Or
- e. Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
Or
- f. Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5)

2. Wood Substrates:

- a. Prime Coat: Primer, acrylic, for interior wood, Dunn-Edwards, Ultra-Grip Select UGSL00 or Dunn-Edwards, Decoprime DCPR00.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3)
Or
- d. Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
Or
- e. Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5)

3. Ferrous Metal Substrates:

- a. Ultra-Premium Low Odor / Zero VOC Latex over a Waterborne Alkyd Primer System:
 - 1) Prime Coat: Primer, alkyd, anti-corrosive, for metal, Dunn-Edwards, Bloc-Rust Premium BRPR00 Series or Enduraprime rust preventative primer ENPR00.
 - 2) Intermediate Coat: Latex, interior, matching topcoat.
 - 3) Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3)
Or

- 4) Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
Or
 - 5) Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5).
4. Non-Ferrous Metal Substrates:
- a. Pre-Treatment: Water based, Krud Kutter, Metal Clean & Etch SCME-01
 - b. Prime Coat: Primer, water based, Dunn-Edwards, Ultrashield Galvanized Metal Primer ULGM00.
 - c. Intermediate Coat: Latex, interior, matching topcoat.
 - d. Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3)
Or
 - e. Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
Or
 - f. Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5).

Cross-Over Chart			
Paint Type	Dunn-Edwards BOD	Kelly Moore	Sherwin Williams
100% Acrylic Eggshell Exterior Paint	EVSH30 Evershield 100% Acrylic	1294 Envy Exterior 100% Acrylic	KxxW000xx Series Emerald Exterior Acrylic Latex
100% Acrylic Low Sheen Exterior Paint	EVSH40 Evershield 100% Acrylic	1294 Envy Exterior 100% Acrylic	KxxW000xx Series Emerald Exterior Acrylic Latex
100% Acrylic Semi-Gloss Exterior Paint	EVSH50 Evershield 100% Acrylic	1298 Envy Exterior 100% Acrylic	KxxW000xx Series Emerald Exterior Acrylic Latex
Water-Borne Alkyd Urethane Eggshell Interior/Exterior Paint	ASHL30 Aristoshield Urethane Alkyd	1997 Epic Urethane Alkyd Enamel	KxxW0xxxx Series Emerald Urethane Trim Enamel
Water-Borne Alkyd Urethane Low Sheen Interior/Exterior Paint	ASHL40 Aristoshield Urethane Alkyd	1997 Epic Urethane Alkyd Enamel	KxxW0xxxx Series Emerald Urethane Trim Enamel
Water-Borne Alkyd Urethane Semi-Gloss Interior/Exterior Paint	ASHL50 Aristoshield Urethane Alkyd	1998 Epic Urethane Alkyd Enamel	KxxW0xxxx Series Emerald Urethane Trim Enamel

END OF SECTION

SECTION 10 14 00
SIGNAGE

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Plastic signs at building entrances, classrooms, restrooms, and as identified on drawings.

B. Related Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 08 11 00 – Metal Doors.
3. Section 09 29 00 – Gypsum Board.

1.02 REFERENCES

A. Accessible signs shall conform with the following requirements as indicated:

1. California Building Code (CBC) Title 24, 2022 Edition.
2. ADA Accessibility Guidelines (ADAAG, latest adopted edition).
3. Contracted Grade 2 Braille shall be used whenever Braille symbols are specifically required (CBC Section 11B-703.3 Braille).
4. Means of Egress Identification: CBC 11B-216.1 & 11B-703.1.
5. Tactile Exit Signs: CBC 1013.4.
6. Restroom Identification Symbols: CBC 11B-216.8 & 11B-703.7.2.6.
7. Signs and Identification: CBC 11B-216.1 & 11B-703.1.
8. International Symbol of Accessibility: CBC 11B-703.7.2.1.
9. Direction and Information Signs: CBC 11B-703.1.
10. Symbols of Accessibility: CBC 11B-703.7.
11. Finish and Contrast: CBC 11B-703.5.1.
12. Character Proportions: CBC 11B-703.2.4.
13. Character Height: CBC 11B-703.2.5.
14. Raised Characters and Pictorial Symbol Signs: CBC 11B-703.2 & 11B-703.6.
15. Braille: CBC 11B-703.3.
16. Mounting Height and Location: CBC 11B-703.4.1 & 11B-703.4.2.
17. Symbols of Accessibility: CBC 11B-703.7.2.
18. Color of Symbol: CBC 11B-703.7.2.1.
19. Entrance Signs: CBC 11B-216.6.

- B. ASTM D4802 - Standard Specification for Poly(Methyl Methacrylate) Acrylic Plastic Sheet.
- C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless-Steel Sheet, Strip, Plate, and Flat Bar.

1.03 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop drawings listing sign styles, lettering and locations and overall dimensions of each sign.
- B. Two (2) samples illustrating full size sample sign with tactile characters, Braille and subsurface text or pictogram to demonstrate fabrication technique and Braille measurements which shall be used on proposed project.
- C. Letters samples: 1-inch-high letters for proportions required in REGULATORY REQUIREMENTS.
- D. Submit manufacturer's technical data and installation for each type of sign required.
- E. Submit samples of background colors, character colors, and one-inch high print outs of "I," "O" and "X" from proposed type styles. Indicate which type styles shall be used for required tactile characters and for required visual characters.
- F. Submit proposed sign schedule to comply with scoping requirements above.
- G. All signage shall be designed and constructed to comply with signage specifications and drawings.

1.04 QUALITY ASSURANCE

- A. Pre-installation Meeting
 - 1. Notify Architect when signs are ready for installation. Arrange for conference at job site. Do not proceed with installation until Architect's approval of specific locations and methods of attachment has been obtained.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site and protect from damage. Store until immediately prior to Notice of Completion.
- B. Manufacturers shall submit 3 references showing products for projects completed within the last 6 years. Both tactile and non-tactile signage shall be included in the work.
- C. Manufacture's Two-Year Warranties.
- D. Contractor shall provide labor and materials to repair or replace defective signs as directed by Owner. Defects shall include:
 - 1. Tactile characters and/or Braille dots which come off or are removed.
 - 2. Discoloration, wear and scratching off of the surface color.
 - 3. All signs and sign components, except for damage by mishandling by Owner, including installation by Owner, or vandalism.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.

1. Gravotech. www.gravotech.com
2. Or approved equal.

2.02 MATERIALS

A. Plastic Signs

1. ADA Tactile and Braille Signs: Sand-Carved signs; thermosetting high-pressure laminate using Graphic Process Sand-Carved signs, exterior-grade, graphics, Braille and tactile copy required. Square corners, square cut edges.
 - a. Unframed Signs: GTAC-INT sign material as manufactured by Gravotac. Sized as required for text or room number.
 - b. Framed Signs: Single piece Modular Frames, concealed screw mounting, by Gravotac or equal.
 - c. ADA TactManufacturer's standard process for producing copy complying with CBC and ADA Accessibility Guidelines. Text shall be accompanied by California Grade 2 Braille. Produce precisely formed characters with square cut edges free from burrs and cut marks, permanently fused to substrate.
 - d. Raised-Copy Thickness: Not less than 1/32 inch.
3. Non-Tactile Signs: Cast Acrylic Plastic Sheet; ASTM D4802 Category A-1, ¼ inch overall thickness, laminated acrylic plastic sheets, Sub-surface Screened process graphics and symbols, exterior-grade at exterior locations, 3/8-inch radius corners, square cut edge, drilled holes for countersunk screws, polished edges.
4. Apply UV inhibitor overcoat for exterior signs.

B. Aluminum Signs

1. Aluminum Sheet for Anodic Finish: Alloy 5005-H32 per ASTM B209 in 0.102-inch thickness.
2. Framing Members and Posts: Special extrusions Alloy 6063-T5 per ASTM B221.
3. Aluminum sheet with die-raised copy, anodic finish applied before fabrication. Background finish enamel applied after fabrication. Color as selected by Architect from manufacturer's standard range of colors.
4. Fabrication: Raised copy, Tactile and Braille.

C. Restroom Signage

1. Male Restroom Signage:
 - a. Doorways leading to male restrooms shall be identified by equilateral triangle 1/4 inch thick with edges 12 inches long, with vertex pointing upward in contrasting color from door color. Sign shall be mounted in center of door 60 inches from finish floor to center of sign.
 - b. Room shall be further identified by rectangular room identification sign ¼ inch thick, 8 inch Height by 6 inch Length minimum unless indicated on Drawings upon which appears a male pictogram 6 inches high, and the word "MEN" immediately below on the same sign in contrasting color. Letters: 5/8 inches minimum and 2 inches maximum high in contrasting color, raised minimum 1/32 inch fully tactile, accompanied by the California Contracted Grade 2 Braille indicator immediately below. Sign shall be located on wall on latch side of

door, 60 inches from finish floor to center of sign, centered horizontally within 18-inch space adjacent to latch side of door or on nearest adjacent wall.

- c. Conform to all CBC requirements, CBC 11B.703.1 and 11B-703.7.2.6.1.

5. Female Restroom Signage:

- a. Doorways leading to female restrooms shall be identified by circle 1/4 inch thick 12 inches in diameter circle in contrasting color from door color. Sign shall be mounted in center of door, 60 inches from finish floor to center of sign.
- b. Room shall be further identified by rectangular room identification sign 1/4 inch thick, 8-inch Height by 6-inch Length minimum unless indicated on Drawings upon which appears a female pictogram 6 inches high, and the word "WOMEN" immediately below on the same sign in contrasting color. Letters: 5/8 inches minimum and 2 inches maximum high in contrasting color, raised minimum 1/32 inch fully tactile, accompanied by the California Contracted Grade 2 Braille indicator immediately below. Sign shall be located on wall on latch side of door, 60 inches from finish floor to center of sign, centered horizontally within 18-inch space adjacent to latch side of door or on nearest adjacent wall.
- c. Conform to all CBC requirements, CBC 11B.703.1 and 11B-703.7.2.6.2.

6. Gender Neutral Restroom:

- a. Doorways leading to unisex restrooms shall be identified by circle 1/4 inch thick, 12 inches in diameter with 1/4-inch-thick triangle superimposed on circle and within 12-inch diameter, total 1/2 inch thick in contrasting color from door color. Sign shall be mounted in center of door 60 inches from finish floor to center of sign. Color of triangle shall have 70 percent minimum contrast with color of circle.
- b. Room shall be further identified by rectangular room identification sign 1/4 inch thick, 8-inch Height by 6-inch Length minimum unless indicated on Drawings upon which appear as male and female pictograms and the word "RESTROOM" immediately below on the same sign in contrasting color. Letters: 5/8 inches minimum and 2 inches maximum high in contrasting color, raised minimum 1/32 inch fully tactile, accompanied by California Contracted Grade 2 Braille indicator immediately below, on same sign. The sign shall be located on wall on latch side of door, 60 inches from finish floor to center of sign, centered horizontally within 18-inch space adjacent to latch side of door or on nearest adjacent wall.
- c. Conform to all CBC requirement, CBC 11B.703.1 and 11B-703.7.2.6.3.

7. Restroom signs – Non-Wheelchair Accessible:

- a. Provide restroom signs with similar font, size and fabrication as accessible signs without the ISA (International Symbol of Accessible) and without tactile construction.
- b. Next to the Non-Wheelchair Accessible sign provide an additional sign same construction, with the wording: "WHEELCHAIR ACCESSIBLE RESTROOM LOCATED" with ARROW below the wording directing to the nearest location.

8. Substitute "BOYS" or "GIRLS" where appropriate

2.03 FABRICATION

A. Regulatory Requirements

- 1. Tactile Character Type: Tactile characters on signs shall be raised 1/32-inch (0.794 mm) minimum, and shall be sans serif uppercase characters accompanied by Contracted (Grade 2)

Braille. Helvetica Regular, uppercase letters only, refer to REGULATORY REQUIREMENTS for letter-proportion compliance. Italic, oblique script, highly decorative or unusual style forms not permitted. CBC Section 11B-703.2. Fabricate sign so that raised letter cannot be peeled off.

2. Character Proportions: Raised characters on signs shall be selected from fonts where the width of the uppercase letter “O” is 60 percent minimum and 110 percent maximum of the height of the uppercase letter “I”.
3. Tactile Character Height: Raised characters shall be a minimum of 5/8 inch (15.9 mm) and a maximum of 2 inches (51 mm) high. CBC Section 11B-703.2.5.
4. Stroke thickness of the uppercase letter “I” shall be 15 percent maximum of the height of the character. CBC Section 11B-703.2.6
5. Character spacing measured between the two closest points of adjacent raised characters within a message. Where characters have rectangular cross sections, spacing shall be 1/8 inch minimum and four (4) times the stroke width, maximum. Where characters have other cross sections, spacing between individual raised characters shall be 1/16 inch minimum and four (4) times the stroke width maximum at the base of the cross sections, and 1/8 inch minimum and four (4) times the stroke width maximum at the top of the cross sections. Characters shall be separated from raised borders and decorative elements 3/8 inch minimum.
6. Line Spacing: Spacing between the baselines of separate lines of raised characters within a message shall be 135 percent minimum and 170 percent maximum of the raised character height.
7. Finish and Contrast: Characters and their background shall have a non-glare finish. Characters shall contrast with their background. Provide white characters on Navy Blue background to match District standard.
8. Braille: California (Contracted) Grade 2 Braille. Dot base diameter shall be 0.059 inch (1.5 mm) to 0.063 inch (1.6 mm). Dots shall be 0.100-inch (2.5 mm) on center in each cell with 0.300-inch (7.6 mm) space between corresponding dots in adjacent cells. Distance between corresponding dots from one cell directly below, 0.395 to 0.400 inch. Dots shall be raised 0.025 to 0.037 inch above the background. Braille dots shall be domed or rounded.
9. Polish all edges

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive Work.
- B. Beginning of installation means installer accepts existing surfaces.

3.02 INSTALLATION

- A. Install signs only after surfaces are finished, in all restrooms, in center of door, or on wall adjacent to latch side as specified herein.
- B. Mounting
 1. Mounting Height and Location: Signs with raised characters and Braille shall be located 48 inches minimum to the baseline of the lowest line of Braille cells and 60 inches maximum to the baseline of the highest line of raised characters above the finish floor or ground surfaces. Mounting location shall be located so that a clear space of 18 inch minimum by minimum by 18 inch minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45-degree open position. CBC Section 11B-703.4.

2. Tactile Plastic Signs: Stainless steel screws (not just adhesive), pin torx, vandal-proof screw appropriate for substrate.
 3. Non-tactile Plastic Signs:
 - a. Install with four (4) stainless steel countersunk flathead screws, pin torx, vandal-proof. Pre-drill holes to prevent breaking plastic, use countersunk drill bits to flush screw head with sign surface.
 - b. [Install with clear silicone adhesive meeting ASTM C834, with zero clearance between plastic and face of substrate. Double face adhesive tape not permitted].
 - c. Metal Signs: Install with four (4) flathead countersunk No. 8 stainless steel vandal-proof screws at pre-drilled holes, top of screw heads shall flush with sign surface, concealed mounting.
- D. Clean and polish.
- 3.03 FIELD QUALITY CONTROL
- A. DSA Inspections: Signs and identifications or other information shall be field inspected after installation and approved by Division of the State Architect prior to the issuance of a final certificate of occupancy, or final approval where no certificate of occupancy is issued. The inspection shall include, but not limited to, verification that Braille dots and cells are properly spaced and the size, proportion and type of raised characters are in compliance with CBC, Section 11B-703.1.1.2.

END OF SECTION

SECTION 10 21 13

TOILET COMPARTMENTS AND CUBICLES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Toilet Compartments.
2. Urinal Screens.

B. Related Sections

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 06 10 00 – Rough Carpentry.
3. Section 09 30 13 - Ceramic Tiling
4. Section 10 28 00 - Washroom Accessories.

1.02 REFERENCES

- A. National Fire Protection Association 101 Life Safety Code, Chapters 5, 6, 8-30.
- B. ANSI A117.1: Accessible and Usable Buildings And Facilities.
- C. Title 24, California Code of Regulations, Parts 2, 3, and 5.
- D. ADA, Accessibility Guidelines for Buildings and Facilities, Federal Register Volume 56, Number 144, Rules and Regulations.
- E. US Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) Program.
- F. American Society for Testing and Materials Standards:
 1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 2. ASTM D2794 Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 3. ASTM D2197 Standard Test Method for Adhesion of Organic Coatings by Scrape Adhesion.
 4. ASTM D6578 Standard Practice for Determination of Graffiti Resistance.

1.03 SYSTEM DESCRIPTION

A. Performance Requirements

1. Graffiti Resistance: Partition material shall have the following graffiti removal characteristics when tested in accordance with ASTM D6578-00 Standard Practice for Determination of Graffiti

Resistance in accordance with Section 9, "Graffiti Removal Procedure Using Manual Solvent Rubs":

- a. Cleanability: Five (5) required staining agents shall be cleaned off material.
2. Scratch Resistance: Partition material shall have the following characteristics when tested in accordance with ASTM D2197-98(2002) Standard Test Method for Adhesion of Organic Coating by Scrape Adhesion, using Gardner Stock #PA-2197/ST pointed stylus attachment on scrape tester:
 - a. Scratch Resistance: Maximum Load Value shall exceed 10 kilograms.
 3. Impact Resistance: Partition material shall have the following characteristics when tested in accordance with ASTM D2794-93(1999)e1 Standard Test Method for Resistance of Organic Coating to the Effects of Rapid Deformation (Impact), using .625" hemispherical indenter with 2-lb impact weight:
 - a. Impact Resistance: Maximum Impact Force value shall exceed 30 inch-lbs.
 4. Fire Resistance: Partition material shall comply with the following requirements, when tested in accordance with ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials:
 - a. Smoke Developed Index: Not to exceed 450.
 - b. Flame Spread Index: Not to exceed 75.
 - c. Material Fire Ratings:
 - 1) National Fire Protection Association (NFPA): Class B.
 - 2) International Code Council (ICC): Class B.

1.04 SUBMITTALS

- A. Comply with requirements of Section 01 33 00.
- B. Manufacturer's Data.
 1. Provide required number copies of:
 - a. Product data sheets.
 - b. Installation instructions.
 - c. Cleaning and maintenance instructions.
 - d. Replacement parts information.
- C. Shop Drawings.
 1. Provide required number of copies of all shop drawings.
 2. Show fabrication and erection of compartment assemblies, to extent not fully described by manufacturer's data sheets.
 3. Show anchorage, accessory items and finishes.
 4. Provide location drawings for bolt hole locations in supporting members for attachment of compartments.
- D. Samples.

1. Furnish scale model of compartments, including stile, shoe, door, door hardware, divider panel, and mounting brackets.
2. Furnish sections showing stile anchoring and leveling devices, concealed threaded inserts, panel, stile, and edge construction.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver items in manufacturer's original unopened protective packaging.
- B. Store materials in original protective packaging to prevent physical damage or wetting.
- C. Handle to prevent damage to finished surfaces.

1.07 WARRANTY

- A. Furnish ten-year limited warranty for panels, doors, and stiles against breakage, corrosion, delamination, and defects in factory workmanship.
- B. Furnish one-year guarantee against defects in material and workmanship for stainless steel door hardware and mounting brackets.

1.08 ATTIC STOCK

- A. Provide two additional latches and associated hardware per toilet room included in scope of work.
- B. Provide one additional 12-inch-wide style per toilet room included in scope of work.
- C. Provide one additional 36-inch-wide stall door per toilet room included in scope of work.

PART 2 - PRODUCTS

2.01 MANUFACTURER (DISTRICT STANDARD)

- A. Model numbers for toilet partitions manufactured by Bobrick Washroom Equipment, Inc., represented by R. E. Edwards & Associates (925-829-2942), are listed to establish a standard of quality for design, function, materials, workmanship, and appearance. Other manufacturers may be submitted for evaluation by the architect by following the conditions of the substitutions clause. Unless approval is obtained ten days prior to the bid date, all bids shall be based on the standard of quality. The architect shall be the sole judge as to the acceptability of all products submitted for substitution.
- B. Toilet partitions shall be the product(s) of a single manufacturer.

2.02 MOUNTING CONFIGURATIONS

- A. Toilet Partitions/Shower Dividers/Dressing Compartments shall be:
 1. Overhead-Braced (1092.67 Sierra™ Series)

B. Urinal Screens shall be:

1. Floor-Anchored (1091 Sierra Series):

2.03 COMPONENTS/MATERIALS

A. Stiles, Panels, Doors, and Screens shall all be manufactured from Solid Color Reinforced Composite material.

B. Toilet Partition Material

1. Toilet partitions shall be constructed of Solid Color Reinforced Composite material, which is composed of dyes, organic fibrous material, and polycarbonate/phenolic resins. Material shall have a non-ghosting, graffiti-resistant surface integrally bonded to core through a series of manufacturing steps requiring thermal and mechanical pressure. Edges of material shall be the same color as the surface.
2. Subject to compliance with the material performance requirements, toilet partitions manufactured by others may be constructed from Solid Surface materials including, but not limited to:
 - a. Dupont Corian Privacy Plus Partitions.
 - b. WilsonArt Solid Surface.
3. Toilet partitions constructed of High-Density Polyethylene (HDPE) or High-Density Polypropylene will not be acceptable.

C. Finish Thickness

1. Stiles and doors shall be 3/4" (19 mm).
2. Panels and benches shall be 1/2" (13 mm).

D. Hardware

1. All hardware shall be Bobrick "1092.67DS Optional Institutional Hardware". Where Specifications and/or Drawings conflict with Bobrick "1092.67 Optional Institutional Hardware" requirements, the Bobrick "1092.67 Optional Institutional Hardware" requirements shall prevail.
2. Provide optional Door Plate Bobrick Part No. 1002510 at top and bottom of each partition door.
3. All hardware to be 18-8, type-304 stainless steel with satin finish.
4. Hardware of chrome-plated "Zamak", aluminum, or plastic is unacceptable.

E. Latch

1. Sliding door latch shall be 14 gauge (2 mm) and shall slide on nylon track.
2. Sliding door latch shall require less than 5-lb force to operate. Twisting latch operation will not be acceptable.
3. Latch track shall be attached to door by machine screws into factory-installed threaded brass inserts.
4. Threaded brass inserts shall be factory installed for door hinge and latch connections and shall withstand a direct pull exceeding 1,500 lbs. per insert.

5. Through bolted, stainless steel, pin-in-head Torx sex bolt fasteners shall be used at latch keeper-to-stile connections and shall withstand direct pull force exceeding 1,500 lbs. per fastener.

F. Hinges

1. Hinge shall be 16-gauge (1.6-mm) continuous piano hinge.
2. All doors shall be equipped with self-closing hinge.
3. Continuous piano hinge shall be attached to door and stile by theft-resistant, pin-in-head Torx stainless steel machine screws into factory-installed, threaded brass inserts
4. Fasteners secured directly into the core are not acceptable.
5. Door shall be furnished with two 11-gauge (3-mm) stainless steel door stop plates with attached rubber bumpers to resist door from being kicked in/out beyond stile.
6. Door stops and hinges shall be secured with stainless steel, pin-in-head Torx machine screws into threaded brass inserts.
7. Threaded brass inserts shall withstand a direct pull force exceeding 1,500 lbs per insert.

G. Mounting Bracket

1. Mounting brackets shall be 18-gauge (1.2- mm) stainless steel and extend full height of panel.
2. U-channels shall be furnished to secure panels to stiles.
3. Angle brackets shall be furnished to secure stiles to walls and panels to walls.
4. Fasteners at locations connecting panels-to-stiles shall utilize through bolted, stainless steel, pin-in-head Torx sex bolt fasteners. Through-bolted fasteners shall withstand direct pull force exceeding 1,500 lbs. per fastener.
5. Wall mounted urinal screen brackets shall be 11 gauge (3 mm) double thickness.

- H. Leveling Device shall be 7-gauge, 3/16" (5-mm) hot rolled steel bar; chromate-treated and zinc-plated; through-bolted to base of solid color reinforced composite stile.

- I. Stile Shoe shall be one-piece, 4" (102-mm) high, type-304, 22-gauge (0.8-mm) stainless steel with satin finish. Top shall have 90° return to stile. Shoe will be composed of one-piece of stainless steel and capable of being fastened (by clip) to stiles starting at wall line.

- J. Headrail (Overhead Braced) shall be satin finish, extruded anodized aluminum (.125" / 3-mm thick) with anti-grip profile.

- K. Full-Height Post: At all partition panels over 5'-0" in unsupported length, provide a full-height 1-1/4"x1-1/4" stainless-steel post, Bobrick Part No. 1000070 and Anchor Package Part No. 1002703. Provide floor and ceiling saddles. Fasteners into concrete floor shall be stainless steel. The panel shall be anchored to post to help eliminate side to side flex of the panel. At locations where post is taller than 8'-0" and/or is in a high vandalism area, provide custom stainless steel post with slip-joint as detailed on drawings.

- L. Grab Bar Anchors for Toilet Partitions: At all locations as shown on drawings where grab bars are mounted on partition system, provide Bobrick 2586 Series stainless steel backing plate.

G. Coat Hook

1. Coat Hook shall Bobrick Model B-233 and be constructed of stainless steel and shall project no more than 1-1/8" (29 mm) from face of door.
 2. Coat hook shall be secured by to door by through-bolted, theft-resistant, pin-in-head Torx stainless steel screws. Through-bolted fasteners shall withstand a direct pull force exceeding 1,500 lbs. per fastener.
 3. Coat Hook shall act as door bumper on in-swing doors.
 4. Mounting height = 48" maximum above finished floor.
- H. Door Pull: Accessible stall door shall have a compliant loop or U-shaped door pull on inside and outside of door immediately below latch.
- I. Door Bumpers: Provide wall door bumper for all doors where partition door will impact wall finish. Wall bumper shall be equal to Trimco, Model No. 1270CVPV. Mount on wall at height to match partition door handle.

2.04 FABRICATION

- A. Vandal-Resistant Hardware Option: for Institutional Hardware option add suffix .67 to 1092 Series.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Check areas scheduled to receive compartments for correct dimensions, plumbness of walls, and soundness of surfaces that would affect installation of mounting brackets.
- B. Verify spacing of plumbing fixtures to assure compatibility with installation of compartments.
- C. Do not begin installation of compartments until conditions are satisfactory.

3.02 ERECTION

- A. Install compartments rigidly, straight, plumb, and level and in accordance with manufacturer's installation instructions.
- B. Installation methods shall conform to manufacturer's recommendation for backing and proper support.
- C. Conceal evidence of drilling, cutting, and fitting to room finish.
- D. Maintain uniform clearance at vertical edge of doors.
- F. Attach panel brackets securely to walls using anchor devices. All anchors shall be into solid wood blocking. No plastic expansion sleeves will be accepted.
- G. Attach panels and pilasters to bracket with through-sleeve tamperproof bolts and nuts.

- H. Anchor urinal screen panels to walls with continuous panel brackets. At free end, provide full-height post as noted in Paragraph 2.03-K.
- I. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster. Conceal floor fastenings with pilaster shoes.
- J. Equip each door with one hinge, one door latch, and one coat hook and bumper.
- K. Install door strike and keeper with door bumper on each pilaster in alignment with door latch.
- L. Adjust hinges to locate doors in partial opening position when unlatched. Return outswing doors to close position.
- M. Contractor shall install backing/blocking as required for secure attachment.
- N. Confirm all locations of full-height post and provide blocking in ceiling space. Contractor shall open ceiling as required to install 4x4 blocking for attachment of post.
- O. At locations of grab bars mounted on partition system, Contractor shall carefully measure and drill panels for grab bar anchors.
- P. Where full-height stainless steel brackets extend above ceramic tile wainscot, provide plywood shim between wall and bracket to act as spacer. Shim shall be narrower than brackets to allow for sealant joint. After shim installation, provide sealant joint between wall and bracket to completely enclose edge of plywood.

3.03 ADJUSTMENT AND CLEANING

- A. Adjust hardware for proper operation after installation.
- B. Set hinge cam on in-swinging doors to hold doors open when unlatched.
- C. Set hinge cam on out-swinging doors to hold unlatched doors in closed position.
- D. Clean exposed surfaces of compartments, hardware, and fittings.
- E. Remove protective masking's. Clean surfaces.
- F. Field touch-up of scratches or damaged enamel finish will not be permitted.
- G. Replace damaged or scratched materials with new materials.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND WASHROOM ACCESSORIES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Toilet and washroom accessories.
2. Framed mirror units.
3. Concealed anchor devices and backing plate reinforcements furnished to other Sections.
4. Attachment hardware.

B. Related Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 09 29 00: Gypsum Board.
3. Section 09 30 13 - Ceramic Tiling
4. Section 10 21 13: Toilet Compartments and Cubicles.

1.02 REFERENCES

- A. ADAAG - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.
- B. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.
- C. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- D. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- E. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

1.03 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00. Provide product data on accessories describing size, finish, details of function, attachment methods.
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements

1. Conform to CBC, California Building Code, (CCR) Title 24, Part 2, and ADAAG or accessibility requirements.
2. Structural strength of grab bars, shower seats, fasteners and mounting devices shall conform to requirements of the CBC, California Building Code, (CCR) Title 24, Part 2, Section 1115B.8.3 and shall withstand the application of a 250 lb. point load.

B. Coordination

1. Coordinate the work of this Section under provisions of Section 01 31 00.
2. Coordinate the work of this Section with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Bobrick Washroom Equipment, Inc., www.bobrick.com. (District standard)
- B. American Specialties, Inc. (ASI), www.americanspecialties.com.
- C. Bradley Corporation, www.bradleycorp.com.
- D. Deb.
- E. EXCEL Dryer.
- F. TORK.
- G. Substitutions: Under provisions of Section 01 33 00.

2.02 MATERIALS

- A. Sheet Steel.
- B. Stainless Steel Sheet: Type 304.
- C. Tubing: ASTM A269, stainless steel, Type 304.
- D. Adhesive: Two component epoxy type waterproof.
- E. Fasteners, Screws, and Bolts: Hot dip galvanized, tamperproof.
- F. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from single sheet of stock, free of joints.
- C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- D. Back paint components where contact is made with building finishes to prevent electrolysis.
- E. Shop assemble components and package complete with anchors and fittings.
- F. Provide steel anchor plates, adapters, and anchor components for installation:
- G. Hot dip galvanize exposed and painted ferrous metal and fastening devices.
- H. Toilet tissue dispensers located in accessible toilet rooms or stalls shall not have their flow restricted and shall be capable of continuous flow.

2.04 FINISHES

- A. Galvanizing: ASTM A123 to 1.25 oz/sq yd.
- B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- C. Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats electrostatic baked enamel.
- D. Chrome/Nickel Plating: ASTM B456, Type SC 2 satin finish.
- E. Stainless Steel: No. 4 satin luster finish.
- F. Mirror Glass: FS DD-G-451 Type I, Class 1, Quality of 2, 1/4 inch thick with silver coating, copper protective coating and non-metallic paint coating complying with FS DD-M-411.
- G. Stainless Steel Mirror: Type 430, 20 gage, bright annealed stainless steel.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that site conditions are ready to receive work and dimensions are as instructed by the manufacturer.
- B. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site at appropriate time for building-in.
- B. Provide templates and rough-in measurements as required.
- C. Verify exact location of accessories for installation.

3.03 INSTALLATION

- A. Install fixtures, accessories and items in accordance with manufacturers' instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Accessories required to be accessible shall be mounted at heights according to CBC Section 1115B.9 and as indicated on the drawings.
- D. Toilet paper dispensers and feminine napkin dispensers located on the grab bar side of an accessible toilet room or stall shall not project more than 3 inches from the finished surface of the wall nor be located closer than 1-1/2 inches clear of the tangent point of the grab bar.
- E. Contractor shall install all necessary blocking, backing, and recessed openings for all toilet accessories.
- F. At locations where grab bars are mounted to toilet partition material, provide optional anchor device, Bobrick #2586 at each flange.
- G. Toilet Seat Cover Dispensers: Provide at staff toilet rooms or stalls, and at gender neutral toilet rooms only. Do not provide at student toilet rooms or stalls.
- H. Sanitary Napkin Disposal: Provide at staff toilet rooms or stalls, at gender neutral toilet rooms, high school girls toilet rooms, and middle school girls toilet rooms.
- I. Hand Dryers: Extend power to location of hand dryer and provide necessary backbox for connection. Provide in-wall blocking for unit support.
- J. Keying Accessories
 - 1. Supply two keys for each accessory to Owner.
 - 2. Master key all accessories.

3.04 SCHEDULE

A. Soap Dispenser Foam Soap	#32084	SC Johnson Professional Stoko Refresh 800ml Refill
B. Paper Towel Dispenser	#5510282	Tork Matic.
C. Toilet Paper Dispenser	B-2888	Surface mount
D. Toilet Seat Cover Dispenser	B-221	Surface Mounted
E. Feminine Napkin Disposal	B-270	Surface mount
F. Feminine Napkin Dispenser	B-2706	Surface Mount for modernization projects
G. Grab bars	B-6808	42" Length

TOILET, BATH, AND WASHROOM ACCESSORIES

10 28 00 - 5

H. Grab bars	B-6808	48" Length
I. Mirror(non-tilt)	B-290	Minimum size 18 inches x 36 inches
J. Electric Hand Dryer rooms	#XL-W	XLERATOR, 120V. Provide at multi-use toilet
K. Hand Dryer Recess Kit	#40502	ADA-Compliant Recess Kit
L. Hand Dryer Wall Guard	#89S	Stainless Steel

END OF SECTION

SECTION 10 51 13
METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Welded lockers.

1.2 REFERENCES

- A. ASTM A 653 – Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.

1.3 SUBMITTALS

- A. Submit shop drawings, product data and manufacturer's installation instructions under provisions of Section 01 33 00.
- B. Include locker types, sizes, configurations, layout of groups of lockers, accessories, and numbering plan.
- C. Verify locker lay-out with actual conditions, including base alignment, clearance dimensions, and related criteria.
- D. Provide two samples 3 x 6 inches of each color selected on actual base material.

1.4 PROTECTION

- A. Store and protect lockers under provisions of Section 01 60 00.
- B. Protect locker finishes and adjacent surfaces from damage during installation.

1.5 GUARANTEE

- A. Manufacturers Guarantee: Provide Owner with manufacturers written guarantee complying with the following criteria
 - 1. Type: Unlimited dollar amount of recovery for labor and material necessary to restore lockers to original condition, in accordance with manufacturers published warranty and limitations.
 - 2. Term: Lifetime.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Welded Lockers

1. Basis-of-Design Product: Subject to compliance with requirements, provide DeBourgh Mfg. Co.; All American Corridor or comparable product by one of the following:
 - a. Lyon Workspace Products, LLC; Integrated Frame All-Welded (IFAW)
 - b. DeBourgh Mfg. Co.
 - c. Penco Products, Inc; All-Welded Defiant
2. Material: Prime, high-grade Class 1 mild annealed, cold-rolled steel free from surface imperfections. A.S.T.M.-A1008. Galvannealed steel available for high humidity atmospheres. A.S.T.M.-A653. Bolts to be zinc plated or subjected to other rust-retardant treatment.
3. General Construction: All lockers shall be pre-assembled, with all seams and joints welded for rigidity and durability.
4. Body: Assembled by welding body components together. Fabricated from unperforated steel sheet of 16-gauge steel, flanged to give double thickness of metal at back vertical corners. 18-gauge backs.
 - a. Provide finished end panels.
5. Door Frame: 16-gauge formed steel channels. Vertical members shall have an additional flange to form continuous door strike. Corners shall be lapped and welded into a rigid assembly. Bottom cross members shall have tang at each end that fits through slot in rear flange of upright frame member to prevent twisting out of alignment. Top and bottom cross members shall provide support for front edge of locker top and locker bottom.
6. Door - One-piece, 14-gauge steel on double and triple tier with both vertical edges formed into channel-shaped formation; top and bottom shall be flanged at 90 degree angle. The hinge side shall be formed into channel shaped formation with other three sides flanged at 90 degree angle.
 - a. Ventilation - Doors shall be punched with diamond shaped perforations.
 - b. Fit with nylon lockbar guides to reduce clanging and provide smoother, quieter operation.
7. Door Jambs - Double tier and triple tier lockers shall have two jambs welded to side of door frames to engage locking device. Design and gauge of jamb shall prevent freeing of locking device by prying. Each jamb shall have easily replaceable soft rubber bumper.
8. Hinges - Shall be not less than 2" high, .050" steel, 5 knuckle, full loop design forming double thickness on each leaf. Hinges to be set in slot in door and frame and projection welded to frame and securely attached to door. Hinge pin to be spun over at ends to resist removal. All hinges on right hand side of door.
9. Handle: Recessed lift with Built-in padlock loop shall be 4-1/8"w x 6-1/16"h x 1-1/4"d.
 - a. Accessible Lockers:
 - 1) Provide handle where door can be opened without a twisting or clasp motion.

- 2) Provide accessory shelving at no lower than 15" above finished floor.
10. Finish: Baked enamel or powder coat.
 - a. Color: X7 True Navy.
- B. Equipment: Provide each locker with an identification plate and the following equipment:
 1. Double and triple tier units: One double-prong ceiling hook and two single-prong wall hooks.
- C. Locks: Not provided

2.2 FABRICATION

- A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.
- C. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds smooth and flush.
- D. Accessible Lockers: Fabricate as follows:
 1. Locate bottom shelf no lower than 15 inches above the floor.
 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.
- E. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install lockers level, plumb, and true; shim as required, using concealed shims.
 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 2. Anchor metal lockers to walls near top and bottom of lockers of lockers and to concrete curbs.
- B. Welded Lockers: Connect groups together with manufacturer's standard fasteners, with no exposed fasteners on face frames.
- C. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
 1. Attach filler panels with concealed fasteners.

END OF SECTION

**SECTION 11 40 00
FOODSERVICE EQUIPMENT**

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This section includes furnishing all labor and material required to provide and deliver all Food Service Equipment herein specified into the building, uncrate, assemble, set-in-place, level and completely install, exclusive of final utility connections.
- B. Furnish all material and labor required to completely provide, deliver and install all Food Service Equipment as specified herein and as shown on the drawings. This work shall be in strict accordance with the plans and specifications with all dimensions verified in the field prior to any fabrication.
 - 1. Coordinate the Food Service Equipment work with the respective trades performing preparatory work for the installation of the Food Service Equipment.
 - 2. Comply with all Federal, State and Municipal regulations which bear on the execution of this project. Food Service aisles shall be a minimum of 36" wide and tray slides shall be mounted at 34" maximum above the finished floor.
- C. WORK INCLUDES:
 - 1. Materials shown on the Food Service Equipment Schedule.
 - 2. Piping, valves, and plumbing accessories that are integral within the equipment.
 - 3. Furnishing control devices such as solenoid valves that are not integral with the equipment, for installation by Mechanical Division 15 and/or Electrical Division 16.
 - 4. Wiring, wiring devices, controls and mechanical accessories that are integral in the equipment.
 - 5. Ventilating ducts, flues, controls and mechanical accessories that are integral in the equipment.
 - 6. Anchors, fasteners, fillers and sealants for mounting equipment securely in place.

7. Cooperation with all other contractors on the job including the furnishing of information in the form of drawings, wiring diagrams and other data.

8. Touch-up painting after the installation of the Food Service Equipment.

D. RELATED SECTIONS INCLUDE THE FOLLOWING:

1. Mechanical

2. Electrical

1.03 QUALITY ASSURANCE

A. QUALIFICATIONS:

1. Installer: Regularly engaged in providing Food Service Equipment from manufacturers of this type of equipment a minimum of five (5) years with at least five (5) installations of this size and type that are at least each three (3) years old.

B. STANDARD OF MANUFACTURE

1. Food Service Equipment that is specified as "custom" having no manufacture name or model number shall be manufactured by a Food Service Equipment Fabricator with at least five (5) years of experience with engineering, design and fabrication of Food Service Equipment. The manufacture shall be subject to the review of the Architect and/or Consultant and shall be approved by the National Sanitation Foundation. All fabricated equipment shall be constructed in strict compliance with the latest standards of the National Sanitation Foundation and shall bear the mark of the National Sanitation Foundation in full compliance with all applicable codes and ordinances.

2. All electrically heated or operated equipment shall bear the seal of approval of the Under Writers Laboratories and shall comply with the National Electrical Code and all local Codes and Ordinances.

3. All Food Service Equipment that is specified as "buy-out" having a specific manufacture name and model number shall comply with the latest editions of the National Sanitation Foundation.

4. All gas-heated or operated equipment shall bear the seal of approval of the American Gas Association (AGA).

5. All steam heated, or operated equipment shall conform to the standard of the American Society of Mechanical Engineers (ASME) and shall be ASME approved.

6. Food shields and sneeze guards shall meet all the requirements of National Sanitation Foundation (NSF) Standard 2.

1.04 SUBMITTALS

A. SHOP DRAWINGS / EQUIPMENT BROCHURES

1. No ordering or fabrication of equipment shall take place until such time as the Equipment Brochures and Shop Drawings have been reviewed in writing by the Architect and/or Consultant. Receipt of this review shall not relieve the Contractor from the responsibility of verifying all quantities and related dimensions, maintaining the specified quality of equipment, and verifying conditions of the job site.
2. Equipment Brochures; within twenty (20) calendar days after award of the contract, submittals in the form of PDF containing Manufacturers specification sheets, dimensioned drawings and/or other pertinent data describing all items of standard manufacture shall be submitted for review by the Architect and/or Consultant. Sheets with the notation "Fabricated Item" and name of the fabricated item, as well as any required mechanical, plumbing or electrical requirements shall be inserted between the Manufacturer's specification sheets describing the "buy-out" equipment; thus, giving a complete Brochure with all times accounted for. These Brochures shall have hard white covers with clear transparent overlays and locking rings. The name of the Contractor, Architect, Consultant and project clearly identified in large readable type. Failure to provide Brochures in the manner as described above will be cause for rejection of said brochures.
3. Rough-in and Equipment Location Drawings; within thirty (30) calendar days after award of the contract, submittals in the form of PDF, complete rough-in and details, electrical and plumbing services with both vertical and horizontal dimensions, from column center-lines or exterior walls for location said connection points and rough-in locations shall be submitted for review by the Architect and/or Consultant. Equipment location plans shall be drawn to scale of not less than $1/4" = 1'-0"$ and include a schedule of equipment clearly identifying all items. Minimum drawings size shall be 24"x 36".
4. Shop Drawings; within thirty (30) calendar days after award of the contract, submittals in the form of PDF of shop fabrication drawings shall be submitted for review by the Architect and/or Consultant. Plans shall be drawn to scale of not less than $1/2" = 1'-0"$. Additional plan views, elevations and sections at $3/4" = 1'-0"$ shall be supplied of all counters and tables with complete dimensions. All shop practices regarding joints, gussets, bracing, tie-downs, supports, etc. shall be clearly defined as well as gauges and quality of metals and brands and model numbers of all miscellaneous fittings, plumbing and electrical trim. The drawings shall also show locations of blocking (supplied under another sections) for all wall and ceiling mounted Food Service Equipment. Minimum drawings size shall be 24"x36".

B. SAMPLES

1. Provide all samples if specification requested.

C. SUBSTITUTIONS:

1. Manufacturer's listed in this section are used as standards for quality. All substitutions shall be approved by the Architect and/or Consultant prior to installation.

2. Refer to Division 1 - General Requirements for procedures governing substitutions.
3. Only one substitution for each item will be considered.
4. Installation of any qualified substituted equipment is the Food Service Equipment Contractor's responsibility. Including any mechanical, electrical, structural changes required for the installation of qualified substitution shall be without additional cost to the Owner.

D. DEFERRED APPROVAL ITEMS:

1. For the items identified on the Equipment List as (Deferred Approval Item), the following submittal requirements shall be provided:
 - a. Product data.
 - b. Manufacturer's recommended methods of installation coordinated with actual field conditions for anchorage to actual substrate conditions.
 - c. Shop Drawings: Indicate types, sections, gages, materials, completely dimensioned layouts and configurations, hardware, fasteners, operators and shop finishes and other required coatings. Provide calculations for all required connections.
 - d. Structural calculations, detail drawings, and all additional necessary drawings and specifications for a deferred approval shall be signed by a Structural Engineer licensed in the State of California.
 - e. Provide a copy of the Installer's Certification and a copy of the Manufacturer's written certification criteria. Provide list of a minimum of (5) five jobs installed by Installation Company with contact phone numbers of both the project's General Contractor and Owner.

1.05 DISCREPANCIES

- A. In the event of discrepancies within the Contract Documents, the Architect and/or Consultant shall be so notified within sufficient time prior to bid opening, ten (10) days to allow issuance of an addendum.
- B. In the event where time does not permit notification or clarification of discrepancies prior to the bid opening, the following shall apply: The drawings and drawing schedules shall govern in matters of quantity; the specifications in matter of quality. In the event of conflict within drawings involving quantities, or within the specifications involving quality, the greater quantity and high quality shall apply. Such discrepancies shall be noted and clarified in the contractors bid. No additional allowances will be made because of errors, ambiguities or omissions that should have been discovered during the preparation of the bid.

1.06 RESPONSIBILITY

- A. The work as specified in this division shall include; assuring that all required submittals conform to the intent and meaning of the documents, conditions at the Job Site, and all Local Codes and ordinances.
- B. Visit the Job Site to field check actual wall dimensions and utility rough-ins. Be responsible for furnishing, fabricating, and installing the equipment in accordance with the available space and utility services as they exist on the Job Site.
- C. Check all door openings, passageways, elevators, etc., to verify that the equipment can be transported to its proper location within the building. If necessary, check the possibility with the General Contractor of holding wall erection, placement of doorjambs, window, etc. for the purpose of moving equipment to its proper location.
- D. Notify the Architect and/or Consultant of any discrepancies between the plans and specification prior to fabrication of any equipment, to actual condition on the job.
- E. If any special hoisting equipment and operators are required, include cost as part of the bid for this work.

1.07 DELIVERY AND STORAGE

- A. All equipment specified herein shall be delivered to the Job Site; received and handled by the Contractor or his authorized agent. The Owner shall in no way be expected to store or handle any such equipment.
- B. All equipment shall be delivered in such a manner as to protect it against dirt, water, chemical or mechanical injury.
- C. Throughout the progress of the work, the Contractor shall keep the working area free of debris of all types resulting from his work.
- D. All packing material shall be removed from the project location by the Contractor.

1.08 COORDINATION

- A. Coordinate work with mechanical, electrical, plumbing, interiors and other trades whose work is in conjunction with equipment specified herein.

1.09 MEASUREMENTS

- A. Verify all dimensions shown on the drawings by taking field measurements at the Job Site prior to fabrication of equipment or ordering equipment. Proper fit and attachment of all parts is required and is the sole responsibility of the Food Service Contractor. If necessary, all equipment shall be fabricated so that it may be handled through finished door openings.

1.10 PRODUCT REQUIREMENTS

- A. Refer to Section 01 60 00.

1.11 GUARANTEE / WARRANTY

- A. All work shall be guaranteed by the Foodservice Equipment Contractor against all defects for a term of one (1) year from the date of notice of completion. This guarantee shall cover replacement of defective material at the Foodservice Equipment Contractor expense, including transportation and labor. This guarantee will not cover any cost for replacement of parts or work made necessary by carelessness or misuse of the equipment by others.
- B. The Food Service Equipment Contractor shall provide at his own expense the installation, start-up and service for one (1) year from the date of recording the notice of completion of the project; the replacement of all Condensing Units and other Refrigeration Devices supplied under this contract. In addition to this one (1) year free service, the Condensing Units shall have a five (5) year Compressor Warranty; said Warranty commencing at the date of completion.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Metal for construction purposes, where entirely concealed, shall be steel of wrought iron sections galvanized by the hot-drip process after fabrication. Bolts, screws, rivets, and similar attachments to this galvanized work shall be galvanized or brass. Exposed screw and rivet work shall be finished to match adjacent surfaces, flush and buffed smooth. Finished work shall be free of tool or construction marks, dents, or other imperfections; and at the completion of the work, all metal shall be gone over with a portable machine and buffed and dressed to perfect surfaces.
- B. All materials shall be new and of first grade. All gauges specified herein shall be minimum and shall be established after polishing. They shall refer to:
 - 1. U.S. Standard Gauge for sheets and plates.
 - 2. Stainless steel shall be manufactured by one of the following: Allegheny Ludlum Steel Corporation, American Rolling Mills, U.S. Steel Corporation.
- C. The Contractor will be required to furnish a certified copy of the Mill Analysis of materials to the Architect and/or Consultant.
- D. Stainless steel sheets shall conform to ASTM A240, Type 304 Condition A, 18-8 having a No. 4 finish. No.2B finish shall be acceptable on surfaces of equipment not exposed to view. All sheets shall be uniform throughout in color, finish and appearance.

- E. Stainless steel tubing and pipe shall be Type 304, 18-8, having a No. 4 finish, and shall conform to either ASTM A213 if seamless or ASTM A249 if welded.
- F. Galvanized steel shall be approved grade of copper-bearing steel sheets with a minimum copper content of 20%. All sheets to be commercial quality, stretcher leveled, bonderized and re-rolled to insure smooth surface. Galvanized steel shall not be allowed in the construction and fabrication of any "Fabricated Assembly" items.
- G. All millwork materials shall be free from defect impairing strength, durability, or appearance; straight and free from warpage; and the best grade for their particular function. All wood shall be well seasoned and kiln dried and shall have an average moisture content of 8%, a maximum of 10%, and a minimum of 5%.
- H. Plywood and other woodwork of treatable species, where required by code, shall be fire-retardant treated to result in a flame spread rating of 25 or less with no evidence of significant progressive combustion when tested for 30 minutes duration under ASTM E-84 and shall bear the testing laboratory mark on the surface to be concealed.
- I. Concealed softwood or hardwood lumber shall be of Poplar, Douglas Fir, Basswood, Red Oak, Birch, Maple, Beech or other stable wood and shall be select or better grade, unselected for color and grain, surfaced four sides, square-edged, and straight. Basswood may be used where fire-retardant treated materials are required.
- J. Face veneers shall be matched for color and grain to produce balance and continuity of character. Mineral streaks and other discolorations, wormholes, ruptured grain, loose texture, doze or shake will not be permitted. Face veneer leaves on each surface shall be full-length, book matched, center matched, and sequence matched. Surfaces shall be sequenced, and Blueprint matched. Veneers not otherwise indicated shall be plain sliced. Backing veneers for concealed surfaces shall be of a species and thickness to balance the pull of the face veneers.
- K. Hardwood plywood for painted surfaces shall conform to U.S. Product Standard PS -51-71, Type I, and shall have sound Birch, Maple or other approved close grain hardwood faces suitable for paint finish.
- L. Plastic laminate surfaces shall be laminated with thermosetting decorative sheets in the color, pattern and style as selected by the Architect. Horizontal surfaces shall be laminated with sheets conforming to Federal Specifications L-P-508F, Style D, Type I (general purpose), Grade HP, Class I, 1/16" thick, satin finish with rough sanded backs. Vertical surfaces shall be laminated with sheets conforming to Federal Specification L-P-598F, Style D, Type II (vertical surface), Grade HP, Class I, conforming, satin finish, 1/32" thick or heavier. Balance sheets for backs in concealed locations shall be .020" thick laminate backing sheets conforming to Federal Specification L-P-00508E, Style ND, Type V (backing sheet), Grade HP.
- M. Adhesive for application of plastic laminate to wood surfaces of counter tops shall be Phenetic, Resorcinol or Melamine adhesive conforming to Federal Specification MMM-A-181C and producing a waterproof bond. Adhesive for applying plastic laminate to vertical surfaces shall be either a waterproof type or a water-resistant type such as a Modified Urea Formaldehyde Resin

liquid glue conforming to Federal Specification MMM-A-188C. Contact adhesive will not be acceptable.

- N. Plate glass shall be 1/2" thick safety glass with polished edges.
- O. Sealant shall be equal to that manufactured by General Electric. Silicone construction 1200 sealant; in either clear or approved color to match surrounding surfaces.
- P. Sound deadening material shall be equal to that manufactured by H.W. Mortell Co., Kankakee, Illinois, and shall be sprayed by use of a mechanical device to a thickness of not less than 1/8" thick.

2.02 FINISHES

- A. Paint and coatings shall be of an NSF approved type suitable for use in conjunction with Food Service Equipment. Such paint or coating shall be durable, non-toxic, non-dusting, non-flaking and mildew resistant, shall comply with all governing regulations and shall be applied in accordance with the recommendations of the manufacturer.
- B. All exterior, galvanized parts, exposed members of framework where specified to be painted shall be cleaned, properly primed with rust inhibiting primer, degreased, and finished with two (2) coats of epoxy-based grey Hammertone paint, unless otherwise specified.
- C. Stainless steel, where exposed, shall be polished to a #4 commercial finish. Where unexposed, finish shall be #2B. The grain of polishing shall run in the same direction wherever possible. Where surfaces are disturbed by the fabricating process, such surfaces shall be refinished to match adjacent undisturbed surfaces.

2.03 SHOP FABRICATED EQUIPMENT CONSTRUCTION

- A. Leg stands for open base tables or dish tables shall be constructed of 1-5/8" dia. 16-gauge stainless steel tubing, with stringer and cross braces of the same material. Joints between legs and cross braces shall be welded and ground smooth. Flattened ends on tube stretchers are not permitted. Mechanical fittings are also not permitted.
 - 1. Stainless Steel Leg Sockets: Component Hardware Group, Inc. model A18-0206, or accepted equal; weld to underside of countertop framing or at bottom of enclosed cabinet unit and fastened with flush set screw locking device.
 - 2. Sanitary Type Stainless Adjustable Foot: Component Hardware Group, Inc. model A10-0851, or accepted equal
- B. Tabletops shall be 14-gauge stainless steel unless otherwise noted, with all shop seams and corners welded, ground smooth and polished. Tops of closed base fixtures shall be reinforced on the underside with a framework of 1-1/2" angles or 16-gauge stainless steel hat section; and on open pipe frames with a 4" channel at each pair of legs. The leg sockets shall be welded to this channel. The channel in turn stud welded to the top. Tops shall be reinforced so that there will

be any noticeable deflection. Unless otherwise shown on the detail drawings, metal tops shall be turned down 2", and back at 15-degree angle, with 1-1/8" turn-under, except where adjacent to walls or other pieces of equipment. The wall side shall be turned up 10" and back 2" at a 45-degree angle. Ends of this splash are to be closed. Free corner of tops shall be spherical. All tops shall have 1/8" of sound-deadening material applied to the underside by use of spray equipment in an oven, smooth application for ease in cleaning.

- C. Enclosed bases or cabinet bodies shall be of the material and gauge hereinafter specified. They shall be enclosed on the ends and sides as required. The bases shall be reinforced at the top with a framework of 1-1/2" x 1-1/2" x 1/8" stainless steel angles fully welded to the base with the stainless-steel angles 36" on center (maximum), with all corners of said framework mitered and fully welded. All vertical joints of the bases shall be fully welded, ground and polished. All free corners of enclosed bases or cabinet bodies and all corners against walls and other fixtures shall be square. In the case of fixtures fitting against or between walls, the bodies shall be set in 1" from the wall line, but the tops shall be extended back to the wall line to permit adjustment to wall irregularities. A flush fitting vertical trim strip (extension of the vertical end mullion without vertical seam of the same material as the body shall be provided at each end of the body and shall extend 1" to the wall line). These fixtures shall be constructed to set on bases or legs as hereinafter specified and shall be set in mastic in a vermin-proof manner.
- D. Shelves, mullions and aprons shall be fabricated flush with the cabinet body, welded, ground, and polished. Butt joints are not acceptable.
- E. Drawers, to be furnished with stainless steel flush pull, Component Hardware Group Inc., model number P63-1012 or equal installed into the 18-gauge double-pan drawer front panel.
 - 1. Stainless steel locks, Component Hardware Group, Inc., model number P30-4781 or equal for each drawer. All drawers are to be keyed alike.
 - 2. Stainless Steel full extension slides, Component Hardware Group, Inc., model no S52-0024 or equal. Provide two (2) per drawer. Slides to be installed so drawer will roll closed when released.
 - 3. Stainless steel removable drawer pan, Component Hardware Group, Inc., model number, S81-1520 or equal one (1) per drawer set loosely in a channel frame so it can be easily lifted out for cleaning. This supporting frame shall be welded stainless steel channel.
 - 4. Drawer face panel to be constructed of 18-gauge stainless steel double pan construction. (Single metal thickness drawer faces are not be expectable.)
- F. Hinged doors in base cabinets shall be of double pan construction, insulated and constructed of 18-gauge stainless steel. Doors shall have wire type pull Component Hardware Group Inc., model number P46-1010 or equal installed as shown in elevations. Door pulls to be NSF and ADA compliant.
- G. Interior shelves shall be solid, non-removable 16-gauge stainless steel, with ends and backs provided with a 1-1/2" high turn-up against the body of the fixture and welded to the same.

Front edge is to be turned down 1-1/2" and under 1/2", at the bottom shelf, beyond the edge of the base to prevent sagging and vermin collection.

- H. Under shelves on open tables shall be constructed of 16-gauge stainless steel, flanged down 90 degrees 1/2". The corners shall be welded to the legs. Under shelves shall be 10" from the floor. Backs shall be turned up 2".
- I. Elevated shelves shall be constructed of 16-gauge stainless steel with edges turned down in a square edge, and back 1/8"; except where shelves are adjacent to walls or other fixtures, where they shall be turned up 2". Corners shall be spherical, mounted on 14-gauge stainless steel support brackets.
- J. Sinks and drain boards shall be constructed of 14-gauge stainless steel. The working edge of the sink shall be provided with 5/8" radius sanitary rolled edge in one piece with rounded corners. The drain boards shall be made as an integral part of the sink; all vertical and horizontal corners shall be rounded with 5/8" radius; and the working front edges shall be maintained at one level, taking up the pitch of the drain boards by dropping the sink to allow for same. Depth of sink bowl shall be determined from the top bowl. Sinks shall be provided with back and end splashes with top edge flanged back 2-1/4" at 45-degree angle and attached to the building wall with "zee" clips. Splash back of sinks and drain boards shall be grained in the same direction. Suitable openings shall be cut for hot and cold-water supplies and waste outlets. All surface plumbing trim as called for on the drawings and herein specified shall be provided. Bottom of each sink bowl with center drain connection shall be fitted with a 2" lever type action waste valve mounted into the sink and made absolutely watertight. Sink bowls and drain boards shall have 1/8" of sound-deadening material underneath, spray-applied.
- K. Rivets, bolts and screws shall not be permitted in any exposed location.
- L. All welding shall be of the heliarc method with welding rod of the same composition as the parts welded. Welds shall be complete, strong, and ductile with excess metal ground off and joints finished smooth to match adjoining surfaces. Welds shall be free of mechanical imperfections and shall be continuously welded so that the fixture shall appear as one-piece construction. Butt welds made by spot solder and finished by grinding are not acceptable.
- M. All exposed joints shall be ground flush with adjoining material and finished to harmonize therein. Whenever material has been sunk or depressed by welding operation, such depressions shall be suitably hammered and peened flush with the adjoining surface and, if necessary, again ground to eliminate low spots. In all cases, the grain of rough grinding shall be removed by successive fine polishing operations.
- N. All exposed welded joints in stainless steel construction shall be suitably coated with an approved metallic-based paint.
- O. After galvanized steel members have been welded, all welds and areas where galvanizing has been damaged shall have a zinc dust coating applied.
- P. Seams shall be continuous welds flush and ground smooth.

1. Field Joints: Flush welded, ground smooth and polished on the job, solder or rivets not allowed.
2. Counter Tops: Field joints in stainless steel counter tops and drain boards butt welded with welds ground flush and smooth and polished to match original finish.
3. Pass windows: Provide a complete all welded seamless counter from inside area to the outside ledge at each pass window location. Mechanical joints, butt joints or lap joints will not be accepted.

2.04 ELECTRICAL REQUIREMENTS

- A. Standard UL listed materials, devices and components shall be selected and installed in accordance with NEMA Standards and Recommendations and as required for safe and efficient use and operation of the Food Service Equipment without objectionable noise, vibration, and sanitation problems.
- B. Motors up to and including ½ HP are to be wired for 120-volt, single phase. Fixtures totaling more than 1000 watts are to be wired for 208-volt, single-phase. Fixtures having multiple number of heating elements, can be wired for three-phase with the load balanced as equally as possible within the fixture.
- C. Heating elements having a connected load of up to and including 1000 watts are to be wired for 120-volt, single-phase. Fixtures totaling more than 1000 watts are to be wired for 208-volt, single-phase. Fixtures having multiple number of heating elements can be wired for three-phase with the load balanced as equally as possible within the fixture.
- D. Equipment where applicable shall be furnished with three-wire cord and plug.

2.05 PLUMBING TRIM, SINKS

- A. All vegetable and pot washing sinks, or other 14" deep sinks shall have Fisher Mfg. Co. Model 22209 series (2" drain size) quick opening drain. Fisher Mfg. Co. Model 60100 splash mounted faucet shall be mounted over each partition as shown on the drawings.
- B. All cook sinks, pantry sinks or other 10" or 12" deep sinks shall have Fisher Mfg. Co. Model 22209 series (2" drain size or as shown on the drawings) quick opening drain. Fisher Mfg. Co. Model 57649 faucets mounted as shown on the drawings.
- C. All Fisher Mfg., Co. faucets to be furnished as stainless steel to comply with AD1953 Standards and conform to NSF 61 Standard 9.
- D. Provide gas pressure regulators for installation by the Plumbing Contractor.
- E. FIRE SUPPRESSION GAS SHUT/OFF VALVE: Gas valve to be furnished by the Foodservice Equipment Contractor and furnished to the Plumbing Contractor for installation. Foodservice

Equipment Contractor is to verify with Plumbing Division for gas line size. Valve to be located in an accessible location and if necessary, with access panel.

2.06 HARDWARE

- A. Elevated shelf brackets shall be as shown on the Drawings.
- B. Drawer and door handles shall be as shown on the Drawings.
- C. Hinges for all metal doors shall be Klein Hardware Co. 7870 series, finished in satin chrome.

2.07 REFRIGERATION

- A. Each refrigeration items specification is written to provide minimum specifications and scope of work. Refrigeration equipment shall be designed and installed to maintain the following general temperature unless otherwise specified.

a.	Walk-In Refrigerators	1.7°C / 35°F
b.	Walk-In Freezers	-23.2°C / -10°F
c.	Reach-In Refrigerators	1.7°C / 35°F
d.	Reach-In Freezers	-23.2°C / -10°F
e.	Undercounter Refrigerators	1.7°C / 35°F
f.	Undercounter Freezers	-23.2°C / -10°F
g.	Cold Pan	5°C / 41°F

PART 3 - INSTALLATION

3.01 POSITIONING OF EQUIPMENT

- A. Installation procedure, details and scheduling shall be so arranged that the work of other contractors may progress without unnecessary delay, interference or damage.
- B. The Contractor shall do all fitting, joining, fastening, scribing, caulking and adjusting necessary to install any fixed item of equipment in its designated location; and shall locate and/or store portable, non-fixed items as directed by the Architect and/or Consultant with due regard for the security and protection from damage of the items involved.

3.02 WORKMANSHIP

- A. Commencement of work shall constitute agreement with and acceptance of all conditions as found.
- B. Equipment shall be installed as shown on the plans. Where abutting, curved or irregularly shaped angles or projecting corners of walls occur, equipment shall be made to conform. Where several pieces of equipment are to be assembled in a group, the group shall be complete as

whole, with all necessary filler or connecting pieces as may be required to make a complete, sanitary and vermin-proof group.

- C. Welded parts shall be non-porous and free of imperfections. Welds on galvanized metal shall be ground smooth, sandblasted and sprayed with molten zinc or 1200 degrees F to a thickness of .004". Tinning of welds will not be acceptable. Welds of stainless steel shall be ground and polished to the original finish and all grained in the same direction.
- D. All fixtures, unless made of stainless steel, shall be finished in sprayed lacquer in color as chosen by the architect; or if specifically stated, in "plastic laminate"; in pattern and/or color as selected by the Architect.

3.03 POST INSTALLATION PROCEDURES

- A. Prior to being offered for final acceptance, all equipment shall be thoroughly cleaned. This shall include removal of all stains, paint spots, protective wrapping and coatings, tapes, grease, oil, plaster, dust, polishing compounds, etc. and cleaning of floors in food service areas (broom clean) and signed off by the General Contractor with a copy to the Architect and/or Consultant.
- B. After installation at least ten (10) days prior to offering for acceptance, all equipment shall undergo a "Start-up" procedure by a Factory Authorized Service Dealer. Equipment is to be inspected, tested, calibrated and adjusted for normal operation conditions. If inspection or testing indicated defects, such defects shall be corrected, and the inspection and test repeated to insure a perfect operation of all equipment, prior to final acceptance and for a period ninety (90) days after final acceptance.
- C. Upon completion of the project, the Contractor shall furnish the Owner two (2) sets of Dimensional Prints, Data Sheets, Spare Parts Lists and Operating Manuals for each piece of mechanical equipment; each set shall be neatly bound in a loose-leaf binder, each set shall be complete with and Index of Equipment and with a complete List of Service Contracts with said agencies to perform these services. In addition to this list: The Contractor shall submit for review of the Architect and/or Contractor and submittal to the Owner for his files, copies of Service Contracts with said agencies to perform these services. It shall be the responsibility of this Contractor to fill out and forward all warranty forms as required.
- D. This contractor shall arrange demonstrations of the operation and maintenance of all "Buy-Out" equipment by competent instructors. These demonstrations to take place within ten (10) days prior to the acceptance of the kitchen. All instruction periods shall be scheduled with the Architect and/or Consultant fourteen (14) days prior to commencement of same, and at times convenient to the Architect and/or consultant and Owner.

PART 4 - ITEMIZED EQUIPMENT SCHEDULE

4.01 FOOD SERVICE EQUIPMENT LIST AND DESCRIPTION

- A. Fabricated Equipment: Wherever the term “Fabricated Assembly” is used within the list noted below and description of Food Service Equipment, it shall be presumed to be followed by the phrase, “constructed to the configuration, dimension, detail and design as shown on the drawings and specifications and with workmanship and materials as specified above” and shall meet the Fabrication Detail Requirements of the latest edition of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA), and National Sanitation Foundation (NSF Standard 2).
- B. All Food Service Equipment shall be installed per the “Guidelines for Seismic Restraints of Kitchen Equipment” by the Sheet Metal and Air Conditioning Contractors National Association (SMACNA).
- C. All Food Service Equipment shall comply with the standards of The California Code of Regulations, Title 24, Part No. 2.
- D. All Food Service Equipment shall comply with the current California Energy Commission Appliance Efficiency Regulations.
- E. Equipment in the following schedule is listed by Item Numbers shown on Drawings.
- F. Equipment listed is schedule as (OFCI) means Owner Furnished Contractor Installed.

1. SCHEDULED ITEMS

ITEM #4 COMBI OVEN, GAS

Quantity: One (1)

Manufacturer: RATIONAL (or equal)

Model: ICP 6-FULL ON 6-FULL NG 208/240V 1 PH

Status: CFCI

Two (2) (CC1GRRRA.0000238) iCombi Pro® 6-Full Size Combi Ovens, double stack, natural gas, (12) 18" x 26" sheet pan or (24) 12" x 20" steam pan or (12) 2/1 GN pan capacity, (6) stainless steel grids included, intelligent cooking system with (4) assistants; iDensityControl, iCookingSuite, iProductionManager, & iCareSystem, (6) operating modes, (5) cooking methods, (3) manual operating modes, 85° to 572°F temperature range, quick clean, care control, eco mode, 6-point core temperature probe, retractable hand shower, Ethernet interface, Wi-Fi enabled, 106,500 BTU each, 208/240v/60/1-ph, 6 ft. cord, 0.9 kW each, CE, IPX5, cCSAus, NSF, ENERGY STAR-®

Accessories:

- 1 ea. Model 60.75.752 Combi-Duo Universal Stacking Kit, for iCombi 6-half size or 6-full size (electric or gas) on iCombi 6-full size (gas only)
- 1 ea. Model 60.31.203 Stand I Stationary Oven Stand for Combi-Duo, 7-3/4"H, open sides, for iCombi 6-full size on 6-full size
- 1 ea. NOTE: All discounts subject to approval by manufacturer
- 1 ea. 2 years parts and labor, 5 years steam generator warranty
- 1 ea. Model CAP Chef Assistance Program, a RATIONAL certified Chef conducts 4 hours/location specialized application training with personnel, no charge
- 1 ea. Model 9999.2002 Pre-Installation Site Consultation, provides an installation consultation to ensure the site has proper space and connections for gas, electric, drain

- & water, one (1) Consultation is needed for every four (4) cooking systems, includes 100 miles (200 miles round trip). (see attached installation flyer for details) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
- 1 ea. Model 9999.2252 RCI RATIONAL Certified Installation, new certified installation for each table-top iCombi of a combi-duo, 100 miles (200 round-trip) included. (See attached installation flyer for details) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
 - 1 ea. Model 9999.1009 Extended Travel Zones, for extra distance beyond the 100 miles(200 round-trip) that is included. THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
 - 1 ea. Model 8720.1560US Installation Kit, for gas iCombi/SCC/CMP 101G (120/60/1ph); gas iCombi/SCC/CMP 62G (208-240/60/1ph); gas iCombi/SCC/CMP 61G (120/60/1ph) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
 - 1 ea. Model 1900.1150US Water Filtration Double Cartridge System, for full-size Combi-Duos or if used for more than (2) units, includes: (1) double head with pressure gauge, (2) R95-CL filter & (1) filter installation kit (for each additional unit add (1) additional head & additional cartridge. Maximum (4) cartridges)
 - 1 ea. Model 9999.2271 RCI RATIONAL Certified Installation, additional installation cost for a RATIONAL Water Filter System is available when purchased with Certified Installation of RATIONAL unit THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
 - 1 ea. NOTE: The RATIONAL Water Filtration Systems helps provide consistent high quality water to your RATIONAL cooking systems. The patented carbon block technology reduces the effects of sediment, chloramines and chlorine while providing the required flow rates
 - 1 ea. NOTE: All public water systems using surface water and most ground water systems treat with either chlorine/chloramine or chlorine dioxide (EPA will allow levels as high as 4ppm safe for drinking water, exceeding our maximum level of .2ppm.
 - 1 ea. Free Water Testing Kits are available (contact factory for info)
 - 1 ea. Model 56.01.535 Active Green Cleaner Tabs, for all iCombi Pro/Classic, 150 pieces/bucket (minimum order quantity- 2 ea, unless ordered with a unit) (NET)
 - 1 ea. Model 56.00.562 Care Tabs, bucket of 150 packets for all iCombi Pro/Classic models and SelfCooking Center® units from 10/2008, with CareControl - Serial SG, SH or SI series (minimum order quantity: 2pcs, unless ordered with a unit) (NET)
 - 1 ea. Safety Door Lock, prevents rapid door opening, requires 2-step pressing of door handle (can be retrofitted in field)
 - 1 ea. Model 60.75.769 Heat Shield, for left side panel, type 6-full size Pro/Classic

END SECTION

SECTION 22 00 50

BASIC PLUMBING MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Flexible joints.
2. Insulation.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. This Section is a part of each Division 22 Section.

1.03 ADDITIONAL REQUIREMENTS

- A. Furnish and install any incidental work not shown or specified which is necessary to provide a complete and workable system.
- B. Make all temporary connections required to maintain services during the course of this Contract without additional cost to the Owner. Notify the Owner seven days in advance before disturbing any service.
- C. Plumbing work done under this contract shall not adversely affect the operation of the existing plumbing systems.

1.04 REFERENCES AND STANDARDS

- A. Where material or equipment is specified to conform to referenced standards, it shall be assumed that the most recent edition of the standard in effect at the time of bid shall be used.
 1. CSA – Canadian Standards Association International.
 2. ANSI - American National Standards Institute.
 3. ASTM - American Society for Testing and Materials.
 4. CCR - California Code of Regulations.
 - a. Title 8 - Division of Industrial Safety, Subchapter 7; General Industry Safety Orders, Articles 31 through 36.
 5. NCPWB - National Certified Pipe Welding Bureau.

6. CEC - California Electrical Code.
 7. NEMA - National Electrical Manufacturers' Association.
 8. NFPA - National Fire Protection Association.
 9. OSHA - Occupational Safety and Health Act.
 10. UL - Underwriters' Laboratories, Inc.
- B. Requirements of Regulatory Agencies:
1. The publications listed below form part of this specification; comply with provisions of these publications except as otherwise shown or specified.
 - a. California Building Code, 2022.
 - b. California Electrical Code, 2022.
 - c. California Energy Code, 2022.
 - d. California Fire Code, 2022.
 - e. California Green Building Standards Code, 2022.
 - f. California Mechanical Code, 2022.
 - g. California Plumbing Code, 2022.
 - h. California Code of Regulations, Title 24.
 - i. California Health and Safety Code.
 - j. CAL-OSHA.
 - k. California State Fire Marshal, Title 19 CCR.
 - l. National Fire Protection Association.
 - m. Occupational Safety and Health Administration.
 - n. Other applicable state laws.
 2. Nothing in Drawings or specifications shall be construed to permit work not conforming to these codes, or to requirements of authorities having jurisdiction. It is not the intent of Drawings or specifications to repeat requirements of codes except where necessary for clarity.

1.05 DRAWINGS

- A. Examine Contract Documents prior to bidding of work and report discrepancies in writing to Architect.

- B. Drawings showing location of equipment and materials are diagrammatic and job conditions will not always permit installation in location shown. The Plumbing Drawings show general arrangement of equipment and materials, etc., and shall be followed as closely as existing conditions, actual building construction, and work of other trades permit.
 - 1. Architectural and Structural Drawings shall be considered part of the Work. These Drawings furnish Contractor with information relating to design and construction of the Project. Architectural Drawings take precedence over Plumbing Drawings.
 - 2. Because of the small scale of Plumbing Drawings, not all offsets, fittings, and accessories required are shown. Investigate structural and finish conditions affecting the Work and arrange Work accordingly. Provide offsets, fittings, and accessories required to meet conditions. Inform Architect immediately when job conditions do not permit installation of equipment and materials in the locations shown. Obtain the Architects approval prior to relocation of equipment and materials.
 - 3. Relocate equipment and materials installed without prior approval of the Architect. Remove and relocate equipment and materials at Contactors' expense upon Architects' direction.
 - 4. Minor changes in locations of equipment, piping, etc., from locations shown shall be made when directed by the Architect at no additional cost to the Owner providing such change is ordered before such items of work, or work directly connected to same are installed and providing no additional material is required.
- C. Execute work mentioned in Specifications and not shown on Drawings, or vice versa, the same as if specifically mentioned or shown in both.

1.06 FEES AND PERMITS

- A. Obtain and pay for all permits and service required in installation of this work; arrange for required inspections and secure approvals from authorities having jurisdiction. Comply with requirements of Division 01.
- B. Arrange for utility connections and pay charges incurred, including excess service charges.
 - 1. Bear the cost of construction related to utility services, from point of connection to utility services shown on Contract Documents. This includes piping, excavation, backfill, meters, boxes, check valves, backflow prevention devices, general service valves, concrete work, and the like, whether or not Work is performed by Contractor, local water/sanitation district, public utility, other governmental agencies or agencies' assigns.
- C. Coordination:
 - 1. General:
 - a. Coordinate plumbing Work with trades covered in other Specifications Sections to provide a complete, operable and sanitary installation of the highest quality workmanship.
 - 2. Electrical Coordination:

- a. Refer to the Electrical Drawings and Specifications, Division 26, for service voltage and power feed wiring for equipment specified under this section. Contractor has full responsibility for the following items of work:
 - 1) Review the Electrical Drawings and Division 26 Specifications to verify that electrical services provided are adequate and compatible with equipment requirements.
 - 2) If additional electrical services are required above that indicated on Electrical Drawings and in Division 26, such as more control interlock conductors, larger feeder, or separate 120 volt control power source, include cost to furnish and install additional electrical services as part of the bid.
 - 3) Prior to proceeding with installation of additional electrical work, submit detailed drawings indicating exact scope of additional electrical work.
3. Mechanical Coordination:
 - a. Arrange for pipe spaces, chases, slots and openings in building structure during progress of construction, to accommodate mechanical system installation.
 - b. Coordinate installation of supporting devices. Set sleeves in poured-in-place concrete and other structural components during progress of construction.
 - c. Coordinate requirements for access panels and doors for mechanical items requiring access where concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."
 - d. Coordinate with other trades equipment locations, pipe, duct and conduit runs, electrical outlets and fixtures, air inlets and outlets, and structural and architectural features. Provide information on location of piping and seismic bracing to other trades as required for a completely coordinated project.

1.07 SUBMITTALS - GENERAL

- A. Refer to Division 01 Submittals Section(s) for additional requirements.
- B. Submittal packages may be submitted via email as PDF electronic files, or as printed packages. PDFs shall be legible at actual size (100 percent). Provide seven copies of printed submittal packages.
- C. Provide submittal of materials proposed for use as part of this Project. Product names in Specifications and on Drawings are used as standards of quality. Furnish standard items on specified equipment at no extra cost to the Contract regardless of disposition of submittal data. Other materials or methods shall not be used unless approved in writing by Architect. Architect's review will be required even though "or equal" or synonymous terms are used.
 1. Partial or incomplete submittals will not be considered.
 2. Quantities are Contractor's responsibility and will not be reviewed.
 3. Provide materials of the same brand or manufacturer for each class of equipment or material.

4. Identify each item by manufacturer, brand, trade name, number, size, rating, or other data necessary to properly identify and review materials and equipment. Words "as specified" are not sufficient identification.
5. Identify each submittal item by reference to items' Specification Section number and paragraph, by Drawing and detail number, and by unit tag number.
6. Organize submittals in same sequence as in Specification Sections.
7. Show physical arrangement, construction details, finishes, materials used in fabrications, provisions for piping entrance, access requirements for installation and maintenance, physical size, mechanical characteristics, foundation and support details, and weight.
 - a. Submit Shop Drawings, performance curves, and other pertinent data, showing size and capacity of proposed materials.
 - b. Specifically indicate, by drawn detail or note, that equipment complies with each specifically stated requirement of Contract Documents.
 - c. Drawings shall be drawn to scale and dimensioned (except schematic diagrams). Drawings may be prepared by vendor but must be submitted as instruments of Contractor, thoroughly checked and signed by Contractor before submission to Architect for review.
 - d. Catalog cuts and published material may be included with supplemental scaled drawings.
- D. Review of submittals will be only for general conformance with design concept and general compliance with information given in Contract Documents. Review will not include quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with work of other trades, or construction safety precautions, which are sole responsibility of Contractor. Review of a component of an assembly does not indicate acceptance of an assembly. Deviations from Contract Documents not clearly identified by Contractor are Contractor's responsibility and will not be reviewed by Architect.
- E. Within reasonable time after award of contract and in ample time to avoid delay of construction, submit to Architect Shop Drawings or submittals on all items of equipment and materials provided. Provide submittal in at least seven copies and in complete package.
 1. Shop Drawings and submittals shall include Specification Section, Paragraph number, and Drawing unit symbol or detail number for reference. Organize submittals into booklets for each Specification section and submit in loose-leaf binders with index. Deviations from the Contract Documents shall be prominently displayed in the front of the submittal package and referenced to the applicable Contract requirement.
- F. Furnish to the Project Inspector complete installation instructions on material and equipment before starting installation.

1.08 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data and installation instructions for plumbing systems materials and products.

- B. Shop Drawings.
- C. Sustainable Design Submittals:
 - 1. Product Data: For adhesives and sealants, documentation of compliance including printed statement of VOC content and chemical components.
 - 2. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.
- D. Pipe, pipe or plumbing fittings, fixtures, solder and flux installed in a system providing water for human consumption shall comply with lead free requirements of the California Health and Safety Code Section 11 68 75. Provide submittal information for products third-party certified by an approved laboratory as complying with California Health and Safety Code Section 11 68 75.
- E. Delegated-Design Submittals: For seismic supports, anchorages, restraints, and vibration isolators indicated to comply with performance requirements and design criteria.
 - 1. Calculations performed for use in selection of seismic supports, anchorages, and restraints shall utilize criteria indicated in Structural Contract Documents.
 - 2. Include design calculations and details for selecting vibration isolators and vibration isolation bases complying with performance requirements, design criteria, and analysis data signed and sealed by the California registered structural engineer responsible for their preparation.
 - 3. Supports, anchorages and restraints for piping, ductwork, and equipment shall be an HCAI pre-approved system such as TOLCO, ISAT, Mason, or equal. Pipes, ducts and equipment shall be seismically restrained in accordance with requirements of current edition of California Building Code. System shall have current OPM number and shall meet additional requirements of authority having jurisdiction. Provide supporting documentation required by the reviewing authority and the Architect and Engineer. Provide layout drawings showing piping, ductwork and restraint locations.
 - a. Bracing of Piping and Equipment: Specifically state how bracing attachment to structure is accomplished. Provide shop drawings indicating seismic restraints, including details of anchorage to building. In-line equipment must be braced independently of piping, and in conformance with applicable building codes. Provide calculations to show that pre-approval numbers have been correctly applied in accordance with general information notes of pre-approval documentation. Gas pipe bracing shall be designed in accordance with California Building Code Section 1615A.1.22 and ASCE 7-10 Section 13.6. Coefficient $I_p = 1.5$ shall be used for gas piping bracing calculations.
 - b. In lieu of the above or for non-standard installations not covered in the above pre-approved systems, Contractor shall provide layout drawings showing piping, ductwork, and restraint locations, and detail supports, attachments and restraints, and furnish supporting calculations and legible details sealed by a California registered structural engineer, in accordance with 2016 California Building Code
 - 4. Additional Requirements: In addition to the above, conform to all state and local requirements.

1.09 INFORMATIONAL SUBMITTALS

- A. Provide layouts for plumbing systems, for inclusion in coordinated layout specified in Section 23 80 00. Comply with requirements for layouts specified in Section 23 80 00.

1.10 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. Refer to Division 01 for complete instructions.
2. Furnish three complete sets of Operation and Maintenance Manual bound in hardboard binder, and one compact disc containing complete Operation and Maintenance Manual in searchable PDF format. Provide Table of Contents. Provide index tabs for each piece of equipment in binder and disc. Begin compiling data upon approval of submittals.
 - a. Sets shall incorporate the following:
 - 1) Product Data.
 - 2) Shop Drawings.
 - 3) Record Drawings.
 - 4) Service telephone number, address and contact person for each category of equipment or system.
 - 5) Complete operating and maintenance instructions for each item of plumbing equipment and systems.
 - 6) Copies of guarantees/warranties for each item of equipment and systems.
 - 7) Test data and system balancing reports.
 - 8) Typewritten maintenance instructions for each item of equipment listing lubricants to be used, frequency of lubrication, inspections required, adjustment, etc.
 - 9) Manufacturers' bulletins with parts numbers, instructions, etc., for each item of equipment.
 - 10) Control diagrams and literature.
 - 11) A complete list or schedule of all scheduled valves giving the number of the valve, location and the rooms or area controlled by the valve. Identify each valve with a permanently attached metal tag stamped with number to match schedule. Post list in frame under plastic on wall in mechanical room or where directed by Architect.
 - 12) Check test and start reports for each piece of plumbing equipment provided as part of the Work.
 - 13) Commissioning and Preliminary Operation Tests required as part of the Work.

- b. Post service telephone numbers and/or addresses in an appropriate place as designated by the Architect.
- B. Record Drawings:
1. Refer to Division 01, Record Documents, for requirements governing Work specified herein.
 2. Upon completion of the work, deliver to Architect the following:
 - a. Originals of drawings showing the Work exactly as installed.
 - b. One complete set of reproducible drawings showing the Work exactly as installed.
 - c. One compact disc with complete set of drawings in PDF format showing the Work exactly as installed.
 - d. Provide Contractor's signature, verifying accuracy of record drawings.
 - e. Obtain the signature of the Project Inspector for all record drawings.

1.11 SUBSTITUTIONS

- A. Refer to Division 01 for complete instructions. Requirements given below are in addition to or are intended to amplify Division 01 requirements. In the case of conflict between requirements given herein and those of Division 01, Division 01 requirements shall apply.
- B. It is the responsibility of Contractor to assume costs incurred because of additional work and or changes required to incorporate proposed substitute into the Project. Refer to Division 01 for complete instructions.
- C. Substitutions will be interpreted to be all manufacturers other than those specifically listed in the Contract Documents by brand name, model or catalog number.
- D. Only one request for substitution will be considered for each item of equipment or material.
- E. Substitution requests shall include the following:
 1. Reason for substitution request.
 2. Complete submittal information as described herein; see "Submittals."
 3. Coordinated scale layout drawings depicting position of substituted equipment in relation to other work, with required clearances for operation, maintenance and replacement.
 4. List optional features required for substituted equipment to meet functional requirements of the system as indicated in Contract Documents.
 5. Explanation of impact on connected utilities.
 6. Explanation of impact on structural supports.

- F. Installation of reviewed substitution is the Contractors' responsibility. Any mechanical, electrical, structural, or other changes required for installation of reviewed substituted equipment or material must be made by the Contractor without additional cost to the Owner. Review by the Architect of the substituted equipment or material, including dimensioned Drawings will not waive these requirements.
- G. Contractor may be required to compensate the Architect for costs related to substituted equipment or material.

1.12 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of plumbing systems products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with plumbing systems work similar to that required for this Project.
- C. California Health and Safety Code Compliance: For products covered under the scope of HSC 116875 for potable water service. Products for potable water service shall be third-party certified by an approved laboratory as complying with California Health and Safety Code Section 11 68 75.
- D. Comply with applicable portions of California Plumbing Code pertaining to selection and installation of plumbing materials and products.
- E. All materials and products shall be new and shall match existing.

1.13 DELIVERY, STORAGE, AND HANDLING

- A. Protect equipment and piping delivered to Project site from weather, humidity and temperature variations, dirt, dust and other contaminants.

1.14 FIELD CONDITIONS

- A. Contractor shall visit Project site and examine existing conditions in order to become familiar with Project scope. Verify dimensions shown on Drawings at Project site. Bring discrepancies to the attention of Architect. Failure to examine Project site shall not constitute basis for claims for additional work because of lack of knowledge or location of hidden conditions that affect Project scope.
- B. Information on Drawings relative to existing conditions is approximate. Deviations from Drawings necessary during progress of construction to conform to actual conditions shall be approved by the Architect and shall be made without additional cost to the Owner. The Contractor shall be held responsible for damage caused to existing services. Promptly notify the Architect if services are found which are not shown on Drawings.

1.15 WARRANTY

- A. Refer to Division 01 for warranty requirements, and duration and effective date of Contractor's Standard Guarantee.

- B. Repair or replace defective work, material, or part that appears within the warranty period, including damage caused by leaks.
- C. On failure to comply with the warranty requirements within a reasonable length of time after notification is given, the Architect/Owner shall have the repairs made at the Contractor's expense.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Materials or equipment of the same type shall be of the same brand wherever possible. All materials shall be new and in first class condition.
- B. All sizes, capacities, and efficiency ratings shown are minimum, except that gas capacity is maximum available.
- C. Refer to Sections 22 10 00 and 23 80 00 for specific system piping materials.

2.02 MATERIALS AND PRODUCTS

- A. No material installed as part of this Work shall contain asbestos.
- B. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).

2.03 PIPE GUIDES

- A. Where flexible connections are indicated on Drawings, provide Metraflex style IV, B-Line, or equal, pipe guides in locations recommended by manufacturer. Maximum spacing from flexible connection to first pipe guide is 4 pipe diameters, and maximum spacing from second pipe guide is 14 pipe diameters.

2.04 EQUIPMENT IDENTIFICATION

- A. Identify each piece of equipment with a permanently attached engraved bakelite plate, 1/2 inch high white letters on black background.

2.05 PIPE IDENTIFICATION

- A. Identify each piping system and indicate the direction of flow by means of Seton, Inc., Marking Services Inc., Reef Industries, Inc., or equal, pre-tensioned, coiled semi-rigid plastic pipe labels formed to circumference of pipe, requiring no fasteners or adhesive for attachment to pipe.
- B. The legends and flow arrows shall conform to ASME A13.1.

2.06 INSULATION WORK

- A. General:
 - 1. For insulating domestic hot water pumps, refer to Section 22 50 00, Plumbing Equipment,

2. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).
 3. Adhesives and sealants shall comply with testing and product requirements of South Coast Air Quality Management District, Rule 1168.
 4. The term "piping" used herein includes pipe, valves, strainers and fittings.
 5. Apply insulating cement to fittings, valves and strainers and trowel smooth to the thickness of adjacent covering. Cover with jacket to match piping. Extend covering on valves up to the bonnet. Leave strainer cleanout plugs accessible.
 6. Provide pre-formed PVC valve and fitting covers.
 7. Provide Calcium Silicate rigid insulation and sheet metal sleeve, 18 inch minimum length at each pipe hanger. Seal ends of insulation to make vapor tight with jacket.
 8. Test insulation, jackets and lap-seal adhesives as a composite product and confirm flame spread of not more than 25 and a smoke developed rating of not more than 50 when tested in accordance with UL723 or ASTM E84.
 9. Clean thoroughly, test and have approved, all piping and equipment before installing insulation and/or covering.
 10. Repair all damage to existing pipe and equipment insulation whether or not caused during the work of this contract, to match existing adjacent insulation for thickness and finish, but conforming to flame spread and smoke ratings specified above.
- B. Insulation of Piping:
1. Insulate domestic hot and tempered water with minimum 3-1/2 pounds per cubic foot density fiberglass with ASJ-SSL jacket. Insulation thickness shall be the following:
 - a. Pipe 3/4 inches and smaller: 1 inch thick.
 - b. Pipe 1 inch through 1-1/2 inches: 1-1/2 inches thick.
 - c. Pipe 2 inches and larger: 2 inches thick.
 2. Insulate domestic hot water piping under slab on grade with Owens Corning Foamglas, preformed pipe insulation, or equal. Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Cover pipe and fittings with insulation manufacturer's recommended jacketing. Insulation thickness shall be the following:
 - a. Pipe 3/4 inches and smaller: 2 inches thick.
 - b. Pipe 1 inch and larger: 3 inches thick.
 3. Insulate domestic cold water piping located within building, outside of insulation envelope in outside walls, vented attic spaces, and unheated spaces, including equipment rooms and below

raised floor with 1 inch thick molded fiberglass, minimum 3-1/2 pound per cubic foot density, with ASJ-SSL jacket.

4. Insulate domestic cold water piping located outside building exposed to weather with minimum 3-1/2 pounds per cubic foot density fiberglass with ASJ-SSL jacket. Insulation thickness for all pipe sizes: 2 inches.
5. Insulate roof drain and overflow drain bodies, horizontal sections of rainwater leader piping and overflow piping, and condensate drains within the building envelope with 1 inch thick fiberglass, minimum 3-1/2 pound per cubic foot density, with ASJ-SSL jacket.
6. Insulate condensate drain piping in freezer with 3/4 inch thick Therma-Cel, Armaflex, or equal. Seal water tight per manufacturer's directions. Install heat tape prior to insulation of piping, in accordance with manufacturer's directions.

PART 3 - EXECUTION

3.01 EXISTING MATERIALS

- A. Remove existing equipment, piping, wiring, construction, etc., which interferes with Work of this Contract. Promptly return to service upon completion of work in the area. Replace items damaged by Contractor with new material to match existing.
- B. Removed materials which will not be re-installed and which are not claimed by Owner shall become property of Contractor and shall be removed from Project site. Consult Owner before removing any material from Project site. Carefully remove materials claimed by Owner to prevent damage and deliver to Owner-designated storage location.
- C. Existing piping and wiring not reused and are concealed in building construction may be abandoned in place and all ends shall be capped or plugged. Remove unused piping and wiring exposed in Equipment Rooms or occupied spaces. Material shall be removed from Project premises. Disconnect power, water, gas, pump or any other active energy source from piping or electrical service prior to abandoning in place.
- D. Existing piping, ductwork, and equipment modified or altered as part of this Work shall comply with the most recent applicable code requirements.

3.02 FRAMING, CUTTING AND PATCHING

- A. Special framing, recesses, chases and backing for Work of this Section, unless otherwise specified, are covered under other Specification Sections.
- B. Contractor is responsible for placement of pipe sleeves, hangers, inserts, supports, and location of openings for the Work.
- C. Cutting, patching, and repairing of existing construction to permit installation of equipment, and materials is the responsibility of Contractor. Repair or replace damage to existing work with skilled mechanics for each trade.
- D. Cut existing concrete construction with a concrete saw. Do not utilize pneumatic devices.

- E. Core openings through existing construction for passage of new piping and conduits. Cut holes of minimum diameter to suit size of pipe and associated insulation installed. Coordinate with building structure, and obtain Structural Engineer's approval prior to coring through existing construction.

3.03 PLUMBING DEMOLITION

- A. Refer to Division 01 Sections "Cutting and Patching" and "Selective Demolition" for general demolition requirements and procedures.
- B. Disconnect, dismantle and remove mechanical systems, equipment, and components indicated to be removed. Coordinate with all other trades.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping to remain with same or compatible piping material. Refrigerant system must be evacuated per EPA requirements.
 - 3. Equipment to Be Removed: Drain down and cap remaining services and remove equipment.
 - 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.04 ELECTRICAL REQUIREMENTS

- A. Provide adequate working space around electrical equipment in compliance with the California Electrical Code. Coordinate the Mechanical Work with the Electrical Work to comply.
- B. Furnish necessary control diagrams and instructions for the controls. Before permitting operation of any equipment which is furnished, installed, or modified under this Section, review all associated electrical work, including overload protection devices, and assume complete responsibility for the correctness of the electrical connections and protective devices. Motors and control equipment shall conform to the Standards of the National Electrical Manufacturers' Association. All equipment and connections exposed to the weather shall be NEMA IIR with factory-wired strip heaters in each starter enclosure and temperature control panel where required to inhibit condensation.
- C. All line voltage and low voltage wiring and conduit associated with the Temperature Control System are included in this Section. Wiring and conduit shall comply with Division 26.

3.05 PIPING SYSTEM REQUIREMENTS

- A. Drawing plans, schematic and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

3.06 PRIMING AND PAINTING

- A. Perform priming and painting on the equipment and materials as specified herein.
- B. See Division 09 Painting Section(s) for detailed requirements.
- C. Priming and Painting:
 - 1. Exposed ferrous metals, including piping, which are not galvanized or factory-finished shall be primed and painted.
 - a. Black Steel Piping:
 - 1) Primer: One coat gray Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, comparable products by Rust-Oleum, Kelly Moore, or equal.
 - 2) Topcoat: Two coats gray Sherwin-Williams Pro Industrial Waterbased Alkyd Urethane Enamel, comparable products by Rust-Oleum, Kelly Moore, or equal.
 - 2. Metal surfaces of items to be jacketed or insulated except piping shall be given two coats of primer unless furnished with equivalent factory finish. Items to be primed shall be properly cleaned by effective means free of rust, dirt, scale, grease and other deleterious matter and then primed with the best available grade of zinc rich primer. After erection or installation, all primed surfaces shall be properly cleaned of any foreign or deleterious matter that might impair proper bonding of subsequent paint coatings. Any abrasion or other damage to the shop or field prime coat shall be properly repaired and touched up with the same material used for the original priming.
 - 3. Where equipment is provided with nameplate data, the nameplate shall be masked off prior to painting. When painting is completed, remove masking material.

3.07 PIPING SYSTEMS INSTALLATION

- A. At time of final connection, and prior to opening valve to allow pressurization of water and gas piping from existing systems, on site or off site, perform a pressure test to indicate static pressure of existing systems. If pressure on water piping is greater than 80 psi, or gas pressure is not as indicated on Contract Documents, inform Architect immediately. Do not allow piping systems to be pressurized without written consent of the Architect.
- B. General:
 - 1. All piping shall be concealed unless shown or otherwise directed. Allow sufficient space for ceiling panel removal.
 - 2. Installation of piping shall be made with appropriate fittings. Bending of piping will not be accepted.
 - 3. Install piping to permit application of insulation and to allow valve servicing.

4. Where piping or conduit is left exposed within a room, the same shall be run true to plumb, horizontal, or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.
 5. Horizontal runs of pipes and/or electrical conduit suspended from ceilings shall provide for a maximum headroom clearance. The clearance shall not be less than 6'-6" without written approval from the Architect.
 6. Close ends of pipe immediately after installation. Leave closure in place until removal is necessary for completion of installation.
 7. Each piping system shall be thoroughly flushed and proved clean before connection to equipment.
 8. Pipe the discharge of each relief valve, air vent, backflow preventer, and similar device to floor sink or drain.
 9. Install exposed polished or enameled connections with special care showing no tool marks or threads at fittings.
 10. Install horizontal valves with valve stem above horizontal.
 11. Use reducing fittings; bushings shall not be allowed. Use eccentric reducing fittings wherever necessary to provide free drainage of lines and passage of air.
 12. Verify final equipment locations for roughing-in.
 13. Service Markers: Mark the location of each plugged or capped pipe with a 4 inch round by 30 inch long concrete marker, set flush with finish grade. Provide 2-1/2 inch diameter engraved brass plate as part of monument marker.
 14. Furnish and install anchors or thrust blocks on PVC water lines in the ground, at all changes in direction of piping, and at all connections or branches from mains 1-1/2 inch and larger. Form anchors or thrust blocks by pouring concrete between pipe and trench wall. Thrust blocks shall be of adequate size and so placed as to take thrusts created by maximum internal water pressure. Sizing and placement shall be per manufacturer's recommendations, CPC, and IAPMO installation standards. Anchor piping to building construction.
 15. Sanitary Sewer and Storm Drain: Grade piping inside building uniformly 1/4 inch per foot if possible but not less than 1/8 inch per foot. Run piping as straight as possible. Make piping connections between building piping and outside service pipe with cast iron reducers or increasers. Slope sewers uniformly between given elevations where invert elevations are shown.
 16. Where piping is installed in walls within one inch of the face of stud, provide a 16 gauge sheet metal shield plate on the face of the stud. The shield plate shall extend a minimum of 1-1/2 inches beyond the outside diameter of the pipe.
- C. Sleeves:
1. Install Adjus-to-Crete, Pipeline Seal and Insulator, or equal, pipe sleeves of sufficient size to allow for free motion of pipe, 24 gauge galvanized steel. The space between pipe and sleeves

through floor slabs on ground, through outside walls above or below grade, through roof, and other locations as directed shall be caulked with oakum and mastic and made watertight. The space between pipe and sleeve and between sleeve and slab or wall shall be sealed watertight.

2. At Contractor's option, Link-Seal, Metraflex Metraseal, or equal, casing seals may be used in lieu of caulking. Wrap pipes through slabs on grade with 1 inch thick fiberglass insulation to completely isolate the pipe from the concrete.
- D. Floor, Wall, and Ceiling Plates:
1. Fit all pipes with or without insulation passing through walls, floors, or ceilings, and all hanger rods penetrating finished ceilings with chrome-plated or stainless escutcheon plates.
- E. Firestopping:
1. Pack the annular space between the pipe sleeves and the pipe through all floors and walls with UL listed fire stop, and sealed at the ends. All pipe penetrations shall be UL listed, Hilti, 3M Pro-Set, or equal.
 - a. Install fire caulking behind mechanical services installed within fire rated walls, to maintain continuous rating of wall construction.
 2. Provide SpecSeal Systems UL fire rated sleeve/coupling penetrators for each pipe penetration or fixture opening passing through floors, walls, partitions or floor/ceiling assemblies. All Penetrators shall comply with UL Fire Resistance Directory (Latest Edition), and in accordance with Chapter 7, CBC requirements.
 3. Sleeve penetrators shall have a built in anchor ring for waterproofing and anchoring into concrete pours or use the special fit cored hole penetrator for cored holes.
 4. Copper and steel piping shall have SpecSeal plugs on both sides of the penetrator to reduce noise and to provide waterproofing.
 5. All above Systems to be installed in strict accordance with manufacturer's instructions.
 6. Alternate firestopping systems are acceptable if approved equal. However, any deviation from the above specification requires the Contractor to be responsible for determining the suitability of the proposed products and their intended use, and the Contractor shall assume all risks and liabilities whatsoever in connection therewith.
- F. Flashing:
1. For all other types of roofing system, furnish and install around each pipe, where it passes through roof, a flashing and counterflashing. All flashing shall be made of four pound seamless sheet lead with 6 inch minimum skirt and steel reinforced boot. Counterflashing shall be cast iron. For vents, provide vandalproof top and flashing combination. Elmdor/Stoneman Model 1100-4, 1100-5, 1100-7, or equal.
- G. Hangers and Supports:

1. General: Support equipment and piping so that it is firmly held in place by approved iron hangers and supports and special hangers. Hanger and support components shall support weight of equipment and pipe, fluid, and pipe insulation based on spacing between supports with minimum factor of safety of five based on ultimate strength of material used. Do not exceed manufacturer's load rating. Pipe attachments or hangers, of same size as pipe or tubing on which used, or nearest available. Rigidly fasten hose faucets, fixture stops, compressed air outlets, and similar items to the building construction. The Architect shall approve hanger material before installation. Do not support piping with plumbers' tape, wire rope, wood, or other makeshift devices. Where building structural members do not match piping support spacing, provide "bridging" support members firmly attached to building structural members in a fashion approved by the structural engineer.
 - a. Materials, design, and type numbers per Manufacturers' Standardization Society (MSS), Standard Practice (SP)-58.
 - 1) Provide copper-plated or felt-lined hangers for use on copper tubing.
2. Hanger components shall be provided by one manufacturer: B-Line, Grinnell, Unistrut, Badger, or equal.
3. Riser clamps: B-line model B3373, or equal.
4. Pipe Hanger and Support Placement and Spacing:
 - a. Vertical piping support spacing: Provide riser clamps for piping, above each floor, in contact with the floor. Provide support at joints, branches, and horizontal offsets. Provide additional support for vertical piping, spaced at or within the following maximum limits:

<u>Pipe Diameter</u>	<u>Steel Threaded or Welded (Note 3)</u>	<u>Steel Gas</u>	<u>Copper Brazed or Soldered (Note 3)</u>	<u>CPVC & PVC (Note 2)</u>
1/2 - 1"	12 ft.	6 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
1-1/4 - 2"	12 ft.	Each Floor, Not to Exceed 10 ft.	Each Floor, Not to Exceed 10 ft..	Base and Each Floor (Note 1)
2-1/2 - 3"	12 ft.	Each Floor, Not to Exceed 10 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
Over 4"	12 ft.	Each Floor, Not to Exceed 10 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)

- 1) Note 1: Provide mid-story guides.
 - 2) Note 2: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
 - 3) Note 3: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.
- b. Vertical cast iron piping support spacing: Base and each floor not to exceed 15 feet.
- c. Horizontal piping, hanger and support spacing: Locate hangers and supports at each change of direction, within one foot of elbow, and spaced at or within following maximum limits:

<u>Pipe Diameter</u>	<u>Steel Threaded or Welded (Note 2)</u>	<u>Steel Gas</u>	<u>Copper Brazed or Soldered (Notes 2, 3)</u>	<u>CPVC & PVC (Note 1)</u>
1/2 - 1"	6 ft.	6 ft.	5 ft.	3 ft.
1-1/4 - 2"	7 ft.	10 ft.	6 ft.	4 ft.
2-1/2 - 3"	10 ft.	10 ft.	10 ft.	4 ft.
Over 4"	10 ft.	10 ft.	10 ft.	4 ft.

- 1) Note 1: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
 - 2) Note 2: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.
 - 3) Note 3: Includes all refrigerant piping, including vapor and hot gas pipes.
- d. Horizontal cast iron piping support spacing:
- 1) Support piping at every other joint for piping length of less than 4 feet.
 - 2) For piping longer than 4 feet, provide support on each side of the coupling, within 18 inches of each joint.
 - 3) Hanger shall not be installed on the coupling.
 - 4) Provide support at each horizontal branch connection.
 - 5) Provide sway brace at 40 foot maximum spacing for suspended pipe with no-hub joints, except where a lesser spacing is required by the seismic design criteria used in delegated design for seismic systems. Refer to Article, Submittals.
 - 6) Provide a brace on each side of a change in direction of 90 degrees or more.

5. Suspended Piping:

- a. Individually suspended piping: B-Line B3690 J-Hanger or B3100 Clevis, complete with threaded rod, or equal. All hangers on supply and return piping handling heating hot water or steam shall have a swing connector at point of support.

<u>Pipe Size</u>	<u>Rod Size Diameter</u>
2" and Smaller	3/8"
2-1/2" to 3-1/2"	1/2"
4" to 5"	5/8"
6"	3/4"

- b. Trapeze Suspension: B-Line 1-5/8 inch width channel in accordance with manufacturer's published load ratings. No deflection to exceed 1/180 of a span.
- c. Trapeze Supporting Rods: Shall have a safety factor of five; securely anchor to building structure.
- d. Pipe Clamps and Straps: B-Line B2000, B2400; isolate copper pipe with two thicknesses of 2 inches wide 10-mil polyvinyl tape. Where used for seismic support systems, provide B-Line B2400 series pipe straps.

6. Support to Structure:

- a. Wood Structure: Provide and install wood blocking as required to suit structure. Provide lag screws or through bolts with length to suit requirements, and with size (diameter) to match the size of hanger rods required.

- 1) Do not install Lag screws in tension without written review and acceptance by Structural Engineer.

Side Beam Angle Clip	B-Line B3062---MSS Type 34
Side Beam Angle Clip	B-Line B3060
Ceiling Flange	B-Line B3199

- 2) Blocking for support of piping shall be not less than 2 inch thick for piping up to 2 inch size. Provide 3 inch blocking for piping up through 5 inch size, and 4 inch blocking for larger piping. Provide support for blocking in accordance with Structural Engineers requirements.
- 3) Where lag screws are used, length of screw shall be 1/2 inch less than the wood blocking. Pre-drill starter holes for each lag screw.

7. Rubber Neoprene Pipe Isolators:
 - a. Pipe isolators shall comprise an internal rubber or neoprene material that isolates pipe from hanger and structure. Install at all piping located in acoustical walls. Refer to Architectural Drawings for location of acoustical walls.
 - b. Isolation material shall be either a rubber or neoprene material that prevents contact between the pipe and the structure. The rubber shall have between a 45 to 55 durometer rating and a minimum thickness of 1/2 inch.
 - c. Acceptable Suppliers:
 - 1) Vertical runs: Acousto-Plumb or equal.
 - 2) Horizontal runs: B-Line, Vibraclamp; Acousto-Plumb or equal.
8. Provide support for piping through roof, arranged to anchor piping solidly in place at the roof penetration.
9. Provide rigid insulation and a 12 inch long, 18 gauge galvanized sheet iron shield between the covering and the hanger whenever hangers are installed on the outside of the pipe covering.
10. Insulate copper tubing from ferrous materials and hangers with two thicknesses of 3 inch wide, 10 mil polyvinyl tape wrapped around pipe.
11. Provide a support or hanger close to each change of direction of pipe either horizontal or vertical and as near as possible to concentrated loads.
12. Suspend rods from concrete inserts with removable nuts where suspended from concrete decks. Power actuated inserts will not be allowed.

3.08 UNION AND FLANGE INSTALLATION

- A. Install Watts, Epco, Nibco, or equal, dielectric unions or flanges at points of connection between copper or brass piping or material and steel or cast iron pipe or material except in drain, waste, vent, or rainwater piping. Bushings or couplings shall not be used. Dielectric unions installed in potable water systems shall conform to the lead-free requirements of the California Health and Safety Code Section 11 68 75.
- B. Install unions in piping NPS 2" and smaller, and flanges in piping NPS 2-1/2" and larger whether shown or not at each connection to all equipment and tanks, and at all connections to all automatic valves, such as temperature control valves. Unions installed in potable water systems shall conform to the lead-free requirements of the California Health and Safety Code Section 11 68 75.
- C. Locate the unions for easy removal of the equipment, tank, or valve.

3.09 PIPE PROTECTION

- A. Wrap bare galvanized and black steel pipe buried in the ground and to 6" above grade, including piping in conduit, with one of the following, or equal:

1. Polyethylene Coating: Pressure sensitive polyethylene coating, "X-Tru-Coat" as manufactured by Pipe Line Service Corporation or "Green Line" wrap as manufactured by Royston Products, or equal.
 - a. Field Joints and Fittings: Protecto Wrap #1170 tape as manufactured by Pipe Line Service Corporation, or Primer #200 tape by Royston Products, or equal. Installation shall be as per manufacturer's recommendation and instructions.
2. Tape Wrap: Pressure-sensitive polyvinyl chloride tape, "Transtex #V-10 or V-20", "Scotchwrap 50", Slipknot 100, PASCO Specialty & Mfg., Inc., or equal, with continuous identification. Tape shall be a minimum of 20 mils thick for fittings and irregular surfaces, two wraps, 50 percent overlap, 40 mils total thickness. Tape shall be laminated with a suitable adhesive; widths as recommended by the manufacturer for the pipe size. Wrap straight lengths of piping with an approved wrapping machine.
 - B. Field Joints: Valves and Fittings: double wrap polyvinyl chloride tape as above. Provide at least two thicknesses of tape over the joint and extend a minimum of 4 inches over adjacent pipe covering. Build up with primer to match adjacent covering thickness. Width of tape of fittings shall not exceed 3 inches. Tape shall adhere tightly to all surfaces of the fittings without air pockets.
 - C. Testing: Test completed wrap of piping, including all epoxy painted piping with Tinker and Razor Co. test machine (San Gabriel, CA - 818-287-5259), Pipeline Inspection Company (Houston, TX - 713-681-5837), or equal.
 - D. Cleaning: Clean all piping thoroughly before wrapping.
 1. Inspection: Damaged or defective wraps shall be repaired as directed. No wrapped pipe shall be covered until approved by Architect.
 - E. Sleeve copper piping/tubing installed below slab with "Polywrap-C" polyethylene sleeve, as manufactured by Northtown Pipe Protection Products, or equal. Sleeve shall be a minimum of 6 mils thick, colored blue for domestic water piping and orange for other piping. Install sleeve per manufacturer's recommendations and instructions.
 - F. Sleeve copper piping/tubing installed outside building below grade with "Polywrap-C" polyethylene sleeve, as manufactured by Northtown Pipe Protection Products, or equal. Sleeve shall be a minimum of 6 mils thick, colored blue for domestic water piping. Install sleeve per manufacturer's recommendations and instructions.
 - G. Sleeve cast iron and ductile iron pipe below grade and below slab with "Polywrap" polyethylene sleeve, as manufactured by Northtown Pipe Protection Products, or equal. Sleeve shall be a minimum of 8 mils thick, colored natural. Install sleeve per manufacturer's recommendations and instructions.
 - H. Covering: No rocks or sharp edges shall be backfilled against the wrap or sleeve. When backfilling with other than sand, protect wrap with an outer wrapping of Kraft paper; leave in place during backfill.

3.10 PIPE IDENTIFICATION

- A. Provide temporary identification of each pipe installed, at the time of installation. Temporary identification shall be removed and replaced with permanent identification as part of the work.
- B. Apply the legend and flow arrow at all valve locations; at all points where the piping enters or leaves a wall, partition, cluster of piping or similar obstruction, at each change of direction and at approximately 20'-0" intervals on pipe runs. Variations or changes in locations and spacing may be made with the approval of the Architect. There shall be at least one marking in each room. Markings shall be located for maximum visibility from expected personnel approach.
- C. Wherever two or more pipes run parallel, the markings shall be supplied in the same relative location on each.
- D. Apply markings after painting and cleaning of piping and insulation is completed.

3.11 PIPING SYSTEM PRESSURE TESTING

- A. General:
 - 1. Perform operational tests under simulated or actual service conditions, including one test of complete plumbing installation with fixtures and other appliances connected.
 - 2. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
- B. Piping Systems: Test piping systems in accordance with the following requirements and applicable codes:
 - 1. Authority having jurisdiction shall witness tests of piping systems.
 - 2. Notify Architect at least seven days in advance of testing.
 - 3. All piping shall be tested at completion of roughing-in, or at other times as directed by Architect.
 - 4. Furnish necessary materials, test pumps, gases, instruments and labor required for testing.
 - 5. Isolate from system equipment that may be damaged by test pressure.
 - 6. Make connections to existing systems with flanged connection. During testing of new work, provide a slip-in plate to restrict test pressure to new systems. Remove plate and make final connection to existing system at completion of testing.
 - a. Authority having jurisdiction shall witness final connection to system.
- C. Test Schedule: No loss in pressure or visible leaks shall show after four hours at the pressures indicated.
- D. Testing of Sanitary Sewer, Drain, Vent, and Storm Drain may be done in segments in order to limit pressure to within manufacturer's recommendations. Test to 10 feet above highest point in the system.

<u>System Tested</u>	<u>Test Pressure PSI</u>	<u>Test With</u>
Sanitary Sewer, Drain, Vent	10 Ft. Hd.	Water
Storm Drain, Condensate Drains	10 Ft. Hd.	Water
Domestic Water	125	Water
Natural Gas (PE)	60	Air & Non-corrosive Leak Test Fluid
Natural Gas (Steel)	100	Air & Non-corrosive Leak Test Fluid
Compressed Air	200 lb.	Air & Non-corrosive Leak Test Fluid
Deionized Water	50	Water

1. Flush deionized water lines with deionized water after test and approval.
2. Non-corrosive leak test fluid shall be suitable for use with piping material specified, and with the type of gas conveyed by the piping system.

3.12 OPERATION OF SYSTEMS

- A. Do not operate any plumbing equipment for any purpose, temporary or permanent, until all of the following has been completed:
 1. Complete all requirements listed under "Check, Test and Start Requirements."
 2. Piping has been properly cleaned. Piping systems shall be flushed and treated prior to operation.
 3. Filters, strainers etc. are in place.
 4. Bearings have been lubricated, and alignment of rotating equipment has been checked.
 5. Equipment has been run under observation, and is operating in a satisfactory manner.
- B. Provide test and balance agency with one set of Contract Drawings, Specifications, Addenda, Change orders issued, applicable shop drawings and submittals and temperature control drawings.

3.13 CHECK, TEST AND START REQUIREMENTS

- A. An authorized representative of the equipment manufacturer shall perform check, test and start of each piece of plumbing equipment. The representative may be an employee of the equipment manufacturer, or a manufacturer-certified contractor. Submit written certification from the manufacturer stating that the representative is qualified to perform the check test and start of the equipment.

1. As part of the submittal process, provide a copy of each manufacturer's printed startup form to be used.
 2. Some items of specified equipment may require that check, test and start of equipment must be performed by the manufacturer, using manufacturer's employees. See specific equipment Articles in these Specifications for this requirement.
 3. Provide all personnel, test instruments, and equipment to properly perform the check, test and start work.
 4. When work has been completed, provide copies of reports for review, prior to final observation of work.
- B. Provide copies of the completed check, test and start report of each item of equipment, bound with the Operation and Maintenance Manual.
- C. Upon completion of the work, provide a schedule of planned maintenance for each piece of equipment. Indicate frequency of service, recommended spare parts (including filters and lubricants), and methods for adjustment and alignment of all equipment components. Provide a copy of the schedule with each operating and maintenance manual. Provide a copy of certification from the Owner's representative indicating that they have been properly instructed in maintenance requirements for the equipment installed.

3.14 PRELIMINARY OPERATIONAL REQUIREMENTS AND TESTS

- A. Prior to observation to determine final acceptance, put all mechanical systems into service and check that work required for that purpose has been done, including but not limited to the following condensed check list. Provide indexed report to tabulating the results of all work.
1. All equipment has been started, checked, lubricated and adjusted in accordance with the manufacturer's recommendations.
 2. Correct rotation of motors and ratings of overload heaters are verified.
 3. Specified filters are installed and spare filters have been turned over to Owner.
 4. All manufacturers' certificates of start-up specified have been delivered to the Owner.
 5. All equipment has been cleaned, and damaged painted finishes touched up.
 6. Missing or damaged parts have been replaced.
 7. Flushing and chemical treatment of piping systems has been completed and water treatment equipment, where specified, is in operation.
 8. Equipment labels, pipe marker labels, ceiling markers and valve tags are installed.
 9. Valve tag schedules, corrected control diagrams, sequence of operation lists and start-stop instructions have been posted.
 10. Preliminary test and balance work is complete, and reports have been forwarded for review.

11. Automatic control set points are as designated and performance of controls checks out to agree with the sequence of operation.
 12. Operation and Maintenance Manuals have been delivered and instructions to the operating personnel have been made.
- B. Prior to the observation to determine final acceptance, operate all mechanical systems as required to demonstrate that the installation and performance of these systems conform to the requirements of these specifications.
1. Operate and test all mechanical equipment and systems for a period of at least five consecutive 8 hour days to demonstrate the satisfactory overall operation of the project as a complete unit.
 2. Commence tests after preliminary balancing and adjustments to equipment have been checked. Immediately before starting tests, install air filters and lubricate all running equipment. Notify the Architect at least seven calendar days in advance of starting the above tests.
 3. During the test period, make final adjustments and balancing of equipment, systems controls, and circuits so that all are placed in first class operating condition.
 4. Where Utility District rebates are applicable, demonstrate that the systems meet the rebate program requirements.
- C. Review of Contractor's Tests:
1. All tests made by the Contractor or manufacturers' representatives are subject to observation and review by the Owner. Provide timely notice prior to start of each test, in order to allow for observation of testing. Upon the completion of all tests, provide a letter to confirm that all testing has been successful.
- D. Test Logs:
1. Maintain test logs listing the tests on all mechanical systems showing dates, items tested, inspectors' names, remarks on success or failure of the tests.
- E. Preliminary Operation:
1. The Owner reserves the right to operate portions of the plumbing system on a preliminary basis without voiding the guarantee.
- 3.15 CERTIFICATES OF INSTALLATION
- A. Contractor shall complete applicable "Certificates of Installation" forms contained in the California Building Energy Efficiency Standards and submit to the authorities having jurisdiction for approval and issuance of final occupancy permit, as described in the California Energy Code.
- 3.16 DEMONSTRATION AND TRAINING
- A. An authorized representative of the equipment manufacturer shall train Owner-designated personnel in maintenance and adjustment of equipment. The representative may be an employee of the equipment manufacturer, or a manufacturer-certified contractor. Submit written certification

from the manufacturer stating that the representative is qualified to perform the Owner training for the equipment installed.

1. As part of the submittal process, provide a training agenda outlining major topics and time allowed for each topic.
2. Some items of specified equipment require that training must be performed by the manufacturer, using manufacturer's employees. See specific equipment Articles in these Specifications for this requirement.
3. Contractor shall provide three copies of certification by Contractor that training has been completed, signed by Owner's representative, for inclusion in Operation and Maintenance Manual. Certificates shall include:
 - a. Listing of Owner-designated personnel completing training, by name and title.
 - b. Name and title of training instructor.
 - c. Date(s) of training.
 - d. List of topics covered in training sessions.
4. Refer to specific equipment Articles for minimum training period duration for each piece of equipment.

END OF SECTION

SECTION 22 10 00

PLUMBING PIPING SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Valves.
3. Domestic water piping specialties.
4. Gas piping specialties.
5. Drain and waste piping specialties.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 22 00 50 Basic Plumbing Materials and Methods.

1.03 ACTION SUBMITTALS

- A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Product Data: Submit manufacturer's technical product data and installation instructions for plumbing piping systems materials and products.

1.04 INFORMATIONAL SUBMITTALS

- A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Provide welding certificate for all gas pipe welders.
- C. Gas Pipe Installer Qualifications: Provide evidence of current qualifications for individuals performing work requiring qualifications.

1.05 CLOSEOUT SUBMITTALS

- A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Maintenance Data: Submit maintenance data and parts lists for plumbing piping systems materials and products. Include this data in Operation and Maintenance Manual.

1.06 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish to Owner, with receipt, one valve key for each key operated hydrant, bibb, or faucet installed.

1.07 QUALITY ASSURANCE

- A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Gas Pipe Installer Qualifications: Individuals performing tasks requiring qualifications under Federal and State regulations shall be qualified by the gas utility supplying Project site. The qualifications shall be current at the time of performing the Work.
- C. NFPA/ANSI Compliance: Fabricate and install natural gas systems in accordance with latest edition of NFPA 54/ANSI Z223.1 "National Fuel Gas Code."
- D. Pipe Welding: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- E. Fabricate and install natural gas systems in accordance with California Plumbing Code.
- F. Utility Compliance: Fabricate and install natural gas systems in accordance with local gas utility company requirements.

PART 2 - PRODUCTS**2.01 MATERIALS AND PRODUCTS**

- A. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Provide materials and products complying with California Plumbing Code. Where more than one type of material or product is indicated, selection from materials or products specified is Contractor's option.
- B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Plastic piping components shall be marked with "NSF-pw."

2.02 PIPE AND FITTINGS ATTACHED TO AND BELOW BUILDINGS INCLUDING 5 FEET FROM BUILDINGS

- A. Piping and fittings attached to covered walkways and corridors shall comply with the requirements of this article.
- B. Drain and Waste Pipe Above Grade: Cast iron soil pipe and fittings, asphaltic coated, conforming to ASTM A888 and Cast Iron Soil Pipe Institute Standard (CISPI) 301 and so marked. Pipe and fittings shall be as manufactured by AB&I, Charlotte, Tyler Pipe, or equal. Pipe and fittings shall be the products of a single manufacturer. At Contractor's option, vertical piping above floor from lavatories, sinks, and drinking fountains may be Schedule 40 galvanized steel pipe with black cast iron drainage fittings, or DWV weld pipe and fittings.
 - 1. Joints above grade: No-Hub pipe conforming to ASTM A888 and CISPI 301. Couplings conforming to ASTM 1277 and CISPI 310, with stainless steel bands. Provide products by ANACO-Husky, Tyler, Ideal or equal. Provide sway brace at 20'-0" maximum spacing for suspended pipe with No-Hub joints. Provide a brace on each side of a change in direction of 90 degrees or more.

Brace riser joints at each floor and at 15 foot maximum intervals (also see Specification Section 22 00 50).

- a. HCAI Projects: Provide sway brace at each joint per CBC.
- C. Drain and Waste Pipe Below Grade: Cast iron soil pipe and fittings, asphaltic coated, conforming to ASTM A888 and CISPI 301 and so marked. Pipe and fittings shall be as manufactured by AB&I, Charlotte, Tyler Pipe, or equal. Pipe and fittings shall be the products of a single manufacturer. At Contractor's option, hub and spigot cast iron soil pipe and fittings, asphaltic coated, conforming to ASTM A-74 and so marked, may be used.
1. Joints below grade: ANACO-Husky SD 4000, Clamp-All 125, or equal couplings and No-Hub fittings, meeting the requirements of FM 1680, SD Class I and ASTM C1540.
 2. Joints below grade (hub and spigot option): Neoprene gaskets conforming to ASTM C564, as manufactured by Ty-Seal, Dual-Tite, or equal.
- D. Vent Pipe:
1. 3 inch and larger: Cast iron soil pipe and fittings conforming to ASTM A888 and Cast Iron Soil Pipe Institute Standard 301 and so marked. Joints in cast iron vent pipe shall be the same as specified for cast iron waste pipe above grade.
 2. 2-1/2 inch and smaller: Cast iron soil pipe and fittings as specified for sizes 3 inch and larger, Schedule 40 galvanized steel pipe with black cast iron drainage fittings, or DWV copper pipe and fittings.
 3. Vent pipe buried in ground and to 6 inches above ground: Cast iron soil pipe and fittings conforming to ASTM A888 and Cast Iron Soil Pipe Institute Standard 301 and so marked. Joints in cast iron vent pipe shall be the same as specified for cast iron waste pipe below ground.
- E. Water Pipe (Tempered Water, Tempered Water Return, Hot Water, Hot Water Return and Cold Water): ASTM B88, Type L copper tubing, hard-temper, with wrought copper fittings. Provide full solder cup for all fittings. Capped or plugged outlets shall be Schedule 40 screwed brass. Water piping below slab: ASTM B88, Type K copper tubing, hard temper, with wrought copper fittings. At Contractor's option, pipe runs below slab having no branches may be ASTM B88, Type K annealed copper tubing without joints. See Section 22 00 50 for pipe protection requirements for below slab copper piping.
- F. Temperature and Pressure Relief Valve Piping: ASTM B88, Type L copper tubing, hard-temper, with wrought copper fittings. Provide full solder cup for all fittings. Capped or plugged outlets shall be Schedule 40 screwed brass.
- G. Gas Pipe: Schedule 40 black steel conforming to ASTM A53, with malleable iron threaded fittings above grade for piping 2 inch and smaller; welded piping below grade and for above grade piping larger than 2 inches, with Class 150 welding fittings.
1. Appliance Flexible Connectors for Indoor Equipment Without External Spring Isolation:
 - a. Contractor may choose one of the following:

- 1) Direct gas pipe connection.
 - 2) Appliance flexible connector:
 - a) Comply with ANSI Z21.24.
 - b) Polymer or hot-dipped PVC coated corrugated 304 stainless steel.
 - c) Operating-Pressure Rating: 0.5 psig.
 - d) End Fittings: Zinc-coated steel.
 - e) Maximum Length: 30 inches.
 - f) Manufacturers: Dormont, Series 30C, 31, 40C, 41, and 51, Brasscraft model ProCoat, or equal.
 - b. Provide with end connections compatible with equipment and piping system.
 - c. Equipment located in spaces normally accessible to building occupants, other than maintenance personnel, shall utilize direct gas pipe connection.
 - d. Provide anti-microbial PVC coating for use with appliances located in kitchen areas.
 2. Flexible Gas Connector for Outdoor Equipment Without External Spring Isolation:
 - a. Contractor may choose one of the following:
 - 1) Direct gas pipe connection.
 - 2) Corrugated stainless steel hose with 304 stainless steel braid covering, CSA certified. Metraflex model GASCT, Unisource Manufacturing series 400, or equal. Provide with end connections compatible with equipment and piping system.
 3. Flexible Gas Connector for Equipment with External Spring Isolation, Indoors and Outdoors:
 - a. Where Drawings indicate installation of mechanical equipment on spring isolation rails spring mounted curbs, or spring hangers, provide metal flexible connectors, Metraflex Metraloop, or equal by Unisource Mfg. Co., or Flexicraft Industries, CSA certified for 4 inches of movement in all directions.
- H. Condensate Drain Piping:
1. Inside buildings provide ASTM B88, Type L copper tubing and fittings. Provide Wye fittings with capped cleanout plug for tubing up to 1 inch size. Provide wrought or cast DWV fittings for sizes 1-1/4 inch and larger.
 2. Outside buildings provide ASTM B88, Type L copper pipe and fittings, cast iron drain pipe and fittings or Schedule 40 galvanized steel pipe and cast iron drain or vent fittings.

3. Connect condensate drains to mechanical equipment per equipment manufacturer's recommendations; provide P-trap where required. Slope piping to drain, with 1 inch in 10 foot minimum pitch. Provide di-electric couplings or unions at connections to dissimilar materials.
 4. Where Drawings indicate installation of mechanical equipment on spring isolation rails spring mounted curbs, or spring hangers, provide threaded metal connector at mechanical equipment, Metraflex Model SST, or equal by Unisource Mfg. Co., or Flexicraft Industries. Arrange flexible connection to ensure drainage of condensate, and support flexible connection at each end of connector, to ensure proper alignment.
 5. Where condensate drain P-traps are required, install trap using Wye fitting on inlet and outlet of trap. Provide cap on top of each Wye, made removable for cleaning and inspection. Drill 1/8 inch diameter hole in cap at outlet of the trap to allow venting of the system. Minimum depth of trap should be 4 inches, or as recommended by the manufacturer in printed literature.
 6. Provide cleanout tees or "Y" at each change in direction.
- I. Condensing-Type Equipment Condensate Drain Pipe: CPVC pipe and fittings conforming to ASTM D-2846.
1. Provide CPVC condensate drain pipe for condensing water heaters, furnaces, and where shown on Drawings.
 2. Piping and fittings shall be as manufactured by Spears Manufacturing, Charlotte Pipe and foundry Co., or equal.

2.03 SITE PIPING AND FITTINGS TO 5 FEET FROM BUILDINGS

- A. Gas Piping Underground: Performance Pipe, "DriscoPlex" 6500 PE 2708 (yellow), Polypipe, Inc., "Polypipe", or equal, polyethylene gas distribution pipe, ASTM D2513, ASTM D3261, and ASTM D2683 fittings with fusion welded joints. Provide piping labeled for natural gas in accordance with CPC.
1. Electrically isolate underground ferrous gas piping from the rest of the gas system with listed or approved isolation fittings installed a minimum of six inches above grade.
 2. Provide Central Plastics Corp., Perfection, or equal, anodeless, single seal riser for transition from below grade polyethylene to schedule 40 steel piping above grade. Minimum horizontal length shall be 30 inches. Minimum vertical length shall be 30 inches, or greater as required. Provide fusion connection to polyethylene pipe below grade, and screwed connection to steel pipe above grade.
- B. Gas Piping Aboveground to 30 inches Belowground: Schedule 40 black steel with beveled ends for welding, with Class 150 welding fittings. Mitering to form elbows or tees will not be permitted; where branch tee connections of welded piping are required, Bonney "Weldolet" Allied Pipe Fittings, or equal fittings may be used if the branch is one-half of the diameter of the main or less.

2.04 FIRE PROTECTION PIPING

- A. Refer to specification Section 21 10 00 "Fire Protection."

2.05 PIPE JOINING MATERIALS

- A. Refer to piping Articles in this Section for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated
 - a. Full-Face Type: For flat-face, Class 125, cast iron and cast bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast iron and steel flanges.
 - 2. AWWA C111, rubber, flat face, 1/8-inch (3.2mm) thick, unless otherwise indicated; and full-face or ring type, unless other indicated.
 - 3. Flange Bolts and Nuts: AWWA C111, carbon steel, unless otherwise indicated.
 - 4. Plastic, Pipe-Flange Gasket, Bolts and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, 100 percent lead free alloys. Include water-flushable flux according to ASTM B813.
- D. Brazing Filler Metals: AWS A5.8, BCup-5 Series, copper-phosphorus unless otherwise indicated. Sil-Fos 15, or equal.
- E. Welding Filler Metals: Comply with ASME B31.1 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- F. Solvent Cements for Joining CPVC Piping: ASTM F 493.
 - 1. CPVC solvent cement shall have VOC content of 490 g/L or less.
 - 2. Adhesive primer shall have VOC content of 550 g/L or less.
 - 3. Solvent cement and adhesive primer shall comply with testing and product requirements of South Coast Air Quality Management District, Rule 1168.

2.06 VALVES AND FITTINGS FOR POTABLE WATER SYSTEMS

- A. General:
 - 1. Provide valves and fittings conforming to lead-free requirements of California Health and Safety Code Section 11 68 75.
 - a. Provide valves listed to NSF/ANSI 61-G or NSF/ANSI 372 for valve materials for potable-water service.

- 1) Exception: Main distribution gate valves above 1-1/2 inches located underground outside building are not required to conform lead-free requirements of California Health and Safety Code Section 11 68 75.

B. Gate Valves:

1. General: Furnish valves in copper lines with adapters to suit valve/line requirements.
2. 1-1/2 inches and smaller: Minimum 200 psi CWP, bronze body, threaded bonnet, rising or non-rising stem, solid wedge, threaded or solder ends, conforming to MSS SP-80. Milwaukee UP148, UP149, Nibco T-113-LF, S-113-LF, or equal.
3. 2 inches through 3 inches: Minimum 200 psi CWP, bronze body, threaded bonnet, non-rising stem, solid wedge, threaded or solder ends, conforming to MSS SP-80. Nibco T-113-LF, S-113-LF, or equal.
4. Main distribution gate valves underground outside building above 1-1/2 inches:
 - a. Underground valves 2 inches thru 12 inches: 250 psi, iron body, Non-rising stem, bolted bonnet, resilient wedge valves, conforming to AWWA C509, equipped with operating nuts, Mueller Series 2360, Nibco F-619-RW-SON, or equal.
 - 1) Underground valves 3 inches and smaller may be furnished with operating nuts or hand-wheels, and with Ring-Tite joint ends.
 - 2) Furnish and deliver to Owner one wrench of each size required for operating underground valves.

C. Ball Valves:

1. 2 inches and smaller: 600 psi CWP, cast bronze or brass body, full port, two piece, threaded ends, and reinforced PTFE seal, conforming to MSS SP-110. Nibco T-685-80-LF, Milwaukee UPBA400, Apollo 77C-LF10, Kitz 868, or equal.
2. 2-1/2 inches: Apollo 77C-LF10, or equal.

D. Swing Check Valves:

1. Minimum 200 psi CWP, bronze or brass body, suitable for regrinding, threaded ends, conforming to MSS SP-80. Milwaukee UP509, Nibco T-413LF, Kitz 822T, or equal.

E. Butterfly Valves:

1. General: Tight closing, full lug type, with resilient seat suitable for minimum working pressure of 200 psig, conforming to MSS SP-67. Bi-direction dead end service with downstream flange removed.
2. Provide valves with the following:
 - a. Seats: suitable for 40 degrees F for cold water service and 250 degrees F for hot water service. Seats shall cover inside surface of body and extend over body ends.

- b. Bodies: ductile iron or cast iron.
 - c. Discs: Bronze or stainless steel.
 - d. Stems or Shafts: Stainless steel. Install valves with stems horizontal.
 - e. Control Handles: Suitable for locking in any position or with 10 degree or 15 degree notched throttling plates to hold valve in selected position. Provide extended necks to compensate for insulation thickness. Provide gear operator for valves 5 inches and larger.
3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
- a. 2 through 12 inches: Watts Regulator Co., model DBF-03.
- F. Silent Check Valves (for use on pump discharge):
- 1. General: Provide spring loaded check valves at pump discharge of all pumps.
 - a. 2 inches and smaller: Minimum 300 psi CWP, bronze body, Apollo 61LF, Milwaukee UP548-T, or equal.
 - b. 2-1/2 inches and larger: Class 250, cast iron body, suitable for regrinding, Mueller 103MAP, or equal.
- G. Calibrated Balancing Valves:
- 1. General: Calibrated orifice ball type rated for 400 psig maximum operating pressure and 250 degrees F. maximum operating temperature.
 - a. Body: Brass.
 - b. Ball: 304 Stainless Steel.
 - c. Seat: Glass and Carbon filled TFE.
 - d. End Connections: Threaded.
 - e. Pressure Gage connections: Integral capped readout valves with internal check valves and drain port, for use with portable pressure differential meter.
 - f. Handle Style: Dial, with memory stops to retain set position.
 - 2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. 3 Inch and Smaller: Bell & Gossett model CB, "LF" series.

2.07 VALVES AND FITTINGS FOR NON-POTABLE WATER, COMPRESSED AIR, AND GAS SYSTEMS

A. Gate Valves:

1. 2-1/2 inches and smaller: Class 150, bronze body, union bonnet, rising stem, solid wedge, threaded or solder ends, conforming to MSS SP-80. Hammond IB641, IB648, Nibco T-134, S-134, Milwaukee 1151, 1169, or equal.
 2. 3 inches and larger: Class 125, iron body, bronze mounted, bolted bonnet, non-rising stem, solid wedge, flanged ends, conforming to MSS SP-70. Hammond IR-1138, Nibco F619, Milwaukee F2882A, Stockham G-612, or equal.
 3. Underground valves 2 inches thru 12 inches: 250 psi, iron body, Non-rising stem, bolted bonnet, resilient wedge valves, conforming to AWWA C509, equipped with operating nuts, Mueller Series 2360, Nibco F-619-RW-SON, or equal.
 - a. Underground valves 3 inches and smaller may be furnished with operating nuts or hand-wheels, and with Ring-Tite joint ends.
 - b. Furnish and deliver to Owner one wrench of each size required for operating underground valves.
- B. Ball Valves:
1. 2 inches and smaller: 600 psi CWP, 150 psi SWP, cast bronze body, full port, two piece, threaded ends, and reinforced PTFE seal, conforming to MSS SP-110. Nibco T585-70, Milwaukee BA-400, Stockham T-285, or equal.
 2. 2-1/2 inches and larger: Class 150, carbon steel body, full port, two piece, stainless steel vented ball, flanged ends, and reinforced PTFE seal, conforming to MSS SP-72. Nibco F-515-CS-F-66-FS, Milwaukee F20-CS-15-F-02-GO-VB, or equal.
 3. Compressed Air Services: 600 psi CWP, 150 psi SWP, bronze body, full port, three piece, threaded ends, and reinforced PTFE seal, conforming to MSS SP-110. Nibco Model T-595-Y, Milwaukee BA-300, or equal.
- C. Swing Check Valves: Class 125 or 150, bronze body, suitable for regrinding, threaded ends, conforming to MSS SP-80. Stockham B-321, Milwaukee 509, Nibco T-433, or equal.
- D. Butterfly Valves:
1. General: Tight closing, full lug type, with resilient seat suitable for minimum working pressure of 200 psig, conforming to MSS SP-67. Bi-direction dead end service with downstream flange removed.
 2. Provide valves with the following:
 - a. Seats: Suitable for 40 degrees F for cold water service and 250 degrees F for hot water service. Seats shall cover inside surface of body and extend over body ends.
 - b. Bodies: Ductile iron or cast iron.
 - c. Discs: Bronze or stainless steel.
 - d. Stems or Shafts: Stainless steel.

- e. Control Handles: Suitable for locking in any position or with 10 degree or 15 degree notched throttling plates to hold valve in selected position. Provide extended necks to compensate for insulation thickness. Provide gear operator for valves 5 inches and larger.
3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. 2 through 12 inches: Milwaukee Valve, CL series, Nibco, Inc., Model LD2000-3, or equal.
- E. Silent Check Valves (for use on pump discharge):
 1. General: Provide spring loaded check valves at pump discharge of all pumps.
 2. 2 inches and smaller: 250 psi CWP, bronze body, Nibco Model T-480, Milwaukee 548-T, or equal.
 3. 2-1/2 inches and larger: Class 250, cast iron body, wafer style, suitable for regrinding. Nibco Model F960, Milwaukee 1400, Mueller 103MAP, or equal.
- F. Calibrated Balance Valves (Symbol CBV): Provide globe style valves for precision regulation and control rated 175 psi for sizes 2-1/2 inches through 12 inches and rated 240 psi for bronze sizes 2 inches and below. Each valve shall have two metering/test ports with internal check valves and protective caps. All valves must be equipped with visual position readout and concealed memory stops for repeatable regulation and control.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. Bell & Gossett Circuit Setter Plus.
 - b. Armstrong CBV.
 - c. Flow Design Inc. Accusetter.
 - d. Tour & Andersson.
 - e. Circuit Sensor with butterfly valve above 3 inches.
 - f. Illinois Series 5000 through 2 inches.
- G. Flow Control Valves: Automatic pressure compensating flow control valves shall be Griswold, Flow Design, Inc., or equal.

2.08 DOMESTIC WATER PIPING SPECIALTIES

- A. Potable Water Pressure-Regulating Valve:
 1. Provide pressure-regulating valves, single-seated, direct-operated type, bronze body, integral strainer, complying with requirements of ASSE Standard 1003, and the lead-free requirements of California Health and Safety Code Section 11 68 75. Size for maximum flow rate and inlet and outlet pressure indicated on Drawings.

2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. Cla-Val Company.
 - b. Watts Regulator Company.
- B. Thermostatic Water Temperature Control Valve:
1. Provide thermostatic water temperature control valve conforming to lead free requirements of California Health and Safety Code Section 11 68 75, with size as noted on Drawings, complete with union angle strainer checkstops. Valves shall be thermostatic type, with a maximum temperature setting as follows:
 2. Provide surface recessed semi-recessed mounted, white enameled or stainless steel cabinet with locking door for control valves. Including:
 - a. Control valve cabinet and valve shall be provided as a package, and include thermostatic water mixing valve, thermometer, safety checkstops, volume control valve and internal piping.
 3. Where indicated on drawings, provide a temperature alarm system, utilizing a micro-processor based controller and solid state temperature controller. Provide audible and visual indication of high and low temperature set points. Provide required hardware and wiring for a complete operating system.
 - a. Provide isolation transformer for control of the alarm system.
 - b. Provide solenoid valve and shock absorber, installed and wired to the alarm module.
 4. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. Leonard Valve Company.
 - b. Lawler Manufacturing Co., Inc.
 - c. Powers.

2.09 GAS PIPING SPECIALTIES

A. Gas Pressure Regulating Valves:

1. Provide single-stage, spring-loaded, corrosion-resistant gas pressure regulators, with die-cast aluminum or cast iron body, complying with ANSI Z21.80. Unit shall be with atmospheric vent, internal relief overpressure protection, threaded ends for 2 inches and smaller, flanged ends for 2-1/2 inches and larger. For inlet and outlet gas pressures, specific gravity, and volume flow refer to Drawings schedule.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

<u>Size</u>	<u>Manufacturer/Model</u>
1/2 inch	Elster (American, Singer) model 1213B Itron (Actaris, Slumberger, Sprague) model B42R.
3/4 thru 1-1/4inches	Elster (American, Singer) model 1813C Sensus (Ivensys, Equimeter, Rockwell) model 143-80-12 Itron (Actaris, Slumberger, Sprague) models B42R, B57R, B58R
1-1/2 thru 2 inches	Elster (American, Singer) models 1813, 1813B Sensus (Ivensys, Equimeter, Rockwell) model 243 Itron (Actaris, Slumberger, Sprague) models B43SR, B34R, B38R

2.10 DRAIN AND WASTE PIPING SPECIALTIES

A. Cleanouts:

1. General: Install cleanouts of same diameter as pipe (4 inch maximum) in all horizontal soil and waste lines where indicated and at all points of change in direction. Cleanouts shall be located not less than 18 inches from building construction so as to provide sufficient space for rodding. No horizontal run over 50 feet inside buildings or 100 feet outside buildings shall be without cleanout, whether shown on Drawings or not. Provide two-way cleanouts where indicated on drawings, and where required for satisfactory use.
 - a. Provide cleanouts in waste drop from each sink and urinal.
 - b. Provide one wrench for each size and type of cleanout used. Turn over to Owner at completion of the project, and obtain receipt. Place receipt in Operation and Maintenance Manuals.
2. Cleanouts in floor and in concrete sidewalks: Ducco Cast Iron with nickel bronze top, clamping collar and ABS plastic plug: Zurn ZN-1400-KC, or equal, with square or round top to suit floor construction.
3. Cleanouts in composition floors: Zurn ZN-1400-X-DX, or equal (nickel bronze top).
4. Cleanouts in concealed, aboveground cast-iron soil or waste lines: Zurn Z-1440A, or equal, with ABS plastic plug.
5. Cleanouts in walls: Zurn Z-1441 or Z-1443, or equal, with stainless steel cover. Provide long sweep elbow or combination wye at connection to riser and install with surface of cleanout within ½ inch of front face of finished wall.

- a. Where space does not permit the above installation, provide Zurn Z-1446, or equal, with stainless steel access cover, and vandal resistant screw.
 - b. Install face of cleanout plug within 1/2 inch of front face of finished wall.
6. Cleanouts exterior to building in landscaped areas: Zurn Z-1449-BP, or equal, cleanout ferrule with tapered bronze plug. Where located at grade, provide 18 by 18 by 6 inch concrete pad; Trowel concrete smooth and edge; set flush with finished grade.
 7. Cleanouts in drive areas: Zurn -1400-HD-KC, or equal, with heavy-duty top and ABS plastic plug.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions under which plumbing piping systems are to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected in manner acceptable to Contractor.
- B. Make all arrangements for the utilities required. Pay all costs involved in obtaining the services including gas service and meter, water meter, pressure reducing valve, access boxes, street work. Connect to site utilities. Verify the location of all services. No extra cost will be allowed if services are not as shown.
- C. Determine sanitary sewer and storm drain location and elevation at all points of connection before installing any piping. Notify Architect immediately if indicated grades cannot be maintained.
- D. At time of final connection, and prior to opening valve to allow pressurization of water and gas piping from existing systems, on site or off site, perform a pressure test to indicate static pressure of existing systems. If pressure on water piping is greater than 80 psi, or gas pressure is not as indicated on Contract Documents, inform Architect immediately. Do not allow piping systems to be pressurized without written consent of the Architect.

3.02 INSTALLATION OF WATER PIPING

- A. Run all water piping generally level, free of traps or unnecessary bends, arranged to conform to the building requirements, and to suit clearance for other mechanical work such as ducts, flues, conduits, and other work. No piping shall be installed so as to cause unusual noise from the flow of water therein under normal conditions.
- B. In freezing locations arrange water piping to drain as shown.
- C. Install piping on room side of building insulation.
- D. Check final location of rubber rings within couplings on PVC water piping with gauge or as recommended by manufacturer. Make connection to valves with cast iron adapters connected to water pipe with cast iron couplings. Furnish and install anchors or thrust blocks.
- E. For all faucets, hose bibbs, or other water outlets delivering industrial hot and/or cold water, provide a sign, permanently mounted, indicating "CAUTION: NON-POTABLE WATER, DO NOT

DRINK". Each sign shall be permanently engraved with black uppercase letters on a yellow background. Letters shall be minimum 1-1/4 inch high.

3.03 INSTALLATION OF NATURAL GAS PIPING

- A. Install natural gas piping in accordance with Division 22 Basic Plumbing Materials and Methods sections.
- B. Use sealants on metal gas piping threads that are chemically resistant to natural gas. Use sealants sparingly, and apply to only male threads of metal joints.
- C. Remove cutting and threading burrs before assembling piping.
- D. Do not install defective piping or fittings. Do not use pipe with threads that are chipped, stripped, or damaged.
- E. Plug each gas outlet, including valves, with threaded plug or cap immediately after installation and retain until continuing piping or equipment connections are completed.
- F. Ground gas piping electrically and continuously within project, and bond tightly to grounding connection.
- G. Install drip-legs in gas piping where indicated and where required by code or regulation.
 - 1. Install "Tee" fitting with bottom outlet plugged or capped at bottom of pipe risers.
 - 2. Where gas supply is connected to equipment with flexible connectors, install drip-leg in piping on downstream side of flexible connector, and install shut off valve on piping on upstream side of flexible connector.
- H. Install piping with 1/64 inch per foot (1/8 percent) downward slope in direction of flow.
- I. Install piping parallel to other piping.
- J. Paint all gas piping installed in exposed exterior locations. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods, article, Painting.
- K. Provide shutoff valve downstream of meter.
- L. Provide exterior shutoff valve at each building. Provide sign affixed to wall at valve location reading: "Gas Shut-Off." Size and location of the sign shall be as required by the Authority Having Jurisdiction. Where gas piping enters a building in more than one location, exterior shutoff valves shall have a permanently attached metal tag identifying the area served by that valve, in addition to sign on wall.
- M. Provide watertight Schedule 40 PVC conduit to protect gas piping installed below covered walk, covered driveways, and where noted on Drawings. Extend sleeve at least 12 inches beyond any area where it is required to be installed, and terminate with valve box extended to grade, and marked "GAS".
- N. Maintain minimum of 12 inch clearance between gas piping and steam piping above 200 degrees F.

3.04 PIPE JOINTS AND CONNECTIONS

A. General:

1. Cutting: Cut pipe and tubing square, remove rough edges or burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt and debris from inside and outside of pipe before assembly.
3. Boss or saddle type fittings or mechanically extracted tube joints will not be allowed.

B. Threaded Pipe: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply thread compound to external pipe threads: Rectorseal No. 5, Permatex No. 1, or equal.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

C. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

D. Joint Construction for Solvent-Cemented Plastic Piping: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.

E. Copper Pipe and Tubing (Except pneumatic control piping): All joints shall be brazed according to ASME Section IX, Welding and Brazing Qualifications, except domestic water piping 1-1/4 inches and smaller when not buried in the ground or concrete and type DWV plumbing piping may be soldered.

1. Soldered joints: Apply water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828.

F. Cast Iron Soil Pipe:

1. No-Hub fittings shall be made with a torque wrench.
2. Hub joints shall be with Ty-Seal couplings.
3. Wrought iron, steel, or copper pipe shall have a ring or part of a coupling screwed on to form a spigot end if caulked into a joint.
4. Connect cast iron sewer piping to outside service pipe with cast iron or vitrified LOP reducers or increasers as required. Caulking of smaller pipe into the larger without a reducer or increaser will not be permitted.

G. Welded Pipe:

1. Make up with oxyacetylene or electric arc process.
 2. All line welds shall be of the single "V" butt type. Welds for flanges shall be of the fillet type.
 3. Where the branch is two pipe sizes smaller than the main or smaller, Bonney Weldolets, Threadolets, Nibco, or equal, may be used in lieu of welding tees.
- H. Polyethylene and Polypropylene Pipe: Assemble with fusion joints in strict accordance with manufacturer's instructions.
- I. Flexible Connections:
1. Furnish and install Thermo Tech., Inc. F/J/R, Metraflex, or equal, flexible couplings with limiter bolts on piping connections to all equipment mounted on anti-vibration bases, on each connection to each base mounted pump and where shown. Couplings shall be suitable for pressure and type of service.
 2. Anchor piping securely on the system side of each flexible connection.

3.05 INSTALLATION OF VALVES

- A. Install valves as indicated on Drawings and in the following locations:
1. Shutoff Valves: Install on inlet of each plumbing equipment item, and on inlet of each plumbing fixture, and elsewhere as indicated.
 2. Drain Valves: Install on each plumbing equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere indicated or required to completely drain potable water system.
 3. Provide gate or globe valves on inlet and outlet of each water heater or pump.
- B. General:
1. Valves shall be full line size unless indicated otherwise on Drawings.
 2. Install horizontal valves with valve stem above horizontal, except butterfly valves.
 3. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
 4. Locate valves for easy access and provide separate support where necessary.
 5. Install valves in position to allow full stem movement.
 6. Install exposed polished or enameled connections with special care showing no tool marks or exposed threads.
 7. Butterfly valves conforming to the paragraph "Butterfly Valves" may be used in lieu of gate or globe valves for locations above grade.

8. Ball valves conforming to the paragraph "Ball Valves" may be used in lieu of gate valves for locations above grade for services 2-1/2 inches and smaller.
 9. Valves 2-1/2 inches and smaller (except ball valves) in nonferrous water piping systems may be solder joint type with bronze body and trim.
 10. Rigidly fasten hose bibbs, hydrants, fixture stops, compressed air outlets, and similar items to the building construction.
- C. Gate Valves:
1. Furnish valves in copper lines with adapters to suit valve / line requirements.
 2. Underground gate valves:
 - a. Underground valves 3 inches and smaller may be furnished with operating nuts or hand-wheels, and with Ring-Tite joint ends.
 - b. Furnish and deliver to Owner one wrench of each size required for operating underground valves.
- D. Swing Check Valves: Install in horizontal position with hinge pin level.
- E. Butterfly Valves: Install with stems horizontal.
- F. Silent Check Valves: Install in horizontal or vertical position between flanges.
- G. Calibrated Balancing Valves: Install calibrated balancing valves per manufacturers' recommendations, including requirements for straight pipe lengths at valve inlet and outlet.
- H. Gas Shut-Off Valves:
1. Provide line size ball valve in gas line to each appliance.
- I. Valve Adjustment: Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.
- 3.06 INSTALLATION OF CLEANOUTS
- A. Cleanouts: Install in piping as indicated, as required by California Plumbing Code, at each change in direction of piping greater than 45 degrees. Install at maximum intervals of 50 feet for piping 4 inches and smaller and 100 feet for larger piping inside buildings, and at base of each conductor.
 - B. Flashing Flanges: Install flashing flange and clamping device with each cleanout passing through water resistant membrane.
- 3.07 INSTALLATION OF GAS PRESSURE REGULATING VALVES
- A. Install as indicated; comply with utility requirements. In locations where regulators are installed in confined spaces, pipe atmospheric vent to outdoors, full size of outlet. Install gas shutoff valve upstream and downstream of each pressure-regulating valve.

3.08 GAS PIPING EQUIPMENT CONNECTIONS

- A. Connect gas piping to each gas-fired equipment item, with union, drip leg and shutoff gas cock full size of supply line shown. Reduce only at connection to equipment. Comply with equipment manufacturer's instructions.
 - 1. Route gas vent and gas relief to outside.
 - 2. Gas shutoff valve shall be placed as close as possible to equipment in a location where it can be serviced. Distance from equipment to valve shall not exceed 6 feet.

3.09 EQUIPMENT CONNECTIONS

- A. Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated.
- B. Mechanical Equipment Connections: Connect hot and cold water piping system and gas piping system to mechanical equipment as indicated, and provide with shutoff valve and union for each connection.

3.10 DOMESTIC WATER SYSTEM STERILIZATION

- A. Clean and disinfect new or altered hot and cold water piping connected to domestic water systems using methods prescribed by the Health Authority. If the Health Authority does not prescribe methods, clean and disinfect new or altered hot and cold water piping using methods given in the California Plumbing Code.
 - 1. A water treatment company that has a current state EPA license to apply disinfectant chlorine in potable water shall perform the procedure.

3.11 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Remove labels from stainless steel sinks, except 316 stainless steel sink labels should be retained to confirm that the correct material has been provided. Leave systems and equipment in satisfactory operating condition.

3.12 OPERATIONAL TESTS

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.13 TESTING AND BALANCING

- A. See Section 23 05 93 of Specifications for testing and balancing requirements.

3.14 CLEANING UP

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION

SECTION 22 40 00
PLUMBING FIXTURES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Water supplies and stops.
2. Plumbing fixture hangers and supports.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 22 00 50 Basic Plumbing Materials and Methods.

1.03 ACTION SUBMITTALS

- A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Product Data: Submit manufacturer's specifications for plumbing fixtures and trim, including catalog cut of each fixture type and trim item furnished.

1.04 INFORMATIONAL SUBMITTALS

- A. Refer to Section 22 00 50, Basic Plumbing Materials and Methods.

1.05 CLOSEOUT SUBMITTALS

- A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Maintenance Data: Submit maintenance data and parts lists for each fixture type and trim item, including instructions for care of finishes. Include this data in Operation and Maintenance Manual.

1.06 QUALITY ASSURANCE

- A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Plumbing Fixture Standards: Comply with applicable portions of the following codes and requirements for all work in this Section:
 1. California Building Code – CBC
 2. California Plumbing Code – CPC
 3. California Health and Safety Code

4. American National Standards Institute - ANSI
 5. Federal Standards - F.S.
 6. National Sanitary Foundation – NSF International
- C. ANSI Standards: Comply with ANSI/NSF 61, “Drinking Water System Components – Health Effects.”
- D. PDI Compliance: Comply with standards established by Plumbing and Drainage Institute pertaining to plumbing fixture supports.
- E. Americans with Disabilities Act (ADA).
- F. California Green Building Standards Code Requirements:
1. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-Type Toilets.
 2. Single Showerheads shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Showerheads.

PART 2 - PRODUCTS

2.01 PLUMBING FIXTURES

- A. General: Provide factory fabricated fixtures of type, style and material indicated. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats, and valves as indicated by their published product information; either as designed and constructed, or as recommended by the manufacturer, and as required for a complete, installation. Where more than one type is dedicated, selection is Contractor's option; but, all fixtures of same type must be furnished by single manufacturer.
1. Take special care with the roughing-in and finished plumbing where batteries of fixtures occur.
 2. Take location and mounting heights for roughing-in from Architectural Drawings.
 3. Follow schedule on Plumbing Drawings for roughing-in connections. Set roughing-in for all fixtures exactly as per measurements furnished by the manufacturers of the fixtures used.
 4. Roughing-in for lavatories and sinks shall be brought in through the wall under the centerline of the drain from the fixture wherever possible and as close to the fixture as possible.

2.02 MATERIALS

- A. Provide materials that have been selected for their surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, foundry sand holes, stains, discoloration, or other surface imperfections on finished units are not acceptable.
- B. Where fittings, trim and accessories are exposed or semi-exposed, provide, chromium plated 17 gauge seamless brass and match faucets and fittings. Provide 17 gauge seamless copper or brass where not exposed.

- C. Handles on all faucets and stops shall be all metal chromium plated.
- D. NSF Standard: Comply with NSF 61 and NSF 372 for supply-fitting materials that will be in contact with potable water.

2.03 PLUMBING FITTINGS, TRIM AND ACCESSORIES

- A. Water Outlets: At locations where water is supplied (by manual, automatic or remote control), provide commercial quality faucets, valves, or dispensing devices, of type and size indicated, and as required to operate as indicated.
 - 1. Include manual shutoff valves and connecting stem pipes to permit outlet servicing without shut-down of water supply piping systems.
- B. P-Traps: Include IAPMO approved removable P-traps where drains are indicated for direct connection to drainage system. P-Traps shall be less trap screw cleanout, and incorporate a chrome plated cast brass body, brass connection nuts, 17 gauge seamless brass wall return and chrome plated wall escutcheon to match trap finish.
- C. Carriers: Provide cast iron supports for fixtures of graphitic gray iron, ductile iron, or malleable iron as indicated. Where the carrier for wall mounted water closets are installed more than 6 inches behind the finished wall, provide water closet support for wide pipe chase.
- D. Fixture Bolt Caps: Provide manufacturer's standard exposed fixture bolt caps finished to match fixture finish.
- E. Escutcheons: Where fixture supplies and drains penetrate walls in exposed location, provide chrome-plated cast brass escutcheons with setscrews.
- F. Aerators: Provide aerators of types approved by Health Departments having jurisdiction. Delete aerators where not allowed by CPC for health care occupancies.
- G. Comply with additional fixture requirements contained in Fixture Schedule shown on the drawings.

2.04 MANUFACTURERS

- A. In accordance with California Plumbing Code, provide indelibly marked or embossed manufacturers name or logo, arranged so as to be visible after installation.
- B. Manufacturers: Drawing schedules indicate Basis of Design products. Subject to compliance with requirements, provide product indicated on Drawings, or comparable product by one of the following:
 - 1. Vitrified China Plumbing Fixtures:
 - a. American Standard, U.S. Plumbing Products.
 - b. Eljer Plumbingware Div., Wallace-Murray Corp.
 - c. Kohler Co.

- d. Vitra.
- 2. Modular Lavatories:
 - a. Bradley.
 - b. Acorn.
 - c. Willoughby Industries, Inc.
- 3. Plumbing Trim:
 - a. McGuire Manufacturing Co., Inc.
 - b. Delta Commercial.
 - c. Chicago Faucet Co.
 - d. T&S Brass and Bronze Works, Inc.
- 4. Flush Valves:
 - a. Sloan Valve Co.
 - b. Zurn Industries, Hydromechanics Div.
 - c. Toto USA, Inc.
- 5. Faucets:
 - a. Chicago Faucet Co.
 - b. Symmons Scott.
 - c. T&S Brass and Bronze Works, Inc.
 - d. Delta Commercial.
- 6. Fixture Seats:
 - a. Church Seat Co.
 - b. Bemis Mfg. Co.
 - c. Beneke Corp.
- 7. Water Coolers and Drinking Fountains:
 - a. Haws Corporation.
 - b. Halsey Taylor Mfg. Co.
 - c. Elkay Mfg. Co.

- d. Acorn Aqua.
8. Service Sinks:
- a. American Standard.
 - b. Kohler Co.
 - c. Williams Serviceceptor.
 - d. Florestone.
 - e. Acorn.
9. Stainless Steel Sinks:
- a. Elkay Mfg. Co.
 - b. Just Mfg. Co.
 - c. Haws Corporation.
10. Showers:
- a. Acorn.
 - b. Bradley.
 - c. Symmons.
 - d. Powers.
11. Emergency Equipment:
- a. Haws Corporation.
 - b. Gardian.
 - c. Symmons.
 - d. Bradley.
 - e. Encon.
12. Fixture Carriers:
- a. Josam Mfg. Co.
 - b. J. R. Smith.
 - c. Tyler Pipe; Wade Div.
 - d. Zurn Industries; Hydromechanics Div.

- e. Mifab, Inc.

2.05 FLUSH VALVE REQUIREMENTS

- A. Metering flush valves where required and specified shall be non-hold open type with exposed parts chrome plated. Conform to all codes and manufacturers' recommendations. All diaphragms are to have multiple filtered bypass and be chloramine resistant synthetic rubber with internal components suitable for 180 degree hot water to 150 pounds pressure, plastic or leather diaphragm not acceptable.
- B. Electronic flush valves where required and specified shall be non-hold open type with exposed parts chrome plated. Conform to all codes and manufacturers' recommendations. All diaphragms are to have multiple filtered by pass and be chloramine and resistant synthetic rubber with rubber and internal components suitable for 180 degree hot water to 150 pounds pressure, plastic or leather diaphragm not acceptable. All flush valve solenoids and sensors shall be UL listed.

2.06 FIXTURE CONNECTIONS

- A. Make connection between fixtures and flanges on soil pipe absolutely gastight and watertight with neoprene type gaskets (wall hung fixtures) or bowl wax (floor outlet fixtures). Rubber gaskets or putty will not be permitted.
- B. Provide fixtures not having integral traps with P-traps of chromium-plated 17 gauge cast brass, with 17 gauge seamless brass wall return, connected to concealed waste in wall and sanitary fittings. Provide IAPMO approval for trap, and provide less trap screw cleanout.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. Dearborn Brass, Commercial series with brass nuts.
 - b. Delta Commercial.
 - c. McGuire Manufacturing Co., Inc.
- C. Connections from stacks or horizontal wastes to wall or floor finish for wastes from lavatories, urinals, sinks, and drinking fountains and connection between floor drains and traps shall be IPS 85 percent red brass pipe.
- D. Plumbing fixture traps connected to special waste systems shall be constructed of materials to suit the waste system.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. Orion.
 - b. Enfield

- E. Unions on waste pipes on fixture side of traps may be slip or flange joints with soft rubber or lead gaskets. Traps shall rough in full size to waste and vent connection, using deep escutcheon plate to cover wall penetration. Compression adaptor extensions or sweat adaptors are not acceptable.

2.07 WATER SUPPLIES AND STOPS

- A. Provide 85 percent IPS threaded red brass nipple, conforming to the lead-free requirements of California Health and Safety Code Section 11 68 75, securely anchored to building construction, for each connection to stops, hose bibbs, etc. Each fixture, except hose bibbs, shall have stop valves installed on water supply lines.
- B. Provide water supplies to fixtures with compression shut-off stops with threaded inlets and lock shield-loose key handles. Provide combination fixtures with compression stop and threaded inlet on each water supply fitting. Provide lock shield-loose key handle for each stop.
- C. Provide 1/2 inch riser tubes with reducing coupling for fixtures, unless otherwise noted.
- D. Provide cast brass escutcheon.
- E. Furnish shut-off valves on hose bibbs where directly connected to mains with no intervening valves.
- F. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - 1. McGuire Manufacturing Company, Inc., model LFH2167LK.
 - 2. T & S Brass and Bronze Works, Inc., model B-1305.

2.08 PLUMBING FIXTURE HANGERS AND SUPPORTS

- A. Floor-affixed supports for off-the-floor plumbing fixtures shall comply with ASME A112.6.1M.
- B. Residential type fixture supports are not acceptable.
- C. Install wall mounted water closets with combination support and waste fittings, with feet of support securely anchored to floor.
- D. Install floor mounted water closets with J.R. Smith, Zurn, or equal government pattern cast iron closet flanges with brass bolts, nuts, washers, and porcelain caps secured with Spackle.
- E. Install the following fixtures on concealed support with feet of support securely anchored to floor. Anchor top of support to wall construction in an approved manner.
 - 1. Wall hung lavatories.
 - 2. Wall mounted urinals.
 - 3. Drinking fountains.
 - 4. Electric water coolers.

2.09 PLUMBING FIXTURES

- A. Install all plumbing fixtures at height indicated on Architectural Drawings. Where mounting height is not indicated, install at height required by Code.
- B. Special Requirements For Accessible Fixtures:
 - 1. Operating handle or valve for accessible water closets, urinals, lavatories, and sinks shall operate with less than 5 pounds force. Metering faucets shall be adjusted to operate between 10 and 15 seconds.
 - 2. Insulate exposed waste piping and domestic water supplies below accessible fixtures with CBC access code compliant molded "closed-cell" vinyl covers. Covers shall be installed using vandal resistant fasteners and must be removable. Covers shall meet flame spread rating not to exceed 25 and smoke density not to exceed 50 when tested in accordance with ASTM E-84, and shall comply with the requirements of California Code of Regulations, Title 24. Plumberex – Handy Shield, Johns Manville – Zeston 2000, or equal.

PART 3 - EXECUTION

3.01 PRODUCT HANDLING AND PROTECTION

- A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

3.02 PREPARATORY PROVISIONS

- A. The Contractor is responsible for the examination and acceptance of all conditions affecting the proper construction and/or installation of the Work of this Section. Do not proceed until all unsatisfactory conditions have been corrected. Commencing work will be construed as acceptance of all conditions by the Contractor as satisfactory for the construction and/or installation of the Work.

3.03 INSPECTION AND PREPARATION

- A. Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of the National Standard Plumbing Code pertaining to installation of plumbing fixtures.
- C. Fasten plumbing fixtures securely to supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies to blocking behind or within wall construction so as to be rigid, and not subject to pull or push movement.

- D. Install CBC accessible fixtures in accordance with Chapter 4 California Plumbing Code, and Chapters 11A and 11B California Building Code.
- E. Refer to Division 26 for wiring for electronic flush valves.

3.04 FAUCET INSTALLATION

- A. Provide 85 percent IPS red brass pipe, conforming to lead-free requirements of California Health and Safety Code Section 11 68 75, securely anchored to building construction, for each connection to faucets, stops, hose bibbs, etc. Each fixture, except hose bibbs, shall have a stop valve installed on water supply lines to permit repairs without shutting off water mains.
- B. Adjust metering faucets to run for 10 to 15 seconds.

3.05 CLEAN AND PROTECT

- A. Clean plumbing fixtures of dirt and debris upon completion of installation.
- B. Protect installed fixtures from damage during the remainder of the construction period.
- C. Grout voids between all fixtures and adjacent surfaces with white Dow Silicone Sealant, arranged to shed water.

3.06 FIELD QUALITY CONTROL

- A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

3.07 EXTRA STOCK

- A. General: Furnish special wrenches and other devices necessary for servicing plumbing fixtures and trim to Owner with receipt. Furnish one device for every ten units.

END OF SECTION

SECTION 22 50 00
PLUMBING EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 22 00 50 Basic Plumbing Materials and Methods.

1.03 ACTION SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Product Data: Submit manufacturer's plumbing equipment specifications, installation and start-up instructions, capacity and ratings, with selection points clearly indicated.

1.04 INFORMATIONAL SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

1.05 CLOSEOUT SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Maintenance Data: Submit maintenance data and parts lists for each item of plumbing equipment. Include "trouble-shooting" maintenance guides. Include this data in Operation and Maintenance Manual.

1.06 QUALITY ASSURANCE

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Trade names or catalog numbers stated herein indicates grade or quality of materials desired.

C. Dimensions, sizes, and capacities shown are minimum and shall not be changed without permission of Architect.

D. UL and NEMA Compliance: Provide electric motors and electrical components required as part of plumbing equipment, which have been listed and labeled by Underwriters Laboratories and comply with NEMA standards.

E. Pump types and sizes regulated by the US Department of Energy's "Energy Conservation Standards for Pumps" 10 CFR Parts 429 and 431 shall be marked with a compliant PEI_{CL} or PEI_{VL} (Pump Energy

- Index, constant or variable load) value, basic model number, and RPM on the nameplate. Regulated pumps shall be listed in the Hydraulic Institute (HI) Energy Rating database (er.pumps.org) and be assigned an Energy Rating as defined in the HI 40.5 program guide.
- F. CEC Compliance: Comply with California Electrical Code (Title 24, Part 3) as applicable to installation and electrical connections of ancillary electrical components of plumbing equipment.
 - G. ASME Relief Valve Stamps: Provide water heaters with safety relief valves bearing ASME valve markings.
 - H. California Energy Commission Compliance: Provide written confirmation of listing of all water heaters in the "Appliance Efficiency Database."

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 and NSF 372.
- B. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).

PART 3 - EXECUTION

3.01 EXAMINATION

- A. The Contractor shall be responsible for the examination and acceptance of all conditions affecting the proper construction and/or installation of the Work of this Section and shall not proceed until all unsatisfactory conditions have been corrected. Commencing work shall be construed as acceptance of all conditions by the Contractor as satisfactory for the construction and/or installation of the Work.

3.02 DEMONSTRATION AND TRAINING

- A. Provide a minimum of 8 hours of training and orientation of Owners staff in proper care and operation of Plumbing Equipment.

3.03 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.

3.04 OPERATIONAL TESTS

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.05 CLEANING UP

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION

SECTION 23 00 50

BASIC HVAC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Electric motors.
 - 2. Motor starters.
 - 3. Thermometers.
 - 4. Access Doors.
 - 5. Flexible joints.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. This Section is a part of each Division 23 Section.
- C. Refer to Section 23 08 00.13, T-24 Commissioning of HVAC for Title 24 commissioning requirements.

1.03 ADDITIONAL REQUIREMENTS

- A. Furnish and install incidental work not shown or specified necessary to provide a complete and workable system.
- B. Make all temporary connections required to maintain services, including adequate heat and cooling, during the course of the Contract without additional cost to Owner. Notify Owner seven days in advance before disrupting services.
- C. Provide for adjustments or modifications to fan and motor sheaves, belts, damper linkages, and other components as required to achieve specified air balance at no additional cost to Owner.

1.04 REFERENCES AND STANDARDS

- A. Where material or equipment is specified to conform to referenced standards, it shall be assumed that the most recent edition of the standard in effect at the time of bid shall be used.
 - 1. AABC - Associated Air Balance Council
 - 2. AFBMA - Anti Friction Bearing Manufacturer's Association
 - 3. AMCA - Air Moving and Control Association Inc.

- a. Standard 210 - Laboratory Methods of Testing Fans
 4. ANSI - American National Standards Institute
 5. ARI - Air-Conditioning and Refrigeration Institute
 6. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
 7. ASME - American Society of Mechanical Engineers
 8. ASTM - American Society for Testing and Materials
 9. CCR - California Code of Regulations
 - a. Title 8 - Division of Industrial Safety, Subchapter 7; General Industry Safety Orders, Articles 31 through 36
 10. CSA – Canadian Standards Association International
 11. CSFM - California State Fire Marshal
 12. NCPWB - National Certified Pipe Welding Bureau
 13. NIST - National Institute of Standards and Technology
 14. NEMA - National Electrical Manufacturers' Association
 15. NFPA - National Fire Protection Association
 16. OSHA - Occupational Safety and Health Act
 17. SMACNA - Duct Manuals
 18. UL - Underwriters' Laboratories, Inc.
- B. Requirements of Regulatory Agencies:
1. The publications listed below form part of this specification; comply with provisions of these publications except as otherwise shown or specified.
 - a. California Building Code, 2022.
 - b. California Electrical Code, 2022.
 - c. California Energy Code, 2022.
 - d. California Fire Code, 2022.
 - e. California Green Building Standards Code, 2022.
 - f. California Mechanical Code, 2022.
 - g. California Plumbing Code, 2022.

- h. California Code of Regulations, Title 24.
 - i. California Health and Safety Code.
 - j. CAL-OSHA.
 - k. California State Fire Marshal, Title 19 CCR.
 - l. National Fire Protection Association.
 - m. Occupational Safety and Health Administration.
 - n. Other applicable state laws.
2. Nothing in Drawings or specifications shall be construed to permit work not conforming to these codes, or to requirements of authorities having jurisdiction. It is not the intent of Drawings or specifications to repeat requirements of codes except where necessary for clarity.

1.05 DRAWINGS

- A. Examine Drawings prior to bidding of work and report discrepancies in writing to Architect.
- B. Drawings showing location of equipment and materials are diagrammatic and job conditions will not always permit installation in location shown. The HVAC Drawings show general arrangement of equipment and materials, etc., and shall be followed as closely as existing conditions, actual building construction, and work of other trades permit.
 - 1. Architectural and Structural Drawings shall be considered part of the Work. These Drawings furnish Contractor with information relating to design and construction of the Project. Architectural Drawings take precedence over HVAC Drawings.
 - 2. Because of the small scale of HVAC Drawings, not all offsets, fittings, and accessories required are shown. Investigate structural and finish conditions affecting the Work and arrange Work accordingly. Provide offsets, fittings, and accessories required to meet conditions. Inform Architect immediately when job conditions do not permit installation of equipment and materials in the locations shown. Obtain the Architects approval prior to relocation of equipment and materials.
 - 3. Relocate equipment and materials installed without prior approval of the Architect. Remove and relocate equipment and materials at Contractors' expense upon Architects' direction.
 - 4. Minor changes in locations of equipment, piping, ducts, etc., from locations shown shall be made when directed by the Architect at no additional cost to the Owner providing such change is ordered before such items of work, or work directly connected to same are installed and providing no additional material is required.
- C. Execute work mentioned in the Specifications and not shown on the Drawings, or vice versa, the same as if specifically mentioned or shown in both.

1.06 FEES AND PERMITS

- A. Obtain and pay for permits and service required in installation of the Work. Arrange for required inspections and secure approvals from authorities having jurisdiction. Comply with requirements of Division 01.
- B. Arrange for utility connections and pay charges incurred, including excess service charges.
- C. Coordination:
 - 1. General:
 - a. Coordinate HVAC Work with trades covered in other Specifications Sections to provide a complete, operable and sanitary installation of the highest quality workmanship.
 - 2. Have fire damper and fire smoke damper installation instructions available at Project site during construction for use by Project Inspector.
 - 3. Electrical Coordination:
 - a. Refer to the Electrical Drawings and Specifications, Division 26, for service voltage and power feed wiring for equipment specified under this section. Contractor has full responsibility for the following items of work:
 - 1) Review the Electrical Drawings and Division 26 Specifications to verify that electrical services provided are adequate and compatible with equipment requirements.
 - 2) If additional electrical services are required above that indicated on Electrical Drawings and in Division 26, such as more control interlock conductors, larger feeder, or separate 120 volt control power source, include cost to furnish and install additional electrical services as part of the bid.
 - 3) Prior to proceeding with installation of additional electrical work, submit detailed drawings indicating exact scope of additional electrical work.
 - 4. Mechanical Coordination:
 - a. Arrange for pipe spaces, chases, slots and openings in building structure during progress of construction, to accommodate mechanical system installation.
 - b. Coordinate installation of supporting devices. Set sleeves in poured-in-place concrete and other structural components during construction.
 - c. Coordinate requirements for access panels and doors for mechanical items requiring access where concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."
 - d. Coordinate with other trades equipment locations, pipe, duct and conduit runs, electrical outlets and fixtures, air inlets and outlets, and structural and architectural features. Provide information on location of piping and seismic bracing to other trades as required for a completely coordinated project.

1.07 SUBMITTALS - GENERAL

- A. Refer to Division 01 Submittals Section(s) for additional requirements.
- B. Submittal packages may be submitted via email as PDF electronic files, or as printed packages. PDFs shall be legible at actual size (100 percent). Provide seven copies of printed submittal packages.
- C. Provide submittal of materials proposed for use as part of this Project. Product names in Specifications and on Drawings are used as standards of quality. Furnish standard items on specified equipment at no extra cost to the Contract regardless of disposition of submittal data. Other materials or methods shall not be used unless approved in writing by Architect. Architect's review will be required even though "or equal" or synonymous terms are used.
 - 1. Partial or incomplete submittals will not be considered.
 - 2. Quantities are Contractor's responsibility and will not be reviewed.
 - 3. Provide materials of the same brand or manufacturer for each class of equipment or material.
 - 4. Identify each item by manufacturer, brand, trade name, number, size, rating, or other data necessary to properly identify and review materials and equipment. Words "as specified" are not sufficient identification.
 - 5. Identify each submittal item by reference to items' Specification Section number and paragraph, by Drawing and detail number, and by unit tag number.
 - 6. Organize submittals in same sequence as in Specification Sections.
 - 7. Show physical arrangement, construction details, finishes, materials used in fabrications, provisions for piping entrance, access requirements for installation and maintenance, physical size, mechanical characteristics, foundation and support details, and weight.
 - a. Submit Shop Drawings, performance curves, and other pertinent data, showing size and capacity of proposed materials.
 - b. Specifically indicate, by drawn detail or note, that equipment complies with each specifically stated requirement of Contract Documents.
 - c. Drawings shall be drawn to scale and dimensioned (except schematic diagrams). Drawings may be prepared by vendor but must be submitted as instruments of Contractor, thoroughly checked and signed by Contractor before submission to Architect for review.
 - d. Catalog cuts and published material may be included with supplemental scaled drawings.
- D. Review of submittals will be only for general conformance with design concept and general compliance with information given in Contract Documents. Review will not include quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with work of other trades, or construction safety precautions, which are sole responsibility of Contractor. Review of a component of an assembly does not indicate acceptance of an assembly. Deviations from Contract Documents not clearly identified by Contractor are Contractor's responsibility and will not be reviewed by Architect.

- E. Within reasonable time after award of contract and in ample time to avoid delay of construction, submit to Architect shop drawings or submittals on all items of equipment and materials provided. Provide submittal as a complete package.
 - 1. Shop drawings and submittals shall include Specification Section, Paragraph number, and Drawing unit symbol or detail number for reference. Organize submittals into booklets for each Specification section and submit in loose-leaf binders with index. Deviations from the Contract Documents shall be prominently displayed in the front of the submittal package and referenced to the applicable Contract requirement.
- F. Furnish to the Project Inspector complete installation instructions on material and equipment before starting installation.

1.08 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data and installation instructions for plumbing systems materials and products.
- B. Shop Drawings.
- C. Sustainable Design Submittals:
 - 1. Product Data: For adhesives and sealants, documentation of compliance including printed statement of VOC content and chemical components.
 - 2. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.
- D. Delegated-Design Submittals: For seismic supports, anchorages, restraints, and vibration isolators indicated to comply with performance requirements and design criteria.
 - 1. Calculations performed for use in selection of seismic supports, anchorages, restraints, and vibration isolators shall utilize criteria indicated in Structural Contract Documents.
 - 2. Include design calculations and details for selecting vibration isolators and vibration isolation bases complying with performance requirements, design criteria, and analysis data signed and sealed by the California registered structural engineer responsible for their preparation.
 - 3. Supports, anchorage and restraints for piping, ductwork, and equipment shall be an HCAI pre-approved system such as TOLCO, ISAT, Mason, or equal. Pipes, ducts and equipment shall be seismically restrained in accordance with requirements of current edition of California Building Code. System shall have current OPM number and shall meet additional requirements of authority having jurisdiction. Provide supporting documentation required by the reviewing authority and the Architect and Engineer. Provide layout drawings showing piping, ductwork and restraint locations.
 - a. Bracing of Piping, Ductwork, and Equipment: Specifically state how bracing attachment to structure is accomplished. Provide shop drawings indicating seismic restraints, including details of anchorage to building. In-line equipment must be braced independently of piping and ductwork, and in conformance with applicable building codes. Provide calculations to

show that pre-approval numbers have been correctly applied in accordance with general information notes of pre-approval documentation.

- b. In lieu of the above or for non-standard installations not covered in the above pre-approved systems, Contractor shall provide layout drawings showing piping, ductwork, and restraint locations, and detail supports, attachments and restraints, and furnish supporting calculations and legible details sealed by a California registered structural engineer, in accordance with 2016 California Building Code

4. Additional Requirements: In addition to the above, conform to all state and local requirements.

1.09 INFORMATIONAL SUBMITTALS

- A. Provide coordinated layouts for HVAC Ductwork systems, in accordance with Specification Section 23 80 00.
- B. Provide evidence of equipment certification to California Energy Code Section 110.1 or 110.2, if not providing Electrically Commutated motors for HVAC fans sized below 1 hp and above 1/12 hp. Refer to specific equipment articles requiring electrically commutated motors.
- C. Check, Test, and Start forms, from equipment manufacturers.
- D. Check, Test and Start reports.

1.10 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. Furnish three complete sets of Operation and Maintenance Manual bound in hardboard binder, and one compact disc containing complete Operation and Maintenance Manual in searchable PDF format. Provide Table of Contents. Provide index tabs for each piece of equipment in binder and disc. Begin compiling data upon approval of submittals.
 - a. Sets shall incorporate the following:
 - 1) Product Data.
 - 2) Shop Drawings.
 - 3) Record Drawings.
 - 4) Service telephone number, address and contact person for each category of equipment or system.
 - 5) Complete operating instructions for each item of heating, ventilating and air conditioning equipment.
 - 6) Copies of guarantees/warranties for each item of equipment or systems.
 - 7) Test data and system balancing reports.

- 8) Typewritten maintenance instructions for each item of equipment listing lubricants to be used, frequency of lubrication, inspections required, adjustment, etc.
 - 9) Manufacturers' bulletins with parts numbers, instructions, etc., for each item of equipment.
 - 10) Temperature control diagrams and literature.
 - 11) Check test and start reports for each piece of mechanical equipment provided as part of the Work.
 - 12) Commissioning and Preliminary Operation Tests required as part of the Work.
2. Post service telephone numbers and addresses in an appropriate place designated by Architect.
- B. Record Drawings:
1. Refer to Division 01 for additional requirements.
 2. Upon completion of the Work, deliver to Architect the following:
 - a. Originals of drawings showing the Work exactly as installed.
 - b. One complete set of reproducible drawings showing the Work exactly as installed.
 - c. One compact disc with complete set of drawings in PDF format showing the Work exactly as installed.
 - d. Provide Contractor's signature, verifying accuracy of record drawings.
 - e. Obtain the signature of the Inspector of Record for Record Drawings.

1.11 SUBSTITUTIONS

- A. Refer to Division 01 for complete instructions. Requirements given below are in addition to or are intended to amplify Division 01 requirements. In case of conflict between requirements given herein and those of Division 01, Division 01 requirements shall apply.
- B. It is the responsibility of Contractor to assume costs incurred because of additional work and or changes required to incorporate proposed substitute into the Project. Refer to Division 01 for complete instructions.
- C. Substitutions will be interpreted to be manufacturers other than those specifically listed in the Contract Documents by brand name, model, or catalog number.
- D. Only one request for substitution will be considered for each item of equipment or material.
- E. Substitution requests shall include the following:
 1. Reason for substitution request.
 2. Complete submittal information as described herein; see "Submittals."

3. Coordinated scale layout drawings depicting position of substituted equipment in relation to other work, with required clearances for operation, maintenance and replacement.
 4. List optional features required for substituted equipment to meet functional requirements of the system as indicated in Contract Documents.
 5. Explanation of impact on connected utilities.
 6. Explanation of impact on structural supports.
- F. Installation of reviewed substitution is Contractors' responsibility. Any mechanical, electrical, structural, or other changes required for installation of substituted equipment or material must be made by Contractor without additional cost to Owner. Review by Architect of substituted equipment or material, will not waive these requirements.
- G. Contractor may be required to compensate Architect for costs related to substituted equipment or material.

1.12 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of HVAC systems products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with HVAC systems work similar to that required for this Project.
- C. Comply with applicable portions of California Mechanical Code pertaining to selection and installation of HVAC materials and products.
- D. All materials and products shall be new.

1.13 DELIVERY, STORAGE, AND HANDLING

- A. Protect equipment and materials delivered to Project site from weather, humidity and temperature variations, dirt, dust and other contaminants.

1.14 FIELD CONDITIONS

- A. Contractor shall visit Project site and examine existing conditions in order to become familiar with Project scope. Verify dimensions shown on Drawings at Project site. Bring discrepancies to the attention of Architect. Failure to examine Project site shall not constitute basis for claims for additional work because of lack of knowledge or location of hidden conditions that affect Project scope.
- B. Information on Drawings relative to existing conditions is approximate. Deviations from Drawings necessary during progress of construction to conform to actual conditions shall be approved by the Architect and shall be made without additional cost to the Owner. The Contractor shall be held responsible for damage caused to existing services. Promptly notify the Architect if services are found which are not shown on Drawings.

1.15 WARRANTY

- A. Refer to Division 01 for warranty requirements, and duration and effective date of Contractor's Standard Guarantee.
- B. Repair or replace defective work, material, or part that appears within the warranty period, including damage caused by leaks.
- C. On failure to comply with warranty requirements within a reasonable length of time after notification is given, Architect/Owner shall have repairs made at Contractor's expense.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Materials or equipment of the same type shall be of the same brand wherever possible. All materials shall be new and in first class condition.
- B. All sizes, capacities, and efficiency ratings shown are minimum, except that gas capacity is maximum available.
- C. Refer to Division 22 10 00 and 23 80 00 for specific system piping materials.

2.02 MATERIALS

- A. No material installed as part of this Work shall contain asbestos.
- B. California Green Building Code Compliance:
 - 1. HVAC and refrigeration equipment shall not contain CFCs.
 - 2. HVAC and refrigeration equipment shall not contain Halons.

2.03 ELECTRIC MOTORS

- A. General Motor Requirements: Comply with NEMA MG 1 unless otherwise indicated. Comply with IEEE 841 for severe-duty motors.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. U.S. Motors.
 - b. Century Electric.
 - c. General Electric.
 - d. Lincoln.
 - e. Gould.

- B. Motor Characteristics: Designed for continuous duty at ambient temperature of 40 deg. C and at altitude of 3300 feet above sea level. Capacity and torque shall be sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
1. Motors exceeding the nameplate amperage shall be promptly replaced at no cost to the Owner. Horsepower shown is minimum and shall be increased as necessary to comply with above requirements. Furnish motors with splash-proof or weatherproof housings, where required or recommended by the manufacturer. Match the nameplate voltage rating with the electrical service supplied. Check Electrical Drawings. Provide a transformer for each motor not wound specifically for system voltage.
- C. Polyphase Motors: NEMA MG 1, Design B, medium induction motor, premium efficiency as defined in NEMA MG 1. Select motors with service factor of 1.15. Provide motor with random-wound, squirrel cage rotor, and permanently lubricated or regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading. Temperature rise shall match insulation rating. Provide Class F insulation.
1. Multispeed motors shall have separate windings for each speed.
- D. Polyphase Motors with Additional Requirements:
1. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
 2. Motors Used with Variable Frequency Controllers:
 - a. Separately Connected Motors: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
 - b. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
 - c. Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 - d. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 - e. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
 - f. Each motor shall be provided with a shaft grounding device for stray current protection.
 3. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.
- E. Single-Phase Motors:
1. Select motors with service factor of 1.15.
 2. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

- a. Permanent-split capacitor.
 - b. Split phase.
 - c. Capacitor start, inductor run.
 - d. Capacitor start, capacitor run.
3. Motors for HVAC exhaust, transfer, and supply fans larger than 1/12 hp and smaller than 1 hp shall be the following:
- a. Electronically Commutated motor (EC type): Motor shall be electronically commutated type specifically designed for applications, with heavy duty ball bearings. The motor shall be speed controllable down to 20% of full speed and 85% efficient at all speeds.
 - 1) Exceptions:
 - a) Motors in fan-coils and terminal units that operate only when providing heating to the space served.
 - b) Motors installed in space conditioning equipment certified under California Energy Code Section 110.1 or 110.2.
4. Contractor's Option: Motors scheduled on Drawings as single-phase, and larger than 1/12 hp and smaller than 1 hp, for applications other than HVAC fans, may be EC type.
5. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
6. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
7. Motors 1/20 HP and Smaller: Shaded-pole type.
8. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

2.04 MOTOR STARTERS

- A. Square D, Allen Bradley, or equal, in NEMA Type 1 enclosure, unless otherwise specified or required. Minimum starter size shall be Size 1. Provide NEMA 3R enclosure where exposed to outdoors.
- B. Provide magnetic motor starters for all equipment provided under the Mechanical Work. Starters shall be non-combination type. Provide part winding or reduced voltage start motors where shown or as hereinafter specified. Minimum size starter shall be Size 1.
 1. All starters shall have the following:
 - a. Cover mounted hand-off-automatic switch. Starters installed exposed in occupied spaces shall have key operated HOA switch.

- b. Ambient compensated thermal overload.
 - c. Fused control transformer (for 120 or 24 volt service).
 - d. Pilot lights, integral with the starters. Starters located outdoors shall be in NEMA IIIR enclosures.
2. Where three phase motors are provided for two-speed operation, provide two speed motor starters.
 3. Starters for single-phase motors shall have thermal overloads. NEMA I enclosure for starters located indoors, NEMA IIIR enclosure for starters located outdoors.
 4. Provide OSHA label indicating the device starts automatically.

2.05 THERMOMETERS

- A. Marsh, Taylor, Palmer, or equal, 5 inch diameter bimetal dial, adjustable from face, with adjustable positioner, located to be easily read from normal personnel approach. Normal reading shall be at mid-scale.
 1. Provide extension for insulation.
 2. Provide thermometers with steel bulb chambers and brass separable sockets.
 3. Thermometers for air temperature shall have 8 inch minimum stem.
- B. Provide Ventlock, Durodyne, or equal thermometer test holes at each air conditioning unit, furnace, and make-up air unit, in mixed air and supply air, and at all locations shown or scheduled on the Drawings. Provide two portable thermometers, with sensing connection arranged to suit test connections.
- C. Provide Pete's Plug II, Sisco P/T, or equal, test plug with Nordel core, on inlet and outlet of each coil, boiler, condenser, chiller and heat exchanger and provide two digital electronic test thermometers for each range of fluid temperature and where shown on Drawings.

2.06 ACCESS DOORS

- A. Where floors, walls, or ceilings must be penetrated for access to mechanical equipment, provide access doors, 14 inch by 14 inch minimum size in usable opening. Where entrance of a serviceman may be required, provide 20 inch by 30 inch minimum usable opening. Locate access doors/panels for non-obstructed and easy reach.
 1. All access doors less than 7'-0" above floors and exposed to public access shall have keyed locks.
- B. Access doors shall match those supplied in Division 08 in all respects, except as noted herein.
- C. Provide stainless steel access doors for use in toilet rooms, shower rooms, kitchens and other damp areas. Provide steel access doors with prime coat of baked-on paint for all other areas.

- D. Where panels are located on ducts or plenums, provide neoprene gaskets to prevent air leakage, and use frames to set door out to flush with insulation.
- E. Provide insulated doors where located in internally insulated ducts or casings.
- F. Do not locate access doors in highly visible public areas such as lobbies, waiting areas, and primary entrance areas. Coordinate with the Architect when access is required in these areas.
- G. Where specific information or details relating to access panels different from the above is shown or given on the Drawings or other Divisions of work, then that information shall supersede this specification.
- H. Manufacturers: Subject to compliance with requirements, available manufacturers offering products which may be incorporated into the Work include Milcor, Karp, Nystrom, or Cesco, equal to the following:
 - 1. Milcor
 - a. Style K (plaster).
 - b. Style DW (gypsum board).
 - c. Style M (Masonry).
 - d. Style "Fire Rated" where required.

2.07 FLEXIBLE JOINTS

- A. Where indicated on Drawings, provide Metraflex Metrasphere, Style R, Mason Industries, or equal, Spherical Expansion Joints. Provide control units at each expansion joint, arranged to limit both expansion and compression.
- B. Flexible joints at entry points to building shall be Barco Ductile iron, Advanced Thermal Systems, or equal, threaded style with stainless ball and mineral filled seal.

2.08 PIPE GUIDES

- A. Where flexible connections are indicated on Drawings, provide Metraflex style IV, B-Line, or equal, pipe guides in locations recommended by manufacturer. Maximum spacing from flexible connection to first pipe guide is 4 pipe diameters, and maximum spacing from second pipe guide is 14 pipe diameters.

2.09 EQUIPMENT IDENTIFICATION

- A. Identify each piece of equipment with a permanently attached engraved bakelite plate, 1/2 inch high white letters on black background.

2.10 PIPE IDENTIFICATION

- A. Identify each piping system and indicate the direction of flow by means of Seton, Inc., Marking Services Inc., Reef Industries, Inc., or equal, pre-tensioned, coiled semi-rigid plastic pipe labels formed to circumference of pipe, requiring no fasteners or adhesive for attachment to pipe.
- B. The legend and flow arrow shall conform to ASME A13.1.

PART 3 - EXECUTION

3.01 EXISTING MATERIALS:

- A. Remove existing equipment, piping, wiring, construction, etc., which interferes with Work of this Contract. Promptly return to service upon completion of work in the area. Replace items damaged by Contractor with new material to match existing.
- B. Removed materials which will not be re-installed and which are not claimed by Owner shall become the property of Contractor and shall be removed from the Project site. Consult Owner before removing any material from the Project site. Carefully remove materials claimed by Owner to prevent damage and deliver to Owner-designated storage location.
- C. Existing piping and wiring not reused and are concealed in building construction may be abandoned in place and all ends shall be capped or plugged. Remove unused piping and wiring exposed in Equipment Rooms or occupied spaces. Material shall be removed from the premises. Disconnect power, water, gas, pump or any other active energy source from piping or electrical service prior to abandoning in place.

3.02 FRAMING, CUTTING, AND PATCHING

- A. Special framing, recesses, chases and backing for Work of this Section, unless otherwise specified, are covered under other Specification Sections.
- B. Contractor is responsible for placement of pipe sleeves, hangers, inserts, supports, and location of openings for the Work.
- C. Cutting, patching, and repairing of existing construction to permit installation of equipment, and materials is the responsibility of Contractor. Repair or replace damage to existing work with skilled mechanics for each trade.
- D. Cut existing concrete construction with a concrete saw. Do not utilize pneumatic devices.
- E. Core openings through existing construction for passage of new piping and conduits. Cut holes of minimum diameter to suit size of pipe and associated insulation installed. Coordinate with building structure, and obtain Structural Engineer's approval prior to coring through existing construction.

3.03 MECHANICAL DEMOLITION

- A. Refer to Division 01 Sections "Cutting and Patching" and "Selective Demolition" for general demolition requirements and procedures.

- B. Disconnect, dismantle and remove mechanical systems, equipment, and components indicated to be removed. Coordinate with all other trades.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping to remain with same or compatible piping material. Refrigerant system must be evacuated per EPA requirements.
 - 3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and cap remaining ducts with same or compatible ductwork material.
 - 4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
 - 5. Equipment to Be Removed: Drain down and cap remaining services and remove equipment.
 - 6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - 7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.04 ELECTRICAL REQUIREMENTS

- A. Provide adequate working space around electrical equipment in compliance with the California Electrical Code. Coordinate the Mechanical Work with the Electrical Work to comply.
- B. Furnish necessary control diagrams and instructions for the controls. Before permitting operation of any equipment which is furnished, installed, or modified under this Section, review all associated electrical work, including overload protection devices, and assume complete responsibility for the correctness of the electrical connections and protective devices. Motors and control equipment shall conform to the Standards of the National Electrical Manufacturers' Association. All equipment and connections exposed to the weather shall be NEMA IIIIR with factory-wired strip heaters in each starter enclosure and temperature control panel where required to inhibit condensation.
- C. All line voltage and low voltage wiring and conduit associated with the Temperature Control System are included in this Section. Wiring and conduit shall comply with Division 26.

3.05 PIPING SYSTEM REQUIREMENTS

- A. Drawing plans, schematic and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

3.06 PRIMING AND PAINTING

- A. Perform priming and painting on the equipment and materials as specified herein.

- B. See Division 09 Painting Section(s) for detailed requirements.
- C. Priming and painting:
 - 1. Exposed ferrous metals, including piping, which are not galvanized or factory-finished shall be primed and painted.
 - a. Black Steel Piping:
 - 1) Primer: One coat gray Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, comparable products by Rust-Oleum, Kelly Moore, or equal.
 - 2) Topcoat: Two coats gray Sherwin-Williams Pro Industrial Waterbased Alkyd Urethane Enamel, comparable products by Rust-Oleum, Kelly Moore, or equal.
 - b. Interior Ductwork: Refer to Division 09 Painting Section(s). Architect shall select paint color.
 - 2. Metal surfaces of items to be jacketed or insulated except ductwork and piping shall be given two coats of primer unless furnished with equivalent factory finish. Items to be primed shall be properly cleaned by effective means free of rust, dirt, scale, grease and other deleterious matter and then primed with the best available grade of zinc rich primer. After erection or installation, all primed surfaces shall be properly cleaned of any foreign or deleterious matter that might impair proper bonding of subsequent paint coatings. Any abrasion or other damage to the shop or field prime coat shall be properly repaired and touched up with the same material used for the original priming.
 - 3. Where equipment is provided with nameplate data, the nameplate shall be masked off prior to painting. When painting is completed, remove masking material.

3.07 UNION AND FLANGE INSTALLATION

- A. Install Epco, Nibco, or equal, dielectric unions or flanges at points of connection between copper or brass piping or material and steel or cast iron pipe or material except in drain piping. Bushings or couplings shall not be used.
- B. Install unions in piping NPS 2" and smaller 3 or flanges in piping NPS 2-1/2" and larger whether shown or not at each connection to all equipment and tanks, and at all connections to all automatic valves, such as temperature control valves.
- C. Locate the unions for easy removal of the equipment, tank, or valve.
- D. Do not install unions or flanges in refrigerant piping systems.

3.08 ACCESS DOOR INSTALLATION

- A. Furnish and install access doors wherever required whether shown or not for easy maintenance of mechanical systems; for example, at concealed valves, strainers, traps, cleanouts, dampers, motors, controls, operating equipment, etc. Access doors shall provide for complete removal and replacement of equipment.

3.09 PIPE PROTECTION

- A. Wrap bare galvanized and black steel pipe buried in the ground and to 6" above grade, including piping in conduit, with one of the following, or equal:
 - 1. Polyethylene Coating: Pressure sensitive polyethylene coating, "X-Tru-Coat" as manufactured by Pipe Line Service Corporation or "Green Line" wrap as manufactured by Royston Products, or equal.
 - a. Field Joints and Fittings: Protecto Wrap #1170 tape as manufactured by Pipe Line Service Corporation, or Primer #200 tape by Royston Products, or equal. Installation shall be as per manufacturer's recommendation and instructions.
 - 2. Tape Wrap: Pressure-sensitive polyvinyl chloride tape, "Transtex #V-10 or V-20", "Scotchwrap 50", Slipknot 100, PASCO Specialty & Mfg., Inc., or equal, with continuous identification. Tape shall be a minimum of 20 mils thick for fittings and irregular surfaces, two wraps, 50 percent overlap, 40 mils total thickness. Tape shall be laminated with a suitable adhesive; widths as recommended by the manufacturer for the pipe size. Wrap straight lengths of piping with an approved wrapping machine.
- B. Field Joints: Valves and Fittings: double wrap polyvinyl chloride tape as above. Provide at least two thicknesses of tape over the joint and extend a minimum of 4 inches over adjacent pipe covering. Build up with primer to match adjacent covering thickness. Width of tape of fittings shall not exceed 3 inches. Tape shall adhere tightly to all surfaces of the fittings without air pockets.
- C. Testing: Test completed wrap of piping, including all epoxy painted piping with Tinker and Razor Co. holiday detector, or equal.
- D. Cleaning: Clean all piping thoroughly before wrapping.
 - 1. Inspection: Damaged or defective wraps shall be repaired as directed. No wrapped pipe shall be covered until approved by Architect.
- E. Covering: No rocks or sharp edges shall be backfilled against the wrap. When backfilling with other than sand, protect wrap with an outer wrapping of Kraft paper; leave in place during backfill.

3.10 PIPE IDENTIFICATION

- A. Provide temporary identification of each pipe installed, at the time of installation. Temporary identification shall be removed and replaced with permanent identification as part of the work.
- B. Apply the legend and flow arrow at all valve locations; at all points where the piping enters or leaves a wall, partition, cluster of piping or similar obstruction, at each change of direction, and at approximately 20'-0" intervals on pipe runs. Variations or changes in locations and spacing may be made with the approval of the Architect. There shall be at least one marking in each room. Markings shall be located for maximum visibility from expected personnel approach.
- C. Wherever two or more pipes run parallel, the markings shall be supplied in the same relative location on each.
- D. Apply the markings after painting and cleaning of piping and insulation is completed.

3.11 EXPANSION ANCHORS IN HARDENED CONCRETE

- A. Qualification Tests: The specific anchor shall have a current ICC-ES report and evaluated in cracked concrete in accordance with Acceptance Criteria AC193. If the specific anchor satisfies cyclic testing requirements per Acceptance Criteria AC01, Section 5.6, the full allowable shear and tension loads listed in the current ICC-ES report and manufacturer's recommendations for the specific anchor may be used. Otherwise, the design shear and tension loads shall not be more than 80% of the listed allowable shear and tension loads for the specific anchor.
- B. Installation: The anchors must be installed in accordance with the requirements given in ICC Research Committee Recommendations for the specific anchor.
- C. Testing: Fifty percent of the anchors shall be load-tested on each job to twice the allowable capacity in tension, except that if the design load is less than 75 pounds; only one anchor in ten need be tested. If any anchor fails, all anchors must be tested. The load test shall be performed in the presence of a special inspector.
- D. The load may be applied by any method that will effectively measure the tension in the anchor, such as direct pull with a hydraulic jack, a torque wrench calibrated using the specific anchor or calibrated spring-loading devices. Anchors in which the torque is used to expand the anchor without applying tension to the bolt may not be verified with a torque wrench.

3.12 PIPING SYSTEM PRESSURE TESTING

- A. General:
 - 1. Perform operational tests under simulated or actual service conditions.
 - 2. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
- B. Piping Systems: Test the installations in accordance with the following requirements and applicable codes:
 - 1. Notify the Architect at least seven days in advance of testing.
 - 2. Authority having jurisdiction shall witness tests of piping systems.
 - 3. Piping shall be tested at completion of roughing-in, or at other times as directed by the Architect.
 - 4. Furnish necessary materials, test pumps, gases, instruments and labor required for testing.
 - 5. Isolate from system equipment that may be damaged by test pressure.
 - 6. Make connections to existing systems with flanged connection. During testing of new work, provide a slip-in plate to restrict test pressure to new systems. Remove plate and make final connection to existing system at completion of testing.
 - a. Authority having jurisdiction shall witness final connection to system.

- C. Test Schedule: No loss in pressure or visible leaks shall show after four hours at the pressures indicated.

<u>System Tested</u>	<u>Test Pressure PSI</u>	<u>Test With</u>
All Hot, Chilled, Combination, Condenser Water Piping	Greater of 1-1/2 x WP or 100 psi	Water

- D. Testing, Evacuating, Charging and Lubrication of Refrigeration Systems:

1. Pressurize with dry nitrogen and/or refrigerant to 300 psig and test all joints with an electronic detector or halide torch. Release the pressure and attach a high vacuum pump. Evacuate to 4 mm (4000 microns) and hold for 30 minutes. Break to 5 psig with dry nitrogen and allow to remain in the system for ten minutes. Evacuate to 2 mm (2000 microns) and hold for 30 minutes. Use a mercury manometer or electronic vacuum gauge. Do not start timing until recommended vacuum range is reached.
2. At the end of the evacuation, if the system has been proved leak-free, charge with refrigerant and fill the crankcase to the oil level specified by the manufacturer. All refrigerant oil shall be delivered to the location in sealed containers.
3. Replenish for a period of one year without cost to the Owner all refrigerant and oil required to maintain the proper levels.

3.13 OPERATION OF SYSTEMS

- A. Do not operate any mechanical equipment for any purpose, temporary or permanent, until all of the following has been completed:
1. Complete all requirements listed under "Check, Test and Start Requirements."
 2. Ductwork and piping has been properly cleaned. Piping systems shall be flushed and treated prior to operation.
 3. Filters, strainers etc. are in place.
 4. Bearings have been lubricated, and alignment of rotating equipment has been checked.
 5. Equipment has been run under observation, and is operating in a satisfactory manner.
- B. Provide test and balance agency with one set of Contract Drawings, Specifications, Addenda, Change orders issued, applicable shop drawings and submittals and temperature control drawings.

3.14 TEMPORARY HEAT

- A. The General Contractor will provide for all temporary heat at such times as may be required or directed by the Architect and pay all fuel and energy costs incurred.
- B. Temporary heating facilities proposed for use by the Contractor will be subject to review of the Architect. Prior to use of any equipment for temporary heat, install temporary filters on all return air

- inlets, to preclude dust and construction debris from entering the duct system. In addition, install filters in air handling units, and replace at the completion of temporary operation.
- C. Filters used for temporary operation of systems shall be as specified for permanent filters specified herein.
 - D. Comply with Check, Test and Start Requirements for start-up of equipment prior to operation for temporary heat.

3.15 CHECK, TEST AND START REQUIREMENTS

- A. An authorized representative of the equipment manufacturer shall perform check, test and start of each piece of mechanical equipment. The representative may be an employee of the equipment manufacturer, or a manufacturer-certified contractor. Submit written certification from the manufacturer stating that the representative is qualified to perform the check test and start of the equipment.
 - 1. As part of the submittal process, provide a copy of each manufacturer's printed startup form to be used.
 - 2. Some items of specified equipment may require that check, test and start of equipment must be performed by the manufacturer, using manufacturer's employees. See specific equipment Articles in these Specifications for this requirement.
 - 3. Provide all personnel, test instruments, and equipment to properly perform the check, test and start work.
 - 4. When work has been completed, provide copies of reports for review, prior to final observation of work.
- B. Provide copies of the completed check, test and start report of each item of equipment, bound with the Operation and Maintenance Manual.
- C. Upon completion of the work, provide a schedule of planned maintenance for each piece of equipment. Indicate frequency of service, recommended spare parts (including filters and lubricants), and methods for adjustment and alignment of all equipment components. Provide a copy of the schedule with each Operation and Maintenance Manual. Provide a copy of certification from the Owner's representative indicating that they have been properly instructed in maintenance requirements for the equipment installed.

3.16 PRELIMINARY OPERATIONAL REQUIREMENTS AND TESTS

- A. Prior to observation to determine final acceptance, put HVAC, plumbing, and fire protection systems into service and check that work required for that purpose has been done, including but not limited to the following condensed check list. Provide indexed report to tabulating the results of all work.
 - 1. All equipment has been started, checked, lubricated and adjusted in accordance with the manufacturer's recommendations, including modulating power exhausts if present.
 - 2. Correct rotation of motors and ratings of overload heaters are verified.

3. Specified filters are installed and spare filters have been turned over to Owner.
 4. All manufacturers' certificates of start-up specified have been delivered to the Owner.
 5. All equipment has been cleaned, and damaged painted finishes touched up.
 6. Damaged fins on heat exchangers have been combed out.
 7. Missing or damaged parts have been replaced.
 8. Flushing and chemical treatment of piping systems has been completed and water treatment equipment, where specified, is in operation.
 9. Equipment labels, pipe marker labels, ceiling markers and valve tags are installed.
 10. Valve tag schedules, corrected control diagrams, sequence of operation lists and start-stop instructions have been posted.
 11. Preliminary test and balance work is complete, and reports have been forwarded for review.
 12. Automatic control set points are as designated and performance of controls checks out to agree with the sequence of operation.
 13. Operation and Maintenance Manuals have been delivered and instructions to the operating personnel have been made.
- B. Prior to the observation to determine final acceptance, operate all mechanical systems as required to demonstrate that the installation and performance of these systems conform to the requirements of these specifications.
1. Operate and test all mechanical equipment and systems for a period of at least five consecutive 8 hour days to demonstrate the satisfactory overall operation of the project as a complete unit.
 2. Include operation of heating and air conditioning equipment and systems for a period of not less than two 8 hour days at not less than 90 percent of full specified heating and cooling capacities in tests.
 3. Commence tests after preliminary balancing and adjustments to equipment have been checked. Immediately before starting tests, install air filters and lubricate all running equipment. Notify the Architect at least seven calendar days in advance of starting the above tests.
 4. During the test period, make final adjustments and balancing of equipment, systems controls, and circuits so that all are placed in first class operating condition.
 5. Where Utility District rebates are applicable, demonstrate that the systems meet the rebate program requirements.
- C. Before handing over the system to Owner replace all filters with complete new set of filters.
- D. Review of Contractor's Tests:

1. All tests made by the Contractor or manufacturers' representatives are subject to observation and review by the Owner. Provide timely notice prior to start of each test, in order to allow for observation of testing. Upon the completion of all tests, provide a letter to confirm that all testing has been successful.
- E. Test Logs:
1. Maintain test logs listing the tests on all mechanical systems showing dates, items tested, inspectors' names, remarks on success or failure of the tests.
- F. Preliminary Operation:
1. The Owner reserves the right to operate portions of the mechanical system on a preliminary basis without voiding the guarantee.
- G. Operational Tests:
1. Before operational tests are performed, demonstrate that all systems and components are complete and fully charged with operating fluid and lubricants.
 2. Systems shall be operable and capable of maintaining continuous uninterrupted operation during the operating and demonstration period. After all systems have been completely installed, connections made, and tests completed, operate the systems continuously for a period of five working days during the hours of a normal working day.
 3. This period of continuous systems operation may be coordinated with the removal of Volatile Organic Compounds (VOCs) from the building prior to occupancy should the Owner decide to implement such a program.
 4. Control systems shall be completely operable with settings properly calibrated and adjusted.
 5. Rotating equipment shall be in dynamic balance and alignment.
 6. If the system fails to operate continuously during the test period, the deficiencies shall be corrected and the entire test repeated.
- H. Pre-Occupancy Building Purge:
1. Prior to occupancy, ventilate the building on 100 percent outside air, 100 percent exhaust for a continuous period determined by a qualified industrial hygienist (engaged by the Contractor) to reduce V.O.C.'s prior to occupancy.
 2. Submit report by the industrial hygienist verifying satisfactory completion of the pre-occupancy purge.

3.17 DEMONSTRATION AND TRAINING

- A. An authorized representative of the equipment manufacturer shall train Owner-designated personnel in maintenance and adjustment of equipment. The representative may be an employee of the equipment manufacturer, or a manufacturer-certified contractor. Submit written certification from

the manufacturer stating that the representative is qualified to perform the Owner training for the equipment installed.

1. As part of the submittal process, provide a training agenda outlining major topics and time allowed for each topic.
2. Some items of specified equipment require that training must be performed by the manufacturer, using manufacturer's employees. See specific equipment Articles in these Specifications for this requirement.
3. Contractor shall provide three copies of certification by Contractor that training has been completed, signed by Owner's representative, for inclusion in Operation and Maintenance Manual. Certificates shall include:
 - a. Listing of Owner-designated personnel completing training, by name and title.
 - b. Name and title of training instructor.
 - c. Date(s) of training.
 - d. List of topics covered in training sessions.
4. Refer to specific equipment Articles for minimum training period duration for each piece of equipment.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Balancing Air Systems:
 - a. Constant-volume air systems.
 - b. Variable-air-volume systems.
 - c. Multizone systems.
2. Balancing Domestic Water Piping Systems.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.03 REFERENCES AND STANDARDS

- A. Associated Air Balance Council (AABC)
 1. National Standards for Total System Balance, latest edition.
- B. National Environmental Balancing Bureau (NEBB)
 1. Procedural Standards for Testing and Balancing of Environmental Systems, latest edition.

1.04 DEFINITIONS

- A. The intent of this Section is to use the standards pertaining to the TAB specialist engaged to perform the Work of this Contract, with additional requirements specified in this Section. Contract requirements take precedence over corresponding AABC or NEBB standards requirements. Differences in terminology between the Specifications and the specified TAB organization standards do not relieve the TAB entity engaged to perform the Work of this Contract of responsibility from completing the Work as described in the Specifications.
- B. Similar Terms: The following table is provided for clarification only:

<u>Similar Terms</u>		
Contract Term	AABC Term	NEBB Term
TAB Specialist	TAB Agency	NEBB Certified Firm
TAB Standard	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems	Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems
TAB Field Supervisor	Test and Balance Engineer	Test and Balance Supervisor

- C. AABC: Associated Air Balance Council.
- D. NEBB: National Environmental Balancing Bureau.
- E. TAB: Testing, adjusting, and balancing.
- F. TAB Organization: Body governing practices of TAB Specialists.
- G. TAB Specialist: An entity engaged to perform TAB Work.

1.05 ACTION SUBMITTALS

- A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.
- B. LEED Submittals:
 - 1. Air-Balance Report for Prerequisite IEQ 1: Documentation of work performed for ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
 - 2. TAB Report for Prerequisite EA 2: Documentation of work performed for ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.06 INFORMATIONAL SUBMITTALS

- A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.
- B. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
 - 1. Provide list of similar projects completed by proposed TAB field supervisor.
 - 2. Provide copy of completed TAB report, approved by mechanical engineer of record for a completed project with similar system types and of similar complexity.

- C. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
 - 1. Submit examinations report with qualifications data.
- D. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- E. Interim Reports. Submit interim reports as specified in Part 3. Include list of system conditions requiring correction and problems not identified in Contract Documents examination report.
- F. Certified TAB reports.
 - 1. Provide three printed copies of final TAB report. Provide one electronic file copy in PDF format.
- G. Sample report forms.
- H. Instrument calibration reports, to include the following:
 - 1. Instrument type and make.
 - 2. Serial number.
 - 3. Application.
 - 4. Dates of use.
 - 5. Dates of calibration.
 - a. Instruments to be used for testing and balancing shall have been calibrated within a period of one year, or less if so recommended by instrument manufacturer and be checked for accuracy prior to start of work.

1.07 CLOSEOUT SUBMITTALS

- A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.
- B. Certified TAB reports, for inclusion in Operation and Maintenance Manual.

1.08 QUALITY ASSURANCE

- A. Independent TAB Specialist Qualifications: Engage a TAB entity certified by AABC or NEBB.
 - 1. The certification shall be maintained for the entire duration of TAB work for this Project. If TAB specialist loses certification during this period, the Contractor shall immediately notify the Architect and submit another TAB specialist for approval. All work specified in this Section and in other related Sections performed by the TAB specialist shall be invalidated if the TAB specialist loses certification, and shall be performed by an approved successor.
- B. To secure approval for the proposed TAB specialist, submit information certifying that the TAB specialist is either a first tier subcontractor engaged and paid by the Contractor, or is engaged and paid directly by the Owner. TAB specialist shall not be affiliated with any other entity participating in

Work of this Contract, including design, furnishing equipment, or construction. In addition, submit evidence of the following:

1. TAB Field Supervisor: Full-time employee of the TAB specialist and certified by AABC or NEBB.
 - a. TAB field supervisor shall have minimum 10 years supervisory experience in TAB work.
2. TAB Technician: Full-time employee of the TAB specialist and who is certified by AABC or NEBB as a TAB technician.
 - a. TAB technician shall have minimum 4 years TAB field experience.
- C. TAB Specialist engaged to perform TAB work in this Project shall be a business limited to and specializing in TAB work, or in TAB work and Commissioning.
- D. TAB specialist engaged to perform TAB work shall not also perform commissioning activities on this Project.
- E. Certified TAB field supervisor or certified TAB technician shall be present at the Project site at all times when TAB work is performed.
 1. TAB specialist shall maintain at the Project site a minimum ratio of one certified field supervisor or technician for each non-certified employee at times when TAB work is being performed.
- F. Contractor shall notify Architect in writing within three days of receiving direction resulting in reduction of test and balance scope or other deviations from Contract Documents. Deviations from the TAB plan shall be approved in writing by the mechanical engineer of record for the Project.
- G. TAB Standard:
 1. Perform TAB work in accordance with the requirements of the standard under which the TAB agencies' qualifications are approved unless Specifications contain different or more stringent requirements:
 - a. AABC National Standards for Total System Balance, or
 - b. NEBB Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems.
 2. All recommendations and suggested practices contained in the TAB standard are mandatory. Use provisions of the TAB standard, including checklists and report forms, to the extent to which they are applicable to this Project.
 3. Testing, adjusting, balancing procedures, and reporting required for this Project, and not covered by the TAB standard applicable to the TAB specialist engaged to perform the Work of this Contract, shall be submitted for approval by the design engineer.
- H. TAB Conference: Meet with Architect and mechanical engineer on approval of the TAB strategies and procedures plan to develop a mutual understanding of the project requirements. Require the participation of the TAB field supervisor. Provide seven days' advance notice of scheduled meeting time and location. TAB conference shall take place at location selected by Architect offices of Capital.

1. Agenda Items:
 - a. The Contract Documents examination report.
 - b. The TAB plan.
 - c. Coordination and cooperation of trades and subcontractors.
 - d. Coordination of documentation and communication flow, including protocol for resolution tracking and documentation.
 2. The requirement for TAB conference may be waived at the discretion of the mechanical engineer of record for the Project.
 - I. Certify TAB field data reports and perform the following:
 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
 2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.
 - J. TAB Report Forms: Use standard TAB specialist's forms approved by Architect.
 - K. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."
 - L. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
 - M. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."
- 1.09 PROJECT CONDITIONS
- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.
- 1.10 WARRANTY
- A. Provide workmanship and performance warranty applicable to TAB specialist engaged to perform Work of this Contract:
 1. AABC Performance Guarantee.
 2. NEBB Quality Assurance Program.
 - B. Refer to Division 01 Specifications for additional requirements.
- 1.11 COORDINATION
- A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

- B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.
- C. Coordinate TAB work with work of other trades.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contract Documents Examination Report:
 - 1. TAB specialist shall review Contract Documents, including plans and specifications. Provide report listing conditions that would prevent the system(s) from operating in accordance with the sequence of operations specified, or would prevent accurate testing and balancing:
 - a. Identify each condition requiring correction using equipment designation shown on Drawings. Provide room number, nearest building grid line intersection, or other information necessary to identify location of condition requiring correction.
 - b. Proposed corrective action necessary for proper system operation.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine equipment performance data including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
- F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- G. Examine test reports specified in individual system and equipment Sections.
- H. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- I. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- J. Examine operating safety interlocks and controls on HVAC equipment.

- K. Report conditions requiring correction discovered before and during performance of TAB procedures.
- L. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.02 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures. TAB plan shall be specific to Project and include the following:
 - 1. General description of each air system and sequence(s) of operation.
 - 2. Complete list of measurements to be performed.
 - 3. Complete list of measurement procedures. Specify types of instruments to be utilized and method of instrument application.
 - 4. Qualifications of personnel assigned to Project.
 - 5. Single-line CAD drawings reflecting all test locations (terminal units, grilles, diffusers, traverse locations, etc).
 - 6. Table indicating pressure relationships (positive, negative, or neutral) between building spaces.
 - 7. Air terminal correction factors for the following:
 - a. Air terminal configuration.
 - b. Flow direction (supply or return/exhaust).
 - c. Effective area of each size and type of air terminal.
 - d. Air density.
- B. Complete system-readiness checks and prepare reports. Verify the following:
 - 1. Permanent electrical-power wiring is complete.
 - 2. Automatic temperature-control systems are operational.
 - 3. Equipment and duct access doors are securely closed.
 - 4. Balance, smoke, and fire dampers are open.
 - 5. Isolating and balancing valves are open and control valves are operational.
 - 6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 - 7. Windows and doors can be closed so indicated conditions for system operations can be met.

3.03 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.
 - 1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 - 2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 23 07 13 "Duct Insulation," Section 23 07 16 "HVAC Equipment Insulation," Section 23 80 00 Heating, Ventilating, and Air Conditioning."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.04 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Test each system to verify building or space operating pressure, including all stages of economizer cycle. Maximum building pressure shall not exceed 0.03 inches of pressure.
- C. Except as specifically indicated in this Specification, Pitot tube traverses shall be made of each duct to measure airflow. Pitot tubes, associated instruments, traverses, and techniques shall conform to ASHRAE Handbook, HVAC Applications, and ASHRAE Handbook, HVAC Systems and Equipment.
 - 1. Use state-of-the-art instrumentation approved by TAB specialists governing agency..
 - 2. Where ducts' design velocity and air quantity are both less than 1000 fpm/CFM, air quantity may be determined by measurements at terminals served.
- D. Test holes shall be placed in straight duct, as far as possible downstream from elbow, bends, take-offs, and other turbulence-generating devices.
- E. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- F. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- G. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

- H. Verify that motor starters are equipped with properly sized thermal protection.
- I. Check dampers for proper position to achieve desired airflow path.
- J. Check for airflow blockages.
- K. Check condensate drains for proper connections and functioning.
- L. Check for proper sealing of air-handling-unit components.
- M. Verify that air duct system is sealed as specified in Section 23 31 13 "Metal Ducts." Section 23 80 00 "Heating, Ventilating, and Air Conditioning."
- N. Provide for adjustments or modifications to fan and motor sheaves, belts, damper linkages, and other components as required to achieve specified air balance at no additional cost to Owner.
- O. Automatically operated dampers shall be adjusted to operate as indicated in Contract Documents. Controls shall be checked for proper calibration.

3.05 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow. Alternative methods shall be examined for determining total CFM, i.e., Pitot-tube traversing of branch ducts, coil or filter velocity profiles, prior to utilizing airflow values at terminal outlets and inlets.
 - 2. Measure fan static pressures as follows to determine actual static pressure:
 - a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
 - b. Measure static pressure directly at the fan outlet.
 - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
 - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
 - 3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
 - a. Report the cleanliness status of filters and the time static pressures are measured.
 - 4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.

5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 6. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Check operation of relief air dampers. Measure total relief air quantity at each stage of normal, economizer, power exhaust, or power exhaust economizer operation, as applicable to installed equipment. Adjust relief air dampers to provide 100 percent relief in economizer mode. Ensure that relief dampers close completely upon unit shutdown.
- C. Check operation of outside air dampers. Measure total outside air quantity at each stage of normal, economizer, power exhaust, or power exhaust economizer operation, as applicable to installed equipment. Adjust outside air dampers to provide 100 percent outside air in economizer mode. Ensure that outside air dampers close completely upon unit shutdown.
- D. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
1. Measure airflow of submain and branch ducts.
 - a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
 3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.
- E. Measure air outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading digital backflow compensating hood. Use outlet manufacturer's written instructions and calculating factors only when direct-reading hood cannot be used due to physical obstruction or other limiting factors. Final report shall indicate where values listed have not been obtained by direct measurement.
- F. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents, if included.
 2. Adjust patterns of adjustable outlets for proper distribution without drafts. Terminal air velocity at five feet above finished floor shall not exceed 50 feet per minute in occupied air conditioned spaces.
- G. Do not overpressurize ducts.

3.06 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

- A. Comply with applicable requirements for constant-volume air systems in addition to those listed below.
- B. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a minimum set-point airflow with the remainder at maximum-airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.
- C. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
1. Set outdoor-air dampers at minimum, and set return- and exhaust-air dampers at a position that simulates full-cooling load.
 2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
 3. Measure total system airflow. Adjust to within indicated airflow.
 4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
 5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.
 - a. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.
 6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.

- a. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.
7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
8. Record final fan-performance data including optimum operating static control set point.

3.07 PROCEDURES FOR MULTIZONE SYSTEMS

- A. Comply with applicable requirements for constant-volume air systems in addition to those listed below.
- B. Set unit at maximum airflow through the cooling coil.
- C. Adjust each zone's balancing damper to achieve indicated airflow within the zone.

3.08 PROCEDURES FOR HEAT EXCHANGERS

- A. Measure water flow through all circuits.
- B. Adjust water flow to within specified tolerances.
- C. Measure inlet and outlet water temperatures.
- D. Measure inlet steam pressure.
- E. Check settings and operation of safety and relief valves. Record settings.

3.09 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 1. Manufacturer's name, model number, and serial number.
 2. Motor horsepower rating.
 3. Motor rpm.
 4. Efficiency rating.
 5. Nameplate and measured voltage, each phase.
 6. Nameplate and measured amperage, each phase.
 7. Starter manufacturer's name, model number, size, type, and thermal-protection-element rating.
 - a. Starter strip heater size, type, and rating.
- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record

observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.10 PROCEDURES FOR CONDENSING UNITS

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record compressor data.

3.11 PROCEDURES FOR HEAT-TRANSFER COILS

- A. Measure, adjust, and record the following data for each electric heating coil:
 - 1. Nameplate data.
 - 2. Airflow.
 - 3. Entering- and leaving-air temperature at full load.
 - 4. Voltage and amperage input of each phase at full load and at each incremental stage.
 - 5. Calculated kilowatt at full load.
 - 6. Fuse or circuit-breaker rating for overload protection.
- B. Measure, adjust, and record the following data for each refrigerant coil:
 - 1. Dry-bulb temperature of entering and leaving air.
 - 2. Wet-bulb temperature of entering and leaving air.
 - 3. Airflow.
 - 4. Air pressure drop.

3.12 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

- A. Perform a preconstruction inspection of existing equipment that is to remain and be reused.
 - 1. Measure and record the operating speed, airflow, and static pressure of each fan.
 - 2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
 - 3. Check the condition of filters.
 - 4. Check the condition of coils.
 - 5. Check the operation of the drain pan and condensate-drain trap.
 - 6. Check bearings and other lubricated parts for proper lubrication.

7. Report on the operating condition of the equipment and the results of the measurements taken. Report conditions requiring correction.
- B. Before performing testing and balancing of existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished. Verify the following:
1. New filters are installed.
 2. Coils are clean and fins combed.
 3. Drain pans are clean.
 4. Fans are clean.
 5. Bearings and other parts are properly lubricated.
 6. Conditions requiring correction noted in the preconstruction report are corrected.
- C. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.
1. Compare the indicated airflow of the renovated work to the measured fan airflows, and determine the new fan speed and the face velocity of filters and coils.
 2. Verify that the indicated airflows of the renovated work result in filter and coil face velocities and fan speeds that are within the acceptable limits defined by equipment manufacturer.
 3. If calculations increase or decrease the air flow rates and water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated rates. If increase or decrease is 5 percent or less, equipment adjustments are not required.
 4. Balance each air outlet.

3.13 GENERAL PROCEDURES FOR PLUMBING SYSTEMS

- A. Measure pressure drop across each backflow preventer assembly at design flows.
- B. Measure water flow at pumps. Use the following procedures except for positive-displacement pumps:
1. Verify impeller size by operating the pump with the discharge valve closed. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
 - a. If impeller sizes must be adjusted to achieve pump performance, obtain approval from Architect Owner Construction Manager Commissioning Authority and comply with requirements in Section 22 50 00 "Plumbing Equipment Section 22 11 23 "Domestic Water Pumps."

2. Check system resistance. With all valves open, read pressure differential across the pump and mark pump manufacturer's head-capacity curve. Adjust pump discharge valve until indicated water flow is achieved.
 - a. Monitor motor performance during procedures and do not operate motors in overload conditions.
 3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.
 4. Report flow rates that are not within range given in article, Tolerances.
- C. Set calibrated balancing valves, if installed, at calculated presettings.
- D. Measure flow at all stations and adjust, where necessary, to obtain first balance.
1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.
- E. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than indicated flow.
- F. Adjust balancing stations to within specified tolerances of indicated flow rate as follows:
1. Determine the balancing station with the highest percentage over indicated flow.
 2. Adjust each station in turn, beginning with the station with the highest percentage over indicated flow and proceeding to the station with the lowest percentage over indicated flow.
 3. Record settings and mark balancing devices.
- G. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures including outdoor-air temperature.
- H. Measure the differential-pressure-control-valve settings existing at the conclusion of balancing.
- I. Check settings and operation of each safety valve. Record settings.

3.14 TOLERANCES

- A. Set HVAC system's air flow rates and water flow rates within the following tolerances:
1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus 10 percent and minus 0 percent.
 2. Air Outlets and Inlets: Plus 5 percent and minus 5 percent.
 3. Multiple outlets within single room: Plus 5 percent and minus 0 percent for total airflow within room. Tolerance for individual outlets within a single room having multiple outlets shall be as for "Air Outlets and Inlets."

- B. Set plumbing systems water flow rates within plus or minus 10 percent.

3.15 REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.
- B. Interim Reports: Prepare periodic lists of conditions requiring correction and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.16 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
 - 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing field supervisor. Report shall be co-signed by the Contractor, attesting that he has reviewed the report, and the report has been found to be complete and accurate.
 - 2. The certification sheet shall be followed by sheet(s) listing items for which balancing objectives could not be achieved. Provide explanation for failure to achieve balancing objectives for each item listed.
 - 3. Include a list of instruments used for procedures, along with proof of calibration.
- B. Final Report Contents: In addition to certified field-report data, include the following:
 - 1. Fan curves.
 - 2. Manufacturers' test data.
 - 3. Field test reports prepared by system and equipment installers.
 - 4. Other information relative to equipment performance; do not include Shop Drawings and product data.
- C. General Report Data: In addition to form titles and entries, include the following data:
 - 1. Title page.
 - 2. Name and address of the TAB specialist.
 - 3. Project name.
 - 4. Project location.
 - 5. Project Performance Guaranty

6. Architect's name and address.
 7. Engineer's name and address.
 8. Contractor's name and address.
 9. Report date.
 10. Signature of TAB supervisor who certifies the report.
 11. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 12. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 13. Nomenclature sheets for each item of equipment.
 14. Data for terminal units, including manufacturer's name, type, size, and fittings.
 15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings including settings and percentage of maximum pitch diameter.
 - f. Inlet vane settings for variable-air-volume systems.
 - g. Settings for supply-air, static-pressure controller.
 - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
 2. Duct, outlet, and inlet sizes.
 3. Pipe and valve sizes and locations.
 4. Terminal units.

5. Balancing stations.
 6. Position of balancing devices.
- E. Air distribution outlets and inlets shall be shown on keyed plans with designation for each outlet and inlet matching designation used in Contract Documents and TAB test reports. Room numbers shall be included in keyed plans and test reports. Where multiple outlets and inlets are installed within a single room, a designation shall be assigned and listed for each outlet and inlet in addition to room number.
- F. Test Reports – General:
1. All test reports containing air or liquid flow data shall record flow values prior to system adjustment in addition to required data listed for each test report.
- G. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches, and bore.
 - i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - j. Number, make, and size of belts.
 - k. Number, type, and size of filters.
 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.

f. Center-to-center dimensions of sheave, and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):

a. Total air flow rate in cfm.

b. Total system static pressure in inches wg.

c. Fan rpm.

d. Discharge static pressure in inches wg.

e. Filter static-pressure differential in inches wg.

f. Preheat-coil static-pressure differential in inches wg.

g. Cooling-coil static-pressure differential in inches wg.

h. Heating-coil static-pressure differential in inches wg.

i. Outdoor airflow in cfm.

j. Return airflow in cfm.

k. Relief airflow in cfm.

l. Outdoor-air damper position, normal and economizer, power exhaust, or power exhaust economizer modes, as applicable to installed equipment.

m. Return-air damper position.

n. Relief-air damper position, normal and economizer, power exhaust, or power exhaust economizer modes, as applicable to installed equipment.

o. Vortex damper position.

H. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.

b. Location.

c. Coil type.

d. Number of rows.

e. Fin spacing in fins per inch o.c.

f. Make and model number.

g. Face area in sq. ft.

- h. Tube size in NPS.
 - i. Tube and fin materials.
 - j. Circuiting arrangement.
2. Test Data (Indicated and Actual Values):
- a. Air flow rate in cfm.
 - b. Average face velocity in fpm.
 - c. Air pressure drop in inches wg.
 - d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
 - e. Return-air, wet- and dry-bulb temperatures in deg F.
 - f. Entering-air, wet- and dry-bulb temperatures in deg F.
 - g. Leaving-air, wet- and dry-bulb temperatures in deg F.
 - h. Refrigerant expansion valve and refrigerant types.
 - i. Inlet steam pressure in psig.
- I. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:
1. Unit Data:
- a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Fuel type in input data.
 - g. Output capacity in Btu/h.
 - h. Ignition type.
 - i. Burner-control types.
 - j. Motor horsepower and rpm.
 - k. Motor volts, phase, and hertz.

- l. Motor full-load amperage and service factor.
 - m. Sheave make, size in inches, and bore.
 - n. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 2. Test Data (Indicated and Actual Values):
 - a. Total air flow rate in cfm.
 - b. Entering-air temperature in deg F.
 - c. Leaving-air temperature in deg F.
 - d. Air temperature differential in deg F.
 - e. Entering-air static pressure in inches wg.
 - f. Leaving-air static pressure in inches wg.
 - g. Air static-pressure differential in inches wg.
 - h. Low-fire fuel input in Btu/h.
 - i. High-fire fuel input in Btu/h.
 - j. Manifold pressure in psig.
 - k. High-temperature-limit setting in deg F.
 - l. Operating set point in Btu/h.
 - m. Motor voltage at each connection.
 - n. Motor amperage for each phase.
 - o. Heating value of fuel in Btu/h.
- J. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:
 1. Unit Data:
 - a. System identification.
 - b. Location.
 - c. Coil identification.
 - d. Capacity in Btu/h.
 - e. Number of stages.

- f. Connected volts, phase, and hertz.
 - g. Rated amperage.
 - h. Air flow rate in cfm.
 - i. Face area in sq. ft.
 - j. Minimum face velocity in fpm.
2. Test Data (Indicated and Actual Values):
- a. Heat output in Btu/h.
 - b. Air flow rate in cfm.
 - c. Air velocity in fpm.
 - d. Entering-air temperature in deg F.
 - e. Leaving-air temperature in deg F.
 - f. Voltage at each connection.
 - g. Amperage for each phase.
- K. Fan Test Reports: For supply, return, and exhaust fans, include the following:
- 1. Fan Data:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches, and bore.
 - h. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.

- d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - g. Number, make, and size of belts.
3. Test Data (Indicated and Actual Values):
- a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Suction static pressure in inches wg.
- L. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
1. Report Data:
- a. System and air-handling-unit number.
 - b. Location and zone.
 - c. Traverse air temperature in deg F.
 - d. Duct static pressure in inches wg.
 - e. Duct size in inches.
 - f. Duct area in sq. ft.
 - g. Indicated air flow rate in cfm.
 - h. Indicated velocity in fpm.
 - i. Actual air flow rate in cfm.
 - j. Actual average velocity in fpm.
 - k. Barometric pressure in psig.
- M. Air-Terminal-Device Reports:
1. Unit Data:
- a. System and air-handling unit identification.

- b. Location and zone.
 - c. Apparatus used for test.
 - d. Area served.
 - e. Make.
 - f. Number from system diagram.
 - g. Type and model number.
 - h. Size.
 - i. Effective area in sq. ft.
2. Test Data (Indicated and Actual Values):
- a. Air flow rate in cfm.
 - b. Air velocity in fpm.
 - c. Preliminary air flow rate as needed in cfm.
 - d. Preliminary velocity as needed in fpm.
 - e. Final air flow rate in cfm.
 - f. Final velocity in fpm.
 - g. Space temperature in deg F.

N. Instrument Calibration Reports:

1. Report Data:
 - a. Instrument type and make.
 - b. Serial number.
 - c. Application.
 - d. Dates of use.
 - e. Dates of calibration.

3.17 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.

2. Check the following for each system:
 - a. Measure airflow of at least 10 percent of air outlets.
 - b. Measure water flow of at least 5 percent of terminals.
 - c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
 - d. Verify that balancing devices are marked with final balance position.
 - e. Note deviations from the Contract Documents in the final report.
- B. Final Inspection:
 1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Architect.
 2. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Architect.
 3. Architect shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
 4. If rechecks yield measurements that differ from the measurements documented in the final report by more than 10 percent, the measurements shall be noted as "FAILED."
 5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:
 1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
 2. If the second final inspection also fails, Owner may contact the TAB specialists' governing organization for remedial action by the governing organization under the workmanship and performance warranty. See article, Warranty.
 3. If remedial action is not provided by the TAB specialists' governing organization in a timely manner, Owner may contract the services of another TAB specialist to complete the TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB specialists' final payment.
- D. Prepare test and inspection reports.

3.18 ADDITIONAL TESTS

- A. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION

SECTION 23 08 00

TITLE 24 COMMISSIONING OF HVAC

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for commissioning of HVAC systems for Title 24 (T-24) compliance.
- B. Scope: Commissioning Coordinator shall complete the building systems commissioning requirements of the California Energy Code, as applicable to Project. It is not the intention of Project specifications to require duplication in testing.
 - 1. T-24 commissioning activities may be coordinated with Contractor tests and TAB work specified in technical Sections.
 - 2. T-24 commissioning activities may be coordinated with LEED and CHPS program commissioning activities, as applicable to Project.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The requirements of this Section apply to all Sections of Division 23.
- C. In the event of conflict between requirements of Division 01 Title 24 commissioning specifications and this Section, Division 01 requirements shall prevail.

1.03 REFERENCES

- A. 2016 California Energy Code.
- B. 2016 California Energy Code and Building Energy Efficiency Standards Reference Appendices.
- C. 2016 Building Energy Efficiency Standards Nonresidential Compliance Manual.

1.04 DEFINITIONS

- A. Commissioning Coordinator: General Contractor, or an entity engaged by the General Contractor to perform T-24 commissioning.
- B. Covered Processes: Process equipment for which there are listed requirements in the California Energy Code.
- C. OPR: Owner's Project Requirements.
- D. TAB: Testing, Adjusting, and Balancing.

1.05 SUBMITTALS (FOR RECORD ONLY)

A. Submit the following:

1. Commissioning Plan.
2. Systems Manual.
3. Commissioning Report.
4. Certificates of Installation.
5. Certificates of Acceptance.

B. Above items for inclusion in closeout documents submitted to authorities having jurisdiction.

PART 2 - PRODUCTS

2.01 TEST INSTRUMENTS

- A. Commissioning Coordinator shall supply test instruments. Instruments to be used for testing and balancing shall have been calibrated within a period of one year, or less if recommended by instrument manufacturer, and be checked for accuracy prior to start of work.

PART 3 - EXECUTION

3.01 COMMISSIONING PROCESS ROLES AND RESPONSIBILITIES

A. Architect/Engineer:

1. Performs construction observation. Provides construction observation reports.
2. Reviews and approves Commissioning Plan, Systems Manual, and Commissioning Report.
3. Assists in problem resolution.

B. Commissioning Coordinator:

1. Coordinates commissioning process.
2. Develops Commissioning Plan.
3. Schedules and conducts functional testing. Completes Certificates of Acceptance.
4. Assembles Systems Manual.
5. Schedules and conducts systems operations training. Verifies systems operations training completion.

C. HVAC Subcontractor: Assists in functional testing.

D. Electrical Subcontractor: Assists in functional testing.

- E. Controls Subcontractor: Assists in functional testing.
- F. TAB Subcontractor: Assists in functional testing.
- G. Equipment Manufacturers/Vendors:
 - 1. Performs Check, Test, and Start of equipment and systems, as required by Project technical Sections.
 - 2. Provides systems and equipment documentation required to complete functional testing and assemble Systems Manual.

3.02 COMMISSIONING PLAN

- A. Commissioning Coordinator shall author the code-required Commissioning Plan. The Commissioning Plan shall address HVAC systems for which commissioning is required. The Commissioning Plan shall be updated by Commissioning Coordinator throughout the construction process. The Commissioning Plan shall contain the following:
 - 1. General Project Information: Commissioning Coordinator shall obtain general Project information from Project architectural Drawings.
 - 2. Commissioning Goals:
 - a. Verify that the applicable equipment and systems are installed in accordance with the contract documents and according to the manufacturer's recommendations.
 - b. Verify and document proper integrated performance of equipment and systems utilizing functional testing for mechanical system acceptance, as required by the California Energy Code.
 - c. Verify that Systems Manual documentation is complete.
 - d. Verify that operating personnel are trained to enable them to operate, monitor, adjust, and maintain HVAC systems in an effective and energy-efficient manner.
 - 3. Commissioning Coordinator shall compile the following information and include in Commissioning Plan:
 - a. An explanation of original design intent: Commissioning Coordinator shall obtain copies of the OPR and BOD for the Project.
 - b. Equipment and systems to be tested, including the extent of tests: Test 100 percent of a given type of installed equipment having associated Acceptance Requirements.
 - 1) Refer to forms MCH-01-E on Drawings for systems to be commissioned.
 - 2) Covered Processes: In addition to systems listed in MCH-01-E on Drawings, complete Acceptance Requirements for the following systems, if applicable to Project:
 - a) Parking garage ventilation systems.

- b) Compressed air systems.
- c) Type 1 Kitchen exhaust systems.
- c. Functions to be tested: Refer to 2016 Building Energy Efficiency Standards for Residential and Nonresidential Buildings, Nonresidential Appendix NA7.
- d. Conditions under which the test shall be performed.
- e. Measureable criteria for acceptable performance: Refer to 2016 Building Energy Efficiency Standards for Residential and Nonresidential Buildings, Nonresidential Appendix NA7.
- f. Commissioning team information:
 - 1) Refer to Project information on architectural Drawings for design team participants. Commissioning Coordinator shall add subcontractor information to provided design team information and include in Commissioning Plan.
- g. Commissioning process activities, schedules, and responsibilities. Plans for the completion of functional performance testing, systems operations training, and commissioning report.

3.03 CERTIFICATES OF INSTALLATION

- A. Commissioning Coordinator shall complete applicable Certificates of Installation forms.

3.04 FUNCTIONAL TESTING REQUIREMENTS

- A. Contractor shall complete the applicable Acceptance Requirements for Code Compliance contained in the California Building Energy Efficiency Standards. Refer to T-24 compliance forms on Drawings for systems having Acceptance testing requirements. Contractor shall perform Acceptance tests and complete the appropriate "Certificates of Acceptance." Contractor shall engage certified HERS Rater to verify duct leakage rate for duct systems indicated on T-24 compliance forms on Drawings as requiring duct leakage rate testing. For additional duct leak testing requirements, refer to Section 23 80 00, "Heating, Ventilating, and Air Conditioning," Article, "Ductwork Sealing and Leak Testing."
- 1. Covered Processes: In addition to systems listed on T-24 compliance forms on Drawings, complete Acceptance Requirements for the following systems, if applicable to Project:
 - a. Parking garage ventilation systems.
 - b. Compressed air systems.
 - c. Type 1 Kitchen exhaust systems.

3.05 SYSTEMS MANUAL

- A. Commissioning Coordinator shall assemble Systems Manual in accordance with the requirements of the California Energy Code, HVAC and Plumbing specifications, and Division 01 specifications, including Section 01 79 00, Demonstration and Training, and commissioning specifications.

3.06 SYSTEMS OPERATIONS TRAINING

- A. Commissioning Coordinator shall provide systems operations training in accordance with the requirements of the California Energy Code, HVAC and Plumbing specifications, and Division 01 specifications, including Section 01 79 00, Demonstration and Training, and commissioning specifications.

3.07 COMMISSIONING REPORT

- A. Commissioning Coordinator shall complete Commissioning Report in accordance with the requirements of the California Energy Code and Division 01 commissioning specifications.

END OF SECTION

SECTION 23 09 23

ENERGY MANAGEMENT CONTROL SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Refer to Basic Mechanical Requirements Section, for general mechanical requirements.
- B. Refer to Mechanical Division for installation of instrument wells, valve bodies, dampers, etc. in mechanical systems.
- C. Provide the following electrical work as work of this Section, complying with requirements of Electrical Division, and as outlined below:
 - 1. All control wiring between field-installed controls, indicating devices, and unit control panels.
 - 2. Interlock wiring between electrically interlocked devices, sensors, and between a hand or auto position of motor starters as indicated.
 - 3. Wiring associated with indicating and alarm panels (remote alarm panels) and connections to their associated field devices.
 - 4. Contractor shall provide and extend low voltage power source wiring required for operation of control devices provided.
 - 5. Wiring for fully complete and functional controls system and as specified.

1.02 SUBMITTALS: IN ACCORDANCE WITH DIVISION 1

- A. Product Data: Submit manufacturer's specifications for each control device furnished, including installation instructions and start-up instructions. Submit integrated wiring and electrical diagram to show complete system operation.
- B. All submittals must be received and approved by the Owner prior to the ordering and installation of any equipment by the Contractor.
 - 1. Provide the Owner with a Building Controls submittal with the following:
 - a. System Hardware
 - b. System Architecture
 - c. Complete System Wiring Schematic
- C. Submit shop drawings showing construction and mounting details for review prior to construction. In addition, submit the following for review prior to panel and/or system fabrication and installation:
 - 1. Field wiring diagrams showing wiring external to panel.

2. Panel internal wiring diagrams also showing panel terminal connections for external wiring, properly coordinated and keyed to external wiring diagram.
3. Designation of all switches, pilot lights, etc. and layout of instruments, switches, and nameplates of panel.

1.03 COORDINATION

- A. Automatic temperature control systems work shall be accomplished as outlined below:
1. Control Valves furnished under this section shall be installed as specified in Mechanical Division.
 2. Control Dampers are provided under the applicable Mechanical Division air distribution or air handling equipment section.
 3. Water Pressure Taps, Thermal Wells, Flow Switches, Flow Meters, that will have wet surfaces furnished under this Section, shall be installed as specified in Mechanical Division.
 4. Controlled Equipment Power Wiring shall be furnished and installed under Electrical Division. Where control involves 120V control devices controlling 120V equipment, the Division 16 Electrical Contractor shall extend power wiring to the equipment and shall extend it from the equipment to the control device.

1.04 INSTALLING CONTRACTOR QUALIFICATIONS

- A. The Building Automation System Control System contractor must have been in business, and licensed as a contractor by the State of California, installing HVAC and building automation controls, and fire/life safety systems, for a minimum of ten (10) years preceding the bid opening.
- B. The Building Automation Control System contractor must have completed no less than one (1) control system installation, within twenty-four (24) months preceding the bid opening, pursuant to a single written contract, valued at no less than three hundred thousand (\$300,000) dollars.
- C. The Building Automation Control System contractor must demonstrate that, from the local office that will service the Owner with a four (4) hour emergency response requirement can logistically be provided.
- D. Controls contractor must have direct access to factory certified instructors to provide training upon request of the district.
- E. Controls contractor must have explicit district approval to interface with district wide server for integration of new controls system. Current approved personnel include: Martin Chance, Tom Brennan, Jeffery Winn and John Borges.
- F. The Building Automation Control System contractor must have been, for five (5) years preceding the bid opening, a factory branch office, or a factory authorized dealer for the product manufacturer type identified in subsection 2.01, A., under PART 2 – PRODUCTS, of this section. Factory authorized dealer means:
1. Installing Contractor has a contract directly with the factory. A contract with a distributor is not acceptable.

2. Installing Contractor has direct access to factory technical support and training.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Manufacturer: The Building Automation Control System shall be provided by the following:
 1. Controls are to be provided by Johnson Controls, Inc., branch office in Folsom, CA to match campus standard. Please Contact Zac Dillow @ 925-719-7785
 2. No other contractors are acceptable or will be considered
 3. The Building Automation Controls contractor must have been, for ten (10) years preceding the bid opening, a factory branch office. A contract with a distributor is not acceptable.
- B. All new controls material must be fully integrated and graphically represented on existing district building automation controls system on the districts servers. Only district authorized personnel may access this server for controls integration.
- C. All components used shall be serviceable, repairable, and replaceable by qualified temperature control technicians using non-proprietary parts, tools, and instruments.

2.02 SUPERVISORY CONTROLLER

- A. NETWORK AUTOMATION ENGINE (NAE) – EXISTING ON SITE
 1. The NAE shall perform the function of monitoring all system variables, both from real hardware points, software variables, and controller parameters such as set points.
 2. NAE's shall be entirely solid state devices. No rigid disk drives will be permitted in the equipment rooms.
 3. The NAE's shall manage and direct all information traffic on the Tier 1 network, between the Tier 1 and Tier2 networks, and to servers.
 4. Any NAE on the Tier 1 network shall be equipped with all software necessary to drive the complete user interface including graphics on a browser connected to the NAE via the network or directly via a local port on the node.
 5. The operating system of the NAE shall support multi-user access. At minimum four users shall be able to access the same NAE simultaneously.
 6. Communication between NAE's shall be per-to-peer via 10/100 Ethernet using the BACnet protocol.
 7. The NAE shall be capable of direct connection to multiple field busses using different protocols simultaneously as indicated below. Should the controller not support multiple field busses, install two supervisory controllers side by side.

- a. An RS-485 serial field bus such as BACnet MSTP or the manufacturer's proprietary field bus – JCI N2.
 - b. A LON field bus for supervision and control of LON based controllers that conform to the Lon Talk standard.
8. The NAE will integrate data from both field busses into a common object structure. Data from both field busses will appear in common displays throughout the user interface in exactly the same format. It shall not be possible to determine which field buss the data originated on without reviewing the system configuration data.
 9. The NAE shall be programmable and governed by the requirements of their applicable codes, approvals and regulations.
 10. The NAE shall be designed, packaged, installed, programmed and commissioned in consideration of their specific service and prevailing operating conditions. They shall be proven standard product of their original manufacturer and not a custom product for this Project.
 11. A failure at an NAE shall not cause failures or non-normal operation at any other system NAE other than the possible loss of active real-time information from the failed NAE.
 12. Ancillary NAE equipment, including interfaces and power supplies, shall not be operated at more than 80% of their rated service capacity.
 13. The NAE shall comply with FCC Part 15 subpart J class A emission requirements.
 14. Each NAE shall be equipped with the necessary un-interruptible power such that it will not cease operation during minor power outages, including those that occur upon transfer to emergency generator or other local power source not provided by the utility.

2.03 NETWORKING/COMMUNICATIONS

- A. The design of the Building Automation Control System shall network operator workstations and Standalone DDC Panels as shown on the attached system configuration drawing. Inherent in the system's design shall be the ability to expand or modify the network(s) either via the local area network, or auto-dial telephone line modem connections, or via a combination of the two networking schemes.
 1. Local Area Network
 - a. Workstation/DDC Panel Support: Operator workstations and DDC panels shall directly reside on a local area network such that communications may be executed directly between controllers, directly between workstations, and between controllers and workstations on a peer-to-peer basis.
 - b. Dynamic Data Access: All operator devices, either network resident or connected via dial-up modems, shall have the ability to access all point status and application report data, or execute control functions for any and all other devices via the local area network. Access to data shall be based upon logical identification of building equipment. Access to system data shall not be restricted by the hardware configuration of the Building Automation Control

System. The hardware configuration of the Building Automation Control System network shall be totally transparent to the user when accessing data or developing control programs.

- c. General Network Design: Network design shall include the following provisions:
- 1) High-speed data transfer rates for alarm reporting, quick report generation from multiple controllers and upload/download efficiency between network devices. The minimum baud rate shall be one (1) Megabaud.
 - 2) Support of any combination of controllers and operator workstations directly connected to the local area network. A minimum of fifty (50) devices shall be supported on a single local area network.
 - 3) Detection and accommodation of single or multiple failures of either workstations, DDC panels or the network media. The network shall include provisions for automatically reconfiguring itself to allow all operational equipment to perform their designated functions as effectively as possible in the event of single or multiple failures.
 - 4) Message and alarm buffering to prevent information from being lost.
 - 5) Error detection, correction, and retransmission to guarantee data integrity.
 - 6) Default device definition to prevent loss of alarms or data, and ensure alarms are reported as quickly as possible in the event an operator device does not respond.
 - 7) Commonly available, multiple sourced, networking components and protocols shall be used to allow the Building Automation Control System to coexist with other networking applications such as office automation. MAP, ETHERNET, IBM Token Ring and ARCNET are acceptable technologies.
 - 8) Use of an industry standard IEEE 802.x protocol. Communications must be of a deterministic nature to assure calculable performance under worst-case network loading.
 - 9) Synchronization of the real-time clocks in all DDC panels shall be provided.

2.04 APPLICATION SPECIFIC CONTROLLERS - HVAC APPLICATIONS:

- A. Each Standalone DDC Controller shall be able to extend its performance and capacity through the use of remote Application Specific Controllers (ASCs).
- B. Each ASC shall operate as a standalone controller capable of performing its specified control responsibilities independently of other controllers in the network. Each ASC shall be a microprocessor-based, multi-tasking, real-time digital control processor.
- C. Each ASC shall have sufficient memory to support its own operating system and data base including:
 1. Control Processes
 2. Energy Management Applications

3. Operator I/O (Portable Service Terminal)
- D. The operator interface to any ASC point data or programs shall be through any network-resident PC workstation, or any PC or portable operator's terminal connected to any DDC panel in the network.
- E. Application Specific Controllers shall directly support the temporary use of a portable service terminal. The capabilities of the portable service terminal shall include but not be limited to the following:
 1. Display temperatures
 2. Display status
 3. Display setpoints
 4. Display control parameters
 5. Override binary output control
 6. Override analog setpoints
 7. Modification of gain and offset constants
- F. Powerfail Protection: All system setpoints, proportional bands, control algorithms, and any other programmable parameters shall be stored such that a power failure of any duration does not necessitate reprogramming the controller.
- G. Application Description:
 1. Field Equipment Controller (FEC) – BY JCI
 - a. When indoors - the FEC shall operate as a standard from 32 to 122 degrees Fahrenheit ambient air temperature and 10 to 90% relative humidity.
 - b. When outdoors mounted either in unit cabinet or mounted in a steel enclosure – the FEC shall operate from -40 to 158 degrees Fahrenheit ambient air temperature and 10 to 90% relative humidity.
 - c. The Field Equipment Controller (FEC) shall be a fully user-programmable, digital controller that communicates via BACnet MS/TP protocol.
 - d. The FEC shall employ a finite state control engine to eliminate unnecessary conflicts between control functions at crossover points in their operational sequences. Suppliers using non-state based DDC shall provide separate control strategy diagrams for all controlled functions in their submittals.
 - e. Controllers shall be factory programmed with a continuous adaptive tuning algorithm that senses changes in the physical environment and continually adjusts loop tuning parameters appropriately. Controllers that require manual tuning of loops or perform automatic tuning on command only shall not be acceptable.

- f. The FEC shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.
- g. The FEC shall include a removable base to allow pre-wiring without the controller.
- h. The FEC shall include troubleshooting LED indicators to identify the following conditions:
 - 1) Power On
 - 2) Power Off
 - 3) Download or Startup in progress, not ready for normal operation
 - 4) No Faults
 - 5) Device Fault
 - 6) Field Controller Bus - Normal Data Transmission
 - 7) Field Controller Bus - No Data Transmission
 - 8) Field Controller Bus - No Communication
 - 9) Sensor-Actuator Bus - Normal Data Transmission
 - 10) Sensor-Actuator Bus - No Data Transmission
 - 11) Sensor-Actuator Bus - No Communication
- i. The FEC shall accommodate the direct wiring of analog and binary I/O field points.
- j. The FEC shall support the following types of inputs and outputs:
 - 1) Universal Inputs - shall be configured to monitor any of the following:
 - a) Analog Input, Voltage Mode
 - b) Analog Input, Current Mode
 - c) Analog Input, Resistive Mode
 - d) Binary Input, Dry Contact Maintained Mode
 - e) Binary Input, Pulse Counter Mode
 - 2) Binary Inputs - shall be configured to monitor either of the following:
 - a) Dry Contact Maintained Mode
 - b) Pulse Counter Mode
 - 3) Analog Outputs - shall be configured to output either of the following

- a) Analog Output, Voltage Mode
- b) Analog Output, current Mode
- 4) Binary Outputs - shall output the following:
 - a) 24 VAC Triac
- 5) Configurable Outputs - shall be capable of the following:
 - a) Analog Output, Voltage Mode
 - b) Binary Output Mode
- k. The FEC shall have the ability to reside on a Field Controller Bus (FC Bus).
 - 1) The FC Bus shall be a Master-Slave/Token-Passing (MS/TP) Bus supporting BACnet Standard protocol SSPC-135, Clause 9.
 - 2) The FC Bus shall support communications between the FECs and the NAE.
 - 3) The FC Bus shall also support Input/Output Module (IOM) communications with the FEC and with the NAE.
 - 4) The FC Bus shall support a minimum of 100 IOMs and FEC in any combination.
 - 5) The FC Bus shall operate at a maximum distance of 15,000 ft. between the FEC and the furthest connected device.
- l. The FEC shall have the ability to monitor and control a network of sensors and actuators over a Sensor-Actuator Bus (SA Bus).
 - 1) The SA Bus shall be a Master-Slave/Token-Passing (MS/TP) Bus supporting BACnet Standard protocol SSPC-135, Clause 9.
 - 2) The SA Bus shall support a minimum of 10 devices per trunk.
 - 3) The SA Bus shall operate at a maximum distance of 1,200 ft. between the FEC and the furthest connected device.
- m. The FEC shall have the capability to execute complex control sequences involving direct wired I/O points as well as input and output devices communicating over the FC Bus or the SA Bus.
- n. The FEC shall support, but not be limited to, the following:
 - 1) Hot water, chilled water/central plant applications
 - 2) Built-up air handling units for special applications
 - 3) Terminal units

- 4) Special programs as required for systems control

H. Field Devices

1. Input/Output Module (IOM) – BY JCI

- a. The IOM shall operate as a standard from 32 to 122 degrees Fahrenheit ambient air temperature and 10 to 90% relative humidity
- b. The Input/Output Module (IOM) provides additional inputs and outputs for use in the FEC.
- c. The IOM shall communicate with the FEC over either the FC Bus or the SA Bus using BACnet Standard protocol SSPC-135, Clause 9.
- d. The IOM shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.
- e. The IOM shall have a minimum of 4 points to a maximum of 17 points.
- f. The IOM shall support the following types of inputs and outputs:
 - 1) Universal Inputs - shall be configured to monitor any of the following:
 - a) Analog Input, Voltage Mode
 - b) Analog Input, Current Mode
 - c) Analog Input, Resistive Mode
 - d) Binary Input, Dry Contact Maintained Mode
 - e) Binary Input, Pulse Counter Mode
 - 2) Binary Inputs - shall be configured to monitor either of the following:
 - a) Dry Contact Maintained Mode
 - b) Pulse Counter Mode
 - 3) Analog Outputs - shall be configured to output either of the following:
 - a) Analog Output, Voltage Mode
 - b) Analog Output, current Mode
 - 4) Binary Outputs - shall output the following:
 - a) 24 VAC Triac
 - 5) Configurable Outputs - shall be capable of the following:
 - a) Analog Output, Voltage Mode

b) Binary Output Mode

g. The IOM shall include troubleshooting LED indicators to identify the following conditions:

- 1) Power On
- 2) Power Off
- 3) Download or Startup in progress, not ready for normal operation
- 4) No Faults
- 5) Device Fault
- 6) Normal Data Transmission
- 7) No Data Transmission
- 8) No Communication

2. Network Sensors (NS)

a. The Network Sensors (NS) shall have the ability to monitor the following variables as required by the systems sequence of operations:

- 1) Zone Temperature
- 2) Zone humidity
- 3) Zone setpoint

b. The NS shall transmit the zone information back to the controller on the Sensor-Actuator Bus (SA Bus) using BACnet Standard protocol SSPC-135, Clause 9.

c. The Network Sensors shall include the following items:

- 1) A backlit Liquid Crystal Display (LCD) to indicate the Temperature, Humidity and Setpoint.
- 2) An LED to indicate the status of the Override feature.
- 3) A button to toggle the temperature display between Fahrenheit and Celsius.
- 4) A button to initiate a timed override command

d. The NS shall be available with either screw terminals or phone jack.

e. The NS shall be available in either surface mount or wall mount styles.

2.05 TEMPERATURE CONTROL MATERIAL:

A. PANEL DEVICES

<u>PART #</u>	<u>DESCRIPTION</u>	<u>MFTR</u>
DCP-1.5-W	1.5 AMP POWER SUPPLY	KELE
DPT2640-005D	PRESSURE SENS, DP, 0-5"WC	SETRA
RH2B-UAC24-L	DPDT, 10A, HC=24 VAC, W/LED	IDEC
SH2B-05	DPDT RELAY BASE FOR RH2B	IDEC
RH4B-UAC24V	4PDT, 10A, HC=24 VAC	IDEC
SH4B-05	4PDT RELAY BASE FOR RH4B	IDEC
PXPLX01S	DP TRANSDUCER, AIR, 0-1"	VERIS
1900-5MR	HIGH STATIC PRESS. SWITCH	DWYER
BAM2	TB END STOP	KELE
FEM6	TB END STOP SECTION	KELE
M4/6	TERMINAL BLOCK	KELE
RC610B	TB BLANK MARKING STRIPS	KELE
Y65A13-0	120VAC/24VAC, FOOT, 40VA	JCI
Y65A21-0	120VAC/24VAC, PLATE, 40VA	JCI

B. TRANSDUCERS

<u>PART #</u>	<u>DESCRIPTION</u>	<u>MFTR</u>
A-306	OUTDOOR AIR STATIC	KELE
DPT-2015-1	DIFF PRESS TRANSMITTER	JCI
DPT2090-250G	PRESS SENS, GAGE, 250 PSI, VDC	SETRA
DPT2640-0R1B	PRESS SENS, DP, -0.1-0.1"WC, VDC	SETRA
DPT2640-2R5D	PRESS SENS, DP, 0-2.5"WC, VDC	SETRA
FTG18A-600R	REMOTE MTD PROBE	JCI
PWLX03S	DIFF PRESS, WATER, 0-25PSI	VERIS

C. SENSORS

<u>PART #</u>	<u>DESCRIPTION</u>	<u>MFTR</u>
TE-6000-1	SENSOR, T-NI, 1.0%, STRAP-ON	JCI
TE-6001-3	KIT, MTG BOX FOR WZ-1000 WELL	JCI
TE-6313P-1	SENSOR, T-NI 0.1%, 3IN OAT	JCI
TE-6316P-1	SENSOR, T-NI, 0.1%, 17FT AVG	JCI
TE-6311V-2	DUCT PROBE TEMP. SEN. 1K	JCI
TE-67NP-0N00	SENSOR, RM, 1K, NI, PHONE JACK	JCI
TE-67NT-0N00	TEMP SENSOR 1K NICKEL	JCI
NS-BTP7002-0	ZONE TEMP SENSOR/SETPT	JCI
NS-BTP7003-0	ADDRESSABLE ZONE TEMP	JCI
NS-BCN7004-0	CO2 SENSOR	JCI
A/1KHT-2W-RP	REMOTE PROBE,-40-842, PT, 1K	ACI
A11A-1C	PLN, MLT, SP=35-45 F, STG=1	JCI
TEC-2601-4	1 HEAT/1 COOL BACnet STAT	JCI
LX-24	CEILING MOUNT OCC SENSOR	KELE
ST-S63-XH	S.S ZONE TEMP WITH OCC OVR	KELE

D. FIELD DEVICES

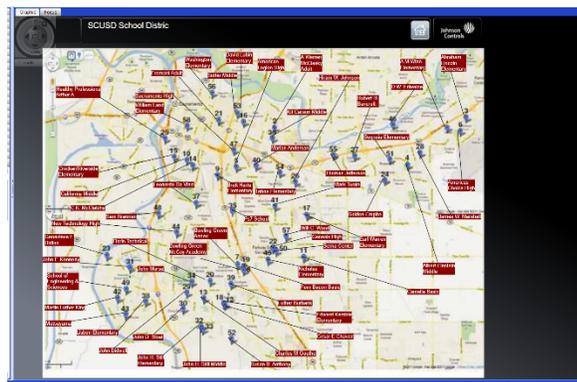
PART #	DESCRIPTION	MFTR
H922	CURRENT SENSOR, SPLIT	VERIS
ST-S63-XM	STAINLESS STEEL ZONE TEMP	KELE
TS-400-24-W	DIGITAL TIME SWITCH	KELE
TS-470	END SWITCH, NO	KELE
WZ-1000-5	WELL, BRASS, 2-3/8 IN, 1/2 IN NPT	JCI
M9104-AGS-2N	ELEC, INCR, NSR, TQ=35	JCI
M9220-BGA-3	DAMPER ACTUATOR 20 NM SR	JCI
MS-FEC2611-0ET	OUTDOOR FEC	JCI
MS-FEC2611	INDOOR FEC	JCI
MS-NAE4510-2	MEDIUM CAPACITY NAE	JCI
MS-NAE5510-2	HIGH CAPACITY NAE	JCI

- E. Motorized Control Dampers: Shall be parallel blade for two-position control and opposed blade for proportional control applications. Dampers shall have an enamel finish or be galvanized, with nylon bearings. Blade edge and tip seals shall be included for all dampers. Blade shall be double piece 22 gauge minimum and 8" wide maximum and frame shall be welded channel iron.
- F. Temperature control panels (TCP): Shall be of NEMA code gauge steel with locking doors for mounting all devices as shown. They shall meet all applicable requirements of Title 24, California Code of Regulations. All controllers, relays, switches, etc. for equipment located in mechanical equipment rooms shall be mounted in a TCP as shown on the drawings. Temperature settings, adjustments and calibration shall be done at the TCP. Any required UCMC Campus Data networks connection for this panel shall be installed inside the panel. All electric devices within a control panel shall be factory pre-piped and wired. Provide engraved laminated plastic nameplates identifying all devices mounted on the face of the control panels. A complete set of related "as-builts" control drawings shall be furnished in each control panel.

2.06 GRAPHIC INTERFACE

- A. The following are examples of the district wide standard for the graphical interface of the controls system. The new controls system must be graphically represented according to the following templates

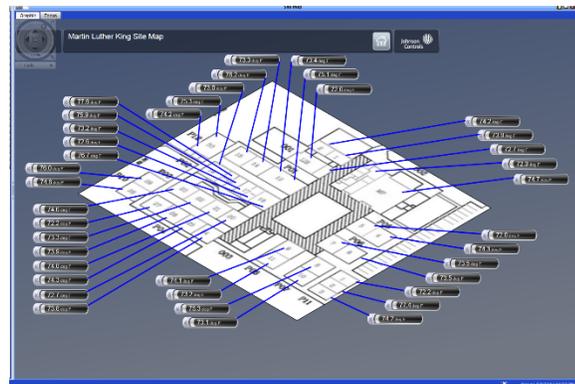
1. District Map View



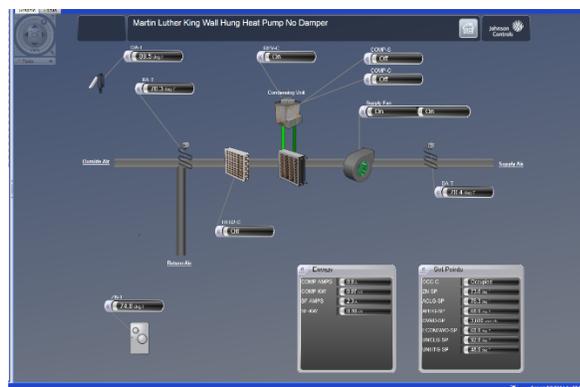
2. School Overview



3. Zone Overview



4. Equipment Overview



2.07 CONSULTATIVE SUPPORT

A. For this project, the manufacturer shall provide at a minimum 8 hours of consultative support services to review and provide recommendations and enhancements to the system, which may include:

1. Review of critical programming loops and adjustments as necessary

2. Adjustments to improve building system operation, reduce energy consumption and/or improve environmental control
3. Implementation or enhancement of functionality in the system

2.08 MISCELLANEOUS DEVICES

A. Moisture Sensors:

1. Moisture sensors shall be used to detect water in elevator sumps and chilled water fan coil unit overflow drain pans and where otherwise indicated on the Drawings using George Risk Industries Model GRI 2650, Veris MX Series, or equal.
2. The sensor shall be floor mounted operating at 24 VAC with SPDT relay for the output signal with automatic reset.

PART 3 - EXECUTION

3.01 GENERAL

- A. Furnish all labor, materials, equipment, and service necessary for a complete and operating Direct Digital Control Building Automation Control System, as shown on the drawings and described herein.
- B. All labor, material, equipment, and software necessary to meet the functional intent of the Building Automation Control System as specified herein and as shown on the drawings shall be included.
- C. Drawings are diagrammatic only. Equipment and labor not specifically referred to herein, or on the plans, that are required to meet the functional intent of the Building Automation Control System, shall be provided without additional cost to Sac City Unified School District.
- D. Equipment furnished by Electrical and/or Mechanical Contractor that is normally wired before installation shall be furnished completely wired. Wiring normally performed in field shall be furnished and installed by the Building Automation Control System contractor.
- E. Control equipment having electrical connections only, which are furnished under this work, shall be installed and connected by the Building Automation Control System contractor. Electrical devices requiring wet side piping connections shall be installed by the Mechanical Contractor.
- F. Clearly identify and label equipment and controls, such as starters, switches, relays, as to function and position with permanently engraved plastic nameplates.
- G. Wiring of control equipment in accordance with wiring diagrams and functional operation of the control system shall be the responsibility of the Building Automation Control System contractor.
- H. Final Adjustment of Equipment: After completion of installation, adjust temperature sensors, control valves, actuators, motors, and similar equipment provided under the scope of work of this section. Cooperate with the air balance contractor as required.
- I. Perform final adjustment by specially trained personnel in direct employ by the manufacturer of the primary Building Automation Control System.

- J. Connect control valves with threaded connections with sufficient unions to permit valves to be readily removed from their installed locations for servicing, without disturbing adjacent piping. In no case shall this be less than three unions for three-way valves and one union for two-way valves.
- K. Wiring and raceways included with the BACS scope of works includes but is not limited to the following:
 - 1. Power wiring for all controllers, sensors, relays and other equipment shall be taken from the local HVAC controls panels except equipment provided with dedicated supplies provided by Division 16.
 - 2. Controls wiring shall be routed from the local HVAC controls panels.
 - 3. Conduit shall be used for the following:
 - a. All exposed and concealed low voltage wiring in all areas below 8 feet above floor level.
 - b. All mechanical and equipment rooms, exterior locations and any other areas where physical protection and/or access is required as defined elsewhere in the contract documents.
 - c. All in-wall drops to equipment monitoring and/or control points including but not limited to medical equipment, kitchen service equipment, elevator sump and other moisture sensors, water flow meters, equipment mounted alarms, etc.
 - d. All areas where specifically indicated on the Drawings.
 - 4. J-Hooks and or designated LV raceway shall be used for the following:
 - a. All low voltage wiring above 8 feet above floor level in open and accessible areas where conduit is not required, to cable trays or other conduits.
 - b. All areas where specifically indicated on the Drawings.
 - 5. Conduit and J-Hook materials and installation requirements shall comply with the applicable sections of Division 16 unless specifically indicated otherwise on the Drawings.

3.02 WARRANTY

- A. The Building Automation Control System contractor shall provide a one-year warranty covering the Building Automation Control System, and all associated components installed by the Building Automation Control System contractor. Any manufacturing or installation defects arising during this warranty period shall be corrected without cost to the Owner. The Building Automation Control System contractor shall respond to the job site within a four (4) hour period for any emergency relating to the control system and associated components installed by the Building Automation Control System contractor. Warranty period shall commence after all operator instruction is completed and the entire system has been accepted by the Owner.

3.03 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Owner's Representative. At completion, carefully clean and adjust

equipment, fixtures, and trim installed as part of this work. Leave systems and equipment in satisfactory operating condition.

3.04 OPERATION TEST/SYSTEM COMMISSIONING

- A. Each piece of equipment shall be tested by the Building Automation Control System contractor to show that it will operate in accordance with designed requirements, and provide written documentation of this test. Control system commissioning shall consist of a point per point conformation and system operational demonstration conducted jointly by the Building Automation Control System contractor and the University's Representative.
- B. The mechanical contractor and BACS contractor/vendor will conduct two levels of Quality Assurance to verify that the required installation and performance of the Building Automation Control System as been met.
 - 1. Static Commissioning:
 - a. A point to point examination and documentation of the successful installation of the BACS system and its components in its entirety.
 - b. The start up of all HVAC equipment and associated systems will not commence until this work has been completed and the documentation received by the Owner.
 - 2. Dynamic Commissioning:
 - a. A point by point demonstration and documentation of the successful performance of the BACS system and its components in its entirety.
 - b. The verification demonstrations of all HVAC equipment and associated systems will not commence until this work has been completed and the documentation received by the Owner.
- C. All new controller programming shall be backed up into the districts existing database.
- D. As part of the operational test's the controls contractor shall demonstrate integration of new controls system into the existing server and BACS.
- E. In General the Commissioning process will comprise the following:
 - 1. Review of points list and documentation.
 - 2. Installation compliance with project plans and specifications.
 - 3. Point-to-point check.
 - 4. Control devices calibration and operation.
 - 5. System programming and documentation.
 - 6. System endurance test.
 - 7. Control loop trends.

8. Reports and alarms.
 9. Analog input calibration.
 10. Analog output check and spring ranges.
 11. Digital input range set points.
 12. Digital output in autolog.
 13. Point by point performance verification.
 14. O & M training and documentation.
 15. Opposite season verification and documentation.
 16. Review and document system architecture.
- F. Prior to job closing, the controls contractor must provide and present drawings showing the physical location of the new Field Control bus routing around the campus. This will be reviewed by district HVAC personnel.

3.05 OPERATOR INSTRUCTION

- A. During system commissioning and at such time acceptable performance of the Building Automation Control System hardware and software has been established, the Control Contractor shall schedule with the Owner's Representative and provide eight (8) hours of on site, or off site, operator instruction to the Owner's operating personnel. Operator instruction during normal working hours shall be performed by a competent representative familiar with the systems hardware, software, and accessories.

END OF SECTION

SECTION 23 80 00

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Roof mounted air conditioning units.
2. Roof mounted heat pump units.
3. Split system heat pump units.
4. Split system air conditioning units.
5. Fans.
6. Air inlets and outlets.
7. Filters.
8. Dampers.
9. Ductwork.
10. Insulation.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 23 00 50, Basic HVAC Materials and Methods.
- C. Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.
- D. Section 23 09 23, Direct Digital Control (DDC) System for HVAC.

1.03 ACTION SUBMITTALS

- A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.
- B. Product Data: Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, dimensions, weight, corner or mounting point weights, furnished specialties and accessories; and installation and start-up instructions. Product data shall include applicable product listings and standards. Refer to Section 23 00 50, Basic HVAC Material and Methods for additional requirements.

1. Upon approval of submittal, provide manufacturer's installation and operating instructions to the Project inspector for the following:
 - a. Fire dampers, smoke dampers, and combination smoke-fire dampers.
- C. Engineering Data: Submit fan curves and sound power level data for each fan unit. Data shall be at the scheduled capacity. Data shall include the name of the rating agency or independent laboratory.

1.04 INFORMATIONAL SUBMITTALS

- A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.
- B. Roof Curb Data: For roof mounted equipment where combined weight of equipment unit and roof curb or rail exceeds 400 pounds, submit calculations from manufacturer for roof curbs proving compliance with the seismic requirements of the California Building Code, and ASCE 7-10. Manufacturer shall certify that roof curbs are suitable for use indicated on Drawings and in Specifications for the seismic design category indicated in structural Contract Documents. Calculations shall be stamped and signed by a State of California registered structural engineer.
- C. Economizer Fault Detection and Diagnostics (FDD) System Data: For all air-cooled unitary direct-expansion units equipped with an economizer, provide data for third-party supplied California Energy Commission certified FDD controller, documenting compliance with the requirements of California Building Energy Efficiency Standards. Provide evidence of certification.
- D. Record of pre-installation meeting.
- E. Coordinated Layouts: Submit coordinated layouts. For requirements refer to article, Coordinated Layouts, in this Section.

1.05 CLOSEOUT SUBMITTALS

- A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.
- B. Maintenance Data: Submit maintenance data and parts list for each piece of equipment, control, and accessory; including "trouble-shooting guide," in Operation and Maintenance Manual.
- C. Record Drawings: Submit Record Drawings of installed ductwork, duct accessories, and outlets and inlets in accordance with requirements of Division 01.

1.06 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Belts: One set(s) for each belt-driven unit.
 2. Provide one complete set(s) of filters for each filter bank.

1.07 COORDINATED LAYOUT

- A. Coordinated layouts are required to amplify, expand and coordinate the information contained in the Contract Documents.
- B. Provide minimum 1/4 inch equals one foot scaled coordinated layout drawings showing plan and pertinent section or elevation views of piping, ductwork, equipment, accessories, and electrical systems. Drawings shall be reproducible and work of each trade represented shall be fully coordinated with structure, other disciplines, and finished surfaces. Drawings shall be presented on a single size sheet. Coordinated layout drawings shall have title block, key plan, north arrow and sufficient grid lines to provide cross-reference to design Drawings.
 - 1. Provide a stamp or title block on each drawing with locations for signatures from all contractors involved, including but not limited to the General, HVAC, Plumbing, Fire Protection, and Electrical contractors. Include statement for signature that the contractor has reviewed the coordinated layout drawings in detail and has coordinated the work of his trade.
 - 2. Show on drawings the intended elevation of all ductwork in accordance with the following example:
 - a. B.O.D. = 9'-0"
OFFSET UP 6"
B.O.D. = 9'-6"
 - 3. Highlight, encircle or otherwise indicate deviations from the Contract Documents on the coordinated layouts. Architect will not be responsible for identifying deviations from the original Contract Documents.
- C. Since scale of contract drawings is small and all offsets and fittings are not shown, Contractor shall make allowances in bid for additional coordination time, detailing, fittings, offsets, hangers and the like to achieve a fully coordinated installation. If changes in duct size are required, equivalent area shall be maintained and the aspect ratio shall not be in excess of 2 to 1 unless approved by the engineer. Drawings shall be submitted for review prior to fabrication and installation. Drawings may be submitted in packages representing at least one quarter of the building ductwork.
- D. Check routing on all ductwork before fabricating. Report any discrepancies to Architect. No extra cost will be allowed for failure to conform to above.

1.08 QUALITY ASSURANCE

- A. Design Criteria:
 - 1. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture. All gas-fired equipment shall be UL, ETL or CSA listed.
 - 2. Supply all equipment and accessories in accordance with requirements of applicable national, state and local codes.
 - 3. All items of a given type shall be products of the same manufacturer.
 - 4. Scheduled equipment performance is minimum capacity required.

5. Scheduled electrical capacity shall be considered as maximum available.
6. Scheduled gas BTU input shall be considered as maximum available.

1.09 FIELD CONDITIONS

- A. Interruption of Existing Services: Do not interrupt services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services according to requirements indicated:
1. Notify Architect no fewer than two days in advance of proposed interruption of services.
 2. Do not interrupt services without Architect's written permission.

1.10 WARRANTY

- A. Air Conditioning Unit, Roof-Mounted:
1. Compressor shall have a five-year warranty.
 2. Standard heat exchanger shall have a ten-year warranty.
- B. Heat Pump Unit, Roof-Mounted: Compressor shall have a five-year warranty.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).

2.02 GAS FIRED EQUIPMENT

- A. All gas-fired equipment shall be listed for use as a gas appliance.
- B. All units shall comply with the emissions requirements of the Air Quality Management District (AQMD) in which they are to be installed.

2.03 AIR CONDITIONING UNIT, ROOF-MOUNTED

- A. Provide factory assembled single packaged outdoor rooftop mounted, electrically controlled gas heating and electric cooling unit, rated in accordance with ARI Standards 210/240 or 340/360, and ETL or UL listed and labeled, classified in accordance with UL 1995. Provide refrigerant charge R-410A, all internal wiring, piping, controls, and special features required prior to field startup. Design unit to conform to the following:
1. California NOx emission requirements.
 2. ASHRAE 15.
 3. ASHRAE 90.1.

4. Insulation, adhesive, and all materials exposed to air stream shall meet NFPA 90A requirements for flame spread and smoke generation.
 5. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
- B. Unit shall be rated in accordance with ARI sound standards 270 or 370.
- C. Unit shall be ETL or UL tested and certified in accordance with ANSI Z21.47 Standards as a total package.
- D. Roof curb shall be designed to conform to NRCA Standards.
- E. Unit shall be designed and manufactured in accordance with ISO 9001.
- F. For unit sizes applicable to Energy Star program, units shall be Energy Star qualified.
- G. Cabinet:
1. Provide galvanized steel unit cabinet, bonderized and coated with a baked enamel finish.
 2. All airstream interior surfaces shall be insulated with a minimum 1/2 inch thick, 1.5 lb density cleanable insulation. Insulation shall be encapsulated with panel design or have sealed edges.
 3. Cabinet panels shall be hinged with integrated non-corrosive hinges. Provide hinged access panels for the filter, compressors, evaporator fan, and control box/ heat section areas. Each panel shall have multiple latches and handles. Each external hinged access panel shall be permanently attached to the rooftop unit.
 4. Return air filters shall be accessible through a dedicated hinged access panel.
 5. Fork lift slots and rigging holes shall be provided in unit base rails. Base rails shall be minimum 16 gauge.
 6. Unit shall have an integral sloped condensate drain pan, providing minimum 3/4 in.-14 NPT connections for horizontal drain configuration. Provide unit with alternate vertical thru-the-bottom drain connection when furnished as standard for units sizes scheduled on Drawings. See Drawings for drain configuration. Pan shall be removable for cleaning and maintenance. All drain pans shall conform to ASHRAE 62.1 self-draining provisions.
 7. Unit shall have standard side and alternate field or factory installed thru-the-bottom power and control wiring connection capability. Thru-the-bottom electrical connections shall use manufacturer's approved water-tight connection method.
 8. Unit shall be field convertible to, or factory furnished with, horizontal air discharge, as applicable for unit sizes as scheduled on Drawings.
- H. Fans:
1. Centrifugal supply air blower (evaporator fan) shall have sealed, permanently lubricated ball bearings, or rigid pillow block bearings, as supplied as standard equipment for unit sizes scheduled

on Drawings. Units supplied with pillow block bearings shall be furnished with accessible lubricant fittings. Provide belt-driven double inlet fan wheel, centrifugal type with forward curved blades and adjustable sheaves. Multiple speed direct drive motors may be utilized when supplied as standard equipment for efficiency and electrical requirements as scheduled on the Drawings. Fan wheel shall be steel, with corrosion resistant finish, dynamically balanced.

2. Condenser fans shall be of the direct-driven propeller type, with corrosion-resistant aluminum blades. Fans shall be dynamically balanced and discharge air upwards. Induced-draft blower shall be of the direct-driven, single inlet, forward-curved, centrifugal type, made from aluminized steel with a corrosion-resistant finish and shall be dynamically balanced.
 3. Induced draft fan shall be of the direct driven, single inlet, forward-curved centrifugal type. Fan wheel shall be steel, with corrosion resistant finish, dynamically balanced.
- I. Motors:
1. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have line break thermal and current overload protection.
 2. Evaporator fan motor shall have permanently lubricated, sealed bearings and inherent automatic-reset thermal overload protection or manual reset calibrated circuit breakers.
 3. Totally enclosed condenser-fan motor shall have permanently lubricated, sealed bearings, and inherent automatic-reset thermal overload protection.
 4. Induced-draft motor shall have permanently lubricated sealed bearings and inherent automatic-reset thermal overload protection.
 5. For single-phase fan motors sized larger than 1/12 hp and smaller than 1 hp, refer to Article, Electric Motors, in Section 23 00 50, Basic HVAC Materials and Methods.
- J. Compressor:
1. Fully hermetic, scroll type with internal high-pressure and temperature protection.
 2. Factory installed rubber shock mounted and internally spring mounted for vibration isolation.
 3. Compressor Anti-Recycle Timer: Compressor shall be prevented from restarting for a minimum of five minutes after shutdown, with manufacturers installed compressor cycle delay.
- K. Coils:
1. Standard evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless internally finned copper tubes with all joints brazed.
 2. Units shall have face-split type evaporator coils.
 3. For units with single compressor, condenser coils shall be single slab, single pass design. For dual compressor units, condenser coils shall be single slab, 2 pass design.

4. Evaporator coils shall be leak tested at minimum 150 psig, and pressure tested at minimum 450 psig.
 5. Condenser coils shall be leak tested at minimum 150 psig, and pressure tested at minimum 650 psig.
- L. Heating Section:
1. Induced-draft combustion type with direct-spark ignition system and redundant main gas valve with 2-stage capability on all 3-phase units.
 2. Heat Exchanger:
 - a. The standard aluminized heat exchanger shall be of the tubular-section type constructed of minimum 20-gage aluminized steel.
 3. Burners shall be of the in-shot type constructed of aluminum-coated steel.
 4. All gas piping shall enter the unit at a single location. Gas entry shall be through side or bottom of unit. See Drawings for gas entry location. When bottom gas entry is utilized, unit shall be furnished with field installed conversion kit, arranged so that gas shut-off valve is accessible from the roof.
 5. All factory-installed orifices are for operation up to 2,000 feet of altitude. For altitudes between 2,000 feet and 7,000 feet, a factory certified kit shall be furnished for field installation.
 6. Units shall be suitable for use with natural gas or propane. Provide field-installed propane conversion kit as required, see schedule on Drawings.
 7. The integrated gas controller board shall include gas heat operation fault notification using an LED (light-emitting diode).
 8. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high-temperature limit switch. Fault indication shall be made using an LED.
 9. The integrated gas controller board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high-temperature limit switch.
 10. The LED shall be visible without removal of control box access panel.
 11. Gas burner tray shall be removable for maintenance.
 12. Heating section shall be insulated with foil-faced fiberglass insulation.
- M. Refrigerant Components:
1. Each refrigerant circuit shall include:
 - a. Balanced port thermostatic expansion valve (TXV) with removable power element.
 - b. Solid core refrigerant filter driers with pressure ports.

- c. Refrigerant pressure gage ports and connections on suction, discharge, and liquid lines.

N. Filter Section:

1. Standard filter section shall accommodate 2 inch deep filters. Filters shall conform to the "Air Filters" Article in this Specification Section.
2. Filter section shall use standard size filters.

O. Controls:

1. Unit shall be complete with self-contained low voltage fuse protected control circuit. Refer to Section 25 50 00, if included, and equipment schedule, sequence of operation and control diagram on Drawings for additional requirements.
2. When third party direct digital controls with an Energy Management System will be utilized, provide electro-mechanical controls with 24V thermostat interface.
3. When stand-alone thermostat operation is utilized, provide electro-mechanical controls with 24V thermostat interface or provide microprocessor controls.
4. When stand-alone thermostat operation is utilized for single-zone VAV units, provide microprocessor controls. Units shall have factory mounted supply fan variable frequency drives.
5. When third party direct digital controls with an Energy Management System will be utilized for single zone VAV units, provide microprocessor controls with BACnet or LON interface. Units shall have factory mounted supply fan variable frequency drives.
6. Electro-mechanical controls shall include the following, as a minimum:
 - a. Service run test capability.
 - b. Provide compressor minimum run time (3 minutes) and minimum off time (5 minutes).
 - c. Economizer control.
 - d. Unit shall have 35° F low ambient cooling operation.
 - e. Time delay relay.
7. Microprocessor controls shall include the following, as a minimum:
 - a. User diagnostic interface.
 - b. Unit control with standard suction pressure transducers and condensing temperature thermistors.
 - c. Shall provide a 5° F temperature difference between cooling and heating set points to meet ASHRAE 90.1 energy standard.
 - d. Service run test capability.

- e. Shall accept input from a CO2 sensor (indoor).
- f. Configurable alarm light shall be provided which activates when certain types of alarms occur.
- g. Provide compressor minimum run time (3 minutes) and minimum off time (5 minutes).
- h. Service diagnostic mode.
- i. Economizer control.
- j. Unit shall have 0° F low ambient cooling operation.
- k. Time delay relay.

P. Safeties:

1. Unit shall incorporate a solid-state compressor lockout that provides optional reset capability at the space thermostat, should any of the following safety devices trip and shut off compressor:
 - a. Compressor lockout protection provided for either internal or external overload.
 - b. Low-pressure protection.
 - c. Freeze protection (evaporator coil).
 - d. High-pressure protection (high pressure switch or internal).
 - e. Compressor reverse rotation protection.
 - f. Loss of charge protection.
 - g. Start assist on single-phase units.
2. Supply-air sensor shall be located in the unit and detect both heating and cooling operation.
3. Induced draft heating section shall be provided with the following minimum protections:
 - a. High-temperature limit switch.
 - b. Induced-draft motor speed sensor.
 - c. Flame rollout switch.
 - d. Flame proving controls.
 - e. Redundant gas valve.
4. Phase Protection: Provide unit-mounted "SymCom," or equal, Motor Saver three phase voltage monitor, model 201A or equal, adjustable voltage range for each unit, install per manufacturer's recommendations, mount in NEMA 3R enclosure if exposed to the weather.
 - a. Units shall provide the following features:

- 1) Low voltage fault trip and reset.
- 2) Voltage unbalance/phasing fault trip and reset.
- 3) High voltage fault trip and reset.
- 4) Transient Protection (Internal).
- 5) Automatic restart.

b. Provide each unit with 600V socket, "SymCom" model OT08, or equal.

Q. Operating Characteristics:

1. Unit shall be capable of starting and running at 125° F ambient outdoor temperature per maximum load criteria of ARI Standards 210 or 360.
2. Unit will operate in cooling down to an outdoor ambient temperature of 35° F.
3. Unit shall be provided with fan time delay to prevent cold air delivery in heating mode.

R. Electrical Requirements:

1. All unit power wiring shall enter unit cabinet at a single location. Both unit side and bottom power entry provisions shall be provided. Refer to Drawings schedule for thru-the-bottom power wiring requirement.

S. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1. Carrier Corporation.
2. Trane Inc.
3. Johnson Controls, Inc.

T. Provide the following additional features and equipment:

1. Roof Curb: Formed galvanized steel with wood nailer strip capable of supporting entire unit weight. Provide 3 inch wide bottom flange.
2. Provide heavy-duty 18 gauge expanded metal coil guard grille to protect all surfaces of the condensing coil. Coil guard by Micrometl, Canfab, or equal.
3. Modulating Power Exhaust Economizer: Micrometl, Canfab, or equal. Integrated type capable of simultaneous economizer and compressor operation.
 - a. Provide self-contained outdoor rooftop system, mounted directly to the return air compartment of the HVAC packaged equipment. Provide differential dry bulb economizer control system and a factory programmed, fully programmable variable frequency drive package controlled by a differential pressure transmitter, mounted directly to the return air

compartment of the HVAC packaged equipment. Design the system to continuously maintain space pressure, and provide capability of introducing up to 100 percent outdoor air.

- 1) Economizer control system shall be certified as meeting the requirements for Fault Detection and Diagnostics (FDD) in the California Building Energy and Efficiency Standards.
 - b. Provide outside differential pressure tubing termination with hex style pneumatic filter-muffler, minimum filtration 40 microns, 53 SCFM maximum at 100 psi, as manufactured by McMaster-Carr, or equal.
 - c. Provide hinged cabinet access doors and include latches to provide a tool-less entry for servicing.
 - d. Provide door lock on the power exhaust cabinet to meet ETL safety requirements.
 - e. Outdoor air intake dampers shall be low leak not to exceed 3 percent at 1 inch wg pressure differential and include stainless steel side seal and neoprene edge seal. Arrange dampers to close upon loss of power.
 - f. Provide belt driven exhaust blowers, double inlet, forward-curved centrifugal type. Provide gravity backdraft damper at fan outlet.
 - g. Provide fully programmable factory programmed variable frequency drive (VFD) package for each fan, driven by 4 to 20 mA signal from a differential pressure transmitter. Pressure transmitters shall measure 0 - 0.1 in wg. Install room sensor tubing with sensor tube termination installed within the room.
 - 1) Where direct digital controls are utilized, provide Belimo, or equal, damper actuator, complete with spring return and all controls required to make the system fully operational.
 - 2) Where stand-alone controls are utilized, provide Belimo, or equal, damper actuator, complete with spring return and all controls, including logic module, required to make the system fully operational.
4. Gas Flue Extensions:
 - a. Provide at all locations where gas flue outlet will be within 10 feet of an adjacent building forced air inlet, or mechanical unit air intake, and where indicated on Drawings.
 5. Other features, accessories, and equipment scheduled on Drawings.
- U. Replenish for a period of one year without cost to the Owner all refrigerant and oil required to maintain the proper levels.
 - V. Owner Training: Manufacturer shall provide two initial on-site 4-hour training sessions for Owners' maintenance personnel. Manufacturer shall provide one 4-hour follow-up training session to be scheduled by Owner within one year of the date of the final initial training session. Training session agenda shall be as follows:

1. First session: Equipment.
2. Second session: Controls.
3. Follow-up session: Agenda by Owner.

2.04 HEAT PUMP UNIT, ROOF-MOUNTED

- A. Provide factory assembled single packaged outdoor rooftop mounted, electrically controlled electric cooling and heating unit, rated in accordance with ARI Standards 210/240 or 340/360, and ETL or UL listed and labeled, classified in accordance with UL 1995. Provide refrigerant charge R-410A, all internal wiring, piping, controls, and special features required prior to field startup. Design unit to conform to the following:
1. ASHRAE 15.
 2. ASHRAE 90.1.
 3. Insulation, adhesive, and all materials exposed to air stream shall meet NFPA 90A requirements for flame spread and smoke generation.
 4. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
- B. Unit shall be rated in accordance with ARI sound standards 270.
- C. Unit shall be ETL or UL tested and certified in accordance with ANSI Z21.47 Standards as a total package.
- D. Roof curb shall be designed to conform to NRCA Standards.
- E. Unit shall be manufactured in a facility registered to ISO 9001:2000.
- F. Unit shall be Energy Star qualified.
- G. Cabinet:
1. Provide galvanized steel unit cabinet, bonderized and coated with a baked enamel finish.
 2. All airstream interior surfaces shall be insulated with a minimum 1/2 inch thick, 1 lb density cleanable insulation. Heat compartment for optional electric heater shall be insulated with minimum 1/2 inch thick, 1 lb. density foil-faced insulation.
 3. Cabinet panels shall be removable. Provide access panels for the filter, compressors, evaporator fan, and control box. Each external hinged access panel shall be insulated, with insulation encapsulated with panel or with sealed edges.
 4. Return air filters shall be accessible through a dedicated tool-less removable access panel.
 5. Fork lift slots shall be provided in unit base rail. Base rail shall be minimum 16 gauge.

6. Unit shall have a factory-installed internally sloped condensate drain pan, providing minimum 3/4 inch-14 NPT connections for both horizontal and alternate vertical drain configuration. See Drawings for drain configuration. Pan shall be removable for cleaning and maintenance. All drain pans shall conform to ASHRAE 62.1 self-draining provisions.
 7. Unit shall have standard side and alternate field or factory installed thru-the-bottom power and control wiring connection capability.
 8. Unit shall be field or factory convertible to horizontal air discharge.
- H. Fans:
1. Centrifugal supply air blower (evaporator fan) shall have permanently lubricated bearings. Provide belt-driven double inlet fan wheel, centrifugal type with forward curved blades and adjustable sheaves. Fan wheel shall be steel, with corrosion resistant finish, dynamically balanced.
 2. Evaporator-fan motors shall be continuous operation, open drip-proof, and thermally protected. Bearings shall be sealed, permanently lubricated ball-bearing type.
 3. Condenser fans shall be of the direct-driven propeller type, with corrosion-resistant aluminum blades. Fans shall be dynamically balanced and discharge air upwards. Condenser-fan motors shall be totally enclosed and thermally protected.
- I. Compressor:
1. Fully hermetic, scroll type with internal high-pressure and temperature protection. Furnish with crankcase heater when normally supplied as standard equipment for model size scheduled on Drawings.
 2. Factory installed rubber shock mounted and internally spring mounted for vibration isolation.
 3. Compressor Anti-Recycle Timer: Compressor shall be prevented from restarting for a minimum of five minutes after shutdown, with manufacturers installed compressor cycle delay.
- J. Coils:
1. Standard evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless internally finned copper tubes with all joints brazed.
 2. Condenser coils shall be single slab, single pass design. Single slab, 2 pass design may be utilized when supplied as standard equipment for unit size as scheduled on the Drawings.
 3. Coils shall be leak tested at minimum 150 psig and pressure tested at minimum 450 psig.
- K. Refrigerant Components:
1. Each refrigerant circuit shall include:
 - a. Fixed orifice metering device.
 - b. Solid core refrigerant filter driers with pressure ports.

- c. Refrigerant pressure gage ports and connections on suction, and discharge lines.
- d. Suction line accumulator.
- e. Reversing valve.

L. Filter Section:

1. Standard filter section shall accommodate 2 inch deep filters. Filters shall conform to the "Air Filters" Article in this Specification Section.
2. Filter section shall use standard size filters.

M. Controls:

1. Unit shall be complete with self-contained low voltage fuse protected control circuit. Refer to Section 25 50 00, if included, and equipment schedule, sequence of operation and control diagram on Drawings for additional requirements.
2. When third party direct digital controls with an Energy Management System will be utilized, provide electro-mechanical controls with 24V thermostat interface.
3. When stand-alone thermostat operation is utilized, provide electro-mechanical controls with 24V thermostat interface or provide microprocessor controls.
4. When stand-alone thermostat operation is utilized for single-zone VAV units, provide microprocessor controls. Units shall have factory mounted supply fan variable frequency drives.
5. When third party direct digital controls with an Energy Management System will be utilized for single zone VAV units, provide microprocessor controls with BACnet or LON interface. Units shall have factory mounted supply fan variable frequency drives.
6. Electro-mechanical controls shall include the following, as a minimum:
 - a. Provide compressor minimum off time (5 minutes).
 - b. Economizer control.
 - c. Time delay relay.
 - d. Integrated adjustable defrost cycle.
7. Microprocessor controls shall be ASHRAE 62.1 compliant and include the following, as a minimum:
 - a. User diagnostic interface.
 - b. Unit control with standard suction pressure transducers and condensing temperature thermistors.
 - c. Shall provide a 5° F temperature difference between cooling and heating set points to meet ASHRAE 90.1 Energy Standard.

- d. Service run test capability.
- e. Shall accept input from a CO2 sensor (indoor) and provide demand ventilation control.
- f. Provide compressor minimum off time (5 minutes).
- g. Service diagnostic mode.
- h. Economizer control.
- i. Time delay relay.
- j. Integrated adjustable defrost cycle.

N. Safeties:

1. Unit shall incorporate a solid-state compressor lockout that provides optional reset capability at the space thermostat, should any of the following safety devices trip and shut off compressor:
 - a. Compressor lockout protection provided for either internal or external overload.
 - b. Low-pressure protection.
 - c. Freeze protection (evaporator coil).
 - d. High-pressure protection (high pressure switch or internal).
 - e. Compressor reverse rotation protection.
 - f. Loss of charge protection.
 - g. Start assist on single-phase units.
2. Supply-air sensor shall be located in the unit and detect both heating and cooling operation.
3. Phase Protection: Provide unit-mounted "SymCom," or equal, Motor Saver three phase voltage monitor, model 201A or equal, adjustable voltage range for each unit, install per manufacturer's recommendations, mount in NEMA 3R enclosure if exposed to the weather.
 - a. Units shall provide the following features:
 - 1) Low voltage fault trip and reset.
 - 2) Voltage unbalance/phasing fault trip and reset.
 - 3) High voltage fault trip and reset.
 - 4) Transient Protection (Internal).
 - 5) Automatic restart.
 - b. Provide each unit with 600V socket, "SymCom" model OT08, or equal.

O. Operating Characteristics:

1. Unit shall be capable of starting and running at 115° F ambient outdoor temperature per maximum load criteria of ARI Standards 210/240 or 340/360.
2. Unit with microprocessor or electro-mechanical controls shall operate in cooling down to an outdoor ambient temperature of 25° F.
3. Unit shall be provided with fan time delay to prevent cold air delivery in heating mode.

P. Electrical Requirements:

1. All unit power wiring shall enter unit cabinet at a single location. Both unit side and bottom power entry provisions shall be provided. Refer to Drawings schedule for thru-the-bottom power wiring requirement.

Q. Motors:

1. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have line break thermal and current overload protection.
2. Evaporator fan motor shall have permanently lubricated, sealed bearings and inherent automatic-reset thermal overload protection or manual reset calibrated circuit breakers.
3. Totally enclosed condenser-fan motor shall have permanently lubricated, sealed bearings, and inherent automatic-reset thermal overload protection.
4. For single-phase fan motors sized larger than 1/12 hp and smaller than 1 hp, refer to Article, Electric Motors, in Section 23 00 50, Basic HVAC Materials and Methods.

R. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1. Carrier Corporation.
2. Trane Inc.

S. Provide the following additional features and equipment:

1. Roof Curb: formed galvanized steel with wood nailer strip capable of supporting entire unit weight. Provide 3 inch wide bottom flange.
2. Provide heavy-duty 18 gauge expanded metal coil guard grille to protect all surfaces of the condensing coil. Coil guard to be Micrometl, Canfab, or equal.
3. Modulating Power Exhaust Economizer: Micrometl, Canfab, or equal. Integrated type capable of simultaneous economizer and compressor operation.
 - a. Provide self-contained outdoor rooftop system, mounted directly to the return air compartment of the HVAC packaged equipment. Provide differential dry bulb economizer control system and a factory programmed, fully programmable variable frequency drive

package controlled by a differential pressure transmitter, mounted directly to the return air compartment of the HVAC packaged equipment. Design the system to continuously maintain space pressure, and provide capability of introducing up to 100 percent outdoor air.

- 1) Economizer control system shall be certified as meeting the requirements for Fault Detection and Diagnostics (FDD) in the California Building Energy and Efficiency Standards.
 - b. Provide outside differential pressure tubing termination with hex style pneumatic filter-muffler, minimum filtration 40 microns, 53 SCFM maximum at 100 psi, as manufactured by McMaster-Carr, or equal.
 - c. Provide hinged cabinet access doors and include latches to provide a tool-less entry for servicing.
 - d. Provide door lock on the power exhaust cabinet to meet ETL safety requirements.
 - e. Outdoor air intake dampers shall be low leak not to exceed 3 percent at 1 inch wg pressure differential and include stainless steel side seal and neoprene edge seal. Arrange dampers to close upon loss of power.
 - f. Provide belt driven exhaust blowers, double inlet, forward-curved centrifugal type. Provide gravity backdraft damper at fan outlet.
 - g. Provide fully programmable factory programmed variable frequency drive (VFD) package for each fan, driven by 4 to 20 mA signal from a differential pressure transmitter. Pressure transmitters shall measure 0 - 0.1 in wg. Install room sensor tubing with sensor tube termination installed within the room.
 - 1) Where direct digital controls are utilized, provide Belimo, or equal, damper actuator, complete with spring return and all controls required to make the system fully operational.
 - 2) Where stand-alone controls are utilized, provide Belimo, or equal, damper actuator, complete with spring return and all controls, including logic module, required to make the system fully operational.
- T. Replenish for a period of one year without cost to the Owner all refrigerant and oil required to maintain the proper levels.
- U. Owner Training: Manufacturer shall provide two initial on-site 4-hour training sessions for Owners' maintenance personnel. Manufacturer shall provide one 4-hour follow-up training session to be scheduled by Owner within one year of the date of the final initial training session. Training session agenda shall be as follows:
1. First session: Equipment.
 2. Second session: Controls.
 3. Follow-up session: Agenda by Owner.

2.05 SPLIT SYSTEM HEAT PUMPS

- A. General: Furnish and install split system air-to-air heat pump system, with R410A refrigerant, and complete with automatic controls. Equipment shall be shipped factory assembled, wired, tested, and ready for field connections.
- B. Quality Assurance:
 - 1. Unit shall be ETL or UL listed and labeled.
 - 2. Unit shall be manufactured in a facility registered to ISO 9001:2000.
 - 3. Unit shall be rated in accordance with ARI standard 210.
- C. Delivery, Storage and Handling: Follow manufacturer's recommendations.
- D. Heating/Cooling System: The total certified heating/cooling capacity shall not be less than scheduled. The compressor power input shall not exceed that of the unit specified.
- E. Indoor Section: Wall mounted, ceiling surface mounted, or ceiling recessed mounted, as indicated on Drawings.
 - 1. Cabinet:
 - a. Wall mounted: Molded white high strength plastic.
 - 1) Provide wall mounted unit with factory mounting plate.
 - b. Ceiling surface mounted: Molded white high strength plastic with provision for outside air duct connection.
 - c. Ceiling recessed mounted: galvanized steel with provision for outside air duct connection.
 - 2. Fans: Double inlet, forward curved, statically and dynamically balanced.
 - 3. Fan Motor: Direct drive, permanently lubricated, with two or 4 speed operation for unit size scheduled on Drawings.
 - a. For single-phase fan motors sized larger than 1/12 hp and smaller than 1 hp, refer to Article, Electric Motors, in Section 23 00 50, Basic HVAC Materials and Methods.
 - 4. Air Outlet: With motorized horizontal and vertical vanes.
 - a. Wall and ceiling surface mounted units: Horizontal vane shall close air outlet upon unit shut-down.
 - 5. Evaporator Coil: Aluminum fins mechanically bonded to copper tubes. Coils shall be pressure leak tested.
 - 6. Insulation: Interior surfaces exposed to the airstream shall be fully insulated.
- F. Outdoor Section:

1. Casing: Galvanized steel plate, powder coated with acrylic or polyester.
 2. Condenser Fan Grille: ABS plastic.
 3. Fan and fan motor: Direct drive, totally enclosed, propeller type, permanently lubricated, horizontal discharge.
 4. Compressor: Variable speed rotary type, with crankcase heater and accumulator. Compressor shall be capable of operating at 0 degrees F. Compressor mounted on vibration isolator pads.
 5. Coil: Aluminum fins mechanically bonded to copper tubes. Coils shall be pressure leak tested. Provide coil with integral metal guard.
- G. Controls: Hard wired, microprocessor based, wall mounted controller with LCD display shall provide the following functions, as a minimum:
1. 7-day programmable timer.
 2. Test and check functions.
 3. Diagnostic functions.
 4. Vane position control.
 5. Fan speed adjustment.
 6. Temperature adjustment.
 7. Automatic restart.
 8. Mode selection, including heat/auto/cool/dry/fan.
 - a. Provide lockable enclosure for wall mounted controller.
- H. Safeties: Shall include the following, as a minimum:
1. Five minute compressor anti-recycle timer.
 2. High pressure protection.
 3. Current and temperature sensing motor overload protection.
- I. Filters: Provide manufacturers washable filters for indoor unit. Provide sufficient filters for four complete changes for each unit.
- J. Service Access: All components, wiring, and inspection areas shall be completely accessible through removable panels.
- K. Refrigerant Piping:
1. Provide factory pre-charged and sealed line set piping, length to suit the location of equipment. Tubing sizes shall be in accordance with manufacturers written instructions.

2. Provide refrigeration piping in accordance with Article, Refrigerant Piping, in this Section.
- L. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
1. Mitsubishi Electric Corporation.
 2. Carrier Corporation.
 3. Sanyo Electric Co., Ltd.
- M. Owner Training: Manufacturer shall provide one on-site 2-hour training session for Owners' maintenance personnel.

2.06 SPLIT SYSTEM AC UNIT

- A. General: Furnish and install split system air conditioner, with R410A refrigerant, and complete with automatic controls. Equipment shall be shipped factory assembled, wired, tested, and ready for field connections.
- B. Quality Assurance:
1. Unit shall be ETL or UL listed and labeled.
 2. Unit shall be manufactured in a facility registered to ISO 9001:2000.
 3. Unit shall be rated in accordance with ARI standard 210.
- C. Delivery, Storage and Handling: Follow manufacturer's recommendations.
- D. Cooling System: The total certified cooling capacity shall not be less than scheduled. The compressor power input shall not exceed that of the unit specified.
- E. Indoor Section: Wall mounted, ceiling surface mounted, or ceiling recessed mounted, as indicated on Drawings.
1. Cabinet:
 - a. Wall mounted: Molded white high strength plastic.
 - 1) Provide wall mounted unit with factory mounting plate.
 - b. Ceiling surface mounted: Molded white high strength plastic with provision for outside air duct connection.
 - c. Ceiling recessed mounted: galvanized steel with provision for outside air duct connection.
 2. Fans: Double inlet, forward curved, statically and dynamically balanced.
 3. Fan Motor: Direct drive, permanently lubricated, with two or 4 speed operation for unit size scheduled on Drawings.

- a. For single-phase fan motors sized larger than 1/12 hp and smaller than 1 hp, refer to Article, Electric Motors, in Section 23 00 50, Basic HVAC Materials and Methods.
 4. Air Outlet: With motorized horizontal and vertical vanes.
 - a. Wall and ceiling surface mounted units: Horizontal vane shall close air outlet upon unit shut-down.
 5. Evaporator Coil: Aluminum fins mechanically bonded to copper tubes. Coils shall be pressure leak tested.
 6. Insulation: Interior surfaces exposed to the airstream shall be fully insulated.
- F. Outdoor Section:
1. Casing: Galvanized steel plate, powder coated with acrylic or polyester.
 2. Condenser Fan Grille: ABS plastic.
 3. Fan and fan motor: Direct drive, totally enclosed, propeller type, permanently lubricated, horizontal discharge.
 4. Compressor: Variable speed rotary type, with crankcase heater and accumulator. Compressor shall be capable of operating at 0 degrees F. Compressor mounted on vibration isolator pads.
 5. Coil: Aluminum fins mechanically bonded to copper tubes. Coils shall be pressure leak tested. Provide coil with integral metal guard.
- G. Controls: Hard wired, microprocessor based, wall mounted controller with LCD display shall provide the following functions, as a minimum:
1. 7-day programmable timer.
 2. Test and check functions.
 3. Diagnostic functions.
 4. Vane position control.
 5. Fan speed adjustment.
 6. Temperature adjustment.
 7. Automatic restart.
 8. Mode selection, including cool/dry/fan.
 - a. Provide lockable enclosure for wall mounted controller.
- H. Safeties: Shall include the following, as a minimum:
1. Five minute compressor anti-recycle timer.

2. High pressure protection.
 3. Current and temperature sensing motor overload protection.
- I. Filters: Provide 1 inch thick fiberglass throwaway filters with cardboard holding frames for indoor unit. Provide sufficient filters for four complete changes for each unit.
- J. Service Access: All components, wiring, and inspection areas shall be completely accessible through removable panels.
- K. Refrigerant Piping:
1. Provide factory pre-charged and sealed line set piping, length to suit the location of equipment. Tubing sizes shall be in accordance with manufacturers written instructions.
 2. Provide refrigeration piping in accordance with Article, Refrigerant Piping, in this Section.
- L. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
1. Mitsubishi Electric Corporation.
 2. Carrier Corporation.
 3. Sanyo Electric Co., Ltd.
- M. Owner Training: Manufacturer shall provide one on-site 2-hour training session for Owners' maintenance personnel.

2.07 FANS

- A. All fans shall be Air Moving and Control Association Inc. (AMCA) labeled.
- B. Provide self-aligning, enclosed ball bearings, accessible for lubrication unless specified otherwise.
- C. Provide variable speed switch for all direct drive fans.
- D. Roof Mounted:
1. Direct or V-belt Drive: Provide one-piece heavy-duty ventilator housings, one piece heavy gauge spun aluminum construction, with weatherproof assembly and integral weather shield. Mount ventilators on curbs furnished by the fan manufacturer. Install with fan assembly level.
 2. Fan wheels shall be centrifugal design, statically and dynamically balanced. Tip speed, rpm and motor horsepower shall not exceed listing in manufacturer's catalog for unit specified.
 3. Fans shall have integral factory formed base and one piece spinning without welding. Housings shall be provided with wiring channel and are to be of the direct discharge design. Motor and fan assembly shall be on vibration isolating mounts. Fans shall have capacity, speeds and motor sizes as shown.
 4. Provide the following accessories:

- a. Gravity backdraft dampers.
- b. Aluminum bird screen with a minimum of 85 percent free area.
- c. Adjustable motor pulley.

E. In-Line Propeller Fans:

1. Heavy-duty propeller type with belt or direct drive as specified. Blades shall be individually mounted to wheel.
2. Provide sloped roof or flat roof type roof cap, or wall cap to suit the location indicated on the Drawings.

F. In-Line Centrifugal Fans:

1. Centrifugal fan with airfoil blades, aluminum or steel housing, externally mounted belt-drive motor, external lube tubes, integral support brackets.
2. Provide sloped roof or flat roof type roof cap, or wall cap to suit the location indicated on the Drawings.

G. Fan Drives:

1. Drive Design: The design horsepower rating of each drive shall be at least 1.5 times, single belt drives 2 times, the nameplate rating of the motor with proper allowances for sheave diameters, speed ratio, arcs of contact and belt length.
2. Provide variable speed drives, Dayco, Browning, Woods, or equal. Allow for replacement of fan and motor drives and belts as required to suit the balance requirements of the project.
3. Select variable speed drives to allow an increase or decrease of minimum of ten percent of design fan speed.

H. Motors:

1. Motors of 25 HP and less shall have adjustable pitch sheaves; sheaves on motors above 25 HP may be non-adjustable. Change, at no extra cost to Owner, the non-adjustable sheaves to obtain desired air quantities.
2. For single-phase fan motors sized larger than 1/12 hp and smaller than 1 hp, refer to Article, Electric Motors, in Section 23 00 50, Basic HVAC Materials and Methods.

- I. Sheaves: Sheaves shall be cast or fabricated, bored to size or bushed with fully split tapered bushings to fit properly on the shafts. All sheaves shall be secured with keys and set screws.

J. Belts:

1. All belts shall be furnished in matched sets.
2. Belts shall be within 1 degree 30 minutes of true alignment in all cases.

K. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1. Greenheck Fan Corporation.
2. Loren Cook Company.
3. PennBarry.
4. American Coolair Corporation.

L. Owner Training: Manufacturer shall provide one on-site 1-hour training session for Owners' maintenance personnel.

2.08 AIR INLETS AND OUTLETS

A. Except as otherwise indicated, provide manufacturer's standard inlets and outlets where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation.

B. Ceiling, wall or floor Compatibility: Provide inlets and outlets with border styles that are compatible with adjacent ceiling, wall or floor systems, and that are specifically manufactured to fit into ceiling, wall or floor module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems that will contain each type of air outlet and inlet.

C. Refer to Schedule on Mechanical Drawings for details of inlets and outlets to be used.

2.09 AIR FILTERS

A. Provide MERV 13 disposable pleated media type. Refer to specific equipment Articles for filter depth and for exceptions to this specification. Filters shall conform to the following:

1. Standards:

- a. ASHRAE Standard 52.2-2007.
- b. Underwriters Laboratories: U.L. 900, Class 2.

2. Construction:

- a. Media: Synthetic or cotton-synthetic blend with radial pleats.
- b. Media Frame: High wet-strength beverage board.
- c. Media Support: Welded wire or expanded metal grid bonded to air leaving side of the media.

3. Performance: 2" deep filter shall have a maximum initial air resistance of 0.31 inches w.g.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1. Camfil Farr, Inc., model 30/30.

2. Flanders Corporation, model 40 LPD.
- C. Temporary (Construction Period) Filters:
1. Install new temporary filters in all units that have filter systems installed. Temporary filters shall match the permanent filters that are specified for the units. Replace filters as needed, in accordance with manufacturer's directions, in order to provide protection for the unit prior to occupancy by the Owner.
 2. If air handling units are operated during construction of the project, install temporary filters directly over each return air inlet. Filters shall match the permanent filters that are specified for the units. Select size of filter to completely cover the frame of the return air inlet, and tape filters firmly in place to eliminate any construction debris from entering the duct system or unit. Remove the temporary filters upon completion of the work, and repair all damaged paintwork.
- D. Spare Filters:
1. Furnish two new, complete sets of filter cartridges for each filter bank on completion and acceptance of the work. Install one set of filters in units (prior to final air balance). Provide units designed to accommodate washable, permanent filters with one washable, permanent filter.

2.10 DAMPERS

- A. Manual Air and Balance Dampers: Provide dampers of single blade type or multi-blade type constructed in accordance with SMACNA, "HVAC Duct Construction Standards," except as noted herein.
1. Rectangular Ductwork:
 - a. Single damper blades may be used in ducts up to 10 inches in height. Dampers shall be 16 gauge minimum. Provide self-locking regulators, equal to Ventlok 641. Provide end bearings equal to Ventlok 607 at each damper. Provide continuous solid 3/8 inch square shafts.
 - b. Multiple blade dampers shall be equal to Ruskin CD35 Standard Control Damper. Maximum width for multiple damper blades for use in rectangular duct shall not exceed 6 inches.
 - c. Where duct velocity may be expected to exceed 1500 fpm, provide Ruskin CD-50, or equal, low leakage dampers with airfoil blades.
 2. Round Ductwork:
 - a. Single damper blades may be used in ducts up to 12 inches in diameter. Provide multiple blade opposed blade dampers, with connected linkage, for ductwork larger than 12 inches in diameter.
 - b. Damper blades for round ductwork shall be 20 gauge steel for ducts up to 12 inches diameter and 16 gauge steel for dampers larger than 12 inches damper. Provide self-locking regulators, equal to Ventlok 641, Durodyne, or equal for operation of dampers. Provide end bearings equal to Ventlok 607 and provide continuous solid 3/8 inch square shafts.

3. Where ductwork is externally insulated, provide self-locking regulators equal to Ventlok 644, Durodyne, or equal for rectangular ductwork, and Ventlok 637, Durodyne, or equal for round ducts.
- B. Fire Dampers and Combination Fire/Smoke Dampers:
1. Fire dampers and combination fire/smoke dampers shall be listed and approved by the California State Fire Marshal. Installation shall conform to the manufacturer's UL approved installation instructions.
 - a. Fire dampers shall be UL 555 classified and labeled as dynamic fire dampers approved for wall and floor installation. They shall ship from the manufacturer as an assembly with a minimum 20-gauge factory installed sleeve. Sleeve length shall suit the requirements of the wall construction. Each dynamic fire damper/sleeve assembly shall ship complete with factory "roll formed" one-piece angles with pre-punched holes for easy installation. Dynamic fire dampers for vertical installation must consist of a single section on sizes up to 33" x 36" and a single section on sizes up to 24" x 24" for horizontal installation. 1-1/2 hour dynamic fire dampers shall be Ruskin DIBD20, Pottorff, or equal. 3 hour dynamic fire dampers shall be Ruskin DIBD230, Pottorff, or equal.
 - b. Fire dampers for high pressure/velocity systems where velocities exceed 2000 fpm and/or 4" w.g. pressure fire damper shall be Ruskin FD60, Pottorff, or equal.
 - c. Fire dampers for ceiling installation shall be UL 555C classified and labeled as ceiling dampers. They shall be provided with a thermal insulating blanket to fit the inlet or outlet condition if required by the application. Ceiling dampers shall be Ruskin CFD 2, 3, 4 or 5. Ceiling dampers for ceilings constructed of wood shall have UL tested in design L501 and shall be Ruskin CFD7, Pottorff, or equal.
 - d. Combination fire/smoke dampers. Dampers shall be UL classified and labeled as Leakage Class I Smoke Dampers in accordance with the latest version of UL 555S. Dampers shall be warranted to be free from defects in material and workmanship for a period of 5 years after date of shipment. Damper/actuator assembly shall be tested to full open and full close at minimum 2000 fpm 250° F heated air and 4" w.g. with airflow in both directions. (Specified select: 250° / 350°, 2000 fpm/3000 fpm). Each damper shall be equipped with "controlled closure" quick detect heat actuated release device to prevent duct and HVAC component damage resulting from instantaneous damper closure. Release device shall be EFL type and shall allow reset from outside the sleeve after moderate temperature exposure. (Replacement type fusible links not acceptable.)
 - e. Two position combination fire smoke dampers shall be equipped with one or more factory installed, direct coupled, 120 volt, single phase, electric actuator for energize open – fail close operation. Dampers with multiple actuators shall be factory wired with single point connection at the EFL heat release device for connection to power. Damper actuator shall include minimum one-year energized hold open (no cycles) and spring return (fail) close reliability. Damper/actuator shall include minimum 20,000 full open-full close cycle performances.

- f. Modulating combination fire smoke dampers shall be equipped with one or more factory installed contact for modulating signal connection. Damper/actuator shall include minimum 100,000 full open-full close cycle performances with spring return (fail) close on loss of power.
- g. Round combination fire smoke dampers up to 24" diameter shall be true round type with minimum 20 gauge galvanized steel designed for lowest pressure drop and noise performance. Bearings shall be stainless steel sleeve turning in an extruded hole in the frame. Blade seals shall be silicone edge designed to withstand 450° F and galvanized steel mechanically locked in to the blade edge (adhesive type seals are not acceptable). Each damper shall be equipped with a factory-installed sleeve of 17 inches minimum length and factory "roll formed" one-piece angles with pre-punched holes. Dampers shall be Ruskin FSDR25, Pottorff, or equal.
- h. Round (larger than 24" diameter) or rectangular combination fire smoke dampers shall include roll-formed structural hat channel frame, reinforced at the corners, formed from a single piece of minimum 16 gauge equivalent thickness formed from single piece galvanized steel. Bearings shall be stainless steel turning in an extruded hole in the frame. Blade edge seals shall be silicone rubber designed to withstand 450° F and galvanized steel mechanically locked in to the blade edge (adhesive type seals are not acceptable). Each damper shall be equipped with a factory-installed sleeve of 17" minimum length and factory "roll formed" one-piece angles with pre-punched holes for easy installation. Dampers shall be Ruskin FSD60, Pottorff, or equal.
- i. 3-hour rated combination fire smoke dampers shall be Ruskin model FSD60-3, Pottorff, or equal.
- j. All FSD60 type dampers shall be AMCA licensed and shall bear the AMCA Seal for Air Performance. AMCA certified testing shall verify pressure drop does not exceed .03" w.g. at a face velocity of 1,000 fpm on a 24" x 24" damper.
- k. Wall type fire/smoke damper:
 - 1) Combination fire/smoke dampers for use in the wall of exit corridors shall be classified and labeled as Leakage Class II Smoke Dampers in accordance with the latest version of UL 555S. Dampers shall meet the requirements for combination fire/smoke dampers in paragraph 3 above except AMCA certified testing shall verify pressure drop does not exceed .07" w.g. at a face velocity of 1,000 fpm on a 24" x 24" damper and blades shall be single skin galvanized steel 10 gauge minimum with 3 longitudinal grooves for reinforcement. Dampers shall be Ruskin FSD36, Pottorff, or equal.
 - 2) Front access combination fire/smoke dampers shall meet all the requirements for combination fire/smoke dampers in paragraph 3 above except pressure drop requirement. In addition the dampers shall be constructed so that actuators and all accessories are accessible from the grille side. Actuators and accessories shall be housed within an integral cabinet on the side of the damper frame and shall not be installed in the air stream in front of the damper. The damper sleeve shall be minimum 14" and flanged to accept a steel framed grille. The sleeve shall be covered with fire resistant material. Dampers shall be Ruskin FSD60FA, Pottorff, or equal.

- I. Ceiling type fire/smoke damper for tunnel type corridor construction: Combination fire/smoke dampers for use in the corridor ceiling of tunnel type corridor construction shall be UL classified and labeled as Corridor Damper. Dampers shall meet the requirements of paragraph 4a above except pressure drop testing does not require AMCA certification. Dampers shall be Ruskin FSD36C, Pottorff, or equal.
- m. Fusible links shall have temperature rating approximately 50° F above normal maximum operating temperature of the heat producing appliance.
 - 1) If project requires re-openable fire/smoke dampers, provide Ruskin 165 ° F / 350° F TS150, NCA or equal. The TS150 firestat replaces the EFL and allows the damper to be re-opened from remote location up to 350 ° F. TS150 shall include full open and full closed damper position contacts for interface with remote position indication panel.
 - 2) Each fire/smoke damper shall be equipped with “controlled closure” quick detect heat actuated release device to prevent duct and HVAC component damage. Release device shall allow easy reset after moderate temperature rise outside the sleeve. Heat release device shall be the Ruskin EFL, NCA or equal.
 - 3) Unless the system is using a validation control system, each fire/smoke damper shall be equipped with a control panel including blade position indicator lights and a key operated switch. The panel cover shall be oversized for flush mount into the wall or ceiling and shall have a brushed look. Control panel shall be Ruskin MCP2, Pottorff, or equal.
2. All actuators used for smoke dampers or combination fire/smoke dampers shall have a cycle time requirement of not more than every twelve months and shall be rated for continuous "On" duty and shall be provided with internal spring return. Actuators shall be equipped with pilot light, remote key test switch, end switch and circuitry to activate pilot light on remote key (test) switch located in corridor ceiling adjacent to damper. Electric motors shall be Invensys MA-250, MA-253, Honeywell H2000, or equal.
- C. Where required to suit the size of damper required, provide manufacturers standard UL Classified mullions, arranged to support multiple dampers. Assembly shall be of minimum 16 gauge galvanized steel, complete with all accessory caps and framing members required for installation.

2.11 DUCTWORK

- A. Construct and install sheet metal ductwork in accordance with the California Mechanical Code for 2 inches static pressure for supply air, and 2 inches minimum for return and exhaust air unless otherwise noted on Drawings.
 1. Where not in conflict with the California Mechanical Code, construct and install all sheet metal ductwork in accordance with SMACNA HVAC Duct Construction Standards (Metal and Flexible). Where applicable for HVAC work, construct and install sheet metal work in accordance with SMACNA Architectural Sheet Metal Manual.
 2. Provide variations in duct size, and additional duct fittings as required to clear obstructions and maintain clearances as approved by the Architect at no extra cost to the Owner.
 3. Gauges, joints and bracing shall be in accordance with the California Mechanical Code.

4. Provide beading or cross breaking for all ductwork inside building. Provide cross breaking for ductwork exposed to weather.
 5. At the contractor's option, ductwork may be fabricated using the Ductmate, Nexus, Quickduct, Transverse Duct Connection (TDC), Pyramid-Loc duct connection systems, or equal. Fabricate in strict conformance with manufacturer's written installation instructions and in accordance with California Mechanical Code.
 - a. Seal flanged ends with pressure sensitive high density, closed cell neoprene or polyethylene tape gasket, Thermo 440, or equal.
 - b. Provide metal clips for duct connections, except at breakaway connections for fire dampers and fire smoke dampers. Provide corner clips at each corner of duct, through bolted, at all locations except at breakaway connections for fire dampers and fire smoke dampers. Where used on locations exposed to weather, provide continuous metal clip at top and sides of duct, with 1 inch overhang for top side.
- B. Design and installation standards:
1. SMACNA Compliance: Comply with applicable portions of Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) for all work in this section.
 2. NFPA Compliance: Comply with ANSI/NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems," and ANSI/NFPA 90B, "Standard for the Installation of Warm Air Heating and Air Conditioning Systems."
 3. California Mechanical Code.
- C. Duct sizes indicated are external sizes.
- D. Galvanized Sheet Steel: Lock-forming quality, ASTM A924 and ASTM A653, Coating Designation G 90. Provide mill phosphatized finish for exposed surfaces of ducts exposed to view.
1. Provide mill certification for galvanized material at request of the Project Inspector.
- E. Duct Sealants:
1. Sealant shall have a VOC content of 250 g/L or less.
 2. Sealant shall comply with testing and product requirements of South Coast Air Quality Management District, Rule 1168.
 3. Provide one part, non-sag, synthetic latex sealant, formulated with a minimum of 68 percent solids. Sealant shall comply with ASTM E84, Surface Burning Characteristics.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - 1) Design Polymerics, model DP1010.
 - 2) Polymer Adhesive Sealant Systems Inc, model Airseal #11.

3) McGill Airseal, LLC.

F. Duct Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, straps, trim, and angles for support of ductwork.

G. Rectangular Duct Fabrication:

1. Shop fabricate ductwork of gauges and reinforcement complying with the more stringent of the following standards, except as noted herein.

a. SMACNA HVAC Duct Construction Standards

b. California Mechanical Code

2. Fabricate ducts for 2 inch pressure class with minimum duct gauges and reinforcement as follows, except as otherwise noted:

<u>Table A</u>		
<u>Duct Dimension</u>	<u>Minimum Gauge</u>	<u>Joint Reinforcement Per CMC</u>
Through 12"	26	Not Required
13" through 18"	24	Not Required
19" through 30"	24	C/4
31" through 42"	22	E/4
43" through 54"	22	F/2
55" through 60"	20	G/4
61" through 84"	20	I/2
85" through 96"	20	J/2
Over 96"	18	K/2

3. Fabricate duct fittings to match adjoining ducts and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to 1.5 times associated duct width. Fabricate to include single thickness turning vane in elbows where space does not permit the above radius or where square elbows are shown. Limit angular tapers to 30 degrees for contracting tapers and 20 degrees for expanding tapers. Turning vanes shall be E-Z Rail II, Durodyne, or equal.

4. Fabricate round supply connections at rectangular, plenum type fittings using spin-in type fittings, complete with extractor and volume control damper. Refer to Paragraph "DAMPERS" for damper requirements.
 5. Provide drive slip or equivalent flat seams for ducts exposed in the conditioned space or where necessary due to space limitations. On ducts with flat seams, provide standard reinforcing on inside of duct. Duct connection to outlet on exposed duct shall be full size of outer perimeter of outlet flange.
 6. Ducts exposed in the conditioned space shall be free of dents and blemishes and be mounted tight against adjacent surface with flat hangers. Remove all fabrication labels from ductwork.
 7. Provide 20 gauge minimum for ductwork exposed within occupied spaces.
- H. Rectangular Internally Insulated Duct Fabrication:
1. Provide internal duct lining where indicated on the Drawings, with a minimum of 10'-0" length in each direction from the fan, fan casing, or unit casing. Line all transfer ducts.
 - a. Where ductwork is exposed to weather or outside the building insulation envelope, provide 2 inch thick, 1-1/2 pound density internal lining with matte facing, with an R-Value of 8.0 minimum.
 - b. Where ductwork is within the building insulation envelope, lining shall be 1" thick, 1-1/2 pound density, with R-value of 4.2 minimum.
 - c. Ducts exposed in the conditioned space shall be free of dents and blemishes and be mounted tight against adjacent surface with flat hangers. Remove all fabrication labels from ductwork.
 - d. Where installed exposed in the conditioned space, duct shall be minimum 20 gauge with 1 inch insulation layer (minimum R-value – R-4.2).
 - e. Cement duct liner in place with nonflammable, non-hardening duct adhesive. Seal all raw edges of insulation inside ductwork with adhesive, including longitudinal liner edges.
 - f. Provide metal nosing at all locations where liner is preceded by unlined metal.
 - g. Provide sheet metal weld pins and washers or clinch pins and washers on all ductwork on 12 inch intervals with the first row within 3 inches of the leading edge of each piece of insulation and within 4 inches of corners. No use of adhesive mounted pins will be considered.
 - 1) Install clinched pin fasteners with properly adjusted automatic fastening equipment. Manual installation will not be considered.
 - 2) Install weld pins with properly adjusted automatic fastening equipment. Installation shall not damage the galvanized coating on the outside of the duct.
 - h. All ductwork, adhesives, lining, sealant, flex duct and the like shall have a flame spread of 25 or less and developed smoke rating of 50 or less when tested in accordance with one of the following test methods: NFPA 255, ASTM E84, or UL 723.

- i. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

<u>Manufacturer:</u>	<u>Product:</u>
Johns Manville	Linacoustic RC
CertainTeed Corporation	ToughGard
Fosters Adhesive	85-62
Swifts Adhesive	7336

I. Round and Oval Ductwork Fabrication:

1. Round and oval duct and fittings shall be spiral lockseam or longitudinal seam as indicated in table below. Provide couplings to join each length of duct.
 - a. At contractors' option, round or oval ductwork may be utilized in place of rectangular ductwork shown on Drawings, provided available space allows installation of round or oval ductwork without compromising space required for installation of products and systems of other trades.
 - 1) Round or oval ductwork utilized in place of rectangular ductwork shown on Drawings shall be sized to have a static pressure loss equivalent to rectangular duct shown on Drawings.
 - 2) Unlined round or oval duct shall not be utilized in place of rectangular internally lined ductwork shown on Drawings.
2. Fabricate duct fittings to match adjoining ducts and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to 1.5 times associated duct width. Provide two-piece, die-stamped, 45-degree to 90-degree elbows for sizes up to 12 inches; five-piece, 90-degree elbows for sizes 12 inches and above; conical tees; and conical laterals. All reducers shall be placed after a tap has been made on the duct main. Reducers shall be long-taper style.
3. Round Ductwork: Construct of galvanized sheet steel complying with ANSI/ASTM A 653 by the following methods and in minimum gauges listed.

<u>Diameter</u>	<u>Minimum Gauge</u>	<u>Method of Manufacture</u>
Up to 14"	26	Spiral Lockseam
15" to 23"	24	Spiral Lockseam
24" to 36"	22	Spiral Lockseam
37" to 50"	20	Spiral Lockseam
51" to 60"	18	Spiral Lockseam
Over 60"	14	Longitudinal Seam

4. Provide locked seams for spiral duct; fusion welded butt seam for longitudinal seam duct.
5. Fittings and Couplings: Construct of minimum gauges listed. Provide continuous welds along seams at exposed ducts. Provide spot weld bonded seams at concealed ducts.

<u>Diameter</u>	<u>Minimum Gauge</u>
3" to 36"	20
38" to 50"	18
Over 50"	16

6. Ducts exposed in the conditioned space shall be free of dents and blemishes and be mounted tight against adjacent surface with flat hangers. Remove all fabrication labels from ductwork.
 7. Provide 20 gauge minimum for ductwork exposed within occupied spaces.
- J. Round Internally Insulated Duct and Fittings: Where ductwork is exposed to weather or outside the building insulation envelope, construct with outer pressure shell, 2 inch thick (Minimum R-value = R-8) insulation layer, and perforated inner liner. Where ductwork is within the building insulation envelope, construct with outer pressure shell, 1 inch thick (minimum R-value = R4.2) insulation layer, and perforated inner liner. Construct shell and liner of galvanized sheet steel complying with ANSI/ASTM A 653, of spiral lockseam construction (use longitudinal seam for over 59 inches), in minimum gauges listed in table below. Where installed exposed in the conditioned space: duct and fitting outer pressure shell shall be minimum 20 gauge with 1 inch insulation layer (minimum R-value = R-4.2), and perforated inner liner.

<u>Nominal Duct Diameter</u>	<u>Outer Shell</u>	<u>Inner Liner</u>
3" TO 12"	26 gauge	24 gauge
13" TO 24"	24 gauge	24 gauge
25" to 34"	22 gauge	24 gauge
35" to 48"	20 gauge	24 gauge
49" to 58"	18 gauge	24 gauge
Over 59"	16 gauge	20 gauge

1. Fittings and Couplings: Construct of minimum gauges listed. Provide continuous weld along seams of outer shell at exposed ducts. Provide spot weld bonded seams at concealed ducts.

<u>Nominal Duct Diameter</u>	<u>Outer Shell</u>	<u>Inner Liner</u>
3" to 34"	20 gauge	24 gauge
36" to 48"	18 gauge	24 gauge
Over 48"	16 gauge	24 gauge

2. Inner Liner: Perforate with 3/32 inch holes for 22 percent open area. Provide metal spacers welded in position to maintain spacing and concentricity.
3. Ducts exposed in the conditioned space shall be free of dents and blemishes and be mounted tight against adjacent surface with flat hangers. Remove all fabrication labels from ductwork.
4. Where installed exposed in the conditioned space, duct shall be minimum 20 gauge with 1 inch insulation layer (minimum R-value – R-4.2).
5. All ductwork, adhesives, lining, sealant, flex duct and the like shall have a flame spread of 25 or less and developed smoke rating of 50 or less when tested in accordance with one of the following test methods: NFPA 255, ASTM E84, or UL 723.
6. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. Sheet Metal Div., McGill AirFlow, LLC., Acousti-k27
 - b. Semco Duct and Acoustical Products, Inc.
 - c. Air Systems Manufacturing, Inc. - Las Vegas

K. Duct Access Doors:

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1. Duct Access: Provide hinged access door in rectangular ducts for access to fire dampers, control equipment, etc. Access door size shall be duct diameter wide by duct diameter high for all ducts under 24 inches. Ducts over 24 inches in diameter shall have 24-inch by 18-inch access doors. Minimum size access doors shall be 6 inches by 6 inches.
2. Provide hinged style access doors for round ductwork, NCA Manufacturing, Inc., Model AD-RD-87, Pottorff Series 60, or equal. Access doors shall be 16 gauge galvanized steel with continuous piano hinge. Locks shall be plated steel strike and catch. Provide 1" x 3/8" Polyethylene "Perma Stik" gasket all around door.

L. Flexible Air Ducts:

1. Provide exterior reinforced laminated vapor barrier, fiberglass insulation, encapsulated spring steel wire Helix, and impervious, smooth, non-perforated interior vinyl liner. Individual lengths of flexible ducts shall contain factory fabricated steel connection collars.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - 1) C.A. Schroeder, Inc., Cal Flex model 2PMJ.
 - 2) ThermaFlex model M KC.
2. Factory made air ducts shall be approved for the use intended and shall conform to the requirements of UL 181 and NFPA 90A. Each portion of a factory-made air duct system shall be identified by the manufacturer with a label or other suitable identification indicating compliance with UL 181, Class 1. Ducts shall be UL listed Class 1, maximum 25/50 smoke and flame spread and shall be installed in accordance with the terms of their listing and the requirements of SMACNA HVAC Duct Construction Standards (Metal and Flexible). Factory-made air ducts shall have the following minimum R-values: R-6.0 for ductwork installed within the building insulation envelope, R-8.0 for ductwork installed outside the building insulation envelope.
3. Flexible ductwork shall be maximum of 5 feet long, and shall be extended to the fullest possible length, in order to minimize pressure drop in the duct.
4. Flexible ducts shall be selected for minimum of 6 inch positive static pressure and minimum of 1 inch negative static pressure.

M. Fabric Duct Air Dispersion System:

1. Duct: Fabric duct shall be constructed of inherently fire resistant polyester fabric complying with flame spread and smoke development index requirements of NFPA 90A when evaluated in accordance with UL 723 or other standard acceptable to authorities having jurisdiction. Treated or laminated fabric is not acceptable. Fabric shall be classified according to ICC AC167 and UL 2518. Fabric weight shall be minimum 6.75 oz./sq. yd. as tested per ASTM D3776. Duct shall be designed for inlet static pressure range of 0.25-3.0 in. wg. Fabric shall withstand without damage temperature range of 0-180 degrees F. Fabric air permeability shall be 0.5 CFM per sq. ft. when tested according to the requirements of ASTM D737.

- a. Linear vent shall consist of round, open orifices in duct fabric, sized and spaced per Drawings, or as recommended by the manufacturer.
 - b. Duct color shall be selected by Architect from among manufacturers' available colors.
 2. Duct Shape Retention System: Provide duct with shape retention system consisting of removable, round, 360 degree hoops, placed inside duct and spaced at 5 ft. o.c., or as recommended by fabric duct system manufacturer.
 3. Duct Connections: Provide fabric duct system with hardware for duct inlet connection to metal duct. Inlet connection shall include zipper for removal or maintenance of duct. Duct sections and end caps shall be provided with zippers for connection, removal, and maintenance, number and location as normally provided by the manufacturer for the size and arrangement of duct as shown on Drawings.
 4. Provide system with airflow, pressure control, and balancing devices as shown on Drawings and Drawing schedules.
 5. Mounting: Provide fabric duct system with hardware for galvanized cable suspension system detailed on Drawings. Provide hanger attachment points on fabric duct, with locations compatible with duct suspension system detailed on Drawings.
 6. Warranty: Provide with manufacturers' minimum 10 year warranty.
 7. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. DurkeeSox.
 - b. DuctSox.
 8. Duct Access Panels:
 - a. Provide duct access panel assembly of the same material and gauge used for the duct. Duct access panels shall conform to the following:
 - 1) Fasteners: Black steel or stainless steel to match material used for the duct. Panel fasteners shall not penetrate duct wall.
 - 2) Gasket: Comply with NFPA 96, grease-tight, high temperature ceramic fiber, rated for minimum 1500 °F.
- N. Flexible Connectors:
1. Materials: Flame-retardant or noncombustible fabrics. Coatings and adhesives shall comply with UL 181, Class 1, with flame spread index of 25 or less, and smoke-developed index of 50 or less.
 2. Metal-Edged Connectors: Factory fabricated with a fabric strip 3 inches wide attached to two strips of 3-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.

3. Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
 - a. Minimum Weight: 26 oz./sq. yd.
 - b. Tensile Strength: Minimum 475 lbf/inch in the warp and minimum 375 lbf/inch in the filling.
 - c. Service Temperature: Minus 50 to plus 200 deg F.
4. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. Ductmate Industries, Inc., model Proflex.
 - b. Ventfabrics, Inc., model Ventlon.

2.12 INSULATION MATERIALS

A. General:

1. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).
2. Products shall not contain asbestos, lead, mercury, or mercury compounds.
3. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
4. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
5. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
6. Test insulation, jackets and lap-seal adhesives as a composite product and confirm flame spread of not more than 25 and a smoke developed rating of not more than 50 when tested in accordance with UL723 or ASTM E84.
7. Adhesives and sealants shall comply with testing and product requirements of South Coast Air Quality Management District, Rule 1168.

B. Insulation Materials:

1. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Provide 2-inch wide stapling and taping flange.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - 1) CertainTeed Corporation.

- 2) Johns Manville.
 - 3) Knauf Insulation.
 - 4) Owens Corning.
- C. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. Design Polymerics.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Knauf Insulation.
 2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
 3. Service Temperature Range: 0 to plus 180 deg F.
 4. Color: White.
- D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below-ambient services.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. Design Polymerics.
 - b. Childers Brand; H. B. Fuller Construction Products.
 - c. Foster Brand; H. B. Fuller Construction Products.
 2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
 3. Service Temperature Range: Minus 50 to plus 220 deg F.
 4. Color: White.
- E. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. Design Polymerics.
 - b. Childers Brand; H. B. Fuller Construction Products.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Knauf Insulation.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
 3. Service Temperature Range: 0 to plus 180 deg F.
 4. Color: White.
- F. Field Applied Jackets:
1. PVC Jacket and Factory Fabricated Fitting Covers: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - 1) Johns Manville, model Zeston, with Zeston 2000 fitting covers.
 - 2) Proto Corporation, model LoSmoke.

2.13 TEMPERATURE CONTROL SYSTEM

- A. Refer to Section 23 09 23, Direct Digital Control System for HVAC.

PART 3 - EXECUTION

3.01 ROOF MOUNTED EQUIPMENT INSTALLATION

- A. Mount and anchor equipment in strict compliance with Drawings details. Alternate anchorage methods will not be considered for roof mounted equipment.
- B. Examine rough-in for roof mounted equipment to verify actual locations of piping and duct connections prior to final equipment installation.
- C. Verify that piping to be installed adjacent to roof mounted equipment allows service and maintenance.
- D. Verify that gas piping will be installed with sufficient clearance for burner removal and service.
- E. Install gas flue extensions. Attach gas flue extensions to unit according to unit manufacturers' installation instructions. Terminate gas flue extensions with lowest discharge opening at height compliant with requirements of California Mechanical Code, based on final unit location.
- F. Install ducts to termination at top of roof curb and install heavy duty rubber gaskets on supply and return openings and on full perimeter of curb, or as required for an airtight installation, prior to setting unit on curb.
- G. Cover roof inside each roof mounted air conditioning unit, heat pump unit, and heating and ventilating unit roof curb with 2 inch thick, 3 pound density fiberglass insulation board.
- H. Connect supply and return air ducts to horizontal discharge roof mounted equipment with flexible duct connectors. Provide G 90 galvanized steel weather hood over flexible connections exposed to the weather. Weather hood minimum gauge shall be per PART 2 article, Ductwork, Table A.

- I. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.

3.02 SPLIT SYSTEM AC, HEAT PUMP, AND VRF SYSTEMS INSTALLATION

A. General:

1. Install units level and plumb.
2. Install evaporator-fan components as detailed on Drawings.
3. Install ground or roof- mounted condensing units as detailed on Drawings.
4. Install seismic restraints as required by applicable codes. Refer to Article, Submittals, in Section 23 00 50, Basic HVAC Materials and Methods, for delegated design requirements for seismic restraints.
5. Install and connect refrigerant piping as detailed in unit manufacturers' literature. Install piping to allow access to unit.
6. Install cooling coil condensate primary drain pan piping, and overflow, if provided, and run to nearest code-compliant receptacle, or as indicated on Drawings. Install secondary drain pan for units installed over permanent and suspended-tile ceilings. Install secondary drain pan piping and terminate 1/2 inch below ceiling, with escutcheon, in a readily visible location or as shown on Drawings.
7. Install air filters at each indoor unit. Install washable, permanent filters at indoor units designed to accept washable, permanent filters. Refer to Drawings schedule, and Article, Air Filters, in this Section, for filter requirements for ducted, above-ceiling units incorporating mixing boxes.
8. Duct Connections: Duct installation requirements are specified in Article, Ductwork, in this Section. Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Article, Ductwork, in this Section.

3.03 FAN INSTALLATION

- A. Provide access doors for fans or motors mounted in ductwork.
- B. Mount all fans as detailed on Drawings and in compliance with CBC standards.
- C. Fan motors mounted in air-stream to be totally enclosed.
- D. Completely line supply, return or exhaust fan cabinets with 1 inch thick, 3/4 pound density acoustic insulation securely cemented in place.
- E. Roof fans shall be mounted level.
- F. Provide heavy-duty rubber gasket between exhaust fan mounting flange and roof curb, or as required for an airtight installation.

3.04 AIR INLETS AND OUTLETS INSTALLATION

- A. Provide all air inlets and outlets with gaskets and install so that there will be no streaking of the walls or ceilings due to leakage. Duct connection to outlet on exposed duct shall be full size of outer perimeter of outlet flange.
- B. Unless otherwise indicated on Drawings, provide rectangular galvanized steel plenum on top of each diffuser and ceiling return for connection to ductwork. Line plenum with internal insulation as indicated for lined ductwork. Size plenum to allow full opening into air terminal. Plenum sheet metal gauge shall be equal to gauge for rectangular equivalent of the branch duct serving the air inlet or outlet.
- C. Ceiling-mounted air inlets, outlets, or other services installed in T-Bar type ceiling systems shall be positively attached to the ceiling suspension main runners or to cross runners with the same carrying capacity as the main runners.
 - 1. Air inlets, outlets, or other services weighing not more than 56 pounds shall have two No. 12 gauge hangers connected from the terminal or service to the structure above. These wires may be slack.
 - 2. Support air inlets, outlets, or other services weighing more than 56 pounds directly from the structure above by approved hangers. Provide 4 taut 12 gauge wires each, attached to the fixture and to the structure above. The 4 taut 12 gauge wires, including their attachment to the structure above must be capable of supporting 4 times the weight of the unit.
 - 3. Secure air inlets and outlets to main runners of ceiling suspension system with two No. 8 sheet metal screws at opposing corners.
- D. Furnish all air inlets and outlets with a baked prime coat unless otherwise noted. Provide off-white baked enamel finish on ceiling-mounted air inlets and outlets. Paint exposed mounting screws to match the material being secured.
- E. Air inlets and outlets shall match all qualities of these specified including appearance, throw, noise level, adjustability, etc.

3.05 FILTER HOUSING INSTALLATION

- A. Mount filters in airtight galvanized steel housings furnished by the filter manufacturer, or shop fabricated. Housings shall incorporate integral tracks to accommodate filters, and flanges for connection to duct or casing system.
 - 1. Sealing: Incorporate positive-sealing gasket material on channels to seal top and bottom of filter cartridge frames and to prevent bypass of unfiltered air.
 - 2. Access Doors: Hinged, with continuous gaskets on perimeter and positive-locking latch handle devices.
- B. Air filters shall be accessible for cleaning or replacement.
- C. Identify each filter access door with 1/2 inch high minimum stenciled letters.

3.06 TEMPORARY FILTERS

- A. Provide temporary filters for fans that are operated during construction; after construction dirt has been removed from the building install new filters at no additional cost to the Owner. In addition to temporary filters at filter location, provide temporary filters on all duct openings which will operate under a negative pressure.
 - 1. Filters used for temporary operation shall be the same as permanent filters for the application. Filters used for duct openings may be 1 inch thick pleated media disposable type.

3.07 DAMPER INSTALLATION

- A. All dampers automatically controlled by damper motors are specified under "Temperature Control System" except those specified with items of equipment.
- B. Provide opposed blade manual air dampers at each branch duct connection and at locations indicated on the drawings and where necessary to control air flow for balancing system. Provide an opposed blade balancing damper in each zone supply duct. Provide an access panel or Ventlok flush type damper regulator on ceiling or wall for each concealed damper.
- C. Install fusible link fire dampers full size of duct at points where shown or required.
- D. Provide 18 inch x 12 inch minimum hinged access doors in ductwork and furring for easy access to each fire damper; insulated access doors in insulated ducts. Label access doors with 1/2 inch high red letters.
 - 1. Provide Ventlok Series 100, Durodyne, or equal access doors with hardware for convenient access to all automatic dampers and other components of the system, insulated type in insulated ducts. Provide Ventlok #202 for light duty up to 2 inch thick doors, #260 heavy-duty up to 2 inch thick doors and #310 heavy-duty for greater than 2 inch thick doors. Provide #260 hinges on all hinged and personnel access doors; include gasketing.

3.08 DUCTWORK INSTALLATION

- A. General:
 - 1. Assemble and install ductwork in accordance with recognized industry practices which will achieve air tight and noiseless (no objectionable noise) systems capable of performing each indicated service. Install each run with minimum of joints. Align ductwork accurately at connections within 1/8 inch misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers, and anchors of type which will hold ducts true to shape and to prevent buckling. Where possible, install ductwork to clear construction by 1/4 inch minimum, except at air inlets and outlets. Where ductwork will not clear construction, secure duct firmly to eliminate noise in the system.
 - 2. Duct Joints: Install duct sealers, pop rivets or sheet metal screws at each fitting and joint. Duct sealers shall be fire retardant. Sheet metal screws for joints shall be minimum #10 size galvanized.

3. Where ductwork is left exposed within a room, the same shall be run true to plumb, horizontal, or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.
 4. Horizontal runs of ductwork suspended from ceilings shall provide for a maximum headroom clearance. The clearance shall not be less than 6'-6" without written approval from the Architect.
 5. Provide sheet metal angle frame at all duct penetrations to wall, floor, roof, or ceiling.
 6. Paint inside of ducts, visible through grille, dull black.
 7. Where ductwork is installed in finished areas of buildings that do not have ceilings, paint ductwork, support hangers, and air inlets and outlets to match adjacent architectural surfaces, or as directed by Architect.
 8. At the time of rough installation, or during storage on the construction site and until final startup of the heating and cooling equipment, duct and other related air distribution component openings shall be covered with tape, plastic, sheet metal, or other methods acceptable to the enforcing agency.
- B. Firestopping:
1. Pack the annular space between duct openings and ducts penetrating floors and walls with UL listed fire stop, and sealed at the ends. All pipe penetrations shall be UL listed, Hilti, 3M Pro-Set, or equal.
 - a. Install fire caulking behind mechanical services installed within fire rated walls, to maintain continuous rating of wall construction.
 2. Firestopping systems to be installed in strict accordance with manufacturer's instructions.
 3. Alternate firestopping systems are acceptable if approved equal. However, any deviation from the above specification requires the Contractor to be responsible for determining the suitability of the proposed products and their intended use, and the Contractor shall assume all risks and liabilities whatsoever in connection therewith.
- C. Flashing:
1. The work of this section shall include furnishing, layout, sizing, and coordination of penetrations required for the mechanical work.
 2. Refer to Division 07 specifications and Drawings details as applicable.
 3. Flashing for penetrations of roof for mechanical items such as flues and ducts shall be coordinated with the roofing manufacturer and roofing installer for the specific roofing type. The work of this section shall include furnishing, layout, sizing, and coordination of penetrations required for the mechanical work.
 - a. Furnish and install flashing and counterflashing in strict conformance with the requirements of the roofing manufacturer. Submit shop drawing details for review prior to installation.

- b. Flues and ducts shall have 24 gauge galvanized sheet metal storm collar securely clamped to the flue above the flashing.
- D. Upper connection of support to wood structure shall be with wood screws or lag screws in shear fastened in the upper one half of the wood structural member. Fasteners shall conform to the following schedule:

For ducts with P/2=30"	#10 x 1-1/2" wood screw
For ducts with P/2=72"	1/4"x 1-1/2" lag screw
For ducts with P/2 over 73"	3/8"x 1-1/2" lag screw

- E. Upper connection in tension to wood shall not be used unless absolutely necessary. Where deemed necessary the contractor shall submit calculations to show the size fastener and penetration required to support loads in tension from wood in accordance with the following schedule:

For ducts with P/2=30"	260 pounds per hanger
For ducts with P/2=72"	320 pounds per hanger
For ducts with P/2=96"	460 pounds per hanger
For duct with P/2 larger than 120"	NOT ALLOWED

- F. Install concrete inserts for support of ductwork in coordination with formwork as required to avoid delays in work.
- G. Upper connection to manufactured truss construction must comply with truss manufacturers published requirements and Structural Engineers requirements.
- H. Where ducts pass through interior partitions and exterior walls, conceal space between construction opening and duct or duct plus insulation with sheet metal flanges of same gauge as duct. Overlap opening on four sides by at least 1-1/2 inches.
- I. Support ductwork in manner complying with SMACNA "HVAC Duct Construction Standards," hangers and supports sections. Where special hanging of ductwork is detailed or shown on Drawings, Drawings shall be followed. Angles shall be attached to overhead construction in a manner so as to allow a minimum of 2 inches of movement in all directions with no bending or sagging of the angle.
1. Except where modified in individual paragraphs of this Section, provide hanger support with minimum 18 gauge straps, 1 inch wide. Fold duct strap over at bottom of duct.
 2. Install duct supports to rectangular ducts with sheet metal screws. Provide one screw at top of duct and one screw into strap at bottom of duct.
- J. Installation of Flexible Ductwork:
1. Provide flexible ducts with supports at 30 inch centers with 2 inch wide, 26 gauge steel hanger collar attached to the structure with an approved duct hanger. Installation shall minimize sharp radius turns or offsets.

- a. Supports shall be in accordance with SMACNA HVAC Duct Construction Standards (Metal and Flexible).
 - b. Flexible duct bends shall be not less than 1-1/2 duct diameter bend radius.
 - 2. Make connections to rigid duct and units with Panduit style draw band at inner liner material, and a second draw band over the outer vapor barrier material.
 - 3. Make connection to duct with spin-in fittings, with air scoop and balance damper.
- K. Installation of Fabric Duct Air Dispersion System:
- 1. Install fabric duct system in accordance with the requirements of the manufacturer, and per Drawings details.
 - a. Air handler and associated ductwork shall be clean and free of particulate matter at the time of fabric duct connection and pressurization of duct system.
 - 2. Fabric duct shall be cleaned according to manufacturers' instructions, if soiled during installation, prior to Project handover to Owner.

3.09 DUCTWORK SEALING AND LEAK TESTING

- A. All ductwork shall receive a Class A seal.
- B. Seal airtight all joints and seams, including standing seams and manufactured joints and seams, of all supply, return and exhaust ducts except those exposed in conditioned space.
- C. Leakage Classes:

<u>Pressure Class</u>	<u>Leakage Class</u>	
	<u>Round Duct</u>	<u>Rectangular Duct</u>
2"W.G. or less	8	16
4"W.G. or greater	2	4

- D. All duct systems (supply, return, outside air intake, and exhaust), except those identified on compliance forms on Drawings as requiring Acceptance Testing per the requirements of the California Energy Code, shall be tested in accordance with the requirements of SMACNA "HVAC Air Duct Leakage Test Manual." Test pressure shall be equal to the pressure class of the duct. For additional duct leak testing requirements, refer to Section 23 08 00.13, "Title 24 Commissioning of HVAC."

3.10 PIPING INSTALLATION

- A. General:
 - 1. All piping shall be concealed unless shown or otherwise directed. Allow sufficient space for ceiling panel removal.

2. Installation of piping shall be made with appropriate fittings. Bending of piping will not be accepted.
 3. Install piping to permit application of insulation and to allow valve servicing.
 4. Where piping or conduit is left exposed within a room, the same shall be run true to plumb, horizontal, or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.
 5. Horizontal runs of pipes and conduits suspended from ceilings shall provide for a maximum headroom clearance. The clearance shall not be less than 6'-6" without written approval from the Architect.
 6. Close ends of pipe immediately after installation. Leave closure in place until removal is necessary for completion of installation.
 7. Use reducing fittings; bushings shall not be allowed. Use eccentric reducing fittings wherever necessary to provide free drainage of lines and passage of air.
 8. Verify final equipment and fixture locations for roughing-in.
 9. Where piping is installed in walls within one inch of the face of stud, provide a 16 gauge sheet metal shield plate on the face of the stud. The shield plate shall extend a minimum of 1-1/2 inches beyond the outside diameter of the pipe.
 10. Each piping system shall be thoroughly flushed and proved clean before connection to equipment.
 11. Install exposed polished or enameled connections with special care showing no tool marks or threads at fittings.
 12. Service Markers: Mark the location of each plugged or capped pipe with a 4 inch round by 30 inch long concrete marker, set flush with finish grade. Provide 2-1/2 inch diameter engraved brass plate as part of monument marker.
 13. Pipe the discharge of each relief valve, air vent, backflow preventer, and similar device to floor sink or drain.
- B. Sleeves:
1. Install Adjus-to-Crete, Pipeline Seal and Insulator, or equal, pipe sleeves of sufficient size to allow for free motion of pipe, 24 gauge galvanized steel. The space between pipe and sleeves through floor slabs on ground, through outside walls above or below grade, through roof, and other locations as directed shall be caulked with oakum and mastic and made watertight. The space between pipe and sleeve and between sleeve and slab or wall shall be sealed watertight.
 2. At Contractor's option, Link-Seal, Metraflex Metraseal, or equal, casing seals may be used in lieu of caulking. Wrap pipes through slabs on grade with 1 inch thick fiberglass insulation to completely isolate the pipe from the concrete.
- C. Floor, Wall, and Ceiling Plates:

1. Fit all pipes with or without insulation passing through walls, floors, or ceilings, and all hanger rods penetrating finished ceilings with chrome-plated or stainless escutcheon plates.

D. Firestopping:

1. Pack the annular space between pipe sleeves and pipes penetrating floors and walls with UL listed fire stop, and sealed at the ends. All pipe penetrations shall be UL listed, Hilti, 3M Pro-Set, or equal.
 - a. Install fire caulking behind mechanical services installed within fire rated walls, to maintain continuous rating of wall construction.
2. Provide SpecSeal Systems UL fire rated sleeve/coupling penetrators for each pipe penetration or fixture opening passing through floors, walls, partitions or floor/ceiling assemblies. All Penetrators shall comply with UL Fire Resistance Directory (Latest Edition), and in accordance with CBC requirements.
3. Sleeve penetrators shall have a built in anchor ring for waterproofing and anchoring into concrete pours or use the special fit cored hole penetrator for cored holes.
4. Copper and steel piping shall have SpecSeal, or equal, plugs on both sides of the penetrator to reduce noise and to provide waterproofing.
5. Firestopping systems to be installed in strict accordance with manufacturer's instructions.
6. Alternate firestopping systems are acceptable if approved equal. However, any deviation from the above specification requires the Contractor to be responsible for determining the suitability of the proposed products and their intended use, and the Contractor shall assume all risks and liabilities whatsoever in connection therewith.

E. Flashing:

1. The work of this section shall include furnishing, layout, sizing, and coordination of penetrations required for the mechanical work.
2. Refer to Division 07 specifications and Drawings details as applicable.
3. Flashing for penetrations of metal or membrane roof for pipes shall be coordinated with the roofing manufacturer and roofing installer for the specific roofing type.
 - a. Furnish and install flashing and counterflashing in strict conformance with the requirements of the roofing manufacturer. Submit shop drawing details for review prior to installation.
 - b. Furnish and install counterflashing above each flashing required. Provide Stoneman, or equal, vandalproof top and flashing combination. Elmdor/Stoneman Model 1540.
4. Furnish and install flashing and counterflashing in strict conformance with the requirements of the roofing manufacturer. Submit shop drawing details for review prior to installation.

3.11 HANGER AND SUPPORT INSTALLATION

- A. General: Support ductwork, equipment and piping so that it is firmly held in place by approved iron hangers and supports, and special hangers. Hanger and support components shall support weight of ductwork, equipment and pipe, fluid, and pipe insulation based on spacing between supports with minimum factor of safety of five based on ultimate strength of material used. Do not exceed manufacturer's load rating. Pipe attachments or hangers, of same size as pipe or tubing on which used, or nearest available. Rigidly fasten hose faucets, fixture stops, compressed air outlets, and similar items to the building construction. The Architect shall approve hanger material before installation. Where building structural members do not match piping and ductwork support spacing, provide "bridging" support members firmly attached to building structural members in a fashion approved by the structural engineer.
1. Materials, design, and type numbers for support of piping per Manufacturers' Standardization Society (MSS), Standard Practice (SP)-58.
 - a. Provide copper-plated or felt-lined hangers for use on uninsulated copper tubing.
 2. Materials and design for ductwork support shall be per SMACNA "HVAC Duct Construction Standards, Metal and Flexible."
- B. Hanger components shall be provided by one manufacturer: B-Line, Grinnell, Unistrut, Badger, or equal.
- C. Riser clamps: B-line model B3373, or equal.
- D. Rubber Neoprene Pipe Isolators:
1. Pipe isolators shall comprise an internal rubber or neoprene material that isolates pipe from hanger and structure. Install at all piping located in acoustical walls. Refer to Architectural Drawings for location of acoustical walls.
 2. Isolation material shall be either a rubber or neoprene material that prevents contact between the pipe and the structure. The rubber shall have between a 45 to 55 durometer rating and a minimum thickness of 1/2 inch.
 3. Manufacturers:
 - a. Vertical runs: Acousto-Plumb or equal.
 - b. Horizontal runs: B-Line, Vibraclamp; Acousto-Plumb or equal.
- E. Pipe Hanger and Support Placement and Spacing:
1. Provide a support or hanger close to each change of direction of pipe either horizontal or vertical and as near as possible to concentrated loads.
 2. Vertical piping hanger and support spacing: Provide riser clamps for piping, above each floor, in contact with the floor. Provide support at joints, branches, and horizontal offsets. Provide additional support for vertical piping, spaced at or within the following maximum limits:

<u>Pipe Diameter</u>	<u>Steel Threaded or Welded (Note 3)</u>	<u>Copper Brazed or Soldered (Notes 3, 4)</u>	<u>CPVC & PVC (Note 2)</u>
1/2 - 1"	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
1-1/4 - 2"	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
2-1/2 - 3"	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
Over 4"	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)

- a. Note 1: Provide mid-story guides.
 - b. Note 2: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
 - c. Note 3: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.
 - d. Note 4: Includes refrigerant piping, including vapor and hot gas pipes.
3. Horizontal piping, hanger and support spacing: Locate hangers and supports at each change of direction, within one foot of elbow, and spaced at or within following maximum limits:

<u>Pipe Diameter</u>	<u>Steel Threaded or Welded (Note 2)</u>	<u>Copper Brazed or Soldered (Notes 2, 3)</u>	<u>CPVC & PVC (Note 1)</u>
1/2 - 1"	6 ft.	5 ft.	3 ft.
1-1/4 - 2"	7 ft.	6 ft.	4 ft.
2-1/2 - 3"	10 ft.	10 ft.	4 ft.
Over 4"	10 ft.	10 ft.	4 ft.

- a. Note 1: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
- b. Note 2: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.
- c. Note 3: Includes refrigerant piping, including vapor and hot gas pipes.

4. Suspended Piping:

- a. Individually suspended piping: B-Line B3690 J-Hanger or B3100 Clevis, complete with threaded rod, or equal. All hangers on supply and return piping handling heating hot water or steam shall have a swing connector at point of support.

<u>Pipe Size</u>	<u>Rod Size Diameter</u>
2" and Smaller	3/8"
2-1/2" to 3-1/2"	1/2"
4" to 5"	5/8"
6"	3/4"

- b. Suspend rods from concrete inserts with removable nuts where suspended from concrete decks. Power actuated inserts will not be allowed.
- c. Trapeze Suspension: B-Line, or equal, 1-5/8 inch width channel in accordance with manufacturers' published load ratings. No deflection to exceed 1/180 of a span.
- d. Trapeze Supporting Rods: Shall have a safety factor of five; securely anchor to building structure.
- e. Pipe Clamps and Straps: B-Line B2000, B2400, or equal. Where used for seismic support systems, provide B-Line B2400 series, or equal, pipe straps.
5. Provide support for piping through roof, arranged to anchor piping solidly in place at the roof penetration.

F. Piping Support to Structure:

1. Wood Structure: Provide and install wood blocking as required to suit structure. Provide lag screws or through bolts with length to suit requirements, and with size (diameter) to match the size of hanger rods required.
- a. Do not install Lag screws in tension without written review and acceptance by Structural Engineer.

Side Beam Angle Clip	B-Line B3062--MSS Type 34
Side Beam Angle Clip	B-Line B3060
Ceiling Flange	B-Line B3199

- b. Blocking for support of piping shall be not less than 2 inch thick for piping up to 2 inch size. Provide 3 inch blocking for piping up through 5 inch size, and 4 inch blocking for larger piping. Provide support for blocking in accordance with Structural Engineers requirements.

- c. Where lag screws are used, length of screw shall be 1/2 inch less than the wood blocking. Pre-drill starter holes for each lag screw.
- G. Duct Hanger and Support Spacing: Conform to Requirements of CMC and SMACNA "HVAC Duct Construction Standards, Metal and Flexible."
- H. Duct Support to Structure:
- Upper connection of support to wood structure shall be with wood screws or lag screws in shear fastened in the upper one half of the wood structural member. Fasteners shall conform to the following schedule:

For ducts with P/2=30"	#10 x 1-1/2" wood screw
For ducts with P/2=72"	1/4"x 1-1/2" lag screw
For ducts with P/2 over 73"	3/8"x 1-1/2" lag screw

- Upper connection in tension to wood shall not be used unless absolutely necessary. Where deemed necessary the contractor shall submit calculations to show the size fastener and penetration required to support loads in tension from wood in accordance with the following schedule:

For ducts with P/2=30"	260 pounds per hanger
For ducts with P/2=72"	320 pounds per hanger
For ducts with P/2=96"	460 pounds per hanger
For duct with P/2 larger than 120"	NOT ALLOWED

- Install concrete inserts for support of ductwork in coordination with formwork as required to avoid delays in work.
- Upper connection to manufactured truss construction must comply with truss manufacturers published requirements and Structural Engineers requirements.

3.12 INSULATION AND FIELD-APPLIED JACKET INSTALLATION

A. General:

- The term "piping" used herein includes pipe, air separators, valves, strainers and fittings.
- Clean thoroughly, test and have approved, all piping and equipment before installing insulation and/or covering.
- Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, ductwork, and equipment.
- Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment as specified in insulation system schedules.

5. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
 6. Install insulation with longitudinal seams at top and bottom of horizontal runs.
 7. Install multiple layers of insulation with longitudinal and end seams staggered.
 8. Keep insulation materials dry during application and finishing.
 9. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
 10. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
 11. Install insulation in removable segments on equipment access doors, manholes, handholes, and other elements that require frequent removal for service and inspection. Bevel and seal insulation ends around manholes, handholes, ASME stamps, and nameplates.
 12. For piping, ductwork, and equipment, with surface temperatures below ambient, apply mastic to open ends, joints, seams, breaks, and punctures in insulation.
 13. Repair all damage to existing pipe, duct and equipment insulation whether or not caused during the work of this contract, to match existing adjacent insulation for thickness and finish, but conforming to flame spread and smoke ratings specified above.
 14. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - a. Install insulation continuously through hangers and around anchor attachments.
 - b. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - c. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - d. Cover inserts with jacket material matching adjacent insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- B. Duct Insulation Installation:
1. General:
 - a. Insulation applied to the exterior surface of ducts located in buildings shall have a flame spread of not more than 25 and a smoke-developed rating of not more than 50 when tested as a composite installation including insulation, facing materials, tapes and adhesives as

normally applied. Material exposed within ducts or plenum shall have a flame-spread rating of not more than 25 and a smoke-developed rating of not more than 50.

- b. Duct insulation applied to the exterior surface of ducts installed outside the building insulation envelope shall meet minimum R-value of R-8 at 3 inches thickness and 3/4 pound per cubic foot density.
 - c. Duct insulation applied to the exterior surface of ducts installed within the building insulation envelope shall meet minimum R-value of R-4.2 at 1-1/2 inches thickness and 3/4 pound per cubic foot density.
2. Mineral Fiber Blanket Installation:
 - a. Insulate all unlined concealed supply and return ducts with fiberglass duct wrap, manufactured as a blanket of glass fibers factory laminated to a reinforced foil/kraft vapor retarding facing. Provide 2 inch stapling and taping flange. Wrap insulation entirely around duct and secure with outward clinching staples on 6 inch centers. Provide mechanical fasteners at maximum 18 inch centers for all bottoms of duct which are greater than 24 inches. Lap all insulation joints 3" minimum. Insulate ducts installed tight against other work before hanging in place. Seal all seams, both longitudinal and transverse, and all staple and mechanical fastener penetrations of facing with scrim backed foil tape or recommended sealant, to provide a vapor tight installation.
 3. PVC Jacket Installation:
 - a. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturer's recommended adhesive.
 - 1) Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.13 TEMPERATURE CONTROL SYSTEM INSTALLATION

- A. Provide thermostats where indicated on drawings. All wiring shall be in conduit. Provide all relays, transformers and the like to render the control system complete and fully operable. All control conduit to be rigid steel type.

3.14 EQUIPMENT START-UP

- A. Initial start-up of the systems and pumps shall be under the direct supervision of the Contractor.
- B. Equipment start-up shall not be performed until the piping systems have been flushed and treated and the initial water flow balance has been completed.
- C. It shall be the responsibility of the Contractor to assemble and supervise a start-up team consisting of controls contractor, start-up technician, and test and balance contractor; all to work in concert to assure that the systems are started, balanced, and operate in accordance with the design.
- D. After start-up is complete, instruct the Owner's personnel in the operation and maintenance of the systems. Obtain from the Owner's representative a signed memo certifying that instruction has been received.

- E. For additional requirements, refer to article, Check, Test and Start Requirements, in Section 23 00 50, Basic HVAC Materials and Methods.

3.15 TESTING AND BALANCING

- A. For testing and balancing requirements, refer to Section 23 05 93, Testing and Balancing for HVAC.

3.16 CLEANING AND PROTECTION

- A. As each duct section is installed, clean interior of ductwork of dust and debris. Clean external surfaces of foreign substances that might cause corrosive deterioration of metal or where ductwork is to be painted.
- B. Strip protective paper from stainless steel ductwork surfaces, and repair finish wherever it has been damaged.
- C. Temporary Closure: At ends of ducts that are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering that will prevent entrance of dust and debris until connections are to be completed.
- D. As each internally lined duct section is installed, check internal lining for small cuts, tears, or abrasions. Repair all damage with fire retardant adhesive.

3.17 EQUIPMENT MOUNTING

- A. Mount and anchor equipment in strict compliance with Drawings details. Alternate anchorage methods will not be considered for roof mounted equipment.

3.18 INDOOR DUCT INSULATION SCHEDULE

- A. Ducts Located Within Building Thermal Envelope:
 - 1. Minimum R-Value = R-4.2.
 - 2. Supply and Return Ducts: Mineral Fiber Blanket, 1-1/2 inches thick, 0.75 lb/cu. ft.
- B. Ducts Located Within Building Outside Thermal Envelope:
 - 1. Minimum R-Value – R-8.0.
 - 2. Supply and Return Ducts: Mineral Fiber Blanket, 3 inches thick, 0.75 lb/cu. ft.

3.19 OUTDOOR DUCT INSULATION SCHEDULE.

- A. Minimum R-Value = R-8.
- B. Refer to article, Ductwork, for internal duct lining. Provide 2 inches thick internal duct lining where indicated on Drawings.

3.20 INDOOR FIELD-APPLIED DUCT JACKET SCHEDULE

- A. Insulated ducts in concealed spaces: None.

- B. Insulated ducts in exposed unconditioned spaces: PVC, 20 mils thick.

END OF SECTION

SECTION 26 00 10

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Table of Contents, Division 26 - Electrical:

<u>SECTION NO.</u>	<u>SECTION TITLE</u>
260010	BASIC ELECTRICAL REQUIREMENTS
260060	POWER SYSTEM STUDY
260090	ELECTRICAL DEMOLITION
260519	BUILDING WIRE AND CABLE
260526	GROUNDING AND BONDING
260529	ELECTRICAL HANGERS AND SUPPORTS
260531	CONDUIT
260533	BOXES
260543	UNDERGROUND DUCTS AND STRUCTURES
260553	ELECTRICAL IDENTIFICATION
262413	SWITCHBOARDS
262416	PANELBOARDS
262719	SURFACE RACEWAYS
262726	WIRING DEVICES
262816	OVERCURRENT PROTECTIVE DEVICES
262819	DISCONNECT SWITCHES
264313	SURGE PROTECTIVE DEVICES
265000	LIGHTING

B. Work included: This Section includes general administrative and procedural requirements for Division 26. The following administrative and procedural requirements are included in this Section to supplement the requirements specified in Division 01.

1. Quality assurance.
2. Definition of terms.
3. Submittals.
4. Coordination.
5. Record documents.
6. Operation and maintenance manuals.
7. Project management and coordination services.
8. Contract modification pricing procedures.
9. Rough-in.
10. Electrical installation.

11. Cutting, patching, painting, and sealing.
 12. Field quality control.
 13. Cleaning.
 14. Project closeout.
 15. Interface/Responsibility Matrix.
- C. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete and operable installation.
1. General and supplementary conditions: Drawings and general provisions of Contract and Division 01 of the Specifications, apply to all Division 26 Sections.
 2. Selective demolition: Nondestructive removal of materials and equipment for reuse or salvage as indicated. Also dismantling electrical materials and equipment made obsolete by these installations. Refer to Division 02, Selective Demolition.
 3. Concrete work: Include forming, steel bar reinforcing, cast-in- place concrete, finishing and grouting as required for underground conduit encasement, light pole foundations, pull box slabs, vaults, housekeeping pads, etc. Also includes setting of floor boxes in existing concrete slabs, saw-cutting of existing slabs and grouting of conduits in saw-cut. Refer to Division 03, Concrete.
 4. Miscellaneous metal work: Include fittings, brackets, backing, supports, rods, welding and pipe as required for support and bracing of raceways, luminaires, panelboards, distribution boards, switchboards, motor control centers, etc. Refer to Division 05, Miscellaneous Metals.
 5. Miscellaneous lumber and framing work: Include wood grounds, nailers, blocking, fasteners and anchorage for support of electrical materials and equipment. Refer to Division 06, Rough Carpentry.
 6. Moisture protection and smoke barrier penetrations: Include membrane clamps, sheet metal flashing, counter flashing, caulking and sealant as required for waterproofing of conduit penetrations and sealing penetrations in or through fire walls, floors, ceiling slabs and foundation walls. All penetrations through vapor barriers at slabs on grade shall be taped and made vapor tight. Refer to Division 07, Thermal and Moisture Protection.
 7. Access panels and doors: Required in walls, ceilings, and floors to provide access to electrical devices and equipment. Refer to Division 08, Access Doors also, Division 05, Metals.
 8. Painting: Include surface preparation, priming and finish coating as required for electrical cabinets, exposed conduit, pull and junction boxes, etc. where indicated as field painted in this Division. Refer to Division 09, Painting.
 9. Luminaire supports: Provide slack support wire for luminaires installed in acoustical tile or lay-in suspended ceilings. Refer to Division 09, Acoustical Treatment.

- D. Work furnished and installed under another Division requiring connections under this Division includes but is not limited to:
1. Electric motors.
 2. Package mechanical equipment: fans, fan coil units, pumps, boilers, compressors, etc.
 3. Flow switches and valve monitors for sprinkler system.
 4. Temperature control panel(s). (Line voltage only)
 5. Irrigation controller(s). (Line voltage only)
 6. FM-200 control panel. (Line voltage only)
 7. Kitchen equipment and appliances.
 8. Laboratory equipment.
 9. Electric signage.
 10. Electric door locks.
 11. Door hold-open/release devices.
 12. Variable frequency drive units.
 13. Motorized roll down/sliding doors and grills.
 14. Projection screens.
- E. Items furnished under another Division, but installed and connected under this Division includes but is not limited to:
1. Wall mounted control stations for motorized roll down and sliding doors.
 2. Electric fire sprinkler water flow bells.
 3. Speed control switches for ceiling exhaust fans.

1.02 QUALITY ASSURANCE

- A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.
- B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority for reducing the quality, requirements, or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.
- C. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not:
1. California Electric Code (CEC).
 2. California Building Code (CBC).
 3. California Fire Code (CFC).

4. California Mechanical Code (CMC).
- D. Standards: Equipment and materials specified under this Division shall conform to the following standards where applicable:
- | | |
|-------|---|
| ACI | American Concrete Institute |
| ANSI | American National Standards Institute |
| ASTM | American Society for Testing Materials |
| CBM | Certified Ballast Manufacturers |
| ETL | Electrical Testing Laboratories |
| FS | Federal Specification |
| IEEE | Institute of Electrical and Electronics Engineers, Inc. |
| IPCEA | Insulated Power Cable Engineer Association |
| NEMA | National Electrical Manufacturer's Association |
| UL | Underwriters' Laboratories |
- E. Independent Testing Agency qualifications:
1. Testing Agency shall be an independent testing organization that will function as an unbiased authority, professionally independent of Manufacturer, Supplier and Contractor, furnishing and installing equipment or system evaluated by Testing Agency.
 2. Testing Agency shall be regularly engaged in the testing of electrical equipment, devices, installations, and systems.
 3. Testing Agency shall meet Federal Occupational Safety and Health Administration (OSHA) requirements for accreditation of independent testing laboratories, Title 9, Part 1907.
 4. On-site technical personnel shall be currently certified by the International Electrical Testing Association in electrical power distribution system testing.
 5. Testing Agency shall use technicians who are regularly employed by the firm for testing services.
 6. Contractor shall submit proof of above Testing Agency qualifications with bid documentation upon request.
- F. All base material shall be ASTM and/or ANSI standards.
- G. All electrical apparatus furnished under this Section shall conform to NEMA standards and the CEC and bear the UL label where such label is applicable.
- H. Certify that each welder performing Work has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.

1.03 DEFINITION OF TERMS

- A. The following list of terms as used in the Division 26 documents shall be defined as follows:
1. "Provide": Shall mean furnish, install, and connect unless otherwise indicated.
 2. "Furnish": Shall mean purchase and deliver to Project site.
 3. "Install": Shall mean to physically install the items in-place.

4. "Connect": Shall mean make final electrical connections for a complete operating piece of equipment.
5. "As directed": Shall be as directed by the Owner or their authorized Representative.
6. "Utility Companies": Shall mean the company providing electrical, telephone or cable television services to the Project.

1.04 SUBMITTALS

- A. Format: Furnish submittal data in electronic format for each Specification Section with a table of contents listing materials by Section and paragraph number.
- B. Submittals shall consist of detailed Shop Drawings, Specifications, block wiring diagrams, "catalog cuts" and data sheets containing physical and dimensional information, performance data, electrical characteristics, materials used in fabrication and material finish. Clearly indicate by arrows or brackets precisely what is being submitted on and those optional accessories which are included and those which are excluded. Furnish quantities of each submittal as noted in Division 01.
- C. Each submittal shall be labeled with the Specification Section Number and shall be accompanied by a cover letter or shall bear a stamp stating that the submittal has been thoroughly reviewed by the Contractor and is in full compliance with the requirements of the Contract Documents or provide a Specification Section line-by-line compliance response statement with detailed exception/ deviation response statements for all applicable provisions for the applicable Specification Section. Any Specification Section lines without a detailed exception/ deviation response statement shall be treated as the Contractor or Vendor is submitting in full compliance with the applicable Specification Section requirements. Cover letters shall list in full the items and data submitted. Failure to comply with this requirement shall constitute grounds for rejection of data.
- D. The Contractor shall submit detailed Drawings of all electrical equipment rooms and closets if the proposed installation layout differs from the construction documents. Physical size of electrical equipment indicated on the Drawings shall match those of the electrical equipment that is being submitted for review, i.e.: switchboards, panelboards, transformers, control panels, etc. Minimum scale: 1/4" = 1'- 0". Revised electrical equipment layouts must be approved prior to release of order for equipment and prior to installation.
- E. As part of the equipment and fixture submittals, the Contractor shall provide anchorage calculations for floor and wall mounted electrical equipment and fixtures, distribution conduits and raceways, in conformance with the 2019 California Building Code (CBC) and ASCE 7-16. Use the Occupancy Category, Ground Accelerations, Site Class, Seismic Design Category, and Seismic Importance Factor as noted in the structural drawings. For components required for Life Safety or containing hazardous materials use $I_p=1.5$. Structural Calculations shall be prepared, stamped, and signed by a California Registered Structural Engineer. Specify proof loads for drilled-in anchors, if used.
- F. The Manufacturer shall recommend the method of anchoring the equipment to the mounting surface and shall provide the Contractor with the assembly dimensions, weights, and approximate centers of gravity.

- G. Review of submittals is for general conformance to design concept and general compliance with the Specification Sections. Submittal Review Comments do not imply waiver of Specifications Section requirements unless specifically noted.
- H. All resubmittals shall include a cover letter that lists the action taken and revisions made to each Drawing and equipment data sheet in response to Submittal Review Comments. Resubmittal packages will not be reviewed unless accompanied by this cover letter. Failure to include this cover letter will constitute rejection of the resubmittal package.
- I. Shop Drawings for the following systems must be prepared via a computer aided drafting (CAD)building information modeling (Revit) system for submission by the Contractor. The Engineer can provide CADRevit files of the electrical Contract Documents to the Contractor.
 - 1. Digital lighting control system, Section 260942.
- J. Independent Testing Agency report:
 - 1. Testing Agency shall provide 3 copies of the complete testing report.
 - 2. Test report shall include the following:
 - a. Summary of Project.
 - b. Description of equipment.
 - c. Equipment used to conduct the test.
 - 1) Type.
 - 2) Manufacturer.
 - 3) Model number.
 - 4) Serial number.
 - 5) Date of last calibration.
 - 6) Documentation of calibration leading to NIST standards.
 - d. Description of test.
 - e. Test results, as compared to Manufacturers or industry accepted standards and tolerances.
 - f. Conclusion and recommendation.
 - g. Signature of responsible test organization authority.
 - 3. Furnish completed test report to Engineer no later than 30-days after completion of testing, unless otherwise directed.
- K. Substitutions:
 - 1. All requests for substitutions shall conform to the general requirements and procedure outlined in Division 01.
 - 2. Where items are noted as "or equal," a product of equal design, construction and performance will be considered. Contractor must submit to the Engineer all pertinent test data, catalog cuts and product information required substantiating that the product

is in fact equal to that specified. Only one substitution will be considered for each product specified.

3. Manufacturers' names and model numbers used in conjunction with materials, processes or equipment included in the Contract Documents are used to establish standards of quality, utility, and appearance. Materials, processes, or equipment, which in the opinion of the Engineer is equal in quality, utility, and appearance, will be approved as substitutions to that specified.
4. Whenever any material, process or equipment is specified in accordance with a Federal specification, an ASTM standard, an ANSI specification, UL rating or other association standard, the Contractor shall present an affidavit from the Manufacturer certifying that the product complies with the particular standard specification. When requested by the Engineer, support test data to substantiate compliance shall be submitted by the Contractor at no additional cost.
5. Substitutions shall be equal, in the opinion of the Architect/Engineer, to the specified product. The burden of proof of such shall rest with the Contractor. When the Architect/Engineer in writing accepts a substitution, it is with the understanding that the Contractor guaranteed the substituted article or material to be equal to the one specified and dimensioned to fit within the construction. Approved substitutions shall not relieve the Contractor of responsibilities for the proper execution of the Work or from any provisions of the Specifications.
6. The Contractor shall be responsible for all expenses in connection with the substitution materials, processes, and equipment, including the effect of the substitution on the Contractor, Subcontractor's, or other Contractor's Work. No substitution of material, processes or equipment shall be permitted without written authorization of the Architect/Engineer. Any assumptions on the acceptability of a proposed substitution prior to acceptance by the Engineer are at the sole risk of the Contractor.

1.05 COORDINATION

A. Discrepancies:

1. In the event of discrepancies within the Contract Documents, the Engineer shall be so notified, within sufficient time, as delineated in Division 01, prior to the Bid Opening to allow the issuance of an Addendum.
2. If, in the event that time does not permit notification or clarification of discrepancies prior to the Bid Opening, the following shall apply: The Drawings govern in matters of quantity and the Specifications govern in matters of quality. In the event of conflict within the Drawings involving quantities or within the Specifications involving quantities or within the Specifications involving quality, the greater quantity and higher quality shall apply. Such discrepancies shall be noted and clarified in the Contractor's Bid. No additional allowances will be made because of errors, ambiguities or omissions that reasonably should have been discovered during the preparation of the Bid.

B. Project conditions:

1. Examination of Project site: The Contractor shall visit the Project site and thoroughly review the locale, working conditions, conflicting utilities, and the conditions in which the Electrical Work will take place. Verify all existing conditions in the field. No

allowances will be made subsequently for any costs that may be incurred because of any error or omission due to failure to examine the Project site and to notify the Engineer of any discrepancies between Contract Documents and actual Project site conditions.

2. Protection: Keep conduits, junction boxes, outlet boxes and other openings closed to prevent entry of foreign matter. Cover fixtures, equipment, devices, and apparatus and protect them against dirt, paint, water, chemical or mechanical damage, before and during construction period. Prior to final acceptance, restore to original condition any fixture, apparatus or equipment damaged including restoration of damaged factory applied painted finishes. Protect bright finished surfaces and similar items until in service. No rust or damage will be permitted.
 3. Supervision: Contractor shall personally or through an authorized and competent representative constantly supervise the Work from beginning to completion and, within reason, keep the same foreman and workmen on the Project throughout the Project duration.
- C. Preparation:
1. Drawings:
 - a. Layout: General layout indicated on the Drawings shall be followed except where other Work may conflict with the Drawings.
 - b. Accuracy: Drawings for the Work under this Section are essentially diagrammatic within the constraints of the symbology applied.

1.06 RECORD DOCUMENTS

- A. Provide Project Record Drawings as described herein:
1. Drawings shall fully represent installed conditions including actual locations of outlets, true panelboard connections following phase balancing routines, correct conduit, and wire sizing as well as routing, revised luminaire schedule listing Manufacturers and products installed and revised panel schedules. Contractor shall record all changes in the Work during the course of construction on blue or black line prints. These prints shall be made subject of monthly review by the Owner's Representative to ascertain that they are current. If not current, monthly payments may be withheld.
 2. Record Drawings shall be the transfer of information on these prints to the construction documents via computer aided drafting (CAD) process. A set of CAD files of the electrical construction documents will be provided to the Contractor by the Engineer.
 3. Record drawing submissions shall be provided to the Engineer to review upon the completion of the following phases of Work:
 - a. Building electrical rough-in.
 - b. Final electrical installation.
 4. Include in the record drawing submission the following shop drawing submission with all updated installation information:
 - a. Digital Lighting Controls

5. A single set of half size prints of the Record Drawings shall be submitted for review. Upon receipt of the Engineer's review comments, corrections shall be made, and the Contractor shall provide the following:
 - a. One set of full size reproducibles.
 - b. Electronic files of Drawings in PDF and CAD.
- B. Panel schedules:
 1. Typewritten panel schedules shall be provided for panelboards indicating the loads served and the correct branch circuit number. Schedules shall be prepared on forms provided by the Manufacturer and inserted in the pocket of the inner door of each panelboard. See Section 262416: Panelboards for requirements.
 2. A single set of the record panel schedules shall be submitted for review. Upon receipt of the Engineer's review comments, corrections shall be made, and the Contractor shall provide the following:
 - a. Fold and insert one copy of the appropriate schedule in the pocket of the inner door of each panelboard.
- C. Field labels, markings, and warning signs: Provide in accordance and as required by:
 1. General: CEC Article 110.21.
 2. Arc-Flash Warning: CEC Article 110.16.
 3. Identification of Disconnecting Means: CEC Article 110.22 (A).
 4. Engineered Series Combination Systems: CEC Article 110.22 (B).
 5. Tested Series Combination Systems: CEC Article 110.22 (C).
 6. Available Fault Current: CEC Article 110.24.
 7. Depth of Working Space in Existing Buildings: CEC Article 110.26 (A)(1)(c).
 8. Locked Rooms or Enclosures: CEC Article 110.34 (C).

1.07 OPERATION AND MAINTENANCE MANUALS

- A. Prior to Project closeout furnish to the Owner, six (6) hard back 3-ring binders containing all bulletins, operation and maintenance instructions, part lists, service telephone numbers and other pertinent information as noted in each Section all equipment furnished under Division 26. Binders shall be indexed into Division Sections and labeled for easy reference. Bulletins containing more information than the equipment concerned shall be properly stripped and assembled.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. All work shall be installed in a neat, workmanlike manner in accordance with ANSI/NECA 1-2015.
- B. Comply with the requirements of all listed codes and standards.

- C. All materials and equipment provided under this contract shall be new (except where otherwise noted) and shall be listed, labeled or certified by a Nationally Recognized Testing Laboratory (NRTL) to meet Underwriters Laboratories, Inc. (UL), standards where test standards have been established. Materials and equipment which are not covered by UL standards will be accepted, providing that materials and equipment are listed, labeled, certified or otherwise determined to meet the safety requirements of a NRTL.
- D. All equipment of the same type and capacity shall be by the same manufacturer.
- E. Where any device or part of equipment is referred to in these specifications in the singular number (e.g., "the switch"), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.
- F. During construction the contractor shall at all times maintain electrical utilities of the building without interruption. Should it be necessary to interrupt any electrical service or utility, the contractor shall secure permission in writing from the owner's representative for such Interruption at least ten (10) business days in advance. Any interruption shall be made with minimum amount of inconvenience and any shut-down time shall have to be on a premium time basis and such time to be included in the contractor's bid. Arrange to provide and pay for temporary power source as required by project conditions.
- G. Working clearance around equipment shall not be less than that specified in the CEC for all voltages specified.
- H. The locations of switches, receptacles, lights, motors, etc. outlets shown are approximate. The contractor shall use good judgment in placing the preceding items to eliminate all interference with ducts, piping, etc. The contractor shall check all door swings so that light switches are not located behind doors. Relocate switches as required, with approval from the Design Professional. The owner's representative may direct relocation of outlets before installation, up to five (5) feet from the position indicated on the Drawings, without additional cost.
- I. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity. Normal maintenance shall not require the removal of protective guards from adjacent equipment. Install equipment as close as practical to the locations shown on the Drawings.
 - 1. Where the owner's representative determines that the Contractor has installed equipment not conveniently accessible for operations and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the owner.
 - 2. "Conveniently Accessible" is defined as being capable of being reached without climbing or crawling over or under obstacles such as motors, pumps, belt guards, transformers, racks, piping, ductwork, raceways or similar.
- J. Owner furnished equipment: Equipment furnished by the District shall be received, stored, uncrated, protected, and installed by the Contractor with all appurtenances required to place the equipment in operation, ready for use. The Contractor shall be responsible for the equipment as if he had purchased the equipment himself and shall hold the warranty

3.02 ROUGH-IN

ISSUE DATE
VERSION DATE

CALIFORNIA MIDDLE SCHOOL CAMPUS REFRESH / 23-145

- A. Contractor shall verify lines, levels and dimensions indicated on the Drawings and shall be responsible for the accuracy of the setting out of Work and for its strict conformance with existing conditions at the Project site.
- B. Verify final locations for rough ins with field measurements and with the requirements for the actual equipment to be connected.
- C. Refer to equipment specification in Divisions 22 through 33 for rough-in requirements.

3.03 ELECTRICAL INSTALLATION

- A. Preparation, sequencing, handling, and installation shall be in accordance with Manufacturer's written instructions and technical data particular to the product specified and/or accepted equal except as otherwise specified. Comply with the following requirements:
 - 1. Shop Drawings prepared by Manufacturer.
 - 2. Verify all dimensions by field measurements.
 - 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
 - 4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 - 5. Sequence, coordinate and integrate installations of electrical materials and equipment for efficient flow of the Work. Give attention to large equipment requiring positioning prior to closing in the building.
 - 6. Where mounting height is not detailed or dimensioned, contact the Architect for direction prior to proceeding with rough-in.
 - 7. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies and controlling agencies. Provide required connection for each service.
 - 8. Install systems, materials, and equipment to conform with approved submittal data, including coordination Drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are indicated only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
 - 9. Install systems, materials, and equipment level and plumb, parallel, and perpendicular to other building systems and components, where installed exposed in finished spaces.
 - 10. Install electrical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
 - 11. Coordinate electrical systems, equipment, and materials installations with other building components.
 - 12. Provide access panel or doors where devices or equipment are concealed behind finished surfaces. Furnish and install access doors per the requirements of Division 08.

13. Install systems, materials and equipment giving right-of-way priority to other systems that are required to maintain a specified slope.
14. Conform to the National Electrical Contractors Association "Standard of Installation" for general installation practice.

3.04 CUTTING, PATCHING, PAINTING AND SEALING

- A. Structural members shall in no case be drilled, bored, or notched in such a manner that will impair their structural value. Cutting of holes, if required, shall be done with core drill and only with the approval of the Architect and Structural Engineer.
- B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
- C. Cut, remove, and legally dispose of selected electrical equipment, components and materials as indicated, including but not limited to removal of electrical items indicated to be removed and items made obsolete by the new work.
- D. Protect the structure, furnishings, finishes and adjacent materials not indicated or scheduled to be removed.
- E. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
- F. Patch existing surfaces and building components using experienced installers and new materials matching existing materials and the original installation. For installers' qualifications refer to the materials and methods required for the surface and building components being patched.
- G. Application of joint sealers:
 1. General: Comply with joint sealer Manufacturers' printed application instructions applicable to products and applications indicated, except where more stringent requirements apply.
 2. Installation of fire-stopping sealant: Install sealant, including forming, packing and other accessory materials, to fill openings around electrical services penetrating floors and walls, to provide fire-stops and fire-resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

3.05 FIELD QUALITY CONTROL

- A. General testing requirements:
 1. The purpose of testing is to ensure that all tested electrical equipment, both Contractor and Owner supplied, is operational and within industry and Manufacturer's tolerances and is installed in accordance with design Specifications.
 2. Tests and inspections shall determine suitability for energization.
 3. Perform tests in presence of the Owner's Representative and furnish test equipment, facilities and technical personnel required to perform tests.
 4. Tests shall be conducted during the construction period and at completion to determine conformity with applicable codes and with these Specifications.

- B. Tests: In addition to specific system test described elsewhere, tests shall include:
1. Equipment operations: Test motors for correct operation and rotation.
 2. Lighting control circuits: Test lighting circuits for correct operation through their control devices.
 3. Alarm and interlock systems: Produce malfunction symptoms in operating systems to test alarm and interlock systems. In addition, all specific tests described in the fire alarm system shall be performed.
 4. Circuit numbering verification: Select on a random basis, various circuit breakers within the panelboards and cycle them on and off to verify compliance of the typed panel directories with actual field wiring.
 5. Voltage check:
 - a. At completion of job, check voltage at several points of utilization on the system that has been installed under this Contract. During test, energize all installed loads.
 - b. Adjust taps on transformers to give proper voltage, which is 118 to 122volts for 120volt nominal systems and proportionately equivalent for higher voltage systems. If proper voltage cannot be obtained, inform the Owner and the serving Utility Company.
- C. Contractor shall provide test power required when testing equipment before service energization and coordinate availability of test power with General Contractor after service energization. The Contractor shall provide any specialized test power as needed or specified herein.
- D. Testing safety and precautions:
1. Safety practices shall include the following requirements:
 - a. Applicable State and Local safety operating procedures.
 - b. OSHA.
 - c. NSC.
 - d. NFPA 70E.
 2. All tests shall be performed with apparatus de-energized and grounded except where otherwise specifically required ungrounded by test procedure.
- E. Calibration of test equipment:
1. Testing Agency shall have calibration program that assures test instruments are maintained within rated accuracy.
 2. Instruments shall be calibrated in accordance with the following frequency schedule:
 - a. Field instruments: Analog, 6-months maximum; Digital, 12-months maximum.
 - b. Laboratory instruments: 12-months.
 - c. Leased specialty equipment: 12-months where accuracy is guaranteed by lessor.
 3. Dated calibration labels shall be visible on test equipment.

4. Records, which show date and results of instruments calibrated or tested, must be kept up to date.
 5. Up-to-date instrument calibration instructions and procedures shall be maintained for test instrument.
 6. Calibration standards shall be of higher accuracy than instrument tested.
 7. Equipment used for field testing shall be more accurate than instrument being tested.
- F. Coordinate with General Contractor regarding testing schedule and availability of equipment ready for testing.
- G. Notify Owner and Engineer one week in advance of any testing.
- H. Any products which fail during the tests or are ruled unsatisfactory by the Owner's Representative shall be replaced, repaired, or corrected as prescribed by the Owner's Representative at the expense of the Contractor. Tests shall be performed after repairs, replacements or corrections until satisfactory performance is demonstrated.
- I. Testing Agency shall maintain written record of tests and shall assemble and certify final test report.
- J. Include all test results in the maintenance manuals.

3.06 CLEANING

- A. Prior to energizing of electrical equipment, the Contractor shall thoroughly clean the interior of enclosures from construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.
- B. Upon completion of Project, prior to final acceptance, the Contractor shall thoroughly clean both the interior and exterior of all electrical equipment per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt, and debris.
- C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.

3.07 PROJECT CLOSEOUT

- A. Training:
1. At the time of completion, a period of not less than 4-hours shall be allotted by the Contractor for instruction of building operating and maintenance personnel in the use of all systems. This 4-hour training is in addition to any instruction time called out in the Specifications for specific systems. All personnel shall be instructed at one time, the Contractor making all necessary arrangements with Manufacturer's Representative. The equipment Manufacturer shall be requested to provide product literature and application guides for the users' reference. Costs, if any, for the above services shall be paid by the Contractor.
 2. All training sessions shall be video recorded. Confirm file type, i.e. MOV, AVI, MP4, etc. with the district. Each specification section that requires training shall include one file, and all Division 26 specifications shall be stored on a flash drive (USB3.0, 1TB min.) 3 flash drives shall be provided to the district representative with closeout documentation.

- B. Special tools: Provide one of each tool type required for proper operation and maintenance of the equipment provided under this Section. All tools shall be delivered to the Owner at the Project completion.
- C. Keying: Provide two keys for each lock furnished under this Section and turn over to Owner.

END OF SECTION

SECTION 260060

POWER SYSTEM STUDY

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Services necessary to complete the system analysis studies required for the item specified under this Division, including but not limited to:
 - 1. Short circuit study.
 - 2. Protective device evaluation study.
 - 3. Protective device coordination study.
 - 4. Arc flash and shock risk assessment.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with equipment specified elsewhere to perform a complete analysis study.
- C. Bid Alternate: The power system study is to be included in scope only if bid alternate to replace Main Switchboards is accepted.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. American National Standards Institute, Inc. (ANSI):
ANSI Z535.4; Product Safety Signs and Labels
 - 2. Institute of Electrical and Electronic Engineers (IEEE):
IEEE 1584; Guide for Performing Arc-Flash Hazard Calculations
 - 3. National Fire Protection Association (NFPA):
NFPA 70E; Standard for Electrical Safety in the Workplace

1.03 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. The results of the Power System Study shall be summarized in a final report. Three (3) bound copies of the final report shall be submitted.
 - 2. The report shall include the following Sections:
 - a. Description, purpose, basis and scope of the study and a single line diagram of that portion of the power system, which is included within the scope of the study.

- b. Tabulations of circuit breaker, fuse and other protective device ratings versus calculated short circuit duties and commentary regarding it.
 - c. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection and commentary regarding it.
 - d. Fault current calculations including a definition of terms and guide for interpretation of computer printout.
 - e. Recommended size for power fuses and recommended settings for ground fault relays and for all adjustable trip relays.
 - f. Confirmation in writing of compliance with Arc Energy Reduction per CEC Articles 240.67 and 240.87.
 - g. Tabulations of arc flash and shock risk assessment results with commentary.
 - h. Sample arc flash and shock hazard warning label.
3. Contractor shall also provide an electronic copy of the report as part of the Record Document process. Electronic copy of the report shall be in PDF format and its native file format (e.g. XXX.PRJ).
- B. The study shall be submitted prior to final review of the distribution equipment Shop Drawings, prior to release of equipment for manufacture. If formal completion of the study may cause delay in equipment manufacture, approval from the Architect may be obtained for a preliminary submittal of sufficient data to ensure that the selection of device ratings and characteristics will be satisfactory. Then the formal study will be provided to verify the preliminary findings.

1.04 QUALITY ASSURANCE

- A. The system analysis studies shall be performed by the Switchboard/Switchgear Manufacturer or by an approved Independent Testing Company. The analysis shall be stamped by a professional engineer licensed in the State of California.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 GENERAL

- A. The studies shall include all portions of the electrical distribution system from the main normal power services down to and including the 208volt AC distribution system. Normal system connections and those that result in maximum fault conditions shall be adequately covered in the study.

3.02 SHORT CIRCUIT STUDY AND PROTECTIVE DEVICE EVALUATION STUDY

- A. The short circuit study shall be performed with the aid of a computer program and shall be in accordance with the latest applicable IEEE and ANSI standards.
- B. The study input data shall include the maximum available short circuit contribution, resistance and reactance components of the branch impedance, the X/R ratios, base quantities selected and other source impedance.

- C. Short circuit close and latch duty values and interrupting duty values shall be calculated on the basis of maximum available current at each substation bus, switchgear bus, medium voltage controller, switchboard, low voltage motor control center, distribution panelboard, pertinent branch circuit panel and other significant locations through the system. The short circuit tabulations shall include asymmetrical fault currents, symmetrical fault currents and X/R ratios. For each fault location, the total duty on the bus, as well as the individual contribution from each connected branch, shall be listed with its respective X/R ratio.
- D. A protective device evaluation study shall be performed to determine the adequacy of circuit breakers, switches, transfer switches and fuses by tabulating and comparing the short circuit ratings of these devices with the calculated fault currents. Appropriate multiplying factors based on system X/R ratios and protective device rating standards shall be applied. Any problem areas or inadequacies in the equipment due to short circuit currents shall be promptly brought to the Architect's attention.

3.03 PROTECTIVE DEVICE COORDINATION STUDY

- A. A protective device coordination study shall be performed to provide the necessary calculations and logic decisions required to select or to check the selection of power fuse ratings, protective relay characteristics and settings, ratios and characteristics of associated current transformers, ground fault relays and low voltage breaker trip characteristics and settings. The studies shall be in accordance with the latest applicable IEEE and ANSI standards.
- B. The coordination study shall include all medium and low-voltage classes of equipment from the building or plant service protective devices down to and including low voltage motor control centers and panelboards. The phase and ground overcurrent protection shall be included as well as settings of all other adjustable protective devices
- C. The time-current characteristics of the specified protective devices shall be drawn on log-log paper. The plots shall include complete titles, representative one-line diagram and legends, significant motor starting characteristics, complete parameters of transformers, complete operating bands of low voltage circuit breaker trip curves and fuses, phase cable damage curves, ground cable damage curves, medium-voltage cable shield damage curves, ground resistor damage curves, etc. as appropriate for the project. The coordination plots shall indicate the types of protective devices selected, proposed relay taps, time dial and instantaneous trip settings, transformer magnetizing inrush and ANSI transformer withstand parameters, cable thermal overcurrent withstand limits and significant symmetrical and asymmetrical fault currents. All restrictions of the National Electrical Code shall be adhered to and proper coordination intervals and separation of characteristic curves shall be maintained. The coordination plots for phase and ground protective devices shall be provided on a system basis. A sufficient number of separate curves shall be used to clearly indicate the coordination achieved.
- D. The selection and settings of the protective devices shall be provided separately in a tabulated form listing circuit identification, IEEE device number, current transformer ratios and connection, Manufacturer and type, range of adjustment and recommended settings. A tabulation of the recommended power fuse selection shall be provided for the medium

voltage fuses where applied in the system. Any discrepancies, problem areas or inadequacies shall be promptly brought to the Architect's attention.

3.04 ARC FLASH AND SHOCK RISK ASSESSMENT

- A. An arc flash and shock risk assessment shall be performed in accordance with NFPA 70E (utilizing IEEE 1584 calculation method for incident energy analysis method) at each switchboard, distribution board, panelboard, etc. in accordance with the referenced standards. NFPA 70E hazard/ risk tables for arc flash PPE category method are not acceptable for compliance with this section.
- B. The arc flash and shock risk assessment shall include all voltage classes of equipment from the service entrance down to and including the panelboards, etc. in addition to all possible scenario configurations from alternate power sources (e.g. generators, etc.).
- C. The company performing the arc flash and shock risk assessment shall provide arc flash and shock hazard warning labels for all equipment evaluated in accordance with NFPA 70E and ANSI Z535.4. Labeling shall be as follows:
 1. Label type:
 - a. White vinyl or polyester with the following warning symbol color and black text:
 - 1) Incident energy below 40 cal/cm² = Orange.
 - 2) Incident energy for 40 cal/cm² and above = Red with DANGER symbol in lieu of WARNING.
 - b. Industrial grade self-adhesive backing.
 - c. Suitable for indoor or outdoor environments for a minimum of 3-years without fading or degrading.
 2. Label information (minimum):
 - a. Nominal system voltage.
 - b. Arc flash boundary (inches).
 - c. Available incident energy and the corresponding working distance (inches).
 - d. Limited approach boundary (inches).
 - e. Restricted approach boundary (inches).
 - f. Equipment identification.
 - g. Date.
 3. Labels shall be affixed to all equipment covered under the risk assessment by the company performing the arc flash and shock risk assessment.
 4. Prior to printing and affixing labels, coordinate with the Owner and Architect, which scenario will be used for the labels.

3.05 PROTECTIVE DEVICE TESTING, CALIBRATION AND ADJUSTMENT

- A. The equipment Manufacturer shall provide the services of a qualified field Engineer and necessary tools and equipment to test and calibrate the protective relays, ground fault relays and circuit breaker trip devices as recommended in the Power System Study.

END OF SECTION

SECTION 26 00 90
ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor and equipment necessary to complete the demolition required for the item specified under this Division, including but not limited to:
 - 1. Electrical demolition

1.02 SYSTEM DESCRIPTION

- A. Disconnection, removal and relocation of all wiring, luminaires, outlets, conduit, and all other types of electrical equipment as described on Drawings.
- B. Purpose is to remove, relocate and extend existing installations to accommodate new construction.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment necessary for patching and extending Work, as specified in other Sections.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly review conditions in the area of demolition prior to commencing Work to ensure complete understanding of existing installation in relationship to demolition Work.

3.02 GENERAL REQUIREMENTS

- A. Remove all wiring, luminaires, outlets, conduit, and all other types of electrical equipment indicated to be removed. Devices that are to be removed may require reworking conduit and wiring in order to maintain service to other devices. If removed devices are on walls or ceilings that are to remain, blank coverplates are to be installed on outlet boxes.
- B. Where remodeling interferes with circuits in areas that are otherwise undisturbed, circuits shall be reworked as required.
- C. Existing devices and circuiting that are indicated are indicated only for informational purposes. Contractor shall visit the Project site and shall verify conditions as they exist and shall remove, relocate, and/or rework any electrical equipment or circuits affected (whether indicated or not) due to removal of existing walls, ceilings, etc. Coordinate all Work with that of other trades.

- D. All equipment, luminaires, devices, etc., which are removed shall be delivered to the Owner for disposition. All items which are removed and not wanted by the Owner and which are not reused shall become the property of the Contractor and shall be legally removed from the Project site.
 - E. Cutting and patching necessary for the removal of Electrical Work shall be included.
 - F. Remove and replace luminaires, rework, relocate or replace conduit and wiring and do other Work required by the installation of new ductwork, piping, etc., above the ceiling. Coordinate with other trades and verify the extent of the Work.
- 3.03 LUMINAIRES
- A. Disconnect and remove abandoned luminaires. Remove conduits, wiring, boxes, brackets, stems, hangers, and other accessories.
- 3.04 OUTLETS
- A. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- 3.05 CONDUIT
- A. Remove abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors and patch surfaces.
- 3.06 WIRING
- A. Remove abandoned wiring to source of supply.
- 3.07 EXISTING SYSTEMS
- A. Electrical distribution system: Disable system only to make switchovers and connections. Obtain permission from Owner's designated representative at least 24-hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to Work area.
- 3.08 CLEANING AND REPAIR
- A. Clean and repair existing materials and equipment that shall remain.
 - B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
 - C. Luminaries: Remove lenses and lamps and clean all exposed surfaces. Also clean the lenses or replace if discolored. Provide all new lamping when re-assembling.

END OF SECTION

SECTION 26 05 19

BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Building wire.
 - 2. Cable.
 - 3. Wiring connections and terminations.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. Underwriters Laboratories, Inc. (UL):
 - UL 4; Armored Cable.
 - UL 44; Thermoset-Insulated Wires and Cables.
 - UL 62; Flexible Cord and Fixture Wire.
 - UL 83; Thermoplastic-Insulated Wires and Cables.
 - UL 183; Manufactured Wiring Systems.
 - UL 310; Electrical Quick-Connect Terminals.
 - UL 486A & B; Wire Connectors.
 - UL 486C; Splicing Wire Connectors.
 - UL 486D; Insulated Wire Connector Systems for Underground Use or in Damp or Wet Locations.
 - UL 493; Thermoplastic-Insulated Underground Feeder and Branch Circuit Cables.
 - UL 510; Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
 - UL 854; Service-Entrance Cables.
 - UL 1569; Metal-Clad Cables.
 - UL 1581; Reference Standard for Electrical Wires, Cables and Flexible Cords.
 - UL 2196; Standard for Tests of Fire Resistive Cables.

2. National Electrical Manufacturer Association (NEMA):
NEMA WC-70; Power Cables Rated 2,000 V or Less for the Distribution of Electrical Energy.
3. Institute of Electrical and Electronic Engineers (IEEE):
IEEE 82; Test Procedure for Impulse Voltage Tests on Insulated Conductors.

IEEE 576; Recommended Practice for Installation, Termination, and Testing of Insulated Power Cable as Used in Industrial and Commercial Applications.

1.03 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 3. Submit Manufacturer's installation instructions.
 4. Final test results.

1.04 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.
- C. Independent Testing Agency qualifications: Refer to Section 260010: Basic Electrical Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 1. Building wire:
 - a. Cerrowire
 - b. General Cable
 - c. Southwire Company
 - d. Stabiloy (aluminum only)
 - e. United Wire and Cable
 2. Wiring connectors and terminations:

- a. 3M Company.
- b. Ideal.
- c. Blackburn-Holub.
- d. Burndy.
- e. Thomas & Betts Corp.
- f. Beau Barrier.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 BUILDING WIRE

A. Conductor material:

- 1. Provide annealed copper for all wire, conductor, and cable, unless otherwise indicated.
- 2. All building wire shall be stranded, unless otherwise indicated.

B. Insulation material:

- 1. All insulated wire, conductor and cable shall be 600volt rated, unless otherwise noted on the Drawings.
- 2. Thermoplastic-insulated building wire.
- 3. Rubber-insulated building wire.
- 4. Copper feeders and branch circuits larger than #6 AWG: Type THW, XHHW or dual rated THHN/THWN.
- 5. Copper feeders and branch circuits #6 AWG and smaller: Type TW, THW, XHHW or dual rated THHN/THWN.
- 6. Feeders and branch circuits for direct-current (DC) in wet locations: Type XHHW-2.
- 7. Conductors for variable frequency drives (VFD): Type XHHW-2.
- 8. Service Entrance: Type RHW or THWN.
- 9. Control Circuits: Type THW or dual rated THHN/THWN.
- 10. Identify system conductors as to voltage and phase connections by means of color-impregnated insulation.

2.03 WIRING CONNECTIONS AND TERMINATIONS

A. Bolted pressure connectors: Provide wide range-taking connectors with cast bronze compression bolts, designed for parallel taps, tees, crosses or end-to-end connections.

B. Electrical spring wire connectors:

- 1. Provide multi-part construction incorporating a non-restricted, zinc coated square cross-section steel spring enclosed in a steel sheet with an outer jacket of plastic and insulating skirt.
- 2. Self-striping pigtail and tap U-contact connectors shall not be used.

C. Compression type terminating lugs:

1. Provide tin-plated copper high-compression type lugs for installation with hand or hydraulically operated circumference-crimping tools and dies as stipulated by the lug Manufacturer or as indicated on Drawings. Notch or single point type crimping is NOT acceptable.
 2. Two-hole, long barrel lugs shall be provided for size #4/0 and larger wire where terminated to bus bars. Use minimum of three crimps per lug, on sizes where possible.
- D. Splicing and insulating tape: Provide black, ultraviolet proof, self-extinguishing, 7-mil thick vinyl general purpose electrical tape with a dielectric strength of 10,000volts suitable for temperatures from minus 18-degrees C to 105-degrees C.
- E. Insulating putty:
1. Provide pads or rolls of non-corrosive, self-fusing, one-eighth inch thick rubber putty with PVC backing sheet. Scotch vinyl mastic pads and roll or equal.
 2. Use putty suitable for temperatures from minus 17.8-degrees C to 37.8-degrees C with a dielectric strength of 570volts/mil minimum.
- F. Insulating resin:
1. Provide two-part liquid epoxy resin with resin and catalyst in pre-measured, sealed mixing pouch. Scotchcast 4 or equal for wet or underground vaults, boxes, etc. splices or terminations.
 2. Use resin with a set up time of approximately 30-minutes at 21.1-degrees C and with thermal and dielectric properties equal to the insulating properties of the cables immersed in the resin.
- G. Terminal strips:
1. Provide box type terminal strips in the required quantity plus 25% spare. Install in continuous rows in terminal cabinets.
 2. Use the box type terminal strips with barrier open backs and with ampere ratings as required.
 3. Identify all terminals with numbering sequence being used for a system.
- H. Crimp type connectors:
1. Provide insulated fork or ring crimp terminals with tinned electrolytic copper-brazed barrel with funnel wire entry and insulation support
 2. Fasten crimp type connectors or terminals using a crimping tool recommended by the connector Manufacturer.
 3. Provide insulated overlap splices with tinned seamless electrolytic copper barrel with funnel wire entry and insulation support.
 4. Provide insulated butt splices with tinned seamless electrolytic copper barrel with center stop, funnel wire entry and insulation support.
- I. Cable ties: Provide harnessing and point-to-point wire bundling with nylon cable ties. All cable ties shall be installed using tool supplied by Manufacturer of ties.
- J. Wire lubricating compound:

1. UL listed for the wire insulation and conduit type and shall not harden or become adhesive.
 2. Shall not be used on wire for isolated type electrical power systems.
- K. Bolt termination hardware:
1. Bolts shall be plated, medium carbon steel heat-treated, quenched and tempered equal to ASTM A-325 or SAE grade 5; or silicon bronze alloy ASTM B-9954 Type B.
 2. Nuts shall be heavy semi-finished hexagon, conforming to ANSI B18.2.2, threads to be unified coarse series (UNC), class 2B steel or silicon bronze alloy.
 3. Flat washers shall be steel or silicon bronze, Type A plain standard wide series, conforming to ANSI B27.2. SAE or narrow series shall not be used.
 4. Belleville conical spring washers shall be hardened steel, cadmium plated or silicon bronze.
 5. Each bolt connecting lug(s) to a terminal or bus shall not carry current exceeding the following values:
 - a. 1/4" bolt: 125amps
 - b. 5/16" bolt: 175amps
 - c. 3/8" bolt: 225amps
 - d. 1/2" bolt: 300amps
 - e. 5/8" bolt: 375amps
 - f. 3/4" bolt: 450amps

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of wire and cable installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 APPLICATION

- A. All wire, conductor and cable with their respective connectors, fittings and supports shall be UL listed for the installed application and ambient condition.
- B. Feeders and branch circuits in wet locations shall be rated 75-degree C.
- C. Feeders and branch circuits in dry locations shall be rated 90-degree C.
- D. Feeders and branch circuits for direct-current (DC) systems, such as PV installations, in wet locations shall be type XHHW-2 copper conductors.
- E. For wiring of the following, refer to the indicated Code Articles:
1. Fire pump systems shall comply with CEC Article 695.
 2. Emergency systems shall comply with CEC Article 700.
 3. Fire alarm systems shall comply with CEC Article 760.

4. Where the any above are required to be fire-resistive, refer to CEC Article 728.
- F. Minimum conductor size:
 1. Provide minimum AWG #12 for all power and lighting branch circuits.
 2. Provide minimum AWG #14 for all line voltage signal and control wiring unless otherwise indicated.
- G. Color coding:
 1. For 120/208volt, 3-phase, 4-wire systems:
 - a. Phase A - Black
 - b. Phase B - Red
 - c. Phase C - Blue
 - d. Neutral - White
 - e. Ground - Green
 2. For 277/480volt, 3-phase, 4-wire systems:
 - a. Phase A - Brown
 - b. Phase B - Orange
 - c. Phase C - Yellow
 - d. Neutral - Gray
 - e. Ground - Green
 3. Switch leg individually installed shall be the same color as the branch circuit to which they are connected, unless otherwise noted.
 4. Travelers for 3-way and 4-way switches shall be a distinct color and pulled with the circuit switch leg or neutral.

3.03 WIRING METHODS

- A. Install wires and cables in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.
- B. Install all single conductors in raceway system, unless otherwise noted.
- C. Parallel circuit conductors and terminations shall be equal in length and identical in all ways.
- D. Provide adequate length of conductors within electrical enclosures and train the conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than #10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at the terminal.
- E. 20amp power and lighting branch circuit containing no more than four (4) current carrying conductors (phases and neutrals). Use #10 AWG conductor for 120/208volt circuits located outside a 75-foot radius of panel source and for 277/480volt branch circuits located outside a 200-foot radius of panel source, unless otherwise noted.

- F. 20amp power and lighting branch circuits containing no more than eight (8) current carrying conductors (phases and neutrals). Use #10 AWG conductors for 120/208volt circuits located outside a 65-foot radius of panel source and for 277/480volt circuits located outside a 150-foot radius of panel source.
- G. Provide #10 AWG pig tails on all 20amp and 30amp wiring devices served by #8 AWG conductors and larger.
- H. Splice cables and wires only in outlet boxes, junction boxes, pull boxes, manholes or handholes. Group and bundle with tie wrap each neutral with its associated phase conductor where more than one neutral is present in a conduit.
- I. Install cable supports for all vertical feeders in accordance with the CEC Article 300. Provide split wedge type fittings, which firmly clamp each individual cable and tighten due to cable weight.
- J. Neatly form, train, and tie the cables in individual circuits. For panelboards, cabinets, wireways, switches, and equipment assemblies.
- K. Seal cable or wire, entering a building from underground or exiting walk-in cold box or freezer, between the wire or cable and conduit, where it exits the conduit, with a non-hardening approved compound, i.e. duct seal or equal.
- L. Provide UL-listed factory-fabricated, solderless metal connectors of size, ampacity rating, material, type, and class for applications and for services indicated. Use connectors with temperature ratings equal to or greater than the wires that are being terminated.
- M. Stranded wire shall be terminated using fitting, lugs or devices listed for the application. However, in no case shall stranded wire be terminated solely by wrapping it around a screw or bolt.
- N. Flexible cords and cables supplied, as part of a pre-manufacturer fixture or unit assembly shall be installed according to Manufacturers published installation instructions.

3.04 WIRING INSTALLATION IN RACEWAYS

- A. Install wire in raceway in accordance with IEEE 576, Manufacturer's written instructions, as indicated on the Drawings and as specified herein after interior of building has been physically protected from the weather and all mechanical Work likely to injure conductors has been completed. Pull all conductors into a raceway at the same time. Exercise care in pulling conductors so that insulation is not damaged. Use UL listed, non-petroleum base and insulating type pulling compound as needed.
- B. Completely mandrel all underground or concrete encased conduits prior to installing conductors.
- C. Completely and thoroughly swab raceway system before installing conductors.
- D. Do not use block and tackle, power driven winch or other mechanical means for pulling conductors of size smaller than #1 AWG.
- E. Wire pulling:
 - 1. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling of cables.

2. Use rope made of nonmetallic material for pulling feeders.
 3. Attach pulling lines for feeders by means of either woven basket grips or pulling eyes attached directly to the conductors.
 4. Pull in together multiple conductors or cables in a single conduit.
 5. Pulling tensions and sidewall pressures shall not exceed 60% of the manufacturer's recommended maximum values. Pulling tension shall be continuously monitored during the pull by a calibrated dynamometer. If pulling tension is exceeded during the pull, immediately notify the engineer to determine if the cables will be considered damaged and require contractor replacement.
- F. Install and test all cables in accordance with Manufacturer's instructions and warranty.

3.05 MC CABLE INSTALLATION

- A. Use of MC Cable is restricted as follows:
1. Installation above accessible ceiling space, for lighting installed in the t-bar ceiling. Circuiting shall be routed to each individual room via conduit and wire to distribution junction boxes for conversion from hardwire to MC cable wiring system. Install these boxes such that they are accessible from below. Do not route MC Cable from room to room, or in inaccessible ceiling spaces.
 2. Use of MC Cable is acceptable to feed new receptacles by 'fishing' into wall cavity of existing walls, if such use will eliminate the need for surface raceway.
 3. Do not install MC Cable under any other conditions.
- B. Install MC cable in accordance with Manufacturer's instructions and in strict accordance with CEC Article 330. Secure and support MC cable with straps, independent hanger wire per CEC 300.11 (B), or cable ties listed for the purpose. Follow Manufacturer's explicit instructions when connecting the cable to fittings and boxes. Connectors shall be firmly secured to the cable, but not over-tightened. Connector shall be firmly attached to the metal boxes.
- C. Support cables every 6-feet and within 12-inches of boxes, per CEC Article 330, using separate spring metal clip or metal cable ties (not steel tie wire) for each cable. Cables shall not be bundled together.
- D. Hanger wire used to support suspended ceilings may not be used to directly support MC cables.
- E. Do not rest cables on ceiling tiles or allow contact with mechanical piping systems.
- F. Bend the cable per CEC Article 330.
- G. Provide separate sleeves and/or fire barriers where cable penetrated firewalls, unless cable is UL listed for the application.

3.06 WIRE SPLICES, JOINTS AND TERMINATION

- A. Join and terminate wire, conductors, and cables in accordance with UL 486A, C, CEC and Manufacturer's instructions.
- B. Thoroughly clean wires before installing lugs and connectors.

- C. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- D. Splices and terminations shall be made mechanically and electrically secure.
- E. Where it's determined that unsatisfactory splice or terminations have been installed, remove the devices and install approved devices at no addition cost.
- F. Terminate wires in Terminal Cabinets, relay, and contactor panels, etc. using terminal strip connectors.
- G. Insulate spare conductors with electrical tape and leave sufficient length to terminate anywhere in the panel or cabinet.
- H. Install cable ties and maintain harnessing.
- I. Encapsulate splices in exterior outlets, pull boxes and junction boxes using specified insulating resin kits. Make all splices watertight for exterior equipment and equipment in pump rooms.
- J. Make up all splices and taps in accessible junction or outlet boxes with connectors as specified herein. Pigtails and taps shall be the same color as the feed conductor. Form conductor prior to cutting and provide at least 6-inches of tail and neatly packed in box after splice is made up.
- K. Branch circuits (#10 AWG and smaller):
 - 1. Connectors: Solderless, screw-on, reusable spring pressure cable type, 600volt, 105-degree C. with integral insulation, approved for copper conductors.
 - 2. The integral insulator shall have a skirt to completely cover the stripped wires.
 - 3. The number, size and combination of conductors as listed on the Manufacturers packaging shall be strictly complied with.
- L. Feeder circuits: (#6 to 750 kCMIL)
 - 1. Join or tap conductors from #6 AWG to 750 kCMIL using bolted pressure connectors or insulate mechanical compression (hi-press) taps with pre-molded, snap-on insulating boots or specified conformable insulating pad and over wrapped with two half-lapped layers of vinyl insulating tape starting and ending at the middle of the joint.
 - 2. Terminate conductors from size #6 AWG to 750 kCMIL copper using bolted pressure or mechanical compression lugs in accordance with Manufacturer recommendation or as specified elsewhere.
 - 3. Field installed compression connectors for cable sizes 250 kCMIL and larger shall have not less than two clamping elements or compression indents per wire.
 - 4. Insulate splices and joints with materials approved for the particular use, location, voltage, and temperature. Insulate with not less than that of the conductor level that is being joined.
- M. Termination hardware assemblies:
 - 1. AL/CU lugs connected to aluminum plated or copper buss, shall be secured using a steel bolt, flat washer (two per bolt), Belleville washer and nut.

2. Copper lugs connected to copper bus, shall be secured using silicon bronze alloy bolt, flat washer (two per bolt), Belleville washer and nut.
3. The crown of Belleville washers shall be under the nut.
4. Bolt assemblies shall be torque to Manufacturer recommendation. Where manufacture recommendations are not obtainable, the following values shall be used:
 - a. 1/4" - 20 bolt at 80-inch pounds torque.
 - b. 5/16" - 18 bolt at 180-inch pounds torque.
 - c. 3/8" - 16 bolt at 20-foot pounds torque.
 - d. 1/2" - 13 bolt at 40-foot pounds torque.Fp
 - e. 5/8" - 11 bolt at 55-foot pounds torque.
 - f. 3/4" - 10 bolt at 158-foot pounds torque.

3.07 IDENTIFICATION

- A. Refer to Section 260553: Electrical Identification for additional requirements.
- B. Securely tag all branch circuits. Mark conductors with specified vinyl wrap-around markers. Where more than two conductors run through a single outlet, mark each conductor with the corresponding circuit number.
- C. Color code conductors' size #8 and larger using specified phase color markers and identification tags, with exception of the grounded conductor which must have a continuous white or gray jacket if #6 or smaller.
- D. Provide all terminal strips with each individual terminal identified using specified vinyl markers.
- E. In manholes, pull boxes and handholes, provide tags of the embossed brass type and show the cable type and voltage rating. Attach the tags to the cables with slip-free plastic cable lacing units.

3.08 FIELD QUALITY CONTROL

- A. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing required herein. Independent Testing Agency shall meet the requirements as outlined in Section 260010: Basic Electrical Requirements.
- B. Prefunctional testing:
 1. Visual and mechanical inspection:
 - a. Compare cable data with Contract Documents.
 - b. Inspect exposed sections of wires and cables for physical damage and proper connections.
 - c. Verify tightness of accessible bolted connections with calibrated torque wrench in accordance with Manufacturer's published data.
 - d. Inspect compression applied connectors for correct cable match and indentation.

- e. Verify visible cable bend meet or exceed ICEA and Manufacturer's minimum allowable bending radius.
 - f. If cables are terminated through window type current transformers, inspect to verify neutral and ground conductors are correctly placed for operation of protective devices.
 - g. Ensure wire and cable identification has been installed as specified herein.
2. Electrical testing:
- a. Contractor shall perform feeder and branch circuit insulation test after installation and prior to connection to utilization devices such as fixtures, motors, or appliances. Testing shall be as follows:
 - 1) 100% of all feeders 100amp rated and above.
 - 2) 50% of all feeders smaller than 100amps.
 - 3) 10% of all branch circuits at each individual panelboard.
 - b. Perform insulation-resistance test using megohm meter with applied potential of 1000volt DC for a continuous duration of 60-seconds. Test conductors' phase-to-phase and phase-to-ground. Conductors shall test free from short-circuit and ground faults.
 - c. Perform continuity test of all feeder and branch circuits to ensure correct cable connections. Test all neutrals for improper grounds.
 - d. Contractor shall furnish instruments, materials, and labor for these tests.
3. Test values: Investigate resistance values less than 50-megohms.
4. Furnish test results in typewritten report form for review and inclusion in the operation and maintenance manuals.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Power system grounding.
 - 2. Electrical equipment and raceway grounding and bonding.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 05: Building Steel.
 - 3. Division 22: Cold Water Piping.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. Underwriters Laboratories, Inc. (UL):
 - UL 467; Grounding and Bonding Equipment.
 - 2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - IEEE No. 142; Recommended Practice for Grounding of industrial and Commercial Power Systems.
 - IEEE No. 81 Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.

1.03 SYSTEM DESCRIPTION

- A. Ground the electrical service system neutral at service entrance equipment as described herein and indicated on Drawings.
- B. Ground each separately derived system neutral as described herein and indicated on Drawings.
- C. Except as otherwise indicated, the complete electrical installation including the neutral conductor, metallic conduits and raceways, cable trays, boxes, cabinets and equipment shall be completely and effectively grounded in accordance with all code requirements, whether or not such connections are specifically indicated or specified.
- D. Resistance:

1. Resistance from the main switchboard ground bus through the ground electrode to earth shall not exceed 5-OHMS unless otherwise noted.
2. Resistance from the farthest panelboard, switchboard, etc. ground bus through the ground electrode to earth shall not exceed 20-OHMS

1.04 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 3. Submit Manufacturer's installation instructions.

1.05 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 1. Ground Rods:
 - a. Weaver.
 - b. Erico "Cadweld" Products, Inc.
 2. Ground Wells:
 - a. Christy Concrete Products, Inc.
 - b. Forni Corp.
 3. Ground Bushings, Connectors, Jumpers and Bus:
 - a. O-Z/Gedney.
 - b. Thomas & Betts Corp.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 GROUND CONDUCTORS

- A. Refer to Specification Section 260519: Building Wire and Cable for conductor specifications.
- B. General purpose insulated:

1. UL approved and code sized copper conductor, with dual rated THHN/THWN insulation, color identified green.
 2. Where continuous color-coded conductors are not commercially available, provide a minimum 4" long color band with green, non-aging, plastic tape in accordance with CEC.
- C. Bare conductors in direct contact with earth or encased in concrete: #4/0 AWG copper minimum, U.O.N.
- D. Bonding pigtails: Insulated copper conductor, identified green, sized per code, and provide with termination screw or lug. Provide solid conductors for #10 AWG or smaller and stranded conductors for #8 AWG or larger.
- 2.03 INSULATED GROUNDING BUSHINGS
- A. Plated malleable iron or steel body with 150-degree Centigrade molded plastic insulating throat and lay-in grounding lug.
- 2.04 CONNECTIONS TO PIPE
- A. For cable to pipe: UL and CEC approved bolted connection.
- 2.05 CONNECTIONS TO STRUCTURAL STEEL, GROUND RODS OR SPLICES
- A. Where required by the Drawings, grounding conductors shall be spliced together, connected to ground rods or connected to structural steel using exothermic welds or high-pressure compression type connectors.
1. Exothermic welds shall be used for cable-to-cable and cable-to-ground rod and for cable to structural steel surfaces. Exothermic weld kits shall be as manufactured by Cadweld or equal. Each particular type of weld shall use a kit unique to that type of weld.
 2. High-pressure compression type connectors shall be used for cable-to-cable and cable-to-ground rod connections.
- 2.06 EXTRA FLEXIBLE, FLAT BONDING JUMPERS
- A. Where required by Code, indicated on the Drawing, and specified herein.
- 2.07 BUILDING GROUND BUS REQUIREMENTS
- A. Main building power system ground bus:
1. Provide one 24" wide x 4" high x 1/4" thick copper bus bar as a minimum. Mount on wall in main electrical room utilizing insulating stand-offs at 18" above finished floor.
 2. Furnish complete with cast copper alloy body lugs for connecting grounding system conductors. Attach lugs to bus with appropriate size cadmium bronze bolt, flat washer, and Belleville washer. Torque all lug connections.
 3. All holes shall be drilled and tapped for single-hole lugs. Provide 6 spare lugs and lug spaces.
- B. Building power system reference ground bus:
1. The reference ground bus is furnished as part of the main electrical switchboard for the building, along with neutral disconnect and bus, and is in addition to the main building power system

ground bus outlined above. The building grounding electrode shall make a direct connection to the building referenced ground bus in the main switchboard.

2. Provide a #4/0 AWG copper ground conductor connection between the building reference ground bus in switchboard and the main building ground bus wall mounted in main electrical room.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of grounding system installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 INSTALLATION

- A. Grounding electrodes:
 1. Metal underground water pipe: Cold water metal piping system: Where the underground cold water service line is metal, indirect contact with the earth for 10-feet or more, the Contractor shall install a grounding electrode conductor from the main incoming cold water line ahead of the meter and extend to the main building reference ground bus in the main electrical room. The electrode shall be sized per CEC Article 250. Electrode connection should be accessible.
 2. Concrete encased grounding electrode (UFER ground): Provide a #4/0 AWG minimum bare copper conductor encased along the bottom of concrete foundation or footings which are in direct contact with the earth and where there is no impervious water-proofing membrane between the footing and the soil. The electrode shall extend through a horizontal length of 30 feet minimum and shall be encased in not less than 2 or more than 5 inches of concrete separating it from surrounding soils. The electrode shall emerge from the concrete slab through a protective non-metallic sleeve and shall be extended to the main building reference ground bus.
 3. Supplementary grounding electrode (ground ring, grid and driven rods): Provide, as indicated on the Drawings, driven ground rod(s) installed in listed ground well box(s) and filled with gravel after connection is made. Interconnect ground rod with structural steel and adjacent rods with minimum #2 AWG bare copper conductor. Ground rod shall not be less than 10 foot from any other electrode of another electrical system or from adjacent ground rod(s).
- B. Grounding electrode conductor: Provide grounding electrode conductor as indicated on the Drawings or sized per CEC Article 250, whichever is greater.
- C. Power system grounding:
 1. Scope of work consists of replacing existing electrical equipment, i.e. switchboards and panelboards. Recommend existing grounding system to new gear to match existing conditions.
- D. Separately derived electrical system grounding:
 1. Ground each separately derived system per requirements in CEC Article 250 as a minimum, unless greater requirements are required elsewhere in the Contract Documents.

2. Transformers: Provide copper terminal bar for grounding and bonding the transformer in accordance with CEC Articles 250.30 and 450.10. Bond the terminal bar to the enclosure and connect the following to the terminal bar:
 - a. Primary feeder equipment ground conductor(s).
 - b. Secondary feeder supply-side bonding jumper(s).
 - c. Grounding electrode conductor.
 - d. Main bonding jumper to neutral (when present).
 - e. Supplemental grounding electrodes.
- E. Equipment bonding/grounding:
 1. Provide a CEC sized insulated copper ground conductor in all 120volt AC through 600volt AC feeder and branch circuit distribution conduits and cables.
 2. Provide a separate grounding bus at panelboards, switchboards. Connect all metallic enclosed equipment so that with maximum fault current flowing, shall be maintained at not more than 35volts above ground.
 3. Conduit terminating in concentric, eccentric, or oversized knockouts at panelboards, cabinets, gutters, etc. shall have grounding bushings and bonding jumpers installed interconnecting all such conduits.
 4. Provide bonding jumpers across expansion and deflection couplings in conduit runs, pipe connections to water meters, dielectric couplings in metallic cold-water piping system.
 5. Provide internal ground wire in flexible conduit connected at each end via grounding bushing.
- F. Site lighting grounding: Bond all metallic light poles and bollards. Provide ground rods where indicated on the Drawings.

3.03 FIELD QUALITY CONTROL

- A. Independent Testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing required herein.
- B. Prefunctional testing:
 1. Provide Testing Agency with Contract Documents for their review prior to the commencement of ground testing.
 2. Visual and mechanical inspection:
 - a. The Testing Agency shall inspect the grounding electrode and connections prior to concrete encasement, burial, or concealment.
 - b. Check tightness and welds of all ground conductor terminations.
 - c. Verify installation complies with the intent of the Contract Documents
 3. Obtain and record ground resistance measurements both from electrical equipment ground bus to the ground electrode and from the ground electrode to earth. Furnish and install additional bonding and add grounding electrodes as required complying with resistance limits specified under this Section of the Specification.

4. A typewritten record of measured resistance values shall be submitted for review and included with the operation and maintenance manual furnished to the Owner at the time of Project closeout and before certificate of final payment is issued.

END OF SECTION

SECTION 260529

ELECTRICAL HANGERS AND SUPPORTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Conduit supports.
 - 2. Equipment supports.
 - 3. Fastening hardware.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 03: Cast-in-place concrete. Concrete equipment pads.
 - 3. Division 05: Miscellaneous metals. Hangers for electrical equipment.
 - 4. Division 09: Ceiling suspension systems. Slack support wires.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. Underwriters Laboratories, Inc. (UL):
 - UL 2239; Hardware for the Supports of Conduit, Tubing and Cable.

1.03 SYSTEM DESCRIPTION

- A. Provide devices specified in this Section and related Sections for support of electrical equipment furnished and installed under Division 26.
- B. Provide support systems that are adequate for the weight of equipment, conduit and wiring to be supported.

1.04 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein.
 - 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 - 3. Submit Manufacturer's installation instructions.

1.05 QUALITY ASSURANCE

ISSUE DATE
VERSION DATE

CALIFORNIA MIDDLE SCHOOL CAMPUS REFRESH / 23-145

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Concrete fasteners:
 - a. Hilti Kwik-Bolt T22.
 - b. Phillips "Red-Head".
 - c. Remington.
 - d. Ramset.
 - 2. Concrete inserts and construction channel:
 - a. Unistrut Corp.
 - b. GS Metals "Globe Strut."
 - c. Thomas & Betts "Kindorf" Corp.
 - 3. Conduit straps:
 - a. O-Z/Gedney.
 - b. Erico "Caddy" Fastening Products.
 - c. Thomas & Betts "Kindorf" Corp.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 CONCRETE FASTENERS

- A. Provide expansion-shield type concrete anchors.
- B. Provide powder driven concrete fasteners with washers. Obtain approval by Architect and Structural Engineer prior to use.

2.03 CONCRETE INSERTS

- A. Provide pressed galvanized steel, concrete spot insert, with oval slot capable of accepting square or rectangular support nuts of ¼ inch to ½ inch diameter thread for rod support.

2.04 THREADED ROD

- A. Provide steel threaded rod, sized for the load unless otherwise noted on the Drawings or in the Specifications.

2.05 CONSTRUCTION CHANNEL

- A. Provide 1.5-inch by 1.5-inch, 12-gauge galvanized steel channel with 17/32-inch diameter bolt holes and 1-1/2 inch on center in the base of the channel.

2.06 CONDUIT STRAPS

- A. One-hole strap, steel, or malleable iron, with malleable iron clamp-back spacer for surface mounted wall and ceiling applications.
 - 1. Use malleable strap with spacers for exterior and wet locations.
 - 2. Use steel strap without spacers for interior locations.
- B. Steel channel conduit strap for support from construction channel.
- C. Steel conduit hanger for pendant support with threaded rod
- D. Steel wire conduit support strap for support from independent #12-gauge hanger wires.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Contractor shall thoroughly examine Project site conditions for acceptance of supporting device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

- A. Coordinate size, shape, and location of concrete pads with Division 03, Cast-in-place concrete.
- B. Layout support devices to maintain headroom, neat mechanical appearance and to support the equipment loads.
- C. Where indicated on the Contract Documents, install freestanding electrical equipment on concrete pads.

3.03 INSTALLATION

- A. Furnish and install supporting devices as noted throughout Division 26.
- B. Electrical device and conduit supports shall be independent of all other system supports that are not structural elements of the building, unless otherwise noted.
- C. Fasten hanger rods, conduit clamps, outlet, and junction boxes to building structure using precast inserts, expansion anchors, preset inserts, or beam clamps.
- D. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster or gypsum board partitions and walls.
- E. Use expansion anchors or preset inserts in solid masonry walls.
- F. Use self-drilling anchors, expansion anchor or preset inserts on concrete surfaces.
- G. Use sheet metal screws in sheet metal studs and wood screws in wood construction.
- H. Do not fasten supports to piping, ductwork, mechanical equipment, conduit, or acoustical ceiling suspension wires.
- I. Do not drill structural steel members unless first approved in writing by the Architect or Structural Engineer.

- J. Fabricate supports from structural steel or steel channel, rigidly welded, or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- K. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide additional support backing in stud walls prior to sheet rocking as required to adequately support cabinets and panels.
- L. Bridge studs top and bottom with channels to support flush mounted cabinets and panelboards in stud walls.

3.04 ERECTION OF METAL SUPPORTS

- A. Cut, fit and place miscellaneous metal fabrications accurately in location, alignment and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS "Structural Welding Code."

3.05 WOOD SUPPORTS

- A. Cut, fit, and place wood grounds, nailers, blocking and anchorage accurately in location, alignment and elevation to support and anchor electrical materials and equipment.

3.06 ANCHORAGE

- A. All floor mounted, free standing electrical equipment such as transformers, switchboards, distribution boards, etc. shall be securely fastened to the floor structure.
- B. Anchorage of electrical equipment shall comply with the seismic requirements as outlined in Section 260010: Basic Electrical Requirements.

END OF SECTION

SECTION 260531

CONDUIT

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Rigid steel conduit and fittings.
 - 2. PVC insulated rigid steel conduit and fittings.
 - 3. Intermediate metal conduit and fittings.
 - 4. Electrical metallic tubing and fittings.
 - 5. Flexible metallic conduit and fittings.
 - 6. Liquidtight flexible metallic conduit and fittings.
 - 7. Miscellaneous conduit fittings and products.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 01: Cutting and patching.
 - 3. Division 07: Sheet metal flashing and trim.
 - 4. Division 09: Painting. Exposed conduit and other devices.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. American National Standards Institute, Inc. (ANSI):
 - ANSI C80.1; Rigid Steel Conduit, Zinc-Coated.
 - ANSI C80.3; Electrical Metallic Tubing, Zinc Coated.
 - ANSI C80.5; Rigid Aluminum Conduit.
 - ANSI/ TIA-569-D Telecommunications Pathways and Spaces.
 - 2. Underwriters Laboratories, Inc. (UL):
 - UL 1; Flexible Metal Conduit.
 - UL 6; Rigid Metal Conduit.
 - UL 360; Liquid-Tight Flexible Steel Conduit.

- UL 514B; Conduit, Tubing and Cable Fittings.
- UL 635; Insulating Bushings.
- UL 797; Electrical Metallic Tubing - Steel.
- UL 1242; Intermediate Metal Conduit - Steel.
- 3. National Electrical Manufacturer Association (NEMA):
 - NEMA RN1; PVC Externally coated Galvanized Rigid Steel Conduit.

1.03 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements the following items:
 - 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 - 3. Submit Manufacturer's installation instruction. Provide written instructions for raceway products requiring glues, special tools, or specific installation techniques.

1.04 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted and approved.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Metal conduit:
 - a. Allied Tube and Conduit Co.
 - b. Triangle PWC, Inc.
 - c. Western Tube and Conduit Corp.
 - d. Spring City Electrical Manufacturing Co.
 - e. Alflex Corp.
 - f. American Flexible Metal Conduit Co.
 - g. Anaconda.
 - 2. Fittings:
 - a. Appleton Electric Co.
 - b. OZ/Gedney.

- c. Thomas & Betts Corp.
 - d. Spring City Electrical Manufacturing Co.
 - B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.
- 2.02 GALVANIZED RIGID STEEL CONDUIT (GRS)
 - A. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and UL 6.
 - B. Standard threaded couplings, locknuts, bushings, and elbows: Only materials of steel or malleable iron are acceptable. Locknuts shall be bonding type with sharp edges for digging into the metal wall of an enclosure; provide two locknuts at each box or can, inside and outside.
 - C. Three-piece couplings: Hot dip galvanized, cast malleable iron.
 - D. Insulating bushings: Threaded polypropylene or thermosetting phenolic rated 150-degree C minimum.
 - E. Insulated grounding bushings: Threaded cast malleable iron body with insulated throat and steel "lay-in" ground lug with compression screw.
 - F. Insulated metallic bushings: Threaded cast malleable iron body with plastic insulated throat rated 150-degrees C.
 - G. All fittings and connectors shall be threaded.
- 2.03 PVC INSULATED GALVANIZED RIGID STEEL CONDUIT (PVC GRS)
 - A. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and NEMA RN-1 with nominal 20 or 40 mil thermoplastic vinyl coating, heat fused and bonded to the exterior of the conduit.
 - B. Fittings: Conduit couplings and connectors shall be as specified for galvanized rigid steel conduit and shall be factory PVC coated with an insulating jacket equivalent to that of the coated material.
- 2.04 INTERMEDIATE METAL CONDUIT (IMC)
 - A. Conduit: Hot dip galvanized steel meeting the requirements of CEC Article 345 and conforming to ANSI C80.6 and UL 1242.
 - B. Fittings: Conduit couplings, connector and bushing shall be as specified for galvanized rigid steel conduit. Integral retractable type IMC couplings are also acceptable.
- 2.05 ELECTRICAL METALLIC TUBING (EMT)
 - A. Conduit: Shall be formed of cold rolled strip steel, electrical resistance welded continuously along the longitudinal seam and hot dip galvanized after fabrication. Conduit shall conform to ANSI C80.3 Specifications and shall meet UL requirements.
 - B. Set screw type couplings: Hot dip galvanized, steel, UL listed concrete tight. Use set screw type couplings with four setscrews each of conduit sizes over 2 inches. Setscrews shall be of case-hardened steel with hex-head and cup point to firmly seat in wall of conduit for positive grounding.

- C. Set screw type connectors: Hot dip galvanized, steel, UL listed concrete tight with male hub and insulated plastic throat, 150-degree C temperature rated. Setscrew shall be same as for couplings.
- D. Raintight couplings: Hot dip galvanized, steel; UL listed raintight and concrete tight, using gland and ring compression type construction.
- E. Raintight connectors: Hot dip galvanized, steel, UL listed raintight and concrete tight, with insulated throat, using gland and ring compression type construction.

2.06 FLEXIBLE METALLIC CONDUIT (FMC)

- A. Conduit: Shall be fabricated in continuous lengths from galvanized steel strip, spirally wound and formed to provide an interlocking design and conforming to UL 1.
- B. Fittings: Connectors shall be of the single screw clamp variety with steel or cast malleable iron bodies and threaded male hubs with insulated throats. Exception: Pressure cast screw-in connectors shall be acceptable for luminaire connection in suspended ceilings and cut-in outlet boxes within existing furred walls.

2.07 LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT (LFMC)

- A. Conduit: Shall be fabricated in continuous lengths from galvanized steel strips, interlocking spirally wound, covered with extruded liquidtight jacket of polyvinyl chloride (PVC) and conforming to UL 360. Provide conduit with a continuous copper-bonding conductor wound spirally between the convolutions.
- B. Fittings: Connector body and gland nut shall be of cadmium plated steel or cast malleable iron, with tapered, male, threaded hub; insulated throat and neoprene "O" ring gasket recessed into the face of the stop nut. The clamping gland shall be of molded nylon with an integral brass push-in ferrule.

2.08 MISCELLANEOUS CONDUIT FITTINGS AND PRODUCTS

- A. Watertight conduit entrance seals: Steel or cast malleable iron bodies and pressure clamps with PVC sleeve, neoprene sealing grommets and PVC coated steel pressure rings. Fittings shall be supplied with neoprene sealing rings between the body and PVC sleeve.
- B. Watertight cable sealing bushings: One piece, compression molded sealing ring with PVC coated steel pressure disks, stainless steel sealing screws and zinc plated cast malleable iron locking collar.
- C. Expansion fittings: Multi-piece unit comprised of a hot dip galvanized malleable iron or steel body and outside pressure bussing designed to allow a maximum of 4" conduit movement (2" in either direction). Furnish with external braid tinned copper bonding jumper. Unit shall be UL listed for wet or dry locations.
- D. Expansion/deflection couplings: Multi-piece unit comprised of a neoprene sleeve with internal flexible tinned copper braid attached to bronze end couplings with stainless steel bands. Coupling shall accommodate 0.75-inch deflection, expansion or contraction in any direction and allow 30-degree angular deflections. Flexible, corrosion-resistant, watertight, moisture and heat resistant molded rubber jacket and stainless-steel jacket clamps. Unit shall comply with UL467 and UL514. Manufacturer shall be OZ/Gedney Type DX, Steel City Type EDF or equal.

- E. Fire rated penetration seals:
 - 1. UL building materials directory classified.
 - 2. Conduit penetrations in fire rated separation shall be sealed with a UL classified fill, void or cavity material.
 - 3. The fire rated sealant material shall be the product best suited for each type of penetration and may be a caulk, putty, composite sheet, or wrap/strip.
- F. Standard products not herein specified:
 - 1. Provide listing of standard electrical conduit hardware and fittings not herein specified for approval prior to use or installation, i.e. locknuts, bushings, etc.
 - 2. Listing shall include Manufacturers name, part numbers and a written description of the item indicating type of material and construction.
 - 3. Miscellaneous components shall be equal in quality, material and construction to similar items herein specified.
- G. Hazardous area fittings: UL listed for the application.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of conduit system installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 APPLICATION

- A. Galvanized rigid steel conduit (GRS) can be used in the following applications:
 - 1. For feeders and branch circuits located indoors, concealed or exposed above suspended ceilings, in damp/wet locations, in crawl spaces, in attics, chases, furred spaces, equipment rooms, loading docks or in hazardous locations in accordance with CEC and local Codes.
 - 2. For feeders and branch circuits concealed in concrete floors and walls when not in contact with earth.
 - 3. For use where conduit is subject to physical damage.
 - 4. For feeders and branch circuits installed exposed on the roof.
- B. PVC insulated galvanized rigid steel conduit can be used in the following applications:
 - 1. Use 40-mil coating for feeders and branch circuits in damp or wet locations.
 - 2. Use 20- or 40-mil for feeders and branch circuits concealed in concrete walls or slabs in contact with earth.
 - 3. Use 20- or 40-mil for runs beneath floor slabs on grade.
 - 4. Use 40-mil for all below grade penetrations through floor slabs on grade or exterior walls.

- C. Intermediate metal conduit (IMC): Can be used for the same application as galvanized rigid steel conduit as specified herein, except for hazardous locations prohibited by CEC or Local Codes.
- D. Electrical metallic tubing (EMT): Can be used exposed or concealed for interior electrical feeders 4" and smaller, interior power and lighting branch circuits and low tension distribution system where run above suspended ceilings, in concrete slabs and walls not in contact with earth; in stud walls, furred spaces and crawl spaces. EMT shall not be installed exposed below 8 feet above the finish floor except within electrical, communication or signal rooms or closets (subject to physical damage).
- E. Flexible metallic conduit (FMC): Can be used only in dry locations for connections from an adjacent outlet box or conduit to all motors, transformers, vibrating equipment or machinery, controllers, solenoid valves, float and flow switches or similar devices and to luminaires installed in suspended ceilings.
- F. Liquidtight flexible metallic conduit (LFMC): Can be used in wet or damp locations for connections from adjacent outlet box or conduit to all motors, transformers, vibrating equipment or machinery, controllers, solenoid valves, float and flow switches or similar devices. These areas are typically food preparation and dishwashing areas, sump wells, loading docks, pump rooms, exterior areas, etc.
- G. Fire-Resistive Systems: Refer to CEC Article 728. All devices utilized, mountings, and supports shall be listed as part of the fire-resistive system.

3.03 PREPARATION

- A. Locations of conduit runs shall be planned in advance of the installation and coordinated with ductwork, plumbing, ceiling and wall construction in the same areas and shall not unnecessarily cross other conduits or pipe, nor prevent removal of ceiling tiles or panels, nor block access to mechanical or electrical equipment.
- B. Where practical, install conduits in groups in parallel vertical or horizontal runs and at elevations that avoid unnecessary offsets.
- C. All conduits shall be run parallel or at right angles to the centerlines of columns and beams, whether routed exposed, concealed above suspended ceiling or in concrete slabs.
- D. Conduits shall not be placed closer than 12-inches to a flue, parallel hot water, steam line or other heat producing source or three inches from such lines when crossing perpendicular to the runs.
- E. Communications conduits shall not be placed closer than 12 inches to power, a flue, parallel hot water, steam line or other heat producing source or three inches from such lines when crossing perpendicular to the runs.
- F. Exposed conduit installation shall not encroach into the ceiling height headroom of walkways or doorways. Where possible, install horizontal raceway runs above water and below steam piping.
- G. The largest trade size conduits in concrete floor and wall slabs shall not exceed 1/3 the floor or wall thickness and conduits shall be spaced a minimum of three conduit diameters apart unless otherwise noted on the Drawings. All conduits shall be installed in the center of

- concrete slabs or wall and shall not be placed between reinforcing steel and the bottom of floor slabs.
- H. In long runs of conduit, provide sufficient pull boxes inside buildings to facilitate pulling wires and cables, with spacing not to exceed 150-feet. Support pull boxes from structure independent of conduit supports. These pull boxes are not indicated on the Drawings.
 - I. Provide all reasonably inferred standard conduits fitting and products required to complete conduit installation to meet the intended application whether noted, indicated, or specified in the Contract Documents or not.
 - J. Connect recessed luminaires to conduit runs with maximum six feet of flexible metal conduit.

3.04 INSTALLATION

- A. Install conduit in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.
- B. Minimum Conduit Size: Unless otherwise noted herein or on Drawings, minimum conduit size shall be 3/4" for interior applications and 1" for exterior and underground applications.
- C. Minimum Communication and Signal Conduit Size: Unless otherwise noted herein or on Drawings, minimum conduit size shall be 1" for interior applications and 2" for exterior and underground applications.
- D. All conduit sizes indicated on the Drawings are sized for copper conductors with THHN/THWN insulation. If conductor type or size is changed the Contractor shall be responsible for resizing conduits upward to meet Code.
- E. All communication and signal conduit sizes indicated on the Drawings are sized for 40% fill or less for category 6 or 6A cable. If cable type or size is changed the Contractor shall be responsible for resizing conduits upward to meet a maximum 40% fill.
- F. In general, all conduit work shall be concealed where possible. Exceptions shall be electrical, communication and mechanical rooms, exposed ceiling areas, and parking garages.
- G. Conduit connections to motors and surface cabinets shall be concealed, except for electrical, communication and mechanical rooms, or unless exposed Work is clearly called for on the Drawings.
- H. Install conduits in complete runs before pulling in cables or wires.
- I. Install conduit free from dented, bruises or deformations. Remove and replace any damaged conduits with new undamaged material.
- J. Conduits shall be well protected and tightly covered during construction using metallic bushings and bushing "pennies" to seal open ends.
- K. In making joints in rigid steel conduit, ream conduit smooth after cutting and threading. Coat all field-threaded joints with UL approved conductive type compound to ensure low resistance ground continuity through conduit and to prevent seizing and corrosion.
- L. Clean any conduit in which moisture or any foreign matter has collected before pulling in conductors. Paint all field-threaded joints to prevent corrosion.

- M. In all empty conduits or ducts, install a “True Tape” conduit measuring tape line to provide overall conduit length for determining length of cables/conductors for future use.
- N. Conduit systems shall be mechanically and electrically continuous throughout. Install code size, insulated, copper, green-grounding conductors in all conduit runs for branch circuits and feeders. This conductor is not indicated on the Drawings. Refer to Section 260526: Grounding and Bonding.
- O. Metallic conduit shall not be in contact with other dissimilar metal pipes (i.e. plumbing).
- P. Make bends with standard conduit bending hand tool or machines. The use of any item not specifically designed for the bending of electrical conduit is strictly prohibited.
- Q. A run of conduit between terminations at wire pulling points shall not contain more than the equivalent of four quarter bends (360-degrees, total).
- R. A run of communications and signal conduit between terminations at wire pulling points shall not contain more than the equivalent of two quarter bends (180-degrees, total).
- S. Emergency power raceway system: Install entirely independent of other raceway systems, except where specifically allowed by CEC Article 517.

3.05 PENETRATIONS

- A. Locate penetrations and holes in advance where they are proposed in the structural sections such as footings, beams, wall, etc. Penetrations are acceptable only when the following occurs:
 - 1. Where indicated on the Structural Drawings.
 - 2. As approved by the Structural Engineer prior to construction and after submittal of Drawing showing location, size, and position of each penetration.
- B. Cutting or holes:
 - 1. Cut holes through concrete, masonry block or brick floors and floors of structure with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed, except where permitted by the Structural Engineer as required by limited working space. Obtain the approval of the Structural Engineer prior to drilling through structural sections.
 - 2. Provide sleeves or “can outs” for cast-in-place concrete floors and walls. Following conduit installation, seal all penetrations using non-iron bearing, chloride free, non-shrinking, dry-pack grouting compounds; or fire rated penetration-sealing materials.
 - 3. Cut holes for conduit penetrations through non-concrete and non-masonry walls, partitions, or floors with a hole saw. The hole shall be only as large as required to accommodate the size of the conduit.
 - 4. Provide single piece escutcheon plates around all exposed conduit penetrations in public places.
- C. Sealing:
 - 1. Non-rated penetrations: Pack opening around conduits with non-flammable insulating material and seal with gypsum wallboard taping compound.

2. Fire stop: Where conduits, wireways and other electrical raceways pass through fire rated partitions, walls, smoke partitions or floor; install a UL classified fire stop material to provide an effective barrier against the spread of fire, smoke, and gases. Completely fill and seal clearances between raceways and openings with the fire stop material.
- D. Waterproofing: At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight as specified in Division 07: Sealants and Caulking.
1. Install specified watertight conduit entrance seals at all below grade wall and floor penetrations. Conduits penetrating exterior building walls and building floor slab shall be PVC coated rigid galvanized steel.
 2. For roof penetrations furnish and install roof flashing, counter flashing and pitch-pockets as specified under Roofing and Sheet Metal Sections of the Specifications.
 3. Provide membrane clamps and cable sealing fittings for any conduit that horizontally penetrates the waterproof membrane.
 4. Conduits that horizontally penetrate a waterproof membrane shall fall away from and below the penetration on the exterior side a minimum of two times the conduit diameters.

3.06 CONCEALED IN CONCRETE

- A. Install conduits approximately in the center of the slab so that there will be a minimum of 3/4-inch of concrete around the conduits.
- B. Installation of conduit in structural concrete that is less than three inches thick is prohibited. Topping slabs, maintenance pads and curbs are exempted.
- C. Tie conduits to reinforcing rods or otherwise secure them to prevent sagging or shifting during concrete placement. Run conduit larger than 1-inch trade size, parallel with or at right angles to the main reinforcement; where at right angles to the reinforcement, the conduit shall be close to one of the supports of the slab.
- D. Where nonmetallic conduit or tubing is used, raceways must be converted to PVC coated rigid steel conduit before rising above floor.
- E. Make couplings and connections watertight.
- F. Protect stub-ups from damage where conduits rise from floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

3.07 TERMINATIONS AND JOINTS

- A. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings except as otherwise indicated.
- B. Raceways shall be joined using specified couplings or transition couplings where dissimilar raceway systems are joined.
- C. Conduits shall be securely fastened to cabinets, boxes and gutters using two locknuts and an insulating bushing or specified insulated connectors. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Where

- terminations are subject to vibration, use bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors. Install grounding bushings or bonding jumpers on all conduits terminating at concentric or eccentric knockouts.
- D. Conduit terminations exposed at weatherproof enclosures and cast outlet boxes shall be made watertight using specified connectors and hubs.
 - E. Stub-up connections: Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs and set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; flexible metal conduit may be used 6 inches above the floor. Where equipment connections are not made under this contract, install screwdriver operated threaded flush plugs with floor.
 - F. Install specified cable sealing bushings on all conduits originating outside the building walls and terminating in switchgear, cabinets, or gutters inside the building. Install cable sealing bushings or raceway seal for conduit terminations in all grade level or below grade exterior pull, junction, or outlet boxes.
 - G. Raceway seal: Inject into wire filled raceways, a pre-formulated rigid 2 lbs. density polyurethane foam which expands a minimum 35 times its original bulk. Foam shall have the physical properties of water vapor transmission of 1.2 to 3.0 perms: water absorption less than 2% by volume, fungus and bacterial resistant. Foam shall permanent seal against water, moisture, insects, and rodents. Install raceway sealing foam at the following points:
 - 1. Where conduits pass from warm locations to cold locations to prevent passage of water vapor (such as refrigerated spaces, constant temperature rooms, air-conditioned spaces, etc.).
 - 2. Where conduits enter buildings from below grade.
 - H. Install expansion couplings where any conduit crosses a building separation or expansion joint as follows:
 - 1. Conduits three inches and larger, shall be rigidly secured to the building structure on opposite sides of a building expansion joint and provided with expansion or deflection couplings. Install the couplings in accordance with the Manufacturer's recommendations.
 - 2. Conduits smaller than three inches shall be rigidly secured to the building structure on opposite sides of a building expansion joint with junction boxes on both sides of the joint. Connect conduits to junction boxes with 15 inches of slack flexible conduit. Flexible conduit shall have a green copper ground-bonding jumper installed. For concrete embedded conduit, use expansion and deflection couplings as specified above for three inches and larger conduits.
 - I. Use short length (maximum of 6ft) of the appropriate FMC or LFMC conduit for connections to motors and other electrical equipment subject to movement, vibration, misalignment, cramped quarters, or noise transmission. Provide liquidtight flexible metal conduit for installation in exterior locations, moisture or humidity-laden atmosphere, corrosive atmosphere, water hose or spray wash-down operations and locations subject to seepage or dripping of oil, grease, or water. Provide a green ground wire with FMC or LFMC conduit.

3.08 HAZARDOUS LOCATIONS

- A. Use rigid steel conduit only.
- B. Install UL approved sealing fittings that prevent passage of explosive vapors in accordance with the Manufacturers written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank coverplate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points and elsewhere as indicated:
 - 1. Where conduits enter or leave hazardous locations.
 - 2. At luminaires, switches, receptacles and as required by the CEC.

3.09 SUPPORTS

- A. Provide supports for raceways as specified in Section 260529: Electrical Hangers and Supports.
- B. All raceways systems shall be secured to building structures using specified fasteners, clamps and hangers spaced according to the CEC.
- C. Support single runs of conduit using one-hole pipe straps. Where run horizontally on walls in damp or wet locations, install "clamp backs" to space conduit off the surface.
- D. Multiple conduit runs shall be supported using "trapeze" hangers fabricated from specified construction channel, mounted to 3/8-inch diameter, threaded steel rods secured to building structures. Fasten conduit to construction channel with standard one-hole pipe clamps or the equivalent. Provide lateral seismic bracing for hangers.
- E. Individual 1/2" and 3/4" conduits installed above suspended ceilings may be attached to the ceiling's hanger wire using spring steel support clips provided that not more than two conduits are attached to any single support wire.
- F. Support exposed vertical conduit runs at each floor level, independent of cabinets or switches to which they run, by means of acceptable supports.
- G. Fasteners and supports in solid masonry and concrete:
 - 1. Use steel or malleable iron concrete inserts set in place prior to placing the concrete.
 - 2. After concrete installation:
 - a. Steel expansion anchors not less than ¼ inch bolt size and not less than 1-1/8" embedment.
 - b. Power set fasteners not less than ¼ inch diameter with depth of penetration not less than three inches.
 - c. Use vibration and shock resistant anchors and fasteners for attaching to concrete ceilings.
- H. Hollow masonry: Toggle bolts are permitted. Bolts supported only by masonry block are not acceptable.
- I. Metal structures: Use machine screw fasteners or other devices specifically designed and approved for the application.

END OF SECTION

SECTION 26 05 33

BOXES

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Wall and ceiling outlet boxes.
 - 2. Pull and junction boxes.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 08: Access doors. Wall and ceiling access doors.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified.
 - 1. American National Standards Institute/National Electrical Manufacturer Association:
 - ANSI/NEMA OS-1; Sheet-Steel Outlet Boxes, Device Boxes, Covers and Box Supports.
 - ANSI/NEMA OS-2; Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
 - NEMA 250; Enclosures for Electrical Equipment (1000 volts maximum).
 - 2. Underwriters Laboratories (UL):
 - UL 50; Enclosures for Electrical Equipment.
 - UL 514A; Metallic Outlet Boxes.
 - UL 1773; Termination Boxes.

1.03 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 - 3. Submit Manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Outlet and junction boxes:
 - a. Spring City Electrical Manufacturing Co.
 - b. Thomas & Betts Corp.
 - c. Raco, Inc.
 - 2. Cast boxes:
 - a. Appleton Electric Co.
 - b. Crouse-Hinds.
 - 3. Pullboxes:
 - a. Circle AW Products.
 - b. Hoffman Engineering Co.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 OUTLET BOXES

- A. Standard outlet box:
 - 1. Provide galvanized, one-piece die formed or drawn steel or welded, knockout type box of size and configuration best suited to the application indicated on the Drawings.
 - 2. 4-inch square by 2-1/4-inch deep shall be minimum box size.
 - 3. ANSI/NEMA OS 1.
- B. Concrete box:
 - 1. Provide galvanized steel, 4-inch octagon rings with mounting lugs, backplate and adapter ring as required.
 - 2. Select height as necessary to position knockouts above concrete reinforcing steel.
 - 3. ANSI/NEMA OS 1.
- C. Tile box:
 - 1. Provide outlet boxes for installation in tile or concrete block walls.
 - 2. Standard outlet boxes with raised, square corners and device covers are acceptable.
 - 3. ANSI/NEMA OS 1.

- D. Cast metal outlet body:
 - 1. Provide 4-inch round, galvanized cast iron alloy with threaded hubs and mounting lugs as required.
 - 2. Provide boxes with cast cover plates of the same material as the box and neoprene cover gaskets.
- E. Conduit outlet body: Provide malleable iron, oblong conduit outlet bodies with threaded conduit hubs and neoprene gasket, cast iron covers.

2.03 PULL AND JUNCTION BOXES

- A. Sheet metal pull and junction box:
 - 1. Provide standard outlet or concrete ring boxes wherever possible; otherwise use minimum 16-gauge galvanized sheet metal, NEMA 1 boxes, sized to Code requirements with covers secured by cadmium plated machine screws located 6 inches on centers.
 - 2. ANSI/NEMA OS 1.
- B. Flush mounted pullboxes and junction boxes: Provide overlapping covers with flush head cover retaining screws, prime coated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of box installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

- A. Install all outlet boxes flush with building walls, ceilings, and floors except where boxes are installed in mechanical and electrical rooms, in cabinetry, above accessible ceilings or where exposed Work is called for on the Drawings.
- B. Locate pullboxes and junction boxes in concealed locations above removable ceilings or exposed in electrical rooms, utility rooms or storage areas.
- C. Install outlet boxes at the locations and elevations indicated on the Drawings or specified herein. Make adjustments to locations as required by structural conditions and to suit coordination requirements of other trades.
- D. Locate switch outlet boxes on the latch side of doorways unless otherwise indicated.
- E. Locate outlet boxes above hung ceilings having concealed suspension systems, adjacent to openings for removable recessed luminaires.
- F. Do not install outlet boxes back-to-back, separate boxes by at least 6". In fire-rated walls separate boxes by at least 24" and wall stud.
- G. Adjust position of outlet boxes in finished masonry walls to suit masonry course lines. Coordinate cutting of masonry walls to achieve neat openings for boxes.

3.03 INSTALLATION

- A. Install boxes in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.
- B. Locate electrical boxes as indicated on Drawings and as required for splices, taps, wire pulling, equipment connections and Code compliance.
- C. Install junction or pullboxes where required to limit bends in conduit runs to not more than 360 degrees or where pulling tension achieved would exceed the maximum allowable for the cable to be installed. Note that these boxes are not indicated on the Drawings.
- D. Install raised covers (plaster rings) on all outlet boxes in stud walls or in furred, suspended, or exposed concrete ceilings. Covers shall be of a depth to suit the wall or ceiling finish.
- E. Leave no unused openings in any box. Install close-up plugs as required to seal openings.
- F. Provide cast metal boxes with gasketed cast metal cover plates where boxes are exposed in damp or wet locations.
- G. Welded outlet boxes shall only be used in concealed interior installations.
- H. Provide precast concrete boxes in exterior planting areas, walkways, roads etc.
- I. Provide an access panel in permanent ceiling or wall where boxes are installed and will be inaccessible.
- J. For boxes mounted in exterior walls, make sure that there is insulation behind outlet boxes to prevent condensation in boxes.
- K. For outlets mounted above counters, benches or backsplashes, coordinate location and mounting heights with built-in units. Adjust mounting height to agree with required location for equipment served.
- L. Use conduit outlet bodies to facilitate pulling of conductors or to make changes in conduit direction only. Do not make splices in conduit outlet bodies.
- M. Add additional sheet rock as necessary to maintain original fire rating of walls where boxes are installed.
- N. Install galvanized steel coverplates on boxes in unfinished areas, above accessible ceilings and on surface mounted outlets.

3.04 SUPPORTS

- A. Provide boxes installed in metal stud walls with brackets designed for attaching directly to the studs or mount boxes on specified box supports.
- B. Mount boxes, installed in suspended ceilings of gypsum board or lath and plaster construction, to 16-gauge metal channel bars attached to main ceiling runners.
- C. Support boxes independently of conduit system.
- D. Support boxes, installed in suspended ceilings supporting acoustical tiles or panels, directly from the structure above wherever pendant mounted luminaires are to be installed from the box.
- E. Support boxes mounted above suspended acoustical tile ceilings, directly from the structure above.

END OF SECTION

SECTION 26 05 43

UNDERGROUND DUCTS AND STRUCTURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Underground conduits and ducts.
 - 2. Handhole and pullboxes.
 - 3. Excavation, trenching and backfill.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 31 - Earthwork: General requirements for Excavation and Backfill and related items for ducts, manholes, pullboxes and handholes.
 - 3. Division 03 - Cast-in-place concrete: Protective envelope for ducts.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. American Concrete Institute (ACI):
 - ACI 318; Building Code Requirements for Structural Concrete
 - 2. American National Standards Institute, Inc. (ANSI):
 - 3. American Society for Testing And Materials (ASTM):
 - ASTM C31; Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - ASTM C39; Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - ASTM C172; Standard Practice for Sampling Freshly Mixed Concrete
 - ASTM C192; Practice for Making and Curing Concrete Test Specimens in the Laboratory
 - ASTM C231; Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
 - ASTM C478; Specification for Precast Reinforced Concrete Manhole Sections

- | | |
|-------------|--|
| ASTM C805; | Test Method for Rebound Number of Hardened Concrete |
| ASTM C857; | Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures |
| ASTM C858; | Specification for Underground Precast Concrete Utility Structures |
| ASTM C877; | Specification for External Sealing Bands for Concrete Pipe, Manholes and Precast Box Sections |
| ASTM C891; | Practice for Installation of Underground Precast Concrete Utility Structures |
| ASTM C990; | Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants |
| ASTM C1037; | Practice for Inspection of Underground Precast Concrete Utility Structures |
| ASTM C1064; | Standard Test Method for Temperature of Freshly Mixed Concrete |
| ASTM C1231; | Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinder |
| ASTM C1611; | Standard Test Method for Slump Flow of Self-Consolidating Concrete |
4. Underwriters Laboratories, Inc. (UL):
- | | |
|---------|---------------------------------------|
| UL 651; | Schedule 40 and 80 Rigid PVC Conduit. |
|---------|---------------------------------------|
5. National Electrical Manufacturer Association (NEMA):
- | | |
|------------|---|
| NEMA RN1; | PVC Externally-coated Galvanized Rigid Steel Conduit. |
| NEMA TC 2; | Electrical Plastic Tubing and Conduit. |
| NEMA TC 3; | PVC Fittings for use with Rigid PVC Conduit. |
| NEMA TC6; | PVC Plastic Utilities Duct (EB and BD Type). |

1.03 DEFINITIONS

- A. Duct: Electrical conduit and other raceway, either metallic or nonmetallic, used underground embedded in earth.
- B. Duct bank: Two or more conduits or another raceway installed underground in same trench.
- C. Handhole: An underground junction box in a duct or duct bank.

1.04 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.

3. Shop Drawings showing details and design calculations for precast handholes, including reinforced steel.
4. Submit Manufacturer's installation instructions.
5. Complete bill of material listing all components.

1.05 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted and approved.
- C. Precast concrete vaults shall be designed and fabricated by an experienced and acceptable precast concrete manufacturer. The manufacturer shall have been regularly and continuously engaged in the manufacture of precast concrete units similar to that indicated in the project specifications or drawings for at least 10 years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 1. Underground precast concrete utility structures:
 - a. Oldcastle Enclosure Solutions.
 - b. Jensen Precast.
 2. Conduits, ducts and fittings:
 - a. Prime Conduit.
 - b. JM Eagle.
 - c. Cantex.
 - d. Occidental Coating Company (OCAL).
- B. Substitution: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 CONDUIT AND DUCT

- A. Refer to Section 260531: Conduit.
- B. Galvanized rigid steel conduit (GRS) in underground installations:
 1. PVC insulated galvanized rigid steel conduit (PVC GRS):
 - a. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and NEMA RN-1 with nominal 20 or 40 mil thermoplastic vinyl coating, heat fused and bonded to the exterior of the conduit.
 - b. Fittings: Conduit couplings and connectors shall be steel or malleable iron as required with factory PVC coating and insulated jacket equivalent to that of the coated material.

2. Tape insulated galvanized rigid steel conduit (Tape GRS):
 - a. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and NEMA RN-1 with half lapping of PVC 10 mil tape over the exterior of the conduit. Half lap all raceways a minimum of one time and extend to 12-inches above grade.
 - b. Fittings: Conduit couplings and connectors shall be steel or malleable iron as required with half lapping of PVC 10 mil tape over the exterior of the fittings. Half lap shall extend to 12-inches above grade.
 - C. Rigid non-metallic conduit (PVC):
 1. Conduit:
 - a. Rigid polyvinylchloride, schedule 40 or 80 conforming to NEMA TC2 and UL 651. UL listed for exposed and direct-burial applications and for 90 degrees C conductor insulation. Conduit shall include an integral bell fitting at one end.
 - b. Rigid polyvinylchloride, type EB or DB conforming to NEMA TC 6 and UL 651. UL listed for concrete encased burial and direct burial applications and for 90 degree C conductor insulation. Conduit shall include an integral bell fitting at one end.
 2. Fittings: Couplings, adaptors, transition fittings, bell ends, etc., shall be molded PVC, slip on and solvent weld type. Schedule 40 or 80 conforming to NEMA TC 3 and type EB or DB conforming to NEMA TC 9.
 - D. Elbows:
 1. Low voltage systems (1000 volts and less):
 - a. Minimum radius bends shall be 18" for conduits up to 2" diameter, 36" for conduits greater than 2" diameter, or greater if indicated on the drawings or required by the cable manufacturer.
 - E. Duct supports: Rigid PVC spacers selected to provide minimum duct spacing and concrete cover depths, while supporting ducts during concrete pour.
 - F. Duct sealing compound: Non-hardening, safe for human skin contact, not deleterious to cable insulation, workable at temperatures as low as 35 degree F, withstands temperature of 300 degrees F without slump and adheres to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, cable sheaths and jackets, etc.
- 2.03 PULLBOXES AND HANDHOLES
- A. Construction: High densities precast reinforced concrete box, extension, base, and cover. Furnish box with end and side knockouts and non-settling shoulders. Cover shall have hold-down bolts and two lifting eyes.
 - B. Size: As indicated on the Drawings.
 - C. Cover markings: Covers shall read "ELECTRICAL", "COMMUNICATIONS", or "SIGNAL" as appropriate.
 - D. Rated covers: Use cast iron lid with H20 traffic rating when subject to vehicular traffic.

PART 3 - EXECUTION

3.01 EXAMINATION

ISSUE DATE
VERSION DATE

CALIFORNIA MIDDLE SCHOOL CAMPUS REFRESH / 23-145

- A. Contractor shall thoroughly examine Project site conditions for acceptance of duct and manhole installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 EARTHWORK

- A. Excavation and backfill: Conform to Division 31, Earthwork.
- B. Excavation for underground electrical structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus, a sufficient distance to permit placing and removal of concrete formwork, installation or services, other construction and for inspection.
 - 1. Excavate, by hand, areas within dripline of large trees. Protect the root system for damage and dry-out. Maintain moist conditions for root system and over exposed roots with burlap. Paint root cuts of 1 inch in diameter and larger with emulsified asphalt tree paint.
 - 2. Take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed.
- C. Trenching: Excavate trenches for electrical installation as follows:
 - 1. Excavate trenches to the uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches clearances on both sides of raceways and equipment.
 - 2. Excavate trenches to depth indicated or required.
 - 3. Limit the length of open trench to that in which installations can be made and the trench backfilled within the same day.
 - 4. Where rock is encountered, carry excavation below required elevation and backfill with a layer of crushed stone or gravel prior to installation of raceways and equipment. Provide a minimum of 6 inches of stone or gravel cushion between rock bearing surface and electrical installations.
- D. Backfilling and filling: Place soil materials in layers to required sub-grade elevations for each area classification, using materials and methods specified in Division 31: Earthwork.
 - 1. Under building slabs, use drainage fill materials.

3.03 CONDUIT AND DUCT INSTALLATION

- A. Install duct lines in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Application:
 - 1. Direct burial ducts: Schedule 40, minimum 24-inches below finished grade.
 - 2. Below building slab-on-grade: Schedule 40, minimum 4-inches below bottom of slab except that bends and penetrates through floor slab shall be insulated galvanized rigid steel conduit.
 - 3. Below roads and paved surfaces:
 - a. Schedule 80, minimum 36-inches below finished grade.
 - 4. Utility pole riser: Schedule 80.
 - 5. Penetrations of building and equipment slabs: Insulated galvanized rigid steel conduit .

- C. Slope duct to drain towards handholes and away from building and equipment entrances. Pitch not less than 4-inches per 100-feet.
- D. Curved sections in duct lines shall consist of long sweep bends with a minimum radius of 25-feet in the horizontal and vertical directions. The use of manufactured bends is limited to building entrances and equipment stub-ups.
- E. For communications and signal conduits, do not exceed a combined bend radius of greater than 180 degrees between pull points.
- F. Underground conduit stub-ups to inside of building and exterior equipment shall be insulated galvanized rigid steel conduit.
- G. Make joints in ducts and fittings watertight according to Manufacturer's instructions. Stagger couplings so those of adjacent ducts do not lie in the same plane.
- H. Terminate duct lines at handholes with end bells spaced 10-inches on center for 5-inch ducts and varied proportionately for other duct sizes. Change from regular spacing to end-bell spacing 10-feet from the end bell without reducing duct line slope and without forming trap in the line.
- I. Separation between direct buried duct lines shall be 3-inches minimum for like systems and 12-inches minimum between power and signal ducts.
- J. For direct burial installations install continuous warning strip of heavy gage plastic imprinted "electrical ducts below", approximately 12-inch wide at 12-inches above ducts.
- K. Mandrel all ducts upon completion of installation and prior to pulling cables.

3.04 HANDHOLE AND PULL BOX INSTALLATION

- A. Install handholes in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.
- B. Handholes shall be installed flush with finished grade or surface. Install on a level 6-inch bed of well-tamped gravel or crushed stone.
- C. Orientation of handholes shall be coordinated in advance with Landscape Architect and arranged to minimize connecting duct bends and deflections.

3.05 FIELD QUALITY CONTROL

- A. Testing: Demonstrate capability and compliance with requirements upon completion of installation of underground duct and structures.
 - 1. Duct integrity: Rod ducts with a mandrel 1/4-inch smaller in diameter than internal diameter of ducts. Where rodding indicates obstructions in ducts, remove the obstructions and retest.

3.06 CLEANING

- A. Pull brush through full length of ducts. Use round bristle brush with a diameter 1/2-inch greater than internal diameter of duct.
- B. Clean internal surfaces of handholes. Remove foreign material.

END OF SECTION

SECTION 26 05 53

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Electrical equipment nameplates.
 - 2. Panelboard directories.
 - 3. Wire and cable identification.
 - 4. Buried electrical line warnings.
 - 5. Junction box identification.
 - 6. Warning and caution signs.
 - 7. Inscribed device coverplates.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 09: Painting.

1.02 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein.
 - 2. Schedules for nameplates to be furnished.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Conduit and wire markers:
 - a. Thomas & Betts Corp.
 - b. Brady.
 - c. Griffolyn.

2. Inscription Tape:
 - a. Kroy.
 - b. Merlin.
 - B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.
- 2.02 NAMEPLATES
- A. Type NP: Engraved, plastic laminated labels, signs, and instruction plates. Engrave stock melamine plastic laminate 1/16-inch minimum thickness for signs up to 20-square inches or 8-inches in length; 1/8-inch thick for larger sizes. Engraved nameplates shall have white letters and be punched for mechanical fasteners.
 - B. Color and letter height as specified in Part 3: Execution.
- 2.03 LEGEND PLATES
- A. Type LP: Die-stamped metal legend plate with mounting hole and positioning key for panel mounted operator devices, i.e. motor control pilot devices, hand-off-auto switches, reset buttons, etc.
 - B. Stamped characters to be paint filled.
- 2.04 BRASS TAGS
- A. Type BT: Metal tags with die-stamped legend, punched for fastener.
 - B. Dimensions: 2" diameter 19 gauge.
- 2.05 PANELBOARD DIRECTORIES (400 AMP OR LESS)
- A. Directories: A 6" x 8" minimum size circuit directory frame and card with clear plastic covering shall be provided inside the inner panel door.
 - B. Circuit numbering: Starting at the top, odd numbered circuits in sequence down the left-hand side and even numbered circuits down the right-hand side. Multi-section panelboards shall have continuous consecutive circuit numbers, i.e. Section 1 (circuit numbers 1-42), Section 2 (circuit numbers 43-84), Section 3 (circuit numbers 85-126) for all 42-pole panelboards. For 84-pole panelboards the numbering is Section 1 (circuit numbers 1-84), Section 2 (circuit numbers 85-168), etc.
- 2.06 WIRE AND TERMINAL MARKERS
- A. Provide self-adhering, pre-printed, machine printable or write-on, self-laminating vinyl wrap around strips.
 - B. Blank markers shall be inscribed using the printer or pen recommended by Manufacturer for this purpose.
- 2.07 CONDUCTOR PHASE MARKERS
- A. Colored vinyl plastic electrical tape, 3/4" wide, for identification of phase conductors. Scotch 35 Brand Tape or equal.
- 2.08 UNDERGROUND CONDUIT MARKER

- A. 6-inch wide, yellow polyethylene tape, with continuous black imprinting reading "Caution - Buried Electric Line Below".

2.09 INSCRIBED DEVICE COVERPLATES

- A. Coverplate material shall be as specified in Section 262726: Wiring Devices.
- B. Methods of inscription: (Unless otherwise noted)
 - 1. Type-on-tape:
 - a. Imprinted or thermal transfer characters onto tape lettering system.
 - b. Tape trimmer.
 - c. Matte finish spray-on clear coating.
 - 2. Engraving:
 - a. 1/8" high letters.
 - b. Paint filled letters finished in black.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of identification device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 NAMEPLATES

- A. Installation:
 - 1. Degrease and clean surfaces to receive nameplates.
 - 2. Install nameplates parallel to equipment lines.
 - 3. Secure nameplates to equipment fronts using machine screws.
- B. Provide type 'NP' color coded nameplates that present, as applicable, the following information:
 - 1. Equipment or device designation:
 - 2. Amperage, KVA or horsepower rating, where applicable.
 - 3. Voltage or signal system name.
 - 4. Source of power or control.
- C. Nameplates for power system distribution equipment and devices are to be black.
- D. Minimum letter height shall be as follows:
 - 1. For panelboards, switchboards, etc.: ½ inch letters to identify equipment designation. Use ¼ inch letters to identify voltage, phase, wires, etc.
 - 2. For individual circuit breakers, switches and motor starters in panelboards, distribution boards, and switchboards use 3/8-inch letters to identify equipment designation. Use 1/8-inch letters to identify all other.

3. For individual mounted circuit breakers, disconnect switches, enclosed switches and motor starters use 3/8-inch letters to identify equipment designation. Use 1/8" letters to identify all other.
 4. For transformers use ½-inch letters to identify equipment designation. Use ¼-inch letters to identify primary and secondary voltages, etc.
 5. For equipment cabinets, terminal cabinets, control panels and other cabinet enclosed apparatus use 3/8-inch letters to identify equipment designation.
- 3.03 LEGEND PLATES
- A. Provide panel-mounted operators devices such as pilot lights, reset buttons, "HAND-OFF-AUTO" switches, etc.
- 3.04 BRASS TAGS
- A. Provide type BT tags for individual ground conductors to exposed ground bus indicating connection i.e. "UFER", "Cold water bond", etc.
 - B. Provide tags for all feeder cables in underground vaults and pull boxes.
 - C. Provide tags for empty conduits in underground vault, pull boxes and stubs.
- 3.05 PANELBOARD DIRECTORIES (400AMP OR LESS)
- A. Provide typewritten directories arranged in numerical order denoting loads served by room number or area for each circuit.
 - B. Verify room numbers or area designation with Project Manager.
 - C. Mount panelboard directories in a minimum 6" x 8" metal frame under clear plastic cover inside every panelboard.
- 3.06 WIRE AND CABLE IDENTIFICATION
- A. Provide wire markers on each conductor in panelboards, pull boxes, outlet, and junction boxes and at load connection. Identify with branch circuit or feeder number for power and lighting circuits and with control wire number as indicated on equipment Manufacturer's Shop Drawings for control wiring.
 - B. Provide colored phase markers for conductors as noted in Section 260519: Building Wire and Cable. Apply colored, pressure sensitive plastic tape in half-lapped turns for a distance of 3-inches from terminal points and in boxes where splices or taps are made. Apply the last two laps of tape with no tension to prevent possible unwinding. Do not cover cable identification markings by taping.
- 3.07 UNDERGROUND CONDUIT MARKERS
- A. During trench backfilling, for exterior underground power, signal, and communications lines, install continuous underground plastic line marker, located directly above line at 6 to 8 inches below finished grade. Where multiple lines installed in a common trench or concrete envelope, do not exceed an overall width of 16 inches; install a single line marker.
- 3.08 JUNCTION BOX IDENTIFICATION
- A. The cover of junction, pull and connection boxes for both power and signal systems, located above suspended ceilings and below ceilings in non-public areas, shall be clearly marked

with a permanent ink felt pen. Identify the circuit(s) (panel designation and circuit numbers) contained in each box, unless otherwise noted or specified.

3.09 WARNING, CAUTION, AND INSTRUCTION SIGNS

- A. Provide warning, caution or instruction signs where required by CEC, where indicated or where reasonably required to assure safe operation and maintenance of electrical systems and of the items to which they connect. Install engraved plastic laminated instruction signs with approved legend where instructions or explanations are needed for system or equipment operation. Install butyrate signs with metal backing for outdoor items.
- B. Emergency Operating Signs: Install engraved laminate signs with white letters on red background with minimum 3/8-inch high lettering for emergency instructions on power transfer, load shedding or other emergency operations.
- C. Elevator Machine Rooms(s): Provide warning sign for each elevator controller disconnect to read "Warning - Part of the Control Panel is not De-energized by this Switch."
- D. Elevator car light and fan switch: Provide signage indicating elevator number serving and function of each switch.

3.10 INSCRIBED DEVICE COVERPLATE

- A. General:
 - 1. Lettering type: Helvetica, 12 point or 1/8" high.
 - 2. Color of characters shall be black.
 - 3. Locate the top of the inscription 1/2" below the top edge of the coverplate.
 - 4. Inscription shall be centered and square with coverplate.
- B. Application:
 - 1. Type-on-tape inscriptions shall be provided for the following devices:
 - a. Receptacles.
 - b. Outlets in surface raceways.
 - c. Telecommunication outlets.
 - 2. Engraved inscriptions shall be provided for the following devices:
 - a. Multi-ganged switches.
 - b. Special purpose switches.
 - 3. Type-on-tape installation:
 - a. Tape shall be trimmed to the height of the letters.
 - b. Trim tape length to 1/4-inch back from each edge of coverplate.
 - c. Contractor hands shall be clean or covered with surgical type glove prior to application of tape. Tape installations with visible fingerprints or smudges will not be acceptable.

END OF SECTION

SECTION 26 24 13

SWITCHBOARDS

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Main service switchboard.
 - 2. Distribution switchboards (800 amps and greater).
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 03: Cast-in-place concrete. Equipment housekeeping pad.
 - 3. Division 09: Painting. Touch-up of painted surfaces.
- C. Bid Alternate:
 - 1. Replacement of existing main switchboards is a bid alternate, refer to instructions on the plans.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. American National Standards Institute, Inc. (ANSI):
 - ANSI C12; Code for Electricity Metering.
 - 2. Underwriters Laboratories, Inc. (UL):
 - UL 486E; Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors.
 - UL 489; Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.
 - UL 869A; Service Equipment.
 - UL 891; Dead-Front Switchboards.
 - UL 943; Ground-Fault Circuit Interrupters.
 - UL 1053; Ground-Fault Sensing and Relaying Equipment.

3. National Electrical Manufacturer Association (NEMA):
 - NEMA AB1; Molded Case Circuit Breakers.
 - NEMA PB 2; Deadfront Distribution Switchboards.
 - NEMA PB 2.1; General Instruction for Proper Handling, Installation, Operation and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or less.
 - NEMA PB 2.2; Application Guide Ground Fault Protective Devices for Equipment.
 - NEMA SG5; Power Switchgear Assemblies.

1.03 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 2. Shop Drawings to include:
 - a. Front, plan, and side view elevations with overall dimensions.
 - b. Conduit entrance locations and requirements.
 - c. Nameplate legends; size and number of bus bars per phase, neutral and ground.
 - d. Switchboard instrument details and accessories.
 - e. Electrical characteristics including voltage, frame size and trip rating and withstand ratings.
 3. Submit Manufacturer's installation instructions.
 4. Complete Bill of Material listing all components.
 5. Final test results.
 6. Warranty.
- B. Dimensions and configurations of switchboards shall conform to the space allocated on the Drawings. The Contractor shall submit a revised layout if equipment furnished varies in size from that indicated on Drawings for the Engineer's approval.
- C. Service entrance switchboard utility metering sections shall be submitted to the local electrical utility company for approval prior to submission to the Engineer. A letter of acceptance from utility company shall be included in submittal package.

1.04 OPERATION AND MAINTENANCE MANUAL

- A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:
 1. A detailed explanation of the operation of the system.
 2. Instructions for routine maintenance.

3. Pictorial parts list and part numbers.
4. Pictorial and schematic Electrical Drawings of wiring systems, including operating and safety devices, control panels, instrumentation, and annunciators.
5. Telephone numbers for the authorized parts and service distributors.
6. Include all service bulletins and torque Specifications for all terminations.
7. Final testing report.

1.05 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.
- C. Independent Testing Agency qualifications: Refer to Section 260010: Basic Electrical Requirements.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Switchboard components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner. Components shall be properly packaged in factory-fabricated containers and mounted on shipping skids.
- B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.
- C. Handling: Handle in accordance with NEMA PB2.1 and Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.07 WARRANTY

- A. Units and components offered under this Section shall be covered by a 1-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

1.08 EXTRA MATERIAL

- A. Provide one spray can of matching finish paint for touching up damaged surfaces after installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 1. Square D.
 2. ABB/ General Electric.

3. Eaton.
 4. Siemens.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.
- 2.02 SWITCHBOARDS - GENERAL
- A. Enclosure:
1. Each switchboard shall consist of a dead front, completely metal enclosed self-supporting structure. Construction shall consist of vertical sections of the universal frame type bolted together and braced with self-tapping bolts. Sides, top and rear shall be covered with captive-bolt fastened steel plates having formed edges all around. Front plates shall be sectionalized and removable. All plates shall be fabricated from 12-gage steel and shall have die-formed edges all around. The switchboard frame shall be suitable for use as floor sills in indoor installations. Corners shall be reinforced with rigged gussets internal and external to the structural members.
 2. Switchboards shall have depth as required to house all equipment contained within it. Switchboard shall be constructed so that the back and front of all sections align. Construction of the board shall allow maintenance of incoming line terminations, device connections and all bus bolted connections.
 3. All devices shall be accessible and removable from the front unless rear access is indicated on the Drawings.
 4. Provide necessary hardware to permit locking every overcurrent protective device handle in the "OFF" position.
 5. Provide hinged access doors to all termination, meter, and relay compartments with knurled and slotted large head captive-bolts. The design shall allow access to compartments without tools and without removing any panels.
 6. Furnish cable pull sections or top cable pull boxes where indicated on the Drawings complete with cable tie down supports. Where cable pull section or pull boxes contain utility service cables, provide utility acceptable sealing means.
 7. Switchboard shall be suitable for use as service entrance equipment and be labeled in accordance with UL requirements.
 8. Utility metering compartment section shall be fabricated to meet all utility company requirements. Where separate vertical section is required for utility metering, match and align with switchboard enclosure.
- B. Bus assembly and terminations:
1. The switchboard bussing shall be highly conductive silver-plated copper with sufficient cross-sectional area to meet UL Standard 891 temperature rise requirements.
 2. Bus arrangement shall be Phase A-B-C-N left-to-right, top-to-bottom and front-to-rear as viewed from the front. Horizontal and vertical bus ampere rating shall be uniform from end-to-end.
 3. All bussing to and from an overcurrent protective device shall be rated to the frame sizing, not the trip rating.

4. Where "SPACE" is indicated in the switchboards, cross connectors and mounting hardware shall be installed to match the frame size ampere rating noted on the Electrical Drawings. All "SPACES" shall be ready for installation of overcurrent protective devices at a future time.
 5. Shipping splits and provisions for future bus extension shall be provided with necessary bus splices.
 6. Each switchboard shall contain a full length, bottom/front located copper ground bus that is securely connected to each vertical section. Ground bus shall be sized in accordance with UL 891, Table 25.1.
 7. Termination lugs: High compression circumference crimped type rated for use with aluminum/copper conductors.
 8. Switchboards shall be fully rated for a minimum of 65,000 AIC or as indicated on the Drawings.
 9. Neutral bus shall be 100-percent rated unless otherwise indicated on the Drawings.
 10. Main service switchboards:
 - a. Removable neutral link: Provide removable bolted bus section for the purpose of disconnecting the ground circuit conductor from the premises wiring at the supply side of the service in accordance with CEC article 230-75.
 - b. Main bonding jumper: Connection between the grounded circuit conductor and the equipment ground conductor at the supply side of the service. Size in accordance with CEC table 250-94 or 12-1/2% of the area of the largest phase conductor in accordance with CEC article 250-79(c).
- C. Switching and overcurrent protective devices:
1. Refer to Section 262816: Overcurrent Protective Devices.
 2. Main overcurrent protective device(s) shall be fixed mounted molded case circuit breaker with interrupting rating and frame and trip ratings as indicated on Drawings.
 3. Feeder overcurrent protective device(s) shall be fixed mounted molded case circuit breaker with frame and trip rating as indicated on Drawings.
 4. Devices interrupting rating shall match that of switchboard for which the device is installed.
 5. Series ratings of overcurrent protective devices is not acceptable unless specifically noted on the Drawings.
 6. Devices shall be manually operated unless shunt trip and/or electrically operated devices are indicated on Drawings.
- D. Ground fault protection:
1. General: A solid-state, zone-interlocked, ground fault protection system shall be provided integral on the main device(s) as indicated on Drawings. It shall consist of integral phase current sensors, appropriate solid-state relaying equipment to provide the desired ground fault current sensitivity and time-current response characteristics. Provide neutral ground fault current transformer for four wire systems.

2. Device settings: Adjustable pickup current sensitivity for ground fault currents from 200 amperes to 1200 amperes shall be provided. A calibrated dial shall be provided for setting the current pickup point in the field. Time delay shall be adjustable from 0 to 60 cycles. Settings for individual relays shall be as directed by the short circuit/coordination study specified in Section 260060: Power System Study. A locking screw shall be provided to retain both adjustments at desired setting.
 3. All overcurrent devices shall be independently time coordinated irrespective of zone interlocking to allow the last downstream level of ground fault devices to be time coordinated, i.e. it shall NOT revert to the lowest time setting.
- E. Surge Protective Devices:
1. Refer to Section 264313: Surge Protective Devices.
- F. Instrumentation and controls:
1. Switchboards shall have a digital meter unit (DMU) as indicated on the Drawings. DMU shall be by the same manufacturer as the switchboard.
 2. Meter potential circuits shall be fused. Potential transformers if required for the monitoring devices shall be provided with fuses in the primary.
 3. Meter current circuits shall have shorting terminal blocks between the meter and the current transformers. Current transformers shall be ring type (one per phase) with ratio, thermal, and mechanical ratings coordinated with the application and protection.
 4. Instrument transformer accuracy per IEEE C57.13.6:
 - a. Current transformers must maintain 0.3% accuracy from 5% rated current through rating factor at rated burden.
 - b. Voltage transformers must maintain 0.15% accuracy from 90% to 110% of rated voltage.
 5. All internal devices (relays, transformers, etc.) shall be tagged as to rating and function with permanently fastened engraved nameplates.
 6. Control and signal circuits: Control devices, i.e.: contactors, relays, time clocks, etc. shall be mounted in a separate compartment that is fully barrier from the overcurrent protective device compartments. Control devices shall be accessible through a separate hinged cover panel.
 7. Relays: All relays shall be industrial control grade with a "ON" indicating neon light, hold down springs, minimum of 10amp rated contacts and a minimum of four form C contacts. Relays used for control power transfer shall have 20amp rated contacts. Do NOT use paralleled relays for relays with greater than 4-poles, use relays with the required number of poles. This is to prevent the situation where one relay fails, and half of the intended function is lost, which could be dangerous.
- G. Refer to Electrical Drawings for the following:
1. Mounting style; voltage; terminal lug size, location, and quantity; bus ampacity; interrupting capacity of bus and overcurrent protective devices, quantity, poles, and rating of overcurrent protective devices. Note that the AIC value noted on the Drawings

for distribution equipment is the minimum rating of all components; values are in RMS symmetrical amps.

2. If indicated on the Electrical Drawings, provide contactors, relays, time clocks, etc. mounted within switchboard.
- H. Miscellaneous requirements:
1. Circuit numbering: Starting at the top, odd numbered circuits in sequence down the left-hand side and even numbered circuits down the right-hand side.
 2. Nameplates: Engraved nameplates shall be provided for each device and all "SPACES" located in the switchboard. An engraved nameplate shall also be provided indicating the switchboard designation. See Section 260553: Electrical Identification for requirements.
 3. All control wires shall be labeled with wire markers and referenced to the control wiring diagrams. Provide colored wires with colored stripes to facilitate troubleshooting and locating both ends of wires. Do not use wires with all the same wire color. Use fork, crimp type terminations on all control wires.
 4. Provide a test block and plugs for voltage and current monitoring at each main switch. Provide engraved legend plates to indicate function of each test point.
 5. Vertically mounted mains shall have the operating handle in the up position when energized.
- I. Weatherproof outdoor enclosure and accessories:
1. Provide a NEMA 3R non-walk-in type weatherproof housing with hinged lockable access doors. Each section shall have a minimum of 13-inch deep vestibule. Provide a latch for each door to ensure adequate closing pressure to seal against harmful weather.
 2. The weatherproof housings shall be provided with lifting eyes.
- J. Finish:
1. Five step zinc phosphate pre-treatment, one coat of rust inhibiting dichromate primer and one coat of baked-on enamel finish, ANSI 61 (light gray).
 2. A seven-step spray wash electroplate primer with final baked-on enamel finish; ANSI 61 (light gray) is an acceptable finish alternative.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of switchboard installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

- A. Ensure all conduit stub-ups for bottom entry into switchboard are in place and located as required per Shop Drawings.
- B. Whether noted on the Drawings or not, provide a 4-inch high concrete housekeeping pad beneath equipment. Coordinate actual sizes of equipment based on approved Shop

Drawings and extend pad 4-inches in all directions beyond overall dimension of base. Provide reinforcing bars as required structurally within pad to ensure proper support of equipment. In addition to housekeeping pad, add concrete working space min 48" depth.

3.03 INSTALLATION

- A. Install switchboards in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Handling, storage, installation and energize of switchboards shall be carried out in accordance with latest edition of NEMA Publications PB 2.1.
- C. Freestanding switchboards shall be accurately aligned, leveled, and bolted in place on full-length channels securely fastened to concrete floor.
- D. Switchboards shall be anchored and braced to withstand seismic forces as calculated per Section 260010: Basic Electrical Requirements.
- E. Provide mounting hardware brackets, bus bar drilling and filler pieces for all unused spaces.
- F. "Train" interior wiring; bundle and clamp, using specified plastic wire wraps specified under Section 260519: Building Wire and Cable.
- G. Replace any panel pieces, doors or trims having dents, bends, warps, or poor fit that may impede ready access, security, or integrity.
- H. Conduits terminating in concentric, eccentric, or oversized knockouts at switchboards shall have ground bushings and bonding jumpers installed interconnecting all such conduits and the switchboards.
- I. Check and tighten all bolts and connections with a torque wrench using Manufacturer's recommended values.
- J. Visually inspect switchboards for rust and corrosion if signs of rust and corrosion are present, board shall be restored to new condition or replaced.
- K. In damp and wet locations mount switchboard with a minimum 1 inch of air space between enclosure and the wall or other supporting material.

3.04 FIELD QUALITY CONTROL

- A. Manufacturer's field service: Contractor shall arrange and pay for the services of a factory-authorized service representative to supervise the initial start-up, testing, and adjustment of the switchboard.
- B. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing, calibration and inspection required herein. Independent Testing Agency shall meet the requirements as outlined in Section 260010: Basic Electrical Requirements. Testing Agencies objectives shall be to:
 - 1. Assure switchboard installation conforms to specified requirements and operates within specified tolerances.
 - 2. Field test and inspect to ensure operation in accordance with Manufacturer's recommendations and Specifications.

3. Prepare final test report including results, observations, failures, adjustments, and remedies.
 4. Apply label on switchboard upon satisfactory completion of tests and results.
 5. Verify ratings and settings and make final adjustments.
- C. At least three weeks prior to any testing, notify the Engineer so that arrangement can be made for witnessing test, if deemed necessary. All pretesting shall have been tested satisfactorily prior to the Engineer's witnessed test.
- D. The Contractor shall supply a suitable and stable source of electrical power to each test site. The Testing Agency shall specify the specific power requirements.
- E. Testing of overcurrent protective devices shall be done only after all devices are installed and prior to system being energized.
- F. Prefunctional testing:
1. Provide Testing Agency with Contract Documents and Manufacturer instructions for installation and testing.
 2. Visual and mechanical inspection:
 - a. Compare nameplate information and connections to Contract Documents.
 - b. Inspect for physical damage, defects alignment and fit.
 - c. Verify appropriate anchorage, required clearances and correct alignment.
 - d. Inspect doors, panels and sections for paint, dents, scratches, fit and missing hardware
 - e. Check tightness of all control and power connections.
 - f. Check that all covers, barriers, and doors are secure.
 - g. Verify correct barrier installation.
 - h. Verify that relays and overcurrent protective devices meet Drawing, power system study and specified requirements.
 - i. Perform mechanical operational tests in accordance with Manufacturer's instructions.
 - j. Exercise active components.
 - k. Inspect control power and instrument transformers.
 - l. Inspect insulators for evidence of physical damage or contaminated surfaces.
 - m. Ground-fault protection:
 - 1) Verify ground connection is made ahead of neutral disconnect link and on line side of any ground fault sensor.
 - 2) Verify neutral sensors are connected with correct polarity on both primary and secondary.

- 3) Verify all phase conductors and neutral pass through sensor in same direction for zero sequence systems.
 - 4) Verify grounding conductors do not pass through zero sequence sensors.
 - 5) Verify grounded conductor is solidly grounded.
 - 6) Verify correct operation of self-test panel.
 - 7) Set pickup and time-delay settings in accordance with Specifications. Record operation and test sequences as required by code.
3. Electrical tests:
- a. Perform resistance tests through bus joints with low-resistance ohmmeter. Joints that cannot be directly measured due to permanently installed insulation wrap shall be indirectly measured from closest accessible connection.
 - b. Perform insulation-resistance tests on each bus section, phase-to-phase, and phase-to-ground, at 1000volt DC for 60-seconds. Investigate resistance values less than 50-megohms.
 - c. Perform over-potential test on each bus section, each phase-to-ground with phases not under test grounded, in accordance with Manufacturer's published data. Test voltage shall be applied for 60-seconds.
 - d. Perform insulation-resistance tests at 1000volt DC for 60-seconds on control wiring. Do not perform this test on wiring connected to solid-state components.
 - e. Perform current injection tests on the entire current circuit in each section of switchgear.
 - 1) Perform current tests by primary injection, where possible, with magnitudes such that minimum of 1amp flows in secondary circuit.
 - 2) Where primary injection is impractical, utilize secondary injection with minimum current of 1amp.
 - 3) Test current at each device.
 - f. Perform tests on all instrument transformers in accordance with Manufacturer's written instructions.
 - g. Determine accuracy of meters and instruments per Manufacturer's instructions.
 - h. Perform the following tests on control power transformers:
 - 1) Perform insulation-resistance test. Perform measurements from winding-to-winding and each winding-to-ground. Test voltages shall be determined in accordance with Manufacturer's instructions.
 - 2) Perform secondary wiring integrity test. Disconnect transformer at secondary terminals and connect secondary wiring to correct secondary voltage. Confirm potential at all devices.
 - 3) Verify correct secondary voltage by energizing primary winding with system voltage. Measure secondary voltage with secondary wiring disconnected.

- i. Potential transformer circuits:
 - 1) Perform insulation-resistance tests. Perform measurements from winding-to-winding and each winding-to-ground. Test voltages shall be determined in accordance with Manufacturer's instructions.
 - 2) Perform secondary wiring integrity test. Disconnect transformer at secondary terminals and connect secondary wiring to correct secondary voltage.
 - 3) Verify secondary voltage by energizing primary winding with system voltage. Measure secondary voltage with secondary wiring disconnected.
 - j. Ground resistance:
 - 1) Measure system neutral-to-ground insulation-resistance with neutral disconnect link temporarily removed. Replace neutral disconnect link after test.
 - 2) Measure insulation-resistance of control wiring at 1000volt DC for 60-seconds. Refer to Manufacturer's instruction for devices with solid-state components
 - k. Ground fault protection system:
 - 1) Perform the following pickup tests using primary injection:
 - a) Verify relay does not operate at 90% of pickup setting.
 - b) Verify pickup is less than 125% of setting or 1200amps, whichever is smaller.
 - 2) Measure time delay of the relay at 150% or greater of pickup.
 - l. Test overcurrent protection devices per Section 262816: Overcurrent Protective Devices.
4. Test values:
- a. Bolt torque levels shall be in accordance with Manufacturer's requirements.
 - b. Compare bus connection resistances to values of similar connections.
 - c. Insulation-resistance values for bus, control wiring and control power transformers shall be in accordance with Manufacturer's published data. Values of insulation resistance less than Manufacturer's minimum levels should be investigated. Over-potential tests should not proceed until insulation-resistance levels are raised above minimum values.
 - d. Insulation shall withstand the over-potential test voltage applied.
 - e. Determine contact resistance in microhms. Resistance values shall not exceed high limit of normal range as indicated in Manufacturer's published data.
 - f. System neutral-to-ground insulation shall be a minimum of one megohm.
 - g. Ground fault protection systems relay timing shall be in accordance with Manufacturer's Specifications but must also be no longer than one second at 3000amps.
- G. In the event that the system fails to function properly during the testing as a result of inadequate pretesting or preparation, the Contractor shall bear all costs incurred by the

necessity for retesting including test equipment, transportation, subsistence and the Engineer's hourly rate.

- H. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.
- I. Contractor shall submit the Testing Agency's final report for review prior to Project closeout and final acceptance by the Owner. Test report shall indicate test dates, devices tested, results, observation, deficiencies, and remedies. Test report shall be included in the operation and maintenance manuals.

3.05 CLEANING

- A. Prior to energizing of switchboard, the Contractor shall thoroughly clean the interior of enclosure of all construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.
- B. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean both the interior and exterior of switchboard per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt, and debris.
- C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.

3.06 TRAINING

- A. Factory authorized service representative shall conduct a 4-hour training seminar for Owner's Representatives upon completion and acceptance of system. Instructions shall include safe operation, maintenance, and testing of equipment with both classroom training and hands-on instruction.
- B. Contractor shall schedule training with a minimum of 7-days advance notice.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Branch circuit panelboards.
 - 2. Distribution panelboards (400amps to 800amps).
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified.
 - 1. National Electrical Manufacturers Association (NEMA):
 - NEMA AB 1; Molded Case Circuit Breakers.
 - NEMA PB 1; Panelboards.
 - NEMA PB 1.1; General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.
 - 2. Underwriters Laboratories, Inc. (UL):
 - UL 67; Panelboards.
 - UL 486E; Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors.
 - UL 489; Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.
 - UL 870; Wireways, Auxiliary Gutters and Associated Fittings.

1.03 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards
 - 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.

3. Shop Drawings: Include elevations, cabinet dimensions, gutter sizes, layout of contactors, relays, time clocks, lug sizes, bussing diagrams; make, location and capacity of installed equipment; mounting style; finish and panelboard nameplate inscription.
 4. Furnish structural calculations for equipment anchorage as described in Section 26 00 10: Basic Electrical Requirements.
 5. Submit Manufacturer's installation instructions.
 6. Complete bill of material listing all components.
 7. Warranty.
- B. Dimensions and configurations of panelboards shall conform to the spaces allocated on the Drawings for their installation. The Contractor shall include with the submittal a layout of the electrical room if it differs from construction documents for review and approval by the Engineer prior to release of order.
- 1.04 OPERATION AND MAINTENANCE MANUAL
- A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:
1. A detailed explanation of the operation of the system.
 2. Instructions for routine maintenance.
 3. Pictorial parts list and parts number.
 4. Telephone numbers for authorized parts and service distributors.
 5. Final testing reports.
- 1.05 QUALITY ASSURANCE
- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.
- 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING
- A. Delivery: Panelboard components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner.
- B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.
- C. Handling: Handle in accordance with NEMA PB1.1 and Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.
- 1.07 WARRANTY

- A. Units and components offered under this Section shall be covered by a **1**-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

1.08 EXTRA MATERIAL

- A. Turn over two (2) sets of panelboard keys to the Owner at completion of Project. All panelboards shall be keyed alike.
- B. Provide one spray can of matching finish paint for touching up damaged surfaces after installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Square D.
 - 2. ABB/ General Electric.
 - 3. Eaton.
 - 4. Siemens.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 PANELBOARDS - GENERAL

- A. Enclosure:
 - 1. Cabinets shall be NEMA Type 1 enclosure, door, and trim of code gauge galvanized steel. Provide NEMA Type 3R enclosures for exterior mounted panelboard.
 - 2. Panelboard covers shall be door-in-door construction such that inner door exposes the overcurrent protective devices and the outer door exposes the complete panelboard interior (i.e. branch circuit conductors, lugs, neutral and ground bus, overcurrent protective devices, etc.). Outer door shall have full-length piano hinge and inner door shall have two-point hinges.
 - 3. Provide combination spring catch and lock on inside edge of the inner door trims with flush fitting joint between door and trim. Locks on all panelboards shall be keyed alike. Doors 36 inches and over in height shall be provided with three-point catch and lock. Provide quarter-turn captive bolts on the outer door.
- B. Bus assembly and terminations:
 - 1. Bus shall be bolted copper with taps arranged for distributed phase connections to branch circuit devices
 - 2. Cross connectors shall be copper, drilled and tapped for bolt-on device connections, arranged for double row placement of device and designed to permit removal or addition of overcurrent protection devices without disturbing adjacent devices or removing main bus connections.
 - 3. Neutral bus shall be 100 percent rated of phase bus bars and shall have lugs for each outgoing branch circuit or feeder requiring a neutral connection unless otherwise noted.
 - 4. Ground bus shall be full size with lugs for each outgoing branch circuit and feeder.

5. Refer to panelboard schedules on Drawings for bus rating. Bus rating shall match or be greater than main device or main lug rating.
 6. As a minimum, bus bars shall be rated 10,000 AIC for 120/208volt panelboards and 14,000 AIC for 277/480volt panelboards. Unless otherwise noted.
 7. Provide full sized bussing in all sections of multi-section panelboards.
 8. Termination Lugs: Rated for use with aluminum/copper conductors.
 9. All "SPACES" shall be ready for installation of future overcurrent protective device.
- C. Miscellaneous requirements:
1. Circuit numbering: Starting at the top, indicate odd numbered circuits in sequence down the left-hand side and even numbered circuits down the right-hand side. Multi-section panelboards shall have continuous consecutive circuit numbers. Provide metal embossed circuit identification of panelboards.
 2. Directories: A 6" x 8" minimum size circuit directory frame and card with clear plastic covering shall be provided inside the inner panelboard door to reflect conditions at completion of Work. Directory shall be typewritten denoting loads served by room number or area for each circuit.
 3. Nameplates: Provide engraved nameplate for each panelboard. See Section 260533: Electrical Identification for requirements.
- D. Refer to Panelboard Schedules for the following:
1. Mounting style; service voltage; terminal lug size, location, and quantity; bus ampacity; interrupting capacity of bus and breakers; quantity, poles and rating of overcurrent protective devices.
- E. Overcurrent protective devices:
1. Refer to Section 26 28 16: Overcurrent Protection Devices.
 2. Overcurrent protective devices shall be molded case circuit breakers.
 3. Main devices shall be hard bus connected to the panelboard bus bars.
 4. In all cases, panelboards fed directly from a transformer shall have a main overcurrent protective device. If not indicated on the Drawings or Panelboard Schedules, provide this device sized to provide the full capacity of the transformer rating.
 5. Main devices shall be vertically mounted and shall have their operating handle in the up position when energized. Main devices that are mounted in the same manner as the branch devices are NOT acceptable, i.e. main devices shall be individually mounted at the top or bottom of the phase bus bars.
 6. Panelboards overcurrent protective devices layout shall conform to the layout indicated on the panelboard schedules.
 7. Provide identified handle ties for single pole circuit breakers that share a neutral conductor.
- F. Surge Protective Devices:
1. Refer to Section 264313: Surge Protective Devices.

- G. Finish: Five step zinc phosphate pre-treatment, one coat of rust inhibiting dichromate primer and one coat of baked-on enamel finish, ANSI 61 (light gray).

2.03 DISTRIBUTION PANELBOARDS

- A. Enclosures shall be sized as required and shall meet the space restriction allocated on Drawings. Panelboard shall comply with NEMA PB 1.
- B. Provide necessary hardware to permit locking every overcurrent protective device handle in the "OFF" position.
- C. Where "SPACE" is indicated on panelboard schedules or Drawings, install cross connectors and mounting hardware to match the frame size ampere rated noted.

2.04 BRANCH CIRCUIT PANELBOARDS

- A. Enclosure shall be 20" wide x 5-3/4" deep, surface or flush mounted and shall comply with NEMA PB 1.
- B. Flush panelboards mounted adjacent to each other shall be same physical size.
- C. Where "SPACE" is indicated on panelboard schedules or Drawings, install minimum 100amp branch circuit cross connectors and mounting hardware. For future device spaces larger than 100amps, cross connectors shall match the frame size ampere rated noted.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of panelboard installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.
- B. Where panelboards are shown to be flush mounted in walls, the contractor shall insure that 6" deep studs are employed in wall construction to accommodate the 5-3/4" deep panelboard enclosure.

3.02 INSTALLATION

- A. Install panelboards in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Set panels plumb and symmetrical with building lines in conformance with PB1.1. Furnish and install all construction channel bolts, angles, etc., required to mount the equipment furnished under this Section.
- C. Mounting height shall be 6 feet.
- D. Panelboards shall be anchored and braced to withstand seismic forces as calculated per Section 260010: Basic Electrical Requirements.
- E. Provide mounting hardware brackets, busbar drillings and filler pieces for all unused spaces.
- F. "Train" interior wiring; bundle and clamp, using specified plastic wire wraps specified under Section 260519: Building Wire and Cable.
- G. Replace panel pieces, doors or trim exhibiting dents, bends, warps, or poor fit that may impede ready access, security, or integrity.

- H. Conduits terminating in concentric, eccentric, or oversized knockouts at panelboards shall have ground bushings and bonding jumpers installed interconnecting all such conduits and the panelboard.
- I. Check and tighten all bolts and connections with a torque wrench using Manufacturer's recommended values.
- J. Provide four 3/4" spare conduits stubbed-out of flush mounted panelboards to nearest accessible ceiling space.
- K. Visually inspect panelboard for rust and corrosion. If signs of rust and corrosion are present, restore or replace panelboard to new condition.
- L. In damp and wet locations, mount panelboards with a minimum one inch of air space between cabinet and the wall or other support material.
- M. Provide close up plugs in all unused openings in the cabinet.
- N. Field install handle ties on single pole circuit breakers that share a neutral conductor.
- O. Circuit breakers feeding "Fire Alarm Control Panel(s)" shall be red in color.

3.03 FIELD QUALITY CONTROLS

- A. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing, calibration and inspection required herein. Testing Agencies objectives shall be to:
 - 1. Assure panelboard installation conforms to specified requirements and operates within specified tolerances.
 - 2. Field test and inspect to ensure operation in accordance with Manufacturer's recommendations and Specifications.
 - 3. Prepare final test report including results, observations, failures, adjustments, and remedies.
 - 4. Apply label on panelboards upon satisfactory completion of tests and results.
 - 5. Verify ratings and settings and make final adjustments.
- B. At least three weeks prior to any testing, notify the Engineer so that arrangement can be made for witnessing test, if deemed necessary. All pretesting shall have been tested satisfactorily prior to the Engineer's witnessed test.
- C. The Contractor shall supply a suitable and stable source of electrical power to each test site. The Testing Agency shall specify the specific power requirements.
- D. Testing of overcurrent protective devices shall be done only after all devices are installed and system is energized.
- E. Prefunctional testing:
 - 1. Provide Testing Agency with Contract Documents and Manufacturer instructions for installation and testing.
 - 2. Visual and mechanical inspection:
 - a. Inspect for physical damage, defects alignment and fit.

- b. Perform mechanical operational tests in accordance with Manufacturer's instructions.
 - c. Compare nameplate information and connections to Contract Documents.
 - d. Check tightness of all power connections.
 - e. Check that all covers, barriers, and doors are secure.
3. Electrical tests:
- a. Insulation resistance: 1000volt DC tests for one minute on all 600volt and lower rated equipment, components, buses, feeder and branch circuits and control circuits. Test phase-to-phase and phase-to-ground circuits showing less than 10-megohms resistance to ground shall be repaired or replaced.
 - b. Circuit continuity: All feeders shall be tested for continuity. All neutrals shall be tested for improper grounds.
 - c. Ground resistance: Test resistance to ground of system and equipment ground connection.
 - d. Test overcurrent protection devices per Section 262816: Overcurrent Protective Devices.
- F. In the event that the system fails to function properly during the testing as a result of inadequate pretesting or preparation. The Contractor shall bear all costs incurred by the necessity for retesting including test equipment, transportation, subsistence, and the Engineer's hourly rate.
- G. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.
- H. Contractor shall submit the Testing Agency's final report for review prior to Project closeout and final acceptance by the Owner. Test report shall indicate test dates, devices tested, results, observation, deficiencies, and remedies. Test report shall be included in the operation and maintenance manuals.

3.04 CLEANING

- A. Prior to energizing of panelboards, the Contractor shall thoroughly clean the interior of enclosure of all construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.
- B. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean both the interior and exterior of panelboards per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt, and debris.
- C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.

END OF SECTION

SECTION 26 27 19

SURFACE RACEWAYS

PART 1 - GENERAL

1.01 SUMMARY

1. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - a. Surface metal raceways.
 - b. Surface nonmetallic raceways.
 - c. Multi-outlet assemblies.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified.
 1. Federal Specifications (FS):
 - FS W-C-582; Conduit, Raceway, Metal and Fitting; Surface.
 2. Underwriters Laboratories, Inc. (UL):
 - UL 5; Standard for Surface Metal Raceways and Fittings.
 - UL 5A Nonmetallic Surface Raceways and Fittings.
 - UL 870; Wireways, Auxiliary Gutters and Associated Fittings.

1.03 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 2. Clearly mark on each data sheet the specific item(s) being submitted and proposed application.
 3. Submit Manufacturer's installation: Provide written instructions for raceway products special installation techniques.
 4. Complete bill of material listing all components.

1.04 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Surface metal raceways and multi-outlet assemblies:
 - a. Wiremold (Legrand)
 - 2. Surface nonmetallic raceways and multi-outlet assemblies:
 - a. Wiremold (Legrand)
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 SURFACE METAL RACEWAYS

- A. Assembly: Single or Double compartment raceway shall be complete to include bases, covers, end plates, compartment divider, fittings and connections as required. Raceways shall be UL labeled.
- B. Construction: Raceway base, cover, compartment divider and end plates shall be constructed of cold rolled steel with 0.094" minimum wall thickness. or of extruded aluminum of No. 6063-T5 aluminum alloy extrusion. Corner extrusions shall be identical to linear extrusions.
- C. Size: Raceway size and length shall be as indicated on Drawings.
- D. Fittings: Boxes, extension rings, couplings, elbows, and connectors shall be designed for use with raceway system.
- E. Finish: To be determined by the Architect.
- F. Application: Utilize for power-only applications.
 - 1. Legrand/Wiremold 500 or 700 series, or equal, as required.

2.03 SURFACE NONMETALLIC RACEWAYS

- A. Assembly: Single, double, or triple compartment raceway shall be complete to include bases, covers, end plates, compartment divider, fittings and connections as required. Raceways shall be UL labeled. Double and triple compartment raceway shall have individual covers for each channel to allow access to one compartment at a time.
- B. Construction: Raceway base, cover, compartment divider and end plates shall be of non-metallic construction.
- C. Size: Raceway size and length shall be as indicated on Drawings.
- D. Fittings: Boxes, extension rings, couplings, elbows and connectors shall be designed for use with raceway system.
- E. Finish: To be determined by the Architect.
- F. Application:
 - 1. Multi-channel nonmetallic raceway system: Utilize for applications where both power and low voltage systems (telecommunications, A/V) are required.
 - a. Legrand/Wiremold 5500 or equal.

2. Single channel, non-metallic raceway shall not be used for power applications; acceptable for use only for low voltage systems.

2.04 MULTI-OUTLET ASSEMBLIES

- A. Assembly: Single or Double compartment raceway shall be factory pre-assembled, pre-cut and complete, including bases, covers, end plates, compartment dividers, wiring, receptacles, fittings and connections as required. Raceway shall be U.L. labeled.
- B. Construction: Raceway base, cover, compartment divider and end plates shall be constructed of cold rolled steel with 0.094" minimum wall thickness.
- C. Size: Raceway size and length shall be as indicated on Drawings.
- D. Receptacles: Convenience receptacles mounted in cover shall be NEMA 5-20R in accordance with Specification Section 262726: Wiring Devices. Space receptacles on center as indicated on Drawings.
- E. Coverplates: Device coverplates shall be of same material and finish as the raceway.
- F. Wiring: Receptacle circuits shall be pre-wired, or field wired with minimum #12 AWG conductors throughout entire length of section. 12" pigtails shall be provided for field connections. Pigtails shall be properly tagged with circuit identification in the field. No tap splicing.
- G. Wire retention clips: Shall be installed in sufficient numbers to securely hold all wire lengths in place.
- H. Grounding: Ground continuity shall be maintained to receptacles throughout the entire length of raceway by means of a separate, insulated, code sized ground conductor.
- I. Fittings: Boxes, extension rings, couplings, elbows and connectors shall be designed for use with raceway system.
- J. Finish: To be determined by the Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of surface raceway installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 SURFACE METAL RACEWAY AND MULTI-OUTLET ASSEMBLY

- A. Installation:
 1. Install raceway in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.
 2. Contractor shall coordinate raceway lengths with building walls, counter, and actual field conditions.
 3. Raceways mounted on walls above benches and counters shall align exactly with each end of bench or counter.

4. Use flat-head screws to fasten channel to surfaces, at heights indicated on Drawings, per Manufacturer's instructions. Mount plumb and level. Channel must be mechanically fastened; use of double-sided tape or other methods of attachment are not acceptable.
 5. Installed complete with all necessary corner connectors, 'T' connectors, feed connectors, compartment dividers and any other hardware required to provide a complete system as described in the Drawings.
 6. Provide fittings to feed the raceway from the back.
- B. Branch circuiting: Provide connection to pre-wired or field wired assembly as indicated on Drawings. Install circuit identification tags on pigtailed. Receptacles shall be identified with panel and circuit I.D. above each outlet with gray dymo label.
- C. Grounding: Ground continuity shall be maintained throughout entire raceway length per CEC.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Receptacles.
 - 2. Coverplates.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 03: Cast-in-place concrete.
- C. Scope of Work: In addition to installation of new wiring devices as indicated on the plans, all 15 and 20-amp, 125 and 250-volt receptacles are to be replaced with new tamper resistant and/or GFCI devices, to meet the requirements of CEC Article 406.12 and 210.8 (B).

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified.
 - 1. National Electrical Manufacturer's Association (NEMA):
 - NEMA WD-1; General-Purpose Wiring Devices.
 - 2. Underwriter's Laboratories (UL):
 - UL 231; Power Outlets.
 - UL 310; Electrical Quick-Connect Terminals.
 - UL 498; Attachment Plugs and Receptacles.
 - UL 514A; Metallic Outlet Boxes.
 - UL 514D; Cover Plates for Flush-Mounted Wiring Devices.
 - UL 943; Ground-Fault Circuit-Interrupters.
 - UL 1681; Wiring Device Configurations.

1.03 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 3. Provide color finishes for Architect to select from.
 4. Submit Manufacturer's installation instructions.
- B. Where inscribed device coverplates are noted on the Drawings or in the Specifications, conform to the requirements of Section 260553: Electrical Identification.

1.04 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
1. Receptacles and coverplates:
 - a. Pass & Seymour.
 - b. Hubbell.
 - c. Leviton.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 RECEPTACLES

- A. Standards:
1. Provide general purpose 20amp, 125/250volt AC receptacles that conform to NEMA WD-1 Specifications. Specialty receptacles shall conform to NEMA WD-5 Specifications as applicable.
 2. Provide NEMA 5-20R, industrial (heavy-duty) specification grade as noted herein, 20amp, 125volt AC, 2-pole, 3-wire grounding type receptacles.
 3. Receptacles shall be the standard conventional style device.
 4. Receptacles shall be tamper-resistant to meet the requirements of CEC Article 406.12.
- B. Color:
1. Device color shall be as selected by the Architect, unless otherwise noted.
 2. Devices connected to an emergency circuit shall be red.
- C. General purpose single outlets:
1. Provide self-grounding back and side wired with binding head staked terminal screw.

- D. General purpose duplex receptacles:
 - 1. Provide self-grounding, back and side wired with binding head staked terminal screws and break-off strip for two-circuit wiring.
- E. Ground fault circuit interrupting (GFCI) receptacles:
 - 1. Provide 20amp, 125volt AC, receptacles consisting of NEMA 5-20R duplex device with integral solid state sensing and signaling circuitry capable of detecting and interrupting a maximum 5-milli-amp line-to-ground fault current in approximately 1/40th of a second.
 - 2. Provide visual device with trip indication, manual reset, and test mechanisms and with point of use and multi-outlet protection.
 - 3. Provide self-test and monitor feature with visual indicators on device face representing power status, trip condition, ground fault condition and end of life status.
 - 4. Provide weather resistant devices at all damp and wet locations.
- F. Special purpose receptacles: Provide Specification grade devices with the NEMA configuration, voltage and current rating, number of poles and ground provisions as noted on the Drawings.

2.03 COVERPLATES

- A. General:
 - 1. Provide all coverplates with rounded edges and corners, smooth and free of grooves, embossing or other embellishment.
 - 2. Provide mounting screws to match the plate finish.
 - 3. Provide gang type coverplates where two or more devices are installed at one location. Individual gangable coverplates are not acceptable.
 - 4. Provide plates of one design, standard conventional designer decora style, throughout the Project unless otherwise specified.
- B. Color: Coverplate color shall be ivorywhiteblackgrayas specified by the Architect, unless otherwise noted.
- C. Plastic coverplates:
 - 1. Provide smooth, high impact, self-extinguishing thermoplastic coverplates and 0.100 inches thick with rounded edges and corners.
 - 2. Provide openings to accommodate the devices indicated on the Drawings and in the Specifications.
- D. Metal coverplates:
 - 1. Provide smooth, type 430 stainless steel coverplates, 0.035" thick with rounded edges and corners.
 - 2. Provide openings to accommodate the devices indicated on the Drawings and in the Specifications.
 - 3. Provide removable plastic film to protect coverplates during installation. Remove film at time of final acceptance.

E. Weatherproof coverplates:

1. Provide horizontal mounted weatherproof in-use coverplate for one duplex or one GFCI receptacle. Provide gasketed, spring loaded, lockable, vertically self-closing covers suitable for use in damp and wet locations as described in UL 514 and CEC 406. Covers shall allow the use of the device with the cover closed.
2. Furnish base plates, covers, hinge pins, spring and screws of corrosion resistant type 302 stainless steel.
3. Provide two (2) keys for each locking type coverplate.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of wiring device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

- A. Coordinate device heights in vending, kitchen and utility areas with benches and counters.
- B. Coordinate switch mounting location with Architectural details. Unless otherwise noted, locate switches on latch side of door.

3.03 INSTALLATION

- A. Install wiring devices in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Install devices with the vertical centerline plumb and with all edges of the device flush against the adjacent wall surfaces.
- C. Mount switches at 42 inches to center above finished floor unless otherwise noted.
- D. Mount receptacles vertically with the centerline 18-inches above finished floor and with grounding slot at bottom.
- E. Mount receptacles vertically horizontally when mounting above counters, mount with grounding slot to the left.
- F. Mount GFCI receptacles in the following locations, whether indicated as GFCI type or not on the drawings:
 1. In bathrooms.
 2. Where receptacles are installed within 6'0" from edge of sinks.
 3. In kitchens above counters.
 4. On rooftops.
 5. Outdoors.
 6. Where serving vending machines.
 7. Where serving electric drinking fountains.

- G. Derate ganged dimmer switches as instructed by Manufacturer. Do not use common neutrals in dimmer circuits.
- H. Install red receptacles where connected to an emergency circuit.
- I. Provide coverplates for all outlet boxes, switches, receptacles, etc.
- J. Install blank coverplates on all outlet boxes in which no device is required or installed.
- K. Provide coverplates that completely cover wall opening and seat against wall.
- L. Provide stainless steel coverplates for all devices in kitchen/food service equipment areas.

3.04 FIELD QUALITY CONTROL

- A. Electrical testing:
 - 1. Test proper polarity of all receptacles.
 - 2. Test ground continuity of all wiring devices.
 - 3. Test ground fault interrupting device operation.
- B. Visual and mechanical inspection:
 - 1. Check proper operation of all switches.
 - 2. Check indicating lights on all SPD receptacles.
 - 3. Visually inspect and replace damaged or defective devices.

3.05 CLEANING

- A. Clean interior of all boxes from dirt and paint prior to installation of devices.
- B. Clean wiring devices and coverplates from dirt and paint over spray.

END OF SECTION

SECTION 26 28 16

OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
1. Fuses.
 2. Molded case circuit breakers.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
1. Underwriters Laboratories, Inc. (UL):
 - UL 248(1-16); Low-Voltage Fuses.
 - UL 489; Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.
 - UL 512; Fuseholders.
 2. National Electrical Manufacturer Association (NEMA):
 - NEMA AB 1; Molded Case Circuit Breakers.

1.03 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 2. Describe product operation, equipment and dimensions and indicate features of each component.
 3. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 4. Provide factory certification of trip characteristics for each type and rating of circuit breaker.
 5. Provide current let-through and melting time information for each type and rating of fuses.
 6. Confirmation in writing of compliance with Arc Energy Reduction per CEC Articles 240.67 and 240.87.

7. Submit Manufacturer's installation instructions.
8. Complete bill of material listing all components.
9. Warranty.

1.04 OPERATION AND MAINTENANCE MANUAL

- A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:
 1. A detailed explanation of the operation of the system.
 2. Instructions for routine maintenance.
 3. Parts list and part numbers.
 4. Telephone numbers for authorized parts and service distributors.
 5. Final testing reports.

1.05 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Overcurrent Protective Device components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner.
- B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.
- C. Handling: Handle in accordance with Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.07 WARRANTY

- A. Units and components offered under this Section shall be covered by a **1**-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 1. Fuses:
 - a. Bussmann Division, Cooper Industries.

- b. Gould Shawmut Co.
- 2. Circuit breakers:
 - a. Square D.
 - b. ABB/ General Electric.
 - c. Eaton.
 - d. Siemens.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 GENERAL

- A. Overcurrent protective devices shall satisfy all CEC mandated selective coordination requirements (e.g. CEC Articles 517, 620, 645, 695, 700, 701, 708).
- B. Fuses rated 1200 amps or higher shall satisfy CEC Article 240.67 requirements.
- C. Circuit breakers rated (or can be adjusted) 1200amps or higher shall satisfy CEC Article 240.87 requirements.

2.03 FUSES

- A. General: All power fuses shall be time-delay, high interrupting (300K AIC), current limiting type, unless otherwise noted on the Drawings. All fuses shall be the product of a single Manufacturer and shall be selectively coordinated when applied in 2:1 ratio. Types of fuses shall be as follows:
 - 1. 0 to 600amps: UL Class J, dual element, time delay type fuse with separate overload and short-circuit elements. The fuse shall hold 500% of rated current for a minimum of 10-seconds.
- B. Control and instrument fuses shall be suitable for installing in blocks or fuseholders. Exact type and rating shall be as recommended by the Manufacturer of the equipment being protected.

2.04 MOLDED CASE CIRCUIT BREAKERS

- A. Branch and feeder circuit breakers shall be molded case, bolt on and trip indicating.
- B. Where stationary molded case circuit breakers are indicated on the Drawings to be current limiting type, they shall be current limiting as defined by UL 489 and shall not employ any fusible elements.
- C. Circuit breakers shall have interrupting capacity not less than that indicated on the Drawings or if not indicated, not less than 14,000 RMS symmetrical amps for 480volt systems and 10,000 RMS symmetrical amps for 208volt systems.
- D. Covers shall be sealed on non-interchangeable breakers and trip unit covers shall be sealed on interchangeable trip breakers to prevent tampering. Circuit breaker ratings shall be clearly visible after installation or engraved nameplates shall be provided stating the rating. All ferrous parts shall be plated to minimize corrosion.
- E. Circuit breakers shall be toggle, quick-make and quick-break operating mechanisms with trip-free feature to prevent contacts being held closed against overcurrent conditions in the circuit. Trip position of the breakers shall be clearly indicated by operating handles moving to a center position.
- F. Provide identified handle ties for single pole circuit breakers that share a neutral conductor.

- G. Multipole breakers shall have a single handle to open and close all contacts simultaneously in both manual operation and under automatic tripping. Interpole barriers shall be provided inside the breaker to prevent any phase-to-phase flashover. Each pole of the breaker shall have means for Arc extinguishing.
- H. All terminals shall be dual rated for aluminum or copper wire.
- I. Circuit breakers with frame ratings 100amps and smaller shall be ambient temperature compensated, thermal magnetic type unless otherwise noted. Breakers shall be of full size, 1" per pole type. Panels with more than one branch breaker larger than 100amps shall be installed in distribution type panels.
- J. Circuit breakers with frame ratings above 100amps through 400amps shall have solid state electronic trips with true RMS reading through the 13th harmonic with 1% accuracy, interchangeable trip via front accessible current plug, adjustable instantaneous and short time be rated as indicated on Drawings at the voltage indicated.
- K. Circuit breakers with frame ratings above 400amps through 2500amps shall have microprocessor-based RMS sensing trip units with the following characteristics:
 - 1. Interchangeable current rating plug or an adjustable trip setting to match the trip rating as indicated on Drawings.
 - 2. Adjustable long-time pick-up setting. Minimum of five settings from 50% to 100%.
 - 3. Adjustable long-time delay setting. Minimum of three delay bands.
 - 4. Adjustable short time pick-up setting. Minimum of five settings from 200% to 800%.
 - 5. Adjustable short-time delay setting. Minimum of three delay bands with I2t IN and OUT curves.
 - 6. Adjustable instantaneous pick-up setting. Minimum of five settings from 200% to 1000%. Where the instantaneous feature is omitted on the Drawings, the trip unit shall have an instantaneous override feature.
 - 7. Zone selective interlocking (ZSI) for short-time delay and ground-fault delay trip functions, if indicated on the drawings.
 - 8. LED status indication to show "health" of trip unit.
 - 9. Three-phase ammeter, if indicated on the drawings.
 - 10. Trip indication targets on overload, ground fault and short circuit, if indicated on the drawings.
- L. Accessories: Provide accessories as noted on the Drawings, i.e. shunt-trip, auxiliary contacts, undervoltage trip, alarm switch, etc.
- M. Spaces in the boards shall be able to accept any combination of 1, 2 or 3-pole circuit breakers as indicated. Provide all necessary bus, device supports, and mounting hardware sized for frame, not trip rating.
- N. Series rated breakers are not acceptable unless specifically noted on the Drawings.
- O. Breaker shall be rated to operate in an ambient temperature of 40-degrees C and at 100% of their frame ampere rating on a continuous basis, if indicated on the drawings.
- P. For circuit breakers rated or can be adjusted to 1200amps (or higher), provide zone selective interlocking (ZSI) with downstream protective devices, if indicated on the drawings. If ZSI is not

indicated on the drawings, provide a key interlock maintenance mode switch and blue LED indicating lamp in the same section, which shall allow an operator to manually enable temporary protective device maintenance settings to reduce the arc flash energy level. Key shall be held captive when maintenance mode signal is disabled and removable when maintenance mode signal is enabled. Maintenance mode switch positions shall be labeled "Enabled" and "Disabled". Blue indicating lamp shall be push-to-test type.

- Q. Refer to the Drawings for breakers requiring ground fault protection. See Section 262413: Switchboards for requirements of ground fault protection system.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of overcurrent protective device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 INSTALLATION

- A. Install overcurrent protective devices in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Tighten electrical connectors and terminals; including screws and bolts, in accordance with equipment Manufacturers published torque-tightening values for equipment connectors. Where Manufacturers torque requirements are not indicated tighten connectors and terminals to comply with tightening torque specified in UL Standard 486A.
- C. Install overcurrent protective devices and accessories in accordance with Manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. All devices shall be installed in accordance with applicable CEC and NEMA standards for installation.
- D. Circuit breakers serving "Fire Alarm Control Panel(s)" shall be red in color.

3.03 ATTIC STOCK

- A. Provide 1 set of spare fuses for every set installed.

3.04 FIELD QUALITY CONTROL

- A. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing, calibration and inspection required herein. Testing Agencies objectives shall be to:
1. Assure overcurrent protective device installation conforms to specified requirements and operates within specified tolerances.
 2. Field test and inspect to ensure operation in accordance with Manufacturer's recommendations and Specifications.
 3. Prepare final test report including results, observations, failures, adjustments, and remedies.
 4. Verify ratings and settings and make final adjustments.

- B. At least three weeks prior to any testing, notify the Engineer so that arrangement can be made for witnessing test, if deemed necessary. All pretesting shall have been tested satisfactorily prior to the Engineer's witnessed test.
- C. The Contractor shall supply a suitable and stable source of electrical power to each test site. The Testing Agency shall specify the specific power requirements.
- D. Testing of overcurrent protective devices shall be done only after all devices are installed and prior to system being energized.
- E. Prefunctional testing:
 - 1. Provide Testing Agency with Contract Documents and Manufacturer instructions for installation and testing.
 - 2. Visual and mechanical inspection:
 - a. Inspect for physical damage, defects alignment and fit.
 - b. Perform mechanical operational tests in accordance with Manufacturer's instructions.
 - c. Compare nameplate information and connections to Contract Documents.
 - d. Check tightness of all control and power connections.
 - e. Check that all covers, barriers, and doors are secure.
 - 3. Electrical tests:
 - a. Circuit continuity: All feeders shall be tested for continuity. All neutrals shall be tested for improper grounds.
 - b. Test all circuit breakers with frame size 225amps and larger in each panelboard, distribution board, switchboard, etc. unless otherwise noted via primary current injection testing. Testing shall verify the following:
 - 1) Determine that circuit breaker will trip under overcurrent conditions, with tripping time in conformance with NEMA AB 1 requirements.
 - 2) Circuit breaker pickup and delay measurements are within the manufacturers published tolerances for long time, short time, instantaneous, and ground fault.
 - 3) For circuit breakers rated or can be adjusted to 1200amps (or higher), confirm ZSI protection is acceptable or the maintenance mode switch is operational (enabled and disabled) with reduced pickup and delay measurements when enabled.
- F. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.
- G. Contractor shall submit the Testing Agency's final report for review prior to Project closeout and final acceptance by the Owner. Test report shall indicate test dates, devices tested, results, observation, deficiencies, and remedies. Test report shall be included in the operation and maintenance manuals.

3.05 ADJUSTING

- A. Adjust circuit breaker trip settings based on recommendations of Section 260060: Power System Study.

- B. Adjust circuit breaker trip settings for coordination with other overcurrent protective devices in system.
- C. Adjust circuit breaker trip settings for adequate protection from overcurrent and fault currents.

3.06 CLEANING

- A. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean overcurrent protective devices per Manufacturer's approved methods and materials. Remove paint splatters and other spots, dirt, and debris.

3.07 TRAINING

- A. Factory authorized service representative shall conduct a 4-hour training seminar for Owner's Representatives upon completion and acceptance of system. Instructions shall include safe operation, maintenance, and testing of equipment with both classroom training and hands-on instruction.
- B. Contractor shall schedule training with a minimum of 7-days advance notice.

END OF SECTION

SECTION 26 28 19

DISCONNECT SWITCHES

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Disconnect Switches.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated on specified:
 - 1. National Electrical Manufacturer Association (NEMA):
 - NEMA KS 1; Enclosed Switches.
 - 2. Underwriters Laboratories, Inc. (UL):
 - UL 512; Fuseholders.

1.03 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - 2. As a minimum the following characteristics shall be indicated:
 - a. NEMA types.
 - b. Current rating.
 - c. Number of poles.
 - d. Fuse provisions.
 - e. Enclosure dimensions.
 - f. Voltage.
 - g. Horsepower rating (if applicable).
 - h. Short circuit rating.
 - 3. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 - 4. Submit Manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Square D.
 - 2. ABB/ General Electric.
 - 3. Eaton.
 - 4. Siemens.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 DISCONNECT SWITCHES

- A. Description: Provide NEMA heavy-duty type switches with dead front construction and padlock provisions for up to three locks in the "OFF" position.
- B. Switch interior: Provide switch with switchblades that are fully visible in the "OFF" position when the door is open. Provide UL listed lugs for copper conductors, lugs to be front removable. Provide plated current carrying part.
- C. Switch mechanism: Provide switches with a quick-make, quick-break, position indicating, operating handle and mechanism and a dual cover interlock to prevent unauthorized opening of the switch door in the "ON" position or closing of the switch mechanism with the door open. Furnish an electrical interlock to de-energize control wiring when the disconnect switch is opened.
- D. Enclosures: Provide switches with hinged cover in NEMA 1 general purpose, sheet steel enclosure for dry locations and NEMA 3R weatherproof galvanized enclosures for exterior, damp, or wet locations, unless otherwise noted on the Drawings. Provide an enclosure treated with a rust-inhibiting phosphate primer and finished in gray baked enamel.
- E. Ratings: Provide switches that are horsepower rated for 240 VAC or 600volt AC as required for the circuit involved and that meet "I-SQUARED-T" requirements. Fusible switches to have provisions for the types of fuses specified in Section 262816: Overcurrent Protective Devices. UL listed short circuit rating, when equipped with fuses to be 200,000amps RMS symmetrical. Furnish with provisions for RK-1 fuses for switches up to 600amps. 800amp switches and larger to have provisions for Class L fuses.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Contractor shall thoroughly examine Project site conditions for acceptance of disconnects switch installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

- A. Coordinate locations of switches and equipment in the field to provide code required clearances in front of switches and to ensure that switches are insight of the controller as described in CEC Article 430.

3.03 INSTALLATION

- A. Install disconnect switches where indicated on the Drawings.
- B. Install fuses in fusible disconnect switches.
- C. Include construction channel and mounting hardware as required to support disconnect switch.

3.04 IDENTIFICATION

- A. Provide engraved, machine screw retained type 'NP' nameplate on each disconnect switch. See Section 260553: Electrical Identification.

3.05 CLEANING

- A. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean both the interior and exterior of enclosure of all construction debris, scrap wire, paint splatters, dirt, etc.

END OF SECTION

SECTION 26 43 13

SURGE PROTECTIVE DEVICES (SPD)

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Surge protective devices (SPD).
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified.
 - 1. American National Standards Institute, Inc. (ANSI)/Institute of Electrical and Electronics Engineers (IEEE):
 - ANSI/IEEE C62.1; Standard for Surge Arresters for Alternating Current Power Circuits.
 - ANSI/IEEE C62.11; Standard for Metal-Oxide Surge Arrestors for AC Power Circuits.
 - ANSI/IEEE C62.41.1; Guide on the Surges Environment in Low-Voltage (1000V and Less) AC Power Circuits.
 - ANSI/IEEE C62.41.2; Recommended Practices on Characterization of Surges in Low-Voltage (1000V and Less) AC Power Circuits.
 - ANSI/IEEE C62.45; Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000V and Less) AC Power Circuits.
 - 2. Underwriters Laboratory, Inc. (UL):
 - UL 50; Cabinets and Boxes.
 - UL 1283 Electromagnetic Interference Filters. [Type 2 only]
 - UL 1449; Surge Protective Devices, 4th Edition.
 - 3. National Electrical Manufacturers Association (NEMA):
 - NEMA PB 1.1; General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.

1.03 SYSTEM DESCRIPTION

- A. Provide surge protective device (SPD) equipment having the electrical characteristics, ratings, and modifications as specified herein and as shown on the drawings. To maximize performance and reliability and to obtain the lowest possible let-through voltages, the ac surge protection shall be integrated into all new electrical distribution equipment, including switchboards and panelboards.

- B. SPD units and all components shall be designed, manufactured, and tested in accordance with the latest applicable UL standard (ANSI/UL 1449 4th Edition).
- C. SPD units shall be furnished in two Types. Type 1 and Type 2 as outlined below:
 - 1. Type 1: Permanently connected SPDs installed on the line or load side of main disconnect device(s), at main switchboard. This type closely relates to the devices previously referred to as secondary surge arrestors. These Type 1 SPDs should be specially suited to conduct the high energy impulses from lightning strikes.
 - 2. Type 2: Permanently connected SPD installed on the load side of the service panel main disconnect device(s). This type most closely relates to devices that were previously classified as Transient Voltage Surge Suppression (TVSS). These Type 2 SPDs are especially suited for distribution boards and panelboard applications.

1.04 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - 2. Describe system operation, equipment and dimensions and indicate features of each component.
 - 3. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 - 4. Shop Drawings: Include elevations, cabinet dimensions, complete component listing and layout within cabinet, amperage ratings and capacities, system characteristics and wiring diagrams.
 - 5. Submit Manufacturer's installation instructions.
 - 6. Complete bill of material listing all components.
 - 7. Warranty.

1.05 OPERATION AND MAINTENANCE MANUAL

- A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following.
 - 1. A detailed explanation of the operation of the system.
 - 2. Instruments for routine maintenance.
 - 3. Pictorial parts list and parts number.
 - 4. Telephone numbers for authorized parts and service distributors.

1.06 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: SPD components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner.
- B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.
- C. Handling: Handle in accordance with the Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.08 WARRANTY

- A. Units and components offered under this Section shall be covered by a 5-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Schneider Electric/ Square D.
 - 2. ABB/ General Electric.
 - 3. Eaton.
 - 4. Siemens.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 GENERAL

- A. All Specification noted herein apply to the switchboard, and panelboard units, unless otherwise noted.
- B. The SPD system utilizes diversion modules to suppress and divert transient voltage and surge currents. The system is designed to provide protection for sensitive electronic devices against the effects of surges, transients, and electrical line noise.
- C. Environmental requirements:
 - 1. Operating temperature: -40-degree C to 60-degree C.
 - 2. Relative humidity: 0% to 95%.
 - 3. Operating altitude: 0 to 12,000-feet.
 - 4. Audible noise: Less than 35-dB.
- D. Electrical requirements:
 - 1. Unit operating voltage: The SPD system voltage shall be as indicated on the Drawings.

2. Maximum continuous operating voltage “MCOV”: The MVOC shall not be less than 125% of the nominal system operating voltage.
3. The suppression system shall incorporate thermally protected metal-oxide varistors “MOVs” as the core surge suppression component for the service entrance and all other distribution levels. The system shall not utilize silicon avalanche diodes, selenium cells, air gaps, or other components that may crowbar the system voltage leading to system upset or create any environmental hazards.
4. Protection modes: The SPD must protect all modes of the electrical system being utilized. The required protection modes are indicated by bullets in the following table:

PROTECTION MODES TABLE				
Configuration	L-N	L-G	L-L	N-G
WYE	●	●	●	●
Delta	N/A	●	●	N/A
Single Split Phase	●	●	●	●
High Leg Delta	●	●	●	●

5. Nominal discharge current (In): All SPDs applied to the distribution system shall have a 20kA In rating regardless of their SPD Type (includes Types 1 and 2) or operating voltage. SPDs having an in less than 20kA shall be rejected.
6. Voltage protection rating (VPR): The maximum ANSI/UL 1449 4th Edition VPR for the device shall not exceed the following:

VOLTAGE PROTECTION RATING TABLE				
System Voltage	L-N	L-G	L-L	N-G
120/208	700V	700V	1200V	700V
277/480	1200V	1200V	2000V	1200V
346/600	1500V	1500V	3000V	1500V

E. SPD design:

1. The SPD shall be maintenance free and shall not require any user intervention throughout its life. SPDs containing items such as replaceable modules, replaceable fuses, or replaceable batteries shall not be accepted. SPDs requiring any maintenance of any sort such as periodic tightening of connections shall not be accepted. SPDs requiring user intervention to test the unit via a diagnostic test kit or similar device shall not be accepted.
2. The surge current shall be equally distributed to all MOV components to ensure equal stressing and maximum performance. The surge suppression platform must provide equal impedance paths to each matched MOV.
3. Each unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be up to 50-dB from 10kHz to 100MHz using the MIL-STD-220A insertion loss test method.
4. No plug-in component modules or printed circuit boards shall be used as surge current conductors. All internal components shall be soldered, hardwired with connections utilizing low impedance conductors.
5. SPD shall provide the following integral monitoring options:

- a. Each unit shall have a green/red solid-state indicator light that reports the status of the protection on each phase:
 - 1) For WYE configured units, the indicator lights must report the status of all protection elements and circuitry in the L-N and L-G modes. WYE configured units shall also contain an additional green/red solid-state indicator light that reports the status of the protection elements and circuitry in the N-G mode.
 - 2) For delta configured units, the indicator lights must report the status of all protection elements and circuitry in the L-G and L-L modes.
 - 3) The absence of a green light and the presence of a red light shall indicate that damage has occurred on the respective phase or mode. All protection status indicators shall indicate the actual status of the protection on each phase or mode. If power is removed from any one phase, the indicator lights shall continue to indicate the status of the protection on all other phases and protection modes.
- b. The SPD must include Form C dry contacts (one NO and one NC) for remote annunciation of its status. Both the NO and NC contacts shall change state under any fault condition.
- c. The SPD shall contain an audible alarm that will be activated under any fault condition. There shall also be an audible alarm silence button used to silence the audible alarm after it has been activated.
- d. Surge counter:
 - 1) The SPD shall be equipped with an LCD display that indicates to the user how many surges have occurred at the location.
 - 2) The surge counter shall trigger each time a surge event with a peak current magnitude of a minimum of 50amps \pm 20amps occurs.
 - 3) A reset pushbutton shall also be standard, allowing the surge counter to be zeroed. The reset button shall contain a mechanism to prevent accidental resetting of the counter via a single, short-duration button press. In order to prevent accidental resetting, the surge counter reset button shall be depressed for a minimum of 2-seconds in order to clear the surge count total.
 - 4) The ongoing surge count shall be stored in non-volatile memory. If power to the SPD is completely interrupted, the ongoing count indicated on the surge counter's display prior to the interruption shall be stored in non-volatile memory and displayed after power is restored. The surge counter's memory shall not require a backup battery in order to achieve this functionality.
6. The unit shall contain thermally protected MOVs. These thermally protected MOVs shall have a thermal protection element packaged together with the MOV in order to achieve overcurrent protection of the MOV. The thermal protection element shall disconnect the MOV(s) from the system in a fail-safe manner should a condition occur that would cause them to enter a thermal runaway condition.
7. All the SPD's components and diagnostics shall be contained within one discrete assembly. SPDs or individual SPD modules that must be ganged together in order to achieve higher surge current ratings or other functionality shall not be accepted.

8. Safety requirements:

- a. The SPD shall minimize potential arc flash hazards by containing no user serviceable or replaceable parts and shall be maintenance free. SPDs requiring any maintenance of any sort such as periodic tightening of connections shall not be accepted. SPDs requiring user intervention to test the unit via a diagnostic test kit or similar device shall not be accepted.
- b. SPDs designed to interface with the electrical assembly via conductors shall require no user contact with the inside of the unit. Such units shall have any required conductors be factory installed.

2.03 SYSTEM APPLICATION

- A. The SPD applications covered under this section include switchboards panelboard assemblies. All SPDs shall be tested and demonstrate suitability for application within ANSI/IEEE C62.41 Category C, B, and A environments.
- B. The minimum surge current capacity the device is capable of withstanding shall be as shown in the following table:

MINIMUM SURGE CURRENT CAPACITY TABLE			
Category	Application	Per Phase	Per Mode
C	Service Entrance Locations (Switchboards)	250kA	125kA
B	High Exposure Roof Top Locations (Switchboards and Panelboards)	160kA	80kA
A	Branch Locations (Panelboards)	120kA	60kA

- C. All SPDs installed on the line side of the service entrance disconnect shall be Type 1 SPDs. All SPDs installed on the load side of the service entrance disconnect shall be Type 1 or Type 2 SPDs.

2.04 PANELBOARDS

- A. The SPD application covered under this section includes lighting and outlet panelboards. The SPD units shall be tested and demonstrate suitability for application within ANSI/IEEE C62.41 Category A or B environments.
- B. The SPD shall not limit the use of through-feed lugs, sub-feed lugs, and sub-feed breaker options.
- C. SPDs shall be installed immediately following the load side of the main breaker. SPDs installed in main lug only panelboards shall be installed immediately following the incoming main lugs.
- D. The panelboard shall be capable of re-energizing upon removal of the SPD.
- E. The SPD shall be interfaced to the panelboard via a direct bus bar connection.
- F. The SPD shall be included and mounted within the panelboard by the manufacturer of the panelboard.
- G. The SPD shall be of the same manufacturer as the panelboard.
- H. The complete panelboard including the SPD shall be UL67 listed.

2.05 SWITCHBOARDS

- A. The SPD application covered under this section is for switchboard locations. Service entrance located SPDs shall be tested and demonstrate suitability for application within ANSI/IEEE C62.41 Category C environments.

- B. The SPD shall be of the same manufacturer as the switchboard.
- C. The SPD shall be factory installed inside the switchboard at the assembly point by the original equipment manufacturer.
- D. Locate the SPD on the load side of the main disconnect device, as close as possible to the phase conductors and the ground/neutral bar.
- E. The SPD shall be connected through a disconnect (30A circuit breaker). The disconnect shall be located in immediate proximity to the SPD. Connection shall be made via bus, conductors, or other connections originating in the SPD and shall be kept as short as possible.
- F. The SPD shall be integral to switchboard as a factory standardized design.
- G. All monitoring and diagnostic features shall be visible from the front of the equipment.

2.06 ENCLOSURES

- A. All enclosed equipment shall have NEMA 1 general purpose enclosures, unless otherwise noted. Provide enclosures suitable for locations as indicated on the drawings and as described below:
 - 1. NEMA 1: Constructed of a polymer (units integrated within electrical assemblies), intended for indoor use to provide a degree of protection to personal access to hazardous parts and provide a degree of protection against the ingress of solid foreign objects (falling dirt).
 - 2. NEMA 4: Constructed of steel, intended for either indoor or outdoor use, to provide a degree of protection from the following:
 - a. Against access to hazardous parts.
 - b. Of equipment inside the enclosure against ingress of solid foreign objects (dirt and windblown dust).
 - c. With respect to the harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water).

2.07 SOURCE QUALITY CONTROL

- A. Standard factory tests shall be performed on the equipment under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of SPD installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 INSTALLATION

- A. Install SPD in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. As a minimum, provide SPDs on all service entrance switchboards, 120/208volt distribution switchboards and 120/208volt panelboards in compliance with CEC Article(s) 285, 620, 645, 670, 695, and 700.

- C. Conductors from the power source to the SPD shall be minimum #4 AWG copper in switchboards and #8 AWG copper in panelboards (when not direct bus connected). Conductors shall be routed without sharp bends and straight and short as possible. The absolute maximum of 7'-0" long for units in switchboards and 1'-0" long for units in panelboards.
- D. Conductors originating from direct bus bar connections shall be individually wrapped with electric tape in half-lapped increments for added protection of the un-protected conductors. Tie-wrap the conductors away from the bus bars without any sharp bends. All holes that the conductors pass through shall be grommets.
- E. Cabinets shall be anchored and braced to withstand seismic forces as calculated per Section 260010: Basic Electrical Requirements.

3.03 ATTIC STOCK

- A. For every SPD installed in panelboard or switchboard, a replacement SPD shall be provided for attic stock.

3.04 FIELD QUALITY CONTROL

- A. Prefunctional testing:
 - 1. Visual and mechanical inspection:
 - a. Inspect for physical damage, defects, alignment, and fit.
 - b. Compare nameplate information and connections to Contract Documents.
 - c. Check tightness of all control and power connections.
 - d. Prior to energization, verify source neutral is bonded to ground per CEC Articles 250.24(B), 250.28 and 250.30.

END OF SECTION

SECTION 26 50 00

LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Interior luminaires (lighting fixtures.)
 - 2. Exterior luminaires.
 - 3. Light-emitting diode (LED) assemblies.
 - 4. Drivers and transformers.
 - 5. Optical components; including diffusers, refractors, reflectors, and louvers.
 - 6. Unit battery equipment.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 03: Concrete; for cast-in place bases for lighting poles and bollards.
 - 3. Division 05: Metals; for fittings, brackets, backing supports, rods, etc. as required for support and bracing of luminaires.
 - 4. Division 09: Finishes; for ceilings, wall assemblies, acoustical treatment, and field painting of luminaires.

1.02 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and Standards except as otherwise indicated or specified:
 - 1. American National Standards Institute (ANSI):
 - ANSI/IEC 60529; American National Standard for Degrees of Protection Provided by Enclosures (IP Code)
 - C137.0 Lighting System Terms and Definitions.
 - C137.1 0-10V Dimming Interface for LED Drivers and Controls
 - 2. Underwriters Laboratories, Inc. (UL):
 - UL 66; Fixture Wire.
 - UL 102.3; Standard Method of Fire Test of Light Diffusers and Lenses.
 - UL 844; Luminaires for Use in Hazardous (Classified) Locations.
 - UL 924; Emergency Lighting and Power Equipment.

- | | |
|------------|--|
| UL924a; | Auxiliary Power Supplies (for generator-backed systems.) |
| UL 1574; | Track Lighting Systems. |
| UL 1598; | Luminaires. |
| UL 1598C; | Light-Emitting Diode Retrofit Luminaire Conversion Kits. |
| UL 1838; | Low Voltage Landscape Lighting Systems. |
| UL 1993; | Self-Ballasted Lamps and Lamp Adapters. |
| UL 2007A; | Shatter Containment of Lamps for Use in Regulated Food Establishments. |
| UL 2108; | Low Voltage Lighting Systems. |
| UL 2592; | Low Voltage LED Wire. |
| UL 5085-3; | Low Voltage Transformers: Class 2. |
| UL 8750; | Light Emitting Diode (LED) Equipment for Use in Lighting Products. |
| UL 8753; | Field-Replaceable Light Emitting Diode (LED) Light Engines. |
| UL 8754; | Holders, Bases, and Connectors for Solid-State (LED) Light Engines and Arrays. |
3. National Electrical Manufacturers Associations (NEMA):
- | | |
|--------|--|
| SSL-1; | Electronic Drivers for LED Devices, Arrays or Systems. |
| SSL-4; | Retrofit Lamps—Minimum Performance Requirements. |
| 77; | Temporal Light Artifacts: Test Methods and Guidance for Acceptance Criteria. |
| LE-4; | Recessed Luminaires, Ceiling Compatibility |
| 100; | Wire Insulation Colors for Lighting Systems |
4. Illuminating Engineering Society of North America (IESNA):
- | | |
|---------------|--|
| TM-15; | Luminaire Classification System for Outdoor Luminaires. |
| TM-21; | Projecting Long Term Lumen Maintenance of LED Light Sources. |
| TM-30; | Method for Evaluating Light Source Color Rendition. |
| TM-30-Annex E | Recommendations for Specifying Light Source Color Rendition |
| LM-79; | Electrical and Photometric Measurements of Solid-State Lighting Products. |
| LM-80; | Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules. |
| LM-84; | Measuring Luminous Flux and Color Maintenance of LED Lamps, Light Engines, and Luminaires. |
| LM-86; | Measuring Luminous Flux and Color Maintenance of Remote Phosphor Components |
5. Restriction of Hazardous Substances (RoHS):

RoHS 3; Directive 2015/863 - Cat 5. Lighting: lamps, luminaires, light bulbs.

1.03 SYSTEM DESCRIPTION

- A. Provide and install a fully functional and operating lighting system as indicated, complete with light engines, lamps, wiring, and securely attached to support system to meet all seismic code requirements.
- B. Where catalog number and narrative or pictorial descriptions are provided, the written description shall take precedence and prevail.

1.04 SUBSTITUTIONS

- A. Refer to Section 260010: Basic Electrical Requirements for specific Equipment requirements.
- B. Items specified under this Section and Luminaire Schedule are subject to the requirements, with the following qualifications:
 - 1. Items solely specified by Manufacturer name and catalog number, without qualifiers: Provide as specified – No Substitutions.
 - 2. Items specified by multiple Manufacturers, without qualifiers: Provide any listed manufacturer – No Substitutions.
 - 3. Items specified by sole or multiple Manufacturers, followed by “Or Approved Equal” or “Or Approved Equivalent”: Conform to substitution requirements outlined for Equipment.
 - 4. Items specified by sole or multiple Manufacturers, followed by “Or Equal” or “Or Equivalent”:
Products that meet the salient requirements are acceptable to provide.
 - a. Equivalency is at the sole judgement of the Architect and Engineer.
 - b. Should a submitted, unspecified product fail to meet the requirements of Equivalency, provide specified products at no additional cost to the Owner.
- C. Equivalency shall be determined by review of the following luminaire characteristics where applicable. Lack of pertinent data on any characteristic shall constitute justification for rejection of the submittal or substitution.
 - 1. Performance:
 - a. Distribution.
 - b. Utilization.
 - c. Luminance distribution (Average brightness / maximum brightness.)
 - d. Spacing to mounting height ratio.
 - e. Overall luminaire efficiency.
 - 2. Construction:
 - a. Engineering.
 - b. Workmanship.
 - c. Rigidity.
 - d. Permanence of materials and finishes.
 - 3. Installation Ease:

- a. Captive parts and captive hardware.
- b. Provision for leveling.
- c. Through-wiring ease.
- 4. Maintenance:
 - a. Ease of relamping / replacement of LED array.
 - b. Ease of replacement of driver/ballast and lamp sockets.
- 5. Appearance:
 - a. Architectural integration.
 - b. Light tightness.
 - c. Styling.
 - d. Conformance with design intent.
 - e. When requested, furnish a working sample complete with housing, trim, 8' cord and plug, and specified lamp.

1.05 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Complete bill of material listing (index) of all luminaires. Index shall be organized in the same sequence as the Luminaire Schedule (alphabetical.) Include in the index:
 - a. Type per the Luminaire Schedule.
 - b. Manufacturer.
 - c. Complete catalog number, including all accessories and appurtenances required for the installation.
 - d. Voltage.
 - e. Poles, arms, and brackets, if applicable.
 - f. Lamping, if applicable.
 - 2. Manufacturer's data sheets/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - a. Identify luminaire type on each sheet.
 - b. Clearly mark on each data sheet the specific item(s) being submitted. Obfuscate or otherwise delete options on data sheets that are not provided.
 - 3. Driver or transformer and/or lamp data sheets as applicable to submitted item.
 - 4. Manufacturer's installation instructions.
 - 5. Warranty.
 - 6. U.L. labeling information.
 - 7. Photometric Reports consisting of:

- a. Independent Testing Laboratories, Inc. or equal, photometric test report for each luminaire listed on the Luminaire Schedule. Test reports shall be based on Illuminating Engineering Society published test procedures and shall contain candlepower distribution curves in five lateral planes for luminaires with asymmetric distributions and luminance data for vertical angles above 45 degrees from nadir.
 - b. Coefficient of utilization table.
 - c. Zonal lumen summary including overall luminaire efficiency.
8. Shop Drawings:
- a. Where noted in the Luminaire Schedule, submit Shop Drawings from Manufacturer detailing modified or custom luminaires indicating dimensions, weights, methods of field assembly, components, features, accessories, methods of support, etc.
9. Mock-ups: Provide mock-up luminaire samples where "MOCK-UP" is indicated in the Luminaire Schedule. Refer to Part 3 – Execution for requirements.

1.06 OPERATION AND MAINTENANCE MANUAL

- A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:
1. An updated index per 1.05-A.
 2. One complete set of final submittals of actual product installed, including product data and shop drawings.
 3. Instructions for routine maintenance.
 4. Pictorial parts list and parts number.
 5. Telephone numbers for authorized parts and service distributors.

1.07 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Luminaires shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner.
- B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.
- C. Handling: Handle in accordance with Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.09 WARRANTY

- A. Units and components offered under this Section shall be covered by a **1**-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Luminaires, Poles, and Exit Signs: as listed in the Luminaire Schedule.
 - 2. Light-Emitting Diode (LED) Arrays:
 - a. LEDs provided by Luminaire Manufacturer listed in the Luminaire Schedule: meeting the technical and warranty requirements of this Section.
 - 3. LED drivers (DC output):
 - a. Drivers provided by Luminaire Manufacturer listed in the Luminaire Schedule: meeting the technical and warranty requirements of this Section.
 - 4. Unit battery equipment:
 - a. Unit battery equipment provided by Luminaire Manufacturers listed in the Luminaire Schedule: meeting the technical and warranty requirements of this Section.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 GENERAL

- A. Luminaires new and complete with mounting accessories, junction boxes, trims, and lamps.
- B. Luminaire assemblies U.L. listed appropriate to mounting conditions and application. All labels affixed to the luminaire shall be in a location not visible from normal viewing angles.
- C. Each luminaire family type (downlights, etc.) supplied by only one manufacturer.
- D. Recessed luminaires installed in fire rated ceilings and using a fire rated protective cover shall be thermally protected for this application and shall carry a fire rated listing.
- E. Luminaires installed under canopies, roofs or open areas and similar damp or wet locations shall be UL listed and labeled as suitable for damp or wet locations.
- F. Luminaires shall bear the IP rating appropriate for the application.
- G. Luminaires shall be free of light leaks and shall be designed to provide sufficient ventilation of light engines, including ventilation holes where required.

2.03 LUMINAIRE CONSTRUCTION

- A. All sheet metal Work shall be free from tool marks and dents and shall have accurate angles bent as sharp as compatible with the gauges of the required metal. 20-gauge (0.7-mm or 0.027-inch) minimum.
 - 1. Finish: Baked white dry polyester powder, unless otherwise specified, with a minimum average reflectance of 85% on all exposed and light reflecting surfaces. Steel components shall be prepared for finishing with a 5-step zinc phosphating process prior to painting.

2. Luminaire (including all painted component parts) shall be painted after fabrication unless specifically noted in the Luminaire Schedule.
 - B. Extruded Aluminum Housings: One-piece housing of AA 6063 T5 extruded aluminum with 0.14 minimum thickness smooth and free of tooling lines in one uninterrupted section of 1-foot to 24-foot with the cross sectional dimensions as indicated in the Luminaire Schedule.
 - C. Die-Cast Aluminum Housings:
 1. Single-piece casting to ensure water tightness.
 2. Low copper (<0.7% Cu) aluminum alloy.
 3. Minimum Class 4 Consumer Grade per NADCA Standards.
 - D. All surfaces shall be cleaned and dressed to eliminate all exposed sharp edges or burrs.
 - E. All intersections and joints shall be formed true and of adequate strength and structural rigidity to prevent any distortion after assembly.
 - F. End Plates: Die cast end plates shall be mechanically attached without exposed fasteners. End caps shall be minimum 0.125" thick.
 - G. All mitered corners or joints shall be accurately aligned with abutting intersecting members. Sheet metal Work shall be properly fabricated so that planes will not deform (i.e. become concave or convex) due to normal expected ambient and operating conditions.
 - H. Ferrous mounting hardware and accessories shall be finished using either a galvanic or phosphate primer/baked enamel process to prevent corrosion and discoloration of adjacent materials.
 - I. Fasteners shall be manufactured of galvanized steel.
 - J. Adjustable Lamp Mechanisms: To have aiming stops which can be permanently set to position lamp vertically and rotationally.
 - K. Recessed luminaires: Equip with through-wire junction box. Box, driver, and replaceable components shall be accessible from the ceiling opening of the luminaire.
 - L. Finish:
 1. All exposed aluminum surfaces shall be treated with an acid wash and clear water rinse prior to painting. The luminaire shall then be electrostatically painted, or powder coated, and oven baked in the color indicated in the Luminaire Schedule.
 2. All exposed steel surfaces shall be treated with an acid wash and clear water rinse, then prime coated. The luminaire shall then be electrostatically painted, or powder coated, and oven baked in the color indicated in the Luminaire Schedule.
 - M. Door Frames for lensed luminaires: White painted, flat aluminum with mitered corners.
- 2.04 LED ARRAYS
- A. Minimum lumen maintenance per LM-80 measurements and TM-21 calculations: L90 at 60,000 hours.
 - B. Maximum burnout: B90 at 200,000-hours.
 - C. Free of mercury and toxic materials; RoHS compliant.

D. Linear LED boards: LED pitch shall be consistent throughout the luminaire and shall remain consistent from the end of one board to the start of the next. LED pitch shall be the same from the endcap of the luminaire to the last LED on the board as the LED pitch throughout the luminaire. Luminaire shall have a continuous luminous appearance – bright or dark spots are not acceptable.

E. White LEDs:

1. Interior

- a. Correlated Color Temperature (CCT): 4000K
- b. Minimum efficacy: 75 lumens per watt.
- c. L70 lifetime: minimum 80,000-hours (extrapolated.)
- d. Correlated Color Temperature (CCT); as specified in Luminaire Schedule. Maximum 3-step MacAdam ellipse variation throughout listed life (L70).
- e. Color Rendering Index (CRI); minimum 80 Ra.
- f. R9 value; minimum 30.
- g. TM30 values; $R_f > 75$, $92 > R_g > 110$.

2. Exterior

- a. Correlated Color Temperature (CCT): 4000K
- b. Minimum efficacy: 100 lumens per watt.
- c. L70 lifetime: minimum 100,000-hours (extrapolated.)
- d. Correlated Color Temperature (CCT); as specified in Luminaire Schedule. Maximum 4-step MacAdam ellipse variation throughout listed life (L70).
- e. Color Rendering Index (CRI); minimum 70 Ra.
- f. R9 value; minimum 20.
- g. TM30 values; $R_f > 70$, $80 > R_g > 120$.

2.05 LED DRIVERS:

A. LED drivers shall be integral to luminaire housing or remotely located, when specified, within 15 feet of diode assembly.

1. Luminaires shall be provided with the UL listed or equivalent driver and low voltage power supply as recommended by Manufacturer to insure proper and consistent lamp and luminaire performance. The number of LEDs per luminaire per power supply shall not be exceeded, and LEDs shall not be wired to a high capacity driver unless recommended by Manufacturer.
2. Light Emitting Diode (LED) control gears shall operate with sustained variations of +/- 10% in voltage and frequency without damage to the driver and have a power factor not less than 90%. Regulations: +/-5% across the listed load range.
3. Driver input current shall have Total Harmonic Distortion (THD) of less than 20%. The Driver shall have a Class A sound rating unless otherwise specified.
4. Control gear shall be rated for 50-degree C ambient temperature.

5. All control gear shall facilitate smooth, flicker-free dimming from 100% to 10%, 1% or 0.1% as noted on the Luminaire Schedule.

2.06 UNIT BATTERY EQUIPMENT

A. LED Emergency Power Supplies

1. Standard Features:
 - a. Safety compliance to UL 924; CAN/CSAC22.2 No.141-10 and NFPA requirements for 90-minute egress
 - b. Open circuit / short circuit protection
 - c. Operating temperature: 32-degree F/0-degree C to 122-degree F/50-degree C
2. Test switch / charging indicator light
3. Emergency reaction time < 1-sec
4. Powder-coat steel, stainless or galvanized case
5. Field-replaceable NiCd battery pack (x2) with quick connect
6. Min. lead wire length: 6in UL 1452 solid / #18 AWG 1000volt / 90-degree C

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of luminaire installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

- A. Architectural Plans shall govern exact ceiling construction and mounting conditions for all luminaires. Locate as shown on the architectural elevations and reflected ceiling plan.
- B. Consult Architectural Drawings for details of ceiling construction, finish, and other applicable details.
- C. Contractor shall be responsible for coordination of luminaire mounting and compatibility with ceiling construction.
- D. Luminaires in areas where exposed or concealed pipe and ductwork prevents direct access to the structural ceiling shall be provided with appropriate support system to install luminaire below obstructions to avoid conflicts with same.

3.03 ARCHITECTURAL COORDINATION

- A. Where luminaires are mounted in architectural coves, soffits, valances, or cabinets and are given an overall length, the Contractor shall verify all lengths in the field prior to releasing order.
- B. Where luminaires are surface mounted or suspended to match the length of walls or other architectural elements, the Contractor shall verify all lengths in the field prior to releasing order.
- C. Mounting heights specified on drawings:
 1. Wall mounted luminaires: shall be to centerline of luminaire.
 2. Pendant mounted luminaires: shall be to bottom of luminaire unless specifically identified in the Luminaire Schedule or on drawings.

3.04 INSTALLATION

- A. Install luminaires in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Contractor shall be responsible for all supports, hangers, and hardware necessary for a complete installation.
- C. Luminaires shall be plumb, level, square, in straight lines and without distortion.
- D. Remedy light leaks that may develop after installation of recessed or enclosed luminaires.
- E. Adjustable luminaires shall be installed with "dead" zone of rotation away from intended aiming point.

3.05 LUMINAIRE SUPPORTS

- A. Physical (gravity) supports:
 - 1. Recessed luminaires in wood framed ceilings shall be supported by 2" x 4" hangers fastened to adjacent ceiling joists.
 - 2. Recessed downlights in wood frame ceilings shall be supported with Manufacturers supplied bar hangers and shall be installed according to the Manufacturer's instructions.
 - 3. Surface mounted luminaires solely supported by recessed boxes in a gypsum board ceiling shall have a 1-1/8" steel bar screwed or welded to the back of the box. This steel bar must be long enough to span two ceiling support channels and shall be attached to the channels by twisting wire around the bar and the support channel. For luminaires weighing over 50-pounds, provide studs in recessed box.
 - 4. Support surface mounted luminaires more than 18" wide at or near each corner or edge, in addition to support from outlet box.
 - 5. Support recessed downlights manufactured with built-in brackets by twisting wire around the bracket and two adjacent ceiling support channel runners on either side of the luminaire.
 - 6. Support outlet boxes as specified in Section 260533: Boxes. Provide all boxes with grounding pigtail.
 - 7. On concrete ceilings, use one of the following for supporting luminaires other than by outlet box:
 - a. Preset concrete inserts, provided inserts are completely covered by the luminaire after installation.
 - b. 1/4-20 threaded appropriate length wedge type anchor.
- B. Seismic supports:
 - 1. Recessed luminaires in suspended ceilings shall be supported by connecting two support wires to the luminaire at diagonal opposite corners for luminaires weighing 56 pounds or less. Connect four wires, one at each corner for luminaires weighing more than 56 pounds.
 - 2. Surface mounted luminaires on suspended ceilings shall be attached to the main ceiling runner with at least two positive clamping devices and shall have an additional support wire attached to each clamping device and to the structure above.

3. Recessed downlight luminaires in suspended ceilings shall be supported by connecting one support wire to the luminaire housing.

3.06 IDENTIFICATION SYSTEM

- A. All concealed junction box cover plates for the lighting branch circuit system shall be clearly marked with a permanent black ink felt pen identifying the branch circuit (both panel designation and circuit number) contained in the box.

3.07 FIELD QUALITY CONTROL

- A. Visual and mechanical inspection:
 1. Inspect for physical damage, defects, alignment and fit.
 2. Perform operational test of each luminaire after installed, circuited, and energized.
 3. Perform emergency operational test of all luminaires connected to emergency circuiting by simulating normal power source failure.
- B. Contractor shall replace at no cost to the Owner all equipment which is found defective or do not operate within factory specified tolerances.

3.08 ADJUSTING AND AIMING

- A. Aiming will occur at night under the direction of the Owner's Representative and the Architect or Engineer. The Contractor shall be responsible for providing the labor and materials for field aiming. This shall include, but not limited to, special rigging or scaffolding, adjusting luminaires in field, testing of various lenses or louvers, as directed by the Architect or Engineer.
- B. Aim all directional luminaires, including but not limited to luminaires described in the Contract Documents or by the luminaire manufacturer as "aimable," "adjustable," or "asymmetric" as follows:
 1. To provide the lighting pattern for which the luminaire is designed.
 2. To provide the lighting pattern as shown on the drawings.
 3. To predetermined aiming points as shown on the drawings.
 4. Where aiming cannot be determined, request, in writing, clarification from the Specifier, indicating luminaires needing clarification.
- C. Re-aim luminaires as determined by Architect during final project walkthrough.

3.09 CLEANING

- A. Clean luminaires prior to Project closeout in accordance with Manufacturer's recommended materials and methods.
- B. Remove all debris, fingerprints, and packaging remnants.

END OF SECTION

SECTION 27 00 00
COMMUNICATIONS BASIC REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies the common administration basic requirements and common methods for all low voltage systems installation work included under Division 27 and 28 and where those requirements differ from the requirements of this section, the more stringent shall govern.

1.02 STANDARDS, REGULATIONS, AND CODES REFERENCES

- A. The following Standards, Regulations and Codes apply to work specified in the Contract Documents.
1. Applicable State and Local Codes.
 2. California Building Code and California Electrical Code, Current Editions.
 3. BICSI TDMM (Telecommunications Distribution Methods Manual), 11th Edition 2006.
 4. ANSI/TIA/EIA-568-B.1. Commercial Building Telecommunications Cabling Standard,
 5. ANSI/TIA/EIA-568-B.1-2. Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements, Addendum 2, Grounding and Bonding Specifications for Screened Balanced Twisted-Pair Horizontal Cabling.
 6. ANSI/TIA/EIA-568-B.1-3. Commercial Building Telecommunications Cabling Standard.
 7. ANSI/TIA/EIA-568-B.1-4. Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements, Addendum 4, Recognition of Category 6 and Category Cat 6A and 50 nm Laser-Optimized 50/125 um Multimode Optical Fiber Cabling.
 8. ANSI/TIA/EIA-568-B.1-2. Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.
 9. ANSI/TIA/EIA-568-B.2-1. Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components, Addendum 1, Transmission Performance Specifications for 4-Pair 100 Ohm Category 6 Cabling.
 10. ANSI/TIA/EIA-568-B.2-10 (draft 2.0). Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components, Addendum 10, Transmission Performance Specifications for 4-Pair 100 Ohm Augmented Category 6 Cabling.
 11. ANSI/TIA/EIA-568-B3.3 Optical Fiber Cabling Components Standard.
 12. TIA-569-B. Commercial Building Standard for Telecommunications Pathways and Spaces.
 13. ANSI/TIA/EIA-606-A. Administration Standard for Commercial Telecommunications Infrastructure.
 14. ANSI/TIA/EIA-607-A. Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.

15. TIA/EIA TSB-67 Transmission Performance Specifications for Field Testing of Unshielded Twisted-Pair Cabling Systems.

16. TIA/EIA TSB-72 Centralized Optical Fiber Cabling Guidelines.

1.03 DEFINITIONS

A. The following is a list of abbreviations generally used in Divisions 27 & 28:

1. ADA - Americans with Disabilities Act
2. AHJ - Authority Having Jurisdiction
3. ANSI - American National Standards Institute
4. APWA - American Public Works Association
5. ASTM - American Society for Testing and Materials
6. CBC - California Building Code
7. CEC - California Electrical Code
8. CFC - California Fire Code
9. FCC - Federal Communications Commission
10. HVAC - Heating, Ventilating and Air Conditioning
11. IEC - International Electro-technical Commission
12. IEEE - Institute of Electrical and Electronics Engineers.
13. IETA - International Electrical Testing Association
14. FM - FM Global
15. NEMA - National Electrical Manufacturers Association
16. NFPA - National Fire Protection Association
17. OSHA - Occupational Safety and Health Administration
18. UL - Underwriters Laboratories Inc.

B. Provide: To furnish and install, complete and ready for the intended use.

C. Furnish: Supply and deliver to the project site, ready for unpacking, assembly, and installation.

D. Install: Includes unloading, unpacking, assembling, erecting, installing, applying, finishing, protecting, cleaning and similar operations at the project site to complete items of work furnished by others.

E. Following is a list of commonly used terms in Division 27:

1. Active Equipment: Electronic equipment used to develop various WAN and LAN services.
2. Backbone: Collective term sometimes used to describe the campus and vertical distribution subsystem facilities and media interconnecting service entrances, communications rooms, and communications cabinets.
3. Bonding: Permanent joining of metallic parts to form an electrically conductive path which will assure electrical continuity and the capacity to safely conduct currents likely to be imposed on it.
4. Cabinet: Wall-mounted modular enclosure designed to house and protect electronic equipment.

5. Cable Tray: Vertical or horizontal open supports, usually made of aluminum or steel, that are fastened to a building ceiling or wall. Cables are laid in and fastened to the trays. A cable tray is not a raceway.
6. Campus: Grounds and buildings of a multi-building premises environment.
7. Channel: The end-to-end transmission path between two points at which application specific equipment is connected; may include one or more links, cross-connect jumper and/or patch cords, and work area station cords. Does not include connection to active equipment.
8. Cross-Connect: Equipment used to terminate and tie together communications circuits.
9. Cross-Connect Jumper: A cluster of twisted-pair conductors without connectors used to establish a circuit by linking two cross-connect termination points.
10. Fiber Optic Distribution Unit (FDU): Cabinet with terminating equipment used to develop fiber optic cross-connect facilities. Also known as LIU.
11. Grounding: a conducting connection to earth, or to some conducting body that serves in place of earth.
12. Hinged Cover Enclosure: Wall-mounted box with a hinged cover that is used to house and protect electrical devices.
13. Horizontal: Pathway facilities and media connecting the MDF or IDF to Telecommunications Outlets.
14. Intermediate Distribution Frame (IDF): Data networking equipment rack and/or location that serves an individual area, floor or building. Downstream from the MDF.
15. Jack: Receptacle used in conjunction with a plug to make electrical contact between communications circuits, e.g., eight-position/eight-contact modular jacks.
16. Link: A transmission path between two points, not including terminal equipment, work area cables, and equipment cables; one continuous section of conductors or fiber, including the connecting hardware at each end.
17. Local Area Network (LAN): Data transmission facility connecting several communicating devices, typically Ethernet and the network is limited to a single campus.
18. Main Distribution Frame (MDF): Initial (main) data network equipment rack and/or location. Only one MDF occurs per site and may serve many downstream IDFs.
19. Media: The type of cable (e.g., twisted-pair, coaxial, or fiber optic) used to provide signal transmission paths.
20. Minimum Point of Entry (MPOE): The location where the service provider hands off connection and responsibility for service to on premise customer owned equipment.
21. Modular plug: An eight-position, eight-conductor end-of-wire electrical connector used with Category rated cable.
22. Passive Equipment: Non-electronic hardware and apparatus, e.g., equipment racks, cable trays, electrical protection, wiring blocks, FDUs, etc.
23. Patch Cord: A length of copper or fiber cable with connectors on both ends used to join communications circuits at MDF/IDF and end stations.
24. Patch Panel: System of terminal blocks or connectors used with patch cords that facilitate the administration of cross-connect fields.

- 25. Pathway: Facility for the placement of communications cable. A pathway facility can be composed of several components including conduit, wireway, cable tray, surface raceway, underfloor systems, raised floor, ceiling support wires, etc.
- 26. Protectors: Electrical protection devices used to limit foreign voltages on metallic communications circuits.
- 27. Raceway: An enclosed channel designed expressly for holding wires or cables; may either be conductive metal or insulating plastic. The term includes conduit, tubing, wireway, underfloor raceway, and surface raceway; does not include cable tray.
- 28. Rack: An open or enclosed structure, typically made of aluminum or steel, used to mount equipment; usually referred to as an equipment rack. May be freestanding and floor mounted or a wall mounted cabinet. Industry standard 19" width spacing.
- 29. Wiring Block: Punch down terminating equipment used to develop twisted pair cross-connect facilities.

1.04 PRODUCT AVAILABILITY

- A. Products with long lead times are to be brought to the attention of the project manager.

1.05 PRODUCT SUBMITTALS

- A. See Division 01 Submittals for more requirements

1.06 SUBSTITUTION LIMITATIONS

- A. Equivalent product(s) may be considered for substitution for those products specified, however, the equivalent product(s) must be approved, and show demonstrated and documented equivalence to the product(s) specified. Documentation includes but is not limited to product samples, data sheets, and actual test data. The request for product substitution, and supporting documentation, must be submitted, in writing to the Project Manager/Designer.
- B. See Division 01 Substitutions for more requirements

1.07 QUALITY ASSURANCE

- A. Conform to requirements of the CEC, latest adopted version with amendments by local AHJs.
- B. Conform to the latest adopted version of the CBC with amendments by local AHJs.
- C. Obtain and pay for electrical permits, plan review, and inspections from local AHJs.
- D. Furnish products listed by UL or other testing firm acceptable to AHJ.

- E. Conform to requirements of the serving electric, telephone, broadband and cable television utilities.
- F. Contractor Qualifications:
 - 1. Minimum of five years' experience in the design, installation, testing, and maintenance of low-voltage systems.
 - 2. Maintain a local service facility which stocks spare devices and/or components for servicing systems.
 - 3. Have performed successful installation and maintenance of at least three projects similar in scope and size. Be able to provide project references for these three projects, including scope of Work, project type, owner/user contact name and telephone number.
 - 4. The contractor selected for this project must be certified by the manufacturer of the products and utilize these components for completion of work.
 - 5. Holds and maintains a valid California C-7 or C-10 State Contractors License and can exhibit validity upon request.
 - 6. A list of test equipment proposed for use in verifying the installed integrity of copper and fiber optic cable systems used.
 - 7. A technical resume of experience for the contractor's Project Manager and on-site installation supervisor who will be assigned to this project.
 - 8. A list of technical product training attended by the contractor's personnel that will install the specified manufacturer system.
 - 9. List of Sub-Contractor(s) who will assist the contractor in the performance of this work.

1.08 SEQUENCING AND SCHEDULING

- A. For the proper execution of the work, cooperate with other tradecrafts and contracts as needed.
- B. To avoid installation conflicts, thoroughly examine the complete set of Contract Documents. Resolve conflicts with Project Manager/Designer prior to installation.
- C. Prior to installation of communications cable to equipment requiring connections, examine the manufacturer's shop drawings, wiring diagrams, product data, and installation instructions. Verify that the electrical characteristics detailed in the Contract Documents are consistent with the electrical characteristics of the actual equipment being installed. When inconsistencies occur request clarification from Project Manager/Designer.

1.09 SHOP DRAWINGS

- A. Shop Drawings: When required by individual Specification Sections, provide shop drawings which include physical characteristics, electrical characteristics, device layout plans, point-

to-point wiring diagrams for all connections, and the like. Refer to individual Specification Sections for additional requirements for the shop drawings.

1.10 WARRANTY

- A. Provide an extended manufacturer's warranty on the Backbone and Horizontal Communications systems as specified in other sections of Division 27.

1.11 CLOSE OUT DOCUMENTS

- A. Final coordination drawings, with as-built information added, are to be submitted as record drawings at completion of project.
- B. Record Drawings:
 - 1. Show changes and deviations from the Construction Drawings. Include written Addendum and change order items.
 - 2. Show exact routes of pathway facilities and service entrance conduits.
 - 3. Show the exact location of racks, cabinets, mounting frames and the like.
- C. Operation and Maintenance Documentation: Provide copies of certificates of code authority acceptance, product data, guarantees, warranties, installation guides, maintenance guides and the like.
- D. Inspection and/or testing: Submit testing reports for testing that was performed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide like items from one manufacturer, such as wire/cable, jacks, modular plugs, patch panels, equipment connection cords, wall plates, and the like. See individual sections for detailed information.

2.02 MATERIALS

- A. Provide new electrical materials of the type and quality detailed, listed by UL, bearing their label wherever standards have been established. Indicated brand names and catalog numbers are used to establish standards of performance and quality.
- B. Provide material and equipment that is acceptable to AHJ as suitable for the use indicated. For example, provide plenum rated cable in ceilings that are utilized as air return plenums.
- C. Include special features, finishes, accessories, and other requirements as described in the Contract Documents regardless of the item's listed catalog number.
- D. Provide incidentals not specifically mentioned herein or noted on Drawings, but needed to complete the system, in a safe and satisfactory working condition.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Construction Documents:

1. Drawings are diagrammatic with symbols representing communications equipment, outlets, and wiring.
2. Electrical symbols indicating wiring and equipment shown in the Contract Documents are included in the Contract unless specifically noted otherwise.
3. Examine the entire set of Drawings to avoid conflicts with other systems. Determine exact route and installation of communications wiring and equipment with conditions of construction.

3.02 INSTALLATION

- A. Install communications equipment completely as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of the communications equipment, examine the instructions thoroughly. When requirements of the installation instructions conflict with the Contract Documents, request clarification from Project Manager/Designer prior to proceeding with the installation.
- B. Do not install communications equipment in obvious passages, doorways, scuttles, or crawl spaces which would impede or block the passage's intended usage.
- C. Do not install communications equipment in locations where it would obviously be subject to damage during normal usage.

3.03 FIELD QUALITY CONTROL

- A. Tests: Conduct tests of equipment and systems to demonstrate compliance with requirements specified in Division 27 & 28. Refer to individual Specification Sections for required tests. Document tests and include in Closeout Documents.

3.04 CLEANING

- A. Remove dirt and debris caused by the execution of the communications work.
- B. Leave the entire communications system installed under this Contract in a clean, dust-free, and proper working order.
- C. Vacuum clean interiors of new and modified electrical signal and communication equipment enclosures.

END OF SECTION

SECTION 27 05 00
COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section specifies the basic materials and methods for all low voltage pathways installation work included under Division 27 and 28 and where those requirements differ from the requirements of this section, the more stringent shall govern.
- B. This section adds refinements to Division 26 that apply to Communications and extra-low-voltage systems.

1.02 SCOPE

- A. Materials and/or methods for the following.
 - 1. Communication services
 - 2. Grounding
 - 3. Fasteners
 - 4. Hangers and supports
 - 5. Conduits/Backboxes/Raceways
 - 6. Underground
 - 7. Sleeves and penetrations

1.03 SUBMITTALS

- A. Submittals shall be done in accordance with District submittal procedures, see Division 01 Submittals for requirements.

1.04 RELATED REQUIREMENTS

- A. Division 07 – Thermal and Moisture Protection
- B. Division 26 – Electrical
- C. 27 00 00 – Communications Basic Requirements

1.05 REFERENCES

- A. ANSI American Nation Standards Institute

B. NFPA 70 – National Electrical Code

C. UL Underwriters Laboratory

D. California Building Code (CBC)

E. California Electrical Code (CEC)

1.06 WARRANTY

A. Refer to Division 01 -- Warranties

PART 2 – PRODUCTS

2.01 All products used on this project shall bear the label and be approved by Underwriters Laboratories unless otherwise approved in writing by District.

2.02 FASTENERS

A. Mounting hardware and anchors recommended by the manufacturer of any material that shall be mounted to the building or structure.

1. Sheet rock / drywall / wall board: Easy Anchor, toggle bolt, other spread type anchor with load distribution, or approved equal.
2. Concrete / cinder block / solid masonry: Expanding compression type lag, expanding compression type bolt, expanding compression type, all-thread with nuts, or approved equal.
3. Tile / Stucco / hollow masonry: Toggle bolts or approved equal.
4. Wood: Lag screws, wood screws, or approved equal.
5. Metal: Beam clamps, sheet metal screws, self-drilling screws or approved equal.

2.03 HANGERS AND SUPPORT

A. D-RINGS

1. Commercial grade

B. J-HOOKS

1. Commercial grade

2.04 SURFACE RACEWAY

A. The District has standardized on Wiremold 800, 2300, 5400 and 5500 series for non-metallic surface raceway.

2.05 CONDUITS AND ACCESSORIES

A. CONDUITS

1. See Division 26 for requirements.
2. Conduit for Fire Alarm applications shall be red in color (non-accessible areas are excluded).

3. All new conduits shall be sized accordingly to achieve a 40% maximum fill ratio with initial cables installed.
4. Underground conduits shall be Schedule 40 PVC.

B. INNERDUCT

1. Orange corrugated HDPE (High Density Polyethylene) Innerduct shall be used for fiber optic cable protection in interior locations.
2. Fabric multi-cell innerduct is approved for underground conduits 2" and larger.

C. FITTINGS:

1. See Division 26 for requirements.
2. Conduit bodies and any sharp bend fittings are strictly prohibited for communication Cat6A and fiber optic cables. Appropriate conduit sweeps are required.

D. PULL LINE

1. Minimum 1/8" diameter, or larger braided line of polypropylene or continuous fiber polyolefin. The minimum breaking strength of 1/8 in. line is 200 lbs.

2.06 BACKBOXES, JUNCTION BOXES AND FLOOR BOXES

- A. Galvanized one-piece or welded pressed steel type. Boxes for fixtures shall not be less than 4" square and shall be equipped with fixture stud. Boxes shall be at least 2-1/8" deep, 4" square for 1 or 2 gang devices, with device rings. Boxes mounted in wall or ceiling finished with 5/8" gypsum board shall be furnished with 5/8" deep device rings. Provide blank cover for all boxes without fixture or device.
- B. Junction boxes, larger than 8", located indoors shall be hinged, NEMA-1 rated.
- C. Junction boxes, larger than 8", located outdoors, or in wet or damp locations shall be hinged, NEMA-3R.
- D. Provide and install tamper-proof screws for all exterior boxes.
- E. Junction boxes used for Fire Alarm systems are to be red in color with red colored cover plates.

2.07 GROUND BOXES

- A. See Division 26 and below for requirements.
- B. Approved manufactures are Jensen, Christy or approved equal.
- C. All ground boxes shall have metal traffic-rated lids with permanent factory markings of COMM or COMMUNICATIONS.
- D. Minimum size is 17" x 30"
- E. For AT&T service feeds the requirement is for 30"x48" Intercept Pullboxes. Jensen SKU 100020251/Mod # K304836AT was referenced by AT&T.
- F. For Comcast - Christy B2436 at service tie in and B1730 as an inline pullboxes are acceptable.

2.08 PENETRATION SEALING

- A. Firestopping: Provide UL Listed Firestopping materials for all penetrations through rated assemblies (walls / floors). See Division 07 for more information.
- B. Draft stopping: Foam sealant for use around conduit penetrations (in non-rated assemblies) to prevent passage of air, smoke, and/or toxic gas. See Division 07 for more information.
- C. Weatherproofing: Weatherproof sealant for use around conduit penetrations in exterior walls to prevent the intrusion of water. See Division 07 for more information.

2.09 GROUNDING BUS BAR

- A. Copper bus bar 2"x10"x1/4" minimum size with stand-off brackets and insulators, pre-drilled and threaded mounting holes (hole qty. 12 or greater) for equipment grounding lug attachment.

PART 3 - EXECUTION

3.01 COMMUNICATION SERVICES

- A. Install inground boxes, conduits, and terminal cabinets per service provider requirements.

3.02 GROUNDING

- A. Ground fittings shall be UL approved for each application and installed and/or connected to system in accordance with current CEC Code requirements.
- B. See Division 26 for additional requirements.
- C. Install grounding bus bar per manufacturer's instructions and to be in each MDF and IDF.

3.03 HANGERS AND SUPPORTS

- A. Install hangers and supports per manufacturer's written instructions.
- B. Hanger spacing shall be 48" or less and within 12" of sleeves and/or junction/back boxes.

3.04 LOW VOLTAGE PATHWAY/RACEWAYS

- A. EMT conduit may be used at following locations (see Division 26 for exact requirements):
 - 1. In dry locations in furred spaces.
 - 2. In partitions other than concrete or solid masonry.
 - 3. In protected exterior locations not exposed to direct weather.
- B. Rigid steel conduit and fittings shall be used for vertical risers and on top of all roofs, overhangs, walkways, canopies, or any other location exposed to direct weather. See Division 26 for exact requirements.
- C. Furnish and install pull lines in all unused (empty) conduits or raceways. All pull lines shall be permanently tagged with identification at both ends.
- D. Install exposed conduit neatly, parallel to or at right angles to structural members. Maintain a minimum of 12 inches of clearance from steam or hot water pipes. All installed strut channel supports should allow for future conduit attachments. The width of strut channel to match the width of the closest attached junction box. See design document details for attachment requirements.
- E. Supports: Support conduit with two-hole straps or strut channel where shown in design documents and/or specified. Coordinate supports with architectural details. Secure to wood structure by means of bolts or lag screws, to metal by means of shallow self-tapping screws,

- to concrete by means of insert or expansion bolts, to brickwork by means of expansion bolts, and to hollow masonry or stucco by means of toggle bolts.
- F. Spacing for all EMT and rigid steel conduit supports shall be as follows unless otherwise specified in design documents details:
 - 1. Surface conduit spacing and supports and unless otherwise specified or shown on drawing details:
 - a. EMT – Size 3/4" to 2" – 4' maximum spacing (3 each supports per 10' conduit length) and 12" from each end of conduit at coupling, connector or 90-degree bend.
 - b. Rigid steel – Size 3/4" to 2" – 4' maximum spacing (3 each supports per 10' conduit length) and 12" from each end of conduit at coupling, connector or 90-degree bend.
 - G. If conduit is designated for low voltage use, no more than a total of 360 degrees of conduit bend radius will be allowed between pull boxes.
 - H. All junction boxes shall be connected to conduits using appropriate connecting hardware (i.e. box connectors).
 - I. Clean, prep and paint with white primer all exposed conduit, junction boxes, channel strut, fittings, and accessories.
 - J. Before pulling any conductors into an underground PVC conduit (new or existing), the conduit shall be first be proofed by pulling through a mandrel of a diameter ¼ in. smaller than the conduit inside dia., followed by a swab of the same diameter as the conduit inside diameter.
 - K. Non-metallic raceway to be installed with mechanical fasteners only, do not remove adhesive tape backing.
 - L. Capping
 - 1. Cap conduits during construction with manufactured seals. Swab out conduits before installing wires.
 - 2. Cap all empty conduits below grade and in pull boxes with manufacturer's caps to prevent entrance of debris, attach pull string to cap.

M. Underground Conduit

1. Service provider conduits shall be:
 - a. AT&T - 1-4" (fiber only) or 2-4" (fiber and copper)
 - b. Comcast - 1-2"
2. #10 tracer wire or tracer tape is required for all underground Division 27 PVC conduits.

3.05 J-BOXES

- A. Screws shall be used to attach boxes, and must be accurately placed for finish, independently and securely supported by adequate wood backing or by manufactured adjustable channel type heavy-duty box hangers.
 1. Boxes shall be attached to metal studs with metal box hangers.
 2. Boxes installed in masonry tile or concrete block construction shall be secured with auxiliary plates, bars or clips and be grouted in place.
- B. Locate outlets at the following heights unless otherwise noted on Drawings, Specifications, current CBC or as required to meet ADA handicap requirements.
 1. Data Outlets: Same height as electrical outlets
 2. Telephone Wall Outlets: Above counter/backsplash height or at electrical switch height.
- C. Boxes shall be placed within 18" of electrical outlets.
- D. For sound control, separate outlets on opposite sides of walls 16" minimum. Where outlets are less than 16" or in sound rated walls, seal airtight with fire rated sheet putty pads. Fill gap between junction box and wall with acoustical sealant all around perimeter of junction box. Fill conduits larger than 1 1/4" with fire rated putty.
- E. Installation of conduit and outlet boxes in fire-resistive walls, floors, floor-ceiling or roof-ceiling assemblies shall comply with Title 24, Part 2, Section 713.

3.06 GROUND BOXES

- A. To be installed per Division 26 requirements.
- B. Provisions to be made for supporting cables from the box sides (i.e., j-hooks, d-rings)

- C. Install a 30" x 48" for service provider AT&T at service tie-in location and/or a 24" x 36" for service provider Comcast at service tie-in location. If less than 360-degrees of bends and less than 200 feet it is acceptable to stub in to the MPOE directly. If greater for 360-degree for bends or 200 feet for length then additional in-line ground boxes are required (30" x 48" for AT&T, 17" x 30" for Comcast). See section Part 2 – Products for more information.

3.07 SLEEVES AND CONDUIT PENETRATIONS

- A. Where conduit passes through walls, ceilings, or floors with connection points to junction boxes or raceways mounted to the same wall as the penetration provide a threaded conduit and secured in place with locking rings on both sides. Bend radius requirements shall be maintained where penetrations are made through the back of raceways; junction boxes with adequate depth shall be installed to comply with this requirement.
- B. Where conduit passes through walls, ceilings, or floors with connection points to junction boxes or raceways not mounted to the same wall as the penetration, provide EMT conduit and secured in place with strut channel. Box connectors shall always be used to connect EMT to junction boxes and raceways.
- C. FIRE STOPPING
 - 1. Seal all conduit penetrations through fire rated walls and floors fire and smoke tight in conformance with current CBC and current CEC. See Division 07 for more information.
- D. DRAFT STOPPING
 - 1. All non-fire rated walls must be draft stopped and sealed. Submit method to be used for approval by inspector and/or project manager. Mineral wool is one product that may be used. See Division 07 for more information.
- E. WEATHER SEALING
 - 1. All exterior penetrations shall be sealed watertight. The contractor shall use silicon rubber caulk or other approved methods and materials. Submit method and material with inspector and/or project manager. See Division 07 for more information.

3.08 CLEANING

- A. Clean all work prior to concealing, painting, and acceptance. Performed in stages if directed.
- B. Clean and repair soiled or damaged painted exposed work and match adjoining work before final acceptance.

C. Remove debris from inside and outside of equipment and enclosures.

3.09 FINAL DOCUMENT SUBMITTALS

A. See 27 00 00 for more information.

END OF SECTION

SECTION 27 10 00
STRUCTURED CABLING**PART 1 – GENERAL**

1.01 SUMMARY

- A. This section specifies equipment, accessories, materials, installation, configuration, and testing requirements for a complete and operable Structured Cabling communications system. The system shall provide highly reliable and high-performance data communication from main distribution frame (MDF) through each intermediate distribution frame (IDF) to end points requiring fiber optics and/or copper cabling and associated equipment.
- B. This section condenses sections 27 11 00 – Communications Equipment Room Fittings, 27 13 00 – Communications Backbone Cabling, 27 15 00 – Communications Horizontal Cabling and 27 16 00 – Communications Connecting Cords into one comprehensive section.

1.02 SCOPE

- A. The work will include but not be limited to the following objectives:
 - 1. Contractor shall furnish and install all required components and accessories as outlined in the design documents for a complete and operable turn-key system.
 - 2. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship. Contractors unfamiliar with the District's standards shall familiarize themselves with the standards and requirements prior to beginning work
 - 3. The Contractor shall furnish and install all required fire-treated $\frac{3}{4}$ " (three quarter inch) plywood for the MDF and all IDF locations.
 - 4. The Contractor shall furnish and install a ground bus bar at the MDF and IDF rooms.
 - 5. The Contractor shall furnish and install all required racks and cabinets.
 - 6. The Contractor shall furnish, install, and configure uninterruptable power supply(ies) (UPS) for the MDF and/or IDF racks.
 - 7. The Contractor shall furnish and install all newly required conduit/raceway.
 - 8. The Contractor shall furnish and install all wire/cable (copper/fiber optic) as required.
 - 9. The Contractor shall terminate all strands of fiber at each fiber enclosure.
 - 10. The Contractor shall furnish and install termination all end-point equipment (patch panels, jacks, wallplates, enclosures, etc.).
 - 11. The Contractor shall furnish and install all patch cords (copper/fiber).
 - 12. The Contractor shall test and certify (for warranty) the installed cable plant.

1.03 RELATED REQUIREMENTS

- A. Section 01 – General Requirements
- B. Section 27 00 00 – Communications
- C. Section 27 05 00 – Common Work Results for Communication Systems.

1.04 INDUSTRY GUIDELINES AND STANDARDS

- A. California Electrical Code (CEC) – 2022.
- B. California Building Code (CBC) – 2022.
- C. ANSI/TIA-568.0-D – Generic Communications Cabling for Customer Premises.
- D. ANSI/TIA-568.1-D – Commercial Building Communications Cabling Standard Part 1: General Requirements.
- E. ANSI/TIA 568-C.2 – Balanced Twisted-Pair Telecommunications Cabling and Components Standards
- F. ANSI/TIA 568.3-D – Optical Fiber Cabling Components Standard
- G. ANSI/TIA-569-D – Commercial Building Standard for Telecommunications Pathways and Spaces.
- J. ANSI/TIA-606-B – Administration Standard for the Commercial Telecommunications Infrastructure.
- K. ANSI/JSTD-607-C – Commercial Building Bonding and Grounding (Earthing) Requirements for Telecommunications.

1.05 QUALIFICATIONS

- A. The contractor shall possess a California C7 or C10 license.
- B. The Contractor or Subcontractor shall have 5 years’ documented experience.
- C. The Contractor and installers shall be certified by the product manufacturer.

1.06 SYSTEM REQUIREMENTS

- A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing data cable plan system.

1.07 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. See section 27 00 00 for requirements.

1.08 SUBMITTALS

- A. See section 27 00 00 for requirements.

1.09 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. See section 27 00 00 for additional requirements.
- C. 25-year manufacturer's warranty/certification required for all copper and fiber cable plant installations.

1.10 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

PART 2 – PRODUCTS**2.01 GENERAL**

- A. See Appendix A at the end of this document for pre-approved materials.
- B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.
- C. Contractor shall confirm all equipment part numbers with the Project Manager or District prior to ordering equipment and updating submittals as required.
- D. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. The Contractor shall provide all components needed for complete and satisfactory installation and operation.
- E. Install mounting hardware and anchors as recommended by the Manufacturer of the equipment that requires mounting to the building or structure and adhere to all code requirements. See section 27 05 00 for requirements.
- F. Product Availability
 - 1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

2.02 MANUFACTURERS AND PRODUCTS

- A. See Appendix A at the end of this document for pre-approved materials.
- B. Substitutions require proof of equivalence and approval by District and/or its representative.
- C. For maintenance and consistency with the existing installed base, data connectivity components (copper and fiber) shall be Ortronics.

2.03 COPPER/FIBER OPTIC CABLES AND COMPONENTS

- A. All copper cables and components shall be Cat6A rated except for Extended Distance PPOE cable described in 2.03.F.
 - 1. Cable to be reduced diameter. White jacket for default cable, Blue jacket for CCTV and Access Control only.
 - 2. Jacks to be keystone style.

- B. Patch cords system/color:
 - 1. Data = Blue color
 - 2. AP = Green color
 - 3. CCTV = Blue color
 - 4. Clock/Intercom = Yellow color
 - 5. Access Control = Black color
 - 6. Fire Alarm/Intrusion Alarm = Red color

- C. Data jacks system/color:
 - 1. Data/default = White color
 - 2. AP = Green color
 - 3. CCTV = Blue color
 - 4. Clock/Intercom = Yellow color
 - 5. Access Control = Black color
 - 6. Fire Alarm/Intrusion Alarm = Red color

- D. All fiber optic cables and components shall be single single-mode OS2 rated.

- E. Fiber optic cable terminations shall be LC-Duplex style.

- F. Extended Distance category cable may be used for links over 100m when called for in the plans.
 - 1. Certify the Extended Distance cable per the manufacturer's specifications.
 - 2. Patch cables must conform to the manufacturer's specifications.
 - 2. Utilize modular plug terminated link (MPTL) terminations with a patch cable at the MDF/IDF only.

PART 3 – EXECUTION

3.01 ACCEPTABLE INSTALLERS

- A. The components making up the structure cabling system shall only be installed by Contractors who are qualified to install, service and maintain the system.
- B. Cable terminations (copper or fiber) shall be installed by manufacturer certified technicians.
- C. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience before the Bid Opening Date.

3.02 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to job bidding. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for accurate bidding and performance of the Work.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

- A. The Contractor shall order all required parts and equipment upon receipt of approved product submittals.
- B. The Contractor shall verify the availability of power where required.

3.04 SHOP DRAWINGS

- A. The Contractor shall create "Shop Drawings" per section 27 00 00 for this section.
- B. Submit drawings for review and approval by the Project Manager and/or Designer.

3.05 INSTALLATION

A. ENTRANCE FACILITIES

- 1. Contact telecommunications service provider and arrange for installation of demarcation point, protected entrance terminals, and housing when so directed by service provider.
- 2. Install underground or aerial pathways complying with recommendations in TIA/EIA-569-A, "Entrance Facilities" Article.

B. UNDERGROUND ENTRANCE PATHWAY

1. Install underground entrance pathway complying with Division 26.

C. EQUIPMENT RACKS, CABINETS, ENCLOSURES AND ACCESSORIES

1. Backboards:
 - a. Shall be installed behind the rack or cabinet if the cabinet is not able to be directly attached to two vertical wall studs.
 - b. Backboards shall be made of fire retardant or treated materials, squarely cut, and with sanded edges
 - c. Backboards shall be a minimum $\frac{3}{4}$ " thick and large enough to secure it to two vertical wall studs.
 - d. The "FIRE RATED" stamp shall be visible.
 - e. Backboards shall be fastened with $\frac{1}{4}$ " lag bolt and washer, non-recessed, with maximum spacing of 18" into 2 vertical studs. 1-1/2" embedment.
 - f. Visible portions (outside of cabinet) of Backboards shall be painted black.
2. All data & voice communications racks and cabinets shall be anchored in accordance with manufacturer's specifications, project specifications and/or drawn details, to walls and floors and grounded to building ground grid (not to water pipes etc.).
3. Securely mount equipment cabinet and racks to the building structure. A proper quantity of support fasteners shall be utilized. Typically lag bolts for wood installations, wedge anchors for concrete flooring. Submit data sheets for mounting fasteners for approval before installation. Mount equipment per DSA approved drawings/details.
4. Equipment cabinet mounted on or against walls will have 3-foot clearance in front of deepest component and accessible to rear for service.
5. MDF and all IDFs shall have at least one dedicated 120VAC 20-amp quad-receptacle each.
6. Patch Panels: Mount patch panels into the cabinet/rack. Match manufacturer of existing install or if new construction, see Appendix A.
7. Cable Management: Secure the cable bundle(s) to the rack strain relief and cable management behind the patch panels and cross connect block panels. Install horizontal cable management panels and brackets for routing and management of patch cables. Maintain TIA/EIA and BICSI standards on bundling, supporting and bend radius.

8. Surge Protected Outlet Strips: Required in MDF rack. Mount surge protected outlet strips per Manufacturer's directions. Refer to details on the Drawings for mounting location.
9. Furnish and install UPS in bottom of MDF/IDF rack.

D. MDF/IDF GROUNDING

1. Refer to Section 27 05 00 Grounding for more requirements.
2. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 6 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
3. Bond metallic equipment (including ladder rack) to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.06 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District' Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.
- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- D. Perform Work with persons experienced and qualified to produce workmanship specified.
- E. Maintain quality control over suppliers and Subcontractors.

3.07 WIRE/CABLE (COPPER/FIBER OPTIC)

- A. Design, layout, size, and plan new cable runs as required.
- B. All wire and cable passing through metalwork shall be sleeved by an approved grommet or bushing.
- C. Conduit/raceway fill shall not exceed 40 percent of interior cross-sectional area.
- D. Neatly dress and tie (Velcro) all cabling.

- E. UTP cabling shall conform to a 6-foot separation requirement from the main power panel, transformers, switchgear and/or starter motors adjacent to the MDF, IDF and termination locations.
- F. Fiber optic cable shall be installed from the MDF to each IDF.
- G. Orange corrugated HDPE (High Density Polyethylene) Innerduct shall be used for fiber optic cable protection in all interior locations.
- H. Spicing of fiber optic cable shall be done with fusion splices.
- I. When required copper feeders (minimum 4-pair) are to be installed from the MDF to each IDF.
- J. Maintain proper bend radius for all cable installations.
- K. Do not exceed cable manufacturer's instructions for installation pull load. Any cable damaged by excessive pull force shall be replaced by the installing contractor.
- L. Modular plug terminated link (MPTL) style wiring is acceptable for CCTV with modified single connector permanent link testing.

3.08 LABELING

- A. MDF/IDF - Identification number in large font on front of cabinet.
- B. MDF, Fiber Optic LIU Ports – IDF number and room number
- C. MDF/IDF, Copper Patch Panel – Panels labeled P1, P2, P3, etc., ports labeled with room number.
- D. LAN Outlet – IDF number, patch panel number, patch panel port number.
- E. Cables to be labeled both ends with unique identifiers and from/to location identifiers. For Copper Cat cable IDF number, patch panel number, patch panel port number.
- F. T-bar ceilings shall have device labels attached next to the device for ceiling mounted equipment and at the tile for above ceiling equipment with device type and device ID points/IP address.

3.09 CONDUIT AND RACEWAY INSTALLATION

- A. See Division 26 and section 27 05 00 for requirements.

B. Conduit bodies and any other sharp bend fittings are strictly prohibited for communications cabling (copper/fiber).

C. Install proper radius conduit sweeps where required.

3.10 FIELD QUALITY CONTROL AND TESTING

A. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify District of your readiness to perform the formal Test & Inspection of the complete system.

B. Submit the Record Drawings (as-builts) to District for review prior to inspection.

C. During the formal Test & Inspection (Commissioning) of the system, the Contractor shall have personnel available with tools and equipment to inspect wiring, devices, and system operation.

D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.

E. Notify the District when ready to perform a re-inspection of the installation.

F. Provide 25-year manufacturer's warranty/certification documentation for all copper and fiber cable plant installations.

3.11 CLOSEOUT DOCUMENTS

A. See section 27 00 00 for requirements.

APPENDIX A – Pre-Approved Materials

DESCRIPTION	MFG	PART NUMBER
Wall Swing Rack 40RU, 32" Deep	Middle Atlantic	SR-40-32
Zero Clearance Latch Kit	Middle Atlantic	DWRSR-ZL
Plexi Front Door	Middle Atlantic	PFD-40
20 AMP Power Strip	Chatsworth Products	12848-701
Standard Busbar	Chatsworth Products	10622-010
12" Ladder Rack 10'	Chatsworth Products	11275-712
Ladder Rack Triangular Support Bracket	Chatsworth Products	11746-712
Ladder Rack Wall Angle Support 12"	Chatsworth Products	11421-712
Ladder Rack Butt-Splice Kit	Chatsworth Products	11301-712
Ladder Rack Foot Kit	Chatsworth Products	11309-701
19" Horizontal Cable Manager	Ortronics	808004759
Patch Panel 24-port 1-RU (Black)	Ortronics	OR-SPKSU24
Patch Panel 48-port 2-RU (Black)	Ortronics	OR-SPKSU48
Patch Panel Cable Management Support Bar	Ortronics	OR-CMBFR0RU
Faceplate, 2-port (White)	Ortronics	KSFP2-88
Faceplate, 4-port (White)	Ortronics	KSFP4-88
Surface Mount, 2-port (White)	Ortronics	KSSMB2
Cat6A Data Jacks (White)	Ortronics	KT2J6A-88
Cat6A Data Jacks (Green)	Ortronics	KT2J6A-45
Cat6A Data Jacks (Blue)	Ortronics	KT2J6A-36
Cat6A Data Jacks (Yellow)	Ortronics	KT2J6A-44
Cat6A Data Jacks (Black)	Ortronics	KT2J6A-00
Cat6A Data Cable, Riser (White = default)	Superior Essex	6B-246-4A

Cat6A Data Cable, Plenum (White = default)	Superior Essex	6B-246-4B
Cat6A Data Cable, Riser (Blue = CCTV/Access Control)	Superior Essex	6B-246-2A
Cat6A Data Cable, Plenum (Blue = CCTV/Access Control)	Superior Essex	6B-246-2B
Cat6A Data Cable, Indoor/Outdoor (Black)	Superior Essex	6B-272-ER
Cat6A Data Cable, OSP (Black)	Superior Essex	04-001-A8
Cat6A Patch Cord (Blue)	Quiktron	576-A10-0xx (xx = length)
Cat6A Patch Cord (Green)	Quiktron	576-A20-0xx (xx = length)
Cat6A Patch Cord (Yellow)	Quiktron	576-A115-0xx (xx = length)
Cat6A Patch Cord (Black)	Quiktron	576-A135-0xx (xx = length)
Cat6A Patch Cord Slim 1' (Blue)	C2G	30125
Cat6A Patch Cord Slim 1' (Green)	C2G	30153
Cat6A Patch Cord Slim 1' (Yellow)	C2G	30167
Cat6A Patch Cord Slim 1' (Black)	C2G	30139
Fiber Optic LIU 1-RU	Ortronics, Infinium	INFC01U-M4-E
Fiber Optic LIU 2-RU	Ortronics, Infinium	INFC02U-M4-E
Fiber Optic Adapter	Ortronics, Infinium	HDFP-LCD12AC
Fiber Optic LC Field Term Connector	Ortronics	205KAN9GASM
Fiber Optic Fanout Kit	Ortronics	61500858
Fiber Optic Cable Single- Mode OS2, Indoor/Outdoor	Superior Essex	W4012J101

END OF SECTION

SECTION 27 21 00

DATA COMMUNICATIONS NETWORK EQUIPMENT

PART I - GENERAL

1.01 SUMMARY

- A. This section specifies equipment, accessories, materials, installation, configuration, and testing requirements for a complete and operable data network system. The system shall provide reliable and high-performance data communication throughout the site.

1.02 SCOPE

- A. The work will include but not be limited to the following objectives:
 - 1. Provide, coordinate, and install all required equipment and accessories as outlined in the design documents for a complete and operable system.
 - 2. Labor and Materials: The Contractor shall provide and pay for all labor, supervision, materials, accessories, components, equipment, tools, utilities, construction equipment and machinery, transportation, and other facilities and services necessary for the proper execution, operation, and completion of a turn-key system to the District.
 - 3. Data Communications Network Equipment: Includes, but is not limited to:
 - a. Routers
 - b. Firewalls
 - c. Networking Switches
 - d. Wireless Access Points
 - e. VoIP Phone Equipment
 - f. Uninterruptible Power Supplies (UPS)

1.03 RELATED REQUIREMENTS

- A. Division 01 - General Requirements
- B. Section 27 00 00 - Communications
- C. Section 27 05 00 - Common Work Results for Communication Systems.
- D. Section 27 10 00 - Structured Cabling

1.04 QUALIFICATIONS

- A. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.
- B. Five years' experience installing data network equipment and systems.

1.05 SYSTEM REQUIREMENTS

- A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing data network infrastructure.

1.06 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. See section 27 00 00 for requirements.

1.07 SUBMITTALS

- A. See section 27 00 00 for requirements.

1.08 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. See section 27 00 00 for additional requirements.

1.09 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

PART 2 - PRODUCTS

2.01 GENERAL

- A. See Appendix A at the end of this document for pre-approved materials.
- B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.
- C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory installation/operation.
- D. Product Availability

1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.
2. Subject to compliance with these specifications, products and systems included in this section are to be installed as specified by the manufacturer of the system or engineer approved equal.

2.02 EQUIPMENT

- A. The District's preferred manufacturer for:
 1. Routers - Cisco
 2. Firewalls - Cisco
 3. Networking Switches – Cisco
 4. Wireless Access Points - Cisco
 5. VoIP Phone Equipment – Cisco
 6. UPS – N1C
- B. Substitutions require proof of equivalence and approval by District and/or its representative.

PART 3 - EXECUTION

3.01 ACCEPTABLE INSTALLERS

- A. The equipment shall only be installed by Contractors who are qualified to install and maintain the system.
- B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience installing data network equipment before the Bid Opening Date.

3.02 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to bidding for the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to District.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

- A. The Contractor shall verify materials are readily available prior to submitting product submittals and notify the Project Manager of long lead time items.
- B. The Contractor shall order all required parts and equipment only after receipt of approved product submittals from the Project Manager.
- C. The Contractor shall coordinate with the District's Technology Services department for needed IP addresses at least 2 weeks prior to configuration/installation.

3.04 SHOP DRAWINGS

- A. The Contractor shall create "Shop Drawings" per section 27 00 00.

3.05 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District's Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.

- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- D. Perform Work with persons experienced and qualified to produce workmanship specified.
- E. Maintain quality control over suppliers and Subcontractors.

3.06 PATHWAY AND EQUIPMENT INSTALLATION

- A. Install all conduit and pathway per design documents. Refer to 27 05 00 for additional information/requirements.
- B. Install all Cat6A cable per design documents. Refer to 27 15 00 for additional information/requirements.
- C. Equipment to be installed per manufacturer's instructions.
- D. Devices requiring PoE power shall be connected to a PoE switch in the MDF/IDF data rack – verify with Technology Services for available PoE power.

3.07 CONFIGURATION

- A. Any information needed from the District for configuration of equipment (i.e. VLAN, etc.) needs to be requested in writing 2 weeks prior.
- B. All equipment to be fully configured and tested for functionality by the Contractor prior to District acceptance testing.

3.08 FIELD QUALITY CONTROL AND TESTING

- A. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify the District of readiness to perform the formal Test & Inspection of the complete system by the District or its representative. Make all adjustments/changes required from District/representative review.
- B. Submit the Record Drawings (as-builts) to District for review prior to inspection.
- C. During the formal Test & Inspection (Commissioning) of the system and have personnel available with tools and equipment to inspect wiring, devices, and system operation.
- D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.
- E. Notify the District when ready to perform a re-inspection of the installation.

3.10 AS-BUILT DRAWINGS

- A. See section 27 00 00 for requirements.

APPENDIX A – Pre-Approved Materials

DESCRIPTION	MFG	PART NUMBER
Network Switch (48G/4SFP+)	Cisco	C9300L-48PF-4X-EDU
Network Switch License (DNA Essentials, 48-port, 3-yr)	Cisco	C9300-DNA-E-48-3Y
Network Switch Power Supply	Cisco	PWR-C4-950WAC-R
SFP transceiver	Cisco	SFP-10G-LR
Network Switch stacking kit	Cisco	C9300-STACK-KIT
Core Switch (16SFP+/2QSFP+)	Cisco	C9500-16X
Core Switch License (DNA Essentials, 3-yr)	Cisco	C9500-DNA-E-3Y
VOIP Phone (Admin)	Cisco	CP-8851
VOIP Phone (Classroom) with wall mount kit	Cisco	CP-7841, CP-7800-WMK
UPS (MDF and IDF) with network monitoring and external battery (2000VA, 50AH) 120VAC input	N1C	N1C.LR2000, N1C.L4850EBM2U
UPS (IDF)	N1C	N1C.L1000
UPS (IDF)	N1C	N1C.L1500
UPS (IDF)	N1C	N1C.L2000

*Product requires District Approval

END OF APPENDIX A

END OF SECTION

SECTION 27 51 23.50

EDUCATIONAL INTERCOM SYSTEMS

PART I - GENERAL

1.01 SUMMARY

- A. This section specifies equipment, accessories, materials, wire, installation, configuration, and testing requirements for a complete and operable Intercom/Public Address/Bell system. This system shall provide the ability to bi-directionally communicate with an individual room, broadcast to defined speaker zone(s) and ring bell tones on a predefined schedule. For sites that utilize the small message board, this section will supplant the use of section 27 53 13 Clock Systems.

1.02 SCOPE

- A. The work will include but not be limited to the following objectives:
1. Labor and Materials: The Contractor shall provide and pay for all labor, supervision, materials, accessories, components, equipment, tools, transportation, and other facilities and services necessary for the proper installation of a turn-key Assistive Listening system to the District.
 2. The contractor will coordinate with the District in writing for any needed information (i.e. IP addresses, etc.) 10 business days prior to the date the information is needed.
- B. The District has standardized on Rauland Telecenter U equipment and the installing Contractor shall be Rauland Telecenter authorized.
- C. For existing construction – provide and install all components and accessories to modify the existing system while maintaining code compliance and to seamlessly integrate the new components into the existing campus’ system. Prior to beginning any work, the Contractor is responsible for identifying any existing system errors or faults and bring these issues to the attention of the District Project Manager.
- D. The Contractor shall be responsible for programming the Rauland Telecenter Intercom System.
- E. The Contractor shall coordinate with site staff for Bell schedule programming requirements.
- F. The Contractor shall review the proposed final system programming, functionality and expectations with the project manager, Architect/Engineer/Designer and District prior to final programming.

- G. After completion of the installation and pretest of the system a satisfactory final test of the entire system shall be made in the presence of the inspector of record (IOR) and District or the District's representative.
- H. The Contractor shall adjust any speaker levels to the appropriate level as determined in system testing.
- I. Existing systems shall remain operable until the new system is accepted and approved by the District or the District's representative.
- J. The Contractor is responsible for user/operator training (maximum 2 hours).
- K. The Contractor shall complete all required project closeout documentation in a timely fashion.

1.03 RELATED REQUIREMENTS

- A. Division 01 – General Requirements
- B. Section 27 00 00 - Communications
- C. Section 27 05 00 – Common Work Results for Communication Systems.
- E. Section 27 10 00 – Structured Cabling

1.04 REFERENCES

- A. See section 27 00 00 for requirements.

1.05 DEFINITIONS

- A. See section 27 00 00 for requirements.

1.06 SYSTEM REQUIREMENTS

- A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing intercom system when applicable.

1.07 SUBMITTALS

- A. See section 27 00 00 for requirements.

1.08 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. See section 27 00 00 for requirements.
- B. Shop drawings are required for this section.

1.09 QUALIFICATIONS

- B. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.
- B. Five (5) years' experience installing Rauland Telecenter equipment.
- C. The contractor shall possess a California a C7 or C10 license.
- D. The Contractor or Subcontractor shall be Rauland Telecenter authorized to provide and install equipment with 5 years documented experience.

1.10 CERTIFICATIONS

- A. Installers shall be manufacturer certified..

1.11 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District's Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.
- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- D. Perform Work with persons experienced and qualified to produce workmanship specified.
- E. Maintain quality control over suppliers and Subcontractors.
- F. Contractor shall be responsible for scheduling Subcontractors in a timely fashion.

1.12 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. See section 27 00 00 for additional requirements.

1.13 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

PART 2 – PRODUCTS

2.01 GENERAL

- A. The approved manufacturers for the project are:
1. Control unit and related accessories: Rauland Telecenter U
 2. Speakers: See Appendix A for different installation types
 3. Wire, cable, and accessories: See Appendix A.
- B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.
- C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. The Contractor shall provide all components needed for complete and satisfactory installation and operation.
- D. Product Availability
1. The Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.
 2. Subject to compliance with these specifications, products and systems included in this section are to be installed as specified by the manufacturer of the system or engineer approved equal.

2.02 EQUIPMENT

- A. See Appendix A at the end of this document for pre-approved materials.
- B. Substitutions require proof of equivalence and prior approval by District and/or its representative before ordering.
- C. Main system components:
1. Rauland Telecenter U IP Campus Controller and software
 2. Rauland Telecenter U Auxilliary Input/Output Module
 3. Rauland Telecenter U 24-port Gateway
 4. Rauland Telecenter U IP Classroom Module
 5. Rauland Telecenter U Administrative Console
 6. Rauland Telecenter U Program Line Input Module

PART 3 - EXECUTION

3.01 ACCEPTABLE INSTALLERS

- A. The equipment shall only be installed by Contractors who are qualified and certified by the manufacturer to install and maintain the system.
- B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience installing educational intercom equipment before the Bid Opening Date.

3.02 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to District.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

- A. The Contractor shall verify materials are readily available prior to submitting product submittals and notify the District's Project Manager of long lead time items.
- B. The Contractor shall order all required parts and equipment only after receipt of approved product submittals from the District's Project Manager.
- C. Submit and receive approval for shop drawings prior to work commencement.

3.04 PATHWAY INSTALLATION

- A. See Division 26 and Section 27 05 00 for requirements and more information.
- B. Existing Construction:
 - 1. Refer to design documents.
 - 2. Surface raceway and components shall be Wiremold 2300.

3.05 EQUIPMENT INSTALLATION

- A. Equipment to be wired and installed per manufacturer's instructions.

- B. The Contractor shall coordinate with the District's IT Department if connecting to their network. The Contractor shall provide a spreadsheet of all device MAC addresses indexed by device location to the District IT department to facilitate programming of reserved IP addresses for each device.
- C. Installation shall be in accordance with applicable codes (i.e. NEC, NFPA 72) local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.
- D. Perform all Work as indicated in the Drawings and Specifications.
- E. All low voltage cables shall be kept away from power circuits.
- F. Contractor shall provide programming and configuration of the Educational Intercom system for full functionality.
- G. Contractor shall maintain a complete, up-to-date backup of the system configuration. Backup shall be maintained throughout the programming period until final Acceptance by District. Submit back-ups to District upon Final Acceptance.

3.06 LABELING/SCHEDULES

- A. All labels are to be machine generated black letters on white adhesive label stock that is appropriate for the installation environment (interior/exterior).
- B. Label all standard speaker cables with port ID.
- C. Label all speakers with speaker ID.
- D. Label all IP speakers with MDF/IDF, patch panel and jack numbers.

3.09 CONFIGURATION

- A. All equipment to be fully configured and tested for functionality prior to testing.

3.10 FIELD QUALITY CONTROL AND TESTING

- A. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify District of your readiness to perform the formal Test & Inspection of the complete system.
- B. Submit the Record Drawings (as-builts) to District for review prior to inspection.

- C. During the formal Test & Inspection (Commissioning) of the system the Contractor shall have personnel available with tools and equipment to inspect wiring, devices, and system operation.
- D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.
- E. Notify the District when ready to perform a re-inspection of the installation.
- F. District or its representative to provide final sign-off for acceptance.

3.11 AS-BUILT DRAWINGS

- A. See section 27 00 00 for requirements.
- B. As-built riser diagram showing all access control components for site.

3.12 TRAINING

- A. For new systems provide 8-hrs end-user training.
- B. For existing system upgrades provide 2-hrs end-user training.

APPENDIX A – Pre-Approved Materials

DESCRIPTION	MFG	PART NUMBER
IP Campus Controller and software/licenses	Rauland Telecenter U	TCC2000
Administrative Console	Rauland Telecenter U	TCC2045
Auxiliary Input/Output Module	Rauland Telecenter U	TCC2033
Universal Rack Mounting Kit	Rauland Telecenter U	TCC2099
Program Line Input Module	Rauland Telecenter U	TCC2055
Zone page amplifier (25V, 14W/35W)	Rauland Telecenter U	Amplifier: TCC3022 Power Supply (over 14W): TCC3022PS
IP Classroom Module	Rauland Telecenter U	TCC2011B
Zone Page Module (used with external audio amplifier)	Rauland Telecenter U	TCC2022
Audio Power Amplifier (25V, 2x160W)	Powersoft	MEZZO 322A
8-Ohm 2’x2’ Lay-in Ceiling Speaker, RJ-45	Rauland	BAFKIT2X2L8RJ Add: IP Classroom module
25V 2’x2’ Lay-in Ceiling Speaker	Rauland	BAFKIT2X2L
8-Ohm 8” Speaker assembly (Interior Surface)	Rauland	- Speaker USO880 - Backbox ACC1112 - Baffle ACC1003 - Add: IP Classroom module
25V Surface Speaker	Rauland	ACCWB5
Clock/Speaker surface combo (for use with message boards)	Rauland	- Baffle w/ Speaker ACC3011S - Backbox ACC3011SBB - Message Board TCC3011S Add: IP Classroom module
Clock/Speaker flush combo (for use with message boards)	Rauland	- Backbox ACC3011FBB - Baffle w/speaker ACC3011S - Message Board TCC3011S Add: IP Classroom module

Exterior Speaker Enclosure (for use with all exterior speakers and paging horns)	Rauland	Backbox: ACC1113 Baffle: ACC1012
Speaker, Exterior (8-ohm)	Lowell Rauland Rauland	Speaker: 8C10MRB <ul style="list-style-type: none">- Add: IP Classroom Module (single speaker up to 2W)- Add: Wire breakout 603101 (when IP module used)
Large Message Board	Rauland	TCC3012L

END OF APPENDIX
END OF SECTION

SECTION 28 10 00
ACCESS CONTROL SYSTEM

PART I - GENERAL

1.01 SUMMARY

- A. This section specifies equipment, accessories, materials, installation, configuration, and testing requirements for a complete and operable electronic Access Control system. The system shall provide electronic access to secure doorways to authorized persons at authorized time of day.

1.02 SCOPE

- A. The work will include but not be limited to the following objectives:
1. Labor and Materials: The Contractor shall provide and pay for all labor, supervision, materials, accessories, components, equipment, tools, transportation, and other facilities and services necessary for the proper installation of a turn-key Access Control system to the District.
 2. The contractor will coordinate with the District in writing for any needed information (i.e. IP addresses, etc.) at least 2 weeks prior to the date the information is needed.
 3. Access Control software and equipment: Includes, but is not limited to:
 - a. Software based system for user authentication and system control
 - b. RFID cards/fobs
 - c. RFID readers
 - d. Door controllers
 - e. Power supplies
 - f. Electrified door hardware/latches/strikes
 - g. Door position switches
 - h. Power transfer hinges/armored loops
 - i. Request to exit (REX) devices
 - j. RFID badge printer (optional)
 4. Typical installation includes software, door controller, card reader, door sensor, request to exit (REX) sensor and a surface mounted electric strike designed to accommodate existing panic hardware. For doors with electrified lockset have bored doors and electric power transfer hinges see section (08 71 00 – Door Hardware for more information).
 5. All installations with network connectivity shall utilize District's network and be managed by the District's Avigilon ACM Enterprise system.

6. Access control hardware shall continue to fully function in the event of communication loss to the central server.
7. Power to control panels shall be hardwired in conduit.
8. All door controllers shall have battery backup.

1.03 RELATED REQUIREMENTS

- A. Division 01 – General Requirements
- B. Section 08 71 00 – Door Hardware
- C. Section 27 00 00 - Communications
- D. Section 27 05 00 – Common Work Results for Communication Systems.
- E. Section 27 10 00 – Structured Cabling
- F. Americans with Disability Act (ADA)

1.04 REFERENCES

- A. See section 27 00 00 for requirements.

1.05 DEFINITIONS

- A. See section 27 00 00 for requirements.

1.06 SYSTEM REQUIREMENTS

- A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing Access Control systems and integrate into the Districts Avigilon ACM Enterprise installation.

1.07 SUBMITTALS

- A. See section 27 00 00 for requirements.

1.08 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. See section 27 00 00 for requirements.

- B. Shop drawings are required for this section.

1.09 QUALIFICATIONS

- A. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.
- B. Five (5) years' experience installing communications equipment systems.

1.10 CERTIFICATIONS

- A. See section 27 00 00 for requirements.

1.11 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District's Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.
- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- D. Perform Work with persons experienced and qualified to produce workmanship specified.
- E. Maintain quality control over suppliers and Subcontractors.
- F. Contractor shall be responsible for scheduling Subcontractors in a timely fashion.

1.12 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. See section 27 00 00 for additional requirements.

1.13 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Manufacturers - See Appendix A at the end of this document for pre-approved materials.
- B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.
- C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory installation and operation.
- D. Product Availability
 - 1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.
 - 2. Subject to compliance with these specifications, products and systems included in this section are to be installed as specified by the manufacturer of the system or engineer approved equal.

2.02 EQUIPMENT

- A. See Appendix A at the end of this document for pre-approved materials.
- B. Substitutions require proof of equivalence and prior approval by District and/or its representative before ordering.
- C. Whenever possible and required the request to exit functionality shall be integrated into the door hardware.
- D. Electrified latch hardware shall be compatible with panic hardware and be "rim" style.
- E. Panel cabinets shall have key locks.
- F. The contractor shall furnish at least 100 RFID cards serialized per the District's standards. Middle Schools and High Schools to receive 200 RFID cards.

2.03 EXTRA STOCK

A. For each increment of 100 controlled doors furnish:

1. Quantity 5 of current model door controller.
2. Quantity 7 of current model card reader.

PART 3 - EXECUTION**3.01 ACCEPTABLE INSTALLERS**

- A. The equipment shall only be installed by Contractors who are qualified to install and maintain the system.
- B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience installing electronic access control equipment before the Bid Opening Date.

3.02 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to District.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

- A. The Contractor shall verify materials are readily available prior to submitting product submittals and notify the District's Project Manager of long lead time items.
- B. The Contractor shall order all required parts and equipment only after receipt of approved product submittals from the District's Project Manager.
- C. Submit and receive approval shop drawings prior to work commencement.

3.04 PATHWAY INSTALLATION

- A. New Construction:
 - 1. Install 3/4" EMT in wall from hollow door frame to double-gang mud-ring and deep 4" Sq. back box on interior latch side above door frame at 96" AFF to top of box to accessible ceiling space or continuous conduit to nearest IDF.
 - 2. Install on the exterior latch side of the door a single-gang mud-ring and back box for exterior card reader at 48" AFF to top of box. Route EMT conduit to above door 4"-Sq. j-box.
- B. Existing Construction:
 - 1. Refer to design documents.

2. Surface raceway and components shall be Wiremold 2300.

3.05 EQUIPMENT INSTALLATION

- A. Power supplies and electric strike to use 24VDC and 16AWG wire.
- B. Power supplies shall be centrally located in the nearest MDF/IDF.
- C. Equipment to be wired and installed per manufacturer's instructions.
- D. Door controllers to be installed in nearest MDF/IDF unless noted otherwise on design documents.
- E. Devices requiring POE power shall be connected to a POE switch in the nearest MDF/IDF data rack – verify with Electronics/Lock Shop for available PoE.
- F. All wiring in enclosure shall have 12" minimum service loop for troubleshooting/repairs.
- G. All shielded wiring to have shields grounded at the upstream end only. Floating shields is strictly prohibited.
- H. Data drops to be installed inside the controller panel cabinet.

3.06 LABELING/SCHEDULES

- A. All labels are to be machine generated black letters on white adhesive label stock that is appropriate for the installation environment (interior/exterior).
- B. Device ID Labels are to be 1/4" lettering for mounting heights 10' AFF or less, 1/2" black lettering on white labels for mounting heights greater than 10' AFF.
- C. Access Control Panel/Cabinet label – Panel ID on exterior top right of panel door.
- D. Battery label – Install date.
- E. Wiring label – Panel ID-Panel Schedule-Door ID.
- F. Network Information label – MAC and IP address on interior top right of panel door.
- G. Network Cable Termination label - MDF/IDF-port number.
- H. Reader/Door schedule – A reader/door schedule and location drawing shall be printed and installed in a plastic sleeve inside the panel cover door.

3.09 CONFIGURATION

- A. Program all network equipment with network IP address information obtained from Electronics/Lock Shop.
- B. All equipment to be fully configured and tested for functionality prior to testing.

3.10 FIELD QUALITY CONTROL AND TESTING

- A. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify District of your readiness to perform the formal Test & Inspection of the complete system.
- B. Submit the Record Drawings (as-builts) to District for review prior to inspection.
- C. During the formal Test & Inspection (Commissioning) of the system the Contractor shall have personnel available with tools and equipment to inspect wiring, devices, and system operation.
- D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.
- E. Notify the District when ready to perform a re-inspection of the installation.
- F. District or its representative to provide final sign-off for acceptance.

3.11 AS-BUILT DRAWINGS

- A. See section 27 00 00 for requirements.
- B. As-built riser diagram showing all access control components for site.

APPENDIX A – Pre-Approved Materials

DESCRIPTION	MFG	PART NUMBER
Door Controller (1-door)	Avigilon	AC-MER-CONT-LP1501
Door Controller (2-door)	Avigilon	AC-MER-CONT-LP1502
Door Controller (1-door/slave PoE)	Avigilon	AC-MER-CON-MR62E
2-Reader Interface Module	Avigilon	AC-MER-CON-MR52
Card Reader	Avigilon	AC-ING-READ-APTIQ-SNG-MT15
Card Reader (Mullion)	Schlage	MT11-485
Power Supply/Cabinet (2 Door)	Avigilon	AC-LSP-2DR-MER-LCK
Power Supply/Cabinet (8 Door)	Avigilon	AC-LSP-8DR-MER-LCK
Video Intercom	Avigilon	3.0C-H4VI-RO1-IR
Electronic Surface Strike (rim style)	Assa Abloy/HES	9600
Electronic Surface Strike (rim style)	Von Duprin	6300
Electronic Latch Set (mortise)	Schlage	ND96EUPD
Latch Retraction Motor (Von Duprin)	Von Duprin	QEL
Latch Retraction Motor (Jackson)	Command Access	MLRK1-JAC12REX
Power Transfer	Von Duprin	EPT
Door Position Switch	George Risk Industries, Inc.	195-12WG
Battery 12VDC, 8AH	ELK, Powersonic	ELK-1280, PS-1280
Proximity Cards	Schlage	8520 - Serialized per District Requirements
Armored Door Loop	SDC	PT-3/8

END OF SECTION

SECTION 28 20 00

VIDEO SURVEILLANCE

PART I - GENERAL

1.01 SUMMARY

- A. This section specifies software, equipment, accessories, wire, materials, installation, configuration, and testing requirements for a complete and operable Video Surveillance system. The system shall provide electronic recording/playback and monitoring of digital cameras installed at the site.

1.02 SCOPE

- A. The work will include but not be limited to the following objectives:
 - 1. Labor and Materials: The Contractor shall provide and pay for all labor, supervision, materials, accessories, wire, components, equipment, tools, transportation, and other facilities and services necessary for the proper installation of a turn-key Video Surveillance system to District.
- A. The CCTV system shall have the following minimum requirements.
 - 1. Cameras
 - a. Weather resistant IP67 or greater (exterior only)
 - b. Network/IP based
 - c. PoE powered
 - d. 5MP or 4K resolution
 - e. H.265 video compression
 - f. Day/night with IR illumination
 - g. Motion detection
 - h. ONVIF
 - 2. Network Video Recorder
 - a. Network/IP based
 - b. H.265 video compression
 - c. RAID 5 or greater
 - d. Record on motion detection
 - e. 30+ day recording
- C. Software
 - a. PC and Mobile viewing
 - b. View live and recorded video
 - c. Search
 - d. Save video to MP4 format
 - e. Notifications

1.03 RELATED REQUIREMENTS

- A. Division 01 - General Requirements
- B. Section 27 00 00 - Communications
- C. Section 27 05 00 - Common Work Results for Communication Systems.
- C. Section 27 10 00 - Structured Cabling

1.04 QUALIFICATIONS

- A. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.
- B. Five years' experience installing Video Surveillance equipment systems.

1.05 SYSTEM REQUIREMENTS

- A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing Video Surveillance system.

1.06 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. See section 27 00 00 for requirements.
- B. Shop drawings are required for this section

1.07 SUBMITTALS

- A. See section 27 00 00 for requirements.

1.08 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. See section 27 00 00 for additional requirements.

1.09 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

PART 2 - PRODUCTS

2.01 GENERAL

- A. See Appendix A at the end of this document for pre-approved materials.
- B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.
- C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory installation/operation.
- D. Product Availability
 - 1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.
 - 2. Subject to compliance with these specifications, products and systems included in this section are to be installed as specified by the manufacturer of the system or engineer approved equal.

2.02 EQUIPMENT

- A. The District's preferred manufacturer for CCTV equipment is i-Pro (formally Panasonic) for cameras and network video recorders (NVR).
- B. The District's preferred manufacturer for video intercom is Avigilon.
- C. Substitutions require proof of equivalence and approval by District and/or its representative.
- D. All exterior cameras to be IP67 rated or better.

PART 3 - EXECUTION

3.01 ACCEPTABLE INSTALLERS

- A. The equipment shall only be installed by Contractors who are qualified to install and maintain the system.
- B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience installing Video Surveillance equipment before the Bid Opening Date.

3.02 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to job bidding. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to District.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

- A. The Contractor shall verify materials are readily available prior to submitting product submittals and notify the Project Manager of long lead time items.
- B. The Contractor shall order all required parts and equipment only after receipt of approved product submittals from the Project Manager.
- C. The Contractor shall coordinate with the District's Technology Services department for needed IP addresses at least 2 weeks prior to configuration/installation.

3.04 SHOP DRAWINGS

- A. The Contractor shall create "Shop Drawings" per section 27 00 00.

3.05 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District's Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.

- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- D. Perform Work with persons experienced and qualified to produce workmanship specified.
- E. Maintain quality control over suppliers and Subcontractors.

3.06 PATHWAY AND EQUIPMENT INSTALLATION

- A. Install all conduit and pathway per design documents. Refer to 27 05 00 for additional information/requirements.
- B. Install all Cat6A cables per design documents. Refer to Section 27 10 00 for additional information/requirements.
- B. Equipment to be installed per manufacturer's instructions.
- C. Devices requiring PoE power shall be connected to a PoE switch in the MDF/IDF data rack – verify for adequate PoE power capacity.

3.07 CONFIGURATION

- A. Program cameras and/or NVR with network IP address using the following scheme.
Note: x=site octet, contact District Electronics shop for site information.
 1. Cameras: 10.x.253.101 = Camera 1, 10.x.253.102 = Camera 2...
 2. NVR: 10.x.253.1
 3. POE Switch: 10.x.253.10 = 1st switch, 10.x.253.11 = 2nd switch...
 4. Gateway: 10.x.0.1
 5. Subnet Mask: 255.255.0.0
- B. All equipment to be fully configured and tested for functionality prior to District acceptance testing.

3.08 CAMERA VIEW

- A. Adjust view aim, zoom and focus camera to show intended view from design documents.

3.09 FIELD QUALITY CONTROL AND TESTING

- A. Upon completion of network programming and initial view setting, notify District of your readiness to perform the formal camera view review with District or its representative. Make all adjustments required from District review.
- B. Submit the Record Drawings (as-builts) to District for review prior to inspection.

- C. During the formal Test & Inspection (Commissioning) of the system, Contractor to have personnel available with tools and equipment to inspect wiring, devices, and system operation.
- D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.
- E. Notify the District when ready to perform a re-inspection of the installation.

3.10 AS-BUILT DRAWINGS

- A. See section 27 00 00 for requirements.

APPENDIX A – Pre-Approved Materials

VIDEO SURVEILLANCE:

DESCRIPTION	MFG.	PART NUMBER
Network Video Recorder 96TB	i-PRO	NVR-RL-2-96TB-V4
NVR license	i-PRO	ASM-300
Network Dome Camera, Outdoor, Vandal Resistant, 5MP with Base Bracket	i-PRO	WV-S25500-V3LG
Network Dome Camera, Indoor, 5MP with Base Bracket	i-PRO	WV-S22500-V3L
Network Multi-Directional Camera, Outdoor (3x4MP Sensors)	i-PRO	WV-S8543LG
Network Multi-Directional Camera, Outdoor (4x4MP Sensors)	i-PRO	WV-S8544LG
Wall Mount Bracket	i-PRO	WV-QWL500-W
Back Box	i-PRO	WV-QJB500-W
Corner Bracket	i-PRO	WV-QCN500-W
Sunshade	i-PRO	WV-QSR500-W
Dome Cover	i-PRO	WV-CW7SN
2 RU Din Rack Mount Adapter	Antaira	DIN-Rack-2U
35mm Steel DIN-Rail Track (10")	Antaira	DIN-RAIL-10
35mm Steel DIN-Rail Track (20")	Antaira	DIN-RAIL-20
240W Power Supply	Antaira	NDR-240
480W Power Supply	Antaira	SDR-480-48
10-Port Industrial Gigabit PoE+ Managed Ethernet Switch	Antaira	LMP-1002G-SFP
20-Port Industrial Gigabit PoE+ Managed Ethernet Switch	Antaira	LMP-2004G-SFP
28-Port Industrial Gigabit PoE+ Switch 1RU	Antaira	LNP-2804GN-SFP-T
Gigabit Ethernet-Single Mode Transceiver	Antaira	SFP-S10-T
Video Intercom	Avigilon	3.0C-H4VI-RO1-IR

END OF APPENDIX A
END OF SECTION

SECTION 28 46 00

FIRE DETECTION AND ALARM

PART 1 – GENERAL

1.01 SUMMARY

- A. This section specifies equipment, accessories, wire, materials, installation, configuration and testing requirements for a complete and operable Fire Detection and Alarm system. The system shall provide fire alarm detection, notification, monitoring, command, and control and be connected to the District's existing UL listed monitoring station. New construction shall be Emergency Voice Alarm Communication (EVAC) compliant.

1.02 SCOPE

- A. The installed Fire Alarm system shall comply with all requirements of the currently adopted version of California Fire Code and adopted version of NFPA 72.
- B. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship. Contractors unfamiliar with the District's standards shall familiarize themselves with the District's standards and requirements prior to beginning work.
- C. For new building construction on an existing campus – provide and install all components and accessories as outlined in the design documents for a complete and operable system that extends and seamlessly integrates into the existing campus' Fire Alarm system.
- D. For construction in existing buildings - provide and install all components and accessories as outlined in the design documents to modify the existing system while maintaining code compliance and to seamlessly integrate the new components into the existing campus' Fire Alarm system. Prior to beginning any work, the Contractor is responsible for identifying any existing system errors or faults and bringing these issues to the attention of the District Project Manager.
- E. Labor and Materials: The Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution, operation, and completion of the Work
- F. Contractor shall furnish and install all new conduit/raceway and wire as indicated on the project drawings and/or as required to provide a turn-key system to the District.

- G. The Contractor shall be responsible for the programming of all Fire Alarm Control Panel(s) (FACP) site wide.
- H. With one-week notice the Contractor shall coordinate with the District staff for monitoring connectivity.
- I. Prior to final programming the contractor shall review the proposed final system programming, functionality and expectations with the District project manager, and/or Designer/Engineer. If the system is programmed without approval, all subsequent requested programming changes by the District will be at the Contractor's expense.
- J. After completion of the installation and 100% pretest of the system, a satisfactory final test (compliant with NFPA 72 requirements) of the entire system shall be made in the presence of the inspector of record (IOR) and District or the District's representative.
- K. Provide District an electronic copy of final test results.
- L. Existing system shall remain operable until new system is accepted and approved by the IOR and the District or its representative.
- M. The Contractor is responsible for user/operator training (2 hours).
- N. The Contractor shall complete all required project closeout documentation in a timely fashion.
- O. A single speaker/strobe notification appliance may be used for both Fire alarm and CO detection notification. However, the device shall NOT have the word "FIRE" and requires a distinct temporal (3 or 4) coding with distinct voice notification (see DSA IR 9-2 for more information).

1.03 RELATED REQUIREMENTS:

- A. Division 01 – General Requirements
- B. Division 26 – Electrical
- C. Section 27 00 00 – Communications
- D. Section 27 05 00 – Common Work Results for Communication Systems

1.05 CODES AND STANDARDS:

- A. The installed system shall conform to all California State Codes
 - 1. 2022 California Building Code (CBC)
 - 2. 2022 California Electrical Code (CEC)
 - 3. 2022 California Fire Code (CFC)
 - 4. All equipment shall have California State Fire Marshall listing(s)
 - 5. DSA IR 9-1 Emergency Voice/Alarm Communication Systems
 - 6. DSA IR 9-2 Carbon Monoxide Detection Requirements for Group E Classrooms and Group I-4 Occupancies

- B. National Fire Protection Association (NFPA) - USA:
 - 1. 2020 NFPA 70 - National Electric Code (NEC)
 - 2. 2022 NFPA 72 - National Fire Alarm Code (NFPA 72)
 - 3. 2021 NFPA 101 - Life Safety Code (NFPA 101)
 - 4. Americans with Disabilities Act (ADA)

- C. Local building codes

- D. All requirements of the Authority Having Jurisdiction (AHJ)

1.06 UNDERWRITERS LABORATORY (UL) LISTING

- A. All equipment shall be UL listed for its intended purpose.

- B. Any modification to equipment and/or cabinets that voids the equipment's UL listing is strictly prohibited (i.e. relocated or oversize knock-outs).

- C. Any modified new equipment that voids the UL listing shall be replaced by the Contactor (parts and labor) at their expense.

1.07 QUALIFICATIONS:

- A. The Contractor shall possess a California C10 license.

- B. The installing Contractor or Subcontractor shall be FACP manufacturer authorized to provide and install equipment with 5 years of documented experience.

- C. The programming technician shall possess a valid manufacturer's programming certification.

- D. The Contractor shall have at least one NICET certified in Fire Alarm Technology, level II (or greater) personnel as the on-site supervising technician who is always on site when Fire Alarm activities are taking place.

- E. The installation company and its subcontractors shall have an office located within 50 miles of the project site.

1.07 REFERENCES

- A. See Section 27 00 00

1.08 SYSTEM REQUIREMENTS

- A. Site Compatibility

- 1. Any new installations or modifications to an existing system shall seamlessly integrate into the site's existing Fire Alarm system.

1.09 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. See Section 27 00 00 for requirements.

1.10 SUBMITTALS

- A. See Section 27 00 00 for requirements.
- B. Provide copies of certificates listed in the QUALIFICATIONS section above.

1.11 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. After the satisfactory completion letter has been received, a continuous and fault free thirty (30) day "burn-in" period shall begin. Any fault shall reset the "burn-in" period to zero (0). Warranty shall commence at day 31 of a successful and continuous "burn-in" period.

PART 2 – PRODUCTS**2.01 EQUIPMENT AND MATERIAL, GENERAL:**

- A. The District preferred fire alarm control panel manufacturers are FireLite for Elementary and Notifier for Middle and High Schools.
- B. See Appendix A for pre-approved equipment listings.
- C. All products shall be new and unused and shall be of manufacturer's current and standard production.
- D. Where two or more equipment items of the same kind are provided, all shall be identical and provided by the same manufacturer.
- E. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. The Contractor shall provide all components needed for complete and satisfactory system operation.
- F. Product availability:
 - 1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.
 - 2. Certain products specified may only be available through factory authorized dealers and distributors. The Contractor shall verify his ability to procure the products specified prior to submitting a proposal.
- G. In compliance with DSA IR 9-2 for CO Detection, in areas where CO detection is needed EVAC notification appliances will be utilized for Fire Alarm and Carbon Monoxide alerts, promoting a building wide evacuation. For this reason, interior notification appliances (Speaker/Strobes) shall not have the word "FIRE" on the device.

2.02 CONDUIT AND RACEWAY

- A. See Section 27 05 00 for conduit and raceway requirements.

2.03 WIRE AND CABLE

- A. Provide all new wire and cable required to install systems as indicated on design documents or approved shop drawings.

- B. Approved wire and cable manufacturer is West Penn, substitutions require prior approval.
- C. All cable shall be jacketed, and jacket color shall be red (OSP cable excluded). No THHN/THWN allowed.
- D. All cables shall be specifically designed for their intended use and installation requirements (FPL, plenum, direct burial, aerial, etc.).
- E. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG solid for initiating device circuits and signaling line circuits, 12 AWG stranded for notification appliance circuits and 14 AWG stranded for emergency voice communication circuits. (Coordinate with wire schedule)

2.05 BATTERIES

- A. Shall be new 12-volt, sealed lead-acid type.
- B. Battery shall be sized according to calculations on design drawings.
- C. Approved battery manufacturer: Powersonic or approved equal

2.06 EXTRA STOCK:

- A. For projects with less than 10 new Fire Alarm devices – no extra stock required.
- B. For projects with 11 – 50 new Fire Alarm devices – provide extra stock of 1 (ea.) Smoke detector (current model), 1 (ea.) Heat detector (current model) and 1 (ea.) Pull station (current model)
- C. For projects over 50 new Fire Alarm devices – provide extra stock of 2 (ea.) Smoke detector (current model), 1 (ea.) CO detector (current model), 1 (ea.) Wall speaker/strobe (current model) and 1 (ea.) Ceiling speaker strobe (current model) per 100 Fire Alarm device increments.
- D. For projects over 300 new Fire Alarm devices – provide devices listed in sections C (above) plus 1 (ea.) Power Booster (current model)

PART 3 – EXECUTION

3.01 INSTALLATION:

- A. The installing company shall employ a minimum of one National Institute for the Certification in Engineering Technologies (NICET) Fire Alarm Systems, level II technician. To ensure system integrity, the NICET level II technician shall be on site during all fire system related work to guide the installation of conduit, back-boxes, device placement, device installation, programming, pre-testing, and final testing of the system.
- B. The District, Inspector of Record (IOR), Construction Manager or an agent of the District shall have the authority to stop work until the certified personnel requirement is met. The Contractor shall be held accountable for meeting completion dates.
- C. Installation shall be in accordance with the CBC, CEC, CFC, NFPA 72, local and national codes.
- D. Fire Alarm cables shall not be installed in decking flutes as pathway. Any conduit that needs to be located in decking flutes needs to be rigid.
- E. All Fire Alarm cables shall be run unexposed (not observable from occupiable space) throughout the entire cable path – either in conduit, on ladder racking, on j-hooks above ceilings or below flooring.
- F. All fire devices and panels shall be mounted at the height as indicated on the design plans and shall comply with local, CBC, CEC, CFC, and NFPA 72 codes and standards. Any code discrepancies shall be brought to the Designer/Engineer and Project Manager's attention.
- G. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place with fasteners and supports in accordance with drawings and specifications.
- H. Signal line circuits (SLC) for initiating devices shall be wired Class B.
- I. Notification appliance circuits (NAC) shall be wired Class B.
- J. CO detection to initiate a building wide evacuation in accordance with DSA IR 9-2.
- K. Smoke detectors shall remain covered until operational. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and/or physical damage and may require additional testing and/or replacement.
- L. All addressable smoke or heat devices shall have trim skirts.

- M. All modules with indicator lights (i.e., Monitor Modules & etc.) shall be mounted where the indicator lights are observable from the occupiable space.
- N. Smoke relief hatches are to have door contacts installed and monitored with a monitoring module. The opening of the hatch shall produce a Supervisory event notification. Monitoring module height is to be 10' AFF or less.
- O. Fire alarm circuits shall have a red breaker lock on device per NFPA 72 requirements.
- P. All modifications to electrical power shall be made by a licensed electrician.
- Q. Headend FACP and associated equipment layout per design documents. If no layout exists Contractor to notify and receive guidance from District or District's representative prior to install.
- R. All Duct Smoke Detector / Fire Smoke Damper shutdown to be coordinated with Div 23.

3.02 LABELING

- A. All labels are to be machine generated black letters on white adhesive label stock that is appropriate for the installation environment (interior/exterior).
- B. Device ID Labels are to be 1/4" lettering for mounting heights 10' AFF or less, 1/2" black lettering on white labels for mounting heights greater than 10' AFF.
- C. All panels and power supplies shall be labeled indicating AC electrical power panel and circuit breaker number and panel location.
- D. All panels and power supplies shall be identified per design plans.
- E. All smoke and heat detectors shall be labeled with Point ID affixed to the trim skirt. Labels are to be visible when approaching the device from the room entry.
- F. All modules are to be labeled with Point ID and function and/or associated equipment (i.e., FAN SHUTDOWN, HVAC UNIT XX, ATTIC HEAT, etc.)
- G. All notification devices shall be labeled with NAC Point ID.
- H. All cables in cabinets shall be labeled with function and circuit ID.
- I. All end-of-line devices shall have a "EOL" label.

3.03 PANEL PROGRAMMING/SOFTWARE MODIFICATION

- A. The contractor shall review the proposed system programming, functionality, expectations with the District or its representative 10 days prior to final programming.
- B. Contractor shall provide the services of a factory trained, and authorized technician to perform all system software modifications, upgrades, or changes on site. No remote programming is allowed.
- C. Contractor shall provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system.
- D. Programming syntax shall be consistent with the existing site for label text and numbering scheme.

3.04 PRE-TESTING

- A. The entire system shall be checked and pre-tested by the Contractor and shall test free of all faults prior to calling for a final test.
- B. Before energizing the cables and wires, check for correct connections and test for open circuits, short circuits, ground faults, continuity, and any physical damage to the cable/wire insulation that may have occurred during installation.

3.05 TESTING AND GUARANTEE

- A. Upon completion of the installation of the system, a test consisting of 100% of all newly installed and 10% of existing relevant system components shall be performed to confirm operation and function. This test shall be done in the presence of the Inspector of Record (IOR) and the District or its representative.
- B. Provide the Project Manager with 7 days in advance written notice of system readiness for Final Testing and Inspection. The system shall be 100% pre-tested and fully operable with no trouble conditions prior to the final test.
- C. Provide the service of a NICET level II technician to supervise and participate in all the adjustments and/or testing of the system.
- D. Testing and adjustments
 - 1. Verify that all devices operate per Design documents matrix (matrices.)
 - 2. Verify the Point IDs and descriptions as indicated on the updated (redlined) Design Documents Floor Plan.

3. Verify the candela settings of all NAC devices with strobes.
4. Verify the intelligibility for all EVAC notification appliance speakers.
5. Verify and document that sound levels at all EVAC notification appliance speakers meet or exceed the minimum sound levels as indicated in the design drawings for expected average ambient or maximum sound levels. Testing to be conducted using dBA setting, 5' above finished floor and 10' from speaker with a stand-alone meter (Galaxy Check Mate series or equal).
6. Contractor to adjust speaker wattage settings as required to meet sound levels required after testing.
7. Verify proper alarm and trouble of all sprinkler system flow valve(s).
8. Verify that an open circuit on the initiating device circuit activates a trouble signal locally for all circuits.
9. Verify that an open or a short circuit on the signaling line circuit activates a trouble signal locally for all circuits.
10. Verify that an open or short circuit on the notification appliance circuit activates a trouble signal locally for all circuits.
11. Verify that a ground condition on an initiating device circuit activates a trouble signal locally for all circuits.
12. Verify that a ground condition on a signaling line circuits activates a trouble signal locally for all circuits.
13. Verify that a ground condition on a notification appliance circuit activates a trouble signal locally for all circuits.

3.06 DEMOLITION

- A. See section 27 05 00, for requirements

3.07 FINAL DOCUMENT SUBMITTALS

- A. See section 27 00 00, for additional requirements
- B. Submit completed NFPA certification forms as found in NFPA 72. Forms shall be submitted in typewritten format.

- C. Provide District an electronic copy of final test results.
- D. Contractor “red-line as-built” drawings shall also include the following: The drawings shall depict, at a minimum, the following conditions:
 - 1. The device exact installed location.
 - 2. Device updated labeling ID(s), which shall match the physical label at the device.
 - 3. Revised risers to match record set point to point installation and
 - 4. Updated battery calculation with quantity of device changes.
 - 5. New pathways, conduit, ground boxes, junction boxes, raceway, power-poles and floor-monuments.
 - 6. Any other new conditions.
- E. The Contractor shall submit “red-line as-built” drawings as indicated on project schedule.
- F. Warranty:
 - 1. Refer to Division 01 Warranty section.
 - 2. After the satisfactory completion letter has been received, a continuous and fault free thirty (30) day “burn-in” period shall begin. Any fault shall reset the “burn-in” period to zero (0). Warranty shall commence at day 31 of a successful and continuous “burn-in” period.

APPENDIX A – Pre-Approved Materials

DESCRIPTION	MFG	PART NUMBER
Fire Alarm Control Panel	Fire-Lite	MS9600UDS
Voice EVAC Control Panel	Fire-Lite	ECC-50/100
Remote Fire Annunciator	Fire-Lite	LCD-80F
Smoke Detector	Fire-Lite	SD365
Heat Detector (Rate of Rise)	Fire-Lite	H365R
Heat Detector (Non-addressable)	System Sensor	5602
CO Detector	Fire-Lite	SD355CO
Pull Station	Fire-Lite	BG-12LX
Monitor Module (Single)	Fire-Lite	MMF-300
Monitor Module (Dual)	Fire-Lite	MDF-300
Monitor Module (Mini)	Fire-Lite	MMF-301
DACT	Fire-Lite	DACT-UD2
Remote Amplifier	Fire-Lite	ECC-50DA
Remote Microphone	Fire-Lite	ECC-RM
Booster Power Supply	Fire-Lite	FCPS-24FS6
Horn/Strobe (Wall)	System Sensor	P2RL
Horn/Strobe (Ceiling)	System Sensor	PC2RL
Horn (Outdoor)	System Sensor	HRK
Speaker/Strobe (Wall)	System Sensor	SPSRL
Speaker/Strobe (Ceiling)	System Sensor	SPSCRL
Speaker (Outdoor)	System Sensor	SPRK
Duct Smoke Detector	System Sensor	D4120
Test Switch	System Sensor	RTS-151-KEY
Terminal/Barrier Strip	Ideal Industries	89-608
Dry Contact Input Relay	Functional Devices, Inc.	RIB01BDC
Fire Alarm Control Panel	Notifier	NFS2-3030
Voice EVAC Control Panel	Notifier	NFC-50/100
Smoke Detector	Notifier	FSP-951

Heat Detector (Rate of Rise)	Notifier	FST-951
CO Detector	Notifier	FSCO-951
Smoke/CO Detector	Notifier	FCO-951
Pull Station	Notifier	NBG-12LX
Monitor Module	Notifier	FMM-1
Monitor Module (Mini)	Notifier	FMM-101
Control Relay	Notifier	FRM-1
Isolator Module	Notifier	ISO-X
Remote Power Supply	Notifier	PSE-6
Heat Detector (194°/Rate of rise, Conventional)	System Sensor	5602

SECTION 31 00 00

EARTHWORK

PART 1 - GENERAL

1.01 SUMMARY

A. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 01 50 00, Construction Facilities and Temporary Controls.
3. Section 01 57 13, Erosion Control
4. Section 31 23 33, Trenching and Backfilling.
5. Section 32 12 00, Asphalt Concrete Paving.
6. Section 32 16 00, Site Concrete.
7. Section 32 80 00, Irrigation.
8. Section 32 90 00, Landscaping.
9. Section 33 40 00, Site Drainage.

1.02 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.

1.03 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects discovered in their work during or following completion of the project. Correcting of inadequate compaction or moisture content is the sole responsibility of the contractor.
- D. Tests (See Part 3 for Compaction Testing).
- E. Contractor shall be solely responsible for all subgrades built. Failures resulting from inadequate compaction or moisture content are the responsibility of the contractor. Contractor shall be solely responsible for any and all repairs.

1.04 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.05 REFERENCES AND STANDARDS

- A. General: Site survey, included in the drawings, was prepared by Warren Consulting Engineers and is the basis for data regarding current conditions. While the survey is deemed generally accurate, there exists discrepancies and variations due to elapsed time, weather, etc. Existing dirt grades may vary 0.2 ft. from that shown.
- B. Site Visitation: All bidders interfacing with existing conditions shall visit the site prior to bid to verify general conditions of improvements. Discrepancies must be reported prior to the bid for clarification.
- C. ANSI/ASTM D698-e1 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- D. ANSI/ASTM D1556-e1 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- E. ANSI/ASTM 698-12e2 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- F. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- G. ANSI/ASTM D 4318-10e1 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
- H. CALTRANS Standard Specifications Section 17.
- I. CAL-OSHA, Title 8, Section 1590 (e).
- J. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.07 PROJECT CONDITIONS

- A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he

is to immediately notify the Architect before continuing work.

- B. Excavation dewatering may be necessary. Contractor shall provide any and all tools, equipment and labor necessary for excavation dewatering no matter what the source. Dewatering shall be continuous until all site utilities are installed and backfilled.

1.08 EXISTING SITE CONDITIONS

- A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.09 ON SITE UTILITY VERIFICATION AND REPAIR PROCEDURES

A. Ground-breaking requirements:

1. All underground work performed by a Contractor must be authorized by the District's Construction Manager or the Low Voltage Consultant prior to start of construction.
2. The Contractor is to obtain and keep the original School's construction utility site plans on site during all excavation operations. Contractor can contact the District's Construction Manager, Facilities Manager, or the Low Voltage Consultant to procure the drawings.

B. Underground Utility Locating:

1. The contractor shall hire an Underground Utility Locating Service to locate existing underground utility pathways in areas affected by the scope of work for excavation.
2. Contractor must use an underground utility locator service with a minimum of 3 years' experience. The equipment operator must have demonstrated experience.
3. The Underground Utility Locator Service must have the use of equipment with the ability to locate by means of inductive clamping, induction, inductive metal detection, conductive coupling, or TransOnde (Radio detection) to generate signals, passive locating (free scoping) for "hot" electric, and metal detector.
4. The Underground Utility Locator Service must be able to locate existing utilities at a depth of at least 72".
5. The Underground Utility Locator Service must be able to locate but are not limited to locating the following types of utility pathways:
 - a) All conduit pathways containing 110 volt or greater 50-60Hz electrical wire.
 - b) All conduit pathways containing an active cable TV system.
 - c) All conduit pathways containing wire or conductor in which a signal can be attached and generated without damaging or triggering the existing systems.
 - d) All empty conduit pathways or pipe in which a signal probe or sonde (miniature transmitter) can be inserted.
 - e) All conduit pathways containing non-conductive cables or wires in which a signal probe or sonde (miniature transmitter) can be inserted.
 - f) All plastic and other nonconductive water lines in which a TransOnde Radio detection) or other "transmitter" can be applied to create a low frequency pressure wave (signal) without damaging or triggering the existing systems.

- g) All copper or steel waterlines and plastic or steel gas lines
- 6. All markings made by the Underground Utility Locator Service or other shall be clear and visible.
- 7. The contractor shall maintain all markings made by Underground Utility Locator Service or other throughout the entire length of the project.
- 8. The Underground Utility Locator Service shall provide the contractor with two sets of maps showing the location of utilities and average depth. They will be referenced to permanent buildings. Contractor will deliver one copy to the district at no additional charge.
- 9. Contractor is responsible to contact Underground Service Alert (U.S.A. 800/227-2600) and receive clearance prior to any excavation operations.
- 10. Contractor shall inform the (District's Construction Manager) (Architect) (Owner) no later than five (5) days prior to the date scheduled for the utility locator service to be on site.

1.10 PROTECTION

- A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
- B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
- C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
- D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gullyng of sides of excavation.
- E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
- F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
- G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.

1.11 SEASONAL LIMITS

- A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

- B. Excessively wet fill material shall be bladed and aerated per section 3.08, B.

1.12 TESTING

- A. General: Refer to Section 01 45 00 – Quality Requirements.
- B. Geotechnical Engineer: Owner is retaining a Geotechnical Engineer to determine compliance of fill with Specifications, and to direct adjustments in fill operations. Costs of Geotechnical Engineer will be borne by Owner; except those costs incurred for re-tests or re-inspection will be paid by Owner and back charged to Contractor.
 - 1. If Contractor elects to process or mine onsite materials for use as Suitable Fill, Aggregate Sub Base, Aggregate Base, Rock, Crushed Rock or sand the cost of all testing of this material shall be paid for by the Contractor.
 - 2. Testing of import fill for compliance with Department of Toxic Substance Control (DTSC) shall be paid for by the Contractor.

1.13 ARCHEOLOGICAL AND CULTURAL RESOURCES

- A. If archeological or cultural resources are discovered during the Work, the Contractor must cease all construction operations in the vicinity of the discovery until a qualified archeologist can assess the value of these resources and make recommendations to the State Historic Preservation Officer. Archeological and cultural resources include artifacts, large amounts of bone, shell, or flaked stone, and other evidence of human activity. If the State Historic Preservation Officer or the Owner directs that work be temporarily ceased at the location of an archeological or cultural find, the Contractor must temporarily suspend work at the location.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Engineered Fill Materials: All fill shall be of approved local materials supplemented by imported fill if necessary. "Approved" local materials are defined as local soils tested and approved by Geotechnical Engineer free from debris, and concentrations of clay and organics; and contain rocks no larger than 3-inches in greatest dimension. The soil and rock should be thoroughly blended so that all rock is surrounded by soil. This may require mixing of the soil and rock with a dozer prior to placement and compaction. Clods, rocks, hard lumps or cobbles exceeding 3-inches in final size shall not be allowed in the upper 12 inches of any fill. Native clay or clayey soils will not be permitted within the upper 12 inches of building pad areas or paved areas.
- B. Imported Engineered Fill Material: Imported fill may be required to complete work. Proposed import fill material shall meet the above requirements; shall be similar to the native soils. Import fill shall meet the above requirements; shall have plasticity index of 12 or less; an Expansion Index of 20 or less; be free of particles greater than 3-inches in largest dimension; be free of contaminants and have corrosion characteristics within the acceptable limits. All import fill material shall be tested and approved by Soils Engineer prior to transportation to the site. Proposed fill material shall comply with DTSC guidelines to include Phase 1 environmental site assessment and related tests. Refer to the October 2001 DTSC

Information Advisory for clean imported fill material.

1. DTSC TESTING: Site work contractor is to coordinate testing with an analytical lab, hired by the owner, licensed by the State of California for the DTSC testing. The costs associated with the testing will be paid by the contractor.
2. DTSC testing shall include documentation as to the previous land use, location, and history. Soils shall be analyzed for all compounds of concern to ensure the imported soil is uncontaminated and acceptable. Testing shall be performed per the recommendations included in DTSC Imported Fill Advisory (http://www.dtsc.ca.gov/Schools/upload/SMP_FS_Cleanfill-Schools.pdf). Soils shall be tested prior to import to the project site.
Lab shall determine geographically which tests and analysis comparison will be appropriate for the testing. (CAM 17 / Title 22); (RWQCB) Regional Water Quality Control Board; or (OEHHA) Office of Environmental Health Hazard Assessment.
3. Frequency of testing shall be conducted in accordance with DTSC's Imported Fill Advisory as follows;

Fill Material Sampling Schedule

Area of Individual Borrow Area	Sampling Requirements
2 Acres or less	Minimum of 4 samples
2 to 4 Acres	Minimum of 1 sample every ½ Acre
4 to 10 Acres	Minimum of 8 Samples
Greater than 10 Acres	Minimum of 8 locations with 4 subsamples per location
Volume of Borrow Area Stockpile	
Up to 1,000 Cubic Yards	1 sample per 250 cubic yards
1,000 to 5,000 Cubic Yards	4 samples for the first 1000 cubic Yards + 1 sample per each additional 500 cubic yards
Greater than 5,000 Cubic Yards	12 samples for the first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

4. Reports/ Documentation
 - a. Results of the testing analysis shall be sent to the Owner; Architect; Project Inspector, Project Civil Engineer, DTSC, and DSA. Letter shall reference DSA file and application numbers.

C. Landscape Backfill Material:

1. The top 2" of native topsoil stripped from the site may be used for landscape backfill material provided it meets the requirements as specified in Section 329000.
2. Imported Topsoil may be required to complete work. See Section 329000 for requirements. Proposed Topsoil material shall comply with DTSC guidelines to include Phase 1 environmental site assessment and related tests. Refer to the October 2001 DTSC Information Advisory for clean imported fill material.

D. Water: Furnish all required water for construction purposes, including compaction and dust control.

Water shall be potable.

- E. Aggregate Base: Provide Class 2 3/4" Aggregate Base conforming to standard gradation as specified in Cal Trans Standard Specifications, Section 26,-1.02A.
- F. Decomposed Granite: Decomposed Granite shall be well graded mixture of fine to 1/8" particles in size with no clods. The material shall be free of vegetation, other soils, debris and rock. The material shall be reddish-tan to tan in color.
- G. Decomposed Granite Solidifier: PolyPavement or equal.

PART 3 – EXECUTION

3.01 INSPECTION LAYOUT AND PREPARATION

- A. Prior to installation of the work of this Section, carefully inspect and verify by field measurements that installed work of all other trades is complete to the point where this installation may properly commence
- B. Layout all work, establish grades, locate existing underground utilities, set markers and stakes, setup and maintain barricades and protection facilities; all prior to beginning actual earthwork operations. Layout and staking shall be done by a licensed Land Surveyor or Professional Civil Engineer.
- C. Verify that specified items may be installed in accordance with the approved design.
- D. In event of discrepancy, immediately notify Owner and the Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.02 PERFORMANCE

A. GENERAL:

1. General: Do all grading, excavating and cutting necessary to conform finish grade and contours as shown. All cuts shall be made to true surface of subgrade.
2. Archaeological Artifacts: Should any artifacts of possible historic interest be encountered during earthwork operations, halt all work in area of discovery and immediately contact the Architect for notification of appropriate authorities.
3. Degree of Compaction: Percentage of maximum density, hereinafter specified as degree of compaction required, means density equivalent to that percentage of maximum dry density determined by ASTM D1557 Compaction Test method, and such expressed percentage thereof will be minimum acceptable compaction for specified work.
4. Moisture Content: Moisture content shall be as noted below and as called for on the plans. Moisture content shall be maintained until subgrade is covered by surfacing materials.

3.03 DEMOLITION, DISPOSAL AND DISPOSITION OF UNDESIRABLE MAN-MADE FEATURES

- A. All other obstructions, such as abandoned utility lines, septic tanks, concrete foundations, and the like shall be removed from site. Excavations resulting from these removal activities shall be cleaned of all

loose materials, dish shaped, and widened as necessary to permit access for compaction equipment. Areas exposed by any required over-excavation should be scarified to a depth of 12", moisture-conditioned to 2% above optimum moisture content, and recompacted to at least 90% of the maximum dry density.

3.04 TESTING AND OBSERVATION

- A. All grading and earthwork operations shall be observed by the Geotechnical Engineer or his representative, serving as the representative of the Owner.
- B. Field compaction tests shall be made by the Geotechnical Engineer or his representative. If moisture content and/or compaction are not satisfactory, Contractor will be required to change equipment or procedure or both, as required to obtain specified moisture or compaction. Notify Geotechnical Engineer at least 48 hours in advance of any filling operation.
- C. Earthwork shall not be performed without the notification or approval of the Geotechnical Engineer or his representative. The Contractor shall notify the Geotechnical Engineer at least two (2) working days prior to commencement of any aspect of the site earthwork.
- D. If the Contractor should fail to meet the compaction or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory, as determined by the Geotechnical Engineer or Architect/Engineer.
- E. After each rain event Geotechnical Engineer shall test fill material for optimum moisture. Do not place any fill material until desired moisture is achieved.

3.05 CLEARING AND GRUBBING

- A. Prior to grading, remove all debris off-site. Remove trees and brush including the root systems. Holes resulting from tree and brush removal should be prepared and backfilled in accordance with paragraphs 3.07, 3.08, 3.09, and 3.10. This may require deepening and/or widening the holes to adequately remove disturbed soil and provide room for compaction equipment. Strip the surface of all organics. Stripping's meeting the requirements of Section 32 90 00 may be used in landscape areas only.

3.06 CUTTING

- A. Building pads that are located within a cut/fill transition area will have to be overexcavated to provide a semi-uniform fill beneath the building pad. The portions of building pads located in cut areas shall be overexcavated to provide no more than 1 foot difference in fill placed in the same building pad.
- B. Do all cutting necessary to bring finish grade to elevations shown on Drawings.
- C. When excavation through roots is necessary, cut roots by hand.
- D. Carefully excavate around existing utilities to avoid unnecessary damage. The contractor shall anticipate and perform hand work near existing utilities as shown on the survey, without additional claims or cost.

3.07 STRUCTURAL EXCAVATION

- A. General: Excavate to bear on firm material at contract depth shown on Structural Drawings.
- B. Footings: All footing excavations shall be of sufficient width for installation of formwork, unless earth will retain its position during concreting. All portions of footings above grade must be formed.
- C. Unsuitable Ground: Any errors in structural excavation, soft ground, or clay soils found when excavating shall be reported to Architect. In no case shall work be built on any such soft or clayey unsuitable surface without direction from the Architect. Restore excavations to proper elevation with engineered fill material compacted to 90% of dry density.

3.08 SUBGRADE PREPARATION

- A. Grade compact and finish all subgrades within a tolerance of 0.10' of grades as indicated on Drawings and so as not to pool water. Subgrade within building pads and concrete walks shall be within 0.05' of grades indicated.
- B. After clearing, grubbing and cutting, subsurface shall be plowed or scarified to a depth of at least 12", until surface is free from ruts, hummocks or other uneven features and uniform and free from large clods. Moisture condition to 2% above optimum moisture content and recompact to at least 90% of the maximum dry density as determined by ASTM Test Method D1557. If the existing soils are at a water content higher than specified, the contractor shall provide multiple daily aerations by ripping, blading, and/or disking to dry the soils to a moisture content where the specified degree of compaction can be achieved. After seven consecutive working days of daily aerations, and the moisture content of the soil remains higher than specified, the contractor shall notify the architect. If the existing soils have a moisture content lower than specified, the contractor shall scarify, rip, water and blade existing soil to achieve specified moisture content. The contractor shall make proper allowance in schedule and methods to complete this work.
- C. Subgrade in areas to receive landscaping shall be compacted to 90%.
- D. Where Contractor over-excavates building pads through error, resulting excavation shall be recompacted as engineered fill at Contractor's expense.

3.09 PLACING, SPREADING AND COMPACTING FILL MATERIAL IN BUILDING PAD AND PAVEMENT AREAS

- A. Selected fill material shall be placed in layers which, when compacted, shall not exceed 6 inches in compacted thickness. Each layer shall be spread evenly and thoroughly mixed to insure uniformity in moisture content.
- B. Selected fill material shall be moisture-conditioned to specified moisture content. Selected fill material shall be unfrozen. When moisture content of fill material is below that specified, add water until proper moisture content is achieved. When moisture content is above that specified, aerate by blading or other methods mentioned in 3.08 B until moisture content is satisfactory.
- C. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to a minimum of 90% as determined by the ASTM D1557 Compaction Test. Compact each layer over its entire area until desired density has been obtained.

- D. Recompaction of Fill in Trenches and Compaction of Fill Adjacent to Walls: Where trenches must be excavated, backfill with material excavated. Place in lifts that when compacted do not exceed 6", moisture conditioned to (optimum)(2% above optimum) moisture content, and compact to a minimum of 90% relative compaction in building pad and paved areas, and to 90% relative compaction in landscape areas.
- E. Jetting of fill materials will not be allowed.

3.10 FINAL SUBGRADE COMPACTION

- A. Building Pads: Upper 12" of all final building pad subgrades (including future buildings) shall be uniformly compacted at specified moisture content to at least 90% of maximum dry density, as determined by ASTM D1557 Compaction Test, regardless of whether final subgrade elevation is attained by filling, excavation, or is left at existing grade. After acceptance of final compaction test, contractor shall maintain the required moisture content of subgrade until concrete flatwork is placed.
- B. Concrete Flatwork Areas: Upper 12" of all final subgrades supporting flatwork shall be brought to specified moisture content and shall be uniformly compacted to not less than 90% of maximum dry density, regardless of whether final subgrade elevation is attained by filling, excavation, or is left at existing grade. After acceptance of final compaction test, contractor shall maintain the required moisture content of subgrade until concrete flatwork is placed.
- C. Asphalt Paved Areas: Upper 12" of all final subgrades asphalt pavement shall be brought to specified moisture content and shall be uniformly compacted to not less than 95% of maximum dry density, regardless of whether final subgrade elevation is attained by filling, excavation, or is left at existing grade. After acceptance of final compaction test, contractor shall maintain the required moisture content of subgrade until concrete flatwork is placed.
- D. Other Fill and Backfill: Upper 12" of all other final subgrades or finish grades shall be compacted to 90% of maximum dry density.
- E. Gravel Fill: Do not place compacted gravel fill until after underground work and foundations are in place. Compact gravel fill with vibratory plate or similar equipment to preclude settlement.

3.11 PLACING, SPREADING, AND COMPACTION OF LANDSCAPE BACKFILL MATERIALS

- A. All landscaped areas shall receive topsoil. After subgrade under landscape area has been scarified and brought to 90% maximum dry density, top soil shall be placed evenly to depth of 12" at 85% of maximum dry density.
- B. Project Inspector must verify that materials are uniformly spread to minimum depth specified.

3.13 SLOPE CONSTRUCTION

- A. Cut slopes shall be constructed to no steeper than 2:1 (horizontal:vertical). Fill slopes shall be constructed to no steeper than 2:1 (horizontal:vertical). Prior to placement of fill on an existing slope the existing slope shall be benched. The benches shall be in a ratio of 2 horizontal to 1 vertical. The face

of the fill slopes shall be compacted as the fill is placed, or the slope may be overbuilt and then cut back to the design grade. Compaction by track walking will not be allowed.

3.14 FINISH GRADING

- A. At completion of project, site shall be finished graded, as indicated on Drawings. Finish grades shall be "flat graded" to grades shown on the drawing. Mounding of finish grades will not be allowed unless otherwise directed on the landscape drawings. Tolerances for finish grades in drainage swales shall be $\pm 0.05'$. Tie in new and existing finish grades. Leave all landscaped areas in finish condition for lawn seeding. Landscaped planters shall be graded uniformly from edge of planter to inlets. If sod is used for turf areas the finish grade on which it is placed shall be lowered to allow for sod thickness.
- B. All landscape areas shall be left free of rock or foreign material as specified in Section 32 90 00.
- C. All landscape areas shall be approved by Architect prior to any planting.

3.15 SURPLUS MATERIAL

- A. Excavated material not required for grading or backfill shall be removed from site at contractor's expense.

3.16 CLEANING

- A. Refer to Section 01 74 00.
- B. Remove from fill all vegetation, wood, form lumber, casual lumber, and shavings, in contact with ground; buried wood will not be permitted in any fill.

END OF SECTION

SECTION 31 13 16

TREE PROTECTION

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Tree protection complete as shown and as specified.

B. Related Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 00 00 00 – Site Demolition.
3. Section 32 80 00 – Irrigation.
4. Section 32 90 00 – Landscaping

1.02 SUBMITTALS

- A. Contractor shall submit Tree Protection Area plan to Architect outlining all trees and plants listed by number to be protected and their groupings. All trees and plants shall be grouped in their own Fenced Tree Protection Areas as shown in Drawings.
- B. Contractor shall submit to Landscape Architect in writing a schedule including any and all activity inside Fenced Tree Protection Areas. This schedule to include but not limited to the dates fences are initially installed, altered and dates of fence replacement. Intent of these provisions is that the Tree Protection Zone (TPZ) are fenced for the entire duration with only exceptions of short intervals or specifically defined construction activity needs. Revise schedule as directed by Architect.
- C. Provide a Mediation Plan to keep existing trees and planting irrigated during construction.

1.03 WARRANTY

- A. Guarantee all workmanship and materials hereunder against defective workmanship and materials, including damage by leaks and settlement of irrigation trenches, for the duration specified in Division 01 of these Specifications. (The Contractor is not responsible for vandalism or theft after date of final acceptance.)

PART 2- PRODUCTS

2.01 MATERIALS

- A. Use materials as specified; any deviation from the Specifications must first be approved by the Owner's Representative in writing. All material containers or certificates shall be clearly marked by

manufacturer as to contents for inspection.

B. Trunk Protection constructed of:

1. 20-foot long 2x6 wood boards or length needed to protect the trunk if tree trunk is shorter than 20'.
2. Metal wire. Gauge strong enough to tie the boards around the trunk of the tree.

C. Tree Protection Zone Fencing:

1. 4-foot-tall snow fencing or 6-foot-tall metal chain link construction fencing per the discretion of the Landscape Architect or District Representative.

D. Bark Mulch: Untreated, shredded cedar.

PART 3 – EXECUTION

3.01 PREPARATION

A. Maintain pre-existing moisture levels.

B. Maintain areas inside the fenced tree protection area including lawn mowing, leaf removal, operation and repair of irrigation.

C. Protect root systems from flooding, erosion, excessive watering and drying resulting from dewatering or other operations:

D. Prohibitions - DO NOT:

1. Allow run off or spillage of damaging materials in vicinity of root systems,
2. Rinse tools or equipment under trees,
3. Store materials, stockpile soil, park or drive vehicles within drip lines or in areas with plants,
4. Cut, break skin or bark, bruise roots or branches,
5. Allow fires under and adjacent trees and plants,
6. Discharge exhaust under foliage,
7. Secure cable, chain, or rope to trees,
8. Change grade within drip line of trees without Landscape Architect's approval,
9. Lime shall not be used.

3.02 INSTALLATION

A. Tree Trunk Protection

1. Conform to requirements for trees and plants to be retained, per 3.01, above.
2. Install boards vertically around tree and bind together with wire to protect the bark 360 degrees around the entire tree prior to start of any demolition and construction. Boards are not to dig

into bark.

3. Major scaffold limbs may require plastic fencing or straw waddles to be wrapped around them to protect them.

B. Tree Dripline Protection

1. The Tree Protection Zone (TPZ) is a restricted area around the base of the tree with a radius of one foot (1') for every inch of tree trunk diameter or ten feet, which is greater, enclosed by tree protection zone fencing.
2. Signage designating the protection zone and penalties for violations shall be secured in prominent location on each protection fence.

C. Requirements for Trees to be Protected

1. Duration: Tree protection shall be erected before demolition, grading, or any construction begins and remain in place until final inspection of the project.
2. Conform to requirements for trees and plants to be retained, per 3.01, above.
3. Architect shall give final review of Tree Protection before construction to begin. Revise schedule as directed by Architect.
4. Vehicle movement within the TPZ will only be allowed for construction equipment.
 - a. Within dripline, apply 10-inch layer of mulch over geotextile fabric.
5. Perform trenching operations within the TPZ of the tree so that:
 - a. Digging shall be by hand using narrow trenching shovel,
 - b. No roots larger than 2" diameter are cut and utilities are routed around or below them,
 - c. Roots smaller than 2" diameter are cut with sharp tools, saws, loppers- not torn, chopped or broken.
6. Where roots are exposed:
 - a. Do not allow the roots to dry out,
 - b. On the same day the excavation is made, provide temporary backfill to original grade at tree roots,
 - c. Or cover roots with 4 layers of wet untreated burlap, made wet each day, including weekends.
7. Roots larger than 3" in diameter are not to be cut without review and approval of Arborist.

3.03 REPAIR/RESTORATION:

- A. It shall be the responsibility of Contractor to repair or replace any damaged trees.
- B. Repair trees damaged by operations:
 1. within 24 hours of damage,
 2. to satisfaction of Landscape Architect,
 3. to ISA Pruning Standards.
- C. Replace repaired trees where repair has not restored them to health or aesthetics:

1. within 6 months of request to replace,
 2. to the satisfaction of Landscape Architect,
 3. with replacement plants of a size and variety matching those that were removed
- D. Replaced trees and plants shall be the responsibility of Contractor to maintain in good health and aesthetics for the duration of the project from installation.
1. Contractor shall submit to Landscape Architect comprehensive maintenance plan for replacement tree, including but not limited to provisions for irrigation system independent of existing system.
- E. Where suitable replacement of trees and plants are not available:
1. Contractor shall provide affidavits to Landscape Architect that they are not available.
 2. Contractor shall provide compensation to the State at the following rates:
 - a. \$2000 for each caliper inch of any tree or plants removed under 12 inches.
 - b. \$4000 for each caliper inch of any tree or plants removed 12 inches or more.
 - c. Caliper of trees and plants measured at 6 inches above grade.
 - d. Caliper defined here as thickness of diameter, measured in inches.
- F. Soil Contamination:
1. Contractor shall remove soil that has been contaminated during the performance of the Work by oil, solvents, and other materials which could be harmful to trees and plants, and replace with good soil, at Contractor's expense.

END OF SECTION

SECTION 31 23 33

TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.01 SUMMARY

A. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 01 50 00, Construction Facilities and Temporary Controls.
3. Section 01 57 13, Erosion Control
4. Section 31 23 33, Trenching and Backfilling.
5. Section 32 12 00, Asphalt Concrete Paving.
6. Section 32 16 00, Site Concrete.
7. Section 32 80 00, Irrigation.
8. Section 32 90 00, Landscaping.
9. Section 33 40 00, Site Drainage.

1.02 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. Contractor / Installer shall have been in business for five (5) years providing/finishing similar size projects and complexity.

1.03 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Submit Manufacturers data and shop drawings.

1.04 WARRANTY

- A. Submit fully executed warranty for work and materials in this section per 01 78 36.

1.05 REFERENCES AND STANDARDS

- A. California Building Code current edition.
- B. California Plumbing Code current edition.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.07 PROJECT CONDITIONS

- A. Contractor shall acquaint himself with all existing site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
- B. Field verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.
- C. Trench dewatering may be necessary. Contractor shall provide any and all tools, equipment and labor necessary for trench dewatering no matter what the source. Dewatering shall be continuous until all site utilities are installed and backfilled.

1.08 PROTECTION

- A. Adequate protection measures shall be provided to protect workers and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations. Repair all trenches in grass areas with new sod (seeding not permitted) and "stake-off" for protection.
- B. Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
- C. Any construction review of the Contractor's performance conducted by the Architect or Owner is not intended to include review of the adequacy of the Contractor's safety measures, in, on or near the construction site.
- D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gullyng of sides of excavation.
- E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. Keep all excavations free from water during entire progress of work, regardless of cause, source or nature of water.
- F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.

- G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance.
- H. Trees: Carefully protect existing trees which are to remain.

1.09 TRENCH SAFETY PROVISIONS

- A. General Contractor shall be solely responsible for safety design, construction and coordination with agencies having jurisdiction. If such plan varies from shoring system standards established by Construction Safety Orders, plan shall be prepared by registered civil or structural engineer.
- B. Nothing herein shall be deemed to allow use of shoring, sloping or protective system less effective than that required by Construction Safety Orders of California State Division of Industrial Safety.
- C. When trenching through paved surface, provide steel trench plates to cover open trenches daily until trenches are backfilled.

1.10 SEASONAL LIMITS

- A. No backfill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by heavy rains, full operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.
- B. Material above optimum moisture shall be processed per section 310000, 3.08, B.

1.11 TESTING

- A. General: Refer to Section 01 45 00 – Quality Requirements.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Backfill materials: Pipeline and conduit trench backfill as shown on the plans and as specified below.
 - 1. ¾ inch crush rock.
 - 2. Native Materials: Soil native to Project Site, free of wood, organics, and other deleterious substances. Rocks shall not be greater than 3-inches.
 - 3. Sand: Fine granular material, free of organic matter, mica, loam or clay.
 - 4. Lean Mix Concrete/Controlled Density Backfill: 2 sacks cement slurry.
 - 5. Class 2 aggregate base, ¾" rock, per Caltrans section 26-1.02B
- B. Water: Furnish all required water for construction purposes, including compaction and dust control. Water shall be potable.
- C. Provide other bedding and backfill materials as described and specified in Section 31 00 00, Section 33 40 00 and Divisions 15 and 16.

PART 3 – EXECUTION**3.01 INSPECTION****A. Verification of Conditions:**

1. Examine areas and conditions under which work is to be performed.
2. Identify conditions detrimental to proper or timely completion of work and coordinate with General Contractor to rectify.

3.02 COORDINATION

- A. General Contractor shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 INSTALLATION

- A. Perform work in accordance with pipe manufacturer's recommendations, as herein specified and in accordance with drawings.

3.04 TRENCHING

- A. Make all trenches open vertical construction with sufficient width to provide free working space at both sides of trench around installed item as required for caulking, joining, backfilling and compacting; not less than 12 inches wider than pipe or conduit diameter, unless otherwise noted.
- B. Carefully excavate around existing utilities to avoid unnecessary damage. The contractor shall anticipate and perform hand work near existing utilities as shown on the survey, without additional claims or cost.
- C. Trench straight and true to line and grade with bottom smooth and free of edges or rock points.
- D. Where depths are not shown on the plans, trench to sufficient depth to give minimum fill above top of installed item measured from finish grade above the utility as follows:
- | | |
|----------------------------------|---------------|
| 1. Sewer pipe: | depth to vary |
| 2. Storm drain pipe: | depth to vary |
| 3. Water pipe - Fire Supply: | 36 inches |
| 4. Water pipe – Domestic Supply: | 30 inches |
- E. Where trench through existing pavement saw cut existing pavement in straight lines. Grind existing asphalt on each side of trench 3" wide x ½ the depth of the section. Apply tact coat to vertical surfaces before installing new asphalt. Replace asphalt and concrete pavement sections to matched existing conditions. In concrete pavement provide expansion and control joints to match existing joint layout.

3.05 BACKFILL

- A. Pipe Trench Backfill is divided into three zones:
1. Bedding: Layer of material directly under the pipe upon which the pipe is laid.
 2. Pipe Zone: Backfill from the top of the bedding to 6 inches (compacted) over the top of the pipe.
 3. Upper Zone: Backfill between top of Pipe Zone and to surface of subgrade.
- B. Bedding: Type of material and degree of compaction for bedding backfill shall be as defined in the Details and Specifications.
- C. Pipe Zone and Upper Zone Backfill:
1. Type of material and degree of compaction Pipe Zone and Upper Zone Backfill shall be as required by Drawings, Details, & Specifications.
 2. Upper Zone Backfill shall not be placed until conformance of Bedding and Pipe Zone Backfill with specified compaction test requirements has been confirmed.
 3. Backfill shall be brought up at substantially the same rate on both sides of the pipe and care shall be taken so that the pipe is not floated or displaced. Material shall not be dropped directly on pipe.
- D. Backfill Compaction:
1. Backfill shall be placed in layers which, when compacted shall not exceed 6 inches in thickness. Each layer shall be spread evenly and thoroughly mixed to insure uniformity. Do not backfill over, wet, frozen or soft subgrade surfaces. Employ a placement method that does not disturb or damage foundation walls, perimeter drainage, foundation damp-proofing, waterproofing or protective cover.
 2. When moisture content of fill material is below that required to achieve specified density, add water until proper moisture content is achieved. When moisture content is above that required, aerate by blading or other methods until specified moisture content is met, see section 310000, 3.08, B.
 3. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to 90% of maximum dry density while at specified moisture content. Compact each layer over its entire area until desired density has been obtained.
 4. The top 12 inches of subgrade compaction under pavement or building shall be per Earthwork section 31 00 00.
 5. Compaction: All backfill operations shall be observed by the Inspector of Record and/or Geotechnical Engineer. Field density tests shall be made to check compaction of fill material. If densities are not satisfactory, Contractor will be required to change equipment or procedure or both, as required to obtain specified densities. Notify Inspector and Architect at least 24 hours in advance of any operation.
- E. Backfill in Areas Previously Lime or Cement Treated
1. If trenching is necessary in areas that have been previously lime treated the contractor shall backfill the trench with class 2 aggregate base, with minimum section equal to the lime treated section and compacted to 95%.

3.06 TRENCH AND SITE RESTORATION

- A. Finished surface of trenches shall be restored to a condition equal to, or better than the condition as existed prior to excavation work.

3.07 PROTECTION

- A. Protect existing surfaces, structures, and utilities from damage. Protect work by others from damage. In the event of damage, immediately repair or replace to satisfaction of Owner.
- B. Repair existing landscaped areas to as new condition. Replant trees, shrubs or groundcover with existing materials if not damaged or with new materials if required. Replace damaged lawn areas with sod, no seeding will be permitted.
- C. Replace damaged pavement with new compatible matching materials. Concrete walks to be removed to nearest expansion joint and entire panel replaced. Asphalt to be cut neatly and replaced with new materials.
- D. Any existing materials removed or damaged due to trenching to be returned to new condition.

3.08 SURPLUS MATERIAL

- A. Remove excess excavated material, unused materials, damaged or unsuitable materials from site.

3.09 CLEANING

- A. Refer to Section 01 74 00.
- B. Contractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others throughout the project and at the completion of work.
- C. After completion of work in this section, remove all equipment, materials, and debris. Leave entire area in a neat, clean, acceptable condition.

END OF SECTION

SECTION 32 12 00

ASPHALT CONCRETE PAVING

PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. Asphalt paving mix designs.
2. Aggregate Base Course.
3. Asphalt Overlay.
4. Seal Coat and Striping.

B. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 01 50 00, Construction Facilities and Temporary Controls.
3. Section 310000, Earthwork.

1.03 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the contractor.
- D. Contractor shall provide verification that asphalt mix temperature meets the requirements of this specification at time of application.
- E. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction are the responsibility of the contractor.
- F. Sieve analysis from testing laboratories identifying rock/sand percentages within the asphalt mix shall have a testing date within 90 days of contract signing.
- G. Sieve analysis from a testing laboratory identifying rock/sand percentages within the class 2 aggregate base rock shall have a testing date within 90 days of contract signing.

1.04 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.

1.05 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.06 REFERENCES AND STANDARDS

- A. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
- B. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557-02 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- D. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- E. ANSI/ASTM D 4318-05 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
- F. CALTRANS Standard Specifications.
- G. CAL-OSHA, Title 8, Section 1590 (e).
- H. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.08 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Base Course: Do not lay base course on muddy subgrade, during wet weather, or when

atmospheric temperature is below 40 degrees F.

2. Asphalt Surfacing: Do not apply asphaltic surfacing on wet base, during wet weather, or when atmospheric temperature is below 50 degrees F.
- B. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
 - C. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
 - D. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
 - E. Any construction review of the Contractor's performance conducted by the owner's representative is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
 - F. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
 - G. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
 - H. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.
 - I. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

1.09 TESTING

- A. General: Refer to Section 01 40 00 – Quality Requirements.
- B. Geotechnical Engineer: Owner is retaining a Geotechnical Engineer to determine compliance of fill with Specifications, and to direct adjustments in fill operations. Costs of Geotechnical Engineer will be borne by Owner; except those costs incurred for re-tests or re-inspection will be paid by Owner and backcharged to Contractor.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Sterilant: Soil sterilizer shall be CIBA GEIGY's PramatoI 25-E or Thompson-Hayward Casoron.
 - 1. Soil sterilizer shall be applied in strict accordance with manufacturer's instructions.
- B. Base Course Aggregate: State Specifications, Section 26, Class 2 aggregate base (3/4" max.).
- C. Asphalt Binder: Steam-refined paving asphalt conforming to State Specifications, Section 92, viscosity grade PG 64-10. Asphalt binder additives for HMA per Caltrans approved list of manufacturer's.
- D. Liquid Asphalt Tack Coat: Per CALTRANS section 94.
- E. Surface Course Aggregate: Mineral aggregates for Type "B" asphalt concrete, conforming to State Specifications 39-2.02, Type B, 1/2" maximum, medium grading. 3/8" maximum grading at Playcourt.
- F. Seal Coat: shall be a pre-mixed asphalt emulsion blended with select fillers and fibers such as:
 - 1. "Park-Top No. 302", Western Colloid Products.
 - 2. "OverKote", Reed and Gram.
 - 3. "Drivewalk", Conoco Oil.
- G. Wood Headers and Stakes: Pressure treated.
- H. Pavement Marking: Colors as directed by Architect. Colors of painted traffic stripes and pavement markings must comply with ASTM D 6628.
 - 1. Waterborne traffic line - colors white, yellow and red, State specification PTWB-01R3.
 - 2. Waterborne traffic line for the international symbol of accessibility and other curb markings – blue, red and green, Federal specification TT-P-1952F.
- I. Precast Concrete Bumpers: 3000 psi at 28 day minimum strength; 48" length unless otherwise indicated; provide with steel dowel anchors and concrete epoxy.
- J. Pavement Epoxy; K-Lite; KtepX-590; Ennis Epoxy HPS2 or an approved equal.
- K. Crack Filler;
 - 1. Cracks up to 1/2": QPR model CAR08, 10oz asphalt crack filler; Star STA-FLEX Trowel Grade crack filler or approved equal.
 - 2. Cracks 1/4" – 1": "Docal 1100 Viscolastic, distributed by Conoco, Inc., Elk Grove, CA, (916) 685-9253, or approved equal.
 - 3. Cracks greater than 1": Hot Mix, Topeka.
- L. Reclaimed Asphalt Pagment (RAP). HMA Type A or Type B may be produced using RAP providing it does not exceed 15% of the aggregate blend.

2.02 MIXES

- A. General: Plant mixed conforming to State Specifications, Section 39, Type B, ½" maximum, medium grading. 3/8" maximum grading shall be used at hardcourt.
- B. Temperature of Hot Mix Asphalt: Not less than 275 degrees F nor more than 325 degrees F when added to aggregate.
- C. Temperature of Hot Mix Aggregate: Not less than 250 degrees F nor more than 325 degrees F when asphalt is added.
- D. Temperature of Hot Mix Asphalt Concrete: Asphalt shall be not less than 285 degrees at time of application, nor more than 350 degrees. Asphalt not meeting the required temperature shall not be used.
- E. Temperature of Warm Mix Asphalt: Mixing and placement; Per the approved manufactures heat range recommendations for mixing and placement.

PART 3 - EXECUTION

3.01 EXAMINATION OF CONDITIONS

- A. Conditions of Work in Place: Subsurfaces which are to receive materials specified under this Section shall be carefully examined before beginning work hereunder, and any defects therein shall be reported, in writing, to the Architect. Work shall not be started until such defects have been corrected. Starting of work shall imply acceptance of conditions as they exist.

3.02 PREPARATION

- A. Sub-Grade: Clean, shape and compact to hard surface free from elevations or depressions exceeding 0.05' in 10' from true plan. Compact per Section 31 00 00. Compaction and moisture content shall be verified immediately prior to placement of aggregate base. Proof roll subbase in presence of geotechnical engineer prior to placement of aggregate base.
- B. Cleaning: Existing surfaces and new surface shall be clean of all dirt, sand, oil or grease. All cracks shall be cleaned and free of all debris and vegetation. Hose down entire area with a strong jet of water to remove all debris.

3.03 INSTALLATION

- A. Headers:
 - 1. General: Install as edging to asphalt paving, except where adjoining existing pavement, concrete curbs, walks or building.
 - 2. Existing Headers: Remove existing headers where new paving will join existing. Saw cut existing asphalt to provide clean edge.
 - 3. Lines and Levels: Install true to line and grade. Cut off tops of stakes 2-inches below top of header

so they will not be visible on completion of job.

B. Asphalt Paving:

1. Base Course: Install in accord with State Specifications, Section 26. Compact to relative compaction of not less than 95%, ASTM D1557. The material shall be deposited on the subgrade in such a manner as to provide a uniform section of material within five percent tolerance of the predetermined required depth. Deposition will be by spreader box or bottom dump truck to prevent segregation of the material. The material so deposited on the subgrade shall have sufficient moisture which, in the opinion of the Architect is adequate to prevent excessive segregation. It shall then be immediately spread to its planned grade and cross section. Undue segregation of material, excessive drifting or spotting of material will not be permitted. If in the opinion of the site geotechnical engineer, the material is unsuitably segregated, it shall be removed or completely reworked to provide the desired uniformity of the material.
 - a. Moisture content and compaction of base material shall be tested immediately prior to placement of asphalt paving.
2. Sterilant: Apply specified material at manufacturer's recommended rate. Applicator of sterilant material shall be responsible for determining location of all planter areas. Apply specified material over entire base course area just prior to application of asphalt. Follow manufacturer's printed directions.
3. Liquid Asphalt Tack Coat: Apply as "tack coat" to all vertical surfaces of existing paving, curbs, walks, and construction joints in surfacing against which paving is to be placed.
4. Asphalt Concrete Surface Course:
 - a. Comply with State Specifications, 39-6 except as modified below.
 - 1) Final gradation shall be smooth, uniform and free of ruts, humps, depressions or irregularities, with a minimum density of 91% of the theoretical maximum specific gravity determined by California Test Method #309. Maximum variation 1/8 inch in 10' when measured with steel straightedge in any one direction. Test paved areas for proper drainage by applying water to cover area. Correct portions that do not drain properly by patching with plant mix. In no case shall accessible parking spaces or loading and unloading areas exceed 2% slope in any direction.
 - 2) Asphalt material shall be delivered to the project site in a covered condition to maintain acceptable temperature. Onsite inspector shall verify temperature of asphalt upon truck arrival to the site.
5. Placement and adjustment of Frames, Covers, Boxes and Grates: The Contractor shall set and adjust to finish grade all proposed and existing frames, covers, boxes, and grates of all manholes, drop inlets, drain boxes, valves, cleanouts, electrical boxes and other appurtenant structures prior to placement of asphaltic concrete.
6. Water Testing: All paved areas shall be water tested, to check drainage, in the presence of the project inspector prior to placement of seal coat. The surface of asphalt paving shall not vary more than 1/8 inch above or below the grade established on the plans. If variations in grade are present, they will be corrected by overlaying paving and/or pavement removal and replacement as directed by the Architect.
7. Patching: Cut existing paving square and plumb at all edges to be joined by new paving. In trenches; grind existing asphalt on each side of trench 3" wide x 1/2 the depth of the section. Apply tack coat to vertical surfaces before installing new work. Warp carefully to flush surface, with seal over joints, and feather edge. Sawcut, remove and patch existing paving where cutting is necessary for installation of piping or conduits under Divisions 2, 15 and 16.

C. Seal Coat:

1. Seal coat shall be applied no sooner than 30 days from time of asphalt placement, no exceptions.
2. Surface Preparation: surface and cracks shall be clean of all dirt, sand, oil or grease. All cracks shall be filled to a level condition after curing. Make multiple fill applications until a level condition is achieved. Failure to do so will be the reason for rejection. Hose down entire area with a strong jet of water to remove all debris. Remove soft, loose, or otherwise damaged areas of asphalt concrete to full depth of damage and replace with compacted hot mix asphalt concrete as specified herein. Minor holes and imperfections may be patched using hot mix asphalt or mastic using sand/SS-1-H. Use wire brush for removal of oil and grease; prime with shellac or synthetic resin as recommended by manufacturer of pavement sealer material.
3. Seal Coat Seal Application: Thoroughly mix materials and apply in the presence of the onsite inspector. Failure to do so will be cause for rejection. Apply in accordance with manufacturer's written instructions.
 - a. The minimum application rate for each applied coat shall be 30gals per 1000 sq. ft. Two coats of sealcoat will be required.
 - b. Clean-Up and Precautions: As recommended by pavement sealer material manufacturer.

D. Asphalt Concrete Overlay Paving:

1. Comply with State Specifications, 39-6 except as modified below.
2. Grind or remove existing asphalt concrete paving at limits of overlay paving to provide a minimum 1 1/2" overlay thickness. Limits of grinding or removal shall be field verified to insure that finished paving surface will have a one percent minimum slope.
3. Thoroughly clean surface to remove vegetation, dirt, sand, gravel and water from surface and from cracks. Vegetation shall be treated 7 days prior to removal with an herbicide.
4. Cracks greater than 1 inch shall be filled with hot mix asphalt and rolled and compacted. Cracks less than one inch shall be filled with crack filler. Potholes shall be filled with hot-mix rolled and compacted. Contractor shall have Engineer approve crack and pothole repair prior to overlay. Provide leveling courses of hot mix asphalt as required to achieve finish grades shown on the drawings.
 - a. Cracks less than one inch in width shall be level after curing. Contractor shall make multiple filling applications as necessary to achieve a level condition.
5. Place overlay when ambient air temperature is 40 degrees F. and rising, and when pavement is dry.
6. An asphalt tack coat shall be applied to existing surface area at a rate of 0.20 gallons per square yard. Application width shall be width of fabric plus 2 to 6 inches.
7. Place, spread and compact asphalt overlay to provide a minimum density of 95% of maximum theoretical unit weight as determined by California Test Method #304. Maximum variation 1/8" in 10' when measured with steel straight edge in any one direction. Test paved areas for proper drainage by applying water to cover area. Correct portions that do not drain properly by patching with plant mix. Minimum compacted overlay thickness 1 1/2 inches.

[EDIT NOTE] USE ONLY FOR SITE THAT REQUIRE SANDSEAL MIX.

D. Sandseal application:

1. Coat No. 1 and 2: Add 300 lbs of #30 mesh sand and 1 gallon of SS-1 to 100 gallons of pavement sealer. Apply at 2.0 gallons per 100 sq. ft.

2. Coat No. 3: Apply pavement sealer at minimum rate of 1.0 gallon per 100 sq. ft.

- E. Pavement Marking: pavement markings shall be done only after the seal coat has thoroughly dried. Existing surfaces to be striped with traffic paint shall be cleaned of dust, dirt, grime, oil, rust or other contaminants which will impair the quality of work or interfere with proper bond of paint coats. Surfaces shall be thoroughly cleaned by whatever means necessary that will satisfactorily accomplish the purpose without damage to asphalt concrete. Provide measured layouts, temporary markings, templates, and other means necessary to provide required marking. Prepare and apply paint in accordance with manufacturer's instructions; paint shall be applied by spray and shall achieve complete coverage free from voids and thin spots. Where indicated on the Drawings, paint parking stall strips, lettering, arrows, accessible symbols, playfield markings, etc. on asphalt concrete paving. Paint strips shall be 4 inches wide (except otherwise indicated) and applied with two (2) coats of herein specified Traffic Line Paint; white (except as otherwise specified or indicated).
1. Paints shall be delivered to the site in unopened containers.
 - a. Paint shall not be diluted, or watered down.
 - b. Paint shall be applied in 10-12 wet mil thickness (4-6 mil dried). Each coat thickness shall be verified by the project inspector.
 2. International Accessible Symbol: Symbol shall be white figures on a blue background. Blue shall be equal to PMS 293C. Lines and symbols shall be accurately formed and true to line and form; lines shall be straight and uniform in width. Painted edges shall be clean cut and free from raggedness, and corners shall be cut sharp and square. Tolerances: Apply striping within a tolerance 1/2 inch in 50 feet. Apply markings and striping to widths indicated with a tolerance of 1/4 inch on straight sections and 1/2 inch on curved sections.
- F. Colors: As directed by Architect
- G. Precast Concrete Bumpers: Install in location where shown, using steel rebar dowels, and epoxy.

3.04 DEFECTIVE ASPHALT;
Defective asphalt is as described below.

- A. Exposed rock pockets on the finished surface that lack the # 8- #200 fines that is required per the sieve analysis.
- B. Asphalt not placed to the design grades.
- C. Asphalt that ponds water.
- D. Asphalt that was compacted below the minimum required temperature and is cracked.
- E. Asphalt that fails to meet the minimum compaction requirements.
- F. Asphalt that lacks the minimum thickness required per plan.
- G. New asphalt contaminated by a petroleum product, or spilled paint.
- H. Asphalt that has depressions, cracks, scored divits from dumpster wheels, heavy equipment use, heavy

construction products,

- I. Asphalt placed on pumping, unstable sub-grades.

3.05 CLEANING

- A. Refer to Section 01 74 00.
- B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.
- C. Clean excess material from surface of all concrete walks and utility structures.

END OF SECTION

SECTION 32 16 00

SITE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. The Section describes the requirements for providing portland cement concrete paving, including accessibility ramps, sidewalks, accessible routes of travel, vehicular travel, drain structures, sewer structures, thrust blocks and for other non-structural or non-vehicular applications.

B. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 01 50 00, Construction Facilities and Temporary Controls.
3. Section 310000, Earthwork.

1.02 REFERENCES AND STANDARDS

- A. California Building Code, latest edition.
- B. ACI Standards, ACI 211.1, ACI 318-14, ACI 302, IR-04, ACI 301-16, ACI 305R-10, ACI 306R-16, ACI 308-16.
- C. ASTM C-94, Specification for Ready-Mixed Concrete.
- D. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice (latest edition).
- E. ASTM – American Society for Testing and Materials.

1.03 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.
- C. Materials list: Submit to the Architect a complete list of all materials proposed to be used in this portion of the work. Submitted items should include but are not limited to sand, gravel, admixtures, surface treatments, coloring agents, sealers, fibers, cast-in-place accessories, forming and curing products and

concrete mix designs.

- D. With concrete submittal, provide documented history of mix design performance.

1.04 QUALITY ASSURANCE

- A. Use only new materials and products.
- B. Use materials and products of one manufacturer whenever possible.
- C. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- D. Sieve analysis from testing laboratories identifying rock/sand percentages within the concrete mix; or class 2 aggregate base shall have the current project name and project location identified on the report. Outdated analytical reports greater than 90 days old will not be accepted

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver undamaged products to job in manufacturer's sealed containers and/or original bundles with tags and labels intact.
- B. Store materials in protected, dry conditions off of ground and in areas so as to not interfere with the progress of the work.
- C. Transport, store and handle in strict accord with the manufacturer's written recommendations.
- D. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.
- E. Store cement in weather tight building, permitting easy inspection and identification. Protect from dampness. Lumpy or stale cement will be rejected.
- F. Aggregates: Prevent excessive segregation, or contamination with other materials or other sizes of aggregate. Use only one supply source for each aggregate stock pile.

1.06 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.07 TESTING

- A. General: Refer to Section 01 40 00 – Quality Requirements.
- B. Cement and Reinforcing shall be tested in accordance with CBC Section 1910A. Testing of reinforcing may be waived in accordance with Section 1910A.2 when approved by the Structural Engineer and DSA.

1.08 ADEQUACY AND INSPECTION

- A. Design, erect, support, brace and maintain formwork and shoring to safely support all vertical and lateral loads that might be applied until such loads can be carried by concrete.
- B. Notify Inspector, Architect and DSA at least 48 hours prior to placing of concrete.

1.09 PROTECTION

- A. Finish surfaces shall be protected at all times from concrete pour. Inspect forming against such work and establish tight leak-proof seal before concrete is poured. Finish work damaged, defaced or vandalized during the course of construction shall be replaced by contractor at contractor expense.

1.10 FIELD MEASUREMENTS

- A. Make and be responsible for all field dimensions necessary for proper fitting, slopes and completion of work. Report discrepancies to Architect before proceeding.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement: Portland cement, ASTM C150, Type II, per ACI 318-14 Section 26.4.
- B. Concrete Aggregates: Normal weight aggregates shall conform to ASTM C33, except as modified by this section. Combined grading shall meet limits of ASTM C33. Lightweight aggregate shall conform to ASTM C330, suitably processed, washed and screened, and shall consist of durable particles without adherent coatings.
- C. Water: Clean and free from deleterious amounts of acids, alkalis, scale, or organic materials and per ACI 318-14 Section 26.4.1.3.1.
- D. Fly Ash: Western Fly Ash, conforming to ASTM C618 for Class N or Class F materials (Class C is not permitted). Not more than 15% (by mass) may be substituted for portland cement.
- E. Water Reducing Admixture: Admixture to improve placing, reduce water cement ratio, and ultimate shrinkage may be used. Provide WRDA 64 by Grace Construction Products or approved equal. Admixture shall conform to ASTM C494 and ACI 318-14 Section 26.4.1.4.19(a). Such admixture must receive prior approval by the Architect, Structural Engineer, and the Testing Lab, and shall be included in original design mix.
- F. Air-entraining Admixture: Daravair 1000 by Grace Construction Products or approved equal. Admixture must conform to ASTM C260 and ACI 318-14, section 26.4.1.4.
- G. Surface Retarder (for exposed aggregate finishes): Rugasol-S by Sika Corporation or approved equal.
- H. Form Coating: Material which will leave no residue on concrete surface that will interfere with surface coating, as approved by the Architect.

- I. Reinforcement Bars: New billet steel deformed bars conforming to requirements of ASTM A615 or ASTM A706; Grade 60. Dowels for installation through expansion joints or construction joints to existing sidewalks or concrete features shall be smooth or shall be sleeved on one end for slippage.
- J. Reinforcing supports: Galvanized metal chairs or spacers or metal hangers, accurately placed 3'-0" O.C.E.W. Staggered and each support securely fastened to steel reinforcement in place. Bottom bars in footings may be supported with 3" concrete blocks with embedded wire ties. Concrete supports without wire ties will not be allowed.
- K. Truncated Domes: Vitrified Polymer Composite (VPC), Cast-In-Place Detectable/Tactile Warning Surface Tiles; "Armor-Tile", "Access Tile Tactile Systems", or approved equal. Tiles shall comply with Americans with Disabilities Act and the California Code of Regulations (CCR) Title 24, Part 2, Chapter 11B (dome spacing shall be 2.35"). Install tiles as recommended by manufacturer. Color, federal yellow (FS 33538).
- L. Curing Compound (for exterior slabs only): Burke Aqua Resin Cure by Burke by Edoco, 1100 Clear by W.R. Meadows or accepted equal. Water based membrane-forming concrete curing compound meeting ASTM C 309 and C1315.
- M. Concrete Bonding Agent: Weld-Crete by Larson Products Corp., Daraweld C by Grace Construction Products or accepted equal.
- N. Patching Mortar: Meadow-Crete GPS, one-component, trowel applied, polymer enhanced, shrinkage-compensated, fiber reinforced, cementitious repair mortar for horizontal, vertical and overhead applications as manufactured by W.R. Meadows or accepted equal.
- O. Non-shrink Grout: Masterflow 713 Plus by Master Builders or approved equal. Premixed, non-metallic, no chlorides, non-staining and non-shrinking per CRD-C621, Corps of Engineers Specification and ASTM C 1107, Grades B and C.
- P. Aggregate Base: Class 2 AB per Caltrans specification section 26-1.02A.
- Q. Expansion Joint Material: Preformed 3/8" fiber material, full depth of concrete section, with bituminous binder manufactured for use as concrete expansion joint material, as accepted by the Architect.
- R. Joint sealant for expansion joints: Single component silicone sealant, Type S, ASTM D5893.
 - 1. Reference Standard: ASTM C920, Grade P, Class 25, Use T.
 - 2. Dow Corning 890-SL (self-leveling) Silicone, or accepted equal.
 - 3. Dow Corning 888-NS (non-sagging) Silicone, at slopes exceeding 5%. May not be used at asphalt surfaces.
 - 4. Color: Custom color as selected by Architect.
- S. Pre- Formed plastic Expansion Joint; W.R. Meadows 3/8" "Snap Cap", Tex-Trude expansion joint cap, or an approved equal.
- T. Adhesive Anchoring (Epoxy): Hilty HIT-HY 200 Safe Set, or approved equal.

2.02 CONCRETE DESIGN AND CLASS

- A. Class "B": Concrete shall have 1" max. size aggregate, shall have 3000 psi min. at 28 day strength with a maximum water to cementitious ratio no greater than 0.50. Use for exterior slabs, including walks, vehicular paved surfaces, manhole bases, poured-in-place drop inlets, curbs, valley gutters, curb & gutter and other concrete of like nature.
- B. Slump Limits: Provide concrete, at point of final discharge, of proper consistency determined by Test Method ASTM C143 with a slumps of 4" plus or minus 1".
- C. Mix Design: All concrete used in this work will be designed for strength in accordance with provisions of ASI 318-14 Section 26.4. Should the Contractor desire to pump concrete, a modified mix design will need to be submitted for review. Fly ash may be used in concrete to improve workability in amounts up to 15% of the total cementitious weight.
- D. Air Entrainment; Per the Local Jurisdiction minimum requirements, or 3% minimum.

2.03 MIXING OF CONCRETE

- A. Conform to requirements of CBC, Chapter 19A.
- B. All concrete shall be mixed until there is uniform distribution of material and mass is uniform and homogenous; mixer must be discharged completely before the mixer is recharged.
- C. Concrete shall be Ready-mixed Concrete: Mix and deliver in accordance with the requirements set forth in ASTM C94 and ACI 301. Batch Plant inspection may be waived in accordance with CBC Section 1705A.3.3.1, when approved by Structural Engineer and DSA.
 - 1. Approved Testing Laboratory shall check the first batching at the start of the work and furnish mix proportions to the Licensed Weighmaster.
 - 2. Licensed Weighmaster to positively identify materials as to quantity and to certify to each load by ticket.
 - 3. Ticket shall be transmitted to Project Inspector by truck driver with load identified thereon. Project Inspector will not accept load without load ticket identifying mix and will keep daily record of pours, identifying each truck, its load and time of receipt and will transmit two copies of record to DSA.
 - 4. At end of project, Weighmaster shall furnish affidavit to DSA on form satisfactory to DSA, certifying that all concrete furnished conforms in every particular and to proportions established by mix designs.
 - 5. Placement of concrete shall occur as rapidly as possible after batching and in a manner which will assure that the required quality of the concrete is maintained. In no case may concrete be placed more than 90 minutes from batch time.
 - 6. Water may be added to the mix only if neither the maximum permissible water-cement ratio nor the maximum slump is exceeded. In no case shall more than 10 gallons of water shall be added to a full 9 yard load, or 1 gal. per yard on remaining concrete within the drum providing load tag indicates at time of mixing at plant will allow for additional water.

2.04 MATERIALS TESTING

ISSUE DATE
VERSION DATE

CALIFORNIA MIDDLE SCHOOL CAMPUS RENEWAL / 23-145

- A. Materials testing of concrete and continuous batch plant inspection may be waived in accordance CBC Sections 1704A.4.4 when approved by Structural Engineer and DSA.
- B. Testing of concrete shall be performed per article 3.12 of this specification.

2.05 EQUIPMENT

- A. Handling and mixing of concrete: Project Inspector may order removal of any equipment which in his opinion is insufficient or in any way unsuitable.

PART 3 - EXECUTION

3.01 APPROVAL OF FORMS AND REINFORCEMENTS

- A. Forms and reinforcements are subject to approval by the Project Inspector, and notice of readiness to place first pour shall be given to DSA, Architect and Structural Engineer 48 hours prior to placement of concrete. Before placing concrete, clean tools, equipment and remove all debris from areas to receive concrete. Clean all reinforcing and other embedded items off all coatings oil, and mud that may impair bond with concrete.
- B. All reinforcing steel shall be adequately supported by approved devices on centers close enough to prevent any sagging.
- C. All reinforcing bar lap splices shall be staggered a minimum of 5 ft.
- D. Additional reinforcing steel shall be placed around all utility boxes, valve boxes, manhole frames and covers that are located within the concrete placements.
 - 1. The bars shall be placed so that there will be a minimum of 1 ½" clearance and a maximum of 3" clearance. The reinforcing steel shall be placed mid-depth of concrete slab.
- E. At all right angles or intersections of concrete walks, additional 2'x2' #5, 90 degree bars shall be added at all inside corners for additional crack control. The bars shall be placed 2" from concrete forms and supports at mid-depth of slab.

3.02 PROTECTION

- A. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
- B. In the event of damage, make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.
- C. Sub-Grade in vehicular concrete paved areas: Subgrade shall be clean, shaped and compact to hard surface free from elevations or depressions exceeding 0.05' in 10' from true plan. Compact per Section 31 00 00. Compaction and moisture content shall be verified immediately prior to placement of concrete. Proof roll subbase in presence of geotechnical engineer prior to placement of aggregate base.

3.03 CLEANING

- A. Reinforcement and all other embedded items at time of placing concrete to be free of rust, dirt oil or any other coatings that would impair bond to concrete.
- B. Remove all wood chips, sawdust, dirt, loose concrete and other debris just before concrete is to be poured. Use compressed air for inaccessible areas. Remove all standing water from excavations.

3.04 FORMING

- A. Form material shall be straight, true, sound and able to withstand deformation due to loading and effects of moist curing. Materials which have warped or delaminated, or require more than minor patching of contact surfaces, shall not be reused.
- B. Build forms to shapes, lines, grades and dimensions indicated. Construct form work to maintain tolerances required by ACI 301. Forms shall be substantial, tight to prevent leakage of concrete, and properly braced and tied together to maintain position and shape. Butt joints tightly and locate on solid backing. Chamfer corners where indicated. Form bevels, grooves and recesses to neat, straight lines. Construct forms for easy removal without hammering, wedging or prying against concrete.
- C. Space clamps, ties, hangers and other form accessories so that working capacities are not exceeded by loads imposed from concrete or concreting operations.
- D. Build openings into vertical forms at regular intervals if necessary to facilitate concrete placement, and at bottoms of forms to permit cleaning and inspection.
- E. Build in securely braced temporary bulkheads, keyed as required, at planned locations of construction joints.
- F. Slope tie-wires downward to outside of wall.
- G. Brace, anchor and support all cast-in items to prevent displacement or distortion.
- H. During and immediately after concrete placing, tighten forms, posts and shores. Readjust to maintain grades, levels and camber.
- I. Concrete paving, Curbs, Curb and Gutters, Ramps:
 - 1. Expansion Joints: Install at locations indicated, and so that maximum distance between joints is 20' for exterior concrete unless otherwise shown. Expansion joint material shall be full depth of concrete section. Recess for backer rod and sealant where required. Expansion joints shall not exceed ¼ inch depth measured from finish surface to top of felt or sealant, and ½ inch width.
 - 2. Curbs, Valley Gutter, and Curb & Gutter: Install expansion joints at 60' on center, except when placing adjacent to concrete walks, the expansion joints shall align with the expansion joints shown for the concrete walks. Expansion joint material shall be full depth of concrete section. Recess for backer rod and sealant will be required.
 - 3. Isolation Joints: 3/8" felt between walls and exterior slabs or walks so that paved areas are isolated

from all vertical features, unless specifically noted otherwise on plans.

4. Exterior Concrete Paving: Install expansion joints at 20' on center maximum, both directions, unless shown otherwise on plans.
5. Ramps; whether shown or not all ramps shall have control joints and expansion joints.
 - a. Control joints on ramps shall be aligned and be placed in between with the vertical posts for the handrails. The curbs, if required shall have control joints that align with the handrail posts.
 - b. Expansion joints shall be placed at the upper, intermediate, and bottom landings.

3.05 FORM COATING

- A. Before placement of reinforcing steel, coat faces of all forms to prevent absorption of moisture from concrete and to facilitate removal of forms. Apply specified material in conformance with manufacturer's written directions.
- B. Before re-using form material, inspect, clean thoroughly and recoat.
- C. Seal all cut edges.

3.06 INSTALLATION

- A. General: Reinforcement shall be accurately placed at locations indicated on the drawings within required tolerances and providing required clearances. Reinforcement shall be secured prior to placement of concrete such that tolerances and clearances are maintained. Coverage shall be in accordance with Section 1907A.7 of the CBC. Keep a person on the job to maintain position of reinforcing as concrete is placed. Reinforcement must be in place before concreting is begun. Install dowels as shown on drawings. Give notice whenever pipes, conduits, sleeves, and other construction interferes with placement; obtain method of procedure to resolve interferences. All expansion and construction joints in concrete shall have dowels of size and spacing as shown, or as approved by Architect.
- B. Placing Tolerances:
 1. Per ACI 301 or CRSI/WCRSI Recommended Practice for Placing Reinforcing Bars, unless otherwise shown.
 2. Clear distance between parallel bars in a layer shall be no less than 1", the maximum bar diameter not 1 ½ times the maximum size of coarse aggregate.
- C. Splices:
 1. General: Unless otherwise shown on drawings, splice top reinforcing at midspan between supports, splice bottom reinforcing at supports and stagger splices at adjacent splices 5 foot minimum. Bar laps shall be wired together. Reinforcing steel laps shall be as follows:
 - a. Lap splices in concrete: Lap splice lengths shall not be less than 62 bar diameter for No. 5 bar, 56" minimum for No. 6 bars. No. 4 bar shall have a minimum of 24" splice. 93 bar diameters for No. 7 bars and larger.
 - b. All splices shall be staggered at 5 feet minimum.

3.07 INSPECTION

- A. Approval of reinforcing steel, after installation, must be received from Inspector. Architect, Structural Engineer and DSA must be notified 48 hrs. in advance of beginning of concrete placement operations.
- B. Slope of concrete forms and finish condition shall be checked with a two foot (2') digital level.

3.08 PLACING OF CONCRETE

- A. Adjacent finish surfaces shall be protected at all times during the concrete pour and finishing. Verify that all formwork is tight and leak-proof before concrete is poured. Finish work defaced during the concrete pour and finishing shall be replaced at no extra cost to the owner.
- B. Transport concrete from mixer to place of final deposit as rapidly as practicable by methods which will prevent separation or loss of ingredients. Deposit as close as practicable in final position to avoid re-handling or flowing. Partially hardened concrete must not be deposited in work. Concrete shall not be wheeled directly on top of reinforcing steel.
- C. Placing: Once started, continue concrete pour continuously until section is complete between predetermined construction joints. Prevent splashing of concrete onto adjacent forms or reinforcement and remove such accumulation of hardened or partially hardened concrete from forms or reinforcement before work proceeds in that area. Free fall of concrete shall not to exceed 4'-0" in height. If necessary, provide lower openings in forms to inject concrete and to reduce fall height.
- D. Remove form spreaders as placing of concrete progresses.
- E. Place footings as monolithic and in one continuous pour.
- F. Keep excavations free of standing water, but moisture condition sub-grade before concrete placement.
- G. Compacting: All concrete shall be compacted by mechanical vibrators. Concrete shall be thoroughly worked around reinforcement and embedded fixtures and into corners of forms. Vibrating shall not be applied to concrete which has already begun to initially set nor shall it be continued so long as to cause segregation of materials.
- H. Concrete Flatwork:
 - 1. All flatwork shall be formed and finished to required line and grades. Flatwork shall be true and flat with a maximum tolerance of 1/8" in 10' for flatness. Flatwork which is not flat and are outside of the maximum specified tolerances shall be made level by the Contractor at no additional expense to the Owner.
[EDIT NOTE: for non-expansive soils, use the following paragraph regarding exterior flatwork subgrade preparation. Verify soil type and appropriate preparation measures with the soils report, soils engineer and civil engineer]
 - 2. Thoroughly water and soak the flatwork subgrade as required to achieve required moisture content prior to the concrete pour. Provide damming as required to keep water within the formed area and to allow for proper saturation of the subgrade.
 - 3. Concrete vibrator shall be used to assist concrete placement. Contractor shall have spare concrete

vibrator on site during concrete placement.

[EDIT NOTE: for expansive soils, use the following paragraph regarding exterior slab subgrade preparation. Verify soil type and appropriate preparation measures with the soils report, soils engineer and civil engineer. It is critical for sites with expansive soils, to add a prominent note to the architectural site plan(s)/ Legend/Concrete Walk, requiring that the Contractor review this specification section 310000 requirements and become familiar with these mandatory subgrade preparation measures]

4. Thoroughly water and soak the exterior slabs, curbs, curb and gutters, footing subgrades with multiple daily waterings for at least three (3) days or as required to achieve required moisture content prior to the concrete pour in order to place the subgrade soils in full expansion. Provide damming as required to keep standing water within the formed area and to allow for proper saturation and full expansion of the subgrade soils. Remove any standing water before concrete placement.
- I. Placing in hot weather: Comply with ACI 305R-10. Concrete shall not exceed 85 degrees F at time of placement. Concrete shall be delivered, placed and finished in a sufficiently short period of time to avoid surface dry checking. Concrete shall be kept wet continuously after tempering until implementation of curing compound procedure in accordance with this specification.
- J. Placing in cold weather: Comply with ACI 306R-16. Protect from frost or freezing. No antifreeze admixtures are permitted. When deposited concrete during freezing or near-freezing weather, mix shall have temperature of at least 50 degrees F but not more than 90 degrees F. Concrete shall be maintained at temperature of at least 50 degrees F for not less than 72 hours after placing or until it has thoroughly hardened. Provide necessary thermal coverings for any flat work exposed to freezing temperatures.
- K. Horizontal construction joint: Keep exposed concrete face of construction joints continuously moist from time of initial set until placing of concrete; thoroughly clean contact surface by chipping entire surface not earlier than 5 days after initial pour to expose clean hard aggregate solidly embedded, or by approved method that will assure equal bond, such as green cutting. If contact surface becomes contaminated with soil, sawdust or other foreign matter, clean entire surface and re-chip entire surface to assure proper adhesion.

3.09 CONCRETE FINISHES

- A. Concrete Slab Finishing: Finish slab as required by ACI 302.1R. Use manual screeds, vibrating screeds to place concrete level and smooth. Use "jitterbugs" or other special tools designed for the purpose of forcing the course aggregate below the surface leaving a thick layer of mortar 1 inch in thickness. Surface shall be free from trowel marks, depressions, ridges or other blemishes. Tolerance for flatness shall be 1/8" in 10'. Provide final finish as follows:
 1. Flatwork, medium broom finish: Typical finish to be used at all exterior walks and stairs.
 2. Ramps, heavy broom finish: Concrete surfaces with slope greater than 5% including all ramps. Brooming direction shall run perpendicular to slope to form non-slip surface
 3. Under no circumstances can water be added to the top surface of freshly placed concrete.
- B. Curb Finishing: Steel trowel.
- C. Joints and Edges: Mark-off exposed joints, where indicated, with 1/4" radius x 1" deep jointer or edging

- tool. Joints to be clean, cut straight, parallel or square with respect to concrete walk edge. Tool all edges of exposed expansion and contraction joints, walk edges, and wherever concrete walk adjoins other material or vertical surfaces.
1. The expansion joints shall be full depth as shown in the plan details. Failure to do so will result in non-compliance and shall be immediately machine cut by the contractor at his expense.
- D. Exposed Concrete Surface Finishing (not including top surface of flatwork): Remove fins and rough spots immediately following removal of forms from concrete which is to be left exposed. Damaged and irregular surfaces and holes left by form clamps and sleeves shall be patched with grout. Tie wires are to be removed to below exposed surface and holes pointed up with neat cement paste similar to procedure noted under "Patching" below. Removal of tie wires shall extend to distance of 2" below established grade lines. Ends of tie wires shall be cut off flush at all other, unexposed locations. Care shall be taken to match adjacent finishes of exposed concrete surface. After patching, all concrete that is to remain exposed, shall be sacked with a grout mixture of 1-part cement, 1 1/2- parts fine sand and sufficient water to produce a consistency of thick paint. After first wetting the concrete surface, apply mixture with a brush and immediately float entire surface vigorously using a wood float. Keep damp during periods of hot weather. When set, excess grout shall be scraped from wall with edge of steel trowel, allowed to set for a time, then wiped or rubbed with dry burlap. Entire finishing operation of any area shall be completed on the same day. This treatment shall be carried to 4" below grade, and all patching and sacking shall be done immediately upon removal of the forms.
- E. Stair Treads and Risers: Tool exterior stair tread nosing per ADA requirements and as detailed. Paint or stain tooled area at every stair tread nosing or as detailed. Stair tread nosing shall contain no pockets, voids or spalls. Patching is not allowed. Damaged nosing shall be replaced.

3.10 CURING

- A. Cured Concrete in Forms: Keep forms and top on concrete between forms continuously wet until removal of forms, 7 days minimum. Maintain exposed concrete in a continuous wet condition for 14 days following removal of forms.
- B. Flatwork/Variable Height Curbs, Curb and gutter, Valley Gutter: Cure utilizing Curing Compound. If applicable, the Contractor shall verify that the approved Curing Compound is compatible with the approved colorant system. Upon completion of job, wash clean per manufacturer's recommendations.
1. Curing compound shall be applied in a wet puddling application. Spotty applications shall be reason for rejection and possibly concrete removal and replacement at the contractor's expense with no compensation from the owner.
- C. No Curing Compound shall be applied to areas scheduled to receive resilient track surface including, curbs, ramps, run ways, etc.

3.11 DEFECTIVE CONCRETE

- A. Determination of defective concrete shall be made by the Architect or Engineer. His opinion shall be final in identifying areas to be replaced, repaired or patched.

- B. The Owner reserves the right to survey the flatwork, if it is determined to be outside of the maximum tolerance for flatness. If the flatwork is found to be out of tolerance, then the Contractor will be required to replace concrete. The Contractor will be responsible for reimbursing the Owner for any surveying costs incurred. Determination of flatwork flatness, surveying and any remedial work must be completed far enough in advance so that the project schedule is maintained, delays are avoided and the new flatwork or flatwork repairs are properly cured.
- C. As directed by Architect, cut out and replace defective concrete. All defective concrete shall be removed from the site. No patching is to be done until surfaces have been examined by Architect and permission to begin patching has been provided.
- D. Permission to patch any area shall not be considered waiver of right, by the Owner, to require removal of defective work, if patching does not, in opinion of Architect, satisfactorily restore quality and appearance of surface.
- E. Defective concrete is:
 - 1. Concrete that does not match the approved mix design for the given installation type.
 - 2. Concrete not meeting specified 28-day strength.
 - 3. Concrete which contains rock pockets, voids, spalls, transverse cracks, exposed reinforcing, or other such defects which adversely affect strength, durability or appearance.
 - 4. Concrete which is incorrectly formed, out of alignment or not plumb or level.
 - 5. Concrete containing embedded wood or debris.
 - 6. Concrete having large or excessive patched voids which were not completed under Architect's direction.
 - 7. Concrete not containing required embedded items.
 - 8. Excessive Shrinkage, Traverse cracking, Cracking, Curling; or Defective Finish. Remove and replace if repair to an acceptable condition is not feasible.
 - 9. Concrete that is unsuitable for placement or has set in truck drum for longer than 90 minutes from the time it was batched.
 - 10. Expansion joint felt that is not isolating the full depth of the concrete section, and recessed as required for backer rod and sealant where required.
 - 11. Concrete that is excessively wet or excessively dry and will not meet the minimum or maximum slump required per mix design.
 - 12. Finished concrete with oil stains from equipment use, and or rust spots that cannot be removed.
 - 13. Control joints (weakened planed joints) that do not meet the required minimum depth shown on the drawings.
- F. Patching: Install specified Patching Mortar per manufacturer's recommendations. REPAIRS TO DEFECTIVE CONCRETE WHICH AFFECT THE STRENGTH OF ANY STRUCTURAL CONCRETE MEMBER OR COMPONENT ARE SUBJECT TO APPROVAL BY THE ARCHITECT AND DSA.

3.12 CONCRETE TESTING

- A. Comply with CBC Section 1903A, 1905A.1.16, 1910A and 1705A.3 and as specified in B. below. Costs of tests will be borne by the Owner.
- B. Four identical cylinder samples for strength tests of each class of concrete placed each day shall be

- taken not less than once a day, or not less than once for each 50 cubic yards of concrete, or not less than once for each 2,000 square feet of surface area for slabs or walls. In addition, samples for strength tests for each class of concrete shall be taken for seven-day tests at the beginning of the concrete work or whenever the mix or aggregate is changed.
- C. Strength tests will be conducted by the Testing Lab on one cylinder at seven (7) days and two cylinders at twenty-eight (28) days. The fourth remaining cylinder will be available for testing at fifty-six (56) days if the 28-day cylinder test results do not meet the required design strength.
 - D. On a given project, if the total volume of concrete is such that the frequency of testing required by paragraph B. above would provide less than five strength tests for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.
 - E. Cost of retests and coring due to low strength or defective concrete will be paid by Owner and back-charged to the Contractor.
 - F. Each truck shall be tested for slump before concrete is placed.

3.13 REMOVAL OF FORMS

- A. Remove without damage to concrete surfaces.
- B. Sequence and timing of form removal shall insure complete safety of concrete structure.
- C. Forms shall remain in place for not less than the following periods of time. These periods represent cumulative number of days during which temperature of air in contact with concrete is 60 degrees F and above.
 - 1. Vertical forms of foundations, walls and all other forms not covered below: 5 days.
 - 2. Slab edge screeds or forms: 7 days.
 - 3. Concrete columns and beam soffits: 28 days.
- D. Concrete shall not be subjected to superimposed loads (structure or construction equipment) until it has attained its full design strength and not for a period of at least 21 days after placing. Concrete systems shall not be subjected to construction loads in excess of design loads.

3.14 CLEANING

- A. Refer to Section 01 74 00.
- B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.
- C. Clean excess material from surface of all concrete walks and utility structures.
- D. Power wash all concrete surfaces to remove stains, dried mud, tire marks, and rust spots.

END OF SECTION

SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES

1. Fence framework, fabric, and accessories.
2. Excavation for post bases; concrete foundation for posts.
3. Manual gates and related hardware.

B. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 05 50 00: Metal Fabrications
3. Section 08 71 00: Door Hardware.
4. Section 09 91 00: Painting
5. Section 32 16 00: Site Concrete.

1.02 REFERENCES

- A. ANSI/ASTM A123 - Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
- B. ANSI/ASTM F567 – Installation of Chain link Fence.
- C. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- D. ASTM C94 – Ready-mixed Concrete.
- E. Chain link Fence Manufacturers' Institute (CLFMI) – Product Manual.

1.03 SYSTEM DESCRIPTION

- A. Fence Height: 6'-0" unless otherwise noted.
- B. Line Post Spacing: At intervals not exceeding 10 feet.

1.03 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Submit samples of Vinyl Slats for color selection by Engineer.

1.04 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years experience.
- B. Installer: Company specializing in installations of chain-link fencing with a minimum of five years of experience. If any welding is required provide welders' certificates, verifying AWS qualification within the previous 12 months.

1.05 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on shop drawings.

1.06 WARRANTY

- A. Manufacture of slats to provide a 25 year warranty against color fading and breakage of slats.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Fabric:
 - 1. Type C - Non-Slatted Fabric: Black vinyl coated tight weave: 2" mesh, 9-gauge zinc coated steel wire coated with black vinyl, top selvage knuckled tight, bottom selvage knuckled end closed. Posts to be powder coated where vinyl coated fabric occurs. Finish: ASTM F 668 Class 2b, 7mil (0.18 mm) thickness thermally fused over zinc-coated wire. Color shall be: BLACK, GREEN, BROWN, BEIGE (to be chosen by Owner's Representative).
- B. Line Posts: ASTM F1083 SCH 40 galvanized, round, 2.875 inch diameter.
- C. Terminal and Corner Posts: ASTM F1083 SCH 40 galvanized, round, 4.000 inch diameter.
- D. Gate Posts: ASTM F1083 SCH 40 galvanized, round, 4.0 inch diameter.
- E. Gate Frame: 1-7/8 inch SCH 40 galvanized diameter, for fittings and truss rod fabrication.
- F. Top Rail, Middle Brace Rail and Bottom Rail: ASTM F1083 SCH 40 galvanized, round, 1.66 inch diameter, plain end, sleeve coupled **at top**.

- G. Tie Wires: 9 gauge galvanized steel wire.
- H. Concrete: ASTM C94; Portland Cement, 2,500 p.s.i. strength at 28 days, 3 inch slump; one inch maximum sized coarse aggregate.
- I. Kickplate: 12 ga. Steel hot dipped galvanized.
- J. Cane Bolt Receiver: 1-1/4" x 8" galvanized pipe.
- K. Gates serving vehicular access.
 - 1. Provide butterfly forked gravity drop bar with positive locking feature. Modify as required for padlock locking device. Mount at 30 inches minimum, 36 inches maximum above grade.
 - 2. Double Leaf Gates: Provide center drop bar assembly, with minimum three forks equally spaced, configured to engage opposite gate leaf.
 - 3. Provide lock keeper and ring assembly, requiring one padlock to lock both gates.
 - 4. Provide steel heavy-duty track, ball bearing hanger sleeves and raceways, overhead framing and supports, guides, stays bracing, end stops, catches and access, with shaft welded to gate frame, as required, and all accessories as required for complete operable assembly.
 - 5. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings, steel galvanized.
 - 6. Provide drilled and welded tab on gate frame and gate post to receive padlock provided by Owner.
 - 7. Provide Portland cement concrete footing for drop bar, with steel sleeve of sufficient length to provide minimum six inch embedment in concrete.

2.02 ACCESSORIES

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel galvanized.
- C. Gate Hardware: Fork latch with gravity drop mechanical keepers; three 180 degrees gate hinges per leaf and hardware for padlock. Padlock to be provided by District.
- D. ADA Accessible Gate Latch, Lockable; Paddle type lever that opens gate without full rotation.

2.03 FINISHES

- A. Components and Fabric: Galvanized to ANSI/ASTM A123; 1.2 oz./sq. ft.
- B. Hardware: Galvanized to ASTM A153, 1.2 oz./sq. ft. coating.
- C. Accessories: Same finish as framing.
- D. All fence components to be painted 09 90 00

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with ANSI/ASTM F567-93 and manufacturer's instructions.
- B. Drill caissons to diameter and depth as shown in the drawings, and or details. Clean holes and remove all loose dirt to a hard undisturbed bottom.
 - 8. When placing fence posts in existing asphalt, the existing asphalt shall be cored drilled with a diamond core hole saw 3' larger than the caisson diameter. Under no circumstances shall an auger dirt bit be used to drill through the asphalt.
 - 9. When placing fence posts where the new surrounding finish surface will be asphalt, the fence posts shall be placed first before the asphalt is laid. Top of post caisson shall be at the top of aggregate base.
- C. Set intermediate, terminal and gate posts plumb in concrete caisson. Slope top of concrete for water runoff. Use concrete vibrator in each caisson during concrete placement to settle and seat
- D. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail, on bay from end and gate post.
- E. Provide top rail through line post tops and splice with 6 inch long rail sleeves.
- F. Install center and bottom rails all around enclosure.
- G. Stretch fabric between terminal posts.
- H. Position bottom of fabric 1 inch above finished grade.
- I. Fasten fabric to top, center and bottom rail and line posts with tie wire at maximum 12 inches on centers.
- J. Attach fabric to end, corner and gate posts with tension bars and tension bar clips at 12 inches on center.
- K. Install gate with fabric to match fence. Install three hinges per leaf, Install latches, catches, retainers and locking clamp.
- L. Provide kickplate at all accessible gate accesses. Weld to gate frame with 3/16" x 1" welds at 4" o.c. Weld all 4 corners. Grind all welds and edges smooth. Treat all welds with galvanizing zinc "Hot Stick."
- M. All field welding to be performed by certified welder and all welds are to be ground down smooth and treated.

N. All areas of welds are to be thoroughly cleaned, fluxed, and treated with galvanizing zinc “Hot Stick”.
Do not over heat pipe when treating.

O. At double swing gates, install cane bolt receiver in concrete measuring 8” diameter, 12” deep.

3.02 ERECTION TOLERANCES

A. Maximum variation from plum: 1/8 inch.

B. Maximum offset from true position: 3/8 inch.

C. Components shall not infringe adjacent property lines.

3.03 FINISHING

END OF SECTION

SECTION 32 31 19

DECORATIVE METAL FENCES AND GATES

PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. Ornamental picket fencing, gates and accessories.

B. RELATED SECTIONS:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 05 50 00: Metal Fabrications
3. Section 08 71 00: Door Hardware (except hinges which are specified herein).
4. Section 32 13 00: Portland Cement Concrete Paving.

1.03 SUBMITTALS

- A. Shop Drawings: Layout of all fences and gates with dimensions, details and finishes of component accessories and post foundations.
- B. Product Data: Manufacturer's catalog cuts indicating material compliance and specified options including steel tube sizes.
- C. Samples: Color selections for polyester powder coat finish.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Products from other qualified manufacturers having a minimum of 5 years experience manufacturing ornamental picket fencing will be acceptable by the architect as equal if they meet the following specifications for design, size, gauge of metal parts and fabrication (or equal).
- B. Ornamental Picket Fence and Swing Gates:
Style: Monumental Iron Works Imperial B-3 Horizontal Rails, or approved equal.
Heights: 6'0" or as otherwise indicated on the Drawings.
- C. Approved Manufacturers:

1. Monumental Iron Works, Baltimore, MD,
3. Merchant Metals

Phone (888) MH-Fence, (888) 643-3623

Phone (770) 741-0300

211 Perimeter Way, Suite 250

Atlanta, GA 30346

2. Ameristar, Tulsa, OK

Phone (888) 333-3422

4. LOCINOX USA.

Phone (877) 562-4669

460 Windy Point Drive

Glendale Heights, IL 60139

2.02 ORNAMENTAL PICKET FENCE

- A. Pickets: Square tubular members, ASTM A513, hot-rolled structural quality steel. 50,000 psi (310 Mpa) tensile strength, 60,000 psi (372 Mpa) yield strength. Minimum size pickets $\frac{3}{4}$ inches square x 16 ga. Space pickets 3-15/16" maximum (100mm) face to face. Attach each picket to each rail with $\frac{1}{4}$ " (6mm) industrial drive rivets. Size #4. Minimum gauge wall thickness solid gauge.
- B. Rails: "U" channels formed from hot-rolled structural steel having no pockets or shelves to hold water or moisture, 1-3/8" (35 mm) wide x 1-1/2" (38 mm) deep, 11-gauge (0.120" (3.05 mm) wall thickness. Punch rails to receive pickets and rivets and attach rails to rail brackets with 2 each, $\frac{1}{4}$ " (6 mm) industrial drive rivets. Size #4. Steel for rail produced under ASTM A446. Provide top rail, bottom rail, and third rail 6" below top rail.
- C. Posts: Square tubular members, ASTM A500, hot-rolled structural quality steel, 50,000 psi (310 Mpa) Tensile strength, 60,000 psi (372 Mpa) yield strength, with ASTM A525 hot-dipped galvanized G90 coating. Minimum post size 4" sq., having minimum 12-gauge wall thickness. Post size at gates as required to support specified gate leaf size. Posts at all gates to receive LOCINOX hardware shall be between .2 inches and .313 inches thick.
- D. Accessories: post caps.
- E. Finish: After all steel components have been galvanized, clean and prepare the surface of all components to assure complete adhesion of finish coat. Apply 2.5 mil (0.0635) thickness of polyester resin-based powder coating by electrostatic spray process. Bake finish for 20 minutes at 450°C (232°C) metal temperature. Color as selected by Architect from manufacturer's full range of standard colors.

2.03 GATES

- A. Ornamental picket swing gates in same style configuration and height as specified fencing.
- B. Gate posts shall be of extra heavy-duty construction and size to adequately support each specified gate leaf size without sag.
- C. Provide panic hardware at non-vehicular gates.
- D. Gate Hardware
 - 1. See drawings for gate elevations and hardware groups.
 - 2. Lever Hardware Kit – LOCINOX USA – LAKQ U2 chain link lock kit. For use at required accessible

passage type gates not requiring panic devices.

3. Self-Closing Hinge System – LOCINOX USA – Mammoth-HD 180 Degree Closer and Hinge Kit for gates up to 440 lbs. Opening force shall be less than 5 lbs. For use at all accessible required gates along path of travel or along egress route with panic devices. Provide manufacturer's optional mounting hardware for thicker gate post material.
4. Heavy Duty Hinges: Provide heavy-duty weld hinges of size capable of supporting specified leaf width without sag or failure. Gorilla hinge or equal. For all maintenance type swing gates.

2.04 ACCESSORIES

- A. Rail Attachment Brackets – Monumental Iron Works Pro-Arc swivel bracket with up to 30 degree swivel (up/down/left/right) or approved equal). Bracket to fully encapsulate rail end for complete security that is aesthetically pleasing. Note to Bidder: District has standardized on this specific bracket and requires it to be used regardless of which fence panel manufacture is submitted on. Bid accordingly.
- B. Industrial Drive Rivets: Of sufficient length to attach items in a secure non-rattling position. Rivet to have a minimum of 1100 lbs. (4894 N) holding power and a shear strength of 1500 lbs. (6674 N).
- C. Ornamental Picket Fence Accessories: Provide indicated items required to complete fence system. Galvanize each ferrous metal item in accordance with ASTM B695 and finish to match framing.
- D. Post Caps: Formed steel, cast of malleable iron or aluminum alloy, weathertight closure cap. Provide one flat style post cap for each post.
- E. Picket Tops: Flat top with polymer plug.
- F. Hinges: Provide heavy-duty weld hinges of size capable of supporting specified leaf width without sag or failure. Gorilla hinge or equal.
- G. Locking Clasps: Provide heavy-duty hardware to receive padlock at location where gate leaves meet each other or strike post.
- H. Padlocks: Padlocks are provided by District. Contractor to provide necessary padlock quantity to District. Once provided by Owner, Contractor shall re-key to match specific site keying.
- I. Cane Bolt: Provide heavy-duty cane bolt at all 2-leaf gate configurations. Provide at each leaf to secure each leaf into pavement below. Cane bolt shall be capable of being raised and locked in the retracted position when not in use. Provide 12 inch galvanized sleeve receivers encased with 12 inch round concrete in the close and open position. Cane bolts to freely drop and lift in the closed and open position.
- J. Knox Box: Model 3200 series, black. Fully weld to gate frame. Prime and paint affected finish. Location and quantity as shown on drawings. Boxes located at frontage of school shall have a reflective red adhesive sticker on front of lock body. Boxes located at other locations not on main school frontage shall have a reflective green adhesive sticker on front of lock body.
- K. Knox Locks: Model 3700 series, stainless steel, exterior use. Provide at all maintenance gates and fire

apparatus gates along fire lane. All locks shall have a reflective green adhesive sticker around lock body.

2.05 SETTING MATERIAL

- A. Concrete: Minimum 28-day compressive strength of 3,000 psi.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify areas to receive fencing are completed to final grades and elevations.
- B. Ensure property lines and legal boundaries of work are clearly established.

3.02 INSTALLATION

- A. Install fence in accordance with manufacturer's instructions.
- B. Space posts uniformly not to exceed a full panel width. Face of post to closest picket not to exceed 3-7/8 inch spacing.
- C. Concrete Fence Set Posts: 24" min. Ø x36" min. deep or as otherwise indicated on drawings.
- D. Concrete Gate Swing Posts: Provide reinforced concrete footings as indicated on the Drawings.
- E. Check each post for vertical and top alignment and maintain in position during placement and finishing operation.
- F. Align fence panels between posts. Firmly attach rail brackets to posts with 1/4" (6 mm) bolt and lock nut, ensuring panels and posts remain plumb.
- G. Position bottom of picket 2 inches above existing/new finished grade. Distance from picket on each end of panel to the support post shall not be greater than 4".
- H. Where touch up paint is necessary, paint shall match powder coated finish. Unacceptable finishes will require re-powder coating.
- I. Cutting of manufacturer's brackets will not be accepted.

3.03 GATE INSTALLATION

- A. Install gates plumb, level and secure for full opening without interference.
- B. Attach hardware by means, which will prevent unauthorized removal.
- C. Adjust hardware for smooth operation.
- D. All gates with panic hardware to be third-party shop fabricated in a certified shop along with adjacent

posts and header. Galvanized and powder coated finishes.

- E. At gates with LOCINOX closer, Install hinge and closer per manufacturer's recommendations. Provide required backing inside steel gate and post. Install using only manufacturer's provided hardware.
- F. Welding: All welds shall be shop fabricated prior to galvanizing unless otherwise acceptable to Owner's representative. And all field welds shall be completed by a Certified Structural Welder and shall be "spray-galvanized" or otherwise treated subject to the discretion of the Owner's Representative.
 - 1. All field welding to be performed by a certified welder and all welds are to be ground down smooth.
 - 2. All areas of welds are to be thoroughly cleaned and treated with two coats of cold galvanized spray.
 - 3. All maintenance-type hinges shall be welded to the gate post.

3.04 ACCESSORIES

- A. Install post caps and other accessories to complete fence. Post caps shall be riveted to post with two rivets on opposite sides of post.

3.05 CLEANING

- A. Clean up debris and unused material and remove from site.

3.06 ADDITIONAL SUPPLIED ITEMS

- A. Provide a bag of rivets to District.
- B. Provide (4) additional 10 feet long 4 inch square tubing posts.
- C. Provide twenty additional brackets to District.

END OF SECTION

SECTION 32 80 00

IRRIGATION

PART 1 – GENERAL

Construction Documents and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.01 SUMMARY

A. DESCRIPTION

1. Scope of Work: Furnish all labor, materials, tools, equipment, and transportation required to perform and complete the installation of an automatic sprinkler irrigation system, including all piping, sprinkler heads, controls, connections, testing, etc. as shown on the Drawings and as specified herein. The water source for this project is potable water [non-potable water].
2. Utilize and accept as standards manufacturer's recommendations and/or installation details for any information not specifically detailed on the Drawings.

B. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - a. Section 32 90 00 – Landscaping.

1.02 SUBMITTALS

- A. Comply with requirements of Section 01 33 00 – Submittal Procedures.
- B. Product names are used as standards; provide proof as to equality of any proposed material and do not use other materials or methods unless approved in writing by the Owner's Representative. Submit no more than one request for substitution for each item. The decision of the Owner's Representative is final.
- C. Use equipment capacities specified herein as the minimum acceptable standards.
- D. List materials in the order in which they appear in Specifications; include substitutions. Submit the list for approval by the Owner's Representative.
- E. Make any mechanical, electrical, or other changes required for installation of any approved, substituted equipment to satisfaction of Owner's Representative and without additional cost to Owner. Approval by Owner's Representative of substituted equipment and/or dimensional drawing does not waive these requirements.
- F. Do not construe approval of material as authorization for any deviations from Specifications unless attention of Owner's Representative has been directed to specified deviations.
- G. Record Drawings: Upon completion of work, and as a precedent to final payment, deliver to Owner's

Representative one complete set of reproducible originals of Drawings showing work exactly as installed

1. Regularly update plans of the system and any changes made to the system throughout the project. Record all changes on this plan before trenches are backfilled.
 2. Record the as-built information on reproducible plans provided by the Architect. Complete and submit the Record Drawings to the Architect before applying for payment for work installed.
 3. As-built drawings are to be completed electronically with a pdf editing software or computer aided drafting software. As-built drawing done by hand will not be accepted for final submittal.
 4. Show the following on the Record Drawings accurately to scale and dimensioned from two permanent points of reference:
 - a. Distance of mainline from nearby hardscape.
 - b. Location of automatic control valves, quick couplers, and gate valves.
 - c. Location and size of all sleeves.
 - d. Location of automatic control wires and spares.
- H. Operation Manuals: Deliver two complete sets of manufacturer's warranties, Contractor guarantees, instruction sheets, parts lists, and operation manuals to the Architect before requesting final acceptance of the project. Do not request final inspection until the sets are approved.

1.03 QUALITY ASSURANCE

- A. Qualifications of Contractor: Work must be completed by a licensed Landscape Contractor. Provide proof of five years of continuous experience in landscaping and irrigation of projects of similar size (+/- 20% of the construction cost) and scope for education campuses. Contractor to have a minimum of two projects either completed or in construction in the last five years.
- B. Work Force: Ensure that an experienced foreman is present at all times during installation. Keep the same foreman and workers on the job from commencement to completion.
- C. Reviews: Specifically request reviews of all items listed below in "Inspection Requirements" prior to progressing to the next level of work.
- D. Certification: Ensure that the contractor installing the Central Control System is trained and certified in the installation of the Central Control System. The training and certification must have been completed within two years prior to the installation date.
- E. Standards:
 1. Provide work and material in full accordance with the rules and regulations of the California Electric Code; the California Plumbing Code; and other applicable state or local laws or regulations.
 2. Furnish, without extra charge, additional material and labor required to comply with these rules and regulations, though the work may not be specifically indicated in the Specifications or Drawings.
 3. Where the Specification requirements exceed those of the above-mentioned codes and regulations, comply with the requirements in the Specifications.

F. Comply with the requirements of Section 01 77 00 – Closeout Procedures.

G. Inspection Requirements

1. Request and hold a pre-construction meeting prior to beginning the work of this Section. Parties required to be in attendance are the Landscape Contractor, Project Inspector, Owner’s Representative, and the Landscape Architect.
2. Prior to commencement of the work of this Section, obtain written verification from the project Civil Engineer that the rough grade in landscape areas is in conformance with Section 31 00 00 - Earthwork.
3. Obtain verification from Project Inspector for the following at the appropriate times during construction and prior to further progression of work in this Section:
 - a. Pressure testing of all mainlines and lateral lines (See “Hydrostatic Tests – Open Trench” in Part 3.05 of this Section),
 - b. Trench depth,
 - c. Sleeves under pavement,
 - d. Flushing of all mainlines and lateral lines,
 - e. Installation of mainline thrust blocks,
 - f. Installation of Leemco joint restraints and bolts,
 - g. Backfill and pipe bedding,
 - h. Layout of heads,
 - i. Operation of system and coverage adjustments (with Landscape Architect) after system is fully automated and operational, backfill of trenching is completed, and surface has been restored to original grades.
4. In case of failure to obtain any verification by the Project Inspector as required above, remove and replace work as necessary to obtain the verification at no additional cost to the Owner.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Use all means necessary to protect irrigation system materials before, during, and after installation and to protect related work and material.
- B. Handle plastic pipe carefully, especially protecting it from prolonged exposure to sunlight. Store pipe on beds that are the full length of the pipe and keep pipe flat and off the ground with blocks.

1.05 PROJECT/SITE CONDITIONS

- A. Information on Drawings relative to existing conditions is approximate. During progress of construction, make deviations necessary to conform to actual conditions, as approved by Owner’s Representative, without additional cost to Owner. Accept responsibility for any damage caused to existing services. Promptly notify Owner’s Representative if services are found which are not shown on Drawings.
- B. Protect existing utilities within construction area. Repair damages to utility lines that occur as a result of operations of this work.

- C. Verify dimensions at building site and check existing conditions before beginning work. Make changes necessary to install work in harmony with other crafts after receiving approval by Owner's Representative.

1.06 WARRANTY

- A. Guarantee all workmanship and materials hereunder against defective workmanship and materials, including damage by leaks and settlement of irrigation trenches, for the duration specified in Division 01 of these Specifications. (The Contractor is not responsible for vandalism or theft after date of final acceptance.)

1.07 SYSTEM STARTUP

A. Booster Pump:

1. Order booster pump as soon as possible to avoid delays in the project.
2. After booster pump and electrical connections have been installed, power has been made available, the downstream irrigation system has been pressure-tested, heads have been set, and trenches have been backfilled and compacted, request that the booster pump manufacturer's technician participate in and/or direct the start-up of the booster pump. Start-up shall include all testing and settings for the following:
 - a. Flow
 - b. Pressure
 - c. Connections
 - d. Electrical currents
 - e. Wire connections
 - f. Pump installation
3. Upon successful completion of testing by the booster pump technician, request that a checklist/certification be completed and signed by the technician. Deliver copies of the certification to both the Owner's Representative and the Landscape Architect prior to the commencement of the landscape maintenance period.

B. Central Control System

1. Install controllers, master valves, flow sensors, ground system, wiring, cables, Ethernet and any other components not shown on the Drawings.
2. Request that the manufacturer's representative participate and/or direct the start-up of the Central Control System. Start-up shall include all testing and settings for the following:
 - a. Flow sensor
 - b. Grounding
 - c. Wire connections
 - d. Pump start
 - e. Bypass
 - f. Overall instruction

3. Upon successful completion of testing by the technician from [enter technician company], request that a checklist/certification be completed and signed by the technician. Deliver copies of the certification to both the Owner's Representative and the Landscape Architect prior to the commencement of the landscape maintenance period.
4. Run the system; record the flows per valve and report them to the Owner's Representative.

1.08 MAINTENANCE

- A. Furnish three complete sets of operating maintenance instructions bound in a hardback binder and indexed. Start compiling data upon approval of list of materials. Do not request final inspection until booklets are approved by Owner's Representative.
- B. Incorporate the following information in these sets:
 1. Complete operating instructions for each item of irrigation equipment.
 2. Typewritten maintenance instructions for each item of irrigation equipment.
 3. Manufacturer's bulletins which explain installation, service, replacement parts, and maintenance.
 4. Service telephone numbers and/or addresses posted in an appropriate place as designated by Owner's Representative.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use materials as specified; any deviation from the Specifications must first be approved by the Owner's Representative in writing. All material containers or certificates shall be clearly marked by manufacturer as to contents for inspection.
- B. Automatic Controller: [see design standards].
- C. Master Valves and Flow Sensors: [see design standards].
- D. Automatic Control Valves: [see design standards].
- E. Drop Control Kit: [see design standards].
- F. Gate Valve: [see design standards].
- G. Pipe and Fittings:
 1. PVC pipe: for all mainline and lateral lines, PVC schedule 40 up to 3" size and PVC Class 200 for 4" and larger.
 2. PVC fittings three-inch (3") size and smaller: High impact, standard weight, Schedule 40, molded PVC as manufactured by George Fischer, Lasco, Spears, or approved equal. [LEEMCO APPLICATION - PVC fittings for mainline two inches (2") and smaller and all lateral lines: High impact, standard weight, Schedule 40, molded PVC as manufactured by George Fischer, Lasco, Spears, or approved equal.]

3. PVC fittings four-inch (4") size and larger: High impact, standard weight, Class 200 gasketed, molded PVC as manufactured by George Fischer, Lasco, Spears, or approved equal. [LEEMCO APPLICATION - Ductile iron fittings for all mainline fittings two and one-half inches (2 ½") and larger: Leemco joint restraint fittings or approved equal.]
 4. All plastic pipe and fittings: Continuously and permanently marked with manufacturer's name, type of material, IPS size, schedule, NSF approval, and code number.
 5. Threaded PVC pipe and nipples: IPS Schedule 80 when necessary to use threaded connections to gauges, valves, or control valves. Threaded adapters may be used in place of nipples when making pipe to valve connections.
 6. Use 45-degree fittings for changes in depth of pipe, and at transition from main line to automatic control valves.
 7. Piping above ground: Schedule 40 galvanized steel with cast-iron fittings.
 8. Piping used for electrical purposes to be Schedule 40 PVC Rigid Nonmetallic Conduit electrical conduit.
- H. Booster Pump: [see design standards].
- I. PVC Primer: Weld-On P-70 Purple Primer or approved equal.
- J. PVC Glue: Weld-On 711 Gray heavy bodied PVC Cement or approved equal.
- K. Sprinkler Heads: [see design standards].
- L. Quick Coupler Valves: Rainbird 44np or approved equal.
- M. All Valve Boxes and Covers: Concrete manufactured with steel checker plate lid with "Irrigation – Non-Potable" permanently embossed on cover. Christie or approved equal.
- N. Reduced Pressure Backflow Preventer: _____.
- O. Automatic Sprinkler Control Wire:
1. Connections between remote control valves and controller: 14 AWG direct burial plastic polyethylene (PE) insulated wire, Paige Electric P7079D or approved equal. Common wire to be white, and lead wire to be colored. If multiple controllers are used, a different color is to be used for each controller's lead wire. (Use red for the first controller). Spare wires are to be yellow.
 2. UL Listed waterproof sealing pack for wire connections: 3M DBR/Y-6, or approved equal.
 3. Provide adequate working space around electrical equipment in compliance with local codes and ordinances.
 4. Electrical, other than low voltage, such as power wiring, conduit, fuses, thermal overloads and disconnect switches, is included under Division 26 of these Specifications.
- P. Automatic Sprinkler Control Decoder Cable [For expansion of existing two-wire systems only]:
1. Connections between remote control valve decoders and controller: Hunter Jacketed Decoder Cable, Paige Electric P7354D. If multiple controllers are used, a different color jacket is to be

used for each controller.

2. UL Listed waterproof sealing pack for wire connections: 3M DBR/Y-6, or approved equal.
 3. Provide adequate working space around electrical equipment in compliance with local codes and ordinances.
 4. Electrical, other than low voltage, such as power wiring, conduit, fuses, thermal overloads and disconnect switches, is included under Division 26 of these Specifications.
- Q. Single Station Decoder: match existing two-wire system decoder.
- R. Trace Wire:
1. Direct burial #12 AWG Solid, steel core soft drawn tracer wire, 250# average tensile break load, 30 mil high molecular-high density polyethylene jacket complying with ASTM-D-1248, 30-volt rating. Color shall be green.
 2. Connectors: UL Listed waterproof sealing pack for wire connections: 3M DBR/Y-6, or approved equal.
- S. Master Valve and Flow Sensor Wire:
1. Master valve wires are to be 14 AWG direct burial plastic polyethylene (PE) insulated wire, Paige Electric P7079D or approved equal. Wire color to be blue for the lead and white for the common. If there are two master valves, the second master valve wire is to be blue/white striped for the lead and white for the common.
 2. Flow sensor wires are to be 14 AWG direct burial plastic polyethylene (PE) insulated wire, Paige Electric P7079D or approved equal. Wire color to be black for the lead and white for the common. If there are two flow sensors, the wires leading to each flow sensor is to be a different color.
- T. Unions And Flanges:
1. Steel unions and flanges two inches (2") and smaller: 150 lb. screwed black (brass to iron seat) or galvanized malleable iron (ground joint).
 2. Steel unions and flanges two and one-half inches (2 ½") and larger: 150 lb. black flange union, flat-faced, full gasket.
 3. Gaskets: One-sixteenth inch (1/16") thick rubber Garlock No. 122, Johns-Manville or approved equal.
 4. Flange Bolts: Open-hearth bolt steel, square heads with cold pressed hexagonal nuts, cadmium plated in ground. Provide copper-plated steel bolts and nuts or brass bolts and nuts for brass flanges.
- U. Pipe Supports: Adjustable saddle support type support.
- V. Valve Identification Tags: Christy's irrigation ID tags, standard yellow color or approved equal.
- W. Sand for Trench Backfill: Natural sand, free of roots, bark, sticks, rags, or other extraneous material.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Locations of existing utilities and other improvements shown on the Drawings are approximate. Verify existing conditions and, should any utilities be encountered that are not indicated on the plans, notify the Owner's Representative immediately. Accept responsibility for any damages caused to existing services.

3.02 PREPARATION

- A. Scheduling: Notify the Project Inspector prior to commencing and/or continuing the work of this Section. Remove and replace, at no cost to Owner, any work required as a result of failure to give the appropriate notification.
- B. Examination: Examine conditions of work in place before beginning work; report defects.
- C. Measurements: Take field measurements; report variance between plan and field dimensions.
- D. Protection: Maintain warning signs, shoring and barricades as required. Prevent injury to, or defacement of, existing improvements. At no additional cost to Owner, repair or replace items damaged by installation operations.
- E. Existing Tree Protection:
 - 1. Avoid unnecessary root disturbance, compaction of soils within drip line, or limb breakage.
 - 2. Do not store material or dispose of any material other than clean water within the drip line.
 - 3. Provide adequate irrigation during construction.
 - 4. Replace any tree damaged during construction with a tree of equal size and value at no additional cost to Owner.
 - 5. Adjust trench locations in field to minimize damage to existing elements and plant roots of trees-to-remain at no additional cost to Owner.
- F. Surface Preparation: Prior to beginning sprinkler irrigation work, complete placement of topsoil as specified in Section 31 00 00 – Earthwork. Notify Project Inspector of irregularities if any.

3.03 INSTALLATION

- A. Automatic Controller
 - 1. Automatic Controller: Install system and components as per Drawings and manufacturer's recommendations. All wiring connections shall be neatly accomplished within the controller cabinet. Connect Ethernet and grounding system as per manufacturer's recommendations.
 - 2. Connect automatic control valves to controller(s) in sequence as shown on Drawings.
 - 3. Install all exposed wires to a minimum of twenty-four inches (24") beyond controller within a UL approved rigid conduit.

B. Master Valves and Flow Sensor

1. Master Valve: Install as per manufacturer's recommendation. Connect master valve wiring to the automatic controller. Install wire in a conduit. Wire is not to have any splices between the valve and the controller.
2. Connect Master Valve to decoder cable using a single-station line decoder.
3. Flow Sensor: Install as per manufacturer's recommendation. When using a "saddle" installation, install at the correct depth in the pipe and orientate the paddle properly for accurate reading of flow. Connect flow sensor wire to the automatic controller. Install wire in a conduit. The wire is not to have any splices between the valve and the controller.
4. Connect Flow Sensor to decoder cable using a sensor decoder.

C. Reduced-Pressure Backflow-Prevention Device

1. Install where shown, per code, and per manufacturer's specification and written instructions.
2. Provide pipe supports and accessories as necessary to properly secure the assembly.

D. Booster Pump Assembly

1. Booster Pump: Install as per manufacturer's directions and as detailed on Drawings. Lay out piping in field for exact locations and/or connections.
2. Booster Pump Pad: Install on a level, raised utility pad so booster pump is set level. Encase anchor bolts in the concrete pad.
3. Piping Assembly: Lay out system plumb and level. Paint entire assembly, including the pipe supports. Use metal pipe for all exposed pipe and extend below the ground to the horizontal main line pipe.
4. Coordination: Lay out conduit for electrical components to minimize conduit above grade.

E. Control Wires

1. General: Install control wires beneath sprinkler main line whenever possible; tape wires to mainline pipe. Provide one spare wire for each controller.
2. Slack Wire: Provide eighteen inches (18") of slack wire for each wire connected to automatic control valve. Slack wire shall be coiled and left in the valve box. Tape wires in bundles every ten feet (10'); do not tape wires in sleeves.
3. Expansion and Contraction: Snake wire in trench to allow for contraction of wire.
4. Wire Passing Under Existing or Future Paving or Construction: Encase in PVC Schedule 40 or galvanized steel conduit extending at least twelve inches (12") beyond edges of paving or construction.
5. Wire Connections: Install wire connections in a waterproof sealing pack.
6. Wire Splicing: Permit splicing only on runs exceeding 500 feet. Locate all splices within valve boxes.
7. Wire Termination: Install wire in a valve box with eighteen inches (18") of slack wire coiled and individually capped with approved waterproof sealing pack.
8. Spare Wire: Install two (2) spare wires along each wire path. If there is more than one wire path from the controller, the contractor to install two (2) spare wires per path. Provide eighteen inches (18") of slack wire at each automatic control valve.

F. Decoder Cable

1. General: Install control wires beneath sprinkler main line whenever possible.
2. Slack Cable: Provide eighteen inches (18") of slack cable at each automatic control valve. Slack cable shall be coiled and left in the valve box.
3. Expansion and Contraction: Snake cable in trench to allow for contraction of cable.
4. Cable Passing Under Existing or Future Paving or Construction: Encase in PVC Schedule 40 or galvanized steel conduit extending at least twelve inches (12") beyond edges of paving or construction.
5. Connections: Install cable connections in a waterproof sealing pack.
6. Splicing: Permit splicing only on runs exceeding 500 feet. Locate all splices within valve boxes.
7. Cable Termination: Install cable in a valve box with eighteen inches (18") of slack cable coiled and individually capped with approved waterproof sealing pack. Ground cable at all cable terminations.

G. Trace Wire

1. General: Install trace wire above sprinkler main line whenever possible; tape wire to mainline pipe at 10' intervals to ensure the wire remains adjacent to the pipe.
2. Wire Connections: Install wire connections in a waterproof sealing pack.
3. Trace wire access points shall be accessible at all automatic control valves.
4. At all mainline end caps, a minimum of six feet (6') of tracer wire shall be coiled and secured to the cap for future connections. The end of the tracer wire shall be spliced to the wire of a six-pound zinc anode and is to be buried at the same elevation as the irrigation mainline.
5. Testing: The contractor shall perform a continuity test on all trace wires in the presence of the client. If the trace wire is found to be not continuous after testing, Contractor shall repair or replace the failed segment of the wire.

H. Automatic Control Valves and Quick Coupler Valves

1. Install where shown and where practical; place no closer than twelve inches (12") to walk edges, building walls, or fences. Refer to detail for example.
2. Thoroughly flush mainline before installing valve.
3. Install valves in ground cover areas where possible.

I. Piping

1. General: Install in conformance with reference standards, manufacturer's written directions, as shown on Drawings and as herein specified.
2. Workmanship:
 - a. General: Install sprinkler irrigation equipment in planted areas throughout the site.
 - b. Coordination: Organize location of sleeves with other trades as required.
3. Pipeline Assembly:
 - a. General:
 - 1) Cutting: Cut pipe square; remove rough edges or burrs.
 - 2) Solvent-welded Connections: Use materials and methods recommended by the pipe

manufacturer.

- 3) Brushes: Use non-synthetic brushes to apply solvents and primer.
 - 4) Cleaning: Clean pipe and fittings of dirt, moisture, and debris prior to applying solvent or primer.
 - 5) Assembly: Allow pipe to be assembled and welded on the surface or in the trench.
 - 6) Expansion and Contraction: Snake pipe from side to side of trench to allow for expansion and contraction.
 - 7) Location: Locate pipes as shown on Drawings except where existing supply valves, utilities or obstructions prohibit or where slight changes are approved to better suit field conditions.
- b. Elastomeric Seal (Gasket) Joints:
- 1) General: Assemble in strict conformance with the pipe manufacturer's instruction.
 - 2) Rubber Rings: Use rubber rings specific for water service systems.
 - 3) Cleaning: Thoroughly clean ring and groove of dirt, moisture and debris using a clean, dry cloth. Do not use solvents, lubricants, cleaning fluids or other material for cleaning.
 - 4) Seating: Properly seat ring in groove.
 - 5) Spigot: Clean spigot-end of pipe as in "Cleaning" above prior to applying lubricant recommended by pipe manufacturer. Insert spigot into bell and seat to full depth required.
- c. Connections:
- 1) Threaded Plastic Pipe Connection:
 - a) Use Teflon tape or pipe joint compound.
 - b) When assembling to threaded pipe, take up joint no more than one full turn beyond hand-tight
 - 2) Metal Valves and Plastic Pipe: Use threaded plastic male adapters.
 - 3) Metal to Metal Connections:
 - a) Use specific joint compound or gasket material for type of joint made. Where pipe of dissimilar metals are connected, use dielectric fittings.
 - b) Where assembling, do not allow more than three full threads to show when joint is made up.
 - 4) Where assembling soft metal (brass or copper) or plastic pipe, use strap-type friction wrench only; do not use a metal-jawed wrench.
 - 5) Threading:
 - a) Do not permit the use of field-threading of plastic pipe or fittings. Use only factory-formed threads.
 - b) Use factory-made nipples wherever possible. Permit the use of field-cut threads in metallic pipe only where absolutely necessary. When field-threading, cut threads accurately on axis with sharp dies.
 - c) Use pipe joint compound for all threaded joints. Apply compound to male thread only.
- d. Sleeves and conduits:
- 1) Use sleeves of adequate size to accommodate retrieval for repair of wiring or piping and extend a minimum of twelve inches (12") beyond edges of walls or paving.

- 2) Provide removable, non-decaying plug at end of sleeve to prevent entrance of soil.
 - e. Unions: Locate unions for easy removal of equipment or valve.
 - f. Joint Restraints: Install per manufacturer's recommendations.
 - g. Capping: Plug or seal opening as lines are installed to prevent entrance materials that would obstruct pipe. Leave in place until removal is necessary for completion of installation.
 - h. Drip Irrigation Tubing: Install as per Drawings.

J. Sprinkler Heads

1. Sprinkler heads: Locate as shown on the Drawings except where existing conditions prohibit, or slight changes are approved to achieve as good or better coverage under the same conditions. Do not allow sprinkler head spacing to exceed the maximum shown on the Drawings. Plumb heads.
2. Handling, Assembly of Pipe, Fittings, and Accessories: Allow only skilled tradesmen to handle and assemble pipe, fittings, and equipment. Keep interior of pipes, fittings, and accessories clean at all times. Close ends of pipe immediately after installation; leave closure in place until removal is necessary for completion of installation. Do not permit bending of pipe.
3. Flushing: Remove end heads and operate system at full pressure until all rust, scale, and sand is removed. Divert water to prevent ponding or damage to finished work.
4. Coverage: Accept responsibility for full and complete coverage of irrigated areas to satisfaction of Landscape Architect and make necessary adjustments to better suit field conditions at no additional costs to Owner.

3.04 CONSTRUCTION

A. Grading

1. Install all irrigation features to their finished grade and at depths indicated. Complete and /or accommodate all rough grading and/or finish grading before commencing with trenching.

B. Layout

1. Lay out work as accurately as possible to Drawings. Drawings are generally diagrammatic to extent that swing joint offsets and fittings are not shown. Record all changes on the Record Drawings.
2. Do not willfully install the irrigation system as shown on Drawings when it is obvious, in the field, that obstructions or other discrepancies exist which may not have been considered in the design. Notify Owner's Representative of discrepancies before proceeding.

C. Excavating And Trenching

1. General: Perform excavations as required for installation of work included under this Section, including shoring of earth banks to prevent cave-ins. Restore surfaces, existing underground installations, etc., damaged or cut as result of this work to their original condition and in a manner approved by the Landscape Architect.

2. Width:
 - a. Make trenches wide enough to allow a minimum of six inches (6") between parallel pipelines and three inches (3") between side of pipe and side of trench. Do not allow stacking of pipe within trench.
 - b. Allow a minimum clearance of twelve inches (12") in any direction from parallel pipes of other trades.
 3. Preparation of Excavations: Remove rubbish and rocks from trenches. Bed pipe on a minimum of three inches (3") of clean, rock-free soil to provide a firm, uniform bearing for entire length of pipeline. Cover pipe with a minimum of three inches (3") of clean, rock-free soil. If clean, rock-free soil is not available, use sand for pipe bedding and three inches (3") of backfill above the pipe. The remainder of the trench backfill material can be native soil. Do not allow wedging or blocking of pipe.
 4. Minimum depth of cover: Unless shown otherwise, provide the following minimums:
 - a. Mainline: twenty-four inches (24") cover.
 - b. Lateral line: twelve inches (12") cover for spray heads, and eighteen inches (18") cover for rotor heads.
 5. Conflicts with other trades:
 - a. Hand-excavate trenches where potential conflict with other underground utilities exist.
 - b. Where other utilities interfere with irrigation trenching and piping work, adjust the trench depth as instructed by Owner's Representative.
- D. Thrust Blocks
1. To resist system pressure on ring-tite PVC pipe and PVC fittings, provide thrust blocks at any change of direction, change of size, dead end, and/or valves at which thrust develops when closed. See thrust block details for examples.
 2. Use cast-in-place concrete and size thrust blocks based on an average soil-safe bearing load of 700 lbs. per square foot.
 3. Form thrust blocks in such a manner that concrete comes in contact only with the fittings. Place thrust block between adequately compacted soil and the fitting.
 4. Thrust blocks are to be constructed of concrete with a minimum of 2500psi.
 5. Thrust blocks are to be free, separate, and independent of adjacent or nearby thrust blocks.
- E. Backfill And Compacting
1. General: Do not begin until hydrostatic tests are completed. When system is operating and after required tests and inspections have been made, backfill trenches under paving areas to the compaction rate specified in Section 31 00 00 – Earthwork.
 2. Place backfill in six-inch (6") layers and compact with an acceptable mechanical compactor.
 - a. Compact backfill material in landscape areas to eighty-five percent (85%) maximum dry density of the soil.
 - b. If settlement occurs along trenches, make adjustments in pipes, valves, and sprinkler heads, soil, sod or paving as necessary to bring the system, soil, sod or paving to the proper level or the permanent grade, without additional cost to the Owner.

3. Excess Soil: Remove all rocks, debris, and excess soil that results from sprinkler irrigation trenching operations, landscape planting, and soil preparation operations off site at no additional cost to the Owner. If soil meets topsoil requirements in Section 31 00 00 – Earthwork, it may be used for finish grading.
4. Finishing: Dress-off areas to eliminate construction scars.

F. Flushing Lines

1. Thoroughly flush lines prior to installing valves, performing hydrostatic testing, or installing sprinklers. Divert water to prevent washouts.

G. Concrete Work

1. Underground anchors and pads for valves boxes are included under this Section of Specifications. Concrete shall have a minimum strength of 2500 psi. The slump test shall be a four inch (4") maximum slump. At twenty-eight days, the concrete shall have a minimum strength of 2500 psi. Use materials and mix in accordance with ASTM C 94. Refer to Section 32 16 00 - Site Concrete.

3.05 FIELD QUALITY CONTROL

- A. Visual Inspection: Verify that all pipe is homogenous throughout and free from visual cracks, holes, or foreign materials. Inspect each length of pipe. All materials are subject to impact test at the discretion of the Landscape Architect.
- B. Hydrostatic Tests – Open Trench:
1. Center-load piping with a small amount of backfill to prevent arching or slipping under pressure.
 2. Request the presence of the Project Inspector in writing at least forty-eight hours in advance of testing.
 3. At no additional cost to Owner, test in the presence of the Project Inspector.
 4. Apply continuous static water pressure of 100 psi when welded plastic joints have cured at least twenty-four hours, and with the risers capped, as follows: test main lines and submains for four hours; test lateral lines for two hours.
 5. Repair leaks resulting from tests; and repeat tests.
 6. Test to determine that all sprinkler heads function according to manufacturer's data and give full coverage according to intent of Drawings. Replace any sprinklers not functioning as specified with ones that do, or otherwise correct system to provide satisfactory performance.
- C. Continuity Testing: Test locating device and control wires for continuity prior to and after back-filling operations.

3.06 ADJUSTING

- A. Adjusting System: Prior to acceptance, satisfactorily adjust and regulate entire system. Set watering schedule on controller appropriate to types of plants and season of year. Adjust remote control

- valves to operate sprinkler heads at optimum performance based on pressure and simultaneous demands through supply lines.
- B. System Layout: Provide reduced prints of Record Document irrigation plans, laminated in four (4) mil. plastic, of size to fit controller door. Enlarge remote-control valve designations as necessary for legibility. Color-code areas covered by each station. Affix plans to inside of controller door.
 - C. Instructions: Upon completion of work, instruct maintenance personnel on operation and maintenance procedures for entire system.
 - D. Flow Charts: Record and prepare an accurate flow-rate chart for each automatic control valve.

3.07 CLEANING

Remove debris resulting from work of this Section.

END OF SECTION

SECTION 32 90 00

LANDSCAPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Scope of Work: Furnish all labor, materials, tools, equipment, and transportation required to perform and complete the following work as specified herein:
2. Soil Preparation and Fertilization
3. Planting
4. Hydroseeding and/or Sodding
5. Weed Control
6. Mulch
7. Clean-up
8. Landscape Maintenance Period
9. Guarantee
10. Work not included in this Section: Landscape elements such as concrete walks, fencing, outdoor lighting, rough grading, and clearing are not a part of this Section.

B. Related Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 32 80 00 – Irrigation.

1.02 SUBMITTALS

A. See Section 01 33 00 – Submittal Procedures for additional requirements.

B. Plant Material: Within fifteen (15) days after award of contract, locate plant materials required for construction. Ensure that trees and shrubs are contract- grown from a certified nursery. Notify Owner's Representative of plant material "tied off" for review at selected nursery. If specified material is not obtainable, submit the following to Owner's Representative: proof of non-availability, proposal for use of equivalent material, photographs of alternative choices of plant material. Include clear, written description of type, size, condition, and general character of plant material.

C. Data Sheets: Provide product data for each type of landscape material indicated in the Drawings and Specifications.

- D. Samples: Submit samples of the following materials to Landscape Architect for approval:
 - 1. Soil amendment: (3) one-quart zip-locked plastic bags.
 - 2. Bark Mulch: (3) one-quart zip-locked plastic bags.
 - 3. Imported Topsoil: (3) one-quart zip-locked plastic bags. (if needed)
- E. Provide soils analysis reports prepared by a qualified soils laboratory in compliance with the Soil Testing Requirements under "Soil Testing" in Part 3.02 of this Section.
- F. Prior to planting, submit copies of all trucking or packaging tags for all soil amendment, fertilizer, and other additives to Landscape Architect so the quantities can be verified.
- G. Record Drawings: Upon completion of work, and as a precedent to final payment, deliver to Owner's Representative one complete set of reproducible originals of Drawings showing work exactly as installed.

1.03 QUALITY ASSURANCE

- A. Qualifications: Work must be completed by a licensed Landscape Contractor. Provide proof of five years of continuous experience in landscaping and irrigation of projects of similar size (+/- 20% of the construction cost) and **scope for education campuses**. Contractor to have a minimum of two projects either completed or in construction in the last five years.
- B. Work Force: Ensure that an experienced foreman is always present during installation. Keep the same foreman and workers on the job from commencement to completion.
- C. Reviews: Specifically request reviews of all items listed below in "Inspection Requirements" prior to progressing to the next level of work. The Owner's Representative reserves the right to inspect and reject material, both at place of growth and at site, before and/or after planting, for compliance with requirements for name, variety, size and quality.
- D. Reference Standards: Meet or exceed Federal, State and County laws requiring inspection of all plants and planting materials for plant disease and insect control.
- E. Delivery, Storage, and Handling:
 - 1. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.
 - 2. Bulk Materials:
 - a. Do not dump or store bulk materials near structures, utilities, walkways, or pavements, or on existing turf areas or plants.
 - b. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - c. Accompany each delivery of bulk fertilizers **[,lime,]** and soil amendments with

appropriate certificates.

F. Plant Material:

1. Conform to the current edition of Horticultural Standards for quality of Number 1 grade nursery stock as adopted by the American Association of Nurserymen. Conform to sizes specified on plant legend. Select plants which have a natural shape and appearance.
2. Select only plants that are true to name, and tag one of each bundle or lot with the name of the plant in accordance with the standards of practice of the American Association of Nurserymen. In all cases, botanical names shall take precedence over common names.
3. Tag each plant of a patented variety with the variety and identification number, where applicable, as it is delivered to the job site.
4. Select only plants which have been nursery-grown in accordance with good horticultural practices and which have been grown under climatic conditions like those in the locality of the project for at least one year.
5. Select only plants which are typical of their species or variety; have normal habits of growth; are sound, healthy, vigorous, well-branched and densely foliated when in leaf; are free of disease, insect pests, eggs, or larvae; and have a healthy and well-developed root system.
6. Select only container stock that has been grown in the containers in which delivered for at least six (6) months, but not over two (2) years. Provide samples to show that there are no root-bound conditions.
7. Do not use plants that are severely pruned or headed-back to meet size requirements.
8. Do not plant container-grown plants that have cracked or broken balls of earth when taken from the container. Remove canned stock carefully from cans after containers have been cut on two sides with tin snips or another approved cutter.
9. Coordinate a time for the Landscape Architect to inspect the plants upon their delivery to the project site.
10. At any time prior to final acceptance, be prepared to replace any plants that are rejected by the Owner's Representative because of physical damage to the plant.
11. Do not remove container-grown stock from containers before time of planting.
12. Be prepared to replace plants which are rejected by the Owner's Representative for the following reasons:
 - a. Trunk bark damage caused by sunburn,
 - b. Trunk bark wounds caused by rubbing stakes or ties,
 - c. Trunk bark damage caused by ties that have girdled the tree,
 - d. Tree head development that is lopsided and not symmetrical in form,
 - e. Tree branches that cross or touch,
 - f. Tree branches with double leaders (unless multi-trunk trees are specified).
13. Stake shrubs with one-inch by one-inch by eighteen-inch (1"x1"x18") stakes in such manner that the stakes are not visible, and tie to upright position if they lean and/or are not growing in a vertical position.
14. Furnish quantities necessary to complete the work as shown on the Drawings and, if necessary, make up for any discrepancies in the quantities given in the Plant List at no additional cost to Owner.

- G. Decomposed Granite with Binder Mock-up:
 - 1. Install 4 ft wide x 10 ft long mock-up of decomposed granite with Stabilizer additive at location as directed by owner's representative for review and acceptance prior to placement of decomposed granite.
- H. Comply with the requirements of **Section 01 77 00 – Closeout Procedures.**

1.04 INSPECTION REQUIREMENTS

- A. Landscape Architect reserves the right to examine and reject plant material both at place of growth and at site, before and after planting, for compliance with requirements of name, variety, size, and quality.
- B. Request and hold a pre-construction meeting prior to beginning the work of this Section. Parties required to be in attendance are the Landscape Contractor, Project Inspector, Owner's Representative, and Landscape Architect.
- C. Obtain verification from Project Inspector for the following at the appropriate times during construction and prior to further progression of work in this Section:
 - 1. Rough grading is to tolerances specified in **Section 31 00 00 – Earthwork.**
 - 2. The placement of landscape backfill material is as specified in this Section.
 - 3. Prior to the commencement of the work specified in this Section, the coverage and operation of the sprinkler irrigation system are as specified in Section 32 80 00 - IRRIGATION.
 - 4. The soil amendment does not include any metal fragments. (Obtain a letter from the manufacturer stating that the material submitted for use on this project has no metal or foreign objects. Submit this letter as part of the Data Sheet submittal package [see "Submittals and Substitutions" in this Section])
 - 5. Required Test: For each load of soil amendment delivered to the site, spread at least two cubic yards (2 cy) of material onto a paved surface approximately two inches (2") deep. Pass a magnetic rake over the material in two directions. If any metal is found, test the entire load in the same manner. Perform all testing in the presence of the Project Inspector.
 - 6. Soil amendments, fertilizer, bark mulch and materials used for hydroseeding have been delivered to the site by the supplier, the invoices from the supplier indicate the project name and quantities delivered, and the Project Inspector has received copies of all such documents.
 - 7. Prior to planting, amendments and conditioners have been incorporated as per pre-planting recommendations, and planting areas have been made ready to receive planting.
- D. In case of failure to obtain any verification by the Project Inspector as required above, remove, and replace work as necessary to obtain the verification at no additional cost to the Owner.
- E. Beginning of Maintenance Period: Verify all work is complete, then request and hold a meeting to

include the Landscape Architect, Project Inspector, Architect and Owner's Representative for authorization to begin the landscape maintenance period.

- F. End of Maintenance: Verify that all work is complete and acceptable, and that the maintenance has been completed per specifications; and continue to provide landscape maintenance until the Owner's Representative has accepted the work.

1.05 PROJECT/SITE CONDITIONS

- A. Provide protection for persons and property throughout progress of work. Use temporary barricades as required. Proceed with work in such manner as to minimize spread of dust and flying particles and to provide safe working conditions for personnel. Store materials and equipment where directed.
- B. Existing Construction: Execute work in an orderly and careful manner to protect paving, work of other trades, and other improvements.
- C. Existing Utilities: Provide protection for existing utilities within construction area. At no additional cost to Owner, repair any damages to utility lines that occur because of this work.
- D. Landscaping: Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods.
- E. Paving: Maintain cleanliness of paving areas and other public areas used by equipment, and immediately remove spillage; remove rubbish, debris, and other material resulting from landscaping work, leaving site in a safe and clean condition.
- F. Planting Schedule / Environmental Requirements
 - 1. Install, establish, and maintain all lawn areas for a minimum of ninety (90) days prior to date of substantial completion. Coordinate schedule with other work and overall project schedule. Failure to install lawn areas by this date shall result in assessment of liquidated damages.
 - 2. Proceed with work in an orderly and timely manner to complete installation of landscaping within contract limits.
 - 3. Planting Season Limits: Do not plant when grounds are wet or temperature is below 25° F. Do not proceed with any soil preparation and fertilization if all planting cannot be completed within Planting Season Limit.

1.06 WARRANTY

- A. The guarantee period for lawn and plant material shall be the duration of the landscape maintenance period, from commencement until final acceptance of the work of this Section. See Division 01 for other applicable guarantee requirements.
- B. During the guarantee period, repair and/or replace plants and lawn not in satisfactory growing

condition, as determined by Owner's Representative, without additional cost to Owner. Plants are to be replaced as per "Landscape Maintenance" in Part 3.05 of this Section, using plants of the same kind and size specified in plant list.

1.07 MAINTENANCE

A. Beginning of Landscape Maintenance Period:

1. General: Landscape Maintenance Period does not begin until all work is installed and lawn has evenly germinated to an approximated blade height of one and one-half inches (1 ½"), as determined by Landscape Architect, in writing.
2. Booster Pump: Upon successful completion of testing by the booster pump technician, request that a checklist/certification be completed and signed by the technician. Deliver copies of the certification to both the Owner's Representative and the Landscape Architect prior to the commencement of the landscape maintenance period.
3. Central Control System: Upon successful completion of testing by the controller manufacturer representative, request that a checklist/certification be completed and signed by the technician. Deliver copies of the certification to both the Owner's Representative and the Landscape Architect prior to the commencement of the landscape maintenance period.
4. On-site Inspection: When all work is complete, request and hold a meeting to include the Landscape Architect, Project Inspector, Architect and Owner's Representative who must together authorize and determine the start date for the landscape maintenance period. Coordinate and give notice of the date and time of the on-site meeting to all parties at least forty-eight (48) hours in advance.
5. Acceptability: In cases where the lawn has reached adequate fullness and germination in some areas but not all, and authorization has not been given to begin the maintenance period, proceed with mowing, trimming, spraying, etc., as necessary prior to the beginning of the maintenance period.

B. Duration of Landscape Maintenance Period:

The Landscape Maintenance Period shall continue for a minimum of ninety (90) calendar days. During this time, continuously maintain all areas involved until final acceptance of the work by the Owner's Representative. See Landscape Maintenance Period Procedure in Part 3.05 of this Section.

C. Final Acceptance of the Landscape Maintenance Period:

Request the final inspection forty-eight (48) hours in advance. If items require attention, hold on-site meetings until Landscape Architect can certify, in writing, and in concurrence with the Owner's Representative, the successful completion of the Landscape Maintenance Period.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use material in new and perfect condition as specified. Any deviations or substitutions from the Specification and Drawings must first be approved by Owner's Representative in writing prior to use.
- B. Topsoil: Fertile; friable; natural loam surface soil; reasonably free of subsoil, clay lumps, brush, weeds, and other litter; and free of roots, stumps, stones/rocks, and other extraneous or toxic matter harmful to plant growth.
- C. Soil Amendment: One-percent nitrogen-impregnated bark product with a ninety percent (90%) bark base and zero to one-quarter inch (0-1/4") particle size, or approved equivalent. Do not spread until testing requirements have been satisfied.
- D. Fertilizer/Soil Conditioner: Gro-Power Plus or approved equal.
- E. Fertilizer for Trees and Shrubs: Seven-gram Gro-Power Planting Tablets (12-8-8 NPK) or approved equal.
- F. Vitamin B-1: "Superthrive", "Liquinox Start", "Cal-Liquid", or approved equal.
- G. Bark Mulch: Untreated, shredded cedar.
- H. Tree-staking System: As indicated on Drawings.
- I. Pre-Emergent Weed Control: Oxadiazon, "Treeflan", "Ronstar 2G", "Surflan" (Elano Products Company), or approved equal.
- J. Decomposed Granite:
 - 1. Reddish-brown in color.
 - 2. A mixture of fines to three-eighths inch (3/8") size particles with no clods.
 - 3. Free of vegetation, other soils, debris and rocks, and of such nature that it can be compacted readily under watering and rolling.
- K. Decomposed Granite Binder: Shall be Stabilizer by Stabilizer Solutions.
- L. Infield Mix: Premixed infield mix by an approved supplier of volcanic cinder fines and clay. Approved suppliers such as Turface Athletics, TMT Enterprises, or approved equal.
- M. Jute Mesh: Shall be of a uniform, open, plain weave, flame-retardant mesh, made from unbleached single jute yarn. The shall be of loosely twisted construction and shall not vary in thickness by more than one-half its normal diameter. Jute mesh shall be furnished in rolled strips and shall meet the following requirements.
 - 1. Width: 48 inches, with a tolerance of +/- one inch.
 - 2. 78 warp ends per width, 41 weft ends per yard.
 - 3. Weight shall average 1.22 pounds per linear yard, with a tolerance of +/- 5%.
 - 4. Jute Mesh staples: 18" long, #10 steel wire.

- N. Weed Fabric: As indicated on Drawings.
- O. Header Boards: As indicated on Drawings.
- P. Root Barrier: As indicated on Drawings.
- Q. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, three ounces per square yard (3 oz/sq. yd.) (101 g./sq. m.) minimum, composed of fibers formed into a stable network so that fibers retain their relative positions. Fabric shall be inert to biological degradation and resistant to naturally-encountered chemicals, alkalis, and acids.
- R. Nursery Plant Stock:
 - 1. As indicated on Drawings. Do not remove container-grown stock from containers until planting time. Plants shall be true to name.
 - 2. Healthy, shapely, well-rooted, not pot-bound, free from insect pests or plant diseases and properly "hardened off" before planting. Replace plants that are not alive or are not in satisfactory growing condition, as determined by the Landscape Architect, without additional cost to Owner. The Landscape Architect may reject plants before and/or after planting.
 - 3. Labeled. Label at least one tree and one shrub of each species with a securely-attached, waterproof tag bearing legible designation of botanical and common name.
- S. Lawn Sod: As indicated on Drawings.
- T. Lawn Hydroseed: Premium, new crop seed, delivered to site in original, unopened containers bearing a dated guaranteed analysis. Hydroseed mixture shall be as follows:
 - 1. Seed: As indicated on Drawings
 - 2. Starter Fertilizer: 16-20-0 with biosolids or approved equal.
 - 3. Wood Fiber Mulch: As manufactured by Conwed or approved equal.
 - 4. Soil Binding Agent: Polyacrylamide or approved equal.
 - 5. Herbicide: Tenacity or approved equal.
- U. Irrigated Bio-swale Hydroseed: Premium, new crop seed, delivered to site in original, unopened containers bearing a dated guaranteed analysis. Hydroseed mixture shall be as follows:
 - 1. Seed: *list seed mix*
 - a. List seed – x lbs/1,000 sf
 - b. List seed – x lbs/1,000 sf
 - 2. Starter Fertilizer: 7-2-3 or approved equal.
 - 3. Wood Fiber Mulch: Bonded fiber matrix (BFM) or approved equal.
- V. Non-Irrigated Bio-swale Hydroseed: Premium, new crop seed, delivered to site in original, unopened containers bearing a dated guaranteed analysis. Hydroseed mixture shall be as follows:

1. Seed: As indicated on Drawings
 2. Starter Fertilizer: 7-2-3 or approved equal.
 3. Wood Fiber Mulch: Bonded fiber matrix (BFM) or approved equal.
- W. Bermuda Sprigs: Healthy lateral living stems, rhizomes, or stolons, four to six inches (4" - 6") long with leaves or a minimum of two nodes and attached roots free of soil.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine the site, verify grade elevations, and observe conditions under which work is to be performed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the Owner's Representative.
- B. Proceed with complete landscape work as rapidly as portions of the site become available, working within seasonal limitations for each kind of landscape work required.
- C. Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand-excavate, as required, to minimize possibility of damage to underground utilities. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
- D. When conditions detrimental to sod or plant growth are encountered, such as rubble fill, adverse drainage condition, or other obstructions, notify the Owner's Representative before planting.

3.02 PREPARATION

- A. Soil Testing
 1. Coordinate soil testing in an expeditious and timely manner as required for on-site topsoil materials. Contract with a soil laboratory and include cost of sampling and testing in contract price. Take one (1) sample for every 5,000 square feet of landscape area up to a maximum of six (6) samples under the direction of and in the presence of the Owner's Representative.
 2. Submit each sample, according to the quantity of soil required by testing laboratory, to a competent laboratory approved by the Owner's Representative.
 3. Provide analysis of soil samples for pH, salinity, ammonia, phosphate, potassium, calcium, magnesium, boron, and sodium levels. Provide appraisal of chemical properties, including particle size determination, and recommendations for types and quantities of amendments and fertilizers.
- B. Clearing of Vegetation:
 1. If live perennial weeds exist on site at the beginning of work, spray with a non-selective systemic contact herbicide as recommended and applied by an approved licensed

landscape pest control advisor and applicator. Leave sprayed plants intact for at least 15 days.

2. Respray landscape areas if persistent weeds of bermudagrass remain.
3. Clear and remove existing weeds by mowing or grubbing off all plant parts at least one-quarter inch ($\frac{1}{4}$ ") inch below surface of soil over entire areas to be planted.

C. Soil preparation:

1. Loosen soil in all planting areas, and on slopes flatter than 3:1 gradient, to a depth of six to eight inches (6" - 8") below finish grade. All debris, foreign matter, and stones shall be removed prior to the placing of any fertilizers or conditioners. Soil preparation is for all shrub planting beds, lawn hydroseeded areas and sodded lawn areas.
2. Conduct the required soil tests and instruct the lab to include a minimum of the following soil improvements in the recommendation on the soils report.
 - a. Soil Amendment: Two cubic yards (2 cy) per 1,000 square feet.
 - b. Gro-Power Plus: One hundred fifty pounds (150 lbs) per 1,000 square feet.
 - c. If the lab recommends less than six cubic yards (6 cy) of soil amendment, the excess bid amount shall be applied to the cost of any additional recommended soil improvements, or returned to the Owner as a credit
3. Apply amendments as follows, using rates recommended by the soils testing laboratory (the rates of amendments shown below are for bidding purposes only):
 - a. Fertilizer/Soil Conditioner: Broadcast 150 pounds of Gro Power Plus per 1,000 square feet in all planting areas and rototill to a depth of six to eight inches (6" - 8"). Remove from the site any rock and debris brought to the surface by cultivations. "Cultipack" all areas to receive sod or hydroseed.
 - b. Apply soil amendment to all planting areas at the rate of six cubic yards (6 cy) per 1,000 sf and rototill into the top six to eight inches (6" – 8").
4. Upon completion of finish grading, request a review and obtain approval of Landscape Architect prior to commencement of planting or hydroseeding.

D. Finish Grading for all Planting areas

1. Refer to Earthwork Specification Section for Rough Grading.
2. Grade to elevations and contours shown on Drawings. Fill low spots with landscape backfill material and grade to surface drain in manner indicated on Drawings.
3. Finish-grade so that the entire area within the contract lines has a natural and pleasing appearance as specified and as directed by Landscape Architect.
4. Adjust sprinkler heads flush to finish grade in preparation to receive hydroseeding or one-half inch above finish grade in preparation to receive sod. Reset sprinkler heads flush to grade after turf has germinated.
5. Flag the sprinkler heads and valve markers.

E. Planting Pits for Trees:

1. Excavate pits with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage.

2. Set container-grown stock in center of pit on earth pedestal. Separate roots and/or prune roots as directed by Landscape Architect. In hot weather, pre-wet pit. Loosen outside roots from sides and bottom of root ball. When set, place additional backfill around base and sides of root ball. Work each layer to settle backfill and eliminate voids and air pockets. Water after placing final layer of backfill.
3. Loosen hard subsoil in bottom of excavation. Extend excavation as required to insure proper drainage from plant pits.
4. Fill excavated planting pits with water to half the depth of pit. Pits should drain within four hours (4 hrs). If planting pits do not drain, notify Project Inspector immediately. Do not proceed with planting until Landscape Architect has resolved a method to provide drainage.

F. Planting Pits for Shrubs/Groundcover:

1. Excavate pits and trenches with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage.
2. Loosen hard subsoil in bottom of excavation. Extend excavation as required to insure proper drainage from plant pits.
3. Fill excavated planting pits with water to half the depth of pit. Pits should drain within four hours (4 hrs). If planting pits do not drain, notify Project Inspector immediately. Do not proceed with planting until Landscape Architect has resolved a method to provide drainage.

3.03 INSTALLATION

A. Root Barrier

1. Root barriers are required under the following direction:
 - a. Install root barrier where trees are planted within sixty inches (60") of paving or other hardscape elements, such as walls, curbs, and walkways.
 - b. Install root barrier continuously for five feet (5') in each direction from the tree trunk, for a total distance of ten feet (10') per tree. If trees are spaced closer, use a single continuous piece of root barrier.
2. Align root barrier vertically and run it linearly along and adjacent to the paving or other hardscape elements to be protected from invasive roots.
3. Position top of root barrier just below the top of adjacent hardscape element but above finish grade of the soil so that is visible.
4. If there are concrete spoils or overpour that is impeding the root barrier from being installed directly adjacent to the hardscape element, the contractor is to remove the extra concrete in a manner that does not damage the integrity of the hardscape element.
5. Do not distort or bend root barrier during construction activities.
6. Do not install root barrier surrounding the root ball of tree.

B. Lawn Hydroseeding:

1. Do not begin hydroseeding until finish-grading has been checked by Landscape Architect.

If work is rejected due to failure to obtain Landscape Architect's approval prior to hydroseeding, redo rejected work at no additional cost to Owner.

2. General: Hydroseeding is an artificial planting process which provides vegetation to an area by using a mixture of soil conditioner/fertilizer, seed, binder, and wood fiber mulch. This mixture should be of such character that it will disperse into a uniform slurry when mixed with water in a mechanical mixer.
3. Equipment: Use a standard hydraulic mulching machine with a continuous agitation system that keeps material in uniform suspension throughout mixing and distribution cycles and with a minimum mixing tank capacity of 500 gallons (3,000+ sq. ft. of coverage).
4. Mix per 1,000 square feet:
 - a. Lawn Seed Per plans
 - b. Starter Fertilizer 25.0 lbs.
 - c. Wood Fiber Mulch: 45 lbs.
 - d. Soil Binding Agent: 3 oz.
 - e. Herbicide: 0.7 oz.
5. Application: Spray the slurry mix, under pressure, uniformly over the soil surface in a one-step operation. Protect adjacent paving, building walls, etc.
6. Clean any overspray from surfaces at end of each day's work.
7. Permit slurry to "set" approximately twenty-four hours (24 hrs.) before watering. Once watering has begun, do not allow newly hydroseeded areas to dry out.

C. Lawn Sod:

1. Cultivate all lawn areas to a depth of six inches (6"). If cultivation does not break lumps, pull a spike-toothed harrow over the area behind the tractor.
2. Give all lawn areas that are to be sodded a smooth finish to prevent pockets. Do not allow any abrupt changes of surface. Prior to installation of sod, roll the grade with a 200-pound water-ballast roller. Request that the lawn grade be inspected and approved by the Landscape Architect prior to sodding to determine its suitability for planting. Obtain such approval prior to commencing sodding operations.
3. Do not take heavy objects (except lawn rollers) over lawn areas after they have been prepared for planting.
4. Completely lay the sod within twelve hours (12 hrs.) of delivery. Do not leave sod on pallets in the hot sun longer than necessary.
5. Unroll sod carefully. Lay sod tight without any visible open joints, and without overlapping; stagger end joints twelve inches (12") minimum. Do not stretch or overlap sod pieces. Do not place sod in pieces smaller than twenty-four inches (24") in length by width of roll.
6. When new sod is to match existing turf, cut the edge of the existing turf in a series of straight lines that will accept new sod rolls in full width of the sod roll. Make the transition of grade between existing turf and new sod to be seamless with no change in elevation.
7. Immediately after laying sod, roll lawn areas with a 200-pound water-ballast roller.
8. Trim sod to conform to lawn shapes designated in Drawings.
9. On slopes of six inches (6") per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at a maximum of two feet (2') on center. Drive pegs flush with soil portion of sod.

10. Ensure that finished appearance is that of one continuous lawn.
 11. Do not lay whole lawn before watering. When a conveniently large area has been sodded, water lightly to prevent drying. Continue to lay sod and to water until installation is complete.
 12. All sod areas must be approved by Landscape Architect.
 13. Water the complete lawn surface thoroughly. Moisten soil at least eight inches (8") deep. Repeat sprinkling at regular intervals to always keep sod moist until rooted. After sod is established, decrease frequency, and increase amount of water per application as necessary.
- D. Lawn Bermuda Sprigging: Plant freshly shredded sod sprigs after finish grade is properly prepared and thoroughly soaked a day in advance. Plant sprigs at a rate per plans, and fill furrows without covering growing tips. Lightly roll and firm soil around sprigs after planting. Water thoroughly and keep soil moist. Weed by hand or hoe. Do not treat sprig area with herbicide.
- E. Trees, Shrubs, and Groundcover:
1. Lay out individual tree and shrub locations and areas for multiple plantings. Stake the locations, outline the areas, and secure the Owner's Representative's acceptance before beginning the planting work. Make minor adjustments as requested.
 2. Scarify root ball prior to planting. Plant in holes twice the diameter of the root ball and to a depth equal to the container's height. Place the shrub and/or groundcover so the top of the root ball is one inch (1") higher than the surrounding grade; place the tree so that the crown of the trunk is two inches (2") higher than the surrounding grade. Set container-grown stock in center of pit. In hot weather, pre-wet the pit. When set, place additional backfill around base and sides of root ball. Work each layer to settle backfill and eliminate voids and air pockets. Thoroughly compact lower half of backfill in plant pit. See staking or guying detail. Water after planting. Provide a berm or watering basin for each tree. Add Vitamin B-1, in the proper solution as recommended by the manufacturer, to the second watering of the basin.
 3. Place fertilizer planting tablets in root zone and alongside each plant. Follow manufacturer's instructions for number of tablets to use for each container size.
 4. See Drawings for additional information.
 5. Grooming and Staking of Trees:
 - a. Prune, thin-out and shape trees in accordance with standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by Landscape Architect, do not cut tree leaders, and remove only injured or dead branches from flowering trees.
 - b. Paint cuts over one-half inch (½") in size with standard tree paint or compound, covering exposed, living tissue. Use paint that is waterproof, antiseptic, adhesive, elastic and free of kerosene, coal tar, creosote, and other substances harmful to plants. Do not use shellac.
 - c. Stake or guy trees immediately after planting, as indicated on Drawings.
 6. Grooming of Shrubs:
 - a. Prune, thin-out and shape shrubs in accordance with standard horticultural practice. Prune shrubs to retain natural character and to accomplish their use in

landscape design. The required plant size is its size after pruning.

- b. Remove and replace excessively pruned or malformed new plants resulting from improper pruning.
- 7. Request review by the Landscape Architect after locating, but prior to planting all trees. Under the direction of the Landscape Architect, make slight adjustments to plant material location as necessary to reflect original intention of Drawings.

F. Weed Control

- 1. Apply pre-emergent weed control to all planting areas (except lawn) after completion of all planting and one complete watering. Follow manufacturer's directions. To prevent washing away of weed control, do not over-water after its application. Do not allow any weed control into lawn areas. Treat any existing noxious weeds, such as Johnson grass, with Roundup in successive treatments until all roots are destroyed, then remove all grass and roots. Notify Owner's Representative of time of installation for verification of application.

G. Bark Mulch

- 1. Apply mulch at the rate of three inches (3") deep to all planting areas, exclusive of lawn, after the planting and weed control are completed. Twelve inches (12") from planter edges, taper full depth of mulch to meet adjacent grades. Do not place mulch within three inches (3") of trunk or stems.

H. Jute Mesh

- 1. Jute mesh shall be installed at the locations shown on the plans.
- 2. Jute mesh shall be placed after cultivation and before planting. Soil surface should be reasonably smooth, remove rocks or other obstructions that rise above the level of the soil. Jute mesh shall be placed loosely on the finish grade up and down the slope in a manner to fit the soil surface contour and shall be held in place staples driven vertically into the soil at approximately 24" spacing and no more than 12" when overlapping mesh. Jute mesh strips shall be overlap along the sides by at least 6" and if more than one roll is required going down the slope, the ends going down the slope should overlap by at least 3'. Ends of strips shall be tucked into the soil by at least 6".

3.04 CLEANING

- A. During construction, keep the site free of rubbish and debris, and clean up the site promptly when notified to do so. Take care to prevent spillage on streets from hauling and immediately clean up any such spillage and/or debris deposited on streets due to the work of this Section.
- B. During all phases of the construction work, take all precautions to abate dust nuisance by clean-up, sweeping, sprinkling with water, or other means as necessary.

3.05 PROTECTION: MAINTENANCE

- A. The Landscape Maintenance Period will begin when all the Landscape Maintenance Period Requirements have been met (See Part 1 of these Specifications).
- B. Cleaning: Maintain cleanliness on paving areas and other public areas used by equipment and immediately remove all spillage. Remove from project site all rubbish and debris found thereon and all material and debris resulting from landscaping work, leaving the site in a safe and clean condition.
- C. Maintenance:
 - 1. Sprinkler Irrigation System:
 - a. Check system weekly for proper operation. Flush lateral lines out after removing last sprinkler head or two at each end of lateral. Adjust all heads as necessary for unimpeded coverage.
 - b. Set and program automatic controllers for seasonal water requirements. Provide the Owner's Representative with keys to the controllers and instructions on how to turn off system in case of emergency.
 - c. Repair all damages to sprinkler irrigation system as part of the contract work. Make repairs within one watering period or one week, whichever is the least amount of time.
 - 2. Turf Areas:
 - a. Begin mowing turf when grass has reached a height of three inches (3") and cut to a height of one and one-half inches to two inches (1 ½" - 2"). Mow at least weekly after the first cut. Turf must be well-established and free of bare spots and weeds, to satisfaction of Landscape Architect, prior to final acceptance. Do not mow lawns when the soil is not able to support maintenance equipment. Repair wheel marks and ruts caused by the maintenance equipment at no additional cost to the Owner.
 - b. Pick up grass clippings and remove from the site and premises.
 - c. Trim edges at least twice monthly for neat appearance. Vacuum or blow clippings off walks.
 - d. Water the lawns at such frequency as weather conditions require to replenish soil moisture below the root zone. Normally, a total of one and one-half inches (1 ½") of water is needed weekly in hot weather.
 - e. Fertilize the lawn areas at the beginning of the Landscape Maintenance Period and at the completion of the Landscape Maintenance Period. Use a fertilizer with the following characteristics:
 - 1.) Slow release, Best 16-6-8, or approved equal, at the rate of 6.25 lbs per 1,000 square feet from March through October.
 - 2.) Calcium Nitrate (15-0-0) at the rate of 6.5 lbs per 1,000 square feet from November through February.
 - f. Broadcast fertilizer using a mechanical spreader; do not apply by hand-broadcasting. Sweep all fertilizer off hardscape into adjacent planters.
 - g. Weekly as needed and as directed, re-sod lawn areas with material that matches previously installed material. Use sod to repair any bare areas. Repair areas to receive sod as follows:

- 1.) Mark out areas to receive new sod repair.
 - 2.) Cut straight lines that will accept sod the full width of the roll and a minimum of twenty-four inches (24") in length.
 - 3.) Transition the grade between existing turf and new sod seamlessly, with no change in elevation.
3. Trees and Shrubs:
- a. Water enough that moisture penetrates throughout root zone and only as frequently as necessary to maintain healthy growth.
 - b. Construct and/or remove water basins around each plant, depending on the time of the year and as directed.
 - c. Do not prune unless directed by the Landscape Architect.
 - d. Re-stake and re-tie trees as needed and as directed by the Landscape Architect. Do not allow tops of tree stakes to protrude into head of tree.
 - e. Replace any dead, dying or vandalized plant material on a weekly basis throughout the Landscape Maintenance Period.
4. Insecticide and Herbicide Application:
- a. If needed, control weeds with selective herbicides and sprays. In areas where crabgrass has infested the lawn, apply pre-emergent herbicides such as Dacthal by Amvac, Balan, or Betasan by Gowan for control prior to crabgrass germination. Control insect pests if necessary.
 - b. Use only a licensed Pest Control Operator to apply herbicides and sprays and to maintain a log for applications indicating material, timing, and rate.
5. Decomposed Granite with Binder:
- a. Remove debris, such as paper, grass clippings, leaves or other organic material by mechanically blowing or hand raking the surface as needed.
 - b. During the first year, a minor amount of loose aggregate will appear on the paving surface (1/16" to 1/4"). If this material exceeds a ¼", redistribute the material over the entire surface. Water thoroughly to the depth of 1". Compact with power roller of no less than 1,000 lbs. This process should be repeated as needed.
 - c. If cracking occurs, sweep fines into the crack, water thoroughly and hand tamp with an 8"-10" hand tamp plate.
6. Pre-scheduled On-site Meetings: Hold regularly scheduled (monthly or bimonthly as determined by the Landscape Architect) on-site meetings with the Landscape Architect, Project Inspector and Owner's Representative. Dates and times will be jointly agreed upon.
7. Request, forty-eight hours (48 hrs.) in advance, on-site visits by the Landscape Architect to determine the end of the Landscape Maintenance Period.

END OF SECTION

SECTION 33 00 00

SITE UTILITIES

PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. Domestic water piping system.
2. Fire protection piping systems.
3. Sewer piping system.
4. Other water and sewer items that may be specified or shown on the drawings.

B. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 01 50 00, Construction Facilities and Temporary Controls.
3. Section 31 23 33, Trenching and Backfilling.
4. Section 32 16 00, Site Concrete.
5. Section 33 00 00, Earthwork.

1.02 REFERENCES AND STANDARDS

- A. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
- B. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557-02 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- D. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- E. ANSI/ASTM D 4318-05 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
- F. CALTRANS Standard Specifications.
- G. CAL-OSHA, Title 8, Section 1590 (e).
- H. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.
- I. NFPA 13, 24 and 25, latest editions.
- J. California State Health and Safety Code Section 116875, Lead Free Public Water Systems.

K. California Plumbing Code, latest edition.

1.03 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.
- C. Provide sieve analysis from accredited testing lab on pipe bedding material. Analysis shall have a current date not older than project contract signing date.
- D. Substitution: Provide all data of proposed material being submitted as a substitution. Provide comparison with specified product data and identify all differences. Failure to provide comparison will be reason for rejection.

1.04 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the drawings to be salvaged and re-used.
 - 1. Sun damaged or discolored PVC pipe will be rejected.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects or deficiencies discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the contractor.
- D. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction or incorrect grades will be the responsibility of the contractor.
- E. Per 2016 NFPA 13 provide Contractor's material and test certificate to the Owner, Architect, Project Inspector and Local Fire Authority.

1.05 FEES, PERMITS, AND UTILITY SERVICES

- A. Obtain and pay for permits and service charges required for installation of Work. Arrange for required inspections and secure written approvals from authorities having jurisdiction.
- B. Upon completion of work within right-of-way, provide copies of written final approval to the Architect.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.07 PROJECT CONDITIONS

- A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he is to immediately notify the Architect before continuing work.
- B. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.08 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.09 PROTECTION

- A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
- B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
- C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
- D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gullyng of sides of excavation.
- E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to provide pumps and all equipment necessary to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
- F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.

- G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.
- H. Trees: Carefully protect existing trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.

1.10 SEASONAL LIMITS

- A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

1.11 RECORD DRAWINGS

- A. Keep a daily record of all pipe placed in ground, verified by Project Inspector.
- B. Upon completion of this Contract, furnish one tracing showing all outside utility lines, piping, etc., installed under this Contract. Locate and dimension all work with reference to permanent landmarks.
- C. All symbols and designations used in preparing "RECORD" drawings shall match those used in Contract drawings.
- D. Properly identify on as-builts and provide dimensions for all stubs for future connections. Provide concrete markers 6" dia. 12" deep, flush with finish grade at the ends of all stubbed pipes.

PART 2 – PRODUCTS

2.01 MATERIALS - GENERAL

- A. Provide each item listed herein or shown on drawings of quality noted or approved equal. All material shall be new, full weight, standard in all respects and in first-class condition. Insofar as possible, all materials used shall be of same brand or manufacture throughout for each class of material or equipment. Materials shall be of domestic manufacture and shall be tested within Continental United States.
- B. Grade or quality of materials desired is indicated by trade names or catalog numbers stated herein.
- C. Dimensions, sizes, and capacities shown are minimum and shall not be changed without permission of Architect.
- D. All materials in this section used for any public water system or domestic water for human consumption shall be lead free.
 - 1. For the purposes of this section, "lead free" means not more than 0.2 percent lead when used with respect to solder and flux and not more than 8 percent when used with respect to pipes and pipe fittings.
 - 2. All pipe, pipe or plumbing fitting or fixtures, solder, or flux shall be certified by an independent American National Standards Institute (ANSI) accredited third party, including, but not limited

to, NSF International, as being in compliance with this section.

- E. All materials used for fire system piping shall be UL and FM approved.

2.02 VALVE BOXES

- A. Provide at each valve or cock in ground a Christy, Brooks, or equal to Christy G05CT, concrete valve box with cover marked for service, domestic water shall be marked "Water" and fire supply shall be marked "Fire". Furnish extension handles for each size square nut valve, and provide "fork" handle for each size of "wheel handle" valve as required. Do not locate valve boxes in walk, or covered passages, curbs, or curb & gutters, unless necessary. If valve location is within concrete or asphalt paved surface valve box shall be as detailed on plans for such condition. Provide valve box extensions as required to set bottom of valve box to bottom of piping in which valve is installed. Provide Owner with set of special wrenches and/or tools as required for operation of valves.

2.03 PIPES AND FITTINGS

- A. Sanitary Sewer: PVC sewer pipe and fittings with Ring-Tite joints, ASTM D3034 SDR35.
- B. Domestic water lines 3" and smaller: Type K copper tubing, hard temper, with wrought copper fittings.
- C. Water lines 4" and larger: AWWA C-900 Class 150/DR18 with rubber gasket joints.
- D. Fire lines 4" and larger: AWWA C-900 Class 200/DR14 with rubber gasket joints.
- E. Solder: Lead Free. 95/5; 95% Tin / 5% Antimony.
- F. Ductile Iron Pipe; Class 350, Cement Lined
- G. Ductile Iron Pipe Fittings; AWWA C110, C153, Ebba Iron, Star Romac, Sigma, or approved equal.
- H. Mechanical Fitting Bolts; Bolts and nuts shall be carbon steel with a minimum 60,000 psi tensile strength conforming to ASTM A 307, Grade A. Bolts shall be standard ANSI B1.1 Class 2A course threads. Nuts shall conform to ASTM A 563 and be standard ANSI B1.1, Class 2A course thread. All bolts and nuts shall be zinc coated.
- I. Fasteners Anti-Rust Coatings; After assembly, coat all fasteners with an Asphaltic Bituminous coatings conforming to latest edition NFPA 24.
- J. Ductile Iron Pipe Wrap; 8 mil polyethylene pipe wrap conforming to ANSI/AWWA C105/A21.5 standards.
- K. Pipe Insulation; Pipe exposed to atmospheric conditions ½" thru 4" NPT; Johns Manville rigid fiberglass insulation, Micro Lok HP; Owens Corning Fiberglas SSL II; Conforming to ASTM C 612, Type 1A or type 1B.
- L. Aluminum field applied pipe insulation jacket; comply with ASTM B209, ASTM C1729, ASTM C1371 Manufacturers; Childers Metals; ITW Insulation Systems Aluminum Jacketing; or an approved equal.

1. Finish shall be flat mill finish
2. Factory Fabricated Fitting Covers; 45 and 90 degree elbows, tee's, valve covers, end caps, unions, shall be of the same thickness and finish of jacket.
3. The fittings shall be composed of 2-pieces
4. Adhesives; per the manufacturers requirements
5. Joint Sealant; shall be silicone, and shall be aluminum in color.

M. Sewer Forced Main; HDPE, DR 11, color gray with green stripe by JM Eagle or approved equal.

2.04 SANITARY SEWER MANHOLES

A. Shall be constructed as shown on plan details.

2.05 CLEANOUTS

A. Cleanouts of same diameter as pipe up to 8" in size shall be installed in all horizontal soil and waste lines where indicated and at all points of change in direction. Cleanouts shall be located not less than 18" from building so as to provide sufficient space for rodding. No horizontal run over 100 feet shall be without cleanout whether shown on drawings or not.

B. All cleanout boxes shall be traffic rated with labeled lid, Christy G05CT or approved equal. Lid shall be vandal proof with stainless steel screws

2.06 UNIONS

A. Furnish and install one union at each threaded or soldered connection to equipment and 2 unions, one on each side of valves on pipes ½" to 3".

B. Locate unions so that piping can be easily disconnected for removal of equipment or valve. Provide type specified in following schedule:

Type of Pipe Union

Steel Pipe: 150 lb. Screwed malleable ground joint, brass, brass-to-iron seat, black or galvanized to match pipe.

Copper tubing: Brass ground joint with sweat connections.

PVC Sch 80 pipe: PVC union, FIPT X FIPT

2.07 VALVES

A. Provide valves as shown and other valves necessary to segregate branches or units. Furnish valves suitable for service intended. Valves shall be properly packed and lubricated. Valves shall be non-rising stem. Place unions adjacent to each threaded or sweat fitting valve. Install valves with bonnets vertical. All valves shall be lead free.

B. Valves ½" thru 2"; shall be made of bronze, full size of pipe and lead free. Nibco S-113-FL Series; American G-300 Series; Matco 511 FL Series; Apollo 102T-FL Series. Brass valves of brass parts

within valves will not be accepted.

- C. Valves, 2 ½" thru 3" shall be class 150; Shall be made of bronze, full size of pipe; Jenkins Fig. 2310 J; Lunkenheimer Fig. 2153; Crane Fig. 437; Stockham Fig. B-128.
- D. Valves, Flanged; 4" thru 12" Ductile Iron Resilient Wedge Gate Valve; Nibco F 609 RW; American 2500 Series; Kennedy 8561; Mueller 2360 Series.

2.07 FIRE HYDRANTS

- A. Clow 960 Factory Painted or per Local Jurisdiction Requirements, or an approved equal, 36" minimum bury, two 2-1/2" hose nozzles, one 4-1/2" pumper nozzle, and break-off check valve, Clow LBI 400A or approved equal. Hydrant shall conform to, and installation shall comply with the Local Jurisdiction.

2.08 POST INDICATOR

- A. Post Indicator shall be Mueller Co. A-20806 (adjustable) with tamper switch or an approved equal.

2.09 BACKFLOW PREVENTERS

Double Check Valve, Double Check Detector and Reduced Pressure Backflow Preventers

- A. Backflow preventers shall be as approved by the local agency and by the State of California's Department of Health Services most recent list of approved reduced pressure backflow preventers. All approved backflow preventers shall have ductile iron bodies.
 1. Provide Backflow preventer blankets with locking device. Weatherguard R-30 insulated or equal.
 2. Provide ball valve at all test ports with brass plug in valve.
 3. Provide a minimum of 2 valve tamper switches on fire prevention Backflows.

2.10 TAPPING SLEEVE

- A. Shall be used on pipe sizes 6" thru 12" and shall be made with stainless steel material including stainless steel bolts. Flanges shall be ductile iron or high carbon steel. Gaskets shall seal full circumference of pipe. Shall be manufactured for operating pressure of 200 psi, and shall pass test pressure of 300 psi. Romac SST series; Smithblair 662; Mueller H304; Ford "FAST" tapping sleeve.

2.11 SERVICE SADDLES

- A. Shall be used on pipe size 2" thru 4". Body shall be made from ductile iron with epoxy coating or bronze. Cascade Style CSC-1; A.Y. McDonald model 3891 AWWA/3892 FNPT; Smith-Blair #317; Ford S70, S71, S90, (style B).

2.11 TRACER WIRE

- A. No. 10 THW solid copper wire. Solder all joints

PART 3 - EXECUTION

3.01 DRAWINGS AND COORDINATION

- A. General arrangement and location of piping, etc., are shown on Drawings or herein specified. Install work in accord therewith, except for minor changes that may be necessary on account of other work or existing conditions. Before excavation, carefully examine other work that may conflict with this work. Install this work in harmony with other craft and at proper time to avoid delay of work.
- B. Verify invert elevations at points of connection to existing systems prior to any excavation. If invert elevations differ from that shown on drawings, notify Architect immediately.
- C. In advance of construction, work out minor changes if conflicts occur with electrical or mechanical. Relocate services to suit actual conditions and work of other trades to avoid conflict therewith. Any adjustments or additional fittings to make adjustments shall not be cause for additional costs to the owner.
- D. Execute any work or apparatus shown on drawings and not mentioned in specifications, or vice versa. Omission from Drawings or Specifications of any minor details of construction, installation, materials, or essential specialties does not relieve Contractor of furnishing same in place complete.
- E. Graded pipes shall take precedence. If conflict should occur while placing the domestic water and fire service piping, the contractor shall provide any and all fittings necessary to route the water lines over or under such conflicting pipes at no additional costs to the owner.

3.02 ACCESS

- A. Continuously check for clearance and accessibility of equipment or materials specified herein to be placed. No allowance of any kind shall be made for negligence on part of Contractor to foresee means of installing his equipment or materials into proper position.

3.03 EXCAVATING AND BACKFILLING

- A. Excavation and Bedding:
 - 1. General: Trench straight and true to line and grade with bottom smooth and free of irregularities or rock points. Trench width to be a minimum of 12" wider than outside diameter of pipe. Follow manufacturer's recommendations for use of each kind and type of pipe.
 - 2. Bedding: Provide a bedding as noted on drawing details for the full length of the pipe. Bedding shall have a minimum thickness beneath the pipe of 4" or 1/8 the outside diameter of the pipe, which ever is greater. Provide bell holes and depressions for pipe joints only of size required to properly make joint.
 - 3. If the trenches for the site utilities falls within areas to be lime treated, the piping shall be installed prior to any lime treatment operations, providing the elevation of the piping is below the treatment section.
 - a. If trenching is necessary in areas that have been previously lime treated the contractor shall backfill the trench with class 2 aggregate base, with minimum section equal to the lime treated section and compacted to 95%.

- B. Laying of Pipe:

- 1. General: Inspect pipe prior to placing. Sun damaged pipe will be rejected. Set aside any

defective or damaged material. Do not place pipe in water nor place pipe when trenches or weather are unsuitable. Lay pipe bell upgrade, true to line and grade.

- a. Sewer pipe shall be laid in strict conformity to the prescribed line and grade, with grade bars set and each pipe length checked to the grade line. Three consecutive points on the same rate of slope shall be used at all times to detect any variation from a straight grade. In any case of discrepancy, work shall be stopped and the discrepancy immediately reported to the Owner's Representatives. In addition, when requested by the Owner's Representative, a string line shall be used in the bottom of the trench to insure a straight alignment of the sewer pipe between manholes. The maximum deviation from grade shall not be in excess of 1/4 inch. In returning the pipe to grade, no more than ¼" depression shall result.
 - b. The Contractor shall expose the end of existing pipe to be extended, for verification of alignment and elevation, prior to trenching for any pipe which may be affected. All costs of such excavation and backfill shall be included in the price paid for the various items of work.
 - c. A temporary plug, mechanical type shall be installed on sewer pipe at the point of connection to existing facilities. If connecting to a public facility the plug shall conform to the requirements of the local jurisdiction. This plug shall remain in place until the completion of the balling and flushing operation.
2. Bell and Spigot Joints: Lubricate inside of bells and outside of spigots with soap solution. Wedge joints tight. Bell of bell and spigot pipe to be pointed upgrade.

C. Backfilling:

1. General: Do not start backfill operations until required testing has been accomplished.
2. Compaction and Grading: Remainder of backfill shall be in accordance with Section 31 23 33 – TRENCHING AND BACKFILLING.
3. If trenching in area previously lime or cement treated backfill top of trench section, same depth as lime or cement treatment with Class 2 Aggregate Base compacted to 95% minimum relative compaction.

3.04 INSTALLATION OF WATER PIPING

- A. The contractor shall be responsible for determining the installed depth of all water piping, based on surfaces grades and minimum required depth of cover.
- B. Immediately cap or plug ends of, and opening in, pipe and fittings to exclude dirt until final connections made. Use reducing fittings where any change in pipe size occurs. Bushings shall not be used.
- C. General: Should existing conditions or other work prevent the running of pipes or the setting of equipment at the points indicated by drawings, changes as authorized by the Architect shall be made without additional cost to the Owner.
- D. All bolts used on mechanical fittings shall be thoroughly coated with an asphaltic bituminous coating conforming to 2016 NFPA 24, 10.4.1.1.
- E. All buried metal shall be incased with 8 mil polyethylene wrap so that no soil is in contact with metal. Ends of polyethylene wrap shall be taped to provide seal with pipe.
- F. Do not install water lines in same trench with non-metallic sewer lines unless bottom of water pipe at all points is at least 12" above top of sewer line and water line is placed on solid shelf excavated

at one side of common trench with a minimum of 12 inch horizontal separation.

- G. Under no circumstance shall a fitting be located directly under a structural footing without prior approval from the Architect.
- H. In locations where existing domestic pipe is rerouted, the new pipe shall be assembled using restrained fittings at all joints including factory pipe joints. Tapped restrained blind flanges shall be temporarily installed at each end of the assembled pipes until testing and chlorination is completed and approved.

3.05 CLOSING IN OF UNINSPECTED WORK

- A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected, tested, and approved. Should work be enclosed or covered up before it has been approved, uncover work at own expense. After it has been inspected, tested and approved, make repairs necessary to restore work of other contractors to condition in which it was found at time of cutting.

3.06 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in new condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures and trim that are installed as part of this work. Leave systems and equipment in satisfactory new operating condition.
- B. Drain and flush piping to remove grease and foreign matter.
- C. Sewer piping shall be balled and flushed.
- D. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.
- E. Flush fire service piping in the presence of the project inspector. Flushing shall be continued for a sufficient time as necessary to ensure all foreign material has been removed. Flow rate shall be equal to site fire flow requirements.

3.07 SEWER INTERNAL INSPECTIONS

- A. Upon completion of construction and prior to final inspection, the Contractor shall clean the entire new pipeline of all dirt and debris. Any dirt or debris in previously existing pipes or ditches in the area, which resulted from the new installation, shall also be removed. Pipes shall be cleaned by the controlled balling and flushing method. Temporary plugs shall be installed and maintained during cleaning operations at points of connection to existing facilities to prevent water, dirt, and debris from entering the existing facility.

3.08 TEST OF PIPING

- A. Pressure Test piping at completion of roughing-in, in accord with following schedule, and show no loss in pressure or visible leaks after minimum duration or four (4) hours at test pressures indicated.
- B. Chlorination tests shall be performed after all fixtures and any required mechanical devices are

installed and the entire system is complete and closed up.

- C. In cases where new domestic water piping is assembled for re-routing of existing domestic water pipe, the contractor shall perform the following testing prior to connecting the new water pipe to the existing system.
1. The pipe shall be pressure tested and per the test schedule.
 2. The pipe shall be pressure tested down within the trench.
 3. The contractor shall dig a temporary ditch below the existing pipe to drain to a sump that is lower than the bottom of the trench and to the side of the trench. The sump shall be 30% larger than the total volume of water within the testing pipe assembly.
 4. After pressure testing and chlorination has taken place and accepted, the contractor shall drain the pipe into the sump and pump the sump out as it is filling.
 5. The temporary test fittings at each end of the pipe assembly shall be removed and the final restrained couplings installed.
 6. The existing piping shall be cut and the water within the pipe shall drain below the pipe to the temporary sump. Pump the sump as it is being filled up. Take extreme caution not to contaminate the existing pipe with any contaminants within the trench.
 7. Before making the final coupling connections, the restrained couplings at each end of the new pipe shall be thoroughly swabbed inside the fitting with a solution of chlorine mixed with water at a rate of 1 part chlorine to 4 parts potable water.
 8. After final connections are made, a visual inspection shall be made after fittings are wiped off. If after 1 hr, no noticeable drips are noted the pipe can be backfilled.
 9. The contractor shall flush all water piping affected by chlorination until it is within acceptable levels approved by certified testing lab.

TEST SCHEDULE

<u>System Tested</u>	<u>Test Pressure PSIG Test With</u>
Public water mains	Per local jurisdiction requirements.
Private domestic water piping and fire mains serving fire hydrants:	150 Lbs. Water 4 hrs.
Fire Protection Piping from PIV to fire riser:	200 Lbs. Water pressure, 4 hrs duration with no pressure loss.
Sanitary Sewer Piping:	Sewer system shall be tested for leakage per local jurisdiction requirements.

- D. Testing equipment, materials, and labor shall be furnished by contractor.

3.09 WATER SYSTEM STERILIZATION

- A. Public Water Mains: Shall be flushed and disinfected per the local jurisdiction requirements

- B. Clean and disinfect all site water systems connected to the domestic water systems in accordance with AWWA Standard C651 and as required by the local Building and Health Department Codes, and EPA.
 - 1. Clean and disinfect industrial water system in addition to the domestic water system.
 - 2. Disinfect existing piping systems as required to provide continuous disinfection upstream to existing valves. At Contractors option, valves may be provided to isolate the existing piping system from the new piping system.
- C. Domestic water sterilization shall be performed by a licensed “qualified applicator” as required by CAL-EPA Pesticide Enforcement Branch for disinfecting and sterilizing drinking water.
- D. Disinfecting Agent: Chlorine product that is a registered product with Cal-EPA for use in California potable water lines, such as Bacticide, CAL-EPA Registration No. 37982-20001.
- E. Contractor to provide a 1” service valve connected to the system at a point within 2’-0” of its junction with the water supply line. After sterilization is complete Contractor to provide cap at valve.
- F. Sterilization Procedure to be as follows:
 - 1. Flush pipe system by opening all outlets and letting water flow through the system until clear water flows from all outlets.
 - 2. Inject disinfecting agent to provide a minimum chlorine residual concentration of at least 50 parts per million (ppm) of free chlorine at each outlet.
 - 3. Provide sign at all outlets which reads “Water Sterilization in Progress – Do not operate”. Remove signs at conclusion of test.
 - 4. Close all outlets and valves, including valve connecting to water supply line and 1” service valve. Retain treated water in pipe for a minimum of twenty-four hours. Should chlorine residual at pipe extremities be less than 50 PPM at this time, pipe shall be re-chlorinated. As an option, the water systems may be filled with a water-chlorine solution containing a minimum of 200 PPM of chlorine and allowed to stand for three hours.
 - 5. After chlorination, flush lines of chlorinated water and refill from domestic supply. Continue flushing until residual chlorine is less than or equal to 0.2 ppm, or a residual the same as that of the test water.
- G. Chemical and bacteriological tests shall be conducted by a state-certified laboratory and approved by the local authorities having jurisdiction.
- H. Submit written report to Health Department as required by State Regulations. Provide a copy of report to Architect prior to completion of project.
- I. The costs of sterilization and laboratory testing shall be paid for by the contractor.

3.10 CLEANING

- A. Refer to Section 01 74 00.
- B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.

END OF SECTION

SECTION 33 40 00

SITE DRAINAGE

PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. Storm Drain piping, fittings, structures.

B. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 01 50 00, Construction Facilities and Temporary Controls.
3. Section 31 23 33, Trenching and Backfilling.
4. Section 32 16 00, Site Concrete.
5. Section 33 00 00, Earthwork.

1.02 REFERENCES AND STANDARDS

- A. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
- B. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557-02 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- D. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- E. ANSI/ASTM D 4318-05 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
- F. CALTRANS Standard Specifications.
- G. CAL-OSHA, Title 8, Section 1590 (e).
- H. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.
- I. NFPA 13, 24 and 25, latest editions.
- J. California State Health and Safety Code Section 116875, Lead Free Public Water Systems.
- K. California Plumbing Code, latest edition.

1.03 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.
- C. Provide sieve analysis from accredited testing lab on pipe bedding material. Analysis shall have a current date not older than project contract signing date.
- D. Substitution: Provide all data of proposed material being submitted as a substitution. Provide comparison with specified product data and identify all differences. Failure to provide comparison will be reason for rejection.

1.04 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the drawings to be salvaged and re-used.
 - 1. Sun damaged or discolored PVC pipe will be rejected.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects or deficiencies discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the contractor.
- D. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction or incorrect grades will be the responsibility of the contractor.
- E. Per 2016 NFPA 13 provide Contractor's material and test certificate to the Owner, Architect, Project Inspector and Local Fire Authority.

1.05 FEES, PERMITS, AND UTILITY SERVICES

- A. Obtain and pay for permits and service charges required for installation of Work. Arrange for required inspections and secure written approvals from authorities having jurisdiction.
- B. Upon completion of work within right-of-way, provide copies of written final approval to the Architect.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.07 PROJECT CONDITIONS

- A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he is to immediately notify the Architect before continuing work.
- B. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.08 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.09 PROTECTION

- A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
- B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
- C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
- D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gullyng of sides of excavation.
- E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to provide pumps and all equipment necessary to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
- F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from

earthwork operations.

- G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.
- H. Trees: Carefully protect existing trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.

1.10 SEASONAL LIMITS

- A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

1.11 RECORD DRAWINGS

- A. Keep a daily record of all pipe placed in ground, verified by Project Inspector.
- B. Upon completion of this Contract, furnish one tracing showing all outside utility lines, piping, etc., installed under this Contract. Locate and dimension all work with reference to permanent landmarks.
- C. All symbols and designations used in preparing "RECORD" drawings shall match those used in Contract drawings.
- D. Properly identify on as-builts and provide dimensions for all stubs for future connections. Provide concrete markers 6" dia. 12" deep, flush with finish grade at the ends of all stubbed pipes.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Pipe: Use one of the following, unless noted on the Drawings otherwise.
 - 1. Polyvinyl Chloride Pipe (PVC): SDR35 conforming to ASTM D3034 with elastomeric joints conforming to ASTM D3212. Sun damaged pipe will be rejected.
 - 2. High density polyethylene pipe (HDPE): The pipe shall be corrugated exterior/smooth interior pipe and water tight per ASTM D3212 with dual wall water tight gasket fittings.
- B. Perforated Pipe (for subdrains): Shall be ADS N12 pipe, 3 hole, ASTM F 405, AASHTO M 252; PVC ASTM D3034 SDR-35 storm drain pipe
- C. Manhole: Shall be as shown on the drawing details.
- D. Drop Inlet: Shall be as shown on the drawing details.
- E. Curb Inlet: Shall be as shown on the drawing details.
- F. Mortar: For pipe connections to concrete drainage structures, conform to ASTM C270 type N mortar.

- Place within one half hour after adding water.
- G. Crushed Rock: Imported washed crushed rock. Minimum 100% passing 3/4 inch sieve.
 - H. Trench drain: Polycast, Polydrain or equal and as shown on drawings.
 - I. Area Drains: Shall be as shown on the drawing details.
 - J. Floor Drains: Shall be as shown on the drawing details.
 - K. Clean-outs: Shall be as shown on the drawing details.
 - L. Planter drains: Shall be as detailed on the drawing details.
 - M. Filter Fabric: Mirafi 140N.

PART 3 - EXECUTION

3.01 INSPECTION LAYOUT AND PREPARATION

- A. Prior to installation of the work of this Section, carefully inspect and verify by field measurements that installed work of all other trades is complete to the point where this installation may properly commence
- B. Layout all work, establish grades, locate existing underground utilities, set markers and stakes, setup and maintain barricades and protection facilities; all prior to beginning actual earthwork operations. Layout and staking shall be done by a licensed Land Surveyor or Professional Civil Engineer.
- C. Verify that specified items may be installed in accordance with the approved design.
- D. In event of discrepancy, immediately notify Owner and the Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.02 INSTALLATION

- A. General: Installation shall be in strict conformance with referenced standards, the manufacturer's written directions, as shown on the drawings and as herein specified.
- B. Verify invert elevations at points of connection to existing systems prior to any excavation. If invert elevations differ from that shown on drawings, notify Architect immediately.
- C. Excavation and Bedding:
 - 1. General: Trench straight and true to line and grade with bottom smooth and free of irregularities or rock points. Trench width in accordance with pipe manufacturer's recommendations and as per the drawings. Follow manufacturer's recommendations for use of each kind and type of pipe.
 - 2. Bedding: Provide bedding as detailed on plans for the full length of the pipe. Bedding shall have a minimum thickness beneath the pipe of 4" or 1/8 the outside diameter of the pipe, whichever is greater. Provide bell holes and depressions for pipe joints only of size required to properly make

joint.

3. If the trenches for the site drainage fall within areas to be lime treated, the piping shall be installed prior to any lime treatment operations.
 - a. If additional piping is added to previously lime treated areas, the contractor shall backfill the trench with class 2 aggregate base and compact to 95%.

D. Laying of Pipe:

1. General: Inspect pipe prior to placing. Set aside any defective or damaged material. Do not place pipe in water nor place pipe when trenches or weather are unsuitable. Lay pipe upgrade, true to line and grade.
2. Bell and Spigot Joints: Lubricate inside of bells and outside of spigots with soap solution or as recommended by manufacture. Wedge joints tight. Bell of bell and spigot pipe to be pointed upgrade.
3. Pipe shall be bedded uniformly throughout its length.
4. Pipe elevation shall be within 0.02 feet of design elevation as shown on plans.
5. Off Site Work: All work beyond the property lines shall be done in strict conformance with the requirements of the governing agency.

E. Backfilling:

1. General: Do not start backfill operations until required testing has been accomplished.
2. Trenches and Excavations: Backfill with material as detailed on plans, filling both sides of the pipe at the same time, carefully tamping to hold pipe in place without movement. Refer to Section 31 23 33 – TRENCHING AND BACKFILLING for fill above this layer.

F. Grouting of Pipes: Grout pipes smooth and water tight at drop inlet, manholes, and curb inlets. Grout back side of hood at curb inlets all grouting shall be smooth and consistent.

G. Off Site Work: All work beyond the property lines shall be done in strict conformance with the requirements of the local agency.

H. Cutting and Patching: Remove and replace existing surface features per applicable specification section (i.e. asphaltic concrete or concrete paving) where pipe is installed in areas of existing improvements.

3.03 TOLERANCES

A. Storm Drain structure grates

1. In landscape and lawn areas $\pm 0.05'$.
2. In sidewalk and asphalt pavement $\pm 0.025'$.
3. In curb and gutter application $\pm 0.0125'$.

B. Cleanout Boxes and Lids

1. In landscape areas; 0.10 higher than surrounding finish grade, $\pm 0.05'$.
2. In sidewalks and asphalt pavement; Flush with surrounding finish grade, $\pm 0.025'$.

3.03 DEWATERING

- A. Contractor to provide trench dewatering as necessary, no matter what the source is, at no additional cost to the owner.
- B. If the previously excavated material from trenching is too wet to achieve trench backfill compaction the contractor shall make a reasonable effort to aerate and dry the material per section 31 00 00, 3.08, B

3.04 FLUSHING

- A. The Contractor shall thoroughly ball and flush the storm drain system to remove all dirt and debris. Discharge water to an approved location.

3.05 CLEANING

- A. Refer to Section 01 74 00.
- B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.
- C. Clean the dirt, rocks, and debris from all storm drain inlets, structures, and connecting pipes.

END OF SECTION



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CONSULTING GROUP, INC.

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4200 Rocklin Road, Suite 7, Rocklin, CA 95677 Phone (916) 632-6800 Fax (916) 632-6812 www.entekgroup.com

**HAZARDOUS MATERIALS SURVEY
FINAL REPORT**

OWNER/CLIENT

**Sacramento City Unified School District
5735 47th Avenue
Sacramento, CA 95824**

CONTACT

**Mr. Chris Ralston, Director III
Facilities Management, Maintenance & Operations, and Resource
Management**

SURVEY ADDRESS

**California Middle School
1600 Vallejo Way
Sacramento, CA 95818**

BUILDING(S) SURVEYED

**Main Building, East Building
Partial Roof Replacement Project**

PREPARED BY

**Blake Howes
CAC #13-5015 & CDPH #I/A 3315
Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin, CA 95677**

Entek Project #23-6577

March 7, 2023



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Executive Summary

The United States Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants (US EPA NESHAP), 40 CFR Part 61 - Nov. 20, 1990, requires an owner or operator of a demolition or renovation project to thoroughly inspect the affected facility or part of the facility where the demolition or renovation operation will occur for the presence of asbestos-containing materials (ACM) prior to the commencement of that project.

This inspection report was requested by Mr. Eli Gero, Project Manager with Kitchell on behalf of Mr. Chris Ralston, Director III of the Facilities Management, Maintenance & Operations, and Resource Management department for the Sacramento City Unified School District (SCUSD).

The purpose of the inspection was to comply with US EPA NESHAP requirements and the Sacramento Metropolitan Air Quality Management District (SMAQMD) which has jurisdiction for this project site to determine if asbestos containing materials are present which may be impacted during an upcoming project, which will include partial roofing replacement at California Middle School located at 1600 Vallejo Way, Sacramento, CA 95818.

Paints were also tested for lead content for compliance with Cal/OSHA lead in construction regulations. It is our understanding the school was originally constructed in the 1920's.

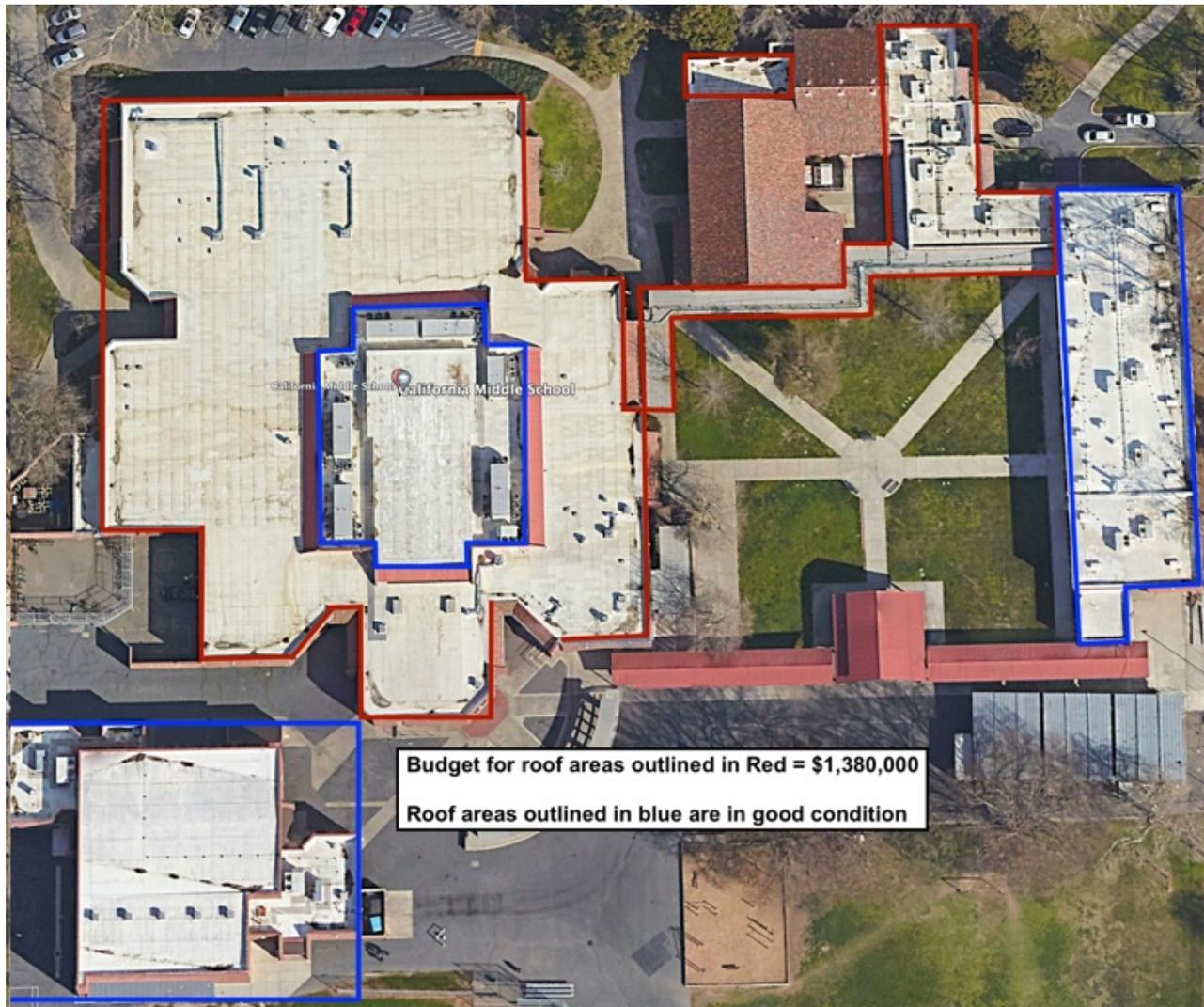
The attached drawings show approximate sample locations and also identify those bulk sample materials analyzed and found to contain asbestos greater than 1% with a (+) after the sample number. Materials analyzed and found to contain less than 1% asbestos or reported as none detected have a (-) after each sample number.

Materials are classified in the tables of this report as regulated asbestos containing material (RACM), Category I (CAT-I) or Category II (CAT-II) ACM, or asbestos containing construction material (ACCM), which included collecting multiple samples of some materials. Contractors and other individuals who view the sample locations and associated results indicated with either a (-) or a (+) on the drawing to make determinations take the risk of misidentifying a material and may arrive at determinations which are in direct conflict with the written findings of this report. This use of the drawing and the information provided on it relating to individual sample results in determining if a material does or does not contain asbestos is not recommended.

This is a summary of the report. The report must be read in its entirety, and the reader must review all the detailed information provided in the body of the report prior to making any interpretations, or conclusions pertaining to the information. Any conclusions made by the reader about the information provided in the body of this report which are contradictory or not included in this report are the responsibility of the reader.

Asbestos

On March 2, 2023 Entek conducted a survey specific to areas designated by the Owner's representative which included roofing materials as designated by red outlines in the following drawing.



The results of testing for asbestos during this survey indicate asbestos is not present in any of the sampled roofing or associated materials. Specifics pertaining to individual materials can be found in later sections of this report.

Lead

Entek investigated existing paints and applied coatings in an effort to determine if lead was present in these materials. None of the counterflashing paints expected to be impacted as part of this project were found to have detectable levels of lead. Specifics pertaining to individual materials can be found in later sections of this report.

Introduction

This report presents results of an asbestos and lead survey performed by Entek which included targeted roofing and associated materials of California Middle School located at 1600 Vallejo Way, Sacramento, CA 95818. The survey is specific to roofing materials as designated by the owner's representative. Please see attached diagram on page 4 for visual indication of included roofing areas.

The inspection was conducted by Mr. Blake Howes on March 2, 2023. Mr. Howes is a Cal/OSHA Certified Asbestos Consultant (CAC) and a State of California Department of Public Health (CDPH) certified Lead Inspector/Assessor.

This report was prepared for Mr. Chris Ralston, Director III of the Facilities Management, Maintenance & Operations, and Resource Management department for the SCUSD at the request of Mr. Eli Gero with Kitchell.

Building Description

The main building is a single story structure with a single ply membrane roof over rock-covered asphaltic roofing. Parapet walls are present at the perimeter and sloped clay tile roofing connects to the membrane at metal cap flashing in various locations. The flat roof is separated into two sections, a central upper level and a lower perimeter level. Only the lower perimeter level of roofing of the main building was included in this survey.

Covered walkways connect the main building to the east building. The north walkway has composition asphalt rolled roofing over wood substrate.

The east building areas included in this report have composition asphalt rolled roofing over wood substrate. HVAC and other mechanical equipment is present throughout the east building roof area. Parapet walls and sloped clay tile roofing are also present in this area.

Asbestos Inspection and Sample Collection Protocols

Entek included specific roofing areas of the buildings included in this report, but did not use methods to look within enclosed ceiling cavities during this investigation. Entek did include all suspect materials observed in, on, or associated with the areas included in this report.

Bulk samples were collected of various materials suspected to contain asbestos by utilizing a power drill and coring tube, cutting the materials with a razor knife, or use of other appropriate hand tools.

Miscellaneous materials were collected from each homogenous area in a manner sufficient to determine whether the material is or is not ACM as required in 40 CFR Part 763, Asbestos-Containing Materials in Schools; Final Rule and Notice, published October 30, 1987.

Approximate locations of all samples collected during this inspection are indicated on the "Bulk Asbestos Material Analysis Request Form for Entek", which served as the chain of custody for the samples, and on the building diagrams attached to this report.

Asbestos Bulk Sample Results

There were several materials observed which are considered “suspect” under US EPA guidelines. Under current US EPA guidelines for conducting building inspections for ACM, all "suspect" materials must be assumed to contain asbestos until otherwise determined by laboratory testing.

The samples of materials suspected of containing asbestos were submitted to Asbestech, a laboratory located in Rancho Cordova, California. These samples were subsequently analyzed by polarized light microscopy (PLM) with dispersion staining.

The US EPA NESHAP and SMAQMD uses the terms Regulated Asbestos Containing Material (RACM), Category I, and Category II when identifying materials which contain asbestos in amounts greater than 1%. Cal/OSHA uses the term ACCM which indicates a manufactured construction material contains greater than 0.1% asbestos by weight by the PLM method. This definition can be found in Title 8, 1529.

A total of 29 bulk samples were collected of all the materials considered to be "suspect" which were observed during this investigation. Some of those samples contained multiple layers which were individually analyzed to determine their asbestos content. Analysis of all samples collected was by PLM with dispersion staining. Results of the analysis are listed in the following table:

Suspect Materials Found NOT TO Contain Asbestos or Considered Non-Suspect				
Sample ID#’s	Suspect Material	EPA AHERA “Suspected” ACM	Asbestos Content	Location
01A-F	Single Ply Membrane Roofing, Black Asphaltic Roofing, White Roofing	Miscellaneous	NONE DETECTED	Main Building, Lower Perimeter Level Roof
02A-C	Gray Clay Tile Roofing Cement	Miscellaneous	NONE DETECTED	Main Building, Lower Perimeter Level Roof
03A-C	White Metal Cap Flashing Seam Mastic	Miscellaneous	NONE DETECTED	Main Building, Lower Perimeter Level Roof
04A	White Metal Counterflashing Mastic	Miscellaneous	NONE DETECTED	Main Building, Lower Perimeter Level Roof at Upper Level Walls
05A-D	Composition Asphalt Rolled Roofing, White Caulk, Gray Roofing, White Roofing	Miscellaneous	NONE DETECTED	East Building Connector Addition Roof
06A	Gray Clay Tile Roofing Cement	Miscellaneous	NONE DETECTED	East Building Connector Addition Roof
07A	White Metal Cap Flashing Seam Mastic	Miscellaneous	NONE DETECTED	East Building Connector Addition Roof

Suspect Materials Found NOT TO Contain Asbestos or Considered Non-Suspect				
Sample ID#'s	Suspect Material	EPA AHERA "Suspected" ACM	Asbestos Content	Location
08A-B	White Roof Jack Mastic, Black Mastic, Silver Paint	Miscellaneous	NONE DETECTED	East Building Connector Addition Roof
09A-C	Composition Asphalt Rolled Roofing, Silver Paint	Miscellaneous	NONE DETECTED	North Covered Walkway Roof
10A-B	Tan Metal Counterflashing Mastic, Silver Paint	Miscellaneous	NONE DETECTED	North Covered Walkway Roof at East Building Walls
11A-B	Composition Asphalt Rolled Roofing, White Coating, Gray Roofing	Miscellaneous	NONE DETECTED	East Building North Side Roof
12A	White Parapet Wall Edge Mastic, Silver Paint	Miscellaneous	NONE DETECTED	East Building North Side Roof

All sample number noted in the table above start with ECG-23-6577-

US EPA AHERA uses three terms when determining the classification of a material for the purpose of sampling. These terms include miscellaneous, surfacing, and thermal system insulation (TSI).

Miscellaneous materials are building materials on structural components, structural members or fixtures, such as floor and ceiling tiles, and does not include surfacing material or TSI.

Surfacing materials are materials that are sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceiling and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

TSI is material applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain, water condensation, or for other purposes.

The information provided in the tables of this report are for use by the Owner in determining where asbestos containing materials are located, and whether or not any future work may impact those materials. The information is also provided for use by any contractor who may perform work in areas impacting the materials listed in this report, and for use as appropriate by asbestos abatement contractors to provide costs related to work impacting ACM.

Any building materials which are considered "suspect" for containing asbestos which have not been identified in this report must be assumed to contain asbestos in amounts >1% until properly investigated and/or tested.

Materials commonly excluded from being suspected for containing asbestos include, but are not limited to: unwrapped pink and yellow fiberglass insulating materials or products, foam insulation, bare concrete, wood, metal, plastic, or glass. All other types of building materials or coatings on the materials listed above are commonly listed as “suspect” and must be tested prior to impact by a Contractor. Work impacting these untested or newly discovered materials must cease until an investigation can be completed.

Asbestos Regulatory Requirements

US EPA

The property included in this survey report is located in Sacramento County. Sacramento Metropolitan Air Quality Management District (SMAQMD) has been given authority for enforcement of the NESHAP regulations by means of their own rules (Rule 902 Asbestos).

A demolition is the wrecking, taking out, or burning of any load supporting structural member. A renovation is everything else. Ten day written notification to the SMAQMD is required prior to the performance of any demolition project regardless of asbestos being present or not. This notification would also apply to any renovation project which involves the wrecking, taking out, or burning of any load bearing structural member during a renovation as well.

There is not a sufficient amount of ACM present to require a 10 day notification to the SMAQMD be submitted prior to starting work which will impact materials identified as RACM or CAT-I and CAT-II materials if they are made friable through mechanical means of removal. If more than 160 square feet, 260 linear feet or 35 cubic feet of RACM is planned for removal on the project, formal written notification to SMAQMD is required.

Cal/OSHA

Disturbance of any ACM or ACCM could generate airborne asbestos fibers and would be regulated by Cal/OSHA. Cal/OSHA worker health and safety regulations apply during any disturbance of ACM or ACCM by a person while in the employ of another. This is true regardless of friability or quantity disturbed.

Since it has been determined that none of the materials expected to be impacted during this project contain asbestos, a licensed asbestos contractor, certified by the State of California, and registered with Cal/OSHA will not be required.

Lead Inspection, Sampling, & Results

A total of two (2) bulk samples of the painted surfaces from various roof counterflashings were collected and submitted to MicroTest Laboratories. These samples were subsequently analyzed by atomic absorption spectrometry (AAS). Results of the analysis are listed in the following table:

Paints/Coatings/Materials Determined NOT TO Contain Lead	
Paint/Coating Color or Material	Building Component
Red Colored Paint	Red Metal Counterflashing - Main Building Lower Roof at Upper Roof Walls
White Colored Paint	White Metal Counterflashing - East Building North Side Roof at Walls

Paints determined “NOT TO” contain lead for the purposes of this report are those samples which when analyzed did not indicate lead to be present at or above the limit of detection for the analysis method used. This limit of detection was 100 parts per million (ppm). As a result, any paints shown “NOT TO” contain lead will not require any special training or work practices related to lead when impacted.

Lead Regulatory Compliance

Any upcoming project which may result in the disturbance of lead containing products or surfaces, but is not intended to remediate a lead hazard or specifically designed to remove LBP to reduce or eliminate a known hazard, would be considered “lead related construction work”.

Since none of the paints that will be impacted by this project were found to contain lead, Cal/OSHA regulations found in CCR, Title 8 Section 1532.1 (§1532.1) Lead in Construction will not apply to this project.

Limitations

Entek inspected only the specific designated roof areas identified by the Owner’s representative to be included in the upcoming project, which did not include all roofing materials. This survey is specific to those roofing materials indicted by the diagram on page 4 of this report.

As a result the information provided in this inspection report may not be used to extend the inspection results to areas not included in this report without additional review and sampling as necessary.

If any new materials not listed as having been sampled, or listed as assumed for containing asbestos in this report are discovered, the new material must be assumed to contain asbestos until properly inspected and tested for asbestos content.

Entek's policy is to retain a full copy of these written documents for three (3) years once the file is closed. At the end of the 3 year period the written files will be destroyed without further notice. It is suggested copies of the file(s) are maintained as per the District's policy.

Entek will be providing only this electronic copy of the report and its attachments for your use. However, if you would like a hard copy of this report please do not hesitate to ask. Entek will be happy to mail the report upon receipt of your request.

Thank you for choosing Entek for your environmental needs. Please call me at (916) 632-6800 if you have any questions regarding this report.

Prepared by: 
Blake Howes
Vice President
Cal/OSHA CAC #13-5015
CDPH I/A Certification #3315

Appendices

- A. Asbestos Related Documents
- B. Lead Related Documents
- C. Backup Documentation

C:\Users\lhowes\Entek Consulting Group, Inc\Entekgroup - Documents\Clients\Sacramento City USD\23-6577 California MS - AsbPb\Project Letters & Reports\Roofing Report\Final Haz Mat Insp Rprt California Roofing 3-7-23.wpd



APPENDIX A

ASBESTOS RELATED DOCUMENTS

- Bulk Asbestos Analysis Report From Asbestech
- Bulk Asbestos Material Analysis Request Form for Entek
- Asbestos Bulk Sample Location Drawing
- SMAQMD Asbestos Survey Form
- SMAQMD Renovation/Demolition Notification Form

AD1.03

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:

Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:

23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70240-1
Date/Time Collected: 3/2/23
Date Received: 3/2/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 3/3/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-01A	White single ply membrane roofing, main bldg. lower roof south area	NONE DETECTED	Rubber
	Black asphaltic roofing	NONE DETECTED	Tar Binder Fibrous Glass
	White roofing	NONE DETECTED	Gypsum Fibrous Glass
01B	White single ply membrane roofing, main bldg. lower roof west area	NONE DETECTED	Rubber
	Black asphaltic roofing	NONE DETECTED	Tar Binder Fibrous Glass
	White roofing	NONE DETECTED	Gypsum Fibrous Glass
01C	White single ply membrane roofing, main bldg. lower roof NW area	NONE DETECTED	Rubber
	Black asphaltic roofing	NONE DETECTED	Tar Binder Fibrous Glass
	White roofing	NONE DETECTED	Gypsum Fibrous Glass

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

AD1.03

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70240-2
Date/Time Collected: 3/2/23
Date Received: 3/2/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 3/3/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-01D	White single ply membrane roofing, main bldg. lower roof north area	NONE DETECTED	Rubber
	Black asphaltic roofing	NONE DETECTED	Tar Binder Fibrous Glass
	White roofing	NONE DETECTED	Gypsum Fibrous Glass
01E	White single ply membrane roofing, main bldg. lower roof NE area	NONE DETECTED	Rubber
	Black asphaltic roofing	NONE DETECTED	Tar Binder Fibrous Glass
	White roofing	NONE DETECTED	Gypsum Fibrous Glass
01F	White single ply membrane roofing, main bldg. lower roof east area	NONE DETECTED	Rubber
	Black asphaltic roofing	NONE DETECTED	Tar Binder Fibrous Glass
	White roofing	NONE DETECTED	Gypsum Fibrous Glass
02A	Gray clay roofing tile cement, main bldg. lower roof at perimeter wall south area	NONE DETECTED	Granular Mins.

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

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Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:

23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70240-3

Date/Time Collected: 3/2/23

Date Received: 3/2/23

NVLAP Lab Code 101442-0

CDPH # 1153

Date Analyzed: 3/3/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-02B	Gray clay roofing tile cement, main bldg. lower roof at perimeter wall NW area	NONE DETECTED	Granular Mins.
02C	Gray clay roofing tile cement, main bldg. lower roof at perimeter wall east area	NONE DETECTED	Granular Mins.
03A	White metal cap flashing seam mastic, main bldg. lower roof at perimeter wall south area	NONE DETECTED	Opaques Cellulose
03B	White metal cap flashing seam mastic, main bldg. lower roof at perimeter wall NW area	NONE DETECTED	Opaques Calcite
03C	Gray metal cap flashing seam mastic, main bldg. lower roof at perimeter wall east area	NONE DETECTED	Opaques Calcite
04A	White metal counterflashing mastic, main bldg. lower roof at roof/ wall transition NE area	NONE DETECTED	Opaques Calcite

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISIO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

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ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:

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4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:

23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70240-4
Date/Time Collected: 3/2/23
Date Received: 3/2/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 3/3/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-05A	Black composition asphalt rolled roofing, east bldg. addition north area	NONE DETECTED	Tar Binder Fibrous Glass
	White caulk	NONE DETECTED	Calcite Opaques
	Gray roofing	NONE DETECTED	Cellulose Pumice
	White roofing	NONE DETECTED	Gypsum Fibrous Glass
05B	Black composition asphalt rolled roofing, east bldg. addition central lower area	NONE DETECTED	Tar Binder Fibrous Glass
	White caulk	NONE DETECTED	Calcite Opaques
	Gray roofing	NONE DETECTED	Cellulose Pumice
	White roofing	NONE DETECTED	Gypsum Fibrous Glass

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

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Rocklin, CA 95677

Job:
23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70240-5
Date/Time Collected: 3/2/23
Date Received: 3/2/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 3/3/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-05C	Black composition asphalt rolled roofing, east bldg. addition south area	NONE DETECTED	Tar Binder Fibrous Glass
	White caulk	NONE DETECTED	Calcite Opagues
	Gray roofing	NONE DETECTED	Cellulose Pumice
	White roofing	NONE DETECTED	Gypsum Fibrous Glass
05D	Black composition asphalt rolled roofing, east bldg. addition south area	NONE DETECTED	Tar Binder Fibrous Glass
	White caulk	NONE DETECTED	Calcite Opagues
	Gray roofing	NONE DETECTED	Cellulose Pumice
	White roofing	NONE DETECTED	Gypsum Fibrous Glass
06A	Gray clay roofing tile cement, east bldg. addition at perimeter wall east area	NONE DETECTED	Granular Mins.
07A	White metal cap flashing seam mastic, east bldg. addition at perimeter wall east area	NONE DETECTED	Opagues Calcite

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

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Rocklin, CA 95677

Job:
23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70240-6
Date/Time Collected: 3/2/23
Date Received: 3/2/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 3/3/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-08A	White roof jack mastic, east bldg. addition south area at HVAC jack	NONE DETECTED	Opagues Calcite
	Black mastic	NONE DETECTED	Tar Binder
	Silver paint	NONE DETECTED	Opagues
08B	White roof jack mastic, east bldg. addition central area at HVAC jack	NONE DETECTED	Opagues Calcite
	Black mastic	NONE DETECTED	Tar Binder
	Silver paint	NONE DETECTED	Opagues
09A	Black composition asphalt rolled roofing, north covered walkway west area	NONE DETECTED	Tar Binder Fibrous Glass
09B	Black composition asphalt rolled roofing, north covered walkway central area	NONE DETECTED	Tar Binder Fibrous Glass
09C	Black composition asphalt rolled roofing, north covered walkway east area	NONE DETECTED	Tar Binder Fibrous Glass
10A	Tan metal counterflashing mastic, north covered walkway west area	NONE DETECTED	Opagues Polyethylene
	Silver paint	NONE DETECTED	Opagues

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

AD1.03

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:

Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:

23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70240-6
Date/Time Collected: 3/2/23
Date Received: 3/2/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 3/3/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-10B	Tan metal counterflashing mastic, north covered walkway east area	NONE DETECTED	Opagues Polyethylene
	Silver paint	NONE DETECTED	Opagues
11A	Black composition asphalt rolled roofing, auditorium bldg. north area upper roof	NONE DETECTED	Tar Binder Fibrous Glass
	White coating	NONE DETECTED	Calcite Opagues
	Gray roofing	NONE DETECTED	Cellulose Pumice
11B	Black composition asphalt rolled roofing, auditorium bldg. north area lower roof	NONE DETECTED	Tar Binder Fibrous Glass
	White coating	NONE DETECTED	Calcite Opagues
12A	White parapet wall edge mastic, auditorium bldg. north area roof	NONE DETECTED	Opagues Calcite
	Silver paint	NONE DETECTED	Opagues

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.



70240

BULK ASBESTOS MATERIAL Analysis Request

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 2, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes

Client Name: Sacramento City Unified School District

Turnaround Time: Monday, 3-6-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

Table with 2 columns: SAMPLE # and MATERIAL DESCRIPTION/LOCATION. Rows include sample IDs like ECG-23-6577-01A through 03A and their corresponding material locations such as Single Ply Membrane Roofing and Clay Roofing Tile Cement.

Delivered by: [Signature] Date: 3/12/23 Time: 12:43 AM/PM

Received by: [Signature] Date: 3/12/23 Time: 12:43 AM/PM



AD1.03

70240

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 2, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes

Client Name: Sacramento City Unified School District

Turnaround Time: Monday, 3-6-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-03B	Metal Cap Flashing Seam Mastic - Main Building Lower Roof at Perimeter Wall, Northwest Area
ECG-23-6577-03C	Metal Cap Flashing Seam Mastic - Main Building Lower Roof at Perimeter Wall, East Area
ECG-23-6577-04A	Metal Counterflashing Mastic - Main Building Lower Roof at Roof/Wall Transition, Northeast Area
ECG-23-6577-05A	Composition Asphalt Rolled Roofing - East Building Addition, North Area
ECG-23-6577-05B	Composition Asphalt Rolled Roofing - East Building Addition, Central Lower Area
ECG-23-6577-05C	Composition Asphalt Rolled Roofing - East Building Addition, South Area
ECG-23-6577-05D	Composition Asphalt Rolled Roofing - East Building Addition, South Area
ECG-23-6577-06A	Clay Roofing Tile Cement - East Building Addition at Perimeter Wall, East Area
ECG-23-6577-07A	Metal Cap Flashing Seam Mastic - East Building Addition at Perimeter Wall, East Area
ECG-23-6577-08A	Roof Jack Mastic - East Building Addition, South Area at HVAC Jack
ECG-23-6577-08B	Roof Jack Mastic - East Building Addition, Central Area at HVAC Jack
ECG-23-6577-09A	Composition Asphalt Rolled Roofing - North Covered Walkway, West Area

Delivered by:

Date: 3/2/23 **Time:** 12:43 AM/PM

Received by:

Date: 3/2/23 **Time:** 12:13 AM/PM



AD1.03

70240

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 2, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes

Client Name: Sacramento City Unified School District

Turnaround Time: Monday, 3-6-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-09B	Composition Asphalt Rolled Roofing - North Covered Walkway, Central Area
ECG-23-6577-09C	Composition Asphalt Rolled Roofing - North Covered Walkway, East Area
ECG-23-6577-10A	Metal Counterflashing Mastic - North Covered Walkway, West Area
ECG-23-6577-10B	Metal Counterflashing Mastic - North Covered Walkway, East Area
ECG-23-6577-11A	Composition Asphalt Rolled Roofing - Auditorium Building, North Area Upper Roof
ECG-23-6577-11B	Composition Asphalt Rolled Roofing - Auditorium Building, North Area Lower Roof
ECG-23-6577-12A	Parapet Wall Edge Mastic - Auditorium Building, North Area Roof

C:\Users\bhowes\Desktop\Bulk Request 03-02-23.wpd

Delivered by: 

Date: 3/2/23 Time: 12:43 AM/PM

Received by: 

Date: 3/2/23 Time: 12:43 AM/PM

AD1.03



N

01C(-)

04A(-)

11A(-)

11B(-)

08B(-)

02B(-)

01D(-)

01E(-)

12A(-)

10B(-)

08A(-)

03B(-)

02C(-)

03C(-)



01B(-)

02A(-)

03A(-)

01A(-)

01F(-)

09A(-)

10A(-)

09B(-)

09C(-)

Sacramento City Unified School District
California Middle School
1600 Vallejo Way
Sacramento, CA 95818

Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin CA 95677
Map Not to Scale

Cloud/Clients/ClientName/ProjectNumber/Drawing/etc.

Asbestos Bulk Sample Locations
Collected by Blake Howes
On March 2, 2023
Project Number 23-6577

AD1.03



05B(-) 05A(-) 06A(-) 07A(-)



05C(-) 05D(-)

Sacramento City Unified School District
California Middle School
1600 Vallejo Way
Sacramento, CA 95818

Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin CA 95677
Map Not to Scale

Cloud/Clients/ClientName/ProjectNumber/Drawing/etc.

Asbestos Bulk Sample Locations
Collected by Blake Howes
On March 2, 2023
Project Number 23-6577



AD1.03 Asbestos Survey Form (See Instructions)

777 12th Street, 3rd Floor
Sacramento, CA 95814
Office (916) 874-4800
Fax (916) 874-4899
Email:
asbestos@airquality.org

1. Purpose of Survey		<input checked="" type="checkbox"/> Renovation		<input type="checkbox"/> Demolition		
2. Facility Information						
Project Area(s) Description California Middle School - Partial Roofing Replacement						
Address 1600 Vallejo Way		City Sacramento		# of Structures 2		
3. Owner Information						
Name Sacramento City Unified School District						
Address 5735 47 th Avenue		City/State Sacramento, California		Zip 95824		
Contact	Phone	Fax	Email			
Chris Ralston	(916) 395-3970		chris-ralston@scusd.edu			
4. Consultant Information			Survey Date(s): March 2, 2023			
Company Name Entek Consulting Group, Inc.						
Name Blake Howes				DOSH # 13-5015		
Address 4200 Rocklin Road, Suite 7		City/State Rocklin, California		Zip 95677		
Phone (916) 632-6800	Fax (916) 632-6812	Email bhowes@entekgroup.com	Signature 			
5. Client Information (If different than owner)			<input type="checkbox"/> General Contractor <input type="checkbox"/> Insurance Company <input type="checkbox"/> Architect <input type="checkbox"/> Property Manager <input type="checkbox"/> Other _____			
Name						
Address		City/State		Zip		
Contact	Phone	Fax	Email			
6. Have all of the suspect materials that will be disturbed been sampled?					<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
If no, explain why:						
7. Summary of Total Asbestos Containing Material (ACM) Findings						
Regulated Asbestos Containing Material (RACM) (Includes materials subject to known mechanical removal and fire damaged materials)			Category II		Category I	
Square Ft.	Linear Ft.	Cubic Ft.	Square Ft.	Linear Ft.	Square Ft.	Linear Ft.
0	0	0	0	0	0	0
To receive future SMAQMD Rule updates and changes affecting your industry (check one box):						
<input type="checkbox"/> Please send e-mail notices to			<input type="checkbox"/> I will sign up myself at www.airquality.org/listserve/ to receive emailed notices.			
<input checked="" type="checkbox"/> I am already subscribed.		<input type="checkbox"/> I want the District to mail notices to the address on this application:			<input type="checkbox"/> Owner	<input type="checkbox"/> Consultant



APPENDIX B

LEAD RELATED DOCUMENTS

- Bulk Lead Analysis Report From MicroTest
- Bulk Lead Material Analysis Request Form for Entek
- Lead Bulk Sample Location Drawing
- CDPH Lead Hazard Evaluation Report (Form 8552)

AD1.03



MicroTest Laboratories, Inc. | AIHA ELPAT #160934
3110 Gold Canal Dr, Ste. A, Rancho Cordova, CA 95670
PH 916.567.9808 | FX 916.404.0302
www.microtestlabsinc.com | service@microtestlabsinc.com

for office use only

Project ID
L31958-59

CLIENT INFORMATION

Company Entek Consulting Group, Inc
Name Ryan Metzen
Address 4200 Rocklin Road, Suite 7
Rocklin, CA 95677
Phone 916.632.6800
Email mainoffice@entekgroup.com
rmetzen@entekgroup.com

SAMPLE
Date Thursday, March 2, 2023
Time

MicroTest Laboratories
Analytical Data

JOB SITE INFORMATION

Sampler Blake Howes
Project Sacramento City Unified School
District
Site California Middle School
Address 1600 Vallejo Way
Sacramento, CA 95818
Job # 23-6577

EPA METHOD 7420/7000B

Client	Laboratory	Client	Reporting	Results	Units
Sample ID	Sample ID	Sample Location / Description	Limits	Comments	
ECG-23-6577-01Pb	L31958	Red Colored Paint - Metal Counterflashing, Main Building Lower Roof at Roof/Wall Transition	0.01%	<100	PPM
ECG-23-6577-02Pb	L31959	White Colored Paint - Metal Counterflashing - Auditorium Building North Lower Roof at Roof/Wall Transition	0.01%	<100	PPM

Date Received: Thursday, March 2, 2023
Date Analyzed: Thursday, March 2, 2023
Date Reported: Monday, March 6, 2023

Samples Received: 2
Samples Analyzed: 2

Analyst: Erich Bowman

Authorized Signatory:
Kelly Favero - Lab Manager

This report applies to the standards and procedures indicated and to the specific samples analyzed. Samples have NOT been corrected for blank values. EPA 3050B Hotblock Preparaton Method



BULK LEAD MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 2, 2023

Lab: MicroTest

Job Number: 23-6577

Collected by: Blake Howes

Client Name: Sacramento City Unified School District

Turnaround Time: 48 Hour

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Lead by Atomic Absorption Spectrometry

Special Instruction: *Please report result in PPM and % by weight. Please email results as soon as possible.*

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-01Pb	Red Colored Paint - Metal Counterflashing, Main Building Lower Roof at Roof/Wall Transition
ECG-23-6577-02Pb	White Colored Paint - Metal Counterflashing - Auditorium Building North Lower Roof at Roof/Wall Transition

C:\Users\lhowes\Desktop\Bulk Request Pb 03-02-23.wpd

Delivered by:

Date: 3/2/23 Time: 12:38 AM/PM

Received by:

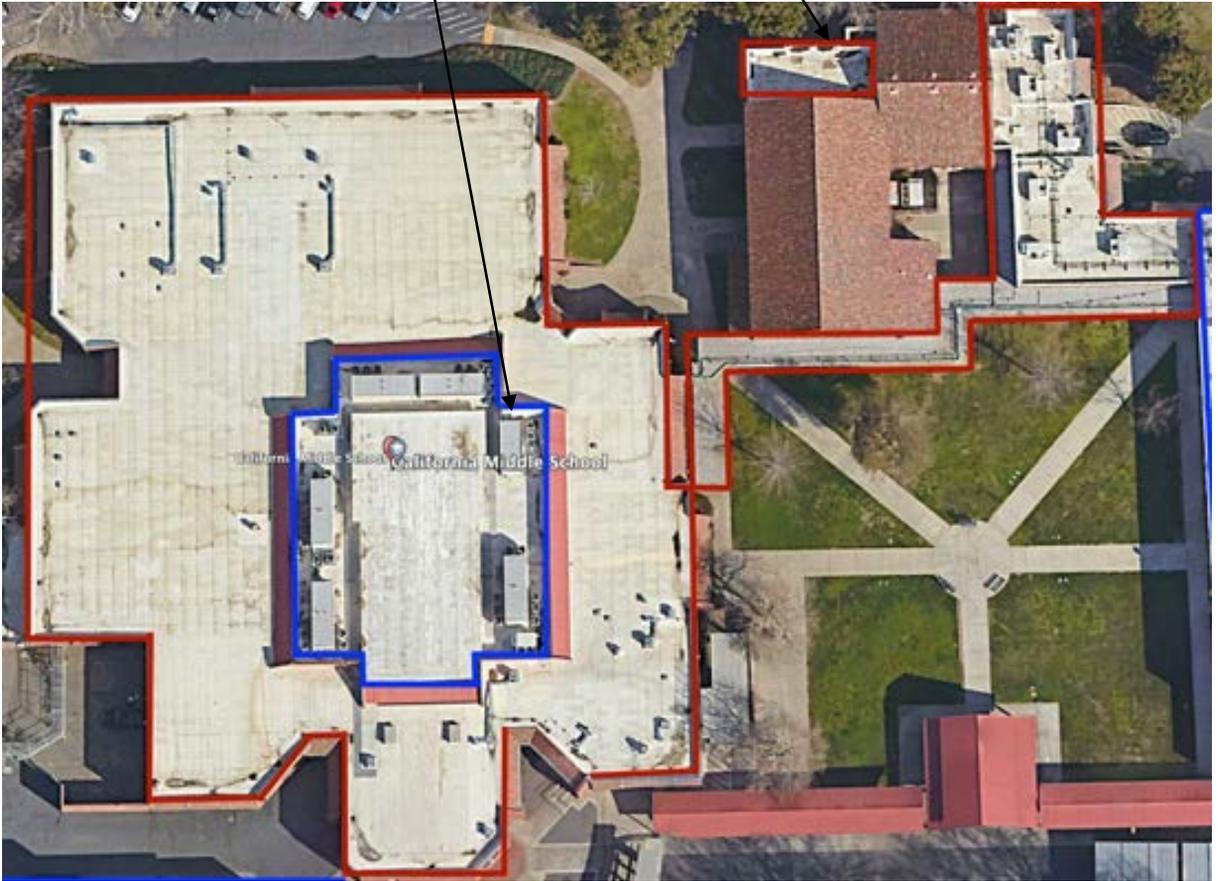
Date: 3/2/23 Time: 12:38 AM/PM

AD1.03



01Pb

02Pb



Sacramento City Unified School District
California Middle School
1600 Vallejo Way
Sacramento, CA 95818

Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin CA 95677
Map Not to Scale
Cloud/Clients/ClientName/ProjectNumber/Drawing/etc.

Lead Bulk Sample Locations
Collected by Blake Howes
On March 2, 2023
Project Number 23-6577

LEAD HAZARD EVALUATION REPORT

Section 1 – Date of Lead Hazard Evaluation _____

Section 2 – Type of Lead Hazard Evaluation (Check one box only)

Lead Inspection Risk assessment Clearance Inspection Other (specify) _____

Section 3 – Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)]		City	County	Zip Code
Construction date (year) of structure	Type of structure <input type="checkbox"/> Multi-unit building <input type="checkbox"/> School or daycare <input type="checkbox"/> Single family dwelling <input type="checkbox"/> Other _____		Children living in structure? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know	

Section 4 – Owner of Structure (if business/agency, list contact person)

Name		Telephone number		
Address [number, street, apartment (if applicable)]		City	State	Zip Code

Section 5 – Results of Lead Hazard Evaluation (check all that apply)

No lead-based paint detected
 Intact lead-based paint detected
 Deteriorated lead-based paint detected
 No lead hazards detected
 Lead-contaminated dust found
 Lead-contaminated soil found
 Other _____

Section 6 – Individual Conducting Lead Hazard Evaluation

Name		Telephone number		
Address [number, street, apartment (if applicable)]		City	State	Zip Code
CDPH certification number	Signature 		Date	

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)

Section 7 – Attachments

- A. A foundation diagram or sketch of the structure indicating the specific locations of each lead hazard or presence of lead-based paint;
- B. Each testing method, device, and sampling procedure used;
- C. All data collected, including quality control data, laboratory results, including laboratory name, address, and phone number.

First copy and attachments retained by inspector
 Second copy and attachments retained by owner

Third copy only (no attachments) mailed or faxed to:
 California Department of Public Health
 Childhood Lead Poisoning Prevention Branch Reports
 850 Marina Bay Parkway, Building P, Third Floor
 Richmond, CA 94804-6403
 Fax: (510) 620-5656



APPENDIX C

BACK UP DOCUMENTATION

- Photo Log
- Inspector Accreditations and Certifications
- Laboratory Accreditations for Asbestos and Lead Analysis

AD1.03 Photo Log

Job Number:	23-6577	Date:	March 2, 2023
Client:	Sacramento City Unified School District		
Site Address:	California Middle School – 1600 Vallejo Way, Sacramento, CA 95818		



Main Building Single Ply Membrane Roofing



Main Building Parapet Wall with Flashing and Clay Roofing Tile Adjacent

AD1.03 Photo Log

Job Number:	23-6577	Date:	March 2, 2023
Client:	Sacramento City Unified School District		
Site Address:	California Middle School – 1600 Vallejo Way, Sacramento, CA 95818		



East Building with Asphaltic Roofing



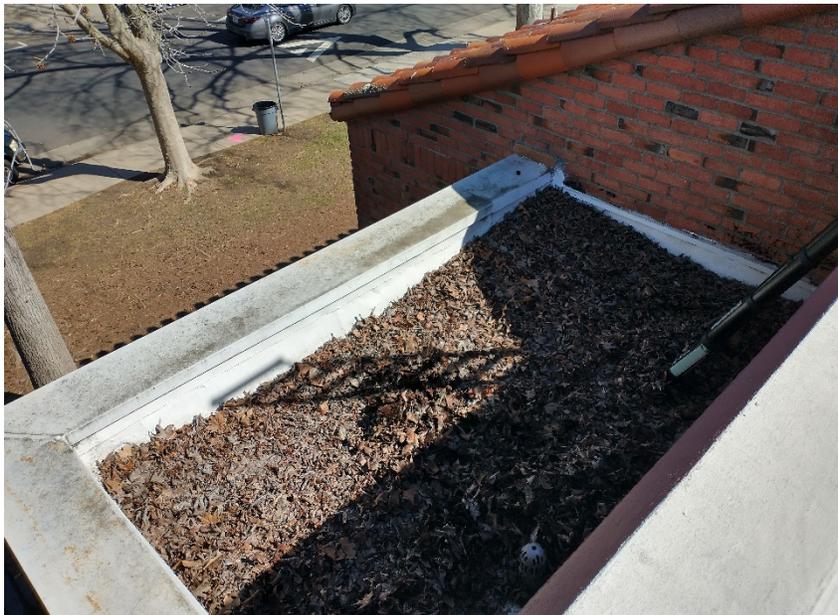
East Building Covered Walkways with Asphaltic Roofing

AD1.03 Photo Log

Job Number:	23-6577	Date:	March 2, 2023
Client:	Sacramento City Unified School District		
Site Address:	California Middle School – 1600 Vallejo Way, Sacramento, CA 95818		



East Building North Side with Asphaltic Roofing



East Building North Side Lower Roof with Asphaltic Roofing

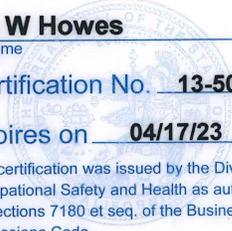
State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

Blake W Howes
Name

Certification No. 13-5015

Expires on 04/17/23

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.





AD1.03

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH



LEAD-RELATED CONSTRUCTION CERTIFICATE

INDIVIDUAL:



CERTIFICATE TYPE:

Lead Inspector/Assessor

NUMBER:

LRC-00003315

EXPIRATION DATE:

9/27/2023

Blake Howes

Disclaimer: This document alone should not be relied upon to confirm certification status. Compare the individual's photo and name to another valid form of government issued photo identification. Verify the individual's certification status by searching for Lead-Related Construction Professionals at www.cdph.ca.gov/programs/clppb or calling (800) 597-LEAD

AD1.03

United States Department of Commerce
National Institute of Standards and Technology

NVLAP[®]



Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 101442-0

ASBESTECH
Rancho Cordova, CA

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

Asbestos Fiber Analysis

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2022-07-01 through 2023-06-30

Effective Dates



[Signature]
For the National Voluntary Laboratory Accreditation Program



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ASBESTECH

11151 Sun Center Drive, Suite B

Rancho Cordova, CA 95670

Mr. Tommy Conlon

Phone: 916-481-8902 Fax: 916-481-3975

Email: asbestech@sbcglobal.net

<http://www.asbestechlab.com>

ASBESTOS FIBER ANALYSIS

NVLAP LAB CODE 101442-0

Bulk Asbestos Analysis

Code

Description

18/A01

EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples

18/A03

EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Airborne Asbestos Analysis

Code

Description

18/A02

U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

A handwritten signature in black ink, appearing to read 'Tom Conlon', is written over a horizontal line.

For the National Voluntary Laboratory Accreditation Program



STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS



CALIFORNIA STATE

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

**CERTIFICATE OF
ENVIRONMENTAL LABORATORY ACCREDITATION**

Is hereby granted to

MicroTest Laboratories, Inc.

3110 Gold Canal Drive
Rancho Cordova, CA 95670

Scope of the certificate is limited to the
"Fields of Accreditation"
which accompany this Certificate.

Continued accredited status depends on compliance with applicable laws and regulations,
proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **2974**
Effective Date: **7/1/2022**
Expiration Date: **6/30/2024**

A handwritten signature in blue ink, appearing to read "Christine Sotelo".

Sacramento, California
subject to forfeiture or revocation

Christine Sotelo, Program Manager
Environmental Laboratory Accreditation Program

AD1.03



CALIFORNIA STATE ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM Fields of Accreditation



MicroTest Laboratories, Inc.

3110 Gold Canal Drive
Rancho Cordova, CA 95670
Phone: 9165679808

Certificate Number: 2974
Expiration Date: 6/30/2024

Field of Accreditation:114 - Inorganic Constituents in Hazardous Waste

114.345 002	Antimony	EPA 6020 B
114.345 003	Arsenic	EPA 6020 B
114.345 004	Barium	EPA 6020 B
114.345 005	Beryllium	EPA 6020 B
114.345 006	Cadmium	EPA 6020 B
114.345 008	Chromium	EPA 6020 B
114.345 009	Cobalt	EPA 6020 B
114.345 010	Copper	EPA 6020 B
114.345 012	Lead	EPA 6020 B
114.345 016	Nickel	EPA 6020 B
114.345 018	Selenium	EPA 6020 B
114.345 021	Thallium	EPA 6020 B
114.345 023	Zinc	EPA 6020 B
114.345 024	Molybdenum	EPA 6020 B
114.515 001	Lead	EPA 7420
114.545 001	Mercury	EPA 7471 B

Field of Accreditation:115 - Leaching/Extraction Tests and Physical Characteristics of Hazardous Waste

115.055 001	Waste Extraction Test (WET)	CCR Chapter11, Article 5, Appendix II
115.085 001	Toxicity Characteristic Leaching Procedure (TCLP)	EPA 1311

Field of Accreditation:121 - Bulk Asbestos Analysis of Hazardous Waste

121.010 001	Bulk Asbestos	EPA 600/M4-82-020
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**ENTEK
CONSULTING GROUP, INC.**

4200 Rocklin Road, Suite 7, Rocklin, CA 95677 Phone (916) 632-6800 Fax (916) 632-6812 www.entekgroup.com

**HAZARDOUS MATERIALS SURVEY
FINAL REPORT**

OWNER/CLIENT

**Sacramento City Unified School District
5735 47th Street
Sacramento, CA 95824**

CONTACT

**Mr. Chris Ralston
Director III, Facilities Management, Maintenance & Operations and
Resource Management**

SURVEY ADDRESS

**California Middle School
1600 Vallejo Way
Sacramento, CA 95818**

BUILDING(S) SURVEYED

**Entire Campus Survey
CAL MS Campus Renewal Project**

PREPARED BY

**Blake Howes
CAC #13-5015 & CDPH #I/A 3315
Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin, CA 95677**

Entek Project #23-6577

March 24, 2023



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Executive Summary

The United States Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants (US EPA NESHAP), 40 CFR Part 61 - Nov. 20, 1990, requires an owner or operator of a demolition or renovation project to thoroughly inspect the affected facility or part of the facility where the demolition or renovation operation will occur for the presence of asbestos-containing materials (ACM) prior to the commencement of that project.

This inspection report was requested by Mr. Eli Gero, Project Manager with Kitchell CEM on behalf of Mr. Chris Ralston, Director III, Facilities Management, Maintenance & Operations and Resource Management for the Sacramento City Unified School District (SCUSD).

The purpose of the inspection was to comply with US EPA NESHAP requirements and the Sacramento Metropolitan Air Quality Management District (SMAQMD) which has jurisdiction for this project site to determine if asbestos containing materials are present which may be impacted during an upcoming project, which will include unspecified renovations for the California Middle School campus, 1600 Vallejo Way, Sacramento, California. This work was done as part of the CAL MS Campus Renewal Project.

Paints, coatings, and glazed ceramic tiles were also tested for lead content for compliance with Cal/OSHA lead in construction regulations. It is our understanding the school was originally constructed in the 1900's, with many renovations over the years, and major addition work around 1975.

The attached drawings show approximate sample locations and also identify those bulk sample materials analyzed and found to contain asbestos greater than 1% with a (+) after the sample number. Materials analyzed and found to contain less than 1% asbestos or reported as none detected have a (-) after each sample number.

Materials are classified in the tables of this report as regulated asbestos containing material (RACM), Category I (CAT-I) or Category II (CAT-II) ACM, or asbestos containing construction material (ACCM), which included collecting multiple samples of some materials. Contractors and other individuals who view the sample locations and associated results indicated with either a (-) or a (+) on the drawing to make determinations take the risk of misidentifying a material and may arrive at determinations which are in direct conflict with the written findings of this report. This use of the drawing and the information provided on it relating to individual sample results in determining if a material does or does not contain asbestos is not recommended.

This is a summary of the report. The report must be read in its entirety, and the reader must review all the detailed information provided in the body of the report prior to making any interpretations, or conclusions pertaining to the information. Any conclusions made by the reader about the information provided in the body of this report which are contradictory or not included in this report are the responsibility of the reader.

Asbestos

On March 4-5 & 11, 2023 Entek conducted a survey specific to areas designated by the Owner's construction management firm which included most interior and exterior areas of all buildings currently located on the California Middle School Campus. A previous sampling report regarding roofing materials was issued for this project and that information is not included in this report.

The results of testing for asbestos during this survey indicate asbestos is present in multiple materials throughout the campus. A quick summary is detailed in the following bullet points, with specifics pertaining to individual materials found in later sections of this report.

Materials Found or Assumed to Contain Asbestos:

Buildings Throughout Campus

- Hard pack pipe insulation and elbows - Unknown if present in inaccessible wall and ceiling cavities throughout campus
- Sub-Grade hydronic pipe insulation - Unknown locations beneath concrete, dirt, and asphalt surfaces
- Sub-Grade asbestos cement "transite" pipe - Unknown if beneath dirt and asphalt surfaces
- Hollow core doors if found to contain friable fibrous insulation material

Main Building

- Beige mottled 12" vinyl floor tile and black mastic - Administration area nurse office & library area storage room
- Black science counter tops - Rooms 15, 17 & Science Storage
- Black floor mastic associated with 12" green mottled vinyl floor tile - Room 18 & associated storage rooms
- Black floor mastic associated with 12" brown streaked & 12" light brown mottled vinyl floor tile - Kitchen, kitchen office, kitchen storage, snack bar
- Orange vinyl flooring material - Cafeteria sublayer flooring beneath visible vinyl floor tile (At time of sampling this orange material was thought to be a vinyl floor tile; laboratory reports indicate it could be a sheet vinyl product - more investigation needed to classify this material correctly at time of removal)
- Gray cementitious wall panels - Room 21
- White cementitious caulking - Exterior northeast area at hose bib
- Window frame panels - Throughout building at lower window frame areas (Unknown if cementitious, metal, or wood - many small panels throughout building at lower window frames - cementitious panels should be assumed to contain asbestos)

Auditorium Building

- Rough wall plaster - Main auditorium, stage, storage rooms, lobby, rooms 31-32 walls
- Acoustic ceiling plaster - Lobby and hall ceiling, rooms 31-32 ceiling above 2'x4' drop ceiling panels
- Cementitious vent pipe - Water heater closet east of stage

East Connector Addition Building

- Brown streaked 12" vinyl floor tile - Rooms 33 & 34 small areas
- Drywall & joint compound - Throughout

East Building

- Brown mottled 12" vinyl floor tile & black mastic - North storage room
- Acoustic ceiling plaster - All classrooms, storage rooms, and hallways (Found above 2'x4' ceiling panels in classrooms)

Portables B-1, B-2, & B-3

- Black floor mastic associated with beige vinyl floor tile (sublayer) - Portables B-1 & B-2 beneath top layer of visible vinyl floor tile
- Roof mastic associated with metal roof panels - Portables B-2 & B-3 at roof seams, edges, and screw holes

Gymnasium Building

- Off-white mottled 12" vinyl floor tile & black mastic - Custodial closet in boy's locker room restroom
- Drywall & joint compound - Boy's locker room area plenum space ceiling (above 2'x4 drop panels or renovated hard lid drywall ceilings)
- Drywall & joint compound - Girl's locker room area plenum space ceiling (above 2'x4 drop panels or renovated hard lid drywall ceilings)
- Drywall & joint compound - Throughout main gym beneath 12" acoustic wall and ceiling tiles, girl's locker room side storage room at older yellow drywall

Lead

Entek investigated existing paints, applied coatings and glazed ceramic tiles in an effort to determine if lead was present in these materials. The materials detailed in the following list were all found or assumed to contain more than 5,000 parts per million (ppm) lead and are classified as lead-based paint (LBP). If more than 100 square feet of these materials are impacted by a "trigger task", prior notification to Cal/OSHA will be required.

- Beige 4" ceramic wall tile glaze - Main building, administration area nurse office restroom; main student boy's and girl's restrooms; main staff restrooms
- Red colored paint - Main building, structural steel beams and columns in plenum spaces and wall cavities
- Dark brown wood varnish - Auditorium building at wood wainscot throughout
- Silver Colored Paint - Auditorium building at main room roof joists
- Dark brown colored paint - East building at exterior wood doors and frames
- Beige 4" ceramic wall tile glaze - Gymnasium building at boy's and girl's locker room showers and restrooms

The paints detailed in the following list were determined to contain lead in amounts less than 5,000 ppm and are classified as lead containing paint (LCP). Any work designated by California Occupational Safety Health Administration (Cal/OSHA) as a "trigger task" which will impact these paints, coatings, or materials must be done by properly trained personnel, in compliance with all lead related Cal/OSHA regulations and requirements.

- Dark brown colored paint - Main building on metal door frames
- Beige colored paint - Auditorium building lobby on wood/masonry wainscot and trim
- Red/brown sheet vinyl flooring - Auditorium building lobby flooring
- Dark brown colored paint - East connector addition building on metal door frames
- Beige colored paint - East building wood trim and door frames
- Red/brown colored paint - Gymnasium building exterior north storage shed on wood walls

Various other paints were sampled and determined not to contain lead above the analysis method detection limit of 100 ppm. Please refer to the lead inspection, sampling, and results section for additional information.

Other Hazardous Materials

Entek did not specifically inspect for mercury containing fluorescent light tubes or light ballast which may contain polychlorinated biphenyls (PCBs) or equipment or systems which may contain Freon or other fluorocarbons. However, due to the age of the school, information pertaining to these materials is included in this report for your use and reference.

Introduction

This report presents results of an asbestos and lead survey performed by Entek which included all designated interior and exterior areas of all buildings at California Middle School located at 1600 Vallejo Way in Sacramento, California. A previous survey for roofing materials was conducted and that information is not included in this report. This survey work was done as part of the CAL MS Campus Renewal Project.

The inspection was conducted by Mr. Blake Howes and Mr. Jose Hernandez on March 4-5 & 11, 2023. Mr. Howes and Mr. Hernandez are Cal/OSHA Certified Asbestos Consultants (CAC) and State of California Department of Public Health (CDPH) certified Lead Inspector/Assessors.

This report was prepared for Mr. Chris Ralston, Director III, Facilities Management, Maintenance & Operations and Resource Management for SCUSD, at the request of Mr. Eli Gero, Project Manager with Kitchell CEM.

Building Descriptions

For the purposes of this survey, the California Middle School campus has been divided up into six distinct buildings or sections. These buildings or section are referred to as follows:

- 1) Main Building
- 2) Auditorium Building
- 3) East Connector Addition Building
- 4) East Building
- 5) Portable Buildings
- 6) Gymnasium Building

Please refer to the site map plan in Appendix C for a visual designation of these buildings or sections.

Interior finish materials found throughout this campus include carpet, vinyl floor tiles, sheet vinyl flooring, rubber vinyl base cove, drywall, plaster, ceramic tile, wood or fiberboard wall panels, 2'x4' drop ceiling panels, and acoustic ceiling tiles. Hard pack pipe insulation is assumed to be present throughout the campus in floor, wall, or ceiling cavities. Asbestos cement drain or water pipe is assumed to be present throughout the site.

Exterior finish materials include brick and mortar, stucco, plaster, concrete, and metal components. All windows at the campus appear to have been replaced and are now aluminum and metal framed with rubber gasket material. Roof systems are single ply membrane, metal sheet, or rolled asphaltic. Mechanical systems are roof and wall mounted HVAC units.

Asbestos Inspection and Sample Collection Protocols

Entek included all interior and exterior areas of the buildings included in this report, but used only limited methods to look within enclosed wall or ceiling cavities during this investigation. Entek did include all suspect materials observed in, on, or associated with the areas included in this report.

Bulk samples were collected of various materials suspected to contain asbestos by utilizing a power drill and coring tube, cutting the materials with a razor knife, or use of other appropriate hand tools.

Surfacing materials were collected in a statistically random manner representative of the associated homogenous area as required in 40 CFR Part 763, Asbestos-Containing Materials in Schools; Final Rule and Notice, published October 30, 1987 and the Sacramento Metropolitan Air Quality Management District (SMAQMD) Compliance Assistance Advisory published in June 2010.

Thermal system insulation (TSI) materials were collected in a randomly distributed manner from each homogenous area that was not assumed to be ACM as required in 40 CFR Part 763, Asbestos-Containing Materials in Schools; Final Rule and Notice, published October 30, 1987.

Miscellaneous materials were collected from each homogenous area in a manner sufficient to determine whether the material is or is not ACM as required in 40 CFR Part 763, Asbestos-Containing Materials in Schools; Final Rule and Notice, published October 30, 1987.

Approximate locations of all samples collected during this inspection are indicated on the "Bulk Asbestos Material Analysis Request Form for Entek", which served as the chain of custody for the samples, and on the building diagrams attached to this report.

Asbestos Bulk Sample Results

There were several materials observed which are considered “suspect” under US EPA guidelines. Under current US EPA guidelines for conducting building inspections for ACM, all “suspect” materials must be assumed to contain asbestos until otherwise determined by laboratory testing.

The samples of materials suspected of containing asbestos were submitted to Asbestech, a laboratory located in Carmichael, California. These samples were subsequently analyzed by polarized light microscopy (PLM) with dispersion staining.

The US EPA NESHAP and SMAQMD uses the terms Regulated Asbestos Containing Material (RACM), Category I, and Category II when identifying materials which contain asbestos in amounts greater than 1%. Cal/OSHA uses the term ACCM which indicates a manufactured construction material contains greater than 0.1% asbestos by weight by the PLM method. This definition can be found in Title 8, 1529.

All samples found to contain <1% asbestos by PLM analysis which are not identified as containing >1% asbestos, classified as RACM, CAT-I, or CAT-II materials in the following results tables were additionally analyzed using the 400 point count (PC) method with analysis by PLM. This additional analysis is required by NESHAP and enforced by SMAQMD. The PC method analysis results were used only to verify a material did not contain >1% asbestos as a single layer material, or as a composite result which is provided for materials such as sheet rock/drywall and joint compound used for wall/ceiling systems. A result reported as none detected or “trace” by the PC method only verified the initial PLM result of <1% and shall not be used to determine the identified material does not contain asbestos. Copies of Asbestech’s laboratory reports and accreditations are attached.

Neither OSHA or Cal/OSHA allow for composite sampling of wall system materials, and neither address the use of the PC method to confirm a material identified as containing <1% asbestos by the PLM method either contains <1% asbestos or is non-detected for asbestos. As a result, reporting of the asbestos content related to a composited material such as sheet rock/drywall and joint compound does not apply to determining if a material is or is not an ACM by OSHA or an ACCM by Cal/OSHA.

A total of 400 bulk samples were collected of all the materials considered to be “suspect” which were observed during this investigation. Some of those samples contained multiple layers which were individually analyzed to determine their asbestos content. Analysis of all samples collected was by PLM with dispersion staining. Results of the analysis are listed in the following tables, broken out by materials found or assumed to be present campus wide and then by each building or area:

Suspect Materials Found or Assumed TO Contain Asbestos Throughout Campus					
Sample ID#'s	Suspect Material	Asbestos Content/Type (%) by PLM/PC	Location	NESHAP Classification	Total Estimated Quantity
n/a	Hard Pack Pipe Insulation & Elbows	ASSUMED POSITIVE FOR ASBESTOS	Throughout Campus In Inaccessible Floor, Wall or Ceiling Cavities	RACM	Unknown
n/a	Sub Grade Hydronic Pipe Insulation	ASSUMED POSITIVE FOR ASBESTOS	Throughout Campus Beneath Asphalt or Dirt Surfaces	RACM	Unknown
n/a	Door Core Insulation	ASSUMED POSITIVE FOR ASBESTOS	Throughout Campus at Doors if Friable Insulation Discovered	RACM	Unknown
n/a	Asbestos Cement "Transite" Water Pipe	ASSUMED POSITIVE FOR ASBESTOS	Throughout Campus Beneath Asphalt or Dirt Surfaces	CAT-II	Unknown
Please see sample series 64, 66-76 & 119-123 in Appendix A for materials found not to contain asbestos throughout the campus					

Suspect Materials Found or Assumed TO Contain Asbestos Main Building					
Sample ID#'s	Suspect Material	Asbestos Content/Type (%) by PLM	Location	NESHAP Classification	Total Estimated Quantity
16A	Beige Mottled 12" Vinyl Floor Tile, Black Mastic	1-2% CHRYSOTILE (Floor Tile) 1-2% CHRYSOTILE (Black Mastic)	Administration Area, Nurse Office	CAT-I	150 Sq. 150 Sq.
16B	Beige Mottled 12" Vinyl Floor Tile, Black Mastic	1-2% CHRYSOTILE (Floor Tile) 1-2% CHRYSOTILE (Black Mastic)	Library Area, Storage Room	CAT-I	150 Sq. 150 Sq.
45A	Black Science Counters	5-10% CHRYSOTILE	Classrooms 15, 17, and Common Storage at Built-In Counters	CAT-II	300 Sq.
50A-B	Green Mottled 12" Vinyl Floor Tile, Black Mastic, Yellow Mastic	NONE DETECTED (Floor Tile) 1-5% CHRYSOTILE (Black Mastic) NONE DETECTED (Yellow Mastic)	Classroom 18 & Adjacent Storage Rooms	CAT-I	1,100 Sq.

Suspect Materials Found or Assumed TO Contain Asbestos Main Building					
Sample ID#'s	Suspect Material	Asbestos Content/Type (%) by PLM	Location	NESHAP Classification	Total Estimated Quantity
64A-B	Brown Streaked 12" Vinyl Floor Tile, Black Mastic	NONE DETECTED (Floor Tile) 1-5% CHRYSOTILE (Black Mastic)	Kitchen Area, Kitchen Office/Storage, Snack Bar	CAT-I	1,500 Sq.
65A	Light Brown Mottled 12" Vinyl Floor Tile, Black Mastic, Yellow Mastic	NONE DETECTED (Floor Tile) 1-2% CHRYSOTILE (Black Mastic) NONE DETECTED (Yellow Mastic)	Kitchen Area, Kitchen Office/Storage, Snack Bar	CAT-I	Combined with samples 64A-B
68A-B	Orange Vinyl Floor Tile (Bottom Layer) & Gray Felt, Black Mastic, Yellow Mastic	15-20% CHRYSOTILE (Orange Vinyl Flooring) NONE DETECTED (Black Mastic) NONE DETECTED (Yellow Mastic)	Cafeteria Area Beneath Visible Brown Mottled 12" Vinyl Floor Tile (Top Layer)	CAT-I	3,500 Sq.
<p>Please note that for samples 68A-B, the flooring material samples were assumed to be a vinyl floor tile at time of survey. Laboratory results of asbestos content and other materials description indicates this orange vinyl flooring material may be a sheet flooring product. If the cafeteria floor will be removed as part of this project, additional investigation should be performed to determine if this orange flooring material is a sheet vinyl or vinyl tile product, as this determination could change the NESHAP classification, notification, and disposal requirements for this material.</p>					
76A	Cementitious "Transite" Wall Panels	15-20% CHRYSOTILE	Room 21, South and West Walls	CAT-II	320 Sq.
189A	White Cementitious Caulking	<1% CHRYSOTILE	Exterior Northeast Area at Hose Bib	Cal/OSHA ACCM (Confirmed by 400 Point Count)	1 Sq.
N/A	Cementitious "Transite" Window Panels	ASSUMED TO CONTAIN ASBESTOS	Throughout Building at Window Frames (Panels may be a mix of metal, wood, and transite)	CAT-II	Unknown
<p>Please see sample series 13-15, 17-44, 46-49, 51-63, 66-67, 69-75, 77-81, 184-188 & 190 in Appendix A for materials found not to contain asbestos in this area</p>					
<p>Please reference the table labeled Suspect Materials Found or Assumed TO Contain Asbestos Throughout Campus at the beginning of the results table section for additional materials</p>					

Suspect Materials Found or Assumed TO Contain Asbestos Auditorium Building					
Sample ID#'s	Suspect Material	Asbestos Content/Type (%) by PLM/PC	Location	NESHAP Classification	Total Estimated Quantity
88A-I	White Rough Wall Plaster	<1% CHRYSOTILE	Main Auditorium, Stage, Storage Rooms, Lobby, Hallway, Classrooms 31 & 32 at Walls	Cal/OSHA ACCM <i>(Confirmed by 400 Point Count)</i>	10,000 Sq.
89A-G	White Acoustical Ceiling Plaster	<1% CHRYSOTILE	Lobby, Hallway, Classrooms 31 & 32 at Ceilings (Above 2'x4' Drop Ceiling in Classrooms 31 & 32)	Cal/OSHA ACCM <i>(Confirmed by 400 Point Count)</i>	2,700 Sq.
N/A	Cementitious "Transite" Vent Pipe	ASSUMED TO CONTAIN ASBESTOS	Water Heater Closet East of Stage Area	CAT-II	4 Ln. Visible
Please see sample series 82-87, 90-98 & 191-195 in Appendix A for materials found not to contain asbestos in this area					
Please reference the table labeled Suspect Materials Found or Assumed TO Contain Asbestos Throughout Campus at the beginning of the results table section for additional materials					

Suspect Materials Found or Assumed TO Contain Asbestos East Connector Addition Building					
Sample ID#'s	Suspect Material	Asbestos Content/Type (%) by PLM/PC	Location	NESHAP Classification	Total Estimated Quantity
101A-B	Brown Streaked 12" Vinyl Floor Tile, Yellow Mastic	1-2% CHRYSOTILE (Floor Tile) NONE DETECTED (Yellow Mastic)	Classrooms 33 & 34 at Small Tiled Areas	CAT-I	48 Sq. (24 Sq. In Each Room)
105A-D	Drywall & Joint Compound	NONE DETECTED (Drywall) <1% CHRYSOTILE (Joint Compound 1) <1% CHRYSOTILE (Joint Compound 2) <1% CHRYSOTILE (Composite)	Throughout Building	Cal/OSHA ACCM <i>(Confirmed by 400 Point Count)</i>	10,000 Sq.
Please see sample series 99-100, 102-104, 106-107 & 196-199 in Appendix A for materials found not to contain asbestos in this area					
Please reference the table labeled Suspect Materials Found or Assumed TO Contain Asbestos Throughout Campus at the beginning of the results table section for additional materials					

Suspect Materials Found or Assumed TO Contain Asbestos East Building					
Sample ID#’s	Suspect Material	Asbestos Content/Type (%) by PLM/PC	Location	NESHAP Classification	Total Estimated Quantity
108A-B	Brown Mottled 12" Vinyl Floor Tile, Black Mastic	>1% CHRYSOTILE (Floor Tile) >1% CHRYSOTILE (Black Mastic)	North Storage Room	CAT-I	500 Sq. 500 Sq.
Please note samples 108A-B were not confirmed to contain <1% asbestos by 400 point count analysis and must be considered to contain >1% asbestos for removal and disposal purposes					
121A-G	White/Tan Acoustic Ceiling Plaster	2% CHRYSOTILE	Hallways, Classrooms, Storage Room Throughout Building at Ceilings (Above 2'x4' Drop Ceiling Panels in Most Classrooms)	RACM (Confirmed by 400 Point Count)	10,000 Sq.
Please see sample series 109-120, 122-124.5 & 200-201 in Appendix A for materials found not to contain asbestos in this area					
Please reference the table labeled Suspect Materials Found or Assumed TO Contain Asbestos Throughout Campus at the beginning of the results table section for additional materials					

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Suspect Materials Found or Assumed TO Contain Asbestos Portable Buildings					
Sample ID#'s	Suspect Material	Asbestos Content/Type (%) by PLM	Location	NESHAP Classification	Total Estimated Quantity
126A	Beige Vinyl Floor Tile (Bottom Layer), Black Mastic 1, Black Mastic 2	NONE DETECTED (Floor Tile)	Portable B-1 Beneath Top Layer of Visible Beige Mottled 12" Vinyl Floor Tile	CAT-I	180 Sq.
		>1% CHRYSOTILE (Black Mastic 1)			180 Sq.
135A	Beige Vinyl Floor Tile (Bottom Layer), Black Mastic 1, Black Mastic 2	NONE DETECTED (Floor Tile)	Portable B-2 Beneath Top Layer of Visible Beige 12" Vinyl Floor Tile	CAT-I	180 Sq.
		NONE DETECTED (Black Mastic 1)			
		>1% CHRYSOTILE (Black Mastic 2)			
142A	White/Red Mastic at Metal Roof	>1% CHRYSOTILE	Portable B-2 at Roof Edges, Seams, and Screw Holes	CAT-I	25 Sq. Distributed
150A	White Mastic at Metal Roof	>1% CHRYSOTILE	Portable B-3 at Roof Edges, Seams, and Screw Holes	CAT-I	25 Sq. Distributed
Please note samples 126A, 135A, 142A, and 150A were not confirmed to contain <1% asbestos by 400 point count analysis and must be considered to contain >1% asbestos for removal and disposal purposes					
Please see sample series 125, 127-134, 136-141, & 143-149 in Appendix A for materials found not to contain asbestos in this area					
Please reference the table labeled Suspect Materials Found or Assumed TO Contain Asbestos Throughout Campus at the beginning of the results table section for additional materials					

Suspect Materials Found or Assumed TO Contain Asbestos Gymnasium Building					
Sample ID#'s	Suspect Material	Asbestos Content/Type (%) by PLM	Location	NESHAP Classification	Total Estimated Quantity
154A	Off-White Mottled 12" Vinyl Floor Tile, Black Mastic	1-2% CHRYSOTILE (Floor Tile)	Custodial Closet in Boy's Locker Restroom	CAT-I	30 Sq.
		>1% CHRYSOTILE (Black Mastic)			30 Sq.
164A-B	Drywall & Joint Compound	NONE DETECTED (Drywall) <% CHRYSOTILE (Joint Compound) <1% CHRYSOTILE (Composite)	Boy's Locker Area Plenum Ceiling (Above 2'x4' Ceiling Panels & Renovated Hard Lid Ceilings)	Cal/OSHA ACCM (Confirmed by 400 Point Count)	1,300 Sq.

Suspect Materials Found or Assumed TO Contain Asbestos Gymnasium Building					
Sample ID#’s	Suspect Material	Asbestos Content/Type (%) by PLM	Location	NESHAP Classification	Total Estimated Quantity
178A-B	Drywall & Joint Compound	NONE DETECTED (Drywall) <% CHRYSOTILE (Joint Compound 1) <% CHRYSOTILE (Joint Compound 2) <1% CHRYSOTILE (Composite)	Girl’s Locker Area Plenum Ceiling (Above 2’x4’ Ceiling Panels & Renovated Hard Lid Ceilings)	Cal/OSHA ACCM (Confirmed by 400 Point Count)	1,500 Sq.
183A-C	Drywall & Joint Compound	NONE DETECTED (Drywall) <% CHRYSOTILE (Joint Compound 1) <% CHRYSOTILE (Joint Compound 2) <1% CHRYSOTILE (Composite)	Throughout Gymnasium & Hallway Beneath 12” Acoustical Tile Hallway Storage Room at Older Yellow Drywall	Cal/OSHA ACCM (Confirmed by 400 Point Count)	20,000 Sq.
Please see sample series 150.5-153, 155-163, 165-177, 179-182 & 202-208 in Appendix A for materials found not to contain asbestos in this area					
Please reference the table labeled Suspect Materials Found or Assumed TO Contain Asbestos Throughout Campus at the beginning of the results table section for additional materials					

NOTE: Any CAT-I or CAT-II materials identified in the previous tables which will be subjected to mechanical removal, must be considered RACM for the purposes of notification to SMAQMD and classification of waste. Removal of any CAT-I or CAT-II materials prior to demolition of a building is dependent upon how the materials will be impacted and if the impact will cause the materials to become friable. If any remaining CAT-I or CAT-II materials will become friable they must be removed prior to the initiation of demolition.

NOTE: Cal/OSHA regulates all materials containing greater than 0.1% asbestos. As a result, impact to materials identified as ACCM and ACM must be performed by properly asbestos trained personnel utilizing appropriate personal protection, work practices, as well as, properly constructed and demarcated work areas or containments, in accordance with Cal/OSHA asbestos regulations.

All sample number noted in the tables above start with ECG-23-6577-

The tables above provide an estimate of the amount of materials in square feet (Sq.) or linear feet (Ln.). Contractors are responsible for quantifying the exact quantity of materials impacted by the renovation or demolition and shall not rely on the quantities in the above tables.

US EPA AHERA uses three terms when determining the classification of a material for the purpose of sampling. These terms include miscellaneous, surfacing, and thermal system insulation (TSI).

Miscellaneous materials are building materials on structural components, structural members or fixtures, such as floor and ceiling tiles, and does not include surfacing material or TSI.

Surfacing materials are materials that are sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceiling and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

TSI is material applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain, water condensation, or for other purposes.

The information provided in the tables of this report are for use by the Owner in determining where asbestos containing materials are located, and whether or not any future work may impact those materials. The information is also provided for use by any contractor who may perform work in areas impacting the materials listed in this report, and for use as appropriate by asbestos abatement contractors to provide costs related to work impacting ACM.

Any building materials which are considered “suspect” for containing asbestos which have not been identified in this report must be assumed to contain asbestos in amounts >1% until properly investigated and/or tested.

Materials commonly excluded from being suspected for containing asbestos include, but are not limited to: unwrapped pink and yellow fiberglass insulating materials or products, foam insulation, bare concrete, wood, metal, plastic, or glass. All other types of building materials or coatings on the materials listed above are commonly listed as “suspect” and must be tested prior to impact by a Contractor. Work impacting these untested or newly discovered materials must cease until an investigation can be completed.

Asbestos Regulatory Requirements

US EPA

The property included in this survey report is located in Sacramento County. Sacramento Metropolitan Air Quality Management District (SMAQMD) has been given authority for enforcement of the NESHAP regulations by means of their own rules (Rule 902 Asbestos).

A demolition is the wrecking, taking out, or burning of any load supporting structural member. A renovation is everything else. Ten day written notification to the SMAQMD is required prior to the performance of any demolition project regardless of asbestos being present or not. This notification would also apply to any renovation project which involves the wrecking, taking out, or burning of any load bearing structural member during a renovation as well.

There is a sufficient amount of ACM present to require a 10 day notification to the SMAQMD be submitted prior to starting work which will impact materials identified as RACM or CAT-I and CAT-II materials if they are made friable through mechanical means of removal. If more than 160 square feet, 260 linear feet or 35 cubic feet of RACM is planned for removal on the project, formal written notification to SMAQMD is required.

Cal/OSHA

Disturbance of any ACM or ACCM could generate airborne asbestos fibers and would be regulated by Cal/OSHA. Cal/OSHA worker health and safety regulations apply during any disturbance of ACM or ACCM by a person while in the employ of another. This is true regardless of friability or quantity disturbed.

Since it has been estimated more than 100 square feet of ACCM and ACM does exist and may be impacted during the upcoming project, a licensed asbestos contractor, certified by the State of California, and registered with Cal/OSHA is required to perform the asbestos related removal work.

For compliance with Title 8, Section 341.9, the asbestos contractor must send written notice at least one day (24 hours) prior to start of any work which will impact any amount of asbestos to the local office for the State of California, Department of Occupational Safety and Health, and perform all work in accordance with Cal/OSHA requirements.

Lead Inspection, Sampling, & Results

A total of 35 bulk samples of the painted surfaces or glazed ceramic tiles from various locations throughout the site were collected and submitted to MicroTest Laboratory. These samples were subsequently analyzed by atomic absorption spectrometry (AAS). Results of the analysis are listed in the following tables:

Paints/Coatings/ Materials Determined to be Lead Based Paint (LBP)		
Paint/Coating Color or Material	Lead Content	Location/Component
Beige 4" Ceramic Wall Tile Glaze	4,459 - 18,114 ppm	Main Building - Nurse Office Restroom, Main Student Restrooms, Main Staff Restrooms
Red Colored Paint	263,054 ppm	Main Building - Structural Steel Beams and Columns Found in Plenum Spaces and Wall Cavities
Dark Brown Colored Wood Varnish	11,720 ppm	Auditorium Building - Wood Wainscot Throughout Main Auditorium, Stage, and Storage Rooms
Silver Colored Paint	Assumed >5,000 ppm	Auditorium Building - Wood Ceiling Joists (Not Accessible at Time of Survey)
Dark Brown Colored Paint	174,744 ppm	East Building - Exterior Wood Doors & Frames
Beige 4" Ceramic Wall Tile Glaze	6,946 ppm	Gymnasium Building - Boy's & Girl's Locker Room Showers & Restrooms
Lead results are assumed to be consistent across all similar components throughout campus, for example all older wood doors and frames should be considered to be lead based paint.		

LBP - Materials/coatings/paints meeting the definition of lead-based paint as defined by the CDPH and the US EPA, currently defined as containing lead in concentrations equal to or greater than 1.0 mg/cm², 5,000 ppm, or 0.5% by weight.

Paints/Coatings/ Materials Determined to be Lead Containing Paint (LCP)		
Paint/Coating Color or Material	Lead Content	Location/Component
Dark Brown Colored Paint	<100- 638 ppm	Main Building - Metal Door Frames Throughout
Beige Colored Paint	2,773 ppm	Auditorium Building - Lobby on Wood/Masonry Wainscot and Trim
Red/Brown Sheet Vinyl Floor	2,361 ppm	Auditorium Building - Lobby Floor Material
Dark Brown Colored Paint	341 ppm	East Connector Addition Building - Metal Doors & Frames
Beige Colored Paint	2,846 ppm	East Building - Interior Wood Trim & Door Frames
Red/Brown Colored Paint	102 ppm	Gymnasium Building - North Exterior Wood Storage Shed

LCP - Materials/coatings/paints which contain measurable amounts of lead. The disturbance of these materials/coatings/paints is regulated by Cal/OSHA.

Paints/Coatings/Materials Determined NOT TO Contain Lead	
Paint/Coating Color or Material	Building Component
Beige Colored Paint	Main Building - Drywall Walls
Off-White Colored Paint	Main Building - Drywall Walls
Dark Brown Colored Paint	Main Building - Exposed Wood Roof Truss Beams
Beige Colored Paint	Main Building - Vinyl Wall Coverings
Red/Brown Colored Paint	Main Building - Exterior Wood Fascia
Beige Colored Paint	Main Building - Wood Wall Panels
Beige Colored Paint	Main Building - Plaster Walls
White Colored Paint	Auditorium Building - Plaster Walls
Red/Brown Colored Paint	Auditorium Building - Exterior Concrete Walls
Light Brown Wood Varnish	Auditorium Building - Main Auditorium Wood Floor
Beige Colored Paint	East Connector Addition Building - Vinyl Wall Coverings
Red/Brown Colored Paint	Exterior Covered Walkway - Wood Columns and Beams
White Colored Paint	East Building - Plaster Walls
Red/Brown Colored Paint	East Building - Exterior Down Spouts
Gray Colored Paint	Gymnasium Building - Metal Doors & Frames
Blue Colored Paint	Gymnasium Building - Metal Lockers
White Colored Paint	Gymnasium Building - Plaster Walls
Blue Colored Paint	Gymnasium Building - Wood Walls

Paints/Coatings/Materials Determined NOT TO Contain Lead	
Paint/Coating Color or Material	Building Component
Yellow Colored Paint	Gymnasium Building - Wood Walls
Gray/Beige Colored Paint	Gymnasium Building - Wood Walls

Paints determined “NOT TO” contain lead for the purposes of this report are those samples which when analyzed did not indicate lead to be present at or above the limit of detection for the analysis method used. This limit of detection was 100 parts per million (ppm). As a result, any paints shown “NOT TO” contain lead will not require any special training or work practices related to lead when impacted.

Lead Regulatory Compliance

Any upcoming project which may result in the disturbance of lead containing products or surfaces, but is not intended to remediate a lead hazard or specifically designed to remove LBP to reduce or eliminate a known hazard, would be considered “lead related construction work”.

Lead related construction work does not fit the classification of a “lead abatement project” under CDPH Title 17 regulations. “*Abatement*” is defined in Title 17, Division 1, Chapter 8, Article 1 as “any set of measures designed to reduce or eliminate lead hazards or LBP for public and residential buildings, but does not include containment or cleaning.” A *lead hazard* is defined in Title 17, Division 1, Chapter 8, Article 1 as “deteriorated LBP, lead contaminated dust, lead contaminated soil, disturbing LBP or presumed LBP without containment, or any other nuisance which may result in persistent and quantifiable lead exposure.”

Lead related construction work means any “construction, alteration, painting, demolition, salvage, renovation, repair, or maintenance of any residential or public building, including preparation and cleanup, that, by using or disturbing lead-containing material or soil, may result in significant exposure of adults or children to lead”. (Title 17, California Code of Regulations, Division 1, Chapter 8, Article 1).

Currently, Cal/OSHA has not established a definition for LBP, nor have they established minimum concentrations where their regulations do not apply. Cal/OSHA regulates all construction activities involving materials containing lead, including LBP. These regulations are found in CCR, Title 8 Section 1532.1 (§1532.1) Lead in Construction.

Since Cal/OSHA has not established a concentration of lead in a product where their regulations do not apply, any disturbance to products containing lead come under the jurisdiction of Cal/OSHA and their regulations. Disturbance of paints/coatings or materials determined to be LBP may trigger a pre-work notification to Cal/OSHA if “trigger tasks” disturb 100 square feet or more of those paints/coatings or materials. Trigger tasks are described in Title 8 CCR 1532.1.

Fluorescent Light Tubes and Polychlorinated Biphenyls (PCBs)

Fluorescent light tubes which contain mercury are considered a universal waste and must be packaged and recycled appropriately if they are removed from a building and not used again. The regulation, called the Universal Waste Rule, are in the California Code of Regulations (CCR), Title 22, Division 4.5, Chapter 23.

Fluorescent light tubes are the bulb or tube portion of an electric lighting device and are commonly referred to as “lamps”. Examples of other common electric lamps considered to be universal wastes include, but are not limited to, high intensity discharge, neon, mercury vapor, high pressure sodium, and metal halide lamps. Any lamp which is not spent and has been designated to be reused is not classified as a waste and does not meet the requirements of a hazardous waste or a universal waste.

Spent lamps typically contain concentrations of mercury exceeding the established Total Threshold Limit Concentration (TTLC) and/or the Soluble Threshold Limit Concentration (STLC) values. Therefore, these lamps must be sent to an authorized recycle facility or to a universal waste consolidator for shipment to an authorized recycling facility.

At a minimum, if removed lamps will not be reused they must be packaged in boxes/packages/containers which are structurally sound, adequate to prevent breakage, and compatible with the content of the lamps. These packages must remain closed and be free of damage which could cause leakage under reasonably foreseeable conditions. Each container must be labeled or marked clearly with one of the following phrases: “Universal Waste Lamp(s),” or “Waste Lamp(s),” or “Used Lamp(s).” Entek recommends shipping any lamp not designated for reuse to a universal waste recycling facility once they have been packaged.

PCB containing light ballasts are to be considered a hazardous waste, and must be properly manifested for transport to a hazardous waste facility. Any contractor who may perform PCB related work (inspection, removal, clean-up) must be trained and qualified to do so. All workers must also follow current OSHA regulations including 29 CFR 1910.120 and 8 CCR 5192, as well as, other applicable federal, state, and local laws, and regulations. While light ballasts marked “No PCB” are not considered a hazardous waste, they are considered a universal waste. As a result, removal, packaging, and disposal/recycling of these types of ballasts must be conducted in accordance with current regulations of Title 22.

Freon and Fluorocarbons

Freon and other fluorocarbon products associated with HVAC systems, refrigerators, etc. may be present in or on the exterior of the buildings included in this investigation. Prior to demolition of a structure or removal of existing HVAC systems, refrigerators, or any other type of equipment which typically uses these types of coolant products shall have the coolant materials investigated prior to their demolition and removed from the mechanical systems and recycled in accordance with Cal/EPA requirements.



Limitations

Entek inspected all accessible interior and exterior areas of all buildings located at the survey site. Roofing materials were sampled and reported previously and are not included in this survey report. The information provided in this inspection report may not be used to extend the inspection results to areas not included in this report without additional review and sampling as necessary.

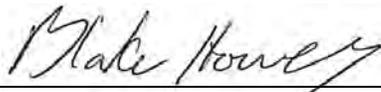
Entek performed only limited destructive sampling to look into ceiling and wall cavities. As a result, it may be possible for materials to be hidden in these areas which are not included in this report. Entek also did not employ any destructive measures on floors of interior spaces or exterior areas covered with asphalt, concrete, or dirt.

If any new materials not listed as having been sampled, or listed as assumed for containing asbestos in this report are discovered, the new material must be assumed to contain asbestos until properly inspected and tested for asbestos content.

Entek's policy is to retain a full copy of these written documents for three (3) years once the file is closed. At the end of the 3 year period the written files will be destroyed without further notice. It is suggested copies of the file(s) are maintained as per the District's policy.

Entek will be providing only this electronic copy of the report and its attachments for your use. However, if you would like a hard copy of this report please do not hesitate to ask. Entek will be happy to mail the report upon receipt of your request.

Thank you for choosing Entek for your environmental needs. Please call me at (916) 632-6800 if you have any questions regarding this report.

Prepared by: 
Blake Howes
Vice President
Cal/OSHA CAC #13-5015
CDPH I/A Certification #3315

Appendices

- A. Asbestos Related Documents
- B. Lead Related Documents
- C. Backup Documentation

APPENDIX A

ASBESTOS RELATED DOCUMENTS

- Bulk Asbestos Analysis Report From Asbestech
- Bulk Asbestos Material Analysis Request Form for Entek
- Asbestos Bulk Sample Location Drawing
- SMAQMD Asbestos Survey Form
- SMAQMD Renovation/Demolition & Survey Notification Form

ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-1
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-13A	Beige/gray splotchy sheet vinyl flooring, main bldg. administration area NW copy area	NONE DETECTED	Vinyl Cellulose
	Yellow mastic	NONE DETECTED	Synthetics
13B	Beige/gray splotchy sheet vinyl flooring, main bldg. administration area west storage entry	NONE DETECTED	Vinyl Cellulose
	Yellow mastic	NONE DETECTED	Synthetics
14A	Brown circle sheet vinyl flooring, main bldg. administration area west reception area	NONE DETECTED	Vinyl Cellulose
15A	Tan/red multicolored carpet, main bldg. administration area east reception area	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
15B	Tan/red multicolored carpet, main bldg. administration area detention room entry	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.



ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-2
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-16A	Beige mottled 12" vinyl floor tile, main bldg. administration area nurse office	1-2 CHRYSOTILE	Calcite
	Black mastic	1-2 CHRYSOTILE	Tar Binder
16B	Beige mottled 12" vinyl floor tile, main bldg. library area library storage room	1-2 CHRYSOTILE	Calcite
	Black mastic	1-2 CHRYSOTILE	Tar Binder
17A	Green carpet, main bldg. administration area west storage room	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
18A	Beige 1" ceramic floor tile, main bldg. administration area nurse restroom	NONE DETECTED	Granular Mins.
	Gray grout	NONE DETECTED	Granular Mins.
	Yellow mastic	NONE DETECTED	Synthetics
19A	Brown/red 6" ceramic floor tile, main bldg. administration area staff lounge	NONE DETECTED	Granular Mins.
	Brown grout	NONE DETECTED	Granular Mins.
	Yellow mastic	NONE DETECTED	Synthetics

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-3
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-20A	Gray 4" vinyl base cove, main bldg. administration area NW copy area	NONE DETECTED	Calcite Opaques
	Yellow mastic	NONE DETECTED	Synthetics
21A	Brown 4" vinyl base cove, main bldg. administration area east offices	NONE DETECTED	Calcite Opaques
	White mastic	NONE DETECTED	Calcite
21B	Brown 4" vinyl base cove, main bldg. administration area staff lounge	NONE DETECTED	Calcite Opaques
	White mastic	NONE DETECTED	Calcite
	Brown mastic	NONE DETECTED	Synthetics
22A	Dark brown 4" vinyl base cove, main bldg. administration area staff lounge	NONE DETECTED	Calcite Opaques
	Brown mastic	NONE DETECTED	Synthetics
22B	Dark brown 4" vinyl base cove, main bldg. library area library storage room	NONE DETECTED	Calcite Opaques
	Brown mastic	NONE DETECTED	Synthetics
23A	Gray concrete slab, main bldg. administration area west storage room	NONE DETECTED	Granular Mins.

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-4
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-24A	White drywall , main bldg. administration area NE office	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Calcite
24B	White drywall , main bldg. administration area west storage room	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Granular Mins.
24C	White drywall , main bldg. administration area staff lounge	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Granular Mins.
24D	White drywall , main bldg. library area library storage room	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Granular Mins.
25A	White drywall texture #1 , main bldg. administration area detention room south wall	NONE DETECTED	Calcite

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-5
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-25B	White drywall texture #1 , main bldg. administration area detention room south wall	NONE DETECTED	Calcite
25C	White drywall texture #1 , main bldg. administration area detention room office	NONE DETECTED	Calcite
26A	White drywall texture #2 , main bldg. administration area detention room custodial closet	NONE DETECTED	Calcite
26B	White drywall texture #2 , main bldg. administration area nurse restroom	NONE DETECTED	Calcite
26C	White drywall texture #2 , main bldg. library area library storage room	NONE DETECTED	Calcite
27A	Beige 4" ceramic wall tile, main bldg. administration area nurse restroom	NONE DETECTED	Granular Mins.
	White grout	NONE DETECTED	Granular Mins.
28A	Tan vinyl wall covering, main bldg. administration area NE office	NONE DETECTED	Vinyl Cellulose
	Yellow glue	NONE DETECTED	Synthetics

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-6
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-28B	Tan vinyl wall covering, main bldg. administration area staff lounge	NONE DETECTED	Vinyl Cellulose
	Yellow glue	NONE DETECTED	Synthetics
28C	Tan vinyl wall covering, main bldg. library area library storage room	NONE DETECTED	Vinyl Cellulose
	Yellow glue	NONE DETECTED	Synthetics
29A	Gray/white 2'x4' drop ceiling panel, main bldg. administration area NE office	NONE DETECTED	Cellulose Pumice
29B	Gray/white 2'x4' drop ceiling panel, main bldg. administration area staff lounge	NONE DETECTED	Cellulose Pumice
29C	Gray/white 2'x4' drop ceiling panel, main bldg. lobby area	NONE DETECTED	Cellulose Pumice
30A	Dark brown 12" cork acoustic ceiling tile, main bldg. library area SW ceiling	NONE DETECTED	Cellulose
	Brown mastic tab	NONE DETECTED	Synthetics
30B	Dark brown 12" cork acoustic ceiling tile, main bldg. counseling area ceiling	NONE DETECTED	Cellulose
	Brown mastic tab	NONE DETECTED	Synthetics

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-7
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-30C	Dark brown 12" cork acoustic ceiling tile, main bldg. cafeteria area ceiling	NONE DETECTED	Cellulose
	Brown mastic tab	NONE DETECTED	Synthetics
31A	White 12" acoustic ceiling tile, main bldg. administration area nurse office	NONE DETECTED	Cellulose Fibrous Glass
	Brown mastic tab	NONE DETECTED	Synthetics
32A	Gray HVAC duct seam tape, main bldg. administration area NE office plenum	NONE DETECTED	Opagues Fibrous Glass
32B	Gray HVAC duct seam tape, main bldg. lobby area plenum	NONE DETECTED	Opagues Fibrous Glass
32C	White HVAC duct seam tape, main bldg. administration area staff lounge plenum	NONE DETECTED	Cellulose Opagues
33A	Black vapor barrier between brick & wood walls, main bldg. lobby area plenum north wall	NONE DETECTED	Tar Binder Cellulose
33B	Black vapor barrier between brick & wood walls, main bldg. lobby area plenum north wall	NONE DETECTED	Tar Binder Cellulose

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-8
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-33C	Black vapor barrier between brick & wood walls, main bldg. lobby area plenum north wall	NONE DETECTED	Tar Binder Cellulose
34A	Blue striped carpet mastic, main bldg. lobby area east side	NONE DETECTED	Synthetics
34B	Blue striped carpet mastic, main bldg. lobby area west side	NONE DETECTED	Synthetics
35A	Beige/gray splotchy sheet vinyl flooring, main bldg. rooms 1-17 area east hallway	NONE DETECTED	Vinyl Cellulose
	Yellow mastic	NONE DETECTED	Synthetics
35B	Beige/gray splotchy sheet vinyl flooring, main bldg. rooms 1-17 area west hallway	NONE DETECTED	Vinyl Cellulose
	Yellow mastic	NONE DETECTED	Synthetics
36A	Blue striped carpet, main bldg. rooms 1-17 area east hallway	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
37A	Tan/red multicolored carpet, main bldg. rooms 1-17 area room 3A	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-9
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-37B	Tan/red multicolored carpet, main bldg. rooms 1-17 area room 12	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
38A	Blue multicolored carpet, main bldg. rooms 1-17 area room 4	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
39A	Brown circle sheet vinyl flooring, main bldg. rooms 1-17 area west hallway	NONE DETECTED	Vinyl Cellulose
	Yellow mastic	NONE DETECTED	Synthetics
40A	Brown/red 6" ceramic floor tile, main bldg. rooms 1-17 area room 17	NONE DETECTED	Granular Mins.
	Brown grout	NONE DETECTED	Granular Mins.
	Clear mastic	NONE DETECTED	Synthetics
41A	Gray 4" vinyl base cove, main bldg. rooms 1-17 area room 4	NONE DETECTED	Calcite Opagues
	White mastic	NONE DETECTED	Calcite
	Brown mastic	NONE DETECTED	Synthetics

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-10
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-42A	Brown 4" vinyl base cove, main bldg. rooms 1-17 area room 5	NONE DETECTED	Calcite Opagues
	White mastic	NONE DETECTED	Calcite
43A	Dark brown 4" vinyl base cove, main bldg. rooms 1-17 area room 17	NONE DETECTED	Calcite Opagues
	White mastic	NONE DETECTED	Calcite
44A	Blue carpet square mastic, main bldg. rooms 1-17 area room 15	NONE DETECTED	Synthetics
45A	Black science countertop, main bldg. rooms 1-17 area room 17	5-10 CHRYSOTILE	Opagues
46A	White drywall , main bldg. rooms 1-17 area east hallway	NONE DETECTED	Gypsum Cellulose
	White joint compound	NONE DETECTED	Calcite
46B	White drywall , main bldg. rooms 1-17 area room 15	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Calcite

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-11
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-46C	White drywall , main bldg. rooms 1-17 area west hallway	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Calcite
47A	Green vinyl wall covering , main bldg. rooms 1-17 area east hallway	NONE DETECTED	Vinyl Cellulose
	Yellow glue	NONE DETECTED	Synthetics
47B	Green vinyl wall covering , main bldg. rooms 1-17 area west hallway	NONE DETECTED	Vinyl Cellulose
	Yellow glue	NONE DETECTED	Synthetics
48A	Gray/white 2'x4' drop ceiling panel , main bldg. rooms 1-17 area east hallway	NONE DETECTED	Cellulose Pumice
48B	Gray/white 2'x4' drop ceiling panel , main bldg. rooms 1-17 area west hallway	NONE DETECTED	Cellulose Pumice
49A	Gray concrete slab, main bldg. room 19	NONE DETECTED	Granular Mins.

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-12
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-50A	Green mottled 12" vinyl floor tile, main bldg. room 18	NONE DETECTED	Calcite
	Black mastic	1-5 CHRYSOTILE	Tar Binder
	Yellow mastic	NONE DETECTED	Synthetics
50B	Green mottled 12" vinyl floor tile, main bldg. room 18 storage	NONE DETECTED	Calcite
	Black mastic	1-5 CHRYSOTILE	Tar Binder
	Yellow mastic	NONE DETECTED	Synthetics
51A	Tan/red multicolored carpet, main bldg. room 18/19 office	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
52A	Dark brown 4" vinyl base cove, main bldg. room 18	NONE DETECTED	Calcite Opagues
	Brown mastic	NONE DETECTED	Synthetics
53A	Brown 4" vinyl base cove, main bldg. rooms 18/19 office	NONE DETECTED	Calcite Opagues
	White mastic	NONE DETECTED	Calcite

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.



ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-13
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-54A	Beige 4" ceramic wall tile, main bldg. central restroom area women's staff restroom	NONE DETECTED	Granular Mins.
	Tan mastic	NONE DETECTED	Calcite
	White mastic	NONE DETECTED	Calcite
55A	White drywall , main bldg. room 19	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
55B	White drywall , main bldg. room 19	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Calcite
56A	White drywall texture #3 , main bldg. room 19	NONE DETECTED	Calcite
56B	White drywall texture #3 , main bldg. room 19	NONE DETECTED	Calcite
56C	White drywall texture #3 , main bldg. room 19	NONE DETECTED	Calcite

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-14
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-57A	White drywall , main bldg. central restroom area women's staff restroom	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Calcite
57B	White drywall , main bldg. central restroom area boy's restroom	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Calcite
58A	White drywall texture #4 , main bldg. central restroom area boy's restroom	NONE DETECTED	Granular Mins.
58B	White drywall texture #4 , main bldg. central restroom area women's staff restroom	NONE DETECTED	Calcite
58C	White drywall texture #4 , main bldg. central restroom area girl's restroom	NONE DETECTED	Calcite
59A	Gray textured wall panel , main bldg. central restroom area drinking fountains east of restrooms	NONE DETECTED	Cellulose

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-15
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-60A	White 12" acoustic ceiling tile , main bldg. room 19	NONE DETECTED	Cellulose Fibrous Glass
	Brown mastic tab	NONE DETECTED	Synthetics
60B	White 12" acoustic ceiling tile , main bldg. room 19	NONE DETECTED	Cellulose Fibrous Glass
	Brown mastic tab	NONE DETECTED	Synthetics
61A	White boiler rope gasket , main bldg. exterior boiler room at boiler unit	NONE DETECTED	Fibrous Glass
62A	White drywall , main bldg. exterior boiler room	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
63A	Brown fiberglass wall insulation mastic, main bldg. exterior boiler room	NONE DETECTED	Synthetics Pumice
64A	Brown streaked 12" vinyl floor tile, main bldg. kitchen area office	NONE DETECTED	Calcite
	Black mastic	1-5 CHRYSOTILE	Tar Binder

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-16
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-64B	Brown streaked 12" vinyl floor tile, main bldg. kitchen area	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
65A	Light brown mottled 12" vinyl floor tile, main bldg. kitchen area	NONE DETECTED	Calcite
	Black mastic	1-2 CHRYSOTILE	Tar Binder
	Yellow mastic	NONE DETECTED	Synthetics
66A	Red floor coating, main bldg. kitchen area wash room	NONE DETECTED	Granular Mins.
67A	Brown mottled 12" vinyl floor tile (top layer) main bldg. cafeteria area NW area	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
67B	Brown mottled 12" vinyl floor tile (top layer) main bldg. cafeteria area north area	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-17
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-67C	Brown mottled 12" vinyl floor tile (top layer) main bldg. cafeteria area east area	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
68A	Orange vinyl floor tile (bottom layer) & gray felt, main bldg. cafeteria area NW area	15-20 CHRYSOTILE	Vinyl Synthetics
	Black mastic	NONE DETECTED	Tar Binder
68B	Orange vinyl floor tile (bottom layer) & gray felt, main bldg. cafeteria area north area	15-20 CHRYSOTILE	Vinyl Synthetics
	Black mastic	NONE DETECTED	Tar Binder
	Yellow mastic	NONE DETECTED	Synthetics
69A	Beige mottled 12" vinyl floor tile, main bldg. room 21	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
69B	Beige mottled 12" vinyl floor tile, main bldg. room 21	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics

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 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-18
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-70A	Gray concrete slab, main bldg. room 22	NONE DETECTED	Granular Mins.
71A	Purple multicolored carpet, main bldg. cafeteria area stage steps	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
72A	Black angular vinyl base cove, main bldg. stage area	NONE DETECTED	Opagues
	Yellow mastic	NONE DETECTED	Synthetics
73A	White drywall , main bldg. classrooms 21/22 entry hall	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Calcite
73B	White drywall , main bldg. cafeteria area hallway near kitchen	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Granular Mins.

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-19
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-73C	White drywall , main bldg. room 25	NONE DETECTED	Gypsum Cellulose
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Calcite
	Yellow glue	NONE DETECTED	Synthetics
74A	White drywall texture #5 , main bldg. room 21	NONE DETECTED	Calcite
74B	White drywall texture #5 , main bldg. room 21	NONE DETECTED	Calcite
74C	White drywall texture #5 , main bldg. room 21	NONE DETECTED	Calcite
74D	White drywall texture #5 , main bldg. room 22	NONE DETECTED	Calcite
74E	White drywall texture #5 , main bldg. room 22	NONE DETECTED	Calcite
75A	White plaster , main bldg. kitchen area	NONE DETECTED	Calcite
	White joint compound	NONE DETECTED	Granular Mins.

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 Rancho Cordova, California 95670
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 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-20
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-75B	White plaster , main bldg. kitchen area	NONE DETECTED	Calcite
75C	White plaster , main bldg. kitchen area	NONE DETECTED	Calcite
75D	White plaster , main bldg. kitchen area	NONE DETECTED	Calcite
75E	White plaster , main bldg. kitchen area	NONE DETECTED	Calcite
76A	Gray cementitious wall panel , main bldg. room 21	15-20 CHRYSOTILE	Calcite
77A	White 12" acoustic ceiling tile , main bldg. room 21	NONE DETECTED	Cellulose Fibrous Glass
	Brown mastic tab	NONE DETECTED	Synthetics
77B	White 12" acoustic ceiling tile , main bldg. room 22	NONE DETECTED	Cellulose Fibrous Glass
	Brown mastic tab	NONE DETECTED	Synthetics
78A	White 12" acoustic ceiling tile , main bldg. stage	NONE DETECTED	Cellulose Fibrous Glass
	Brown mastic tab	NONE DETECTED	Synthetics

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 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

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 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-21
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-78B	White 12" acoustic ceiling tile , main bldg. room 24	NONE DETECTED	Cellulose Fibrous Glass
	Brown mastic tab	NONE DETECTED	Synthetics
79A	Gray/white 2'x4' drop ceiling panel , main bldg. cafeteria area west side	NONE DETECTED	Cellulose Pumice
79B	Gray/white 2'x4' drop ceiling panel , main bldg. cafeteria area east side	NONE DETECTED	Cellulose Pumice
80A	White 2'x4' hard gypsum drop ceiling panel, main bldg. kitchen area	NONE DETECTED	Gypsum Fibrous Glass
	Gray panel	NONE DETECTED	Cellulose
80B	White 2'x4' hard gypsum drop ceiling panel, main bldg. kitchen area	NONE DETECTED	Gypsum Fibrous Glass
	Gray panel	NONE DETECTED	Cellulose
81A	White HVAC duct seam tape, main bldg. cafeteria area plenum	NONE DETECTED	Cellulose Opagues
82A	Brown sheet vinyl flooring w/ gray felt, auditorium bldg. lobby	NONE DETECTED	Cellulose Synthetics
	Gray mastic	NONE DETECTED	Synthetics

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 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-22
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-82B	Brown sheet vinyl flooring w/ gray felt, auditorium bldg. lobby	NONE DETECTED	Cellulose Synthetics
	Gray mastic	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
83A	Beige mottled 12" vinyl floor tile, auditorium bldg. lobby women's restroom	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
83B	Beige mottled 12" vinyl floor tile, auditorium bldg. lobby men's restroom	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
84A	Light brown mottled 12" vinyl floor tile, auditorium bldg. SE entry vestibule	NONE DETECTED	Calcite
	Black mastic	NONE DETECTED	Tar Binder
	Gray leveler	NONE DETECTED	Calcite
85A	Brown mottled 12" vinyl floor tile, auditorium bldg. SW entry vestibule	NONE DETECTED	Calcite
	Black mastic	NONE DETECTED	Tar Binder

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 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-23
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-86A	Brown streaked sheet vinyl flooring w/ gray felt, auditorium bldg. SE storage area north room	NONE DETECTED	Cellulose Synthetics
	Gray mastic	NONE DETECTED	Synthetics
86B	Brown streaked sheet vinyl flooring w/ gray felt, auditorium bldg. SE storage area south room	NONE DETECTED	Cellulose Synthetics
	Gray mastic	NONE DETECTED	Synthetics
87A	Brown 4" vinyl base cove, auditorium bldg. lobby women's restroom	NONE DETECTED	Calcite Opaques
	White mastic	NONE DETECTED	Calcite
87B	Brown 4" vinyl base cove, auditorium bldg. lobby men's restroom	NONE DETECTED	Calcite Opaques
	White mastic	NONE DETECTED	Calcite
88A	White rough plaster, auditorium bldg. main auditorium	<1 CHRYSOTILE	Granular Mins. Pumice
88B	White rough plaster, auditorium bldg. SW entry vestibule ceiling	NONE DETECTED	Granular Mins.

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 Rocklin, CA 95677

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 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
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BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-24
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-88C	White rough plaster, auditorium bldg. stage	NONE DETECTED	Granular Mins.
88D	White rough plaster, auditorium bldg. SE entry vestibule	NONE DETECTED	Granular Mins.
88E	White rough plaster, auditorium bldg. lobby north small storage room	NONE DETECTED	Granular Mins.
88F	White rough plaster, auditorium bldg. lobby west storage room	NONE DETECTED	Granular Mins.
88G	White rough plaster, auditorium bldg. lobby	NONE DETECTED	Granular Mins.
88H	White rough plaster, auditorium bldg. room 31	NONE DETECTED	Granular Mins.
88I	White rough plaster, auditorium bldg. room 32	NONE DETECTED	Granular Mins.
89A	White acoustic ceiling plaster, auditorium bldg. lobby ceiling	<1 CHRYSOTILE	Granular Mins. Pumice
89B	White acoustic ceiling plaster, auditorium bldg. lobby ceiling	<1 CHRYSOTILE	Granular Mins. Pumice

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 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-25
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-89C	White acoustic ceiling plaster, auditorium bldg. lobby ceiling	<1 CHRYSOTILE	Granular Mins. Pumice
89D	White acoustic ceiling plaster, auditorium bldg. rooms 31/32 hallway ceiling	<1 CHRYSOTILE	Granular Mins. Pumice
89E	White acoustic ceiling plaster, auditorium bldg. rooms 31/32 hallway ceiling	<1 CHRYSOTILE	Granular Mins. Pumice
89F	White acoustic ceiling plaster, auditorium bldg. room 31 ceiling above 2'x4' panels	<1 CHRYSOTILE	Granular Mins. Pumice
89G	White acoustic ceiling plaster, auditorium bldg. room 32 ceiling above 2'x4' panels	<1 CHRYSOTILE	Granular Mins. Pumice
90A	White smooth plaster, auditorium bldg. lobby men's restroom	NONE DETECTED	Calcite
90B	White smooth plaster, auditorium bldg. lobby women's restroom	NONE DETECTED	Calcite
90C	White smooth plaster, auditorium bldg. lobby women's restroom	NONE DETECTED	Calcite
91A	Yellow plaster wall panel mastic, auditorium bldg. lobby men's restroom	NONE DETECTED	Calcite

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 Rancho Cordova, California 95670
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 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-26

Date/Time Collected: 3/ 4-5/23

Date Received: 3/6/23

NVLAP Lab Code 101442-0

CDPH # 1153

Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-92A	White drywall , auditorium bldg. main auditorium east side at HVAC ducts	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
92B	White drywall , auditorium bldg. main auditorium east side at HVAC ducts	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
93A	White drywall texture #6 , auditorium bldg. main auditorium east side at HVAC ducts	NONE DETECTED	Calcite
93B	White drywall texture #6 , auditorium bldg. main auditorium east side at HVAC ducts	NONE DETECTED	Calcite
93C	White drywall texture #6 , auditorium bldg. main auditorium east side at HVAC ducts	NONE DETECTED	Calcite
94A	Brown multicolored carpet , auditorium bldg. rooms 31/32 hallway	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics

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 Rocklin, CA 95677

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 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
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BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-27
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-94B	Brown multicolored carpet , auditorium bldg. rooms 31/32 hallway	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
95A	Beige mottled 12" vinyl floor tile , auditorium bldg. room 32	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
95B	Beige mottled 12" vinyl floor tile , auditorium bldg. room 31	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
96A	Brown 3" vinyl base cove , auditorium bldg. room 31	NONE DETECTED	Calcite Opagues
	White mastic	NONE DETECTED	Calcite
96B	Brown 3" vinyl base cove , auditorium bldg. room 32	NONE DETECTED	Calcite Opagues
	White mastic	NONE DETECTED	Calcite

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 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

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 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-28
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-97A	White smooth plaster , auditorium bldg. room 31	NONE DETECTED	Granular Mins.
	Brown wallpaper	NONE DETECTED	Cellulose
	Black mastic	NONE DETECTED	Opagues
	Yellow glue	NONE DETECTED	Calcite
97B	White smooth plaster , auditorium bldg. room 32	NONE DETECTED	Granular Mins.
	Brown wallpaper	NONE DETECTED	Cellulose
	Black mastic	NONE DETECTED	Opagues
	Yellow glue	NONE DETECTED	Calcite
97C	White smooth plaster , auditorium bldg. room 32	NONE DETECTED	Granular Mins.
	Brown wallpaper	NONE DETECTED	Cellulose
	Black mastic	NONE DETECTED	Opagues
	Yellow glue	NONE DETECTED	Calcite
98A	Gray 2'x4' drop ceiling panel , auditorium bldg. room 31	NONE DETECTED	Fibrous Glass

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 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-29
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-98B	Gray 2'x4' drop ceiling panel , auditorium bldg. room 31	NONE DETECTED	Cellulose Pumice
99A	Gray concrete slab, east connector addition bldg. custodial office	NONE DETECTED	Granular Mins.
100A	Brown multicolored carpet, east connector addition bldg. hallway	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
100B	Brown multicolored carpet, east connector addition bldg. room 33	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
100C	Brown multicolored carpet yellow mastic, east connector addition bldg. room 36	NONE DETECTED	Synthetics
101A	Brown streaked 12" vinyl floor tile, east connector addition bldg. room 33	1-2 CHRYSOTILE	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
101B	Brown streaked 12" vinyl floor tile, east connector addition bldg. room 34	1-2 CHRYSOTILE	Calcite
	Yellow mastic	NONE DETECTED	Synthetics

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 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

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 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-30
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-102A	Brown 4" vinyl base cove, east connector addition bldg. room 33	NONE DETECTED	Calcite Opagues
	White mastic	NONE DETECTED	Calcite
102B	Brown 4" vinyl base cove, east connector addition bldg. room 34	NONE DETECTED	Calcite Opagues
	White mastic	NONE DETECTED	Calcite
	Brown mastic	NONE DETECTED	Synthetics
102C	Brown 4" vinyl base cove, east connector addition bldg. room 36	NONE DETECTED	Calcite Opagues
	White mastic	NONE DETECTED	Calcite
	Brown mastic	NONE DETECTED	Synthetics
103A	Blue 4" vinyl base cove, east connector addition bldg. hallway	NONE DETECTED	Opagues
	White mastic	NONE DETECTED	Calcite
	Brown mastic	NONE DETECTED	Opagues
104A	Dark brown 4" vinyl base cove, east connector addition bldg. custodial office	NONE DETECTED	Synthetics Pumice
	White mastic	NONE DETECTED	Synthetics

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 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

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 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
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BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-31
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-105A	White drywall , east connector addition bldg. hallway	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound	NONE DETECTED	Granular Mins.
105B	White drywall , east connector addition bldg. custodial office	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Granular Mins.
105C	White drywall , east connector addition bldg. room 35	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	<1 CHRYSOTILE	Calcite
	White joint compound 2	<1 CHRYSOTILE	Calcite
	Composite	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite
105D	White drywall , east connector addition bldg. room 36	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound	<1 CHRYSOTILE	Calcite
	Composite	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite

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BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-32
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-106A	Tan vinyl wall covering , east connector addition bldg. hallway	NONE DETECTED	Vinyl Cellulose
	Yellow glue	NONE DETECTED	Synthetics
107A	Gray/white 2'x4' drop ceiling panel , east connector addition bldg. room 35	NONE DETECTED	Cellulose Fibrous Glass
107B	Gray/white 2'x4' drop ceiling panel , east connector addition bldg. room 36	NONE DETECTED	Cellulose Fibrous Glass
108A	Brown mottled 12" vinyl floor tile , east bldg. north storage room	<1 CHRYSOTILE	Calcite
	Black mastic	<1 CHRYSOTILE	Tar Binder
108B	Brown mottled 12" vinyl floor tile , east bldg. north storage room	<1 CHRYSOTILE	Calcite
	Black mastic	<1 CHRYSOTILE	Tar Binder
109A	Beige mottled 12" vinyl floor tile , east bldg. hallway at north entry	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.



ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-33
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-109B	Beige mottled 12" vinyl floor tile , east bldg. room 38	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
109C	Beige mottled 12" vinyl floor tile , east bldg. hallway outside women's staff restroom	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
109D	Beige mottled 12" vinyl floor tile , east bldg. room 41	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
109E	Beige mottled 12" vinyl floor tile , east bldg. room 42	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
110A	Gray concrete slab, east bldg. women's staff restroom storage room	NONE DETECTED	Granular Mins.
111A	Black/brown remnant flooring mastic, east bldg. women's staff restroom entry door	NONE DETECTED	Synthetics
	White mastic	NONE DETECTED	Calcite

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-34
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-112A	Gray speckled sheet vinyl flooring, east bldg. staff unisex restroom	NONE DETECTED	Vinyl
	White mastic	NONE DETECTED	Calcite
113A	Brown 4" vinyl base cove, east bldg. hallway at north entry	NONE DETECTED	Calcite
	White mastic	NONE DETECTED	Calcite
113B	Brown 4" vinyl base cove, east bldg. room 41	NONE DETECTED	Calcite
	White mastic	NONE DETECTED	Calcite
113C	Brown 4" vinyl base cove, east bldg. room 43	NONE DETECTED	Calcite
	White mastic	NONE DETECTED	Calcite
114A	Gray 4" vinyl base cove, east bldg. staff unisex restroom	NONE DETECTED	Calcite Opagues
	White mastic	NONE DETECTED	Calcite
	Brown mastic	NONE DETECTED	Synthetics
115A	Gray concrete slab, east bldg. exterior boy's restroom	NONE DETECTED	Granular Mins.

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 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
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 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-35
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-115.5A	Red floor coating, east bldg. exterior boy's restroom	NONE DETECTED	Granular Mins.
	Gray concrete	NONE DETECTED	Granular Mins.
116A	White wall plaster, east bldg. hallway at north entry	NONE DETECTED	Granular Mins.
116B	White wall plaster, east bldg. north storage room	NONE DETECTED	Granular Mins.
116C	White wall plaster, east bldg. hallway	NONE DETECTED	Calcite
116D	White wall plaster, east bldg. room 40	NONE DETECTED	Granular Mins.
116E	White wall plaster, east bldg. room 41	NONE DETECTED	Granular Mins.
116F	White wall plaster, east bldg. room 45	NONE DETECTED	Granular Mins.
116G	White wall plaster, east bldg. room 42	NONE DETECTED	Granular Mins.

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-36
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-117A	White smooth plaster, east bldg. women's staff restroom	NONE DETECTED	Granular Mins.
117B	White smooth plaster, east bldg. unisex staff restroom	NONE DETECTED	Granular Mins.
117C	White smooth plaster, east bldg. men's staff restroom	NONE DETECTED	Granular Mins.
118A	Yellow plastic wall panel mastic, east bldg. women's staff restroom	NONE DETECTED	Calcite
119A	White plaster, east bldg. exterior boy's restroom	NONE DETECTED	Granular Mins.
	White joint compound	NONE DETECTED	Granular Mins.
119B	White plaster, east bldg. exterior boy's restroom	NONE DETECTED	Granular Mins.
119C	White plaster, east bldg. exterior girl's restroom	NONE DETECTED	Granular Mins.
119D	White plaster, east bldg. exterior girl's restroom	NONE DETECTED	Granular Mins.

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-37
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-119E	White plaster, east bldg. exterior storage room	NONE DETECTED	Granular Mins.
120A	Yellow plastic wall panel mastic, east bldg. exterior boy's restroom	NONE DETECTED	Calcite
120.5A	Tan vinyl wall covering, east bldg. hallway at north entry	NONE DETECTED	Vinyl Cellulose
	Yellow glue	NONE DETECTED	Synthetics
120.5B	Tan vinyl wall covering, east bldg. hallway at south entry	NONE DETECTED	Vinyl Cellulose
	Yellow glue	NONE DETECTED	Synthetics
121A	White/tan acoustic ceiling plaster, east bldg. hallway ceiling	1-2 CHRYSOTILE	Opagues Pumice
121B-G	NOT ANALYZED		
122A	White spray applied acoustic ceiling texture, east bldg. room 40	NONE DETECTED	Calcite
122B	White spray applied acoustic ceiling texture, east bldg. room 40	NONE DETECTED	Calcite

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 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-38
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-122C	White spray applied acoustic ceiling texture, east bldg. room 40	NONE DETECTED	Calcite
123A	Gray/white 2'x4' drop ceiling panel, east bldg. room 39	NONE DETECTED	Cellulose Fibrous Glass
123B	Gray/white 2'x4' drop ceiling panel, east bldg. room 45	NONE DETECTED	Cellulose Fibrous Glass
124A	Black attic roofing debris, east bldg. attic space above hallway	NONE DETECTED	Tar Binder
124B	Black attic roofing debris, east bldg. attic space above hallway	NONE DETECTED	Tar Binder
124C	Black attic roofing debris, east bldg. attic space above hallway	NONE DETECTED	Tar Binder
124.5A	White door core insulation , east bldg. room 39 entry door at screw holes	NONE DETECTED	Pumice
125A	Beige mottled 12" vinyl floor tile (top layer), portable B-1	NONE DETECTED	Calcite
	Black mastic	NONE DETECTED	Tar Binder

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-39
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-126A	Beige vinyl floor tile (bottom layer), portable B-1	NONE DETECTED	Calcite
	Black mastic 1	<1 CHRYSOTILE	Tar Binder
	Black mastic 2	<1 CHRYSOTILE	Tar Binder
127A	Brown multicolored carpet, portable B-1	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
128A	Gray 4" vinyl base cove, portable B-1	NONE DETECTED	Calcite Opaques
	White mastic	NONE DETECTED	Calcite
129A	White drywall (no joint compound), portable B-1 beneath tagboard walls	NONE DETECTED	Gypsum Fibrous Glass
130A	White tagboard walls, portable B-1	NONE DETECTED	Vinyl Cellulose
	Yellow glue	NONE DETECTED	Synthetics
131A	White 2'x4' drop ceiling panel, portable B-1	NONE DETECTED	Vinyl Fibrous Glass
	Yellow glue	NONE DETECTED	Synthetics

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 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-40
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-132A	White sink undercoating, portable B-1	NONE DETECTED	Calcite Cellulose
133A	White metal roof mastic, portable B-1	NONE DETECTED	Opagues Polyethylene
	Gray mastic	NONE DETECTED	Calcite Opagues
134A	Beige 12" vinyl floor tile (top layer), portable B-2	NONE DETECTED	Calcite
	Black mastic	NONE DETECTED	Tar Binder
135A	Beige vinyl floor tile (bottom layer), portable B-2	NONE DETECTED	Calcite
	Black mastic 1	NONE DETECTED	Tar Binder
	Black mastic 2	<1 CHRYSOTILE	Tar Binder
136A	Brown multicolored carpet, portable B-2	NONE DETECTED	Synthetics
	Yellow mastic	NONE DETECTED	Synthetics
137A	Gray 4" vinyl base cove, portable B-2	NONE DETECTED	Calcite Opagues
	White mastic	NONE DETECTED	Calcite

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 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-41
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-138A	White sink undercoating, portable B-2	NONE DETECTED	Calcite Cellulose
139A	White drywall (no joint compound), portable B-2 beneath tagboard walls	NONE DETECTED	Gypsum Fibrous Glass
140A	White tagboard walls, portable B-2	NONE DETECTED	Vinyl Cellulose
	Yellow glue	NONE DETECTED	Synthetics
141A	White 2'x4' drop ceiling panel, portable B-2	NONE DETECTED	Vinyl Fibrous Glass
	Yellow glue	NONE DETECTED	Synthetics
142A	White/red metal roof mastic, portable B-2	<1 CHRYSOTILE	Opagues Polyethylene
143A	Brown 12" vinyl floor tile, portable B-3	NONE DETECTED	Calcite
	Black mastic	NONE DETECTED	Tar Binder
144A	Yellow carpet mastic, portable B-3	NONE DETECTED	Synthetics

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 Rancho Cordova, California 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70246-42
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/13/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-145A	Blue 4" vinyl base cove, portable B-3	NONE DETECTED	Calcite Opaques
	White mastic	NONE DETECTED	Calcite
146A	White drywall (no joint compound), portable B-3 beneath tagboard walls	NONE DETECTED	Gypsum Fibrous Glass
147A	White tagboard walls, portable B-3	NONE DETECTED	Vinyl Cellulose
	Yellow glue	NONE DETECTED	Synthetics
148A	White 2'x4' drop ceiling panel, portable B-3	NONE DETECTED	Vinyl Fibrous Glass
	Yellow glue	NONE DETECTED	Synthetics
149A	White sink undercoating, portable B-3	NONE DETECTED	Calcite Cellulose
150A	White metal roof mastic, portable B-3	<1 CHRYSOTILE	Opaques Polyethylene

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 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
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Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
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Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-1
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-150.5A	Gray concrete slab, gymnasium bldg. boy's locker room area	NONE DETECTED	Granular Mins.
151A	Beige 1" ceramic floor tile, gymnasium bldg. boy's locker room restroom	NONE DETECTED	Granular Mins.
	Gray grout	NONE DETECTED	Granular Mins.
	White mastic	NONE DETECTED	Calcite
152A	Beige mottled 12" vinyl floor tile, gymnasium bldg. boy's locker room coach office storage	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
153A	Tan speckled sheet vinyl flooring, gymnasium bldg. boy's locker room coach office restroom	NONE DETECTED	Vinyl Fibrous Glass
	Yellow mastic	NONE DETECTED	Synthetics
154A	Off-white mottled 12" vinyl floor tile, gymnasium bldg. boy's locker room restroom custodial closet	1-2 CHRYSOTILE	Calcite
	Black mastic	<1 CHRYSOTILE	Tar Binder

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.



ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-2
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-155A	Dark brown 4" vinyl base cove, gymnasium bldg. boy's locker room coach office	NONE DETECTED	Opagues
	White mastic	NONE DETECTED	Calcite
	White joint compound	NONE DETECTED	Calcite
156A	Dark brown 4" vinyl base cove, gymnasium bldg. boy's locker room	NONE DETECTED	Opagues Opagues
	Yellow mastic	NONE DETECTED	Synthetics
157A	Black angular vinyl base cove, gymnasium bldg. main room	NONE DETECTED	Opagues
	Yellow mastic	NONE DETECTED	Synthetics
158A	White plaster, gymnasium bldg. boy's locker room area	NONE DETECTED	Granular Mins.
158B	White plaster, gymnasium bldg. boy's locker room area	NONE DETECTED	Granular Mins.
158C	White plaster, gymnasium bldg. boy's locker room area	NONE DETECTED	Granular Mins.
158D	White plaster, gymnasium bldg. boy's locker room area	NONE DETECTED	Granular Mins.

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-3
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-158E	White plaster, gymnasium bldg. boy's locker room area	NONE DETECTED	Granular Mins.
159A	White drywall texture #7, gymnasium bldg. boy's locker room restroom custodial closet	NONE DETECTED	Calcite
159B	White drywall texture #7, gymnasium bldg. boy's locker room restroom custodial closet	NONE DETECTED	Calcite
	Beige joint compound	NONE DETECTED	Granular Mins.
159C	White drywall texture #7, gymnasium bldg. boy's locker room restroom custodial closet	NONE DETECTED	Calcite
160A	White drywall, gymnasium bldg. boy's locker room restroom custodial closet	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Granular Mins.
	White joint compound 2	NONE DETECTED	Granular Mins.

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-4
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-161A	White drywall, gymnasium bldg. boy's locker room coach office storage room	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
161B	White drywall, gymnasium bldg. boy's locker room coach office	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
162A	Beige 4" ceramic wall tile, gymnasium bldg. boy's locker room	NONE DETECTED	Granular Mins.
	Gray grout	NONE DETECTED	Granular Mins.
163A	Gray cementitious overspray, gymnasium bldg. boy's locker room plenum space	NONE DETECTED	Granular Mins.
163B	Gray cementitious overspray, gymnasium bldg. boy's locker room plenum space	NONE DETECTED	Granular Mins.
163C	Gray cementitious overspray, gymnasium bldg. boy's locker room plenum space	NONE DETECTED	Granular Mins.

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-5
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-164A	White drywall , gymnasium bldg. boy's locker room plenum space ceiling	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound	<1 CHRYSOTILE	Calcite
	Composite	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite
164B	White drywall , gymnasium bldg. boy's locker room plenum space ceiling	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound	<1 CHRYSOTILE	Calcite
	Composite	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite
165A	Gray/brown 2'x4' drop ceiling panel , gymnasium bldg. boy's locker room area	NONE DETECTED	Cellulose Fibrous Glass
166A	White HVAC duct seam tape , gymnasium bldg. boy's locker room plenum space	NONE DETECTED	Cellulose Opagues
167A	Beige mottled 12" vinyl floor tile, gymnasium bldg. storage room near girl's locker room	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-6
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-167B	Beige mottled 12" vinyl floor tile, gymnasium bldg. storage room near girl's locker room	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
168A	Brown mottled 12" vinyl floor tile, gymnasium bldg. large entry foyer/hall near girl's locker room	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
169A	Gray concrete slab, gymnasium bldg. girl's locker room	NONE DETECTED	Granular Mins.
170A	Beige 1" ceramic floor tile, gymnasium bldg. girl's locker room	NONE DETECTED	Granular Mins.
	Gray grout	NONE DETECTED	Granular Mins.
171A	Tan speckled sheet vinyl flooring, gymnasium bldg. girl's locker room coach office restroom	NONE DETECTED	Vinyl Fibrous Glass
	Yellow mastic	NONE DETECTED	Synthetics
	Gray leveler	NONE DETECTED	Calcite

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 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-7
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-172A	Brown mottled 12" vinyl floor tile, gymnasium bldg. girl's locker room coach office	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
173A	Black 4" vinyl base cove, gymnasium bldg. large entry foyer/hall near girl's locker room	NONE DETECTED	Opagues
	White mastic	NONE DETECTED	Calcite
174A	Dark brown 4" vinyl base cove, gymnasium bldg. girl's locker room coach office	NONE DETECTED	Opagues
	White mastic	NONE DETECTED	Calcite
175A	Yellow plastic wall panel mastic, gymnasium bldg. girl's locker room coach office restroom	NONE DETECTED	Calcite
176A	White plaster, gymnasium bldg. girl's locker room area	NONE DETECTED	Granular Mins.
176B	White plaster, gymnasium bldg. girl's locker room area	NONE DETECTED	Granular Mins.

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 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-8
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-176C	White plaster, gymnasium bldg. girl's locker room area	NONE DETECTED	Granular Mins.
176D	White plaster, gymnasium bldg. girl's locker room area	NONE DETECTED	Granular Mins.
176E	White plaster, gymnasium bldg. girl's locker room area	NONE DETECTED	Granular Mins.
177A	White drywall , gymnasium bldg. girl's locker room coach office	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
177B	White drywall , gymnasium bldg. girl's locker room coach office	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-9
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-178A	White drywall , gymnasium bldg. girl's locker room plenum space ceiling	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	<1 CHRYSOTILE	Calcite
	White joint compound 2	<1 CHRYSOTILE	Calcite
	Composite	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite
178B	White drywall , gymnasium bldg. girl's locker room plenum space ceiling	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound	<1 CHRYSOTILE	Calcite
	Composite	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite
179A	Gray cementitious overspray, gymnasium bldg. girl's locker room plenum space	NONE DETECTED	Granular Mins.
179B	Gray cementitious overspray, gymnasium bldg. girl's locker room plenum space	NONE DETECTED	Granular Mins.
179C	Gray cementitious overspray, gymnasium bldg. girl's locker room plenum space	NONE DETECTED	Granular Mins.

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-10
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-180A	Gray/white 2'x4' drop ceiling panel , gymnasium bldg. girl's locker room area	NONE DETECTED	Cellulose Pumice
181A	White HVAC duct seam tape , gymnasium bldg. girl's locker room plenum space	NONE DETECTED	Cellulose Opagues
182A	Gray 12" acoustic ceiling/wall tile , gymnasium bldg. main room	NONE DETECTED	Cellulose Fibrous Glass
	Brown mastic tab	NONE DETECTED	Synthetics
182B	Gray 12" acoustic ceiling/wall tile , gymnasium bldg. main room	NONE DETECTED	Cellulose Fibrous Glass
	Brown mastic tab	NONE DETECTED	Synthetics
182C	Gray 12" acoustic ceiling/wall tile , gymnasium bldg. storage room near girl's locker room	NONE DETECTED	Cellulose Fibrous Glass
	Brown mastic tab	NONE DETECTED	Synthetics
182D	Gray 12" acoustic ceiling/wall tile , gymnasium bldg. main room	NONE DETECTED	Cellulose Fibrous Glass
	Brown mastic tab	NONE DETECTED	Synthetics

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-11
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-183A	White drywall , gymnasium bldg. main room beneath acoustic tile	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound	<1 CHRYSOTILE	Calcite
	Composite	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite
183B	White drywall , gymnasium bldg. main room beneath acoustic tile	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound	<1 CHRYSOTILE	Calcite
	Composite	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite
183C	White drywall , gymnasium bldg. storage room near girl's locker room (old yellow drywall)	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	<1 CHRYSOTILE	Calcite
	White joint compound 2	<1 CHRYSOTILE	Calcite
	Composite	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.



ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-12
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-184A	Red brick, main bldg. near NE main entry	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
184B	Red brick, main bldg. west area	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
184C	Red brick, main bldg. SW entry	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
184D	Red brick, main bldg. cafeteria area	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
185A	Gray foundation concrete , main bldg. near NE main entry	NONE DETECTED	Granular Mins.
185B	Gray foundation concrete , main bldg. NE corner	NONE DETECTED	Granular Mins.
185C	Gray foundation concrete , main bldg. NW area	NONE DETECTED	Granular Mins.
186A	Black coating on foundation concrete , main bldg. exterior NE area	NONE DETECTED	Tar Binder Cellulose

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.



ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-13
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-186B	Black coating on foundation concrete , main bldg. exterior NE area	NONE DETECTED	Tar Binder Cellulose
187A	Gray site concrete , main bldg. exterior NE area	NONE DETECTED	Granular Mins.
187B	Gray site concrete , main bldg. exterior west area	NONE DETECTED	Granular Mins.
187C	Gray site concrete , main bldg. exterior SW area	NONE DETECTED	Granular Mins.
188A	Black asphalt , main bldg. exterior SW area	NONE DETECTED	Granular Mins. Tar Binder
188B	Black asphalt , main bldg. exterior SE area	NONE DETECTED	Granular Mins. Tar Binder
189A	White cementitious caulking , main bldg. exterior NE area at hose bib	<1 CHRYSOTILE	Calcite
	Gray mortar	NONE DETECTED	Calcite
190A	Gray mastic , main bldg. exterior SE roof soffit metal flashing	NONE DETECTED	Synthetics

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-14
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-191A	Gray wall concrete , auditorium bldg. exterior north side	NONE DETECTED	Granular Mins.
	Tan concrete	NONE DETECTED	Granular Mins.
191B	Gray wall concrete , auditorium bldg. exterior north side	NONE DETECTED	Granular Mins.
	Tan concrete	NONE DETECTED	Granular Mins.
192A	Red brick , auditorium bldg. exterior north side	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
192B	Red brick , auditorium bldg. exterior west side	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
192C	Red brick , auditorium bldg. exterior east side	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
193A	Gray site concrete , auditorium bldg. SE area	NONE DETECTED	Granular Mins.

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.



ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, CA 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:

Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:

23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-15

Date/Time Collected: 3/11/23

Date Received: 3/14/23

NVLAP Lab Code 101442-0

CDPH # 1153

Date Analyzed: 3/17/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-193B	Gray site concrete , auditorium bldg. north area	NONE DETECTED	Granular Mins.
194A	White stucco , auditorium bldg. west exterior above doors	NONE DETECTED	Granular Mins.
194B	White stucco , auditorium bldg. west exterior above doors	NONE DETECTED	Granular Mins.
194C	White stucco , auditorium bldg. west exterior above doors	NONE DETECTED	Granular Mins.
195A	Gray caulking , auditorium bldg. west exterior at door	NONE DETECTED	Calcite Opaques
196A	Gray foundation concrete , east connector addition bldg. NE area	NONE DETECTED	Granular Mins.
196B	Gray foundation concrete , east connector addition bldg. east area	NONE DETECTED	Granular Mins.
197A	Black coating on foundation concrete , east connector addition bldg. NE area	NONE DETECTED	Tar Binder Cellulose
197B	Black coating on foundation concrete , east connector addition bldg. east area	NONE DETECTED	Tar Binder Cellulose

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ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, CA 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:

Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:

23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-16

Date/Time Collected: 3/11/23

Date Received: 3/14/23

NVLAP Lab Code 101442-0

CDPH # 1153

Date Analyzed: 3/17/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-198A	Red brick , east connector addition bldg. south area	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
199A	Gray site concrete , east connector addition bldg. south area	NONE DETECTED	Granular Mins.
200A	Gray foundation concrete , east bldg. west entry near restrooms	NONE DETECTED	Granular Mins.
200B	Gray foundation concrete , east bldg. west entry near restrooms	NONE DETECTED	Granular Mins.
201A	Red brick , east bldg. west wall	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
201B	Red brick , east bldg. west wall	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
201C	Red brick , east bldg. south wall	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-17
 Date/Time Collected: 3/11/23
 Date Received: 3/14/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/17/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-202A	Red brick , gymnasium bldg. north area	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
202B	Red brick , gymnasium bldg. west area	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
202C	Red brick , gymnasium bldg. NE area	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
203A	Red brick (newer construction) , gymnasium bldg. SE area	NONE DETECTED	Granular Mins.
	Gray mortar	NONE DETECTED	Granular Mins.
204A	Gray/beige caulking , gymnasium bldg. south exterior of boy's locker area wall	NONE DETECTED	Calcite
205A	Gray caulking , gymnasium bldg. south exterior of boy's locker area at small wall access door	NONE DETECTED	Calcite Opagues
206A	Light gray caulking , gymnasium bldg. SW entry door around frame	NONE DETECTED	Calcite Opagues

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.



ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, CA 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:

Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:

23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70263-18
Date/Time Collected: 3/11/23
Date Received: 3/14/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 3/17/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-207A	Light gray caulking , gymnasium bldg. SE exterior area at brick seam	NONE DETECTED	Calcite Opagues
208A	Gray caulking , gymnasium bldg. west entry door around frame	NONE DETECTED	Calcite Opagues
	Brown paint	NONE DETECTED	Opagues
	White caulking	NONE DETECTED	Calcite

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ASBESTECH
 11151 Sun Center Drive, Suite B
 Rancho Cordova, CA 95670
 Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
 Entek Consulting Group, Inc.
 4200 Rocklin Rd., Suite 7
 Rocklin, CA 95677

Job:
 23-6577 Sacramento City USD
 California Middle School, 1600 Vallejo Way
 Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70262-1
 Date/Time Collected: 3/ 4-5/23
 Date Received: 3/6/23

NVLAP Lab Code 101442-0
 CDPH # 1153
 Date Analyzed: 3/15/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECG-23-6577-88A	White rough plaster, auditorium bldg. main auditorium	TRACE CHRYSOTILE	Granular Mins. Pumice
89A	White acoustic ceiling plaster, auditorium bldg. lobby ceiling	<1 CHRYSOTILE	Granular Mins. Pumice
89B	White acoustic ceiling plaster, auditorium bldg. lobby ceiling	<1 CHRYSOTILE	Granular Mins. Pumice
89C	White acoustic ceiling plaster, auditorium bldg. lobby ceiling	<1 CHRYSOTILE	Granular Mins. Pumice
89D	White acoustic ceiling plaster, auditorium bldg. rooms 31/32 hallway ceiling	<1 CHRYSOTILE	Granular Mins. Pumice
89E	White acoustic ceiling plaster, auditorium bldg. rooms 31/32 hallway ceiling	2 CHRYSOTILE	Granular Mins. Pumice
89F	White acoustic ceiling plaster, auditorium bldg. room 31 ceiling above 2'x4' panels	<1 CHRYSOTILE	Granular Mins. Pumice

NOTE: These samples were analyzed by quantitative Point Counting using a Chalkley Point Array over 400 non-empty points.

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ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, CA 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento , Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70262-2
Date/Time Collected: 3/ 4-5/23
Date Received: 3/6/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 3/15/23

<i>Sample No.</i>	<i>Color/Description</i>	<i>% Type Asbestos</i>	<i>Other Materials</i>
ECCG-23-6577-89G	White acoustic ceiling plaster, auditorium bldg. room 32 ceiling above 2'x4' panels	1 CHRYSOTILE	Granular Mins. Pumice
105C	White drywall/joint compound composite east connector addition bldg. room 35	TRACE CHRYSOTILE	Gypsum Fibrous Glass Calcite
105D	White drywall/joint compound composite east connector addition bldg. room 36	TRACE CHRYSOTILE	Gypsum Fibrous Glass Calcite
121A	White/tan acoustic ceiling plaster, east bldg. hallway ceiling	2 CHRYSOTILE	Granular Mins. Pumice

NOTE: These samples were analyzed by quantitative Point Counting using a Chalkley Point Array over 400 non-empty points.

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11151 Sun Center Drive, Suite B
Rancho Cordova, CA 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:

Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:

23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70270-1

Date/Time Collected: 3/11/23

Date Received: 3/14/23

NVLAP Lab Code 101442-0

CDPH # 1153

Date Analyzed: 3/22/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-164A	White drywall/ joint compound composite, gymnasium bldg. boy's locker room plenum space ceiling	TRACE CHRYSOTILE	Gypsum Fibrous Glass Calcite
164B	White drywall/ joint compound composite , gymnasium bldg. boy's locker room plenum space ceiling	TRACE CHRYSOTILE	Gypsum Fibrous Glass Calcite
178A	White drywall/ joint compound composite , gymnasium bldg. girl's locker room plenum space ceiling	TRACE CHRYSOTILE	Gypsum Fibrous Glass Calcite
178B	White drywall/ joint compound composite , gymnasium bldg. girl's locker room plenum space ceiling	TRACE CHRYSOTILE	Gypsum Fibrous Glass Calcite
183A	White drywall/ joint compound composite , gymnasium bldg. main room beneath acoustic tile	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite

NOTE: These samples were analyzed by quantitative Point Counting using a Chalkley Point Array over 400 non-empty points.

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Rancho Cordova, CA 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:

Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:

23-6577 Sacramento City USD
California Middle School, 1600 Vallejo Way
Sacramento, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70270-2

Date/Time Collected: 3/11/23

Date Received: 3/14/23

NVLAP Lab Code 101442-0

CDPH # 1153

Date Analyzed: 3/22/23

<u>Sample No.</u>	<u>Color/Description</u>	<u>% Type Asbestos</u>	<u>Other Materials</u>
ECG-23-6577-183B	White drywall/ joint compound composite , gymnasium bldg. main room beneath acoustic tile	TRACE CHRYSOTILE	Gypsum Fibrous Glass Calcite
183C	White drywall/ joint compound composite , gymnasium bldg. storage room near girl's locker room (old yellow drywall)	TRACE CHRYSOTILE	Gypsum Fibrous Glass Calcite
189A	White cementitious caulking , main bldg. exterior NE area at hose bib	TRACE CHRYSOTILE	Calcite

NOTE: These samples were analyzed by quantitative Point Counting using a Chalkley Point Array over 400 non-empty points.

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A), THE MCL IS 1%. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.



70246

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-13A	Beige/Gray Splotchy Sheet Vinyl Flooring & Mastic - Main Building, Administration Area, Northwest Copy Area
ECG-23-6577-13B	Beige/Gray Splotchy Sheet Vinyl Flooring & Mastic - Main Building, Administration Area, West Storage Entry
ECG-23-6577-14A	Brown Circle Sheet Vinyl Flooring & Mastic - Main Building, Administration Area, West Reception Area
ECG-23-6577-15A	Tan/Red Multi-colored Carpet & Mastic - Main Building, Administration Area, East Reception Area
ECG-23-6577-15B	Tan/Red Multi-colored Carpet & Mastic - Main Building, Administration Area, Detention Room Entry
ECG-23-6577-16A	Beige Mottled 12" Vinyl Floor Tile & Mastic - Main Building, Administration Area, Nurse Office
ECG-23-6577-16B	Beige Mottled 12" Vinyl Floor Tile & Mastic - Main Building, Library Area, Library Storage Room
ECG-23-6577-17A	Green Carpet & Mastic - Main Building, Administration Area, West Storage Room
ECG-23-6577-18A	Beige 1" Ceramic Floor Tile & Grout - Main Building, Administration Area, Nurse Restroom
ECG-23-6577-19A	Brown/Red 6" Ceramic Floor Tile & Grout - Main Building, Administration Area, Staff Lounge

Delivered by: Rovita Shrestha

Date: 3 / 6 / 23 **Time:** 1330 AM/PM

Received by: Jim Gill

Date: 3 / 6 / 23 **Time:** 130 AM/PM



70246

BULK ASBESTOS MATERIAL *Analysis Request*

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Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

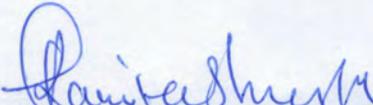
Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

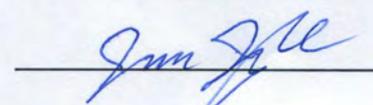
ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-20A	Gray 4" Vinyl Base Cove & Mastic - Main Building, Administration Area, Northwest Copy Area
ECG-23-6577-21A	Brown 4" Vinyl Base Cove & Mastic - Main Building, Administration Area, East Offices
ECG-23-6577-21B	Brown 4" Vinyl Base Cove & Mastic - Main Building, Administration Area, Staff Lounge
ECG-23-6577-22A	Dark Brown 4" Vinyl Base Cove & Mastic - Main Building, Administration Area, Staff Lounge
ECG-23-6577-22B	Dark Brown 4" Vinyl Base Cove & Mastic - Main Building, Library Area, Library Storage Room
ECG-23-6577-23A	Concrete Slab - Main Building, Administration Area, West Storage Room
ECG-23-6577-24A	Drywall & Joint Compound - Main Building, Administration Area, Northeast Office
ECG-23-6577-24B	Drywall & Joint Compound - Main Building, Administration Area, West Storage Room
ECG-23-6577-24C	Drywall & Joint Compound - Main Building, Administration Area, Staff Lounge
ECG-23-6577-24D	Drywall & Joint Compound - Main Building, Library Area, Library Storage Room

Delivered by:  **Date:** 3 / 6 / 23 **Time:** 1330 AM/PM (P)

Received by:  **Date:** 3 / 6 / 23 **Time:** 130 AM/PM



70246

BULK ASBESTOS MATERIAL *Analysis Request*

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Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-25A	Drywall Texture #1 - Main Building, Administration Area, Detention Room South Wall
ECG-23-6577-25B	Drywall Texture #1 - Main Building, Administration Area, Detention Room South Wall
ECG-23-6577-25C	Drywall Texture #1 - Main Building, Administration Area, Detention Room Office
ECG-23-6577-26A	Drywall Texture #2 - Main Building, Administration Area, Detention Room Custodial Closet
ECG-23-6577-26B	Drywall Texture #2 - Main Building, Administration Area, Nurse Restroom
ECG-23-6577-26C	Drywall Texture #2 - Main Building, Library Area, Library Storage Room
ECG-23-6577-27A	Beige 4" Ceramic Wall Tile & Grout - Main Building, Administration Area, Nurse Restroom
ECG-23-6577-28A	Vinyl Wall Covering - Main Building, Administration Area, Northeast Office
ECG-23-6577-28B	Vinyl Wall Covering - Main Building, Administration Area, Staff Lounge
ECG-23-6577-28C	Vinyl Wall Covering - Main Building, Library Area, Library Storage Room
ECG-23-6577-29A	2'x4' Drop Ceiling Panel - Main Building, Administration Area, Northeast Office
ECG-23-6577-29B	2'x4' Drop Ceiling Panel - Main Building, Administration Area, Staff Lounge
ECG-23-6577-29C	2'x4' Drop Ceiling Panel - Main Building, Lobby Area

Delivered by: Raminashush **Date:** 3 / 6 / 23 **Time:** 1330 AM/PM

Received by: [Signature] **Date:** 3 / 6 / 23 **Time:** 130 AM/PM



70246

BULK ASBESTOS MATERIAL *Analysis Request*

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mainoffice@entekgroup.com

Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-30A	Dark Brown 12" Cork Acoustic Ceiling Tile & Brown Mastic Tab - Main Building, Library Area Southwest Ceiling
ECG-23-6577-30B	Dark Brown 12" Cork Acoustic Ceiling Tile & Brown Mastic Tab - Main Building, Counseling Area Ceiling
ECG-23-6577-30C	Dark Brown 12" Cork Acoustic Ceiling Tile & Brown Mastic Tab - Main Building, Cafeteria Area Ceiling
ECG-23-6577-31A	White 12" Acoustic Ceiling Tile & Brown Mastic Tab - Main Building, Administration Area, Nurse Office
ECG-23-6577-32A	HVAC Duct Seam Tape - Main Building, Administration Area, Northeast Office Plenum
ECG-23-6577-32B	HVAC Duct Seam Tape - Main Building, Lobby Area Plenum
ECG-23-6577-32C	HVAC Duct Seam Tape - Main Building, Administration Area, Staff Lounge Plenum
ECG-23-6577-33A	Vapor Barrier Between Brick & Wood Walls - Main Building, Lobby Area Plenum, North Wall
ECG-23-6577-33B	Vapor Barrier Between Brick & Wood Walls - Main Building, Lobby Area Plenum, North Wall
ECG-23-6577-33C	Vapor Barrier Between Brick & Wood Walls - Main Building, Lobby Area Plenum, North Wall

Delivered by: **Date:** 3 / 6 / 23 **Time:** 1330 AM/PM

Received by: **Date:** 3 / 6 / 23 **Time:** 130 AM/PM



70296

BULK ASBESTOS MATERIAL *Analysis Request*

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4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-34A	Blue Striped Carpet Mastic - Main Building, Lobby Area, East Side
ECG-23-6577-34B	Blue Striped Carpet Mastic - Main Building, Lobby Area, West Side
ECG-23-6577-35A	Beige/Gray Splotchy Sheet Vinyl Flooring & Mastic - Main Building, Rooms 1-17 Area, East Hallway
ECG-23-6577-35B	Beige/Gray Splotchy Sheet Vinyl Flooring & Mastic - Main Building, Rooms 1-17 Area, West Hallway
ECG-23-6577-36A	Blue Striped Carpet & Mastic - Main Building, Rooms 1-17 Area, East Hallway
ECG-23-6577-37A	Tan/Red Multi-colored Carpet & Mastic - Main Building, Rooms 1-17 Area, Room 3A
ECG-23-6577-37B	Tan/Red Multi-colored Carpet & Mastic - Main Building, Rooms 1-17 Area, Room 12
ECG-23-6577-38A	Blue Multi-colored Carpet & Mastic - Main Building, Rooms 1-17 Area, Room 4
ECG-23-6577-39A	Brown Circle Sheet Vinyl Flooring & Mastic - Main Building, Rooms 1-17 Area, West Hallway
ECG-23-6577-40A	Brown/Red 6" Ceramic Floor Tile & Grout - Main Building, Rooms 1-17 Area, Room 17
ECG-23-6577-41A	Gray 4" Vinyl Base Cove & Mastic - Main Building, Rooms 1-17 Area, Room 4

Delivered by: **Date:** 3 / 6 / 23 **Time:** 1330 AM/PM

Received by: **Date:** 3 / 6 / 23 **Time:** 130 AM/PM

BULK ASBESTOS MATERIAL *Analysis Request*

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Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

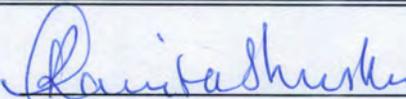
Site Address: California Middle School
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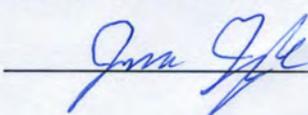
ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-42A	Brown 4" Vinyl Base Cove & Mastic - Main Building, Rooms 1-17 Area, Room 5
ECG-23-6577-43A	Dark Brown 4" Vinyl Base Cove & Mastic - Main Building, Rooms 1-17 Area, Room 17
ECG-23-6577-44A	Blue Carpet Square Mastic - Main Building, Rooms 1-17 Area, Room 15
ECG-23-6577-45A	Black Science Countertop - Main Building, Rooms 1-17 Area, Room 17
ECG-23-6577-46A	Drywall & Joint Compound - Main Building, Rooms 1-17 Area, East Hallway
ECG-23-6577-46B	Drywall & Joint Compound - Main Building, Rooms 1-17 Area, Room 15
ECG-23-6577-46C	Drywall & Joint Compound - Main Building, Rooms 1-17 Area, West Hallway
ECG-23-6577-47A	Vinyl Wall Covering - Main Building, Rooms 1-17 Area, East Hallway
ECG-23-6577-47B	Vinyl Wall Covering - Main Building, Rooms 1-17 Area, West Hallway
ECG-23-6577-48A	2'x4' Drop Ceiling Panel - Main Building, Rooms 1-17 Area, East Hallway
ECG-23-6577-48B	2'x4' Drop Ceiling Panel - Main Building, Rooms 1-17 Area, West Hallway
ECG-23-6577-49A	Concrete Slab - Main Building, Room 19
ECG-23-6577-50A	Green Mottled 12" Vinyl Floor Tile & Mastic - Main Building, Room 18
ECG-23-6577-50B	Green Mottled 12" Vinyl Floor Tile & Mastic - Main Building, Room 18 Storage

Delivered by:  **Date:** 3 / 6 / 23 **Time:** 1330 AM/PM

Received by:  **Date:** 3 / 6 / 23 **Time:** 130 AM/PM



70246

BULK ASBESTOS MATERIAL *Analysis Request*

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Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-51A	Tan/Red Multi-colored Carpet & Mastic - Main Building, Rooms 18/19 Office
ECG-23-6577-52A	Dark Brown 4" Vinyl Base Cove & Mastic - Main Building, Room 18
ECG-23-6577-53A	Brown 4" Vinyl Base Cove & Mastic - Main Building, Rooms 18/19 Office
ECG-23-6577-54A	Beige 4" Ceramic Wall Tile & Grout, Tan Mastic - Main Building, Central Restroom Area, Women's Staff Restroom
ECG-23-6577-55A	Drywall & Joint Compound - Main Building, Room 19
ECG-23-6577-55B	Drywall & Joint Compound - Main Building, Room 19
ECG-23-6577-56A	Drywall Texture #3 - Main Building, Room 19
ECG-23-6577-56B	Drywall Texture #3 - Main Building, Room 19
ECG-23-6577-56C	Drywall Texture #3 - Main Building, Room 19
ECG-23-6577-57A	Drywall & Joint Compound - Main Building, Central Restroom Area, Women's Staff Restroom
ECG-23-6577-57B	Drywall & Joint Compound - Main Building, Central Restroom Area, Boy's Restroom
ECG-23-6577-58A	Drywall Texture #4 - Main Building, Central Restroom Area, Boy's Restroom
ECG-23-6577-58B	Drywall Texture #4 - Main Building, Central Restroom Area, Women's Staff Restroom

Delivered by: **Date:** 3 / 6 / 23 **Time:** 1330 **AM/PM** AM

Received by: **Date:** 3 / 6 / 23 **Time:** 130 **AM/PM**



70246

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Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

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ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-58C	Drywall Texture #4 - Main Building, Central Restroom Area, Girl's Restroom
ECG-23-6577-59A	Textured Wall Panel - Main Building, Central Restroom Area, Drinking Fountains East of Restrooms
ECG-23-6577-60A	White 12" Acoustic Ceiling Tile & Brown Mastic Tab - Main Building, Room 19
ECG-23-6577-60B	White 12" Acoustic Ceiling Tile & Brown Mastic Tab - Main Building, Room 19
ECG-23-6577-61A	Boiler Rope Gasket - Main Building, Exterior Boiler Room at Boiler Unit
ECG-23-6577-62A	Drywall & Joint Compound - Main Building, Exterior Boiler Room
ECG-23-6577-63A	Fiberglass Wall Insulation Mastic - Main Building, Exterior Boiler Room
ECG-23-6577-64A	Brown Streaked 12" Vinyl Floor Tile & Mastic - Main Building, Kitchen Area, Office
ECG-23-6577-64B	Brown Streaked 12" Vinyl Floor Tile & Mastic - Main Building, Kitchen Area
ECG-23-6577-65A	Light Brown Mottled 12" Vinyl Flooring Tile & Mastic - Main Building, Kitchen Area
ECG-23-6577-66A	Red Floor Coating - Main Building, Kitchen Area, Wash Room
ECG-23-6577-67A	Brown Mottled 12" Vinyl Floor Tile (Top Layer) & Mastic - Main Building, Cafeteria Area, Northwest Area

Delivered by: *Ramita Shrestha* Date: 3 / 6 / 23 Time: 1330 AM/PM

Received by: *Jim G/le* Date: 3 / 6 / 23 Time: 150 AM/PM



70246

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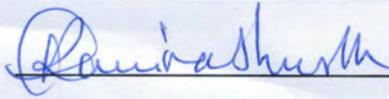
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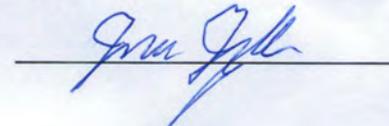
ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-67B	Brown Mottled 12" Vinyl Floor Tile (Top Layer) & Mastic - Main Building, Cafeteria Area, North Area
ECG-23-6577-67C	Brown Mottled 12" Vinyl Floor Tile (Top Layer) & Mastic - Main Building, Cafeteria Area, East Area
ECG-23-6577-68A	Orange Vinyl Floor Tile (Bottom Layer) & Gray Felt - Main Building, Cafeteria Area, Northwest Area
ECG-23-6577-68B	Orange Vinyl Floor Tile (Bottom Layer) & Gray Felt - Main Building, Cafeteria Area, North Area
ECG-23-6577-69A	Beige Mottled 12" Vinyl Floor Tile & Mastic - Main Building, Room 21
ECG-23-6577-69B	Beige Mottled 12" Vinyl Floor Tile & Mastic - Main Building, Room 21
ECG-23-6577-70A	Concrete Slab - Main Building, Room 22
ECG-23-6577-71A	Purple Multi-colored Carpet & Mastic - Main Building, Cafeteria Area, Stage Steps
ECG-23-6577-72A	Black Angular Vinyl Base Cove & Mastic - Main Building, Stage Area
ECG-23-6577-73A	Drywall & Joint Compound - Main Building, Classrooms 21/22 Entry Hall
ECG-23-6577-73B	Drywall & Joint Compound - Main Building, Cafeteria Area, Hallway Near Kitchen
ECG-23-6577-73C	Drywall & Joint Compound - Main Building, Room 25

Delivered by:  **Date:** 3 / 6 / 23 **Time:** 1331 AM/PM (P)

Received by:  **Date:** 3 / 6 / 23 **Time:** 131 AM/PM



70246

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Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-74A	Drywall Texture #5 - Main Building, Room 21
ECG-23-6577-74B	Drywall Texture #5 - Main Building, Room 21
ECG-23-6577-74C	Drywall Texture #5 - Main Building, Room 21
ECG-23-6577-74D	Drywall Texture #5 - Main Building, Room 22
ECG-23-6577-74E	Drywall Texture #5 - Main Building, Room 22
ECG-23-6577-75A	Plaster - Main Building, Kitchen Area
ECG-23-6577-75B	Plaster - Main Building, Kitchen Area
ECG-23-6577-75C	Plaster - Main Building, Kitchen Area
ECG-23-6577-75D	Plaster - Main Building, Kitchen Area
ECG-23-6577-75E	Plaster - Main Building, Kitchen Area
ECG-23-6577-76A	Cementitious Wall Panel - Main Building, Room 21
ECG-23-6577-77A	White 12" Acoustic Ceiling Tile & Brown Mastic Tab - Main Building, Room 21
ECG-23-6577-77B	White 12" Acoustic Ceiling Tile & Brown Mastic Tab - Main Building, Room 22
ECG-23-6577-78A	White 12" Acoustic Ceiling Tile & Brown Mastic Tab - Main Building, Stage
ECG-23-6577-78B	White 12" Acoustic Ceiling Tile & Brown Mastic Tab - Main Building, Room 24
ECG-23-6577-79A	2'x4' Drop Ceiling Panel - Main Building, Cafeteria Area, West Side

Delivered by: Ranibeshu **Date:** 3 / 6 / 23 **Time:** 1331 **AM/PM**

Received by: Jim G/e **Date:** 3 / 6 / 23 **Time:** 121 **AM/PM**



70246

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-79B	2'x4' Drop Ceiling Panel - Main Building, Cafeteria Area, East Side
ECG-23-6577-80A	2'x4' Hard Gypsum Drop Ceiling Panel - Main Building, Kitchen Area
ECG-23-6577-80B	2'x4' Hard Gypsum Drop Ceiling Panel - Main Building, Kitchen Area
ECG-23-6577-81A	HAVC Duct Seam Tape - Main Building, Cafeteria Area Plenum
ECG-23-6577-82A	Brown Sheet Vinyl Flooring with Gray Felt & Mastic - Auditorium Building, Lobby
ECG-23-6577-82B	Brown Sheet Vinyl Flooring with Gray Felt & Mastic - Auditorium Building, Lobby
ECG-23-6577-83A	Beige Mottled 12" Vinyl Floor Tile & Mastic - Auditorium Building, Lobby Women's Restroom
ECG-23-6577-83B	Beige Mottled 12" Vinyl Floor Tile & Mastic - Auditorium Building, Lobby Men's Restroom
ECG-23-6577-84A	Light Brown Mottled 12" Vinyl Floor Tile & Mastic - Auditorium Building, Southeast Entry Vestibule
ECG-23-6577-85A	Brown Mottled 12" Vinyl Floor Tile & Mastic - Auditorium Building, Southwest Entry Vestibule
ECG-23-6577-86A	Brown Streaked Sheet Vinyl Flooring with Gray Felt & Mastic - Auditorium Building, Southeast Storage Area North Room

Delivered by: *Dan Asher* **Date:** 3 / 6 / 23 **Time:** 1:31 AM **PM**

Received by: *Jim G...* **Date:** 3 / 6 / 23 **Time:** 1:31 **AM/PM**



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Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-86B	Brown Streaked Sheet Vinyl Flooring with Gray Felt & Mastic - Auditorium Building, Southeast Storage Area South Room
ECG-23-6577-87A	Brown 4" Vinyl Base Cove & Mastic - Auditorium Building, Lobby Women's Restroom
ECG-23-6577-87B	Brown 4" Vinyl Base Cove & Mastic - Auditorium Building, Lobby Men's Restroom
ECG-23-6577-88A	Rough Plaster - Auditorium Building, Main Auditorium
ECG-23-6577-88B	Rough Plaster - Auditorium Building, Southwest Entry Vestibule Ceiling
ECG-23-6577-88C	Rough Plaster - Auditorium Building, Stage
ECG-23-6577-88D	Rough Plaster - Auditorium Building, Southeast Entry Vestibule
ECG-23-6577-88E	Rough Plaster - Auditorium Building, Lobby North Small Storage Room
ECG-23-6577-88F	Rough Plaster - Auditorium Building, Lobby West Storage Room
ECG-23-6577-88G	Rough Plaster - Auditorium Building, Lobby
ECG-23-6577-88H	Rough Plaster - Auditorium Building, Room 31
ECG-23-6577-88I	Rough Plaster - Auditorium Building, Room 32
ECG-23-6577-89A	Acoustic Ceiling Plaster - Auditorium Building, Lobby Ceiling
ECG-23-6577-89B	Acoustic Ceiling Plaster - Auditorium Building, Lobby Ceiling

Delivered by: *Ramita Shrestha* **Date:** 3 / 6 / 23 **Time:** 1332 AM/PM

Received by: *Jose Hernandez* **Date:** 3 / 6 / 23 **Time:** 131 AM/PM

BULK ASBESTOS MATERIAL *Analysis Request*

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Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
 1600 Vallejo Way
 Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: *Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.*

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-89C	Acoustic Ceiling Plaster - Auditorium Building, Lobby Ceiling
ECG-23-6577-89D	Acoustic Ceiling Plaster - Auditorium Building, Rooms 31/32 Hallway Ceiling
ECG-23-6577-89E	Acoustic Ceiling Plaster - Auditorium Building, Rooms 31/32 Hallway Ceiling
ECG-23-6577-89F	Acoustic Ceiling Plaster - Auditorium Building, Rooms 31 Ceiling Above 2'x4' Panels
ECG-23-6577-89G	Acoustic Ceiling Plaster - Auditorium Building, Rooms 32 Ceiling Above 2'x4' Panels
ECG-23-6577-90A	Smooth Plaster - Auditorium Building, Lobby Men's Restroom
ECG-23-6577-90B	Smooth Plaster - Auditorium Building, Lobby Women's Restroom
ECG-23-6577-90C	Smooth Plaster - Auditorium Building, Lobby Women's Restroom
ECG-23-6577-91A	Plaster Wall Panel Mastic - Auditorium Building, Lobby Men's Restroom
ECG-23-6577-92A	Drywall & Joint Compound - Auditorium Building, Main Auditorium East Side at HVAC Ducts
ECG-23-6577-92B	Drywall & Joint Compound - Auditorium Building, Main Auditorium East Side at HVAC Ducts
ECG-23-6577-93A	Drywall Texture #6 - Auditorium Building, Main Auditorium East Side at HVAC Ducts

Delivered by: *[Signature]* **Date:** 3 / 6 / 23 **Time:** 1332 AM/PM

Received by: *[Signature]* **Date:** 3 / 6 / 23 **Time:** 132 AM/PM



70246

BULK ASBESTOS MATERIAL *Analysis Request*

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Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-93B	Drywall Texture #6 - Auditorium Building, Main Auditorium East Side at HVAC Ducts
ECG-23-6577-93C	Drywall Texture #6 - Auditorium Building, Main Auditorium East Side at HVAC Ducts
ECG-23-6577-94A	Brown Multi-colored Carpet & Mastic - Auditorium Building, Rooms 31/32 Hallway
ECG-23-6577-94B	Brown Multi-colored Carpet & Mastic - Auditorium Building, Rooms 31/32 Hallway
ECG-23-6577-95A	Beige Mottled 12" Vinyl Floor Tile & Mastic - Auditorium Building, Room 32
ECG-23-6577-95B	Beige Mottled 12" Vinyl Floor Tile & Mastic - Auditorium Building, Room 31
ECG-23-6577-96A	Brown 3" Vinyl Base Cove & Mastic - Auditorium Building, Room 31
ECG-23-6577-96B	Brown 3" Vinyl Base Cove & Mastic - Auditorium Building, Room 32
ECG-23-6577-97A	Smooth Plaster - Auditorium Building, Room 31
ECG-23-6577-97B	Smooth Plaster - Auditorium Building, Room 32
ECG-23-6577-97C	Smooth Plaster - Auditorium Building, Room 32
ECG-23-6577-98A	2'x4' Drop Ceiling Panel - Auditorium Building, Room 31
ECG-23-6577-98B	2'x4' Drop Ceiling Panel - Auditorium Building, Room 31

Delivered by:

Ramita Huesca

Date: 3 / 6 / 23

Time: 1332 AM/PM

Received by:

Jim G/E

Date: 3 / 6 / 23

Time: 132 AM/PM

BULK ASBESTOS MATERIAL *Analysis Request*

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Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
 1600 Vallejo Way
 Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

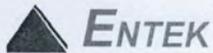
Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-99A	Concrete Slab - East Connector Addition Building, Custodial Office
ECG-23-6577-100A	Brown Multi-colored Carpet & Mastic - East Connector Addition Building, Hallway
ECG-23-6577-100B	Brown Multi-colored Carpet & Mastic - East Connector Addition Building, Room 33
ECG-23-6577-100C	Brown Multi-colored Carpet & Mastic - East Connector Addition Building, Room 36
ECG-23-6577-101A	Brown Streaked 12" Vinyl Floor Tile & Mastic - East Connector Addition Building, Room 33
ECG-23-6577-101B	Brown Streaked 12" Vinyl Floor Tile & Mastic - East Connector Addition Building, Room 34
ECG-23-6577-102A	Brown 4" Vinyl Base Cove & Mastic - East Connector Addition Building, Room 33
ECG-23-6577-102B	Brown 4" Vinyl Base Cove & Mastic - East Connector Addition Building, Room 34
ECG-23-6577-102C	Brown 4" Vinyl Base Cove & Mastic - East Connector Addition Building, Room 36
ECG-23-6577-103A	Blue 4" Vinyl Base Cove & Mastic - East Connector Addition Building, Hallway

Delivered by: Ramita Shesku **Date:** 3 / 6 / 23 **Time:** 1:32 AM/PM

Received by: [Signature] **Date:** 3 / 6 / 23 **Time:** 1:32 AM/PM



70246

BULK ASBESTOS MATERIAL *Analysis Request*

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Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-104A	Dark Brown 4" Vinyl Base Cove & Mastic - East Connector Addition Building, Custodial Office
ECG-23-6577-105A	Drywall & Joint Compound - East Connector Addition Building, Hallway
ECG-23-6577-105B	Drywall & Joint Compound - East Connector Addition Building, Custodial Office
ECG-23-6577-105C	Drywall & Joint Compound - East Connector Addition Building, Room 35
ECG-23-6577-105D	Drywall & Joint Compound - East Connector Addition Building, Room 36
ECG-23-6577-106A	Vinyl Wall Covering - East Connector Addition Building, Hallway
ECG-23-6577-107A	2'x4' Drop Ceiling Panel - East Connector Addition Building, Room 35
ECG-23-6577-107B	2'x4' Drop Ceiling Panel - East Connector Addition Building, Room 36
ECG-23-6577-108A	Brown Mottled 12" Vinyl Floor Tile & Mastic - East Building, North Storage Room
ECG-23-6577-108B	Brown Mottled 12" Vinyl Floor Tile & Mastic - East Building, North Storage Room
ECG-23-6577-109A	Beige Mottled 12" Vinyl Floor Tile & Mastic - East Building, Hallway at North Entry
ECG-23-6577-109B	Beige Mottled 12" Vinyl Floor Tile & Mastic - East Building, Room 38

Delivered by: Ramita Shukla Date: 3 / 6 / 23 Time: 1333 AM/PM (D)

Received by: [Signature] Date: 3 / 6 / 23 Time: 133 AM/PM



70246

BULK ASBESTOS MATERIAL *Analysis Request*

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Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-109C	Beige Mottled 12" Vinyl Floor Tile & Mastic - East Building, Hallway Outside Women's Staff Restroom
ECG-23-6577-109D	Beige Mottled 12" Vinyl Floor Tile & Mastic - East Building, Room 41
ECG-23-6577-109E	Beige Mottled 12" Vinyl Floor Tile & Mastic - East Building, Room 42
ECG-23-6577-110A	Concrete Slab - East Building, Women's Staff Restroom Storage Room
ECG-23-6577-111A	Remnant Black/Brown Flooring Mastic - East Building, Women's Staff Restroom Entry Door
ECG-23-6577-112A	Gray Speckled Sheet Vinyl Flooring & Mastic - East Building, Staff Unisex Restroom
ECG-23-6577-113A	Brown 4" Vinyl Base Cove & Mastic - East Building, Hallway at North Entry
ECG-23-6577-113B	Brown 4" Vinyl Base Cove & Mastic - East Building, Room 41
ECG-23-6577-113C	Brown 4" Vinyl Base Cove & Mastic - East Building, Room 43
ECG-23-6577-114A	Gray 4" Vinyl Base Cove & Mastic - East Building, Staff Unisex Restroom
ECG-23-6577-115A	Concrete Slab - East Building, Exterior Boy's Restroom
ECG-23-6577-115.5A	Red Floor Coating - East Building, Exterior Boy's Restroom
ECG-23-6577-116A	Wall Plaster - East Building, Hallway at North Entry

Delivered by: Date: 3 / 6 / 23 Time: 1333 AM/PM

Received by: Date: 3 / 6 / 23 Time: 193 AM/PM

BULK ASBESTOS MATERIAL *Analysis Request*

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Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
 1600 Vallejo Way
 Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-116B	Wall Plaster - East Building, North Storage Room
ECG-23-6577-116C	Wall Plaster - East Building, Hallway
ECG-23-6577-116D	Wall Plaster - East Building, Room 40
ECG-23-6577-116E	Wall Plaster - East Building, Room 41
ECG-23-6577-116F	Wall Plaster - East Building, Room 45
ECG-23-6577-116G	Wall Plaster - East Building, Room 42
ECG-23-6577-117A	Smooth Plaster - East Building, Women's Staff Restroom
ECG-23-6577-117B	Smooth Plaster - East Building, Unisex Staff Restroom
ECG-23-6577-117C	Smooth Plaster - East Building, Men's Staff Restroom
ECG-23-6577-118A	Plastic Wall Panel Mastic - East Building, Women's Staff Restroom
ECG-23-6577-119A	Plaster - East Building, Exterior Boy's Restroom
ECG-23-6577-119B	Plaster - East Building, Exterior Boy's Restroom
ECG-23-6577-119C	Plaster - East Building, Exterior Girl's Restroom
ECG-23-6577-119D	Plaster - East Building, Exterior Girl's Restroom
ECG-23-6577-119E	Plaster - East Building, Exterior Storage Room

Delivered by: *Ramita Shesha* **Date:** 3 / 6 / 23 **Time:** 1:33 AM/PM

Received by: *Jim Gyl* **Date:** 3 / 6 / 23 **Time:** 1:33 AM/PM



70246

BULK ASBESTOS MATERIAL *Analysis Request*

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Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-120A	Plastic Wall Panel Mastic - East Building, Exterior Boy's Restroom
ECG-23-6577-120.5A	Vinyl Wall Covering - East Building, Hallway at North Entry
ECG-23-6577-120.5B	Vinyl Wall Covering - East Building, Hallway at South Entry
ECG-23-6577-121A	Acoustic Ceiling Plaster - East Building, Hallway Ceiling
ECG-23-6577-121B	Acoustic Ceiling Plaster - East Building, Hallway Ceiling at North Entry
ECG-23-6577-121C	Acoustic Ceiling Plaster - East Building, Hallway Ceiling at Women's Staff Restroom
ECG-23-6577-121D	Acoustic Ceiling Plaster - East Building, Hallway Ceiling at Men's Staff Restroom
ECG-23-6577-121E	Acoustic Ceiling Plaster - East Building, Room 39 Above 2'x4' Ceiling Panels
ECG-23-6577-121F	Acoustic Ceiling Plaster - East Building, Room 41 Above 2'x4' Ceiling Panels
ECG-23-6577-121G	Acoustic Ceiling Plaster - East Building, Room 45 Above 2'x4' Ceiling Panels
ECG-23-6577-122A	Spray Applied Acoustic Ceiling Texture - East Building, Room 40
ECG-23-6577-122B	Spray Applied Acoustic Ceiling Texture - East Building, Room 40
ECG-23-6577-122C	Spray Applied Acoustic Ceiling Texture - East Building, Room 40

Delivered by: *Blaine Fashenko* **Date:** 3 / 6 / 23 **Time:** 1333 AM/PM

Received by: *Jose Hernandez* **Date:** 3 / 6 / 23 **Time:** 133 AM/PM



70246

BULK ASBESTOS MATERIAL *Analysis Request*

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Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-123A	2'x4' Drop Ceiling Panel - East Building, Room 39
ECG-23-6577-123B	2'x4' Drop Ceiling Panel - East Building, Room 45
ECG-23-6577-124A	Attic Roofing Debris - East Building, Attic Space Above Hallway
ECG-23-6577-124B	Attic Roofing Debris - East Building, Attic Space Above Hallway
ECG-23-6577-124C	Attic Roofing Debris - East Building, Attic Space Above Hallway
ECG-23-6577-124.5A	Door Core Insulation - East Building, Room 39 Entry Door at Screw Holes
ECG-23-6577-125A	Beige Mottled 12" Vinyl Floor Tile (Top Layer) & Mastic - Portable B-1
ECG-23-6577-126A	Beige Vinyl Floor Tile (Bottom Layer) & Mastic - Portable B-1
ECG-23-6577-127A	Brown Multi-colored Carpet & Mastic - Portable B-1
ECG-23-6577-128A	Gray 4" Vinyl Base Cove & Mastic - Portable B-1
ECG-23-6577-129A	Drywall (No Joint Compound) - Portable B-1, Beneath Tagboard Walls
ECG-23-6577-130A	Tagboard Walls - Portable B-1
ECG-23-6577-131A	2'x4' Drop Ceiling Panel - Portable B-1
ECG-23-6577-132A	Sink Undercoating - Portable B-1
ECG-23-6577-133A	Metal Roof Mastic - Portable B-1

Delivered by: Ramirathush **Date:** 3 / 6 / 23 **Time:** 1333 AM/PM (D)

Received by: Jim G... **Date:** 3 / 6 / 23 **Time:** 133 AM/PM



70246

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-134A	Beige 12" Vinyl Floor Tile (Top Layer) & Mastic - Portable B-2
ECG-23-6577-135A	Beige Vinyl Floor Tile (Bottom Layer) & Mastic - Portable B-2
ECG-23-6577-136A	Brown Multi-colored Carpet & Mastic - Portable B-2
ECG-23-6577-137A	Gray 4" Vinyl Base Cove & Mastic - Portable B-2
ECG-23-6577-138A	Sink Undercoating - Portable B-2
ECG-23-6577-139A	Drywall (No Joint Compound) - Portable B-2, Beneath Tagboard Walls
ECG-23-6577-140A	Tagboard Walls - Portable B-2
ECG-23-6577-141A	2'x4' Drop Ceiling Panel - Portable B-2
ECG-23-6577-142A	Metal Roof Mastic - Portable B-2
ECG-23-6577-143A	Brown 12" Vinyl Floor Tile & Mastic - Portable B-3
ECG-23-6577-144A	Carpet Mastic - Portable B-3
ECG-23-6577-145A	Blue 4" Vinyl Base Cove & Mastic - Portable B-3
ECG-23-6577-146A	Drywall (No Joint Compound) - Portable B-3, Beneath Tagboard Walls
ECG-23-6577-147A	Tagboard Walls - Portable B-3
ECG-23-6577-148A	2'x4' Drop Ceiling Panel - Portable B-3

Delivered by: **Date:** 3 / 6 / 23 **Time:** 1333 AM/PM

Received by: **Date:** 3 / 6 / 23 **Time:** 133 AM/PM



70246

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 4-5, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-14-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-149A	Sink Undercoating - Portable B-3
ECG-23-6577-150A	Metal Roof Mastic - Portable B-3

C:\Users\lhowes\Desktop\Bulk Request 03-05-23.wpd

Delivered by: *Danish Shesha* Date: 3 / 6 / 23 Time: 1334 AM/PM

Received by: *Jim J...* Date: 3 / 6 / 23 Time: 134 AM/PM



70263

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-21-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-150.5A	Concrete Slab - Gymnasium Building, Boy's Locker Room Area
ECG-23-6577-151A	Beige 1" Ceramic Floor Tile & Grout - Gymnasium Building, Boy's Locker Room Restroom
ECG-23-6577-152A	Beige Mottled 12" Vinyl Floor Tile & Mastic - Gymnasium Building, Boy's Locker Room Coach Office Storage
ECG-23-6577-153A	Tan Speckled Sheet Vinyl Flooring & Mastic - Gymnasium Building, Boy's Locker Room Coach Office Restroom
ECG-23-6577-154A	Off-White Mottled 12" Vinyl Floor Tile & Mastic - Gymnasium Building, Boy's Locker Room Restroom Custodial Closet
ECG-23-6577-155A	Dark Brown 4" Vinyl Base Cove & Mastic - Gymnasium Building, Boy's Locker Room Coach Office
ECG-23-6577-156A	Dark Brown 4" Vinyl Base Cove & Mastic - Gymnasium Building, Boy's Locker Room
ECG-23-6577-157A	Black Angular Vinyl Base Cove & Mastic - Gymnasium Building, Main Room
ECG-23-6577-158A	Plaster - Gymnasium Building, Boy's Locker Room Area
ECG-23-6577-158B	Plaster - Gymnasium Building, Boy's Locker Room Area
ECG-23-6577-158C	Plaster - Gymnasium Building, Boy's Locker Room Area

Delivered by: Date: 3 / 14 / 23 Time: 0926 AM/PM

Received by: Date: 3 / 14 / 23 Time: 924 AM/PM



70263

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

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mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-21-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-158D	Plaster - Gymnasium Building, Boy's Locker Room Area
ECG-23-6577-158E	Plaster - Gymnasium Building, Boy's Locker Room Area
ECG-23-6577-159A	Drywall Wall Texture #7 - Gymnasium Building, Boy's Locker Room Restroom Custodial Closet
ECG-23-6577-159B	Drywall Wall Texture #7 - Gymnasium Building, Boy's Locker Room Restroom Custodial Closet
ECG-23-6577-159C	Drywall Wall Texture #7 - Gymnasium Building, Boy's Locker Room Restroom Custodial Closet
ECG-23-6577-160A	Drywall & Joint Compound - Gymnasium Building, Boy's Locker Room Restroom Custodial Closet
ECG-23-6577-161A	Drywall & Joint Compound - Gymnasium Building, Boy's Locker Room Coach Office Storage Room
ECG-23-6577-161B	Drywall & Joint Compound - Gymnasium Building, Boy's Locker Room Coach Office
ECG-23-6577-162A	Beige 4" Ceramic Wall Tile & Grout - Drywall & Joint Compound - Gymnasium Building, Boy's Locker Room
ECG-23-6577-163A	Cementitious Overspray - Gymnasium Building, Boy's Locker Room Plenum Space

Delivered by: **Date:** 3 / 14 / 23 **Time:** 0926 **AM/PM** AM

Received by: **Date:** 3 / 14 / 23 **Time:** 926 **AM/PM** AM



70263

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

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(916) 632-6800 PHONE
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mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-21-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-163B	Cementitious Overspray - Gymnasium Building, Boy's Locker Room Plenum Space
ECG-23-6577-163C	Cementitious Overspray - Gymnasium Building, Boy's Locker Room Plenum Space
ECG-23-6577-164A	Drywall & Joint Compound - Gymnasium Building, Boy's Locker Room Plenum Space Ceiling
ECG-23-6577-164B	Drywall & Joint Compound - Gymnasium Building, Boy's Locker Room Plenum Space Ceiling
ECG-23-6577-165A	2'x4' Drop Ceiling Panel - Gymnasium Building, Boy's Locker Room Area
ECG-23-6577-166A	HVAC Duct Seam Tape - Gymnasium Building, Boy's Locker Room Plenum Space
ECG-23-6577-167A	Beige Mottled 12" Vinyl Floor Tile & Mastic - Gymnasium Building, Storage Room Near Girl's Locker Room
ECG-23-6577-167B	Beige Mottled 12" Vinyl Floor Tile & Mastic - Gymnasium Building, Storage Room Near Girl's Locker Room
ECG-23-6577-168A	Brown Mottled 12" Vinyl Floor Tile & Mastic - Gymnasium Building, Large Entry Foyer/Hall Near Girl's Locker Room
ECG-23-6577-169A	Concrete Slab - Gymnasium Building, Girl's Locker Room

Delivered by: Ravita Shrestha **Date:** 3 / 14 / 23 **Time:** 0926 AM/PM

Received by: DLH **Date:** 3 / 14 / 23 **Time:** 926 AM/PM



70263

BULK ASBESTOS MATERIAL *Analysis Request*

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(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-21-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-170A	Beige 1" Ceramic Floor Tile & Grout - Gymnasium Building, Girl's Locker Room
ECG-23-6577-171A	Tan Speckled Sheet Vinyl Flooring & Mastic - Gymnasium Building, Girl's Locker Room Coach Office Restroom
ECG-23-6577-172A	Beige Mottled 12" Vinyl Floor Tile & Mastic - Gymnasium Building, Girl's Locker Room Coach Office
ECG-23-6577-173A	Black 4" Vinyl Base Cove & Mastic - Gymnasium Building, Large Entry Foyer/Hall Near Girl's Locker Room
ECG-23-6577-174A	Dark Brown 4" Vinyl Base Cove & Mastic - Gymnasium Building, Girl's Locker Room Coach Office
ECG-23-6577-175A	Plastic Wall Panel Mastic - Gymnasium Building, Girl's Locker Room Coach Office Restroom
ECG-23-6577-176A	Plaster - Gymnasium Building, Girl's Locker Room Area
ECG-23-6577-176B	Plaster - Gymnasium Building, Girl's Locker Room Area
ECG-23-6577-176C	Plaster - Gymnasium Building, Girl's Locker Room Area
ECG-23-6577-176D	Plaster - Gymnasium Building, Girl's Locker Room Area
ECG-23-6577-176E	Plaster - Gymnasium Building, Girl's Locker Room Area

Delivered by:

Ranier Shresh

Date: 3 / 14 / 23

Time: 0927 AM/PM

Received by:

RH

Date: 3 / 14 / 23

Time: 927 AM/PM



70263

BULK ASBESTOS MATERIAL *Analysis Request*

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(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-21-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-177A	Drywall & Joint Compound - Gymnasium Building, Girl's Locker Room Coach Office
ECG-23-6577-177B	Drywall & Joint Compound - Gymnasium Building, Girl's Locker Room Coach Office
ECG-23-6577-178A	Drywall & Joint Compound - Gymnasium Building, Girl's Locker Room Plenum Space Ceiling
ECG-23-6577-178B	Drywall & Joint Compound - Gymnasium Building, Girl's Locker Room Plenum Space Ceiling
ECG-23-6577-179A	Cementitious Overspray - Gymnasium Building, Girl's Locker Room Plenum Space
ECG-23-6577-179B	Cementitious Overspray - Gymnasium Building, Girl's Locker Room Plenum Space
ECG-23-6577-179C	Cementitious Overspray - Gymnasium Building, Girl's Locker Room Plenum Space
ECG-23-6577-180A	2'x4' Drop Ceiling Panel - Gymnasium Building, Girl's Locker Room Area
ECG-23-6577-181A	HVAC Duct Seam Tape - Gymnasium Building, Girl's Locker Room Plenum Space
ECG-23-6577-182A	12" Acoustic Ceiling/Wall Tile & Brown Mastic Tab - Gymnasium Building, Main Room

Delivered by: *Sanjay Shrestha* **Date:** 3 / 14 / 23 **Time:** 0928 AM/PM

Received by: *DRH* **Date:** 3 / 14 / 23 **Time:** 928 AM/PM

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
 ROCKLIN, CA 95677
 (916) 632-6800 PHONE
 (916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-21-23 by 5:00 pm

Site Address: California Middle School
 1600 Vallejo Way
 Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-182B	12" Acoustic Ceiling/Wall Tile & Brown Mastic Tab - Gymnasium Building, Main Room
ECG-23-6577-182C	12" Acoustic Ceiling/Wall Tile & Brown Mastic Tab - Gymnasium Building, Storage Room Near Girl's Locker Room
ECG-23-6577-182D	12" Acoustic Ceiling/Wall Tile & Brown Mastic Tab - Gymnasium Building, Main Room
ECG-23-6577-183A	Drywall & Joint Compound - Gymnasium Building, Main Room, Beneath Acoustic Tile
ECG-23-6577-183B	Drywall & Joint Compound - Gymnasium Building, Main Room, Beneath Acoustic Tile
ECG-23-6577-183C	Drywall & Joint Compound - Gymnasium Building, Storage Room Near Girl's Locker Room (Older Yellow Drywall)
ECG-23-6577-184A	Brick & Mortar - Main Building, Near Northeast Main Entry
ECG-23-6577-184B	Brick & Mortar - Main Building, West Area
ECG-23-6577-184C	Brick & Mortar - Main Building, Southwest Entry
ECG-23-6577-184D	Brick & Mortar - Main Building, Cafeteria Area
ECG-23-6577-185A	Foundation Concrete - Main Building, Near Northeast Main Entry
ECG-23-6577-185B	Foundation Concrete - Main Building, Northeast Corner

Delivered by: Ranica Shrestha **Date:** 3 / 14 / 23 **Time:** 09:28 AM/PM

Received by: Bob **Date:** 3 / 14 / 23 **Time:** 9:28 AM/PM



70263

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-21-23 by 5:00 pm

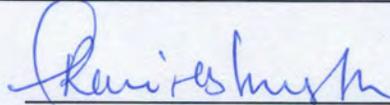
Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-185C	Foundation Concrete - Main Building, Northwest Area
ECG-23-6577-186A	Black Coating on Foundation Concrete - Main Building, Exterior Northeast Area
ECG-23-6577-186B	Black Coating on Foundation Concrete - Main Building, Exterior Northeast Area
ECG-23-6577-187A	Site Concrete - Main Building, Exterior Northeast Area
ECG-23-6577-187B	Site Concrete - Main Building, Exterior West Area
ECG-23-6577-187C	Site Concrete - Main Building, Exterior Southwest Area
ECG-23-6577-188A	Asphalt - Main Building, Exterior Southwest Area
ECG-23-6577-188B	Asphalt - Main Building, Exterior Southeast Area
ECG-23-6577-189A	Cementitious Caulking - Main Building, Exterior Northeast Area at Hose Bib
ECG-23-6577-190A	Gray Mastic - Main Building, Exterior Southeast Roof Soffit Metal Flashing
ECG-23-6577-191A	Wall Concrete - Auditorium Building, Exterior North Side
ECG-23-6577-191B	Wall Concrete - Auditorium Building, Exterior North Side
ECG-23-6577-192A	Brick & Mortar - Auditorium Building, Exterior North Side
ECG-23-6577-192B	Brick & Mortar - Auditorium Building, Exterior West Side

Delivered by:  **Date:** 3 / 14 / 23 **Time:** 0928 AM/PM

Received by:  **Date:** 3 / 14 / 23 **Time:** 928 AM/PM

BULK ASBESTOS MATERIAL *Analysis Request*

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 ROCKLIN, CA 95677
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mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-21-23 by 5:00 pm

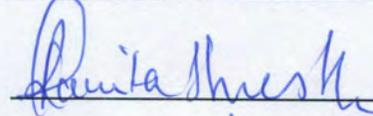
Site Address: California Middle School
 1600 Vallejo Way
 Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.

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SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-192C	Brick & Mortar - Auditorium Building, Exterior East Side
ECG-23-6577-193A	Site Concrete - Auditorium Building, Southeast Area
ECG-23-6577-193B	Site Concrete - Auditorium Building, North Area
ECG-23-6577-194A	Stucco - Auditorium Building, West Exterior Above Doors
ECG-23-6577-194B	Stucco - Auditorium Building, West Exterior Above Doors
ECG-23-6577-194C	Stucco - Auditorium Building, West Exterior Above Doors
ECG-23-6577-195A	Caulking - Auditorium Building, West Exterior at Door
ECG-23-6577-196A	Foundation Concrete - East Connector Addition Building, Northeast Area
ECG-23-6577-196B	Foundation Concrete - East Connector Addition Building, East Area
ECG-23-6577-197A	Black Coating on Foundation Concrete - East Connector Addition Building, Northeast Area
ECG-23-6577-197B	Black Coating on Foundation Concrete - East Connector Addition Building, East Area
ECG-23-6577-198A	Brick & Mortar - East Connector Addition Building, South Area
ECG-23-6577-199A	Site Concrete - East Connector Addition Building, South Area
ECG-23-6577-200A	Foundation Concrete - East Building, West Entry Near Restrooms

Delivered by:  **Date:** 3 / 14 / 23 **Time:** 0929 AM/PM

Received by:  **Date:** 3 / 14 / 23 **Time:** 929 AM/PM

BULK ASBESTOS MATERIAL *Analysis Request*

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4200 ROCKLIN ROAD, SUITE 7
 ROCKLIN, CA 95677
 (916) 632-6800 PHONE
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mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-21-23 by 5:00 pm

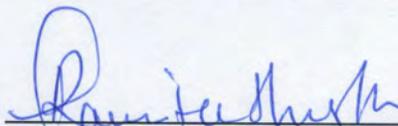
Site Address: California Middle School
 1600 Vallejo Way
 Sacramento, CA 95818

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: *Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.*

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-200B	Foundation Concrete - East Building, West Entry Near Restrooms
ECG-23-6577-201A	Brick & Mortar - East Building, West Wall
ECG-23-6577-201B	Brick & Mortar - East Building, West Wall
ECG-23-6577-201C	Brick & Mortar - East Building, South Wall
ECG-23-6577-202A	Brick & Mortar - Gymnasium Building, North Area
ECG-23-6577-202B	Brick & Mortar - Gymnasium Building, West Area
ECG-23-6577-202C	Brick & Mortar - Gymnasium Building, Northeast Area
ECG-23-6577-203A	Brick & Mortar (Newer Construction) - Gymnasium Building, Southeast Area
ECG-23-6577-204A	Gray/Beige Caulking - Gymnasium Building, South Exterior of Boy's Locker Area Wall
ECG-23-6577-205A	Gray Caulking - Gymnasium Building, South Exterior of Boy's Locker Area at Small Wall Access Door
ECG-23-6577-206A	Light Gray Caulking - Gymnasium Building, Southwest Entry Door Around Frame
ECG-23-6577-207A	Light Gray Caulking - Gymnasium Building, Southeast Exterior Area at Brick Seam

Delivered by:  **Date:** 3 / 14 / 23 **Time:** 0924 AM/PM

Received by:  **Date:** 3 / 14 / 23 **Time:** 929 AM/PM

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
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mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: Asbestech

Job Number: 23-6577

Collected by: Blake Howes & Jose Hernandez

Client Name: Sacramento City Unified School District

Turnaround Time: Tuesday, 3-21-23 by 5:00 pm

Site Address: California Middle School
1600 Vallejo Way
Sacramento, CA 95818

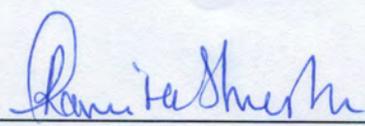
ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: *Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.*

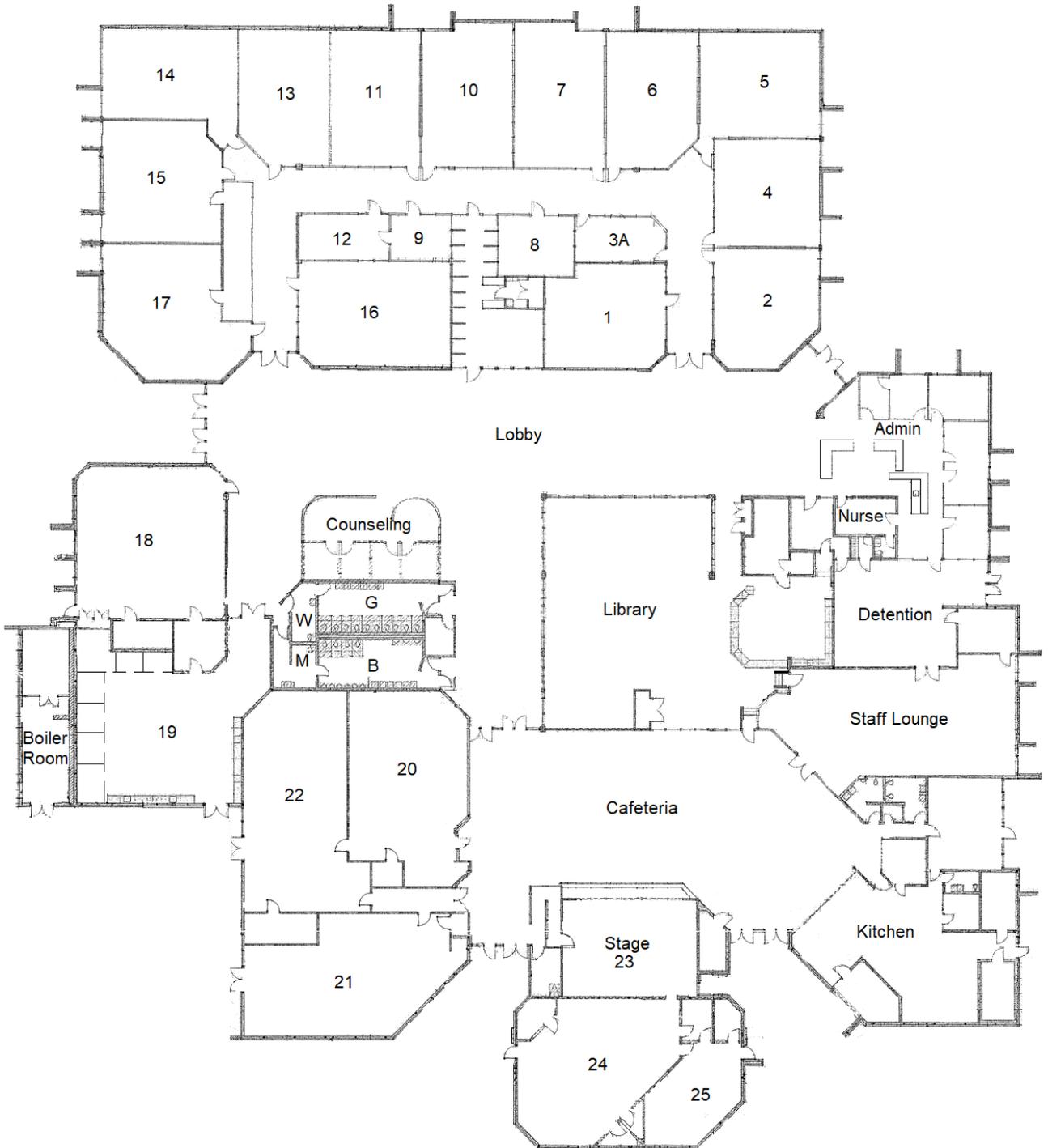
Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-208A	Brown Painted Caulking - Gymnasium Building, West Entry Door Around Frame

C:\Users\lhowes\Entek Consulting Group, Inc\Entekgroup - Documents\Clients\Sacramento City USD\23-6577 California MS - AsbPb\Bulk Asb\Bulk Request 03-11-23.wpd

Delivered by:  Date: 3 / 14 / 23 Time: 0929 AM/PM

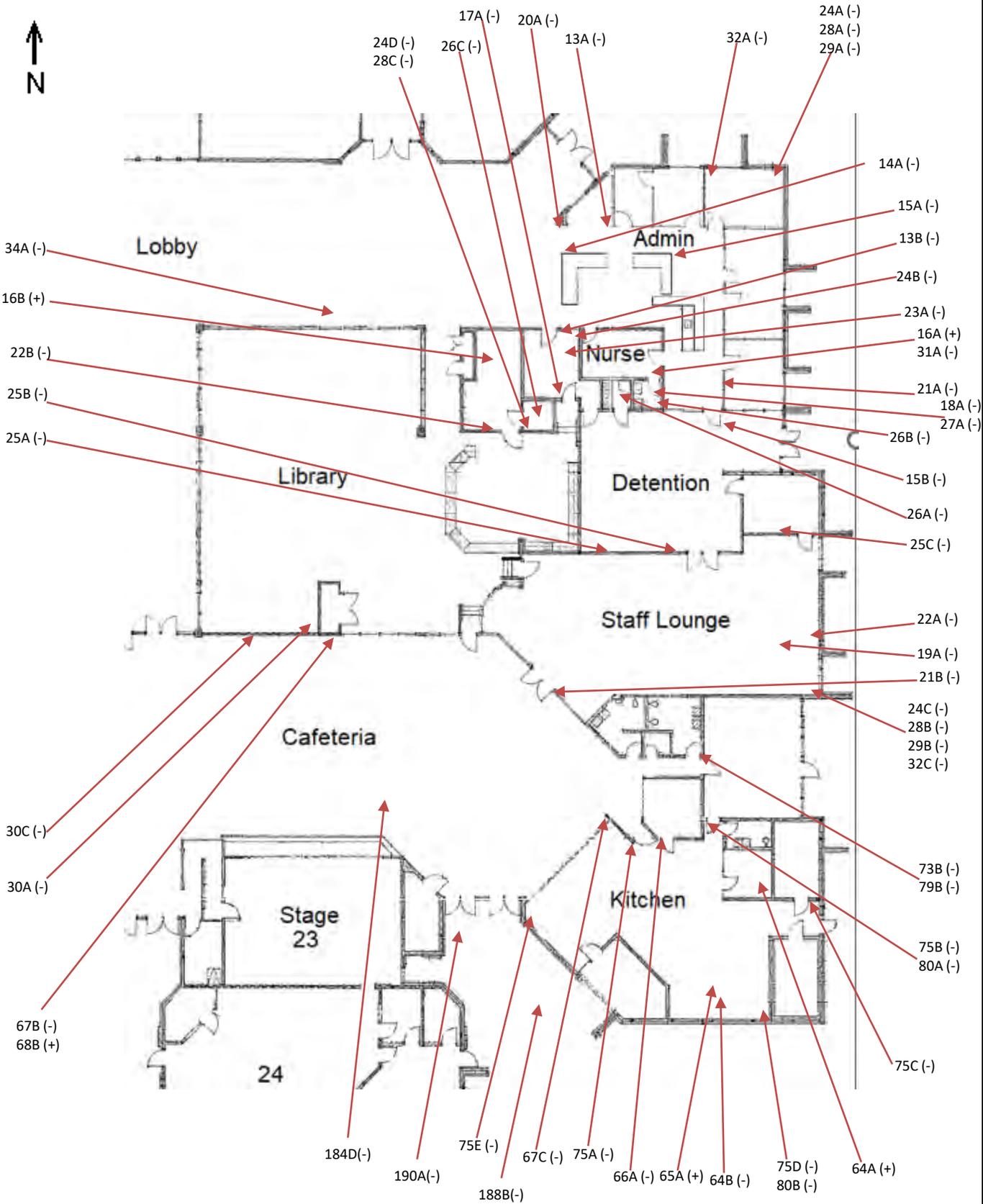
Received by:  Date: 3 / 14 / 23 Time: 929 AM/PM



Sacramento City Unified School District
California Middle School
1600 Vallejo Way
Sacramento, CA 95818

Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin CA 95677
Map Not to Scale

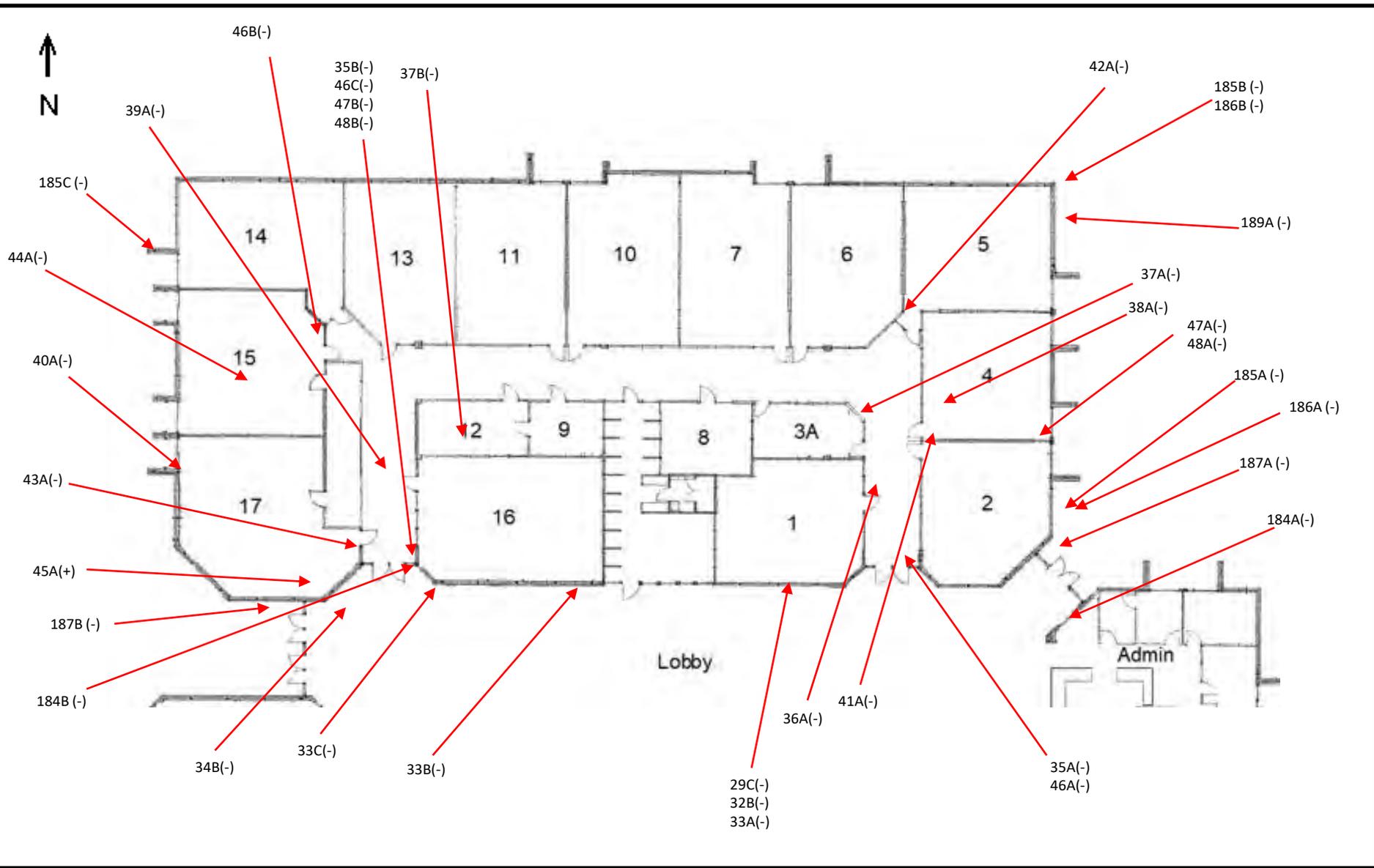
Main Building Reference Map
Survey by Blake Howes & Jose Hernandez
On March 4-5 & 11, 2023
Project Number 23-6577



Sacramento City Unified School District
California Middle School
1600 Vallejo Way
Sacramento, CA 95818

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4200 Rocklin Road, Suite 7
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Map Not to Scale

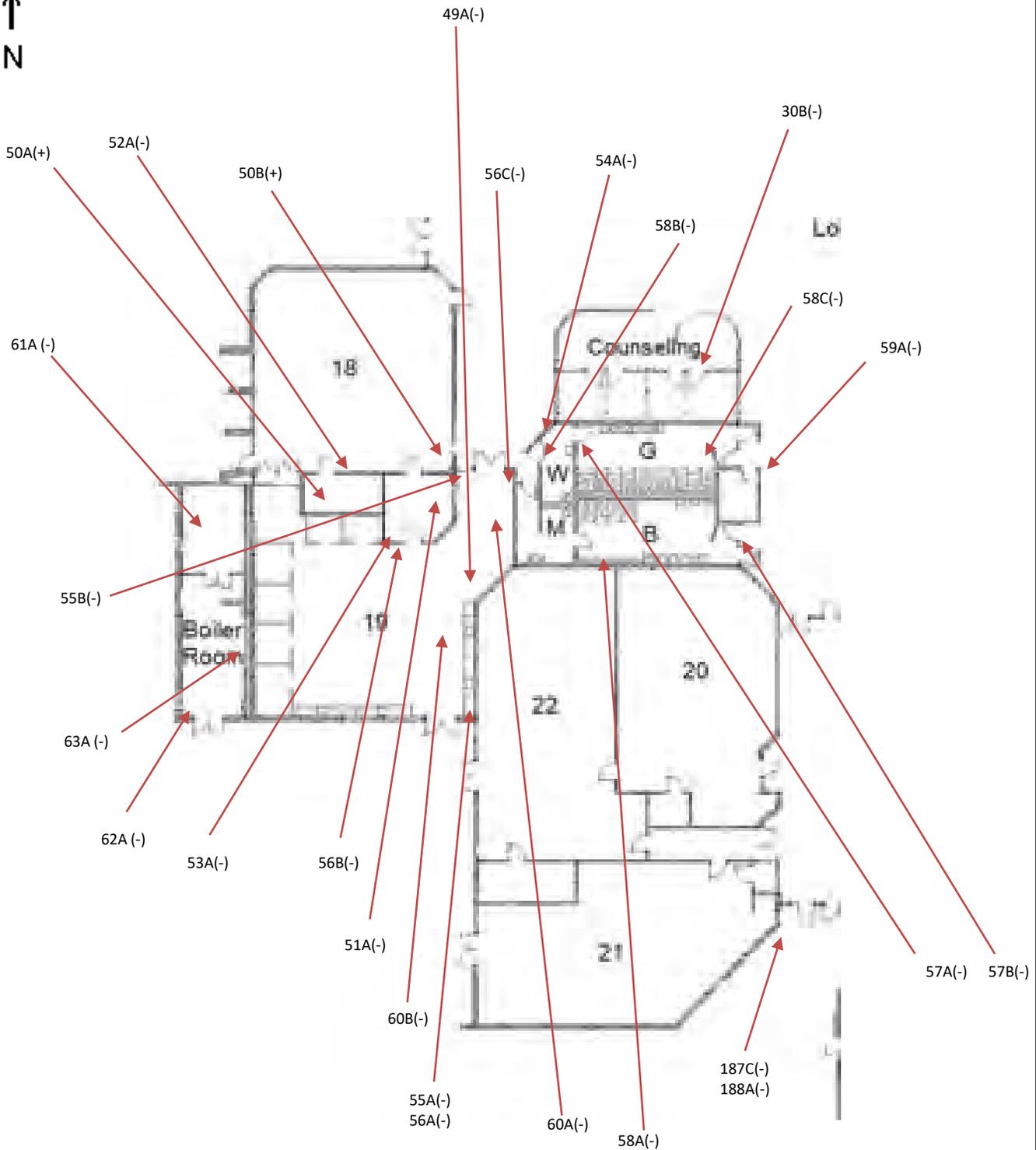
Asbestos Bulk Sample Locations
Collected by Blake Howes & Jose Hernandez
On March 4-5 & 11, 2023
Project Number 23-6577



Sacramento City Unified School District
 California Middle School
 1600 Vallejo Way
 Sacramento, CA 95818

Entek Consulting Group, Inc.
 4200 Rocklin Road, Suite 7
 Rocklin, CA 95677
 Map Not to Scale

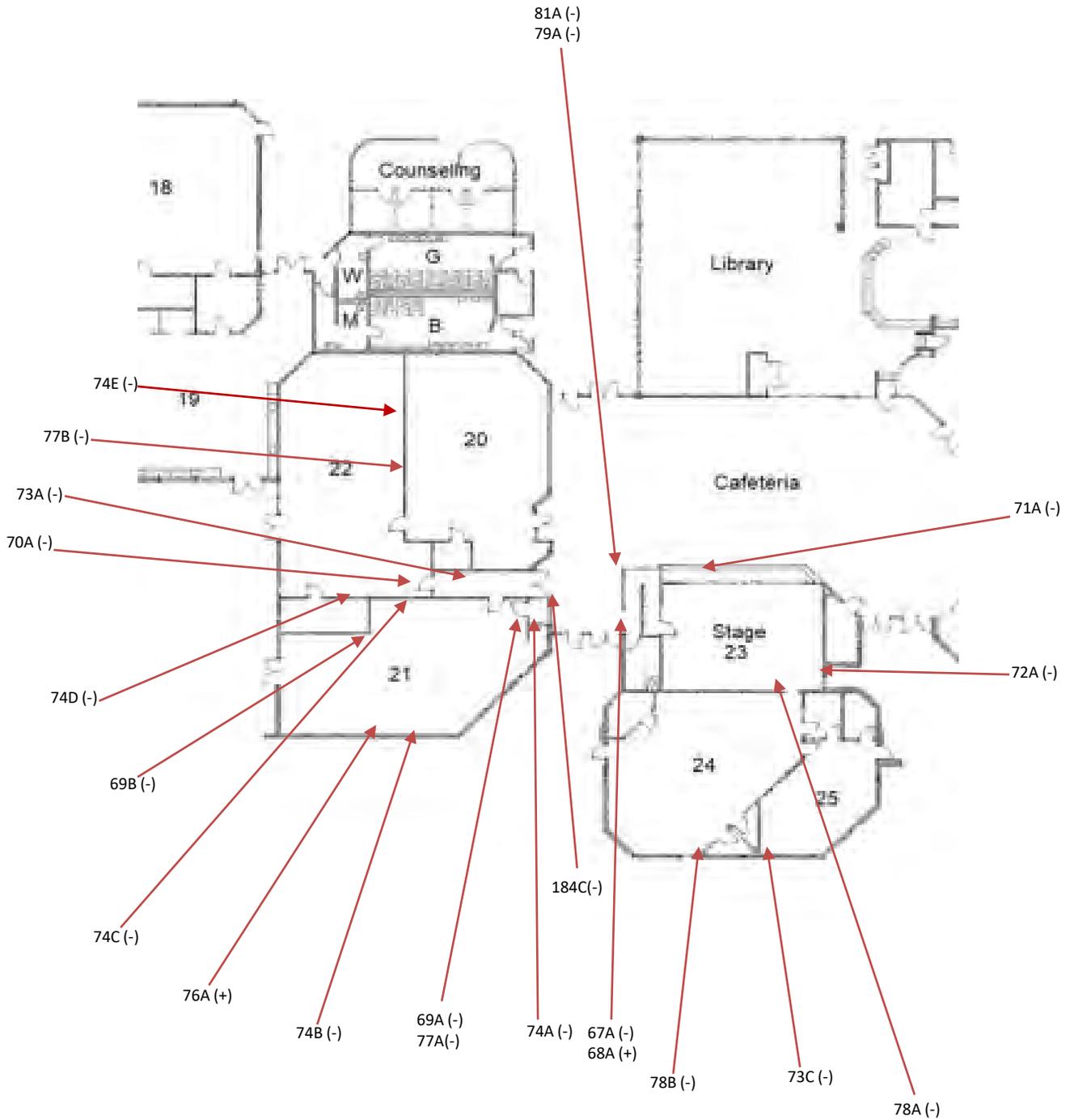
Asbestos Bulk Sample Locations
 Collected by Blake Howes & Jose Hernandez
 On March 4-5 & 11, 2023
 Project Number 23-6577



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Sacramento, CA 95818

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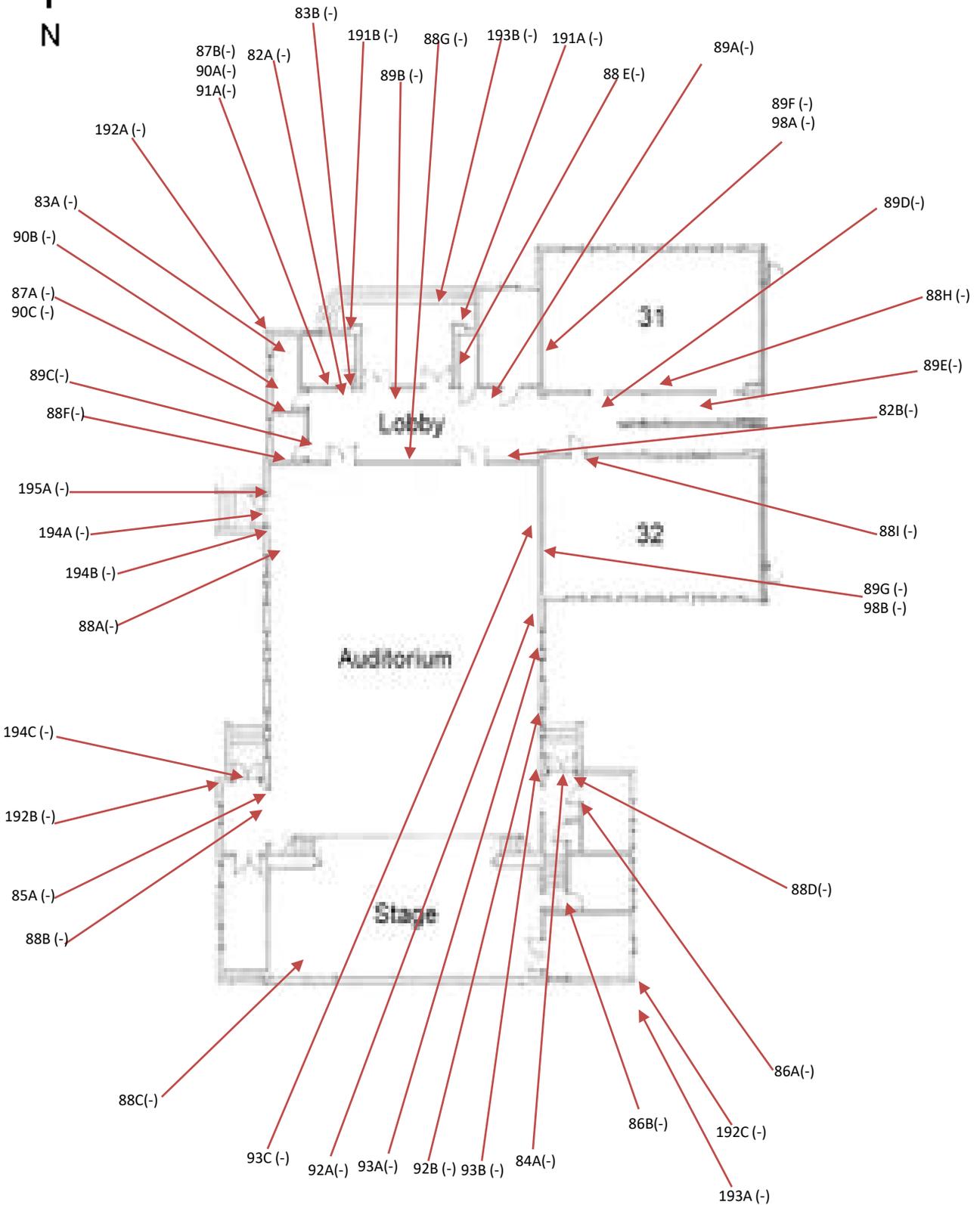
Asbestos Bulk Sample Locations
Collected by Blake Howes
On March 11, 2023
Project Number 23-6577



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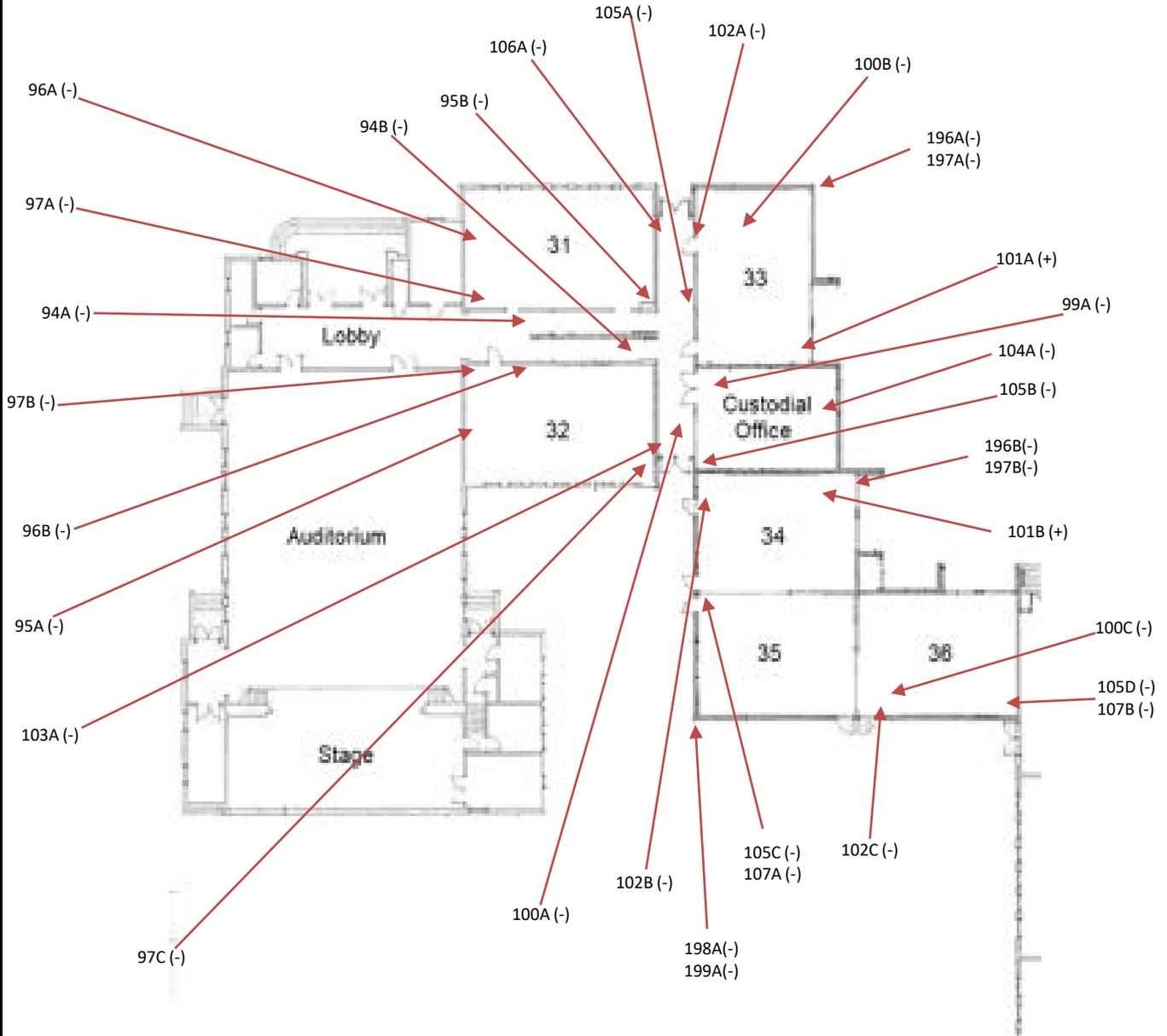
Asbestos Bulk Sample Locations
Collected by Blake Howes & Jose Hernandez
On March 4-5 & 11, 2023
Project Number 23-6577



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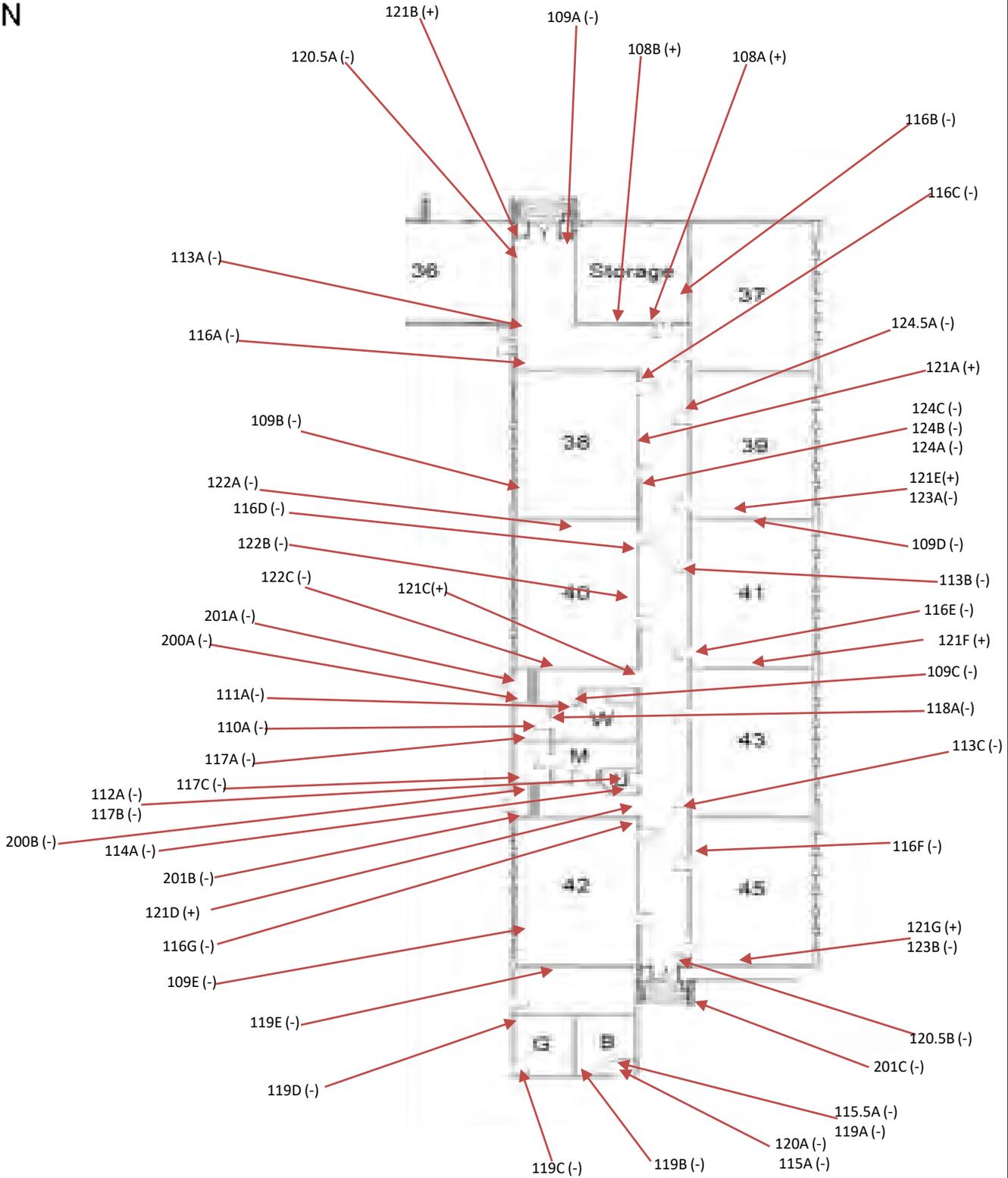
Asbestos Bulk Sample Locations
Collected by Blake Howes & Jose Hernandez
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Project Number 23-6577



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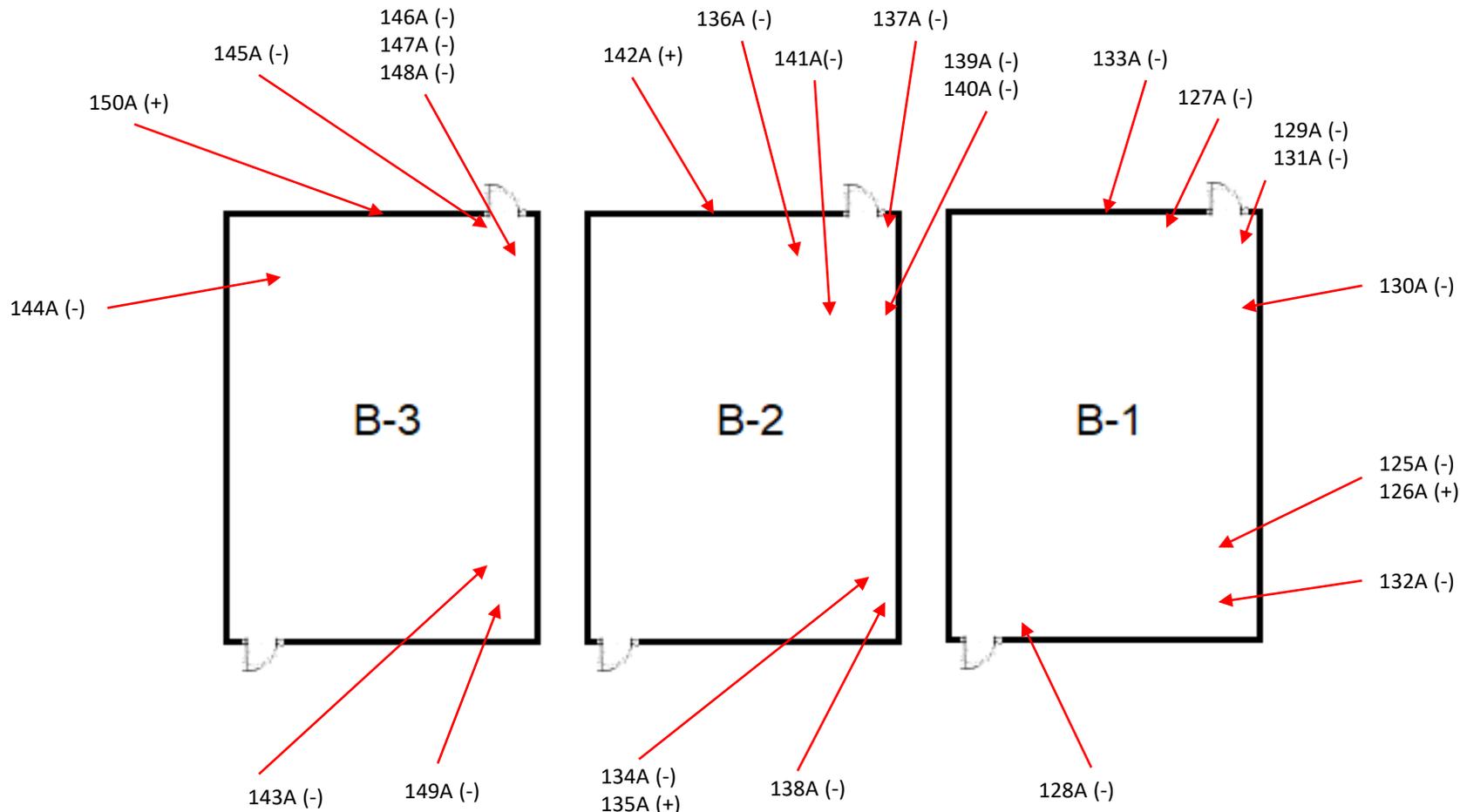
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Asbestos Bulk Sample Locations
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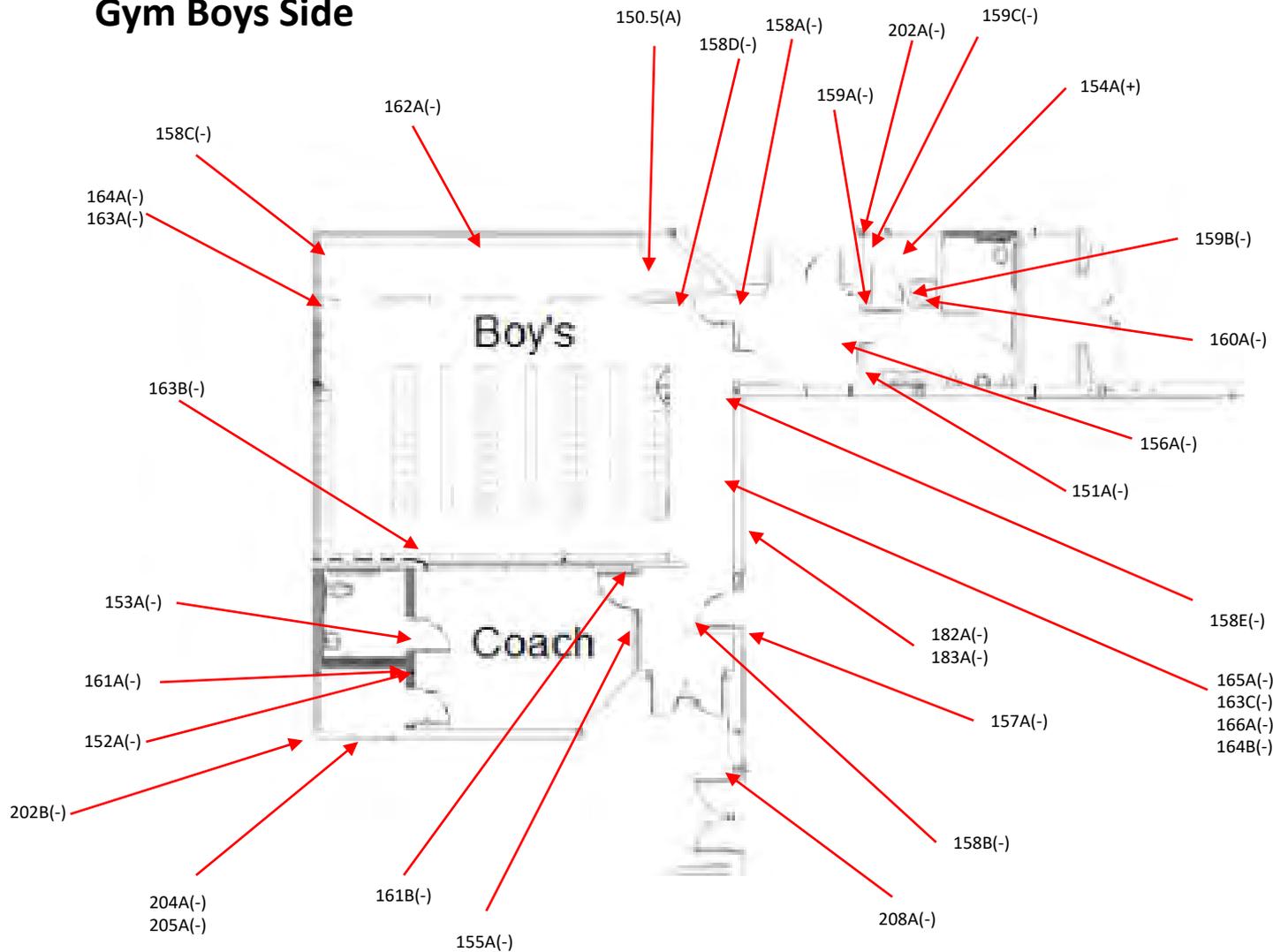
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Asbestos Bulk Sample Locations
Collected by Blake Howes & Jose Hernandez
On March 4-5 & 11, 2023
Project Number 23-6577



Gym Boys Side



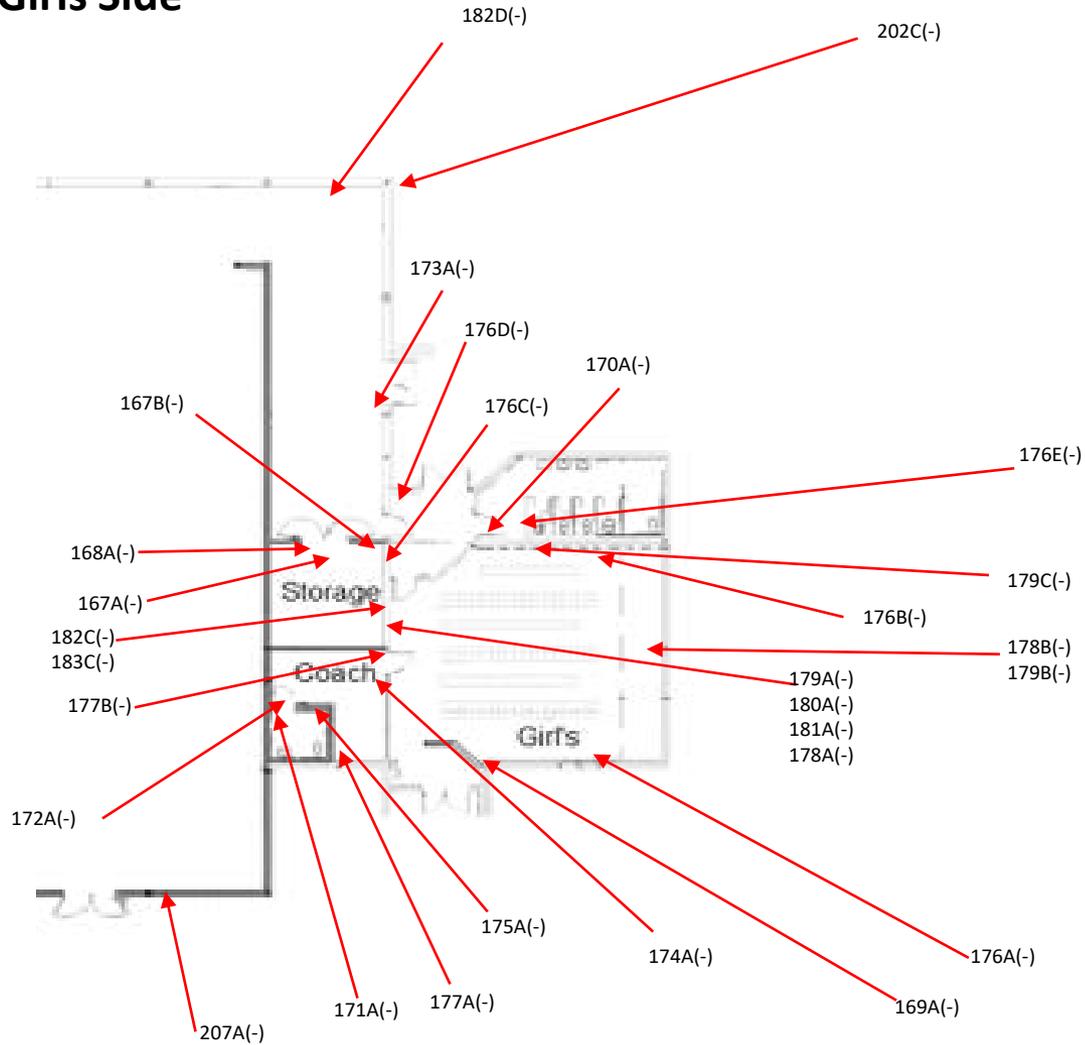
Sacramento Unified School District
California Middle School
1600 Vallejo Way
Sacramento, CA 95818

Entek Consulting Group, Inc.
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Asbestos Bulk Sample Locations
Collected by Blake Howes & Jose Hernandez
On March 4-5 & 11, 2023
Project Number 23-6577



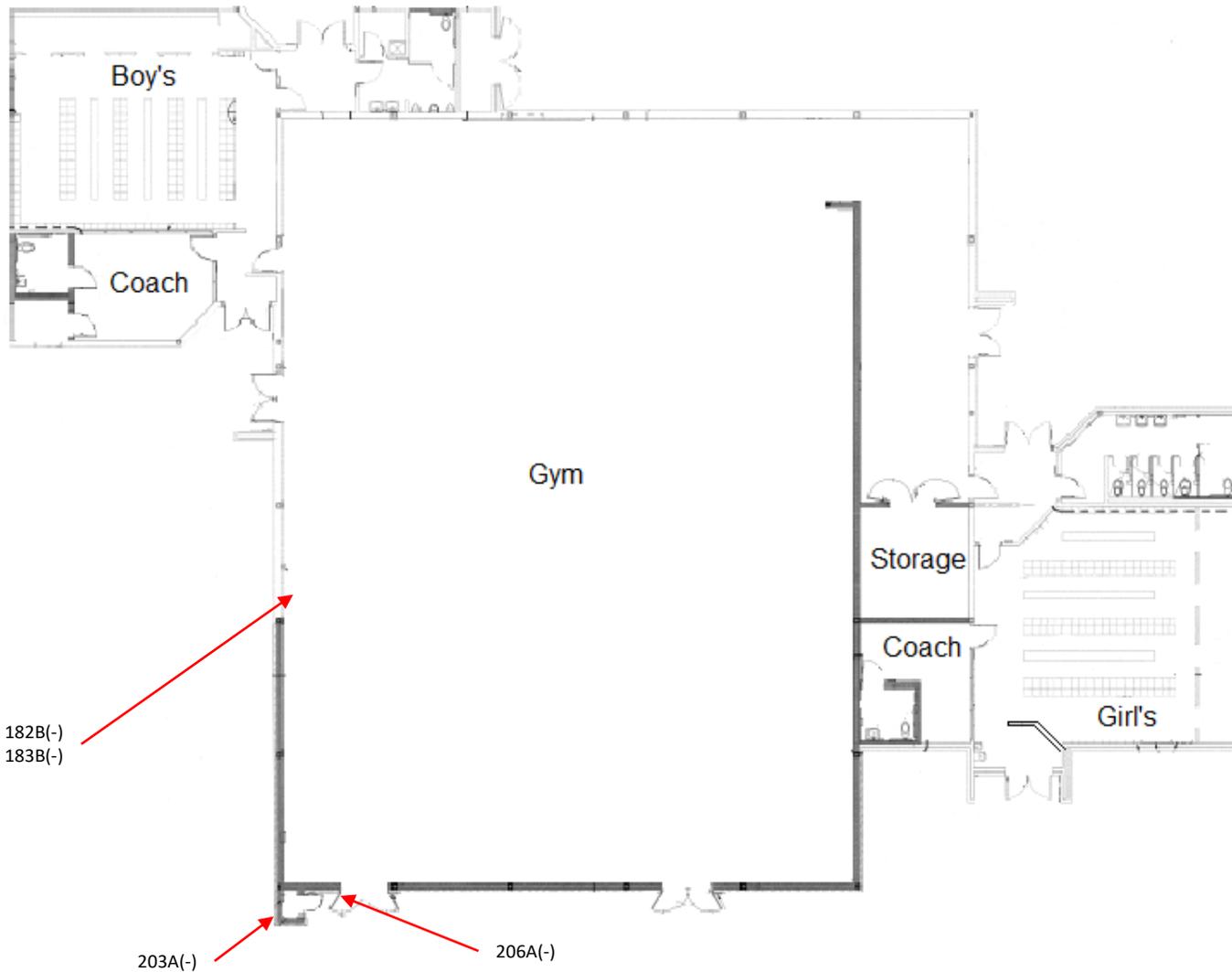
Gym Girls Side



Sacramento City Unified School District
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Asbestos Bulk Sample Locations
Collected by Blake Howes & Jose Hernandez
On March 4-5 & 11, 2023
Project Number 23-6577



Sacramento City Unified School District
California Middle School
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Map Not to Scale

Asbestos Bulk Sample Locations
Collected by Blake Howes & Jose Hernandez
On March 4-5 & 11, 2023
Project Number 23-6577



Asbestos Survey Form

(See Instructions)

777 12th Street, 3rd Floor
 Sacramento, CA 95814
 Office (916) 874-4800
 Fax (916) 874-4899
 Email:
asbestos@airquality.org

1. Purpose of Survey		<input checked="" type="checkbox"/> Renovation		<input type="checkbox"/> Demolition		
2. Facility Information						
Project Area(s) Description California Middle School - Full Campus						
Address 1600 Vallejo Way		City Sacramento		# of Structures 6		
3. Owner Information						
Name Sacramento City Unified School District						
Address 5735 47 th Avenue		City/State Sacramento, California		Zip 95824		
Contact		Phone	Fax	Email		
Chris Ralston		(916) 395-3970		chris-ralston@scusd.edu		
4. Consultant Information			Survey Date(s): March 4-5 & 11, 2023			
Company Name Entek Consulting Group, Inc.						
Name Blake Howes				DOSH # 13-5015		
Address 4200 Rocklin Road, Suite 7		City/State Rocklin, California		Zip 95677		
Phone (916) 632-6800	Fax (916) 632-6812	Email bhowes@entekgroup.com	Signature			
						
5. Client Information (If different than owner)			<input type="checkbox"/> General Contractor	<input type="checkbox"/> Insurance Company		
<input type="checkbox"/> Architect			<input type="checkbox"/> Property Manager	<input type="checkbox"/> Other _____		
Name						
Address		City/State		Zip		
Contact	Phone	Fax	Email			
6. Have all of the suspect materials that will be disturbed been sampled?					<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
If no, explain why:						
7. Summary of Total Asbestos Containing Material (ACM) Findings						
Regulated Asbestos Containing Material (RACM) <small>(Includes materials subject to known mechanical removal and fire damaged materials)</small>			Category II		Category I	
Square Ft.	Linear Ft.	Cubic Ft.	Square Ft.	Linear Ft.	Square Ft.	Linear Ft.
10,000	0	0	620	4	8,398	0
To receive future SMAQMD Rule updates and changes affecting your industry (check one box):						
<input type="checkbox"/> Please send e-mail notices to			<input type="checkbox"/> I will sign up myself at www.airquality.org/listserve/ to receive emailed notices.			
<input checked="" type="checkbox"/> I am already subscribed.	<input type="checkbox"/> I want the District to mail notices to the address on this application:			<input type="checkbox"/> Owner	<input type="checkbox"/> Consultant	



APPENDIX B

LEAD RELATED DOCUMENTATION

- Bulk Lead Analysis Report From MicroTest
- Bulk Lead Material Analysis Request Form for Entek
- Lead Bulk Sample Location Drawing
- CDPH Form 8552



MicroTest Laboratories, Inc. | AIHA ELPAT #160934
 3110 Gold Canal Dr, Ste. A, Rancho Cordova, CA 95670
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 www.microtestlabsinc.com | service@microtestlabsinc.com

for office use only

Project ID
L32035-69

CLIENT INFORMATION

Company Entek Consulting Group, Inc
Name Ryan Metzen
Address 4200 Rocklin Road, Suite 7
 Rocklin, CA 95677
Phone 916.632.6800
Email mainoffice@entekgroup.com
 rmetzen@entekgroup.com

SAMPLE
Date Saturday, March 11, 2023
Time

MicroTest Laboratories

Analytical Data

JOB SITE INFORMATION

Sampler Blake Howes
Project Sacramento City Unified School District
Site California Middle School
Address 1600 Vallejo Way
 Sacramento, CA 95818
Job # 23-6577

EPA METHOD 7420/7000B

Client	Laboratory	Client	Reporting	Results	Units	Limits	Results	Units
Sample ID	Sample ID	Sample Location / Description	Matrix	Results	Units	Limits	Comments	Units
ECG-23-6577-03Pb	L32035	Beige Colored Paint - Main Building, Administration Area on Drywall Walls	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-04Pb	L32036	Dark Brown Colored Paint - Main Building, Administration Area on Metal Door Frame	Paint	0.06%	Wt %	0.01%	638	PPM
ECG-23-6577-05Pb	L32037	Beige 4" Tile Glaze - Main Building, Administration Area Nurse Restroom on Ceramic Wall Tiles	Paint	1.81%	Wt %	0.01%	18114	PPM
ECG-23-6577-06Pb	L32038	Off-White Colored Paint - Main Building, Administration Area Nurse Restroom on Drywall Walls	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-07Pb	L32039	Dark Brown Colored Paint - Main Building, Library Area on Wood Roof Truss Beam	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-08Pb	L32040	Red Colored Paint - Main Building, Room 15 Plenum Space on Structural Metal I-Beam	Paint	26.31%	Wt %	0.01%	263054	PPM
ECG-23-6577-09Pb	L32041	Beige Colored Paint - Main Building, Room 15 on Vinyl Wall Covering	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-10Pb	L32042	Red/Brown Colored Paint - Main Building on Exterior Wood Fascia	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-11Pb	L32043	Beige Colored Paint - Main Building, Room 21 on Wood Wall Panel	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-12Pb	L32044	Dark Brown Colored Paint - Main Building, Cafeteria on Interior Metal Door/Window Frame	Paint	<0.01%	Wt %	0.01%	<100	PPM

Date Received: Tuesday, March 14, 2023
Date Analyzed: Thursday, March 16, 2023
Date Reported: Tuesday, March 21, 2023

Samples Received: 35
 Samples Analyzed: 35

Analyst: Erich Bowman

Authorized Signatory:
 Kelly Favero - Lab Manager

This report applies to the standards and procedures indicated and to the specific samples analyzed. Samples have NOT been corrected for blank values. EPA 3050B Hotblock Preparaton Method



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Project ID
L32035-69

CLIENT INFORMATION

Company Entek Consulting Group, Inc
Name Ryan Metzen
Address 4200 Rocklin Road, Suite 7
 Rocklin, CA 95677
Phone 916.632.6800
Email mainoffice@entekgroup.com
 rmetzen@entekgroup.com

SAMPLE
Date Saturday, March 11, 2023
Time

MicroTest Laboratories

Analytical Data

JOB SITE INFORMATION

Sampler Blake Howes
Project Sacramento City Unified School District
Site California Middle School
Address 1600 Vallejo Way
 Sacramento, CA 95818
Job # 23-6577

EPA METHOD 7420/7000B

Client	Laboratory	Client	Reporting	Results	Units	Limits	Results	Units
Sample ID	Sample ID	Sample Location / Description	Matrix	Results	Units	Limits	Comments	Units
ECG-23-6577-13Pb	L32045	Beige Colored Paint - Main Building, Kitchen on Plaster Walls	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-14Pb	L32046	Beige Colored Paint - Main Building, Room 19 on Drywall Walls	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-15Pb	L32047	Beige 4" Tile Glaze - Main Building, Girl's Restroom on Ceramic Wall Tiles	Paint	0.45%	Wt %	0.01%	4459	PPM
ECG-23-6577-16Pb	L32048	White Colored Paint - Auditorium Building, Main Auditorium on Plaster Walls	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-17Pb	L32049	Beige Colored Paint - Auditorium Building, Lobby on Wood/Masonry Wainscot and Trim	Paint	0.28%	Wt %	0.01%	2773	PPM
ECG-23-6577-18Pb	L32050	Dark Brown Colored Paint - Auditorium Building, West Exterior Wood Door	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-19Pb	L32051	Red/Brown Colored Paint - Auditorium Building, Exterior Concrete Wall	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-20Pb	L32052	Red/Brown Sheet Flooring - Auditorium Building, Lobby Floor Material	Paint	0.24%	Wt %	0.01%	2361	PPM
ECG-23-6577-21Pb	L32053	Dark Brown Colored Varnish - Auditorium Building, Main Auditorium on Wood Wainscot	Paint	1.17%	Wt %	0.01%	11720	PPM
ECG-23-6577-22Pb	L32054	Light Brown Colored Varnish - Auditorium Building, Main Auditorium on Wood Floor	Paint	<0.01%	Wt %	0.01%	<100	PPM

Date Received: Tuesday, March 14, 2023
Date Analyzed: Thursday, March 16, 2023
Date Reported: Tuesday, March 21, 2023

Samples Received: 35
 Samples Analyzed: 35

Analyst: Erich Bowman

Authorized Signatory: 
 Kelly Favero - Lab Manager

This report applies to the standards and procedures indicated and to the specific samples analyzed. Samples have NOT been corrected for blank values. EPA 3050B Hotblock Preparaton Method



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Name Ryan Metzen
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Phone 916.632.6800
Email mainoffice@entekgroup.com
 rmetzen@entekgroup.com

SAMPLE
Date Saturday, March 11, 2023
Time

MicroTest Laboratories

Analytical Data

JOB SITE INFORMATION

Sampler Blake Howes
Project Sacramento City Unified School District
Site California Middle School
Address 1600 Vallejo Way
 Sacramento, CA 95818
Job # 23-6577

EPA METHOD 7420/7000B

Client	Laboratory	Client	Reporting	Results	Units	Limits	Comments	Units
Sample ID	Sample ID	Sample Location / Description	Matrix	Results	Units	Limits	Comments	
ECG-23-6577-23Pb	L32055	Beige Colored Paint - East Connector Addition Building, Hallway on Vinyl Wall Covering	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-24Pb	L32056	Dark Brown Colored Paint - East Connector Addition Building, Hallway on Metal Door & Door Frame	Paint	0.03%	Wt %	0.01%	341	PPM
ECG-23-6577-25Pb	L32057	Red/Brown Colored Paint - Exterior Covered Walkway Wood Support Beams	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-26Pb	L32058	White Colored Paint - East Building, Hallway on Plaster Walls	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-27Pb	L32059	Beige Colored Paint - East Building, Hallway on Wood Trim & Door Frame	Paint	0.28%	Wt %	0.01%	2846	PPM
ECG-23-6577-28Pb	L32060	Dark Brown Colored Paint - East Building, Exterior South Wood Door & Frame	Paint	17.47%	Wt %	0.01%	174744	PPM
ECG-23-6577-29Pb	L32061	Red/Brown Colored Paint - East Building, Exterior West Metal Down Spout	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-30Pb	L32062	Beige 4" Tile Glaze - Gymnasium Building, Boy's Locker Room Restroom on Ceramic Wall Tiles	Paint	0.69%	Wt %	0.01%	6946	PPM
ECG-23-6577-31Pb	L32063	Gray Colored Paint - Gymnasium Building, Boy's Locker Room on Metal Door Frame	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-32Pb	L32064	Blue Colored Paint - Gymnasium Building, Boy's Locker Room on Metal Lockers	Paint	<0.01%	Wt %	0.01%	<100	PPM

Date Received: Tuesday, March 14, 2023
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Date Reported: Tuesday, March 21, 2023

Samples Received: 35
 Samples Analyzed: 35

Analyst: Erich Bowman

Authorized Signatory: 
 Kelly Favero - Lab Manager

This report applies to the standards and procedures indicated and to the specific samples analyzed. Samples have NOT been corrected for blank values. EPA 3050B Hotblock Preparaton Method



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Email mainoffice@entekgroup.com
 rmetzen@entekgroup.com

SAMPLE
Date Saturday, March 11, 2023
Time

MicroTest Laboratories

Analytical Data

JOB SITE INFORMATION

Sampler Blake Howes
Project Sacramento City Unified School District
Site California Middle School
Address 1600 Vallejo Way
 Sacramento, CA 95818
Job # 23-6577

EPA METHOD 7420/7000B

Client	Laboratory	Client	Reporting	Results	Units	Limits	Comments	Units
Sample ID	Sample ID	Sample Location / Description	Matrix	Results	Units	Limits	Comments	
ECG-23-6577-33Pb	L32065	White Colored Paint - Gymnasium Building, Boy's Locker Room on Plaster Walls	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-34Pb	L32066	Blue Colored Paint - Gymnasium Building, Main Gym on Wood Walls	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-35Pb	L32067	Yellow Colored Paint - Gymnasium Building, Main Gym on Wood Walls	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-36Pb	L32068	Gray/Beige Colored Paint - Gymnasium Building, Main Gym on Wood Walls	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6577-37Pb	L32069	Red/Brown Colored Paint - Gymnasium Building, Exterior North Storage Shed on Wood Walls	Paint	0.01%	Wt %	0.01%	102	PPM

Date Received: Tuesday, March 14, 2023
Date Analyzed: Thursday, March 16, 2023
Date Reported: Tuesday, March 21, 2023

Samples Received: 35
 Samples Analyzed: 35

Analyst: Erich Bowman

Authorized Signatory: 
 Kelly Favero - Lab Manager

This report applies to the standards and procedures indicated and to the specific samples analyzed. Samples have NOT been corrected for blank values. EPA 3050B Hotblock Preparation Method



BULK LEAD MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
 ROCKLIN, CA 95677
 (916) 632-6800 PHONE
 (916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: MicroTest

Job Number: 23-6577

Collected by: Blake Howes

Client Name: Sacramento City Unified School District

Turnaround Time: 5-Day

Site Address: California Middle School
 1600 Vallejo Way
 Sacramento, CA 95818

ANALYSIS REQUESTED: Lead by Atomic Absorption Spectrometry

Special Instruction: *Please report result in PPM and % by weight. Please email results as soon as possible.*

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-03Pb	Beige Colored Paint - Main Building, Administration Area on Drywall Walls
ECG-23-6577-04Pb	Dark Brown Colored Paint - Main Building, Administration Area on Metal Door Frame
ECG-23-6577-05Pb	Beige 4" Tile Glaze - Main Building, Administration Area Nurse Restroom on Ceramic Wall Tiles
ECG-23-6577-06Pb	Off-White Colored Paint - Main Building, Administration Area Nurse Restroom on Drywall Walls
ECG-23-6577-07Pb	Dark Brown Colored Paint - Main Building, Library Area on Wood Roof Truss Beam
ECG-23-6577-08Pb	Red Colored Paint - Main Building, Room 15 Plenum Space on Structural Metal I-Beam
ECG-23-6577-09Pb	Beige Colored Paint - Main Building, Room 15 on Vinyl Wall Covering
ECG-23-6577-10Pb	Red/Brown Colored Paint - Main Building on Exterior Wood Fascia
ECG-23-6577-11Pb	Beige Colored Paint - Main Building, Room 21 on Wood Wall Panel
ECG-23-6577-12Pb	Dark Brown Colored Paint - Main Building, Cafeteria on Interior Metal Door/Window Frame
ECG-23-6577-13Pb	Beige Colored Paint - Main Building, Kitchen on Plaster Walls
ECG-23-6577-14Pb	Beige Colored Paint - Main Building, Room 19 on Drywall Walls
ECG-23-6577-15Pb	Beige 4" Tile Glaze - Main Building, Girl's Restroom on Ceramic Wall Tiles

Delivered by:

Date: 03/14/2023 Time: 0936 AM/PM

Received by:

Date: 3/14/2023 Time: 0938 AM/PM

BULK LEAD MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

4200 ROCKLIN ROAD, SUITE 7
 ROCKLIN, CA 95677
 (916) 632-6800 PHONE
 (916) 632-6812 FAX
 mainoffice@entekgroup.com

Date of Sampling: March 11, 2023

Lab: MicroTest

Job Number: 23-6577

Collected by: Blake Howes

Client Name: Sacramento City Unified School District

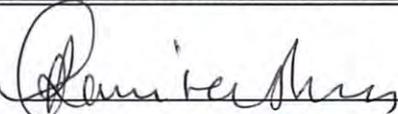
Turnaround Time: 5-Day

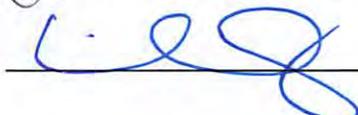
Site Address: California Middle School
 1600 Vallejo Way
 Sacramento, CA 95818

ANALYSIS REQUESTED: Lead by Atomic Absorption Spectrometry

Special Instruction: *Please report result in PPM and % by weight. Please email results as soon as possible.*

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-16Pb	White Colored Paint - Auditorium Building, Main Auditorium on Plaster Walls
ECG-23-6577-17Pb	Beige Colored Paint - Auditorium Building, Lobby on Wood/Masonry Wainscot and Trim
ECG-23-6577-18Pb	Dark Brown Colored Paint - Auditorium Building, West Exterior Wood Door
ECG-23-6577-19Pb	Red/Brown Colored Paint - Auditorium Building, Exterior Concrete Wall
ECG-23-6577-20Pb	Red/Brown Sheet Flooring - Auditorium Building, Lobby Floor Material
ECG-23-6577-21Pb	Dark Brown Colored Varnish - Auditorium Building, Main Auditorium on Wood Wainscot
ECG-23-6577-22Pb	Light Brown Colored Varnish - Auditorium Building, Main Auditorium on Wood Floor
ECG-23-6577-23Pb	Beige Colored Paint - East Connector Addition Building, Hallway on Vinyl Wall Covering
ECG-23-6577-24Pb	Dark Brown Colored Paint - East Connector Addition Building, Hallway on Metal Door & Door Frame
ECG-23-6577-25Pb	Red/Brown Colored Paint - Exterior Covered Walkway Wood Support Beams
ECG-23-6577-26Pb	White Colored Paint - East Building, Hallway on Plaster Walls
ECG-23-6577-27Pb	Beige Colored Paint - East Building, Hallway on Wood Trim & Door Frame
ECG-23-6577-28Pb	Dark Brown Colored Paint - East Building, Exterior South Wood Door & Frame
ECG-23-6577-29Pb	Red/Brown Colored Paint - East Building, Exterior West Metal Down Spout

Delivered by:  **Date:** 03/14/2023 **Time:** 0936 AM/PM

Received by:  **Date:** 3/14/2023 **Time:** 0938 AM/PM

BULK LEAD MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.

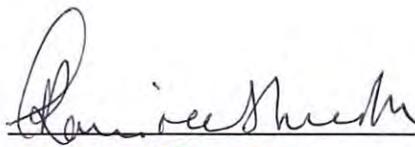
4200 ROCKLIN ROAD, SUITE 7
 ROCKLIN, CA 95677
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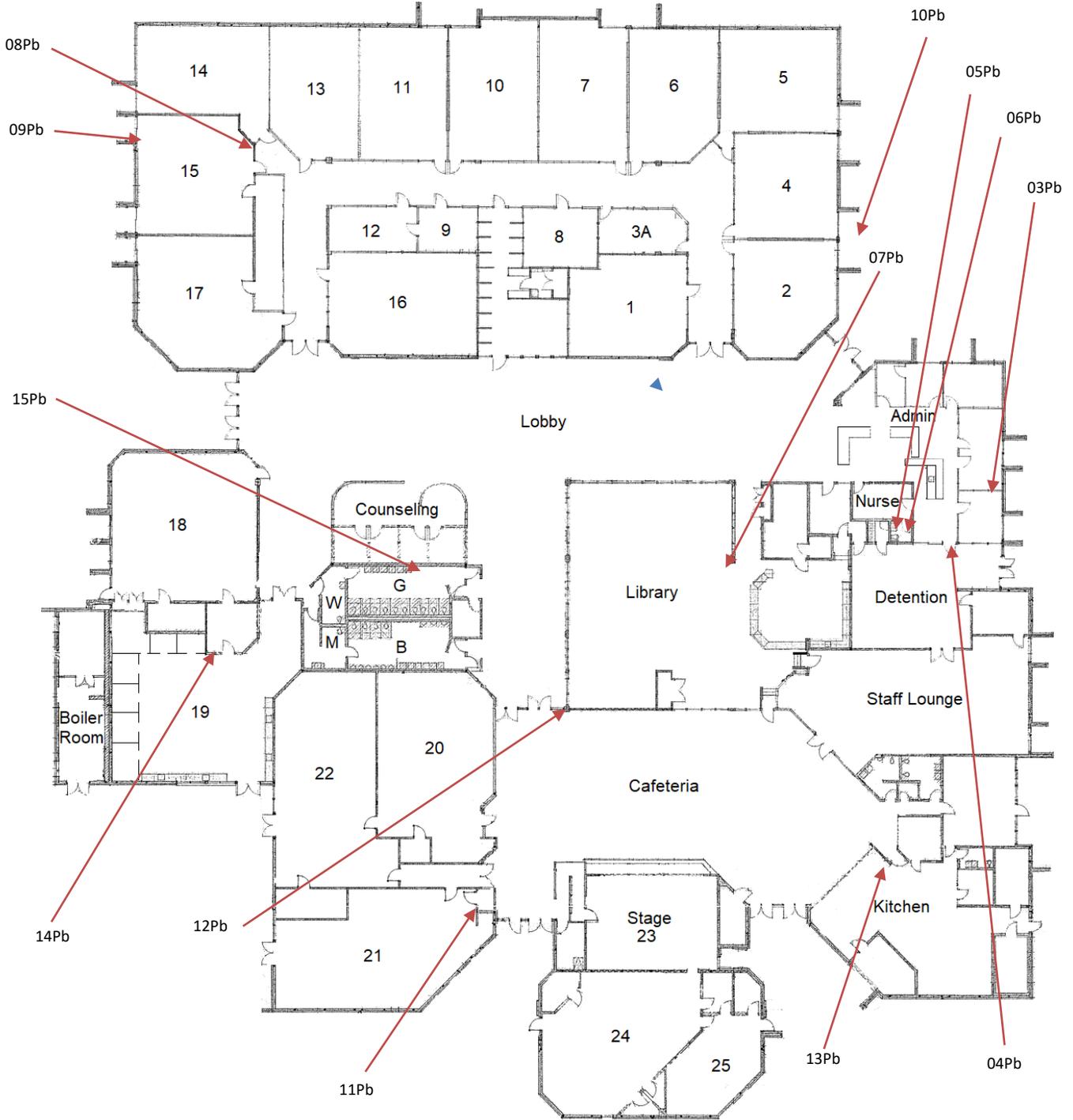
Date of Sampling: March 11, 2023 **Lab:** MicroTest
Job Number: 23-6577 **Collected by:** Blake Howes
Client Name: Sacramento City Unified School District **Turnaround Time:** 5-Day
Site Address: California Middle School
 1600 Vallejo Way
 Sacramento, CA 95818 **ANALYSIS REQUESTED:** Lead by Atomic Absorption Spectrometry

Special Instruction: *Please report result in PPM and % by weight. Please email results as soon as possible.*

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6577-30Pb	Beige 4" Tile Glaze - Gymnasium Building, Boy's Locker Room Restroom on Ceramic Wall Tiles
ECG-23-6577-31Pb	Gray Colored Paint - Gymnasium Building, Boy's Locker Room on Metal Door Frame
ECG-23-6577-32Pb	Blue Colored Paint - Gymnasium Building, Boy's Locker Room on Metal Lockers
ECG-23-6577-33Pb	White Colored Paint - Gymnasium Building, Boy's Locker Room on Plaster Walls
ECG-23-6577-34Pb	Blue Colored Paint - Gymnasium Building, Main Gym on Wood Walls
ECG-23-6577-35Pb	Yellow Colored Paint - Gymnasium Building, Main Gym on Wood Walls
ECG-23-6577-36Pb	Gray/Beige Colored Paint - Gymnasium Building, Main Gym on Wood Walls
ECG-23-6577-37Pb	Red/Brown Colored Paint - Gymnasium Building, Exterior North Storage Shed on Wood Walls

C:\Users\bhowes\Entek Consulting Group, Inc\Entekgroup - Documents\Clients\Sacramento City USD\23-6577 California MS - AsbPb\Bulk Pb\Bulk Request Pb 03-11-23.wpd

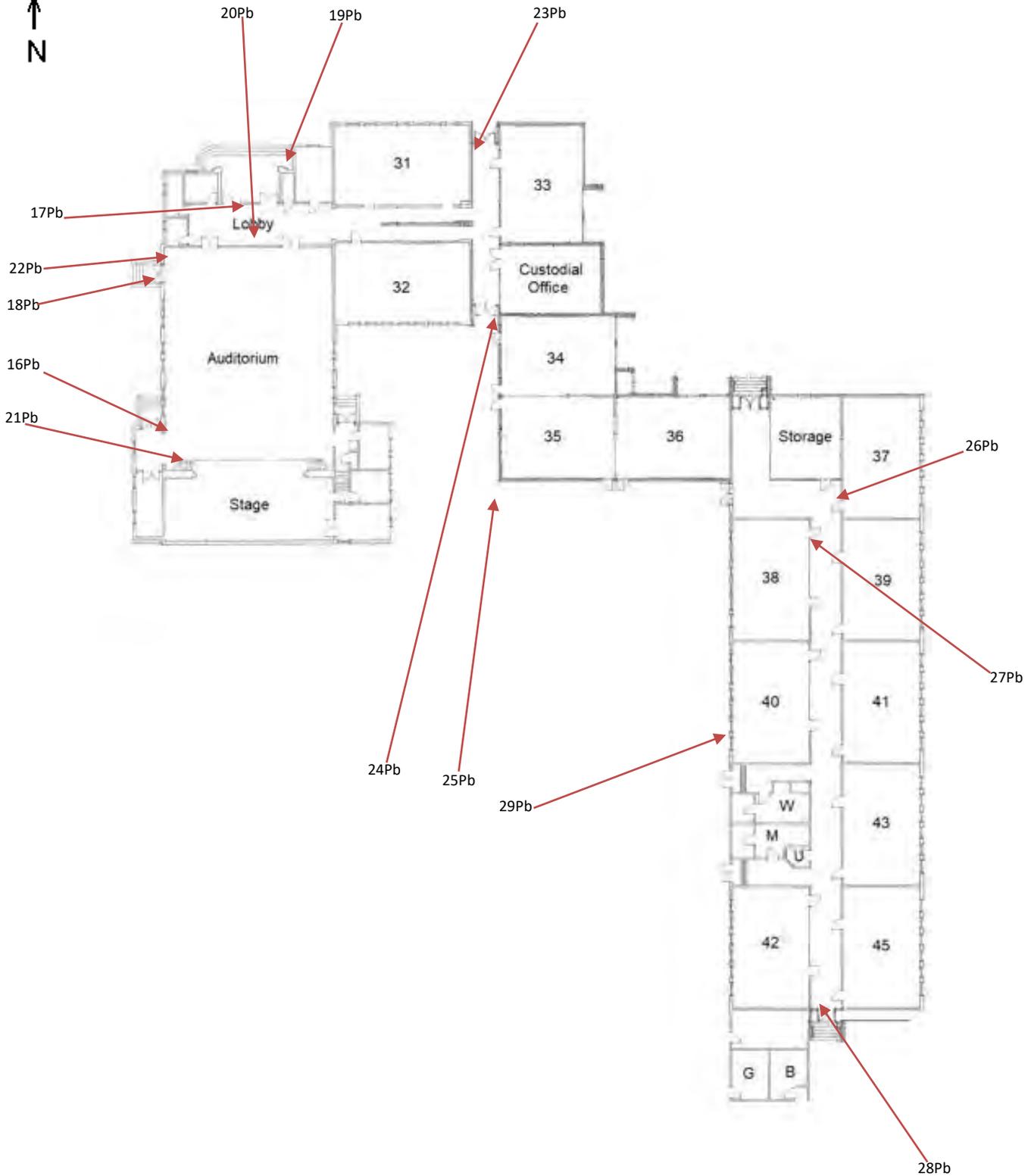
Delivered by:  **Date:** 3/14/2023 **Time:** 0936 AM/PM
Received by:  **Date:** 3/14/2023 **Time:** 0938 AM/PM



Sacramento City Unified School District
California Middle School
1600 Vallejo Way
Sacramento, CA 95818

Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin CA 95677
Map Not to Scale

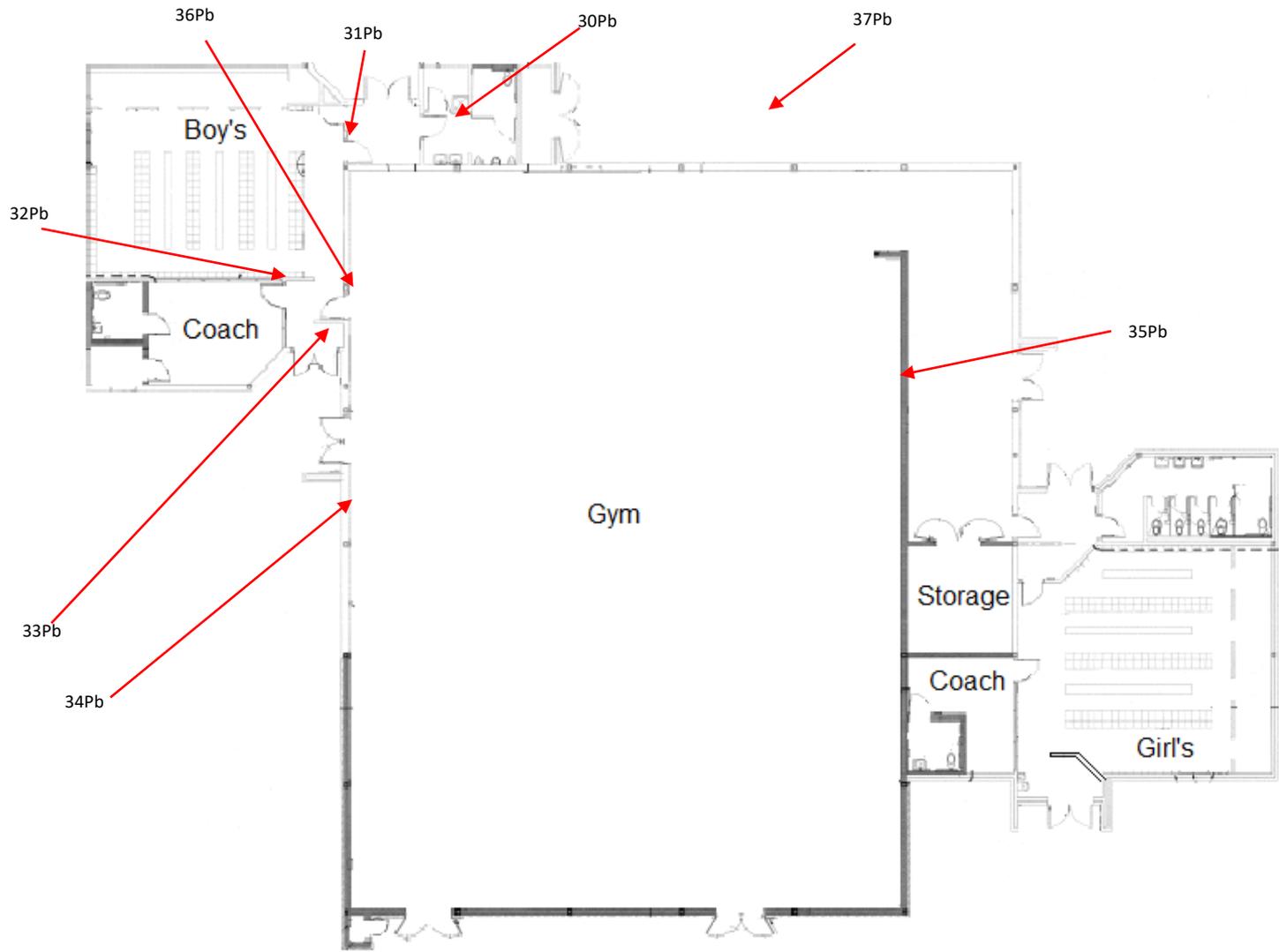
Lead Bulk Sample Locations
Collected by Blake Howes & Jose Hernandez
On March 11, 2023
Project Number 23-6577



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Lead Bulk Sample Locations
Collected by Blake Howes & Jose Hernandez
On March 11, 2023
Project Number 23-6577

LEAD HAZARD EVALUATION REPORT

Section 1 — Date of Lead Hazard Evaluation _____

Section 2 — Type of Lead Hazard Evaluation (Check one box only)

Lead Inspection Risk assessment Clearance Inspection Other (specify) _____

Section 3 — Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)]		City	County	Zip Code
Construction date (year) of structure	Type of structure <input type="checkbox"/> Multi-unit building <input type="checkbox"/> School or daycare <input type="checkbox"/> Single family dwelling <input type="checkbox"/> Other _____		Children living in structure? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know	

Section 4 — Owner of Structure (if business/agency, list contact person)

Name		Telephone number		
Address [number, street, apartment (if applicable)]		City	State	Zip Code

Section 5 — Results of Lead Hazard Evaluation (check all that apply)

No lead-based paint detected
 Intact lead-based paint detected
 Deteriorated lead-based paint detected
 No lead hazards detected
 Lead-contaminated dust found
 Lead-contaminated soil found
 Other _____

Section 6 — Individual Conducting Lead Hazard Evaluation

Name		Telephone number		
Address [number, street, apartment (if applicable)]		City	State	Zip Code
CDPH certification number	Signature 		Date	

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)

Section 7 — Attachments

- A. A foundation diagram or sketch of the structure indicating the specific locations of each lead hazard or presence of lead-based paint;
- B. Each testing method, device, and sampling procedure used;
- C. All data collected, including quality control data, laboratory results, including laboratory name, address, and phone number.

First copy and attachments retained by inspector
 Second copy and attachments retained by owner

Third copy only (no attachments) mailed or faxed to:
 California Department of Public Health
 Childhood Lead Poisoning Prevention Branch Reports
 850 Marina Bay Parkway, Building P, Third Floor
 Richmond, CA 94804-6403
 Fax: (510) 620-5656



APPENDIX C

BACK UP DOCUMENTATION

- Site Plan & Reference Maps
- Inspector Accreditations and Certifications
- Laboratory Accreditations for Asbestos Analysis



Main Building

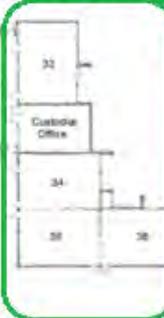


Auditorium



Building

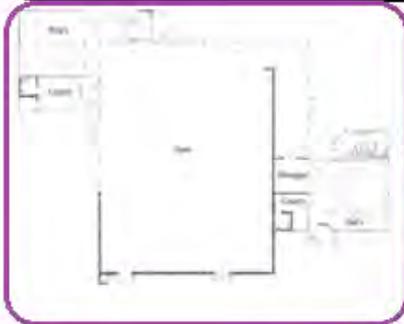
East Connector



Addition Building

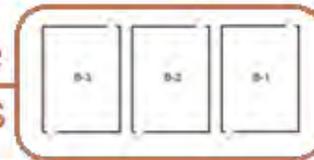


East Building



Gymnasium Building

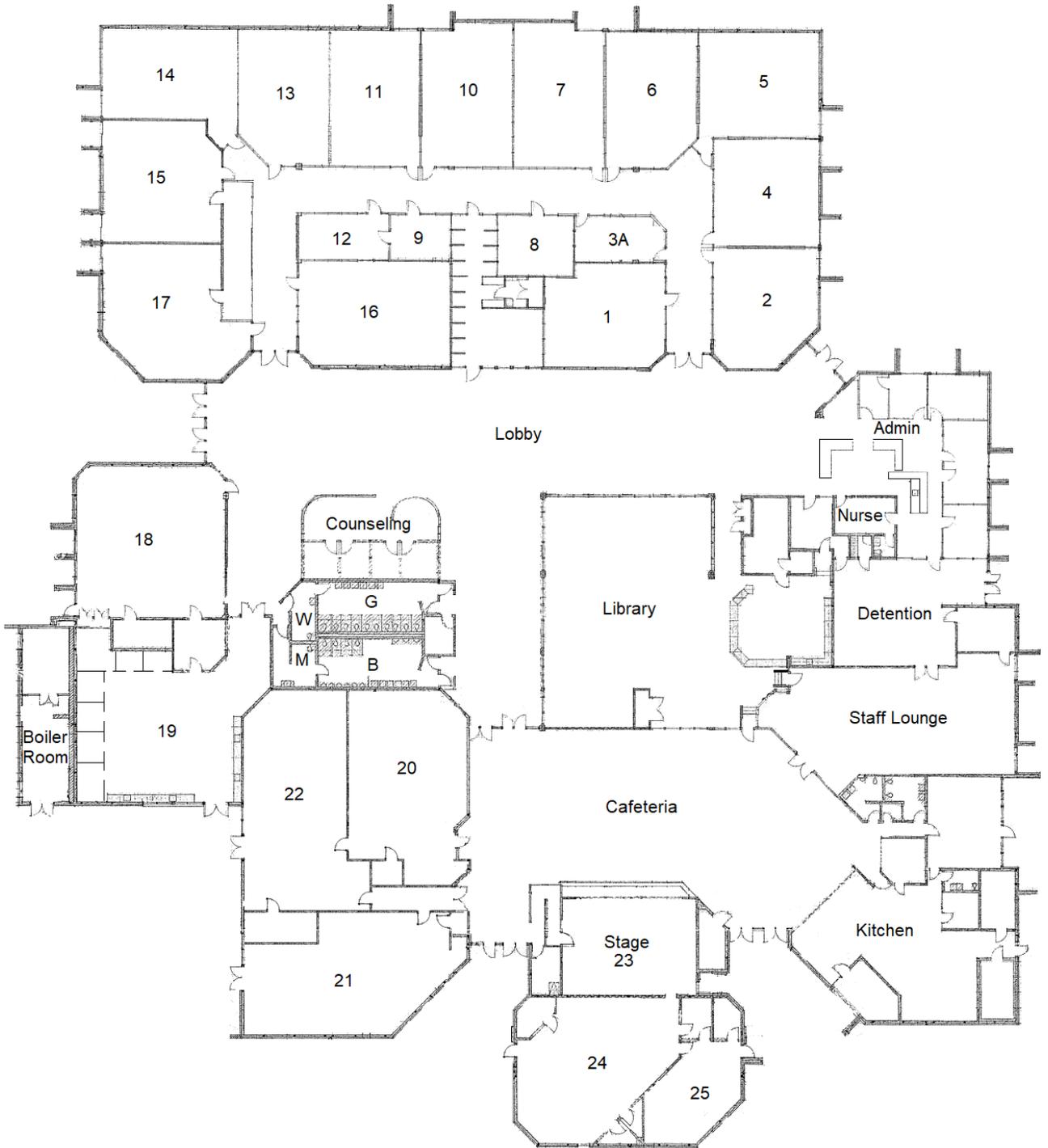
Portable Buildings



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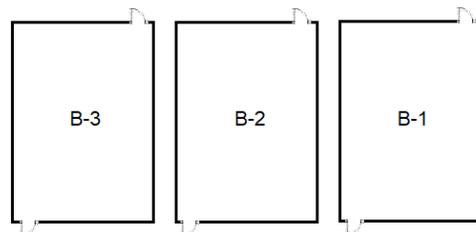
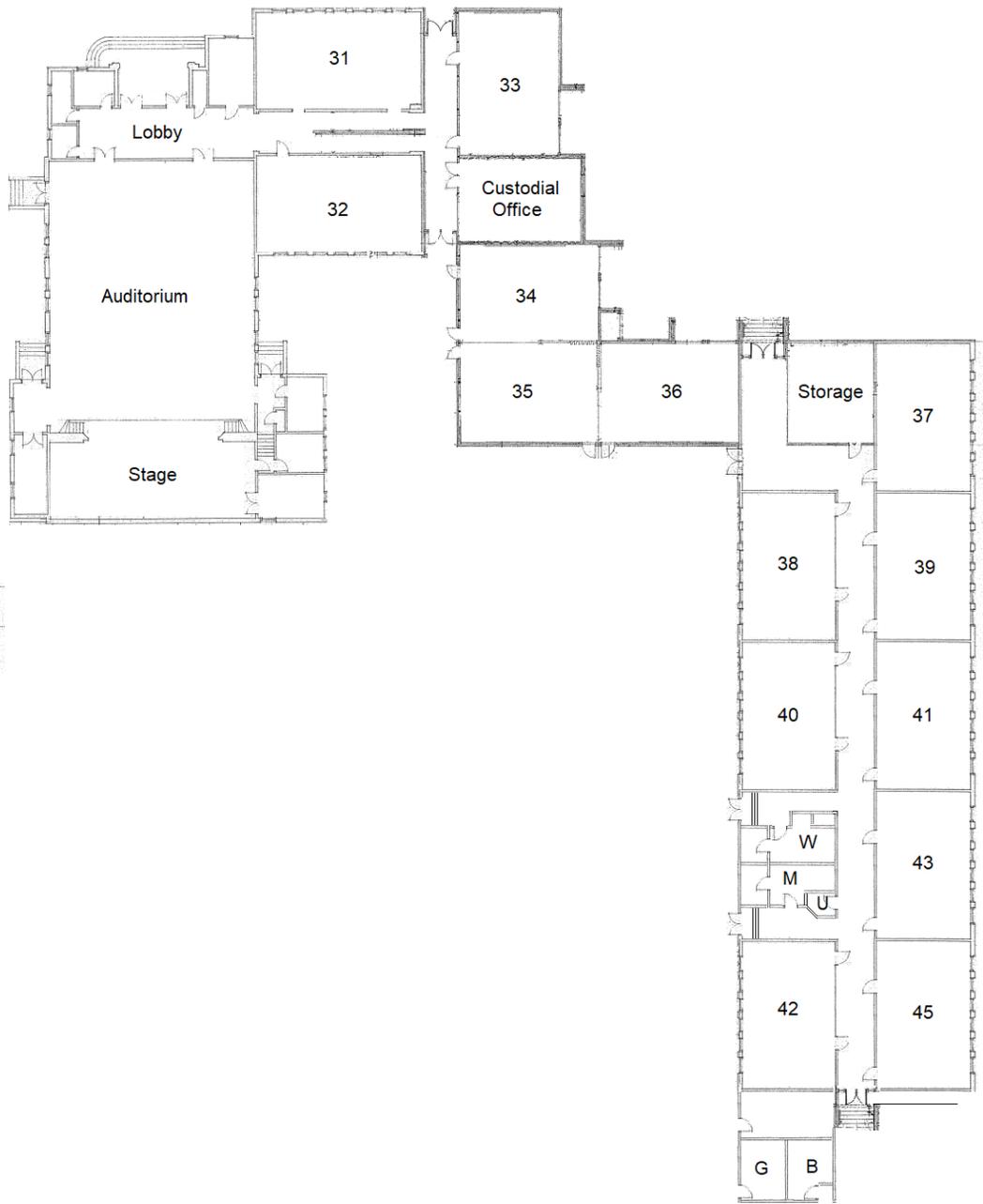
Campus Reference Map
Survey by Blake Howes & Jose Hernandez
On March 4-5 & 11, 2023
Project Number 23-6577



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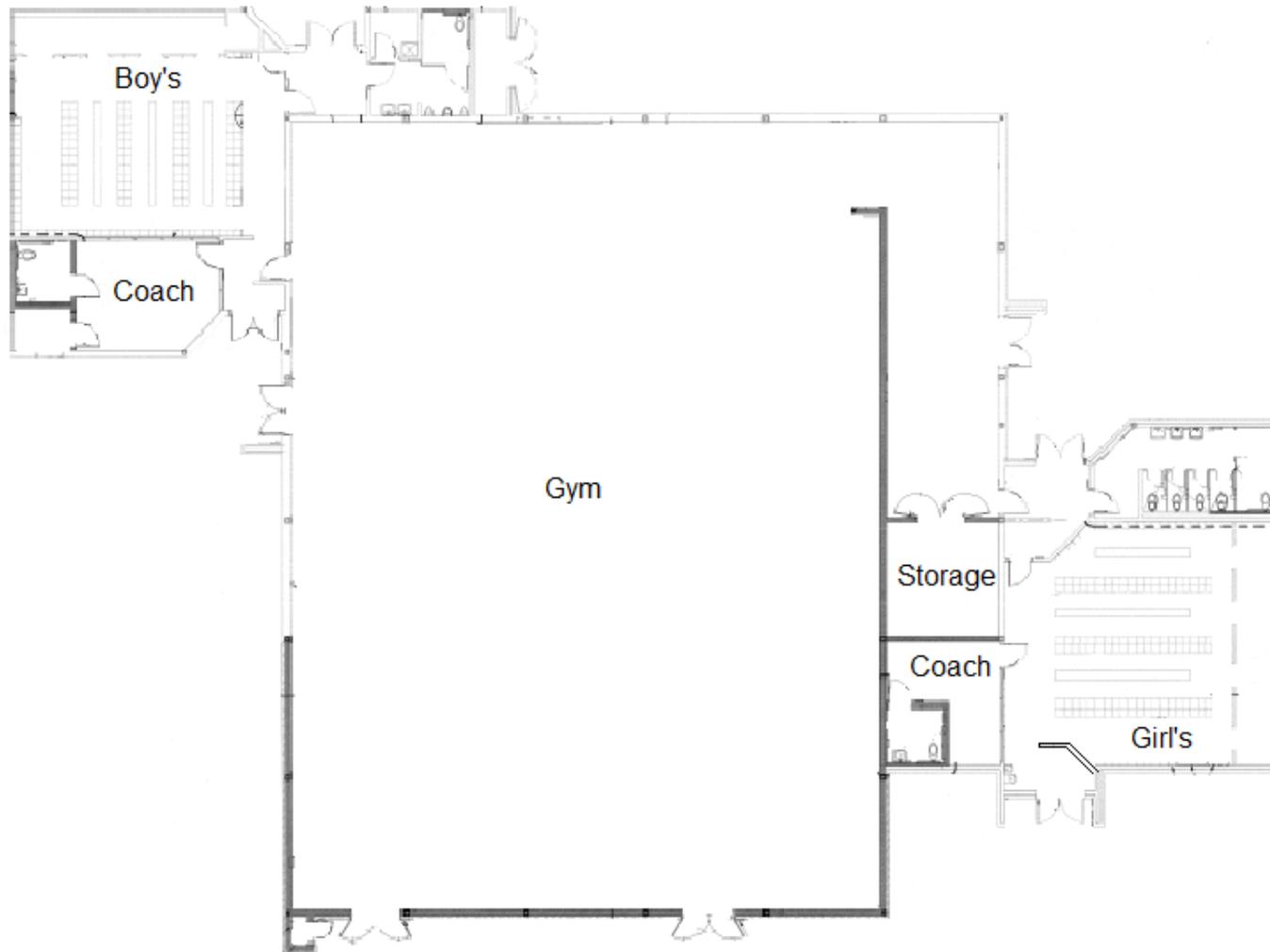
Main Building Reference Map
Survey by Blake Howes & Jose Hernandez
On March 4-5 & 11, 2023
Project Number 23-6577



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Auditorium/Connector/ East & Portable
Building Reference Map
Survey by Blake Howes & Jose Hernandez
On March 4-5 & 11, 2023
Project Number 23-6577



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Sacramento, CA 95818

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Rocklin, CA 95677
Map Not to Scale

Gymnasium Building Reference Map
Survey by Blake Howes & Jose Hernandez
On March 4-5 & 11, 2023
Project Number 23-6577

State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

Blake W Howes

Name



Certification No. **13-5015**

Expires on **04/17/23**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.



STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH



LEAD-RELATED CONSTRUCTION CERTIFICATE

INDIVIDUAL:



CERTIFICATE TYPE:

Lead Inspector/Assessor

NUMBER:

LRC-00003315

EXPIRATION DATE:

9/27/2023

Blake Howes

Disclaimer: This document alone should not be relied upon to confirm certification status. Compare the individual's photo and name to another valid form of government issued photo identification. Verify the individual's certification status by searching for Lead-Related Construction Professionals at www.cdph.ca.gov/programs/clppb or calling (800) 597-LEAD

State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

Jose A Hernandez

Name



Certification No. 22-6995

Expires on 01/21/24

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.



STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH



LEAD-RELATED CONSTRUCTION CERTIFICATE

INDIVIDUAL:



Jose Hernandez

CERTIFICATE TYPE:

Lead Inspector/Assessor

Lead Sampling Technician

NUMBER:

LRC-00010754

LRC-00003446

EXPIRATION DATE:

1/9/2024

10/27/2023

Disclaimer: This document alone should not be relied upon to confirm certification status. Compare the individual's photo and name to another valid form of government issued photo identification. Verify the individual's certification status by searching for Lead-Related Construction Professionals at www.cdph.ca.gov/programs/clppb or calling (800) 597-LEAD

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 101442-0

ASBESTECH
Rancho Cordova, CA

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

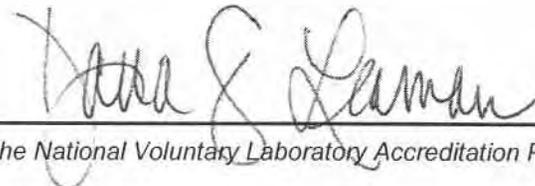
Asbestos Fiber Analysis

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2022-07-01 through 2023-06-30

Effective Dates




For the National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ASBESTECH

11151 Sun Center Drive, Suite B

Rancho Cordova, CA 95670

Mr. Tommy Conlon

Phone: 916-481-8902 Fax: 916-481-3975

Email: asbestech@sbcglobal.net

<http://www.asbestechlab.com>

ASBESTOS FIBER ANALYSIS

NVLAP LAB CODE 101442-0

Bulk Asbestos Analysis

Code

Description

18/A01

EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples

18/A03

EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

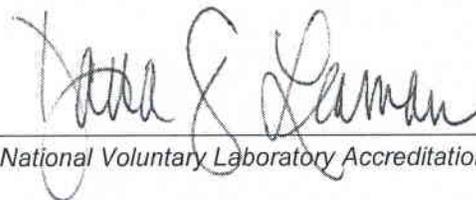
Airborne Asbestos Analysis

Code

Description

18/A02

U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.



For the National Voluntary Laboratory Accreditation Program



STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS



CALIFORNIA STATE

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

**CERTIFICATE OF
ENVIRONMENTAL LABORATORY ACCREDITATION**

Is hereby granted to

MicroTest Laboratories, Inc.

3110 Gold Canal Drive
Rancho Cordova, CA 95670

Scope of the certificate is limited to the
"Fields of Accreditation"
which accompany this Certificate.

Continued accredited status depends on compliance with applicable laws and regulations,
proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **2974**

Effective Date: **7/1/2022**

Expiration Date: **6/30/2024**

A handwritten signature in blue ink, appearing to read "Christine Sotelo".

Sacramento, California
subject to forfeiture or revocation

Christine Sotelo, Program Manager
Environmental Laboratory Accreditation Program



**CALIFORNIA STATE
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Fields of Accreditation**



MicroTest Laboratories, Inc.

3110 Gold Canal Drive
Rancho Cordova, CA 95670
Phone: 9165679808

**Certificate Number: 2974
Expiration Date: 6/30/2024**

Field of Accreditation:114 - Inorganic Constituents in Hazardous Waste

114.345 002	Antimony	EPA 6020 B
114.345 003	Arsenic	EPA 6020 B
114.345 004	Barium	EPA 6020 B
114.345 005	Beryllium	EPA 6020 B
114.345 006	Cadmium	EPA 6020 B
114.345 008	Chromium	EPA 6020 B
114.345 009	Cobalt	EPA 6020 B
114.345 010	Copper	EPA 6020 B
114.345 012	Lead	EPA 6020 B
114.345 016	Nickel	EPA 6020 B
114.345 018	Selenium	EPA 6020 B
114.345 021	Thallium	EPA 6020 B
114.345 023	Zinc	EPA 6020 B
114.345 024	Molybdenum	EPA 6020 B
114.515 001	Lead	EPA 7420
114.545 001	Mercury	EPA 7471 B

Field of Accreditation:115 - Leaching/Extraction Tests and Physical Characteristics of Hazardous Waste

115.055 001	Waste Extraction Test (WET)	CCR Chapter11, Article 5, Appendix II
115.085 001	Toxicity Characteristic Leaching Procedure (TCLP)	EPA 1311

Field of Accreditation:121 - Bulk Asbestos Analysis of Hazardous Waste

121.010 001	Bulk Asbestos	EPA 600/M4-82-020
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