

PROJECT MANUAL

for

Landscape and Drainage Upgrade for Main Quad Area and Re-paving of Existing Main Parking Lot at Tropico Middle School

SOUTHERN KERN UNIFIED SCHOOL DISTRICT

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Project No. 2940.0400

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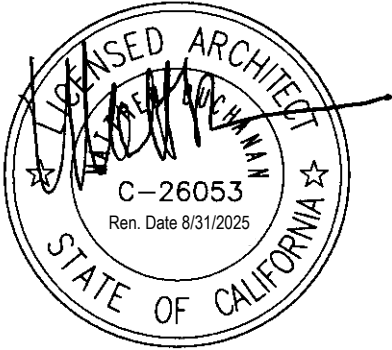
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DATE: 12/04/2024

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SUMMARY OF WORK

1.00 GENERAL

1.01 SUMMARY

- A. The Project consists of design and construction of the following items:
 - 1. Re-paving, re-stripping and drainage improvement for the existing parking lot.
 - 2. Drainage improvement for the existing main campus quad area.
 - 3. Landscape and irrigation improvement for the existing main campus quad area.

1.02 PHASING/CONTRACTOR'S USE OF PREMISES

- A. Move stored products, which interfere with operations of District or other contractors.
- B. Obtain and pay for use of additional storage, work areas or parking needed for operations or Contractor's employees.
- C. Use of site: Limit to areas directed by the District.
 - 1. Allow District access to maintain and operate other existing facilities.
 - 2. Permit unimpeded access by firefighting, law enforcement agencies and rescue equipment.
 - 3. Access to and egress from construction site shall be in strict conformance to prearranged routes approved by the District, with the understanding that curtailment of traffic or revision of access routes may be required on short notice if the District's operations mandate such changes because of excessive noise, or problems with safety, service, or supply.
- D. Partial District's occupancy: The District reserves the right to place and install equipment in areas of the Project prior to Substantial Completion provided it doesn't interfere with normal completion of Work. This partial occupancy shall not constitute acceptance of the Work.

1.03 WORK NOT IN CONTRACT

- A. The following will be provided by the District under separate contracts.
 - 1. Encapsulation, removal and disposal of asbestos, toxic substances and other hazardous materials.
 - 2. Tests and inspections specified to be provided by the District in the Contract Doc

uments.

3. Items noted NIC (Not In Contract) on the Drawings or in the Specifications.
 4. Items noted OFCI (Owner Furnished Contractor Installed) on the drawings or the specifications shall identify those items that will be purchased and delivered to project by the Owner but for which the Contractor(s) shall be responsible for all labor and materials necessary to fully and properly install the supplied items.
- B. When work of this Contract requires the Contractor to make allowance for the above in his work, and to provide supports, power, conduits, stub-outs and other services to these items, the drawings, manufacturer's data and other information necessary for Contractor's work will be provided by the District upon request.

1.04 DEFINITIONS

- A. In addition to other definitions included in these Specifications, the following applies to the Work:
1. Approved, approved equal, or equal, mean as approved and accepted by the Architect and District.
 2. As necessary means essential to completion of Work.
 3. As required means as required by Contract Documents.
 4. As selected, as approved, as directed or words of similar import mean as selected by, as approved by, or as accepted by the Architect. No implied meaning shall be interpreted to extend Architect's responsibility into the Contractor's area of Contractor's supervision.
 5. As shown, as detailed, as indicated and words of similar import mean as indicated on the Drawings.
 6. Building Department and Authorities Having Jurisdiction: All agencies, individually or collectively, charged by statute with administration/ enforcement of requirements of the Building Code at Project location.
 7. Concealed means embedded in masonry, concrete or other construction, installed within furred spaces, within a wall/partitions or above suspended ceilings, in trenches, in crawl spaces, or in enclosures.
 8. Equipment means a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.
 9. Exposed means not installed underground or concealed as defined above.
 10. Fabricated means items specifically assembled or made out of selected materials to meet individual design requirements for the Project.

11. Furnish (materials) means to supply and deliver to the Project ready for installation and in operable condition.
12. Include/including means include/including, without limitation.
13. Install (services or labor) means to place in final position, complete, anchored, connected, and in operable condition.
14. Interior means a space completely enclosed by walls, solid door(s), floor and ceiling.
15. Exterior means a space which does not meet the definition for "interior" above.
16. Manufactured applies to standard units usually mass-produced.
17. Manufacturer's directions, instructions, recommendations, specifications means manufacturer's written directions, instruction, recommendations, specifications.
18. Materials are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form part of Work.
19. Named products are items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature current as of the date of the Contract Documents.
20. Owner furnished/Contractor installed (OFCl) means that some equipment may be Owner furnished and delivered to site by District and installed on site by Contractor under this Agreement.
21. Owner provided (OP) means items or equipment that shall be furnished and installed under separate contract by Owner/District. Product(s) means materials, systems, and equipment, and terms of similar intent.
22. Product(s) means materials, systems, and equipment, and terms of similar intent.
23. Provide means to supply, fabricate, deliver, place, and connect, complete in-place, ready for operation and use. When neither furnish, install nor provide is stated, provide is implied.
24. Division means Division of these Specifications except where the obvious intent is the act or process of dividing. Divisions are groups of related Sections.
25. Section means Section of these Specifications, except where the obvious intent is one of several components, a piece. Section is usually a basic unit of Work.
26. Shall is mandatory.

27. Submit, submittal, submission mean submit to Architect for review, unless otherwise stated.

1.05 TITLING AND ARRANGEMENT

- A. Article, Paragraph and subparagraph titles and other identifications of subject matter in Specifications are intended as an aid in locating and recognizing various requirements in beginning words of a sentence or where title establishes subject, titles are subordinate to and do not define, limit, or otherwise restrict Specification text.
- B. Underlining, bolding or capitalizing of words in the text does not signify or mean that such words convey special or unusual meaning.
- C. Specification text governs over titling and shall be understood to be and interpreted as a whole.
- D. The order of articles, paragraphs, subparagraphs, and sub-subparagraphs in the Specifications text is defined by the sequence of indentations.

1.06 INTERPRETATION

- A. Unless otherwise stated in the Contract Documents, technical words and abbreviation contained in the Contract Documents are used in accordance with commonly understood construction industry meanings; and non-technical words and abbreviations are used in accordance with their commonly understood meanings.
- B. Contract Documents may omit modifying words such as "all" and "any," and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement. Use of the word "including," when following any general statement, shall not be construed to limit such statement to specific items or matters, whether or not non-limiting language (such as "without limitation," "but not limited to," or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement.
- C. Whenever context so requires, use of the singular number shall be deemed to include the plural and vice versa.
 - 1. Each gender shall be deemed to include any other gender, and each shall include corporation, partnership, trust, or other legal entity whenever context so requires.
 - 2. Captions and headings of various subdivisions of Contract Documents are intended only as a matter of reference and convenience and in no way define, limit, or prescribe the scope or intent of Contract Documents or any subdivision thereof.

END OF SECTION

SECTION 01 32 16
CONSTRUCTION SCHEDULE

1.00 GENERAL

1.01 SECTION INCLUDES

- A. Construction Schedule procedures, preparation, submittal, updates, and revisions.

1.02 RELATED SECTIONS

- A. Section 01 33 23: Submittals.
- B. Section 01 77 20: Project Record Documents.

1.03 SCHEDULE

- A. The construction of this project will be planned and recorded with a conventional Critical Path Method (CPM) schedule. The schedule shall be used for coordination, monitoring, and payment of all work under the contract including all activity of subcontractors, vendors, suppliers, and for all submittals.
- B. Contractor is responsible for preparing the schedule. All costs incurred by Contractor in preparing the schedule shall be borne by Contractor as a part of its responsibility under this contract.

1.04 PROCEDURES

- A. Baseline Construction Schedule
 - 1. Before proceeding with any work on site, Contractor shall prepare, submit, and receive District's approval of a Baseline Construction Schedule. This schedule shall provide a detailed breakdown of activities scheduled for the first 90 days of the project and shall include mobilization, submittals, procurement, and construction.
 - 2. No contact work may be pursued at the site without an approved Baseline Construction Schedule or an approved CPM schedule.
- B. Within forty-five (45) calendar days after date of Notice to Proceed, Contractor shall submit, for review, a Detailed Project Schedule setting forth all requirements for complete execution of work.
- C. Preparation of Detailed Project Schedule:
 - 1. The construction time, for the entire project or any milestone, shall not exceed the specified contract time. In the event that any milestone date or contract completion date is exceeded in the schedule, logic and/or time estimates will be revised.

2. Following the District's review, if revisions to the proposed schedule are required, the Contractor shall do so promptly. The schedule must be finalized within 60 days of the Notice to Proceed. Failure to finalize the schedule by that date will result in withholding all contract payments until the schedule is finalized.
- D. Simultaneously with each submittal of Progress Payment Request, Contractor shall deliver to the District an updated Detailed Project Schedule reflecting work progress as of end of previous reporting period. Each such Schedule shall indicate actual progress to date in execution of work, together with a projected schedule for completion of work.
- E. All Schedule submittals are subject to review and acceptance by the District. The District shall withhold progress payments until Contractor submits a Detailed Project Schedule acceptable to the District.
- F. Concurrent with the District's acceptance of Contractor's submitted Detailed Project Schedule, shall be Contractor's signature of acceptance.

1.05 PREPARATION GUIDELINES

- A. Work of this Contract shall be scheduled and progress monitored using a bar chart, although any of the CPM network type scheduling systems, including precedence diagramming or arrow are acceptable. Scheduling system shall show the sequence and interdependence of all activities required for complete performance of all items of work under this contract, including all approvals, shop drawings and other submittals and approvals, and fabrication and delivery activities. Scheduling system shall indicate all inter-relationships between trades and suppliers.
- B. Level of detail indicated in schedule shall be equal to or greater than that provided by Table of Contents of Contract Technical Specifications, including any addenda. Duration and events indicated on schedule shall conform to phasing set forth in the Contract and shall show any area or building within a particular phase. Schedule shall indicate any and all Contract "milestone events" and other milestones agreed to by the District, but no other manually-imposed dates will be accepted unless approved.
- C. Detailed Project Schedule shall represent a practical plan to complete work within time requirements of the Contract.
 1. The Contractor may submit a Detailed Project Schedule depicting completion of the Work in a duration shorter than the Contract Time; provided that such Detailed Project Schedule shall not be a basis for adjustment to the Contract Price in the event that completion of the Work shall occur after the time depicted therein, nor shall such Detailed Project Schedule be the basis for any extension of the Contract Time.
 2. A schedule found unacceptable by the District shall be revised by Contractor and resubmitted.

- D. Detailed Project schedule shall clearly indicate sequence of construction activities, grouped by applicable phase and sorted by areas, buildings, or facilities within phase, and shall specifically indicate:
1. Start and completion of all items of work, their major components, and interim milestone completion dates, as determined by Contractor and the District.
 2. Activities for procurement, delivery, installation of equipment, materials, and other supplies, including:
 - a. Time for submittals, re-submittals, and reviews. Include decision dates for selection of finishes, if applicable.
 - b. Time for fabrication, and delivery of, manufactured products for work.
 - c. Interdependence of procurement and construction activities.
 - d. As applicable, dates for testing, balancing equipment, and final inspection.
- E. Schedule shall be in sufficient detail to assure adequate planning and execution of work.
1. Each activity shall range in duration no longer than two (2) weeks and shall be total of actual days required for completion, and shall include consideration of normal weather impact on completion of that activity.
 2. The activities are to be described so that the work is readily identifiable and the progress of each activity can be readily measured. For each activity, Contractor shall identify the trade or subcontractor performing the work, the duration of the activity in work days, the manpower involved by trade, the equipment involved, the location of the work, and a dollar value of the activity. The dollar value assigned to each activity is to be reasonable and based on the amount of labor, materials, and equipment involved. When added together, the dollar value of all activities are to equal the contract price.
 3. Schedule shall be suitable, in judgement of the Architect, to allow monitoring and evaluation of progress in performance of work; it shall be calendar time-scaled and, at a minimum, in a Bar Chart format.
 4. Activities shall include:
 - a. Description; what is to be accomplished and where.
 - b. Workday duration.
 - c. Scheduled activities shall indicate continuous flow, from left to right.
 5. Identify days per week and shifts per day worked; also, non-work days and holidays.

6. For all schedules submitted, Contractor shall provide the following:
 - a. Computerized sorts by:
 - (1) Total Float
 - (2) Early Start
 - (3) Area Sort
 - (4) Trade responsibility
 - b. 60-day look ahead bar charts by early start.
 - c. A narrative explaining progress to date on the project, work required in the succeeding update period, a description of the critical path, and comments concerning potential problem areas.
 - d. Contract will submit four copies of each of the above.
- F. Failure to include any element of work required for performance of this Contract shall not excuse Contractor from completing work required to comply with the Contract Documents, notwithstanding acceptance of Construction Schedule.
- G. Submittal of Construction Schedule shall be understood to be Contractor's confirmation that the schedule meets requirements of the Contract Documents, and that work will be executed in sequence indicated in schedule.

1.06 REVIEWS, UPDATES, AND REVISIONS

- A. The District will review and return Contractor's Detailed Project Schedule, with summary comments, within Seventeen (17) calendar days. If revisions are required, Contractor shall resubmit Schedule within fourteen (14) calendar days following receipt of the District's comments.
- B. After Contractor and the District agree to a final schedule, it will become the Project Construction Schedule and considered part of the Contract Documents. No changes to Schedule will be allowed unless mutually agreed upon with the District.
- C. Contractor shall analyze and update the Detailed Project Schedule:
 1. As part of monthly payment application, Contractor shall submit to and participate with the District in a schedule review to include:
 - a. Actual completion dates for work items completed during report period.
 - b. Actual start dates for work items started during report period.
 - c. Estimated remaining duration for work items in progress, which will not exceed original duration for activity.

- d. Estimated start dates for work items scheduled to start during month following report period, if applicable.
 - e. Changes in duration of work items.
 - f. A summary bar chart schedule, organized first by work segment plan, and then by area (building number or other appropriate subdivision) shall show construction progress in each area. The previous schedule shall be included in this report to compute the current performance with the original planned sequence of work.
- 2. In case of a change to Contractor's planned sequence of work, Contractor shall include a narrative report with updated progress schedule which shall include, but not be limited to, a description of problem areas, current and anticipated delaying factors, and any proposed revisions for a recover plan.
- 3. All change orders affecting this schedule shall be clearly identified as a separate and new activity.
- 4. Review of Detailed Project Schedule will not relieve Contractor of responsibility for accomplishing all work in accordance with the Contract Documents.
- D. Updates: The Contractor shall submit to the District, with each payment application, an up-to-date Detailed Project Schedule to include following:
 - 1. Work Item Report: Detailing work items and dependencies as indicated on Bar Chart.
 - 2. Separate listing of activities completed during reporting period.
 - 3. Separate listing of activities which are currently in progress, indicating their remaining duration and percentages completed.
 - 4. Separate listing of activities which are causing delay in work progress.
 - 5. Narrative report to define problem areas, anticipated delays, and impact on Detailed Project Schedule. Report corrective action taken, or proposed, and its effect, including effect of changes on schedules of separate contractors.
 - 6. Resolution of conflict between actual work progress and schedule logic: when out-of-sequence activities develop in the Schedule because of actual construction progress, Contractor shall submit a revised schedule to conform to current job sequence and direction.
- E. If, according to current updated Detailed Project Schedule, the District determines Contractor is behind the Contract completion date or any interim milestone completion dates, considering all time extensions to which Contractor is entitled, Contractor shall submit a revised schedule, showing a workable plan and a narrative description to complete project on time. In accordance with Article 1.06, Paragraph C-2.

1. The District shall withhold progress payments until a revised schedule, acceptable to the District, is submitted by Contractor.
- F. Scheduling of change or extra work orders is responsibility of Contractor.
1. Contractor shall revise Detailed Project Schedule to incorporate all activities involved in completing change orders or extra work orders and submit it to the District for review.
- G. If the District finds Contractor is entitled to extension of any completion date, under provisions of the Contract, the District's determination of total number of days extension will be based upon current analysis of Construction Schedule, and upon data relevant to extension.
- H. Contractor acknowledges and agrees that delays to non-critical activities will not be considered a basis for a time extension unless activities become critical. Non-critical activities are those activities which, when delayed, do not affect an interim or final Contract completion date.
- I. Any claim for extension of time shall be made in writing to the Architect not more than seven (7) days after commencement of delay; otherwise, it shall be deemed finally waived for all purposes. Contractor shall provide an estimate of probable effect of such delay on progress of work as part of claim.

1.07 CONTRACTOR'S RESPONSIBILITY

- A. Nothing in these requirements shall be deemed to be a usurpation of Contractor's authority and responsibility to plan and schedule work as Contractor sees fit, subject to all other requirements of Contract Documents.
- B. Contractor shall provide at all times sufficient competent labor, materials, and equipment to properly carry on work and to insure completion of each part in accordance with Construction Schedule and within time agreed.
- C. Contractor shall be responsible for ensuring that all submittals to the District are accurate and consistent. Damages, including extra time and cost, caused by inaccuracies from Contractor will be compensated by Contractor.

1.08 SUSPENSION OF PAYMENTS

- A. Initial Submittal: The District has the right to withhold progress payments until Detailed Project Schedule is accepted by the District.
- B. Update Submittals: The District has the right to withhold progress payments if Contractor fails to update and submit Detailed Project Schedule and reports as required by the District.

1.09 RECORD COPY

- A. At completion of work items, submit Detailed Project Schedule reflecting "as-built" sequence.

1.10 FORM OF SUBMITTAL

- A. All Detailed Project Schedule submittals shall be transmitted with a Letter of Transmittal and shall include three (3) hard copies and one (1) electronic copy.

2.00 PRODUCTS

Not used.

3.00 EXECUTION

Not used.

END OF SECTION

SECTION 01 33 23
SHOP DRAWINGS AND SAMPLES

1.00 GENERAL

1.01 SUMMARY

- A. This Section establishes general requirements for shop drawings and samples, and supplements similar provisions found elsewhere in the Contract Documents.

1.02 GENERAL REQUIREMENTS

- A. Prior to submission to Architect, Contractor to check all shop drawings, brochures, and other such construction data for quantity, size, and dimensions. Architect will answer questions raised by Contractor, and will make determination regarding quality of material and equipment, design and arrangement decisions, and color selections, but will not be responsible for quantity, size, or dimensional errors on shop drawings. In cases of omission and obvious error, and in cases of conflict, either between details on Contract Drawings or Specifications, such questions shall be brought to the Architect's attention, and Architect will give prompt answers to such questions.
 - 1. Colors and textures to be selected will be selected from all available colors and textures, regardless of price ranges. For instance, where the first manufacturer listed has 20 colors or color ways available, that is the minimum number that shall be available for selection. Products of other manufacturers may be submitted, but the cost of colors considered special shall be included in the Contract Sum if their number is less than 20. When colors or textures are custom from any manufacturer, they will be so identified.
- B. Carefully review subcontractors' submittals for completeness and correctness and stamp and acknowledge such review on submittals, prior to transmitting them to Architect.
- C. Close adherence to these requirements is necessary to avoid delay in processing of shop drawings by the Architect. Deviation from these requirements may result in rejection of the submittal. Contractor will be held responsible for delays resulting from tardy and improper submittals.
- D. Obtain approvals from required agencies, prior to submittal to the Architect, for all revisions, substitutions of materials or design, including all structural deviation from the design as shown and specified.

1.03 SUBMITTALS

- A. Shop drawings, minimum (District may request more):
 - 1. One transparent vellum reproducible, reverse-reading.
 - 2. 6 blueline prints bound in sequence.

- B. Brochures/material list/specifications/concrete mix designs: 6 sets each bound in sequence.
- C. Samples: 3 each, unless additional samples are requested by the District.

1.04 SUBMITTAL PROCEDURES

- A. Identify submittals with job name, location, and Architect's job number. They shall be reviewed, stamped with an approximately 3 in. x 1/2 in. identification stamp, and have the signed approval of Contractor, prior to submission to Architect. Each sheet of drawings, both prints and transparencies, shall be so identified and signed.
- B. Bound sets of brochures, catalog sheets, specifications and materials lists shall include an index sheet, completely identifying the entire content of the submittal in sequential order. At his option, the Contractor may identify, stamp and sign only this index sheet.
- C. In lieu of signing each brochure, Contractor may indicate on Letter of transmittal that he has reviewed and approved all material included. This does not eliminate requirements for identification stamp information.
- D. Architect will return to the Contractor one copy of the vellum transparency of drawings and 1 brochure, stamped and signed with corrections, if any. If the Contractor desires additional copies returned, then he must so request and submit the extra copies.
- E. Handle re-submittals the same as the original submittals, but identify as such and use the Architect's original shop drawing number.
- F. Accompany each submittal by a letter of transmittal containing a complete itemized and numbered list of the submitted material together with the subcontractor's name. A separate Letter of transmittal shall accompany each submittal from different subcontractors and different categories (trade and building units).
- G. Segregate and submit shop drawing submittals separately for each building unit comprising entire Project. Submittals shall be made as though each building unit and the site are separate projects.

1.05 SAMPLES

- A. Labeling: Identify each sample with at least a 3 in. by 4 in. label with the following information.
 - 1. Complete identification stamp information in accordance with submittals procedure in paragraph 1.04, A.
 - 2. Name, finish, and composition of the material.
 - 3. Location or intended use on the Project.

- B. Size of samples: Of sufficient size to show all salient features of material or item, and which are truly representative of the extremes of variation in color, texture, finish, and construction to be expected in installed work. Samples of framed materials shall include a corner joint. Allow space for 5 in. by 3 in. Architect's review stamp.
- C. Mock-ups: Specifications may require mock-ups of proposed construction elements, using actual materials and full-size components. Such mock-ups shall be included in the Contract Sum.
- D. Review of samples: After review, samples will be stamped or labeled to indicate their review, and one sample will be returned to the Contractor.
 - 1. Samples retained by the Architect will constitute the standard of quality and appearance of all materials of the type represented by the sample.
 - 2. When samples are rejected, Contractor will be given reasons for rejection and shall resubmit samples until, in the opinion of the Architect, they comply with Contract requirements.
- E. At the option of the District or Architect, samples may be subject to testing. In such event, additional samples as may be required shall be supplied by the Contractor at no additional cost.

END OF SECTION

SECTION 01 35 13
SPECIAL PROJECT PROCEDURES

1.00 GENERAL

1.01 SUMMARY

- A. General: Buildings will not be occupied while the work of this Contract is performed.
- B. Existing conditions:
 - 1. Contractor shall accept the site in the condition in which they exist at the time he is given access to begin work.
 - 2. Before starting work, make a detailed survey of existing conditions, verify governing dimensions at the premises against the Drawings, and examine adjoining work on which the work of this Contract is dependent.
 - 3. No "Extra" or additional compensation will be allowed on account of differences between actual measurements and dimensions shown.
 - 4. Submit differences discovered during Work to Architect for interpretation before proceeding with associated work.
- C. Protection:
 - 1. While work of this Contract is in progress, protect adjacent areas, facilities, grounds, and contents, whether private or public, from damage or harm due to the work of this Contract.
 - 2. Cover and protect all surfaces of areas turned over to Contractor for the Work as required to prevent soiling or damage by dust, dirt, water, fumes or otherwise, and protect other areas where Work is performed in the same manner, all as deemed adequate by the District. Prior to District's re-occupancy of any such area, clean all surfaces according to cleaning instructions as may be specified in other Sections or issued by the District.
 - 3. Conform to following requirements where welding is performed in or on the buildings.
 - a. Protection during welding: Conform to CAC. Further protect occupants and the public with portable solid vision barricades around locations where welding is performed plus sign warning against looking at welding without proper eye protection, or equivalent.
 - b. Fire extinguishers: Maintain a fully charged UL labeled, minimum 10 lbs. ABC fire extinguisher at each location where welding is performed.

- c. Welding smoke control: Verify locations of existing smoke detectors. Perform welding operations by methods that produce the minimum feasible smoke and fumes. Furnish portable type smoke collection and ventilating equipment as required to prevent smoke and fume nuisances. Notify the District at least 48 hours in advance if temporary deactivation of smoke detector is required to prevent false alarms from welding. District will permit deactivation of detectors only for the time welding is actually in progress.
- 4. Fire prevention:
 - a. Ensure that flammable solvents are not being used in the area. Maintain a safe distance between place of welding and source of flammable solvents.
 - b. In addition, examine existing construction and backing for all combustible materials and finishes and for conditions where heat conduction in metals may bring adjoining materials to ignition temperature.
 - c. Use positive fire prevention measures including, without limitation, removal and reinstallation of combustible materials, installation of temporary shields and/or heat sinks, and all other necessary measