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TECHNICAL SPECIFICATIONS

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PAVING REPAIRS AND SECURITY FENCING
7525 CANDLEWOOD WAY
SACRAMENTO, CA 95822

DSA APP # 02-120914
DSA FILE # 34-53

SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

OVERALL SITE REPAIRS AND SECURITY FENCING.

FEBRUARY 2023

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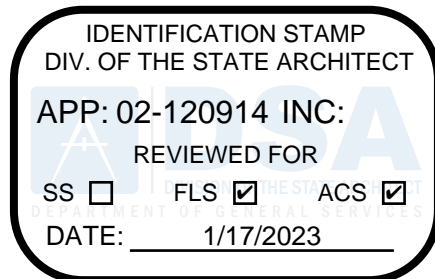
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Refer to separate project manual issued by the District.

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DIVISION 2 – EXISTING CONDITIONS

02 41 19 – Selective Demolition

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SECTION 02 41 00 – SITE DEMOLITION

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes: Site and selective demolition.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00 – Temporary Facilities and Controls.
- C. Section 01 50 13 – Construction Waste Management and Disposal.
- D. Section 31 00 00 – Earthwork.
- E. Section 31 13 16 – Tree Protection.

1.3 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.

1.4 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.

1.5 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.

1.6 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 APPLICABLE

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine conditions of work in place before beginning work, report defects.
- B. Report existence of hazardous materials or unsafe structural conditions.

3.2 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.

3.3 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.

3.4 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.

3.5 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.

3.6 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.

3.7 DISPOSAL

- A. Demolished materials become property of the Contractor and shall be removed from premises, except those items specifically listed to be retained by Owner.
- B. Dispose of all demolished material, trash, debris, and other materials not used in the work in accordance with the regulations of jurisdictional authority.
- C. 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).
- D. Burning and Burying of Materials: NOT ALLOWED.
- E. 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.

F. Remove demolished materials and debris from site on a daily basis.

3.8 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.

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DIVISION 7 – THERMAL AND MOISTURE PROTECTION

07 92 00 – Joint Sealers

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SECTION 07 90 00 – JOINT SEALERS

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Preparing sealant substrate surfaces.
 2. Concrete Joint Sealants.
 3. Sealant and backing.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 00 72 13 – General Conditions.
- C. Section 00 73 13 – Special Conditions.
- D. Section 32 16 00 – Site Concrete.

1.3 REFERENCES

- A. ASTM C834 – Standard Specification for Latex Sealants.
- B. ASTM C920 – Standard Specification for Elastomeric Joint Sealants.
- C. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
- E. ASTM E814 – Standard Test Method for Fire Tests of Penetration Firestop Systems.
- F. FM (Factory Mutual) – Fire Hazard Classifications.
- G. UL – Fire Hazard Classifications.
- H. UL 263 – Standard for Fire Tests of Building Construction and Materials.
- I. UL 723 – Test for Surface Burning Characteristics of Building Materials.
- J. UL 1479 – Fire Tests of Through-Penetration Firestops.
- K. FS TT S 00227 – Sealing Compound: Elastomeric Type, Multi-Component.
- L. FS TT S 00230 – Sealing Compound: Elastomeric Type, Single Component.

M. FS TT S 001543 – Sealing Compound, Silicone Rubber Base.

1.4 SUBMITTALS

- A. Submit manufacturer's product data under provisions of Section 00 72 13 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 00 72 13.
- D. Submit standard color ranges of exposed materials for Architect selection.
- E. Submit manufacturer's installation instructions under provisions of Section 00 72 13.

1.5 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.

1.6 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.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with all Sections referencing this Section.

1.8 WARRANTY

- A. Provide two-year warranty for materials and workmanship under provisions of Section 00 72 13.
- 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

2.1 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. 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.
- C. 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.
- D. 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.
- E. 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.
- F. 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.

- G. Substitutions: Under provisions of Section 00 72 13.
- H. Color of sealant shall be as selected by Architect.

2.2 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

3.1 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.

3.2 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.

3.3 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.

3.4 CLEANING AND REPAIRING

- A. Clean work under provisions of Section 00 72 13.
- 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.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished installation under provisions of Section 00 72 13.
- B. Protect sealants until cured.
- C. Do not paint sealants until sealant is fully cured.

D. Do not paint silicone sealant.

END OF SECTION

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DIVISION 8 – OPENINGS

08 71 00 – Door Hardware

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SECTION 08 71 00 – DOOR HARDWARE

PART 1 – GENERAL

1.1 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. Gate Hardware.
- C. Related Sections:
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Section 32 31 13 – Chain Link Fences.
 - 3. Section 32 31 19 – Decorative Metal Fences and Gates.
- D. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions of Division 1 Specification Sections, apply to this Section.

1.2 REFERENCES

- A. 2019 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

1.3 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. Keyset Symbol.
 - i. Quantity.
 - j. Product description.
 - k. Product Number.

- I. 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. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- F. 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.
- G. 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.
- H. 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.

1.4 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.

1.5 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.

1.6 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.

1.7 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

2.1 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

2.2 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:

- i. Doors up to 42" wide: 4-1/2" inches.
 - ii. 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. Faculty ND94
 3. Administration ND91
 4. Communicating ND72VandlegardXN12-003
 5. Classroom Safe School Lock ND95
 6. Bathroom (Typical) ND94
 7. Janitor / Storage room ND96
 8. Bathroom (Faculty - single compartment toilet) L9485 x 06A x L283-722
 9. Bathroom (Faculty and Student please consult)
 10. 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

11. 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
12. Cylinders: Refer to “KEYING” article, herein.
13. Provide solid steel anti-rotation through bolts and posts to control excessive rotation of lever.
14. Provide lockset that allows lock function to be changed to over twenty other common functions by swapping easily accessible parts.
15. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
16. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
17. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
18. 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. CD98NL-AX x CD98DT x KR4954 Mullion x 154 (Pairs) 626 finish
3. 98L-AX-2-F-996L (F Rated Single Door) 626 finish
4. 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
5. 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.
6. All internal parts shall be of cold-rolled steel with zinc dichromate coating.
7. Non-handed basic device design with center case interchangeable with all functions.
8. All devices shall have quiet return fluid dampeners.
9. All latch bolts shall be deadlocking with ¾” throw and have a self-lubricating coating to reduce friction and wear.

10. Device shall bear UL label for fire and or panic as may be required.
11. All surface strikes shall be roller type and utilize a plate underneath to prevent movement.
12. Lever Trim: "Breakaway" design, forged brass or bronze escutcheon with a minimum of .130" thickness, match lockset lever design.
13. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key.
 - a. MT54 Mullion Storage at Pairs
14. Furnish glass bead kits for vision lites where required.
15. All Exit Devices to be sex-bolted to the doors.
16. 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. The unlatching force shall not exceed 15 lbs. applied in the direction of travel.

-OR-

- b. 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. 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.

F. 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

G. 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.

H. Keying: Schlage as scheduled.

1. Furnish a Proprietary Schlage master key system as directed by the owner or architect. 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")

-OR-

7. Furnish construction keying for doors requiring locking during construction.
 - a. For "Split Key" Construction Cylinders (non-IC cylinders) specify "CK" for each keyed cylinder.
 - b. Provide ten Construction Keys (48-104 "Classic", 48-008 "Everest")
 - c. Provide two Extractor Tools (35-057)
8. Furnish all keys with visual key control.
 - a. Stamp key "Do Not Duplicate".
9. Furnish mechanical keys as follows:
 - a. Furnish 2 cut change keys for each different change key code.
 - b. Furnish 1 uncut key blank for each change key code.
 - c. Furnish 6 cut master keys for each different master key set.
 - d. Furnish 3 uncut key blanks for each master key set.
 - e. Furnish 2 cut control keys cut to the top master key for permanent I/C cylinders.
 - f. Furnish 1 cut control key cut to each SKD combination.

- g. Furnish KS43D2200 padlock for use with non-I/C Schlage cylinders. Furnish 47-413 (conventional) or 47-743-XP (PrimusXP) with above.
 - h. Furnish KS43G3200 padlock for use with FSIC Schlage cylinders. Furnish 23-030 (Classic / Everest) or 20-740 (PrimusXP) with above.
 - i. Furnish KS41D1200 padlock for use with SFIC Schlage cylinders. Furnish 80-037 (Everest-B) with above.
10. Furnish Schlage Padlocks and the cylinders to tie them into the master key system for gates, storage boxes, utility valve security, roof hatches and roll-up doors keyed as directed in the keying schedule.
- a. Furnish KS43D2200 padlock for use with non-I/C Schlage cylinders. Furnish 47- 413 (conventional) or 47-743-XP (PrimusXP) with above.
 - b. Furnish KS43G3200 padlock for use with FSIC Schlage cylinders. Furnish 23-030 (Classic / Everest) or 20-740 (PrimusXP) with above.
 - c. Furnish KS41D1200 padlock for use with SFIC Schlage cylinders. Furnish 80-037 (Everest-B) with above.
- I. 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.

2.3 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

3.1 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.

3.2 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.
- M. Hardware Locations: Conform to CCR, Title 24, Part 2; and ADAAG; and the drawings for access-compliant positioning requirements for the disabled.

3.3 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.

3.4 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.

3.5 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 Strikes, Push Pull & Kick Plates, Door Stops & Silencers
KNX	=	Knox	Knox Boxes
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

D. Hardware Group 20.1: Ornamental Metal Gates – Pedestrian – Single Leaf:

GATES: G007, G010

Each gate leaf to have:

QTY	UNIT	DESCRIPTION	PRODUCT	MFR
3	EA	Heavy Duty Self Closing Hinges	Mammoth 180	LOC
1	TOTAL	Heavy Duty Drop Fork Gate Latch	As recommended by gate manufacturer	
1	TOTAL	Padlock – Fork Latch	KS43D3200	SCH
1	TOTAL	Cylinder	23-030 (Verify Keyway)	SCH
1	EA	Kickplate	8400 (10 ga x 10"H x full width of gate x B-CS); match gate color	IVE
1	EA	Drop Bolt, with staple at top and bottom for padlock, and sleeve for locking in open position		-

E. Hardware Group 20.2: Ornamental Metal Gates – Pedestrian – Double Leaf:

GATES: G003, G004

Each gate leaf to have:

QTY	UNIT	DESCRIPTION	PRODUCT	MFR
3	EA	Heavy Duty Industrial Hinges	As recommended by gate manufacturer.	
1	TOTAL	Heavy Duty Drop Fork Gate Latch	As recommended by gate manufacturer.	
1	TOTAL	Padlock – Fork Latch	KS43G3200	SCH
1	TOTAL	Padlock – Drop Bolt	KS43G3200	SCH
2	TOTAL	Cylinder	23-030 (Verify Keyway)	SCH
1	EA	Drop Bolt, with staple at top and bottom for padlock, and sleeve for locking in open position		-

F. Hardware Group 20.3: Ornamental Metal Gates – Pedestrian – Single Leaf – Panic Hardware:

GATES: G005, G006, G009

Each gate leaf to have:

QTY	UNIT	DESCRIPTION	PRODUCT	MFR
3	EA	Heavy Duty Self Closing Hinges	Mammoth 180	LOC
1	EA	Exit Device	AX-CD99NL	VON
1	EA	Lock Protector / Stop	Fabricated from 10 ga. bent steel	-
1	EA	Rim Cylinder	20-057 26D (Verify Keyway)	SCH
1	EA	Mortise Cylinder	26-091 26D (Verify Keyway)	SCH
1	EA	Kick Plate	8400 (10 ga x 10"H x full width of gate x B-CS); match gate color	IVE
1	EA	Door Stop / Holder	FS43 Series	IVE
<i>NOTE: GATE G005 HAS EXPANDED METAL MESH OVER GATE AND ADJACENT FENCING. REFER TO SECTION 32 31 19.</i>				

G. Hardware Group 20.4: Ornamental Metal Gates – Vehicular:

GATES: G008, G011

Each gate leaf to have:

QTY	UNIT	DESCRIPTION	PRODUCT	MFR
3	EA	Heavy Duty Industrial Hinges	As recommended by gate manufacturer.	
1	TOTAL	Heavy Duty Drop Fork Gate Latch	As recommended by gate manufacturer.	
1	TOTAL	Padlock – Fork Latch	KS43G3200	SCH
1	TOTAL	Padlock – Drop Bolt	KS43G3200	SCH
2	TOTAL	Cylinder	23-030 (Verify Keyway)	SCH
1	EA	Drop Bolt, with staple at top and bottom for padlock, and sleeve for locking in open position		-

H. Hardware Group 20.5: Black Vinyl Coated Chain Link Gates – Pedestrian – Single Leaf:

GATE: G013

Each gate leaf to have:

QTY	UNIT	DESCRIPTION	PRODUCT	MFR
3	EA	Heavy Duty Industrial Hinges	As recommended by gate manufacturer. Match gate finish.	
1	TOTAL	Heavy Duty Drop Fork Gate Latch	As recommended by gate manufacturer. Match gate finish.	
1	TOTAL	Padlock – Fork Latch	KS43G3200	SCH
1	TOTAL	Cylinder	23-030 (Verify Keyway)	SCH
1	EA	Kick Plate	8400 (10 ga x 10"H x full width of gate x B-CS); match gate color	IVE
1	EA	Drop Bolt, with staple at top and bottom for padlock, and sleeve for locking in open position		-

I. Hardware Group 20.6: Black Vinyl Coated Chain Link Gates – Vehicular:

GATE: G012

Each gate leaf to have:

QTY	UNIT	DESCRIPTION	PRODUCT	MFR
3	EA	Heavy Duty Industrial Hinges	As recommended by gate manufacturer. Match gate finish.	
1	TOTAL	Heavy Duty Drop Fork Gate Latch	As recommended by gate manufacturer. Match gate finish	
1	TOTAL	Padlock – Fork Latch	KS43G3200	SCH
1	TOTAL	Padlock – Drop Bolt	KS43G3200	SCH
1	TOTAL	Cylinder	23-030 (Verify Keyway)	SCH
1	EA	Drop Bolt, with staple at top and bottom for padlock, and sleeve for locking in open position		-

J. Hardware Group 20.7: Galvanized Chain Link Gates – Pedestrian – Single Leaf:

GATE: G001

Each gate leaf to have:

QTY	UNIT	DESCRIPTION	PRODUCT	MFR
3	EA	Heavy Duty Industrial Hinges	As recommended by gate manufacturer.	
1	TOTAL	Heavy Duty Drop Fork Gate Latch	As recommended by gate manufacturer.	
1	TOTAL	Padlock – Fork Latch	KS43G3200	SCH
1	TOTAL	Cylinder	23-030 (Verify Keyway)	SCH
1	EA	Kick Plate	8400 (10 ga x 10"H x full width of gate x B-CS); match gate color	IVE
1	EA	Drop Bolt, with staple at top and bottom for padlock, and sleeve for locking in open position		-

K. Hardware Group 20.8: Galvanized Chain Link Gates – Vehicular:

GATE: G002

Each gate leaf to have:

QTY	UNIT	DESCRIPTION	PRODUCT	MFR
3	EA	Heavy Duty Industrial Hinges	As recommended by gate manufacturer.	
1	TOTAL	Heavy Duty Drop Fork Gate Latch	As recommended by gate manufacturer.	
1	TOTAL	Padlock	KS43D3200	SCH
1	TOTAL	Cylinder	23-030 (Verify Keyway)	SCH
1	TOTAL	Knox Box	3700 Confirm Model with District	KNX
1	EA	Drop Bolt, with staple at top and bottom for padlock, and sleeve for locking in open position		-

END OF SECTION.

DIVISION 9 – FINISHES

09 91 00 – Painting

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SECTION 09 91 00 – PAINTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Surface preparation.
 - 2. Products and application.
 - 3. Surface finish schedule.
 - 4. **Even if not noted on plans, GC to touch-up paint vertical walls or other building components where asphalt paving was removed / replaced and the wall or component has been left exposed unfinished. Match existing wall color.**

1.3 REFERENCES

- A. ASTM D16 – Standard Terminology for Paint, Related Coatings, Materials, and Applications.
- B. ASTM D2016 – Test Method for Moisture Content of Wood.

1.4 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.5 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.

1.6 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.

1.7 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.

1.8 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.

1.9 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.

1.10 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.

1.11 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

2.1 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.

2.2 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

3.1 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 D2016.
 4. Exterior Located Wood 15 percent, measured in accordance with ASTM D2016.
- D. Beginning of installation means acceptance of existing surfaces.

3.2 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.

3.3 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.

3.4 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.
10. Interior kitchens and baths to be painted with water-borne alkyd urethane.

3.5 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.

3.6 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.

3.7 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.

3.8 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.

3.9 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. Five (5) different color schemes for painting of 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 lower walls below door header to be done in (SCUSD (COLONY WHITE) SHEEN TO MATCH.
12. Exterior Body color to be (SCUSD SPECIAL HEATHER) some school colors to be determined. Check with SCUSD paint shop Supervisor. Exterior trim colors to be determined by SCUSD paint shop Supervisor and school site.
13. 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: Waterborne Urethane Alkyd Enamel System:

- a. Prime Coat: Primer, rust inhibitive, waterborne alkyd, interior/exterior, Dunn-Edwards, Bloc-Rust Premium BRPR00 Series or Enduraprime rust preventative primer ENPR00.
- b. Intermediate Coat: Waterborne urethane alkyd, interior/exterior 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)

5. Non-Ferrous Metal Substrates: Waterborne Urethane Alkyd Enamel over a Latex Primer System:

- a. Prime Coat: Primer, waterbased, interior/exterior, Dunn-Edwards Ultrashield Galvanized Metal Primer ULGM00.
- b. Intermediate Coat: Waterborne urethane alkyd, interior/exterior, 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)

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.

DIVISION 11 – EQUIPMENT

11 66 00 – Athletic Equipment

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SECTION 11 66 00 – ATHLETIC EQUIPMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Outdoor Athletic Equipment:
 - 1. Outdoor Basketball Equipment.
 - 2. Outdoor Tetherball Equipment.
- B. Yellow Caution Band: Paint athletic equipment poles from 2'-0" AFF to 5'-0" AFF, or as noted by the District, in caution yellow color.

1.3 RELATED SECTIONS

- A. Section 09 91 00 – Painting.
- B. Section 32 12 00 – Asphalt Paving.
- C. Section 32 12 36 – Pavement Sealer, Striping, and Signage.
- D. Section 32 16 00 – Site Concrete.

1.4 REFERENCES

- A. 2019 California Building Code, with Amendments.
- B. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. Federal Standard 191 – Textile Test Methods.
- D. NFPA 101 – Life Safety Code.
- E. NFPA 255 – Surface Burning Characteristics of Building Materials.
- F. NFPA 701 – Methods of Fire Tests for Flame-Resistant Textiles and Films.

1.5 DESIGN REQUIREMENTS

- A. Field Measurements: Coordinate locations and heights of all outdoor athletic equipment with Owner and Architect. Verify dimensions by field measurements.

1.6 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittals.

- B. Product Data: Submit manufacturer's product data, including materials, components, fabrication, finish, and installation instructions.
- C. Shop Drawings:
 - 1. Submit manufacturer's shop drawings, including plans, elevations, footing requirements, sections, and details, indicating locations, quantities, dimensions, tolerances, materials, fabrication, connections, hardware, fasteners, finish, options, and accessories.
 - 2. Show locations of all athletic equipment slated to be installed.
- D. Samples: Submit manufacturer's color samples.
- E. Test Reports: Submit manufacturer's certified test reports from testing performed by accredited independent testing laboratory, indicating compliance of materials with requirements as specified.
- F. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- G. Manufacturer's Project References: Submit manufacturer's list of recently completed projects, including project name and location, name of architect, and type and quantity of play field equipment installed.
- H. Operation and Maintenance Manual: Submit manufacturer's operation and maintenance manual; including operation, maintenance, adjustment, and cleaning instructions; trouble shooting guide; and parts list.
- I. Warranty: Submit manufacturer's standard, lifetime, and additional warranties.

1.7 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide gymnasium and play field equipment from single manufacturer.
- B. Manufacturer's Qualifications: Minimum of 5 consecutive years' experience manufacturing gymnasium and play field equipment similar to the specified.
- C. Installer's Qualifications: Trained and approved by manufacturer.
- D. Regulatory Requirements: Play field equipment shall conform to latest rules and regulations, as required:
 - 1. International Basketball Federation / Federation International de Basketball (FIBA).
 - 2. National Association for Girls and Women in Sport (NAGWS).
 - 3. National Basketball Association (NBA).
 - 4. National Federation of State High School Associations (NFHS).

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions. Keep temporary protective coverings in place.
- C. Handling: Protect materials and finish from damage during handling and installation.

1.9 WARRANTY

- A. Provide minimum one (1) year warranty against defects in materials and workmanship, unless otherwise specified.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Available Manufacturers: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - 1. Basis of Design:
 - a. Porter Athletic, Inc., www.porterathletic.com
- B. Substitutions: To be approved by Owner and Architect per Section 01 25 13 – Product Substitutions.

2.2 OUTDOOR BASKETBALL EQUIPMENT

- A. Outdoor Basketball Backstops: Basis of Design, Porter Athletic, Model No. 175.
 - 1. Backstop: 4-1/2-inch O.D. gooseneck upright and 4-foot extension. Complete with support post system, backboard, and goal with net.
 - 2. Face of Backboard: 5'-0" (1.53 m) extended from center line of formed upright support.
 - 3. Upright Support: 4-1/2" O.D. heavy-walled galvanized pipe formed to approximate 18" radius.
 - 4. Vertical Section: Extend 3'-0" into concrete footing and secured with anchor lugs.
 - 5. Horizontal Section: Fabricated with slotted mounting plate to level backboard and goal.
 - 6. Bolts from Front-Mounted Goal: Mount directly through backboard and into Center-Strut mounting plate to eliminate strain on bank, should player hang on front-mounted goal.

7. Yellow Caution Band: Paint athletic equipment poles from 2'-0" AFF to 5'-0" AFF, or as noted by the District.
- B. Outdoor Basketball Backboards: Basis of Design, Porter Athletic, Model No. 234-3 fan-shaped, cast-aluminum backboard.
1. Provide each outdoor backstop with backboard.
 2. Backboard: Official size, 54" x 39", and shape. Orange perimeter and target-area markings.
 3. Material: Cast-in-permanent-mold process from high-tensile, No. 319 aluminum. Cast with structural reinforcing ribs on backside with heavy, 1-1/2-inch deep perimeter flange to provide maximum rigidity.
 4. Backside of Backboard: 8 tapped holes, 3/8-16, to fit normal mounting attachments without exposed bolt heads on front face of unit.
 5. Backboard Drilling: For front-mount goal, 5-inch by 5-inch hole pattern. Compatible with direct-mount support structures.
 6. Goal Mounting Holes: Four (4), molded with integral, hex-shaped cavity located on front side of backboard to independently mount backboard to rear-support structure center-strut to provide option of removing goal for seasonal use or to prevent vandalism or unauthorized use.
 7. Finish: White powder coated.
- C. Outdoor Basketball Goals: Basis of Design, Porter Athletic Inc. Model No. 235 high-strength Super Goal.
1. Provide each outdoor backstop with goal.
 2. Rim: Fabricated from 5/8-inch diameter, high-strength, cold-drawn alloy steel, round-formed to 18-inch inside diameter ring.
 3. Inside of Ring: Positioned 6 inches from face of backboard by heavy, L-shaped, formed- steel mounting plate with 5-inch by 4-inch and 5-inch by 4-1/2-inch mounting-hole centers for front mounting.
 4. Brace Rim: Rigidly braced by 5/8-inch diameter, high-strength, cold-drawn alloy steel, round-formed and welded in position for maximum support.
 5. Net Attachment Clips: 12 no-tie net attachment clips.
 6. Net: White nylon net or Chain net, as specified by Architect.
 7. Mounting Hardware: Plated.
 8. Finish: Official orange powder coated.

2.3 OUTDOOR TETHERBALL EQUIPMENT

- A. Outdoor Tetherball Equipment: Basis of Design, Porter Athletic, Model 00763-200
1. Post and Footing: 2-3/8" O.D. Tetherball post, including upright, 5/16" x 3" eyebolt, 5/16" hex nut, and pipe cap. Extends 10'-0" above court, and extends 9" into 2'-0" D x 1'-6" W concrete footing, as directed by manufacturer.
 2. Cord and Ball: Official Heavy-duty tetherball and cord.
 3. Yellow Caution Band: Paint athletic equipment poles from 2'-0" AFF to 5'-0" AFF, or as noted by the District.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas and supporting structure to receive play field equipment. Notify Owner and Architect in writing of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install play field equipment in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install equipment plumb, level, straight, square, accurately aligned, correctly located, to proper elevation, and secure.
- C. Install equipment using manufacturer's supplied hardware and fasteners.
- D. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- E. Remove and replace damaged components that cannot be successfully repaired, as determined by Architect.

3.3 ADJUSTING

- A. Adjust basketball backstops, backboards, goals, and tetherball poles for plumb and level.
- B. Adjust operating equipment to function properly and for smooth operation without binding.

3.4 CLEANING

- A. Clean play field equipment promptly after installation in accordance with manufacturer's instructions.
- B. Remove labels and temporary protective coverings.

- C. Do not use harsh cleaning materials or methods that would damage finish.

3.5 PROTECTION

- A. Protect installed play field equipment to ensure equipment will be without damage or deterioration at time of substantial completion.

END OF SECTION.

DIVISION 31 – EARTHWORK

31 00 00 – Earthwork

31 13 16 – Tree Protection

31 23 33 – Trenching and Backfill

31 32 00 – Soil Stabilization

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SECTION 31 00 00 – EARTHWORK

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide labor, materials, tools, and equipment to perform all site grading work as indicated and described herein.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00 – Temporary Facilities and Controls.
- C. Section 01 57 13 – Erosion Control
- D. Section 31 23 33 – Trenching and Backfilling.
- E. Section 31 32 00 – Soil Stabilization
- F. Section 32 12 00 – Asphalt Paving.
- G. Section 32 16 00 – Site Concrete.
- H. Section 32 80 00 – Irrigation.
- I. Section 32 90 00 – Landscaping.
- J. Section 33 40 00 – Site Drainage.

1.3 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.

1.4 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.

1.5 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.6 REFERENCES AND STANDARDS

- A. General: Site survey, included in the drawings, was prepared by Warren Consulting Engineers, Inc., dated October 19, 2022, 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. Geotechnical Engineering Report was prepared by WallaceKuhl & Associates. Report is entitled Pavement Design Recommendations – John Sloat Elementary School Parking Lot Replacement and is on file with Architect. Recommendations of the Geotechnical report were used to develop the contract plans and specifications. The Geotechnical report shall be used as a reference for the soil condition of the project site. The design information contained in the contract plans and specifications shall govern over the recommendation of the Geotechnical report.
- C. 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.
- D. 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)).
- E. ANSI/ASTM D1556-e1 – Test Method for Density of Soil in Place by the Sand-Cone Method.
- F. 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)).
- G. ANSI/ASTM D3017 – Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- H. ANSI/ASTM D4318-10e1 – Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
- I. CALTRANS Standard Specifications Section 17.
- J. CAL-OSHA, Title 8, Section 1590 (e).
- K. 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.

1.7 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.

1.8 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.

1.9 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.

1.10 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
- C. All markings made by the Underground Utility Locator Service or other shall be clear and visible.
- D. The contractor shall maintain all markings made by Underground Utility Locator Service or other throughout the entire length of the project.
- E. 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.
- F. Contractor is responsible to contact Underground Service Alert (U.S.A. 800/227-2600) and receive clearance prior to any excavation operations.
- G. 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.

1.11 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 gulying 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.

1.12 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 Part 3.8.B.

1.13 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.

1.14 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

2.1 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.

3. 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.
4. 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
<hr/>	
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

5. Reports/ Documentation: 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 12" 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

3.1 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.

3.2 PERFORMANCE – GENERAL

- A. 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.
- B. 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.
- C. 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.
- D. 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.

3.3 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 6", moisture-conditioned to optimum moisture content, and recompacted to at least 90% of the maximum dry density.

3.4 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.

3.5 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 3.7, 3.8, 3.9, 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.

3.6 CUTTING

- A. Do all cutting necessary to bring finish grade to elevations shown on Drawings.
- B. When excavation through roots is necessary, cut roots by hand.
- C. 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.

3.7 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.

3.8 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 6", until surface is free from ruts, hummocks or other uneven features and uniform and free from large clods. Moisture condition to 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.

3.9 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 3.8 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. Paved Areas: Upper 6" of all final subgrades supporting pavement sections and all other flatwork 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.
- B. Exception; in lime /cement treated areas the upper 12" shall be compacted to 95% Compaction.
- C. Other Fill and Backfill: Upper 12" of all other final subgrades or finish grades shall be compacted to 90% of maximum dry density.
- D. 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.

3.12 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).

3.13 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.

3.14 SURPLUS MATERIAL

- A. Excavated material not required for grading or backfill shall be removed from site at contractor's expense.

3.15 CLEANING

- A. Refer to Section 01 77 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

1.1 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 02 41 19 – Site Demolition.
3. Section 32 80 00 – Irrigation.
4. Section 32 90 00 – Landscaping.

1.2 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.

1.3 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

2.1 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: 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

3.1 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.

3.2 INSTALLATION

- A. Tree Trunk Protection:
 - 1. Conform to requirements for trees and plants to be retained, per 3.1, 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 3.1, 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.

3.3 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 District 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: 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

1.1 SUMMARY

- A. This section includes trenching and backfill.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00 – Temporary Facilities and Controls.
- C. Section 01 57 13 – Erosion Control
- D. Section 31 23 33 – Trenching and Backfilling.
- E. Section 31 32 00 – Soil Stabilization
- F. Section 32 12 00 – Asphalt Paving.
- G. Section 32 16 00 – Site Concrete.
- H. Section 32 80 00 – Irrigation.
- I. Section 32 90 00 – Landscaping.
- J. Section 33 40 00 – Site Drainage.

1.3 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.

1.4 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Submit Manufacturers data and shop drawings.

1.5 WARRANTY

- A. Submit fully executed warranty for work and materials in this section per 01 78 36.

1.6 REFERENCES AND STANDARDS

- A. California Building Code current edition.
- B. California Plumbing Code current edition.

1.7 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.

1.8 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.

1.9 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 gulying 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.

1.10 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.

1.11 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 31 00 00, 3.8.B.

1.12 TESTING

- A. General: Refer to Section 01 45 00 – Quality Requirements.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Backfill Materials: Pipeline and conduit trench backfill as shown on the plans and as specified below.
 - 1. 3/4 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 __-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, 3/4" 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 22-28, if / as applicable.

PART 3 – EXECUTION

3.1 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.

3.2 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.

3.3 INSTALLATION

- A. Perform work in accordance with pipe manufacturer's recommendations, as herein specified and in accordance with drawings.

3.4 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 1/2 the depth of the section. Apply tack 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.

3.5 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 31 00 00, 3.8.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 6 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: 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%.

3.6 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.

3.7 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.

3.8 SURPLUS MATERIAL

A. Remove excess excavated material, unused materials, damaged or unsuitable materials from site.

3.9 CLEANING

A. Refer to Section 01 77 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 31 32 00 – SOIL STABILIZATION

PART 1 – GENERAL

1.1 SUMMARY

A. Provide Lime Stabilization Treatment, including spreading and mixing lime and water with in-place materials, and compacting the mixture to the lines, grades and dimensions shown on the plans and/or specified.

1.2 RELATED SECTIONS

A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.

B. Section 01 50 00 – Temporary Facilities and Controls.

C. Section 31 23 33 – Trenching and Backfill.

D. Section 32 12 00 – Asphalt Paving.

E. Section 32 16 00 – Site Concrete.

1.3 SUBMITTALS

A. Refer to Section 01 33 00.

B. Weighmaster Certificates: Provide certificates as required in Section 2.1B

1.4 QUALITY ASSURANCE

A. All Quality Assurance procedures specified on the drawings shall apply to this Section in addition to those shown below.

B. Use only new materials and products unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.

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. 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.

E. Tests (See Part 3 for Compaction Testing).

F. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction are the responsibility of the contractor.

G. Failures due to the lack of continuous moisture control during the curing period will be the sole responsibility of the contractor.

H. Any trenching through the finished cured lime/cement section will result in the contractor having to backfill trench with class 2 aggregate base rock, or cement/sand slurry,

1.5 WARRANTY

A. Refer to General Conditions and Section 01 78 36.

1.6 TESTING

- A. Geotechnical Engineer: Owner is retaining a Geotechnical engineer to determine compliance of Lime Stabilization Treatment with Specifications, and to direct adjustments in fill operations. Costs of Geotechnical Engineer will be borne by Owner; except that costs incurred for re-tests or re-inspection will be paid by Owner and back charged to Contractor.
- B. Inspection: Work shall not be performed without the physical presence and approval of Geotechnical Engineer. The Contractor shall notify the Geotechnical Engineer at least two working days prior to commencement of any aspect of site earthwork.
- C. Field Density: Field density and phenolphthalein reaction tests shall be made by the Geotechnical Engineer after completion of compaction. Where compaction equipment has disturbed the surface to a depth of several inches, density tests shall be taken in the compacted material below the disturbed surface.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Lime Treated Engineered Fill: The materials to be treated shall consist of on-site soils or approved import material as described in Section 31 00 00.
- B. Lime: Lime in areas to be treated shall be lime. The percentage of lime shall be based on a soil weight of 100 pcf; hence, 4.5 pounds lime should be utilized per square foot. A certification of compliance shall be submitted to the Geotechnical Engineer with each delivery of lime.
- C. Water: Water shall be added during the preliminary mixing operations and, if necessary, during final mixing and to keep the cured material moist until curing is complete. The amount of water added shall be subject to the approval of the Geotechnical Engineer at all times.

PART 3 – EXECUTION

3.1 PREPARATION

- A. General: Layout all work, establish grades, locate existing underground utilities, set markers and stakes, set up and maintain barricades and protection facilities; all prior to beginning actual earthwork operations.

3.2 EQUIPMENT

- A. Lime Spreader: The lime shall be spread by equipment which shall uniformly distribute the required amount of lime. The rate of spread per square foot of blanket shall not vary more than 5 percent from the designated rate, unless otherwise approved by the Geotechnical Engineer.
- B. Mixing Equipment: Mixing equipment shall be capable of mixing or remixing the materials to a uniform mixture free of streaks or pockets of lime to the full required depth.

3.3 START OF WORK UNDER THIS SECTION

- A. General: Prior to starting physical work under this Section, the property line is to be clearly staked and identified. No lime treated materials shall be allowed to contaminate areas outside of the property.
- B. Utilities: Contractor is to engage with a licensed contractor specialized in the Utility Locating Business. The contractor shall locate any and all utilities and pothole the same. The frequency of potholing shall be enough to establish the elevations of all utilities located.

3.4 LIME SPREADING

- A. Engineered Fill: Provide lime treatment in areas shown on plans and extending a minimum distance of 2 feet from outside edge of curb, building footing, wood header, and to a depth of at least 12-inches.
- B. Temperature: Lime shall not be spread while the atmospheric temperature is below 35 degrees Fahrenheit or when conditions indicate that the temperature may fall below 35 degrees Fahrenheit within 24 hours.

3.5 MIXING

- A. Lime shall be added to the material to be treated at a rate of 4.5 pounds lime per square foot based on a soil unit weight of 120 pcf.
- B. Lime shall be spread by equipment that will uniformly distribute the required amount of lime for the full width of the prepared material. The rate of spread per linear foot of blanket shall not vary more than five percent (5%) from the designated rate.
- C. The spread lime shall be prevented from blowing by suitable means selected by the Contractor. Quicklime shall not be used to make lime slurry. The spreading operations shall be conducted in such a manner that a hazard is not present to construction personnel or the public. All lime spread shall be thoroughly mixed into the soil the same day lime spreading operations are performed.
- D. The distance which lime may be spread upon the prepared material ahead of the mixing operation will be determined by the Geotechnical Engineer.
- E. No traffic other than the mixing equipment and water truck will be allowed to pass over the spread lime until after the completion of mixing. After mixing, grading and compacting are completed, only the water truck is allowed on the treated area to maintain the optimum moisture for curing.

- F. Mixing equipment shall be equipped with a visual depth indicator showing mixing depth, an odometer or footmeter to indicate travel speed and a controllable water additive system for regulating water added to the mixture.
- G. Mixing equipment shall be of the type that can mix the full depth of the treatment specified and leave a relatively smooth bottom of the treated section. Mixing and re-mixing, regardless of equipment used, will continue until the material is uniformly mixed free of streaks, pockets, or clods (of lime), and moisture is at approximately two percent (2%) over optimum and the mixture complies with the following requirements:

1.	<u>Minimum Sieve Size</u>	<u>Percent Passing</u>
a.	1-1/2"	100
b.	1"	95
c.	No. 4	60

- H. Non-uniformity of color reaction when the treated material, exclusive of one inch or larger clods, as tested with the standard phenolphthalein alcohol indicator, will be considered evidence of inadequate mixing.
- I. Lime-treated material shall not be mixed or spread while the atmospheric temperature is below 35°F. The entire mixing operation shall be completed within seventy-two (72) hours of the initial spreading of lime, unless otherwise permitted by the Geotechnical Engineer.

3.6 SPREADING AND COMPACTING

- A. The treated mixture shall be spread to the required width, grade and cross-section. The maximum compacted thickness of a single layer may be determined by the Contractor provided he can demonstrate to the Geotechnical Engineer that his equipment and method of operation will provide uniform distribution of the lime and the required compacted density throughout the layer. If the Contractor is unable to achieve uniformity and density throughout the thickness selected, he shall rework the affected area using thinner lifts until a satisfactory treated subgrade meeting the distribution and density requirements is attained, as determined by the Geotechnical Engineer, at no additional cost to the Owner.
- B. The finished thickness of the lime-treated material shall not vary more than five hundredths of a foot (0.05') from the planned thickness at any point.
- C. The lime -treated soils shall be compacted to a relative compaction of not less than ninety-five percent (95%) as determined by the ASTM D1557 Compaction Test.
- D. Initial compaction shall be performed by means of a sheepsfoot type roller or a vibratory padfoot roller. Final rolling shall be by means of a smooth drum roller.
- E. Areas inaccessible to rollers shall be compacted to meet the minimum compaction requirement by other means satisfactory to the Geotechnical Engineer.
- F. Final compaction shall be completed within thirty-six (36) hours of final mixing. The surface of the finished lime -treated material shall be the grading plane and at any

point shall not vary more than five hundredths of a foot (0.05') foot above or below the grade established by the plans.

- G. Before final compaction, if the treated material is above the grade tolerance specified in this section, uncompacted excess material may be removed and used in areas inaccessible to mixing equipment. After final compaction and trimming, excess material shall be removed and disposed of off site. The trimmed and completed surface shall be rolled with steel or pneumatic-tired rollers. Minor indentations may remain in the surface of the finished materials so long as no loose material remains in the indentations.
- H. At the end of each day's work, a construction joint shall be made in thoroughly compacted material and with a vertical face. After a part-width section has been completed, the longitudinal joint against which additional material is to be placed shall be trimmed approximately three inches (3") into treated material, to the neat line of the section, with a vertical edge. The material so trimmed shall be incorporated into the adjacent material to be treated.
- I. An acceptable alternate to the above construction joints, if the treatment is performed with cross shaft rotary mixers, is to actually mix three inches (3") into the previous day's work to assure a good bond to the adjacent work.

3.7 FINAL GRADING

- A. Finish all lime treated engineered fill grades to within a tolerance of 0.05' of grades shown for top of lime/cement stabilization treatment or as indicated by drawings and specifications.
- B. Leave all areas in suitable condition for subsequent work.
- C. Excess materials not needed for final grading operations shall be removed from the site.

3.8 CURING

- A. The surface of compacted and finish graded lime treated soil shall be kept moist for at least 3 days after final trimming, rolling and compacting. No equipment or traffic shall be permitted on the lime treated material during the 3 day cure, except for the water truck to keep the treated area at or above the optimum moisture. After the 3 day cure apply aggregate base. Maintain moisture curing at optimum level until aggregate base is placed

END OF SECTION.

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DIVISION 32 – EXTERIOR IMPROVEMENTS

- 32 12 00 – Asphalt Paving
- 32 12 36 – Pavement Sealer, Striping, and Signage
- 32 16 00 – Site Concrete
- 32 18 16 – Poured-In-Place Playground Surfacing
- 32 31 13 – Chain Link Fences and Gates
- 32 31 19 – Decorative Metal Fences and Gates
- 32 32 39 – Site Accessories
- 32 80 00 – Irrigation
- 32 90 00 – Landscaping

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SECTION 32 12 00 – ASPHALT PAVING

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Asphalt paving mix designs.
- B. Aggregate Base Course.
- C. Asphalt Overlay.
- D. Seal Coat and Striping.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- A. Section 01 50 00 – Temporary Facilities and Controls.
- B. Section 31 00 00 – Earthwork.
- C. Section 31 32 00 – Soil Stabilization.

1.3 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.

1.4 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.

1.5 REFERENCES AND STANDARDS

- A. ANSI/ASTM D698 – 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 – Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557 – 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 D3017 – Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- E. ANSI/ASTM D4318 – 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 those governing authorities have been notified.

1.6 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.

1.7 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.

1.8 TESTING

- A. General: Refer to Section 01 45 00 – Quality Control.
- 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.

1.9 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Sterilant: Soil sterilizer shall be CIBA GEIGY's Pramitol 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 manufacturers.
- 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 D6628.
 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 Paugment (RAP): HMA Type A or Type B may be produced using RAP providing it does not exceed 15% of the aggregate blend.

2.2 MIXES

- A. General: Plant mixed conforming to State Specifications, Section 39, Type B, 1/2" 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

3.1 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.

3.2 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.

3.3 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.
 - i. 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.
 - ii. 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.
- 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.

3.4 DEFECTIVE ASPHALT

A. Defective asphalt is as described below.

1. Exposed rock pockets on the finished surface that lack the # 8- #200 fines that is required per the sieve analysis.
2. Asphalt not placed to the design grades.
3. Asphalt that ponds water.
4. Asphalt that was compacted below the minimum required temperature and is cracked.
5. Asphalt that fails to meet the minimum compaction requirements.
6. Asphalt that lacks the minimum thickness required per plan.
7. New asphalt contaminated by a petroleum product, or spilled paint.
8. Asphalt that has depressions, cracks, scored divits from dumpster wheels, heavy equipment use, heavy construction products,
9. Asphalt placed on pumping, unstable sub-grades.

3.5 CLEANING

A. Refer to Section 01 77 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.

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SECTION 32 12 36 – PAVEMENT SEALER, STRIPING, AND SIGNAGE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Asphalt Seal Coat, Striping, and Signage

1. Parking Lot: Include text lettering at reserved stalls, to be coordinated with site prior to work being performed. Refer to plans.
 - a. Stall markings shall match existing as currently identified, and as listed below. GC to confirm location of each marked stall with District prior to striping. GC to submit a striping plan with each identified marked stall prior to striping, for District review and approval. **GC is responsible to take photos, dimensions, and colors of existing striping for reference.**

<u>NUMBER OF STALLS</u>	<u>STALL MARKING</u>
1	PRINCIPAL
1	SECRETARY
1	PLANT MANAGER
2	CAFETERIA
4	VISITOR
REMAINDER	STAFF

2. Play Areas / Playgrounds Striping: Includes, but not limited to the following. Some items are not recreated on plans but are described below.
 - a. Entire Asphalt Play Area: All striping shown on plans, as well as the following (if not shown on plans). Provide a minimum of five (5) colors at main play area; colors to be determined by District / site. **GC is responsible to take photos, dimensions, and colors of existing striping for reference.**
 - i. Classroom numbers painted in white (using stencils) onto the asphalt in front of each classroom
 - ii. Track around basketball court.
 - iii. Basketball court striping.
 - iv. Four square court striping.
 - v. Tetherball court striping.
 - vi. Hopscotch striping.
 - vii. Dodgeball / Kickball court striping.
 - viii. Door swings.

ix. Line up dots.

- b. Kindergarten Play Area: All custom striping shown on plans. Provide a minimum of eight (8) colors at Kindergarten Play Area; colors to be determined by District / site. **GC is responsible to take photos, dimensions, and colors of existing striping for reference.**

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00 – Temporary Facilities and Controls.
- C. Section 32 12 00 – Asphalt Paving

1.3 REFERENCES AND STANDARDS

- A. ANSI/ASTM D698 – 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 – Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557 – 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 D3017 – Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- E. ANSI/ASTM D4318 – 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.

1.4 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.
- H. Regulatory Requirements: The following shall comply with requirements of the ADA Standards for Accessible Design and the 2019 California Building Code, Chapter 11B.
 - 1. Pavement markings for disabled access parking stalls and access aisles.
 - 2. Signage for disabled access relating to parking stalls, parking lots, and accessible path of travel to building entrances including vertical clearance below post mounted signs located adjacent to walking surfaces.

1.5 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. Shop Drawings – Pavement Markings: For the following:
 - 1. Indicate pavement markings, colors, lane separations, parking spaces, directional arrows, and accessibility markings.
 - 2. Playground striping plans. No striping shall take place until submittal has been reviewed and returned.

1.6 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.

1.7 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.

1.8 TESTING

- A. General: Refer to Section 01 45 00 – Quality Control.

1.9 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Seal Coat: Shall be an asphalt emulsion blended with select fillers and fibers such as:

1. "Park-Top No. "327", a Western Colloid Product.
 2. "OverKote", Reed and Graham.
 3. "Park Top No. "302" with sand. (When specifically called for in the drawings).
- B. Precast Concrete Bumpers: 3000 psi at 28 day minimum strength; 48" length unless otherwise indicated; provide with steel dowel anchors and concrete epoxy.
- C. Crack Fill:
1. Cracks 1/8" – 1": "Docal 1100 Viscolastic, distributed by Conoco, Inc., Elk Grove, CA, (916) 685-9253, or an approved equal.
 2. Cracks greater than 1": "Topeka" Hot Mix.

2.2 PAVEMENT MARKING PAINT

- A. Approved Manufacturers: TT-P-1952 F traffic paint.
- B. Colors: As directed by District, Architect and California Building Code. Provide as listed below, unless otherwise indicated.
1. Main Play / Asphalt Area: Provide a minimum of five (5) colors at main play area; colors to be determined by District / site. **GC is responsible to take photos, dimensions, and colors of existing striping for reference.**
 2. Kindergarten Play Area: Provide a minimum of eight (8) colors at Kindergarten Play Area; colors to be determined by District / site. **GC is responsible to take photos, dimensions, and colors of existing striping for reference.**
 3. White:
 - a. Parking stall lines and text markings, as noted on plans.
 - b. Figure and border of international symbol of accessibility (ISA) markings at accessible parking stalls.
 - c. Diagonal striping for accessible parking stall access aisles where marked on asphalt paving.
 - d. Speed bumps.
 - e. Traffic arrows.
 - f. Playground striping, where noted on plans.
 4. Blue: Color equal to Color 15090 per Federal Standard 595C.
 - a. Background of international symbol of accessibility (ISA) markings at accessible parking stalls.

- b. Perimeter of accessible parking stall access aisles.
 - c. Diagonal striping for accessible parking stall access aisles where marked on concrete paving.
 - d. Playground striping, where noted on plans.
5. Red:
- a. Curbs of fire lanes, face and top of curb.
 - b. Fire lane striping, as noted on plans.
 - c. Playground striping, where noted on plans.
 - d. 3" wide dashed striping at all door swings, as noted on plans.
6. Black: For painting out existing pavement markings.
- a. Tint to match color of pavement.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Examine areas to receive asphalt sealcoat and verify following:
- 1. Absence of wet receiving surfaces or other conditions to adversely affect execution of his work.
 - 2. No foreseeable rain within 72 hrs. after application.
 - 3. Daytime temperatures of 50 degrees and rising.
- B. Do not start work until unsatisfactory conditions have been corrected and/or daytime temperatures are maintained above the minimum.

3.2 PAVEMENT SEALER (Seal Coat)

- A. Surface Preparation: surface and cracks shall be clean of all dirt, vegetation, sand, oil or grease. Broom, blow and hose down entire area with a strong jet of water to remove all debris, dirt and sand.
- 1. 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.
 - 2. Minor holes and imperfections may be patched using hot mix asphalt or a mastic consisting of sand and SS-1-H.
 - 3. Fill all cracks with a mastic filler up to a level condition. Provide multiple fills on deeper cracks so the cured product is level. Any shrinkage within the cracks will be refilled until it cures level.

- B. Seal Coat Application: Thoroughly mix water with raw materials and apply in accordance with the following,
1. No more than 15% by volume of water can be added to the sealcoat raw mix.
 2. The water shall be added onsite to the raw mix in the presence of the project inspector.
 - a. Any deviation from this procedure will be cause for rejection and re-application at the contractor expense with no additional cost to the owner.
 - b. The contractor shall supply a measuring devise to accurately measure the added water and be verifiable by the project inspector.
 3. The contractor shall place 2 coats of seal coat.
 - a. The first coat shall be applied at a rate of 25 gals per 1000 sq. ft.
 - b. The second coat shall be applied at a rate of 15 gals. per 1000 sq. ft.
 - c. Both applications shall be applied in the presence of the project inspector. Failure to do so will be reason for rejection and reapplication by the contractor at his expense with no extra cost to the owner. The second coat of sealcoat shall not be applied until the first coat thoroughly dried.
 - d. Keep vehicles off the fresh coated surface for a minimum of 24 hrs. or longer in cooler climates.
- C. Clean-Up and Precautions: As recommended by pavement sealer material manufacturer.
1. Remove all utility box lids, including drop inlet grates and clean seal coat from edges of lids so future removal is possible

3.3 PAVEMENT MARKING

- A. Painted pavement markings shall be done only after the seal coat has thoroughly dried.
- B. Clean surfaces to be painted with traffic paint 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 cleaned to the extent by whatever means necessary that will satisfactorily accomplish the purpose of cleaning the surface without damage to asphalt concrete.
- C. Provide measured layouts, temporary markings, templates, and other means necessary to provide required marking.
1. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

2. Allow paving to age for time period recommended by paint manufacturer, but not less than 30 days before starting pavement marking.
 3. Test concrete paving for alkalinity, pH level shall be less than the maximum value recommended by paint manufacturer.
 4. Sweep and clean surface to eliminate loose material and dust. Surfaces shall be clean, dry, and free of oil, grease, and other foreign matter.
- D. 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.
- E. Each coat of paint shall be sprayed at a rate of 10-12 mils wet, 5-7 mils dry.
- F. The first coat of paint shall thoroughly dry before the second coat is applied.
- G. Paint shall not be applied during any windy conditions or anticipated rain events.
- H. Where indicated on the Drawings, paint parking stall strips, lettering, arrows, accessible symbols, playfield markings, etc. on asphalt concrete paving. Paint stripes 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 on the drawings).
1. International Accessible Symbol: Symbol shall be white figures on a blue background. Blue shall be equal to color No. 15080 in Fed. Std. 595C.
- I. Lines and symbols shall be accurately formed and true to line and form; lines shall be straight and uniform in width.
- J. Painted edges shall be clean cut and free from raggedness, and corners shall be cut sharp and square.
- K. Tolerances: Apply striping within a tolerance of 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.
- L. Prohibit traffic until traffic paint is fully dry.

3.4 SITE SIGNAGE

- A. Provide and erect site signage at the locations shown in the drawing and drawing detail(s)
1. Products:
 - a. Sign Post: 1-1/2" (1.90" O.D.) Sch. 40 Galv. Pipe
 - b. Post Cap: 1-1/2" (1.90" I.D.) Galv. Domed Cap
 - c. Sign Brackets: U-Clamp steel plate bracket with bolts sized for 1-1/2" 1.90" O.D.) pipe. 2 per sign.

- d. Sign Post Sleeve: 2" (2.38" O.D.) Sch. 40 Galv. Pipe with 3/8 X 3" bolt & Nut.
- e. Concrete Footing: 4 sack, 2500 psi
- f. "Stop" Sign: MUTCD; R1-1
- g. "Accessible Parking Sign" with \$250 Fine: MUTCD (Ca) R99C
- h. Accessible Parking Lot Entrance Sign: MUTCD (Ca) R100B
- i. "Van Accessible" Sign: MUTCD (Ca) R7-8b
- j. "Passenger Loading Zone Only" Sign: G-66 RA5
- k. Sign Sleeve Through Bolt: 3/8" zinc plated bolt, nut, and lock washer.

2. Installation:

- a. Pier Footings shall be per diameter and depth shown in the drawing detail.
- b. Pier shall crown 1" higher in the center than the surrounding finish grade except when installing the post in a lawn area, the last 4" to the top of the pier shall be 12"x12" square. The top shall match the adjacent sidewalk elevation with a 1" crown higher in the center.
- c. Sleeves and posts shall be installed to within 1/8" of plumb in 80".
- d. Top of sleeves shall be placed no greater than 3" and no less than 2" above finish grade with a 7/16" hole for the through bolt.
- e. All sleeves and posts shall be placed so the post top is no greater than 3" but no less than 2" taller than top of the highest mounted sign.
- f. All signage shall be mounted to 80" (6'-8") to the bottom of the sign(s) measured from finish grade. Exception: The parking lot accessible entrance signage shall be mounted no less than 36" and no greater than 40" when placed within a "Planter", other wise it shall be installed at 80" to the bottom of the sign.
- g. The accessible parking lot entrance sign shall have the name of the code enforcing agency along with the phone number. This information shall be an integral part of the sign when ordered.
- h. All posts shall have post caps installed and locked down by set screw. Glue on is not acceptable.

3.5 PROTECTION

- A. Provide barricades, warning signs and devices as required to protect sealcoat and

striping during application and drying period.

3.6 DEFECTIVE SEALCOAT

- A. The following description of sealcoat is considered defective and shall be corrected per the Engineers instructions.
 - 1. Sealcoat that's peeling, scaling, or blistering
 - 2. Sealcoat diluted greater than 15% the maximum dilution rate.
 - 3. Sealcoat that doesn't fill all of the crevasses within the asphalt up to a level and smooth surface.
 - 4. Sealcoat that lacks the minimum coverage rate as directed in specifications.
 - 5. Sealcoat applied over petroleum products such as diesel, oil, grease, etc.

3.7 WORKMANSHIP

- A. Provide best quality workmanship, performed by skilled tradesman.
- B. Perform work under conditions best suited to the production of acceptable work.
- C. All work will be subject to approval by SCUSD representative. Correct all work, which does not comply with the intent of the specification.
- D. Protect all adjacent areas and surfaces (i.e., cars in parking lot, patio furniture) from damage (i.e., spills, debris, etc.).
- E. Ensure that area is protected with caution tape or snow fence before work is started.
- F. Immediately clean up any accidents and restore the affected surface to its original condition.
- G. Provide a clean and liability-free work area.
- H. The Contractor shall take all necessary steps to protect the public and all property concerned.

3.8 CLEANING

- A. Refer to Section 01 77 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. Clean all striping overspray from the asphalt, if necessary use blackout paint for made for asphalt.

END OF SECTION.

SECTION 32 16 00 – SITE CONCRETE

PART 1 – GENERAL

1.1 SUMMARY

- A. 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.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00 – Temporary Facilities and Controls.
- C. Section 31 00 00 – Earthwork.
- D. Section 31 32 00 – Soil Stabilization.

1.3 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.

1.4 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

1.5 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.6 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 International (ASTM):
 - 1. ASTM C94 – Specification for Ready-Mixed Concrete.
- D. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice (latest edition).

1.7 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.

1.8 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.

1.9 TESTING

- A. General: Refer to Section 01 45 00 – Quality Control.
- 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.

1.10 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.

1.11 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

2.1 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 C309 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.

2.2 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.

2.3 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.

2.4 MATERIALS TESTING

- A. Materials testing of concrete and continuous batch plant inspection may be waived in accordance CBC Sections 1704A.4.4 when approved by Engineer and DSA.
- B. Testing of concrete shall be performed per Part 3.12 of this specification.

2.5 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

3.1 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 1-1/2" 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.

3.2 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.

3.3 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.

3.4 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.

3.5 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.

3.6 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 1-1/2 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.

3.7 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.

3.8 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.
 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.
- 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.

3.9 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 ¼" 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 77 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 18 16 – POURED IN PLACE PLAYGROUND SAFETY SURFACING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this Section.

1.2 WORK INCLUDED

- A. Provide all labor, materials, and tools necessary for the complete installation of a poured in place safety surfacing system composed of a wearing layer upper membrane and an underlying impact attenuation cushion layer as outlined in these specifications. The system should consist of but not necessarily be limited to the following:
 - 1. **Section Includes:** Resilient playground surfacing poured in place system. **The installation of the PIP system at the kindergarten play area is not included in the general contractor's bid, and will be performed by a separate contact, directly with the district. The installation of the PIP system at the main play area shall be bid as part of this project scope, in conjunction with the removal, salvaging, and reinstallation of the existing apparatuses at the main play area (to lower them all to lower grades).**
 - 2. **Related Work:** Playground equipment and resilient playground surfacing subbase.
 - 3. **Quality Assurance:** Manufacturer should have manufactured, and installed playground poured in place safety surfaces for a minimum of 5 years and meet current ASTM F1292 Test Criteria. The installation of the poured in place product should be completed by FLEXGROUND. Manufacturer's detailed installation procedures should be submitted to the Architect and made part of the Bid Specifications.

1.3 RELATED SECTIONS

- A. Division 31 Sections.
- B. Division 32 Sections.

1.4 REFERENCES AND STANDARDS

- A. Poured in Place Playground Safety Surfacing must meet or exceed all required ASTM standards below.
 - 1. ASTM C1028 – Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method

2. ASTM D412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension
3. ASTM D624 – Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
4. ASTM D2859 – Standard Test Method for Flammability of Finished Textile Floor Covering Materials
5. ASTM E303 – Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
6. ASTM F1292 – Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment
7. ASTM F1951 – Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment

1.5 DEFINITIONS

- A. EPDM granules: EPDM rubber (ethylene propylene diene monomer(M-class) rubber), a type of synthetic rubber, is an elastomer characterized by a wide range of applications. The M refers to its classification in ASTM D1418; the M class includes rubbers having a saturated chain of the polymethylene type.
- B. Critical Fall Height: A critical fall height (CFH) is the maximum height of fall from play equipment to the ground. It is important to note that safety surfaces do not prevent injury but aim to lessen the severity of any injury that may occur on falls from height.
- C. Fall Height: Fall height is a measurement defined as the “vertical distance between a designated play surface and the protective surfacing beneath it.
- D. TPV: Thermoplastic Vulcanized Elastomer. Developed using resin and synthetic rubber with higher UV stabilization.
- E. SBR: Styrene-butadiene or styrene-butadiene rubber (SBR) describe families of synthetic rubbers derived from styrene and butadiene

1.6 SUBMITTALS

- A. Prospective manufacturers and/or installers of the poured in place safety surfacing system should be required to comply with the following:
 1. The manufacturer must be experienced in the manufacturing of a poured in place safety surfacing system and provide references of five (5) specific installations in the last three (3) years.
 2. The installer must provide competent workmen skilled in this specific type of poured in place safety surfacing system installation. The designated supervisory personnel on the project must be competent in the installation of this material, including mixing of the materials, and spreading and compacting the materials correctly.

3. Installation should be in accordance with ASTM F1292 for Impact Attenuation of surface system under and around playground equipment. The poured in place system to be installed in compliance with the Critical Fall Height as determined by the Playground Equipment.
4. IPEMA Certification specific to poured in place safety surfacing.
5. IPEMA certification specific to 1/2" layer of 1-4mm TPV over cushion layer. 0.5mm TPV or EPDM IPEMA certification not acceptable.
6. Manufacturer should provide written instructions for recommended maintenance practices.
7. Manufacturer should submit color samples for customer verification. Color samples shall be 6" x 6" of 1/2" top wearcourse layer with aromatic or aliphatic binder, per client selection or specification: or 8 oz clear plastic jars with specified colored granules. Sample submittal format per client preference.

1.7 WARRANTY AND MAINTENANCE

- A. The bidder and/or poured in place safety surfacing manufacturer must provide the following:
 1. The poured in place safety surfacing manufacturer should provide a warranty to the owner that covers defects in materials and workmanship of the rubber for a period of FIVE (5) years from the date of Substantial Completion.
 2. The manufacturer's warranty should include general wear and tear. The warranty should specifically exclude vandalism, high heel punctures, acts of war or acts of nature beyond the control of the owner or the manufacturer.
 3. All poured in place warranties should be limited to repair or replacement of the affected areas and should include all necessary materials, labor, transportation costs, etc. to complete said repairs. All warranties are contingent on the full payment by the owner of all pertinent invoices and adherence to any required maintenance procedures.
 4. The installer should clean the jobsite of excess materials and, if necessary, backfill any excavation around the perimeter with earth or other appropriate fill material.
 5. The manufacturer should instruct the owner's personnel on proper maintenance and repair of the playground safety surface.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design:

1. Manufacturer: FLEXGROUND
2. Product: ENDURAFLEX

2.2 PRODUCT INFORMATION

A. The FLEXGROUND ENDURAFLEX, or equal, poured in place safety surfacing system should be in accordance with the following:

1. A dual durometer poured in place system with a wearing layer upper membrane and an underlying impact attenuation cushion layer. The finished surface should be porous and capable of being installed at varying thickness to comply with the Critical Fall Height requirements of the playground equipment.
2. FLEXGROUND primer is a 100% solids urethane primer/sealer. It is designed with low viscosity and penetrating abilities making this an ideal priming urethane.
3. The cushion layer should be a mixture of black recycled SBR rubber buffings mixed with a 100% solids moisture cured MDI Polyurethane binder or aliphatic (100 pounds of SBR rubber buffings to 12 pounds of binder) installed at the appropriate thickness. As an upgrade, or if recycled SBR rubber buffings are not available, 5/8" chunk rubber with correct amount of urethane for impact attenuation and longevity may be used. **Chunk rubber shall not include SBR derived from rubber tires.** It must be high quality preconsumer recycled rubber containing EPDM. The cushion layer should be porous.
4. The ENDURAFLEX and XTREME SURFACING wearing surface should be manufactured from 1-4mm Thermoplastic Vulcanized (TPV) virgin colored rubber granules bonded by FLEXGROUND binder, 100% solids moisture cured Polyurethane binder or aliphatic (110 pounds of TPV to 22 pounds of binder), and applied to a minimum thickness of 1/2" (12.7 mm) over the cushion layer.
5. FLEXGROUT should be a thixotropic thermoplastic paste applied at 1 gallon per 35 square feet over wear course layer in designated high-wear areas.
6. FLEXGROUT thermoplastic composite grout was tested by QAI Laboratories for the following:
 - a. ATSM D2047 Coefficient of Friction: Polish Flooring Surface. (Test Report #QI1411123-4). FlexGrout has been tested and certified at a friction of .588 dry standard, and .817 wet standard.

- b. ATSM D4 12-06ae2 ThermoPlastic Elastomers – Tension. (Test Report #QI1305148-2)
 - c. FlexGrout has been tested and certified at Peak Tensile Strength of 163psi; chlorine soaked at 133psi; and a Tensile Elongation at Break of 132.2%; chlorine soaked at 112.2%.
 - d. ATSM D624 – Tear Strength. (Test report #QI1305148-2)
 - e. FlexGrout has been tested and certified with a median Maximum Tear Strength of 75.74lbs; chlorine soaked at 70.03lbs.
 - f. A water-based composite color seal should be applied at a 200 sq. ft. per gallon and spread evenly to cover designated FlexGrout areas.
7. Color: The system color should be selected from Manufacturer’s Color Chart by owner prior to bid.
8. High Wear Coating: Flexgrout as manufactured by Flexground, or corresponding equal.

PART 3 – EXECUTION

3.1 GENERAL

- A. Install all systems in full accordance with manufacturer’s recommendations.
- B. Slope across finished product shall not be greater than 2% in any direction. Contractor shall carefully checked grades during installation of perimeter curb and play equipment access points to assure that all slopes are less than 2%.

3.2 SITE PREPARATION AND BASE

- A. The ENDURAFLEX site preparation and base should be in accordance with the following:
 - 1. The sub-base will have a slope of 2%.
 - 2. The base aggregate should consist of a minimum of four inches (4") of free-draining stone compacted to 95%. Finish slope of porous aggregate should be 2% from the centerline of the area to the perimeter, and the grade should not vary more than a quarter inch (1/4") in ten feet (10'-0").
 - 3. The sub-base should be installed in two inch (2") lifts to appropriate thickness.
 - 4. The sub-base should be compacted using vibrating tamper, to approximately 95% Proctor density.
 - 5. The sub-grade should no longer have any vegetation.
 - 6. Subgrade prior to aggregate installation: Sublevel grade is to be compacted prior to the ABC aggregate installation. Particular attention should be paid to

areas of disturbed earth such as where footers for playground equipment enter the ground. Concrete used to fill said areas/footers should be poured to the top of sublevel surface.

7. The poured in place safety surfacing manufacturer and architect will accept the aggregate base in writing prior to the installation of the poured in place system.
8. Any alterations must be agreed between all parties.
9. Hard Base Construction: For concrete surfaces, shot blast, acid etch or power scarify as required to obtain optimal bond of the Cushion Layer to the concrete. Remove sufficient material to provide a sound surface, free of glaze, efflorescence, or form release agents. Remove grease, oil, and other penetrating contaminants.
10. For concrete or asphalt surface that is not enclosed (i.e. a curb to curb pour), the concrete shall have keyway cuts 1-1/2" wide by 1-1/2" deep so that the system can be bull nosed down into the notch area.

3.3 EXECUTION AND INSTALLATION

- A. Installation: The poured in place safety surfacing installer should strictly adhere to the installation procedures outlined under these sections. Any variance from these requirements should be accepted in writing by the manufacturer's onsite representative and submitted to the architect/owner, verifying that the changes do not in any way affect the warranty.
- B. Perimeter:
 1. A urethane primer should be applied to concrete, asphalt or wood surfaces at a rate of 200-250 square feet per gallon. The entire area does not need to be primed at once, instead, prime about 700 square feet at a time in immediate advance of rubber installation. This procedure should be continued until all areas are complete.
 2. The urethane primer should be applied to any playground equipment that will be surrounded by the poured in place safety surfacing system.
- C. Cushion Layer:
 1. Provide a single pour installation for each area. No seams allowed in material.
 2. The components of the poured in place safety surfacing should be mixed on site in a mixer to ensure a comprehensive mix according to manufacturer's instructions.
 3. The cushion layer comprised of SBR buffings shall be mixed with the MDI moisture cure polyurethane binder at a rate of 12% of the total weight of the material thoroughly so that the binder is evenly dispersed into the rubber base.

4. The cushion layer comprised of non-tire derived SBR & EPDM Chunk Rubber shall be mixed with the appropriate amount of urethane so that the binder is evenly dispersed into the rubber base.
5. The cushion layer mix should then be spread and troweled to the desired depth and allow to cure for 24 hours.

D. Wear Course Layer:

1. Provide a single pour installation for each area. No seams allowed in material.
2. The wear course layer should be mixed with 1-4mm TPV granules and urethane binder at a rate of 20% of the total weight of the materials so the granules are covered thoroughly and evenly.
3. The wear course layer mix should be spread and troweled to a depth of a half inch (1/2") immediately after the application of primer.
4. Where seams are required due to color change, a step configuration with a 4" overlap will be constructed to maintain wear surface integrity. Butt seams are not acceptable.
5. The finished texture shall be slip resistant, smooth and even.
6. The poured in place surface should be allowed to cure for 24-72 hours or until dry to the touch.

E. Grout Sealer at High Wear Areas:

1. Provide at base of main access point to structure, at bottom of slides, beneath swings, other high traffic, high wear areas.
2. The wear course layer should be sealed with a thermoplastic composite grout. FLEXGROUT should be spread with a trowel at a rate of 1 gallon per 30 square feet. Pressure should be applied to the trowel with enough force to push the grout into the wear course layer, rendering it impermeable. The finished texture should be slip resistant and even.
3. The poured in place surface should be allowed to cure for 24-72 hours or until dry to the touch.
4. Color Seal: The color seal should consist of a water based composite liquid. Color seal should be rolled (or can be sprayed) to completely cover entire surface. The color seal should be allowed to cure for 24-72 hours or until dry to touch.

3.4 ADDITIONAL INSTALLATION INSTRUCTIONS

- A. Trailer/ Large truck access will be necessary for the installation. In the case that access for trailer/truck is not available the owner or general contractor will be responsible for transporting material to the job site.

- B. Crew is responsible for protecting the surface only while present on site. General Contractor or owner shall be responsible for the security of the surfacing overnight during installation, as well as during the product's cure period after completion of the install.
- C. Crew will leave site clean and shall remove all trash and debris.
- D. General contractor shall provide a dumpster for all waste and trash.

END OF SECTION.

SECTION 32 31 13 – CHAIN LINK FENCES AND GATES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Fence framework, fabric, and accessories.
- B. Excavation for post bases; concrete foundation for posts.
- C. Manual gates and related hardware.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 08 71 00 – Door Hardware.
- C. Section 32 16 00 – Site Concrete.
- D. Section 32 31 19 – Decorative Metal Fences and Gates

1.3 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.

1.4 SYSTEM DESCRIPTION

- A. Fence Height: 6'-0" unless otherwise noted.
- B. Line Post Spacing: At intervals not exceeding 10 feet.

1.5 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 Architect and Owner.

1.6 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.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on shop drawings.

1.8 WARRANTY

- A. Manufacture of slats to provide a 25 year warranty against color fading and breakage of slats.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Fabric: See plans for locations of fencing:
 - 1. Type A – Non-Slatted Fabric: Standard Industrial grade, 1-3/4" mesh, 9 gauge hot-dipped galvanized steel wire, top selvage, knuckle end closed, bottom selvage, knuckled end closed.
 - 2. 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 F668 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).
 - 3. Type D – Privacy Slatted Fabric: Industrial grade. 3-1/2" x 5" diamond mesh interwoven wire with factory installed 2.310" wide PDS "IDS" slats full height or approved equal. Secure slats with monel-clinch-lock staples. 9-gauge zinc coated steel wire, top selvage knuckled tight, bottom selvage knuckled end closed. Color as selected by Owner from Manufacturer's Standard range of colors. Slats to be fabricated of extruded high-density virgin polyethylene, containing color pigmentation and U.V. inhibitors.
- 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. Refer to Section 08 71 00.
- J. Cane Bolt Receiver: 1-1/4" x 8" galvanized pipe. Refer to Section 08 71 00.

2.2 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. Refer to Section 08 71 00.
- D. ADA Accessible Gate Latch, Lockable: Paddle type lever that opens gate without full rotation. Refer to Section 08 71 00.

2.3 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. Refer to Section 08 71 00.
- C. Accessories: Same finish as framing.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with ANSI/ASTM F567 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.
 - 1. 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.
 - 2. 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 concrete.
- D. Line, Terminal, and Gate Post Footing Depth Below Finish Grade: 42 inches and 12 inches diameter.
- E. 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.
- F. Provide top rail through line post tops and splice with 6 inch long rail sleeves.
- G. Install center and bottom rails all around enclosure.
- H. Stretch fabric between terminal posts.
- I. Position bottom of fabric 1 inch above finished grade.
- J. Fasten fabric to top, center and bottom rail and line posts with tie wire at maximum 12 inches on centers.
- K. Attach fabric to end, corner and gate posts with tension bars and tension bar clips at 12 inches on center.
- L. Install gate with fabric to match fence. Install three hinges per leaf, Install latches, catches, retainers and locking clamp.
- M. 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."
- N. All field welding to be performed by certified welder and all welds are to be ground down smooth and treated.
- O. All areas of welds are to be thoroughly cleaned, fluxed, and treated with galvanizing zinc "Hot Stick". Do not over heat pipe when treating.
- P. At double swing gates, install cane bolt receiver in concrete measuring 8" diameter, 12" deep.

3.2 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.

END OF SECTION

SECTION 32 31 19 – DECORATIVE METAL FENCES AND GATES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Ornamental picket fencing, posts, panels, gates, hardware, and accessories.
 - 2. Contractor shall provide all labor, materials and appurtenances necessary for installation of the fence and gate system defined herein.

1.3 RELATED SECTIONS

- A. Section 08 71 00 – Door Hardware
- B. Section 32 16 00 – Site Concrete
- C. Section 32 31 13 – Chain Link Fences and Gates

1.4 REFERENCES

- A. 2019 California Building Code (CBC), with Amendments.
- B. ASTM International (ASTM):
 - 1. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 2. ASTM A513 – Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
 - 3. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
 - 4. ASTM B695 – Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Shop Drawings: Layout of all fences and gates with dimensions, details and finishes of component accessories and post foundations.

- C. Product Data: Manufacturer's catalogue cuts indicating material compliance and specified options including steel tube sizes.
- D. Samples: Color selections for polyester powder coat finish.

1.6 PRODUCT HANDLING AND STORAGE

- A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

1.7 PRODUCT WARRANTY

- A. All structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of 20 years from date of original purchase. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.
- B. Reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufactures warranty shall be guaranteed for five (5) years from date of original purchase.

PART 2 – PRODUCTS

2.1 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:
 - 1. Basis of Design Style:
 - a. Monumental Iron Works, Estate L 3 rail 3/4" picket, or approved equal.
 - b. Ameristar Fencing, Montage II® Welded and Rackable (ATF – All Terrain Flexibility) Ornamental Steel, Genesis profile, or approved equal.
 - 2. Heights: 6'-0" or as otherwise indicated on the Drawings.
- C. Approved Manufacturers:
 - 1. Monumental Iron Works, Baltimore, MD, Phone (888) MH-Fence
 - 2. Ameristar, Tulsa, OK, Phone (888) 333-3422
 - 3. Merchant Metals, Phone (770) 741-0300

2.2 ORNAMENTAL PICKET FENCE

- A. Pickets: Square tubular members, ASTM A513, hot-rolled structural quality steel. 50,000 psi (310 Mps) tensile strength, 60,000 psi (372 Mpa) yield strength. Minimum size pickets 3/4" square x 16 ga. Space pickets 3-15/16" maximum (100mm) face to face. Minimum gauge wall thickness solid gauge.
1. For Monument Iron Works: Attach each picket to each rail with 1/4" (6mm) industrial drive rivets. Size #4.
- 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. Steel for rail produced under ASTM A653. Provide top rail below pickets, bottom rail, and third rail 6" below top rail.
1. For Monument Iron Works: Punch rails to receive pickets and rivets and attach rails to rail brackets with two (2) each, 1/4" (6 mm) industrial drive rivets. Size #4.
 2. For Ameristar Montage Genesis: Pickets shall be inserted into the pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture. The aligned pickets and rails shall be joined at each picket-to-rail intersection by Ameristar's proprietary fusion welding process, thus completing the rigid panel assembly
- 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 A653 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.
- 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°F (232°C) metal temperature. Color as selected by Architect from manufacturer's full range of standard colors.
- F. Security Mesh: At pedestrian gate with panic hardware, provide powder-coated 16 ga. x 1-1/2" x 1-1/2" flattened expanded metal mesh attached to tube steel at 12" on center, with self tapping screws, on fencing shown on plans. Screw heads to have matching black powder-coated finish. Provide welded closure channels at vertical edges. Mesh shall extend to adjacent fencing full width of panel, or as noted on plans. Mesh size / pattern to match existing on campus at existing metal fences and gates.

2.3 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. Pedestrian gates with panic hardware shall have perforated metal mesh attached to full height and width and extended on fencing full width of gate and full width of adjacent fence panel(s) to the side(s) of the gate, as shown on drawings.

2.4 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. Hardware:
 - 1. General:
 - a. Operable parts of hardware shall be between 34" and 44" AFF or ground, per CBC 11B-404.2.7.
 - b. Gate closers shall be adjusted so that from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is 5 seconds minimum (CBC 11B-404.2.8.1). Spring hinges shall be adjusted so that from the open position of 70 degrees, the door or gate shall move to the closed position in 1.5 seconds minimum (CBC 11B-404.2.8.2).
 - c. Gate opening force shall be 5 pounds maximum (CBC 11B-404.2.9)
 - d. Gate surfaces within 10" of finish floor or ground shall have a smooth surface of the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16" of the same plane as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be capped (CBC 11B-404.2.10).
 - 2. Hinges: Provide heavy-duty weld hinges of size capable of supporting specified leaf width without sag or failure. Gorilla hinge or equal.

3. Locking Clasps: Provide heavy-duty hardware to receive padlock at location where gate leaves meet each other or strike post.
4. 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.
5. 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.
6. Panic (Exit) Devices: Refer to Section 08 71 00.
7. Kickplates: Kickplates to be fabricated, as shown on plans, and shall be similar or equal to Ives Model 8400. See plans for sizing and mounting heights / locations.
8. 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.
9. 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.

2.5 SETTING MATERIAL

- A. Concrete: Minimum 28-day compressive strength of 3,000 psi.

PART 3 – EXECUTION

3.1 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.

3.2 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. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.
- D. Concrete Fence Set Posts: 24" min. Ø x36" min. deep or as otherwise indicated on

drawings, or as recommended by manufacturer.

- E. Concrete Footings for Gate Swing Posts: Provide reinforced concrete footings as indicated on the Drawings.
- F. Check each post for vertical and top alignment and maintain in position during placement and finishing operation.
- G. 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.
- H. 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".
- I. Where touch up paint is necessary, paint shall match powder coated finish. Unacceptable finishes will require re-powder coating.
- J. Cutting of manufacturer's brackets will not be accepted.
- K. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations.
- L. Unless otherwise indicated, extend concrete footings 2" above grade and trowel to a crown to shed water.

3.3 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. Welding: All welds shall be shop fabricated prior to galvanizing unless otherwise acceptable to Owner's representative. 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 hinges shall be welded to the gate post.

3.4 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.

3.5 CLEANING

- A. Clean up debris and unused material and remove from site.

3.6 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.

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SECTION 32 32 39 – SITE ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions, and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Work includes: Bike Racks.

1.3 RELATED SECTIONS

- A. 32 13 13 – Concrete Paving.

1.4 QUALITY ASSURANCE

- A. Suppliers: Furnish as detailed on drawings and as listed as below.

1.5 SUBMITTALS

- A. Product Data: Submit Product Data as shown in this specification section.

PART 2 – PRODUCTS

2.1 BIKE RACKS

- A. Basis of Design Product: Ultrasite Contemporary Loop Bike Rack, Model 5807SM. (www.ultra-site.com)
- B. Quantity: See site plan for locations.
- C. Overall Dimensions: 36" H x 2-3/8" W x 87-1/2" L, holds 9 bikes.
- D. Framework: Fabricated from 2-3/8" OD 12 gauge galvanized pipe.
- E. Mounting: Surface Mounted. Surface mount plate is 6" diameter x 1/4" thick steel, electrically MIG welded.
- F. Colors: Powder-coated. As chosen from manufacturer's standard options.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Installer must examine areas and conditions under which units are to be installed and must notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION

- A. Install per manufacturer's recommendations and guidelines.
 - 1. Recommended Surface Mount Hardware: 3/8" x 3-1/2" Concrete Expansion Anchor Bolts.
- B. Install units at locations shown. Provide plumb, level (or with uniform slope for pipe), and rigid installation.

3.3 ADJUST AND CLEAN

- A. Touch-up marred surfaces but replace units which cannot be restored to original appearance.

END OF SECTION.

SECTION 32 80 00 – IRRIGATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Documents and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 DESCRIPTION

- A. 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.
- B. Utilize and accept as standards manufacturer's recommendations and/or installation details for any information not specifically detailed on the Drawings.

1.3 RELATED SECTIONS

- A. Section 01 33 00 – Submittals.
- B. Section 31 00 00 – Earthwork.
- C. Section 32 90 00 – Landscaping.

1.4 GUARANTEE

- 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.)

1.5 QUALITY CONTROL

- 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. Delivery, Storage, and Handling:

1. Use all means necessary to protect irrigation system materials before, during, and after installation and to protect related work and material.
2. 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.

G. Comply with the requirements of Section 01 77 00 – Contract Closeout and Final Cleaning.

1.6 INSPECTION REQUIREMENTS

- A. 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.
- B. 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.
- 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. Pressure testing of all mainlines and lateral lines (See "Hydrostatic Tests – Open Trench" in Part 3.14 of this Section),
 2. Trench depth,
 3. Sleeves under pavement,
 4. Flushing of all mainlines and lateral lines,
 5. Backfill and pipe bedding,
 6. Layout of heads,

7. 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.
- 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.

1.7 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with requirements of Section 01 33 00 – Submittals.
- 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.

1.8 PROJECT CONDITIONS, AND PROTECTION

- 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 trees-to-remain as specified in "Existing Tree Protection" in Part 3.2 of this Section.
- C. Protect existing utilities within construction area. Repair damages to utility lines that occur as a result of operations of this work.
- D. 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.

1.9 MAINTENANCE AND OPERATING INSTRUCTIONS

- 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.

1.10 RECORD DRAWINGS

- A. 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. (See "Record Drawings" in Part 3.17 of this Section)

PART 2 – PRODUCTS

2.1 GENERAL

- 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.

2.2 MATERIALS

- A. Automatic Control Valves: As indicated on Drawings.
- B. Gate Valve: As indicated on Drawings.
- C. Pipe and Fittings:
1. PVC pipe: As indicated on Drawings.
 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.
 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.
 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.
- D. PVC Primer: Weld-On P-70 Purple Primer or approved equal.
- E. PVC Glue: Weld-On 711 Gray heavy bodied PVC Cement or approved equal.
- F. Sprinkler Heads: As indicated on Drawings.
- G. Sleeves: As indicated on Drawings.
- H. All Valve Boxes and Covers: Manufactured, green with "Irrigation – Non-Potable" permanently embossed on cover. Carson, Rainbird or approved equal.
- I. Automatic Sprinkler Control Wire:
1. Connections between remote control valves and controller: UF-14 direct burial 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.
- J. 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 (2-1/2") 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.

- K. Valve Identification Tags: Christy's irrigation ID tags, standard yellow color or approved equal.
- L. Sand for Trench Backfill: Natural sand, free of roots, bark, sticks, rags, or other extraneous material.

PART 3 – EXECUTION

3.1 SITE CONDITIONS

- 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.

3.2 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.

3.3 GRADING

- A. 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.

3.4 LAYOUT

- A. 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.
- B. 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.

3.5 EXCAVATING AND TRENCHING

- A. 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.
- B. Width:
 - 1. 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.
 - 2. Allow a minimum clearance of twelve inches (12") in any direction from parallel pipes of other trades.
- C. 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.
- D. Minimum depth of cover: Unless shown otherwise, provide the following minimums:
 - 1. Mainline: twenty-four inches (24") cover.
 - 2. Lateral line: twelve inches (12") cover for spray heads, and eighteen inches (18") cover for rotor heads.
- E. Conflicts with other trades:

1. Hand-excavate trenches where potential conflict with other underground utilities exist.
2. Where other utilities interfere with irrigation trenching and piping work, adjust the trench depth as instructed by Owner's Representative.

3.6 THRUST BLOCKS

- A. To resist system pressure on ring-tite pipe and 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.
- B. Use cast-in-place concrete and size thrust blocks based on an average soil-safe bearing load of 700 lbs. per square foot.
- C. 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.
- D. Thrust blocks are to be constructed of concrete with a minimum of 2500psi.
- E. Thrust blocks are to be free, separate, and independent of adjacent or nearby thrust blocks.

3.7 BACKFILL AND COMPACTING

- A. 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.
- B. Place backfill in six-inch (6") layers and compact with an acceptable mechanical compactor.
 1. Compact backfill material in landscape areas to eighty-five percent (85%) maximum dry density of the soil.
 2. 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.
- C. 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.
- D. Finishing: Dress-off areas to eliminate construction scars.

3.8 CONTROL WIRES

- A. General: Install control wires beneath sprinkler main line whenever possible; tape wires to mainline pipe. Provide one spare wire for each controller.
- B. 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.

- C. Expansion and Contraction: Snake wire in trench to allow for contraction of wire.
- D. 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.
- E. Wire Connections: Install wire connections in a waterproof sealing pack.
- F. Wire Splicing: Permit splicing only on runs exceeding 500 feet. Locate all splices within valve boxes.
- G. Wire Termination: Install wire in a valve box with eighteen inches (18") of slack wire coiled and individually capped with approved waterproof sealing pack.
- H. 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.

3.9 FLUSHING LINES

- A. Thoroughly flush lines prior to installing valves, performing hydrostatic testing, or installing sprinklers. Divert water to prevent washouts.

3.10 AUTOMATIC CONTROL AND QUICK COUPLER VALVES

- A. 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.
- B. Thoroughly flush mainline before installing valve.
- C. Install valves in ground cover areas where possible.

3.11 PIPING

- A. General: Install in conformance with reference standards, manufacturer's written directions, as shown on Drawings and as herein specified.
- B. Workmanship:
 - 1. General: Install sprinkler irrigation equipment in planted areas throughout the site.
 - 2. Coordination: Organize location of sleeves with other trades as required.
- C. Pipe Line Assembly:
 - 1. General:
 - a. Cutting: Cut pipe square; remove rough edges or burrs.

- b. Solvent-welded Connections: Use materials and methods recommended by the pipe manufacturer.
 - c. Brushes: Use non-synthetic brushes to apply solvents and primer.
 - d. Cleaning: Clean pipe and fittings of dirt, moisture, and debris prior to applying solvent or primer.
 - e. Assembly: Allow pipe to be assembled and welded on the surface or in the trench.
 - f. Expansion and Contraction: Snake pipe from side to side of trench to allow for expansion and contraction.
 - g. 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.
2. Elastomeric Seal (Gasket) Joints:
- a. General: Assemble in strict conformance with the pipe manufacturer's instruction.
 - b. Rubber Rings: Use rubber rings specific for water service systems.
 - c. 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.
 - d. Seating: Properly seat ring in groove.
 - e. Spigot: General: 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.
3. Connections:
- a. Threaded Plastic Pipe Connection:
 - i. Use Teflon tape or pipe joint compound.
 - ii. When assembling to threaded pipe, take up joint no more than one full turn beyond hand-tight.
 - b. Metal Valves and Plastic Pipe: Use threaded plastic male adapters.
 - c. Metal to Metal Connections:
 - i. Use specific joint compound or gasket material for type of joint made. Where pipe of dissimilar metals are connected, use dielectric fittings.
 - ii. Where assembling, do not allow more than three full threads

to show when joint is made up.

- d. Where assembling soft metal (brass or copper) or plastic pipe, use strap-type friction wrench only; do not use a metal-jawed wrench.
- e. Threading:
 - i. Do not permit the use of field-threading of plastic pipe or fittings. Use only factory-formed threads.
 - ii. 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.
 - iii. Use pipe joint compound for all threaded joints. Apply compound to male thread only.
- 4. Sleeves and conduits:
 - a. 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.
 - b. Provide removable, non-decaying plug at end of sleeve to prevent entrance of soil.
- 5. Unions: Locate unions for easy removal of equipment or valve.
- 6. 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.

3.12 SPRINKLER HEADS

- A. 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.
- B. 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.
- C. 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.
- D. 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.

3.13 CONCRETE WORK

- A. 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 C94. Refer to Section 32 16 00 – Site Concrete.

3.14 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.

3.15 CLEAN-UP

- A. Remove debris resulting from work of this Section.

3.16 ADJUSTMENTS AND MAINTENANCE

- 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.

3.17 RECORD DRAWINGS

- A. 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 back-filled.
- B. 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.
- C. 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.
- D. Show the following on the Record Drawings accurately to scale and dimensioned from two permanent points of reference:
 - 1. Distance of mainline from nearby hardscape.
 - 2. Location of automatic control valves, quick couplers, and gate valves.
 - 3. Location and size of all sleeves.
 - 4. Location of automatic control wires and spares.

3.18 OPERATION MANUALS

- A. 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.

END OF SECTION.

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SECTION 32 90 00 – LANDSCAPING

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Scope of Work: Furnish all labor, materials, tools, equipment, and transportation required to perform and complete the following work as specified herein:
 - 1. Soil Preparation and Fertilization
 - 2. Sodding
 - 3. Weed Control
 - 4. Clean-up
 - 5. Landscape Maintenance Period
 - 6. Guarantee
- B. 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 unless shown on the landscape Drawings.
- C. Construction Documents and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications sections, apply to this section.

1.2 RELATED SECTIONS

- A. Section 01 33 00 – Submittals.
- B. Section 01 77 00 – Contract Closeout and Final Cleaning.
- C. Section 31 00 00 – Earthwork.
- D. Section 32 80 00 – Irrigation.

1.3 GUARANTEE

- 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. Sod is to be replaced as per "Landscape Maintenance" in Part 3.6 of this Section.

1.4 QUALITY CONTROL

- 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 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. 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 and soil amendments with appropriate certificates.
- F. Comply with the requirements of Section 01 77 00 – Contract Closeout and Final Cleaning..

1.5 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.

1.6 SUBMITTALS AND SUBSTITUTIONS

- A. See Section 01 33 00 – Submittals for additional requirements.
- B. Data Sheets: Provide product data for each type of landscape material indicated in the Drawings and Specifications.

- C. Samples: Submit samples of the following materials to Landscape Architect for approval:
 - 1. Soil amendment: (3) one-quart zip-locked plastic bags.
 - 2. Imported Topsoil: (3) one-quart zip-locked plastic bags. (if needed)
- D. Provide soils analysis reports prepared by a qualified soils laboratory in compliance with the Soil Testing Requirements under "Soil Testing" in Part 3.2 of this Section.
- E. 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.

1.7 PROTECTION AND CLEAN-UP

- 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 as a result 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.

1.8 PLANTING SCHEDULE / ENVIRONMENTAL REQUIREMENTS

- A. 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.
- B. Proceed with work in an orderly and timely manner to complete installation of landscaping within contract limits.
- C. 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.

1.9 LANDSCAPE MAINTENANCE PERIOD REQUIREMENTS

A. Beginning of Landscape Maintenance Period:

1. General: Landscape Maintenance Period does not begin until all work is installed, as determined by Landscape Architect, in writing.
2. 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.
3. 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 3.6 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.

1.10 RECORD DRAWINGS

A. 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.

PART 2 – PRODUCTS

2.1 GENERAL

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.

2.2 SOIL PREPARATION MATERIALS

A. 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.

- B. 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.
- C. Fertilizer/Soil Conditioner: Gro-Power Plus or approved equal.

2.3 PLANT MATERIAL

- A. Lawn Sod: Ninety percent (90%) Perennial Ryegrass and ten percent (10%) Kentucky Bluegrass.

PART 3 – EXECUTION

3.1 SITE CONDITIONS

- 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.

3.2 SOIL TESTING

- A. 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.
- B. Submit each sample, according to the quantity of soil required by testing laboratory, to a competent laboratory approved by the Owner's Representative.
- C. 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.

3.3 PREPARATION

A. 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. 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.

B. 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 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.

C. 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 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.

3.4 PLANTING

A. 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 keep sod moist at all times until rooted. After sod is established, decrease frequency and increase amount of water per application as necessary.

3.5 CLEAN-UP

- 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.

3.6 LANDSCAPE 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. 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.
4. 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.
5. 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.

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DIVISION 33 – UTILITIES

33 00 00 – Site Utilities

33 40 00 – Site Drainage

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SECTION 33 00 00 – SITE UTILITIES

PART 1 – GENERAL

1.1 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.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- A. Section 01 50 00 – Temporary Facilities and Controls.
- B. Section 31 00 00 – Earthwork.
- C. Section 31 23 33 – Trenching and Backfilling.
- D. Section 31 32 00 – Soil Stabilization.
- E. Section 32 16 00 – Site Concrete.

1.3 REFERENCES AND STANDARDS

- A. ANSI/ASTM D698 – 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 – Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557 – 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 D3017 – Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- E. ANSI/ASTM D4318 – 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.

1.4 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.

1.5 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.

1.6 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.

1.7 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.

1.8 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.

1.9 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

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 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.

1.11 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.

1.12 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

2.1 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.

2.2 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.

2.3 PIPES AND FITTINGS

- A. Sanitary Sewer: PVC sewer pipe and fittings with Ring-Tite joints, ASTM D3034 SDR35.
- B. Domestic water Lines 3 1/2" 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. Solder: Lead Free. 95/5; 95% Tin / 5% Antimony.
- E. Mechanical Fitting Bolts: Bolts and nuts shall be carbon steel with a minimum 60,000 psi tensile strength conforming to ASTM A307, 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.
- F. Pipe Insulation: Pipe exposed to atmospheric conditions 1/2" thru 4" NPT; Johns Manville rigid fiberglass insulation, Micro Lok HP; Owens Corning Fiberglas SSL II; Conforming to ASTM C612, Type 1A or type 1B.

- G. 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.

2.4 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

2.5 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 1/2" to 3".
- B. Locate unions so that piping can be easily disconnected for removal of equipment or valve. Provide type specified in following schedule:
1. Type of Pipe Union
 - a. Steel Pipe: 150 lb. Screwed malleable ground joint, brass, brass-to-iron seat, black or galvanized to match pipe.
 - b. Copper tubing: Brass ground joint with sweat connections.
 - c. PVC Sch 80 pipe: PVC union, FIPT X FIPT

2.6 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.

2.7 TRACER WIRE

- A. No. 10 THW solid copper wire. Solder all joints

PART 3 – EXECUTION

3.1 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.

3.2 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.

3.3 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 up grade, 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 1/4" 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.

3.4 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.

3.5 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.

3.6 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.

3.7 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.

3.8 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 of 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

System Tested	Test Pressure PSIG Test With
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.

3.9 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 77 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.

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SECTION 33 40 00 – SITE DRAINAGE

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Storm Drain piping, fittings, structures.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00 – Temporary Facilities and Controls.
- C. Section 31 00 00 – Earthwork.
- D. Section 31 23 33 – Trenching and Backfilling.
- E. Section 31 32 00 – Soil Stabilization.
- F. Section 32 16 00 – Site Concrete.

1.3 REFERENCES AND STANDARDS

- A. ANSI/ASTM D698 – 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 – Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557 – 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 D3017 – Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- E. ANSI/ASTM D4318 – 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.

1.4 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.

1.5 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.

1.6 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.

1.7 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.

1.8 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.

1.9 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

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 gulying 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.

1.11 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.

1.12 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

2.1 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

3.1 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.

3.2 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.

3.3 TOLERANCES

A. Storm Drain structure grates:

1. In landscape and lawn areas +/- 0.05'.
2. In sidewalk and asphalt pavement +/-0.025'.
3. In curb and gutter application +/-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, $\pm 0.025'$.

3.4 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, Part 3.8.B.

3.5 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.

3.6 CLEANING

- A. Refer to Section 01 77 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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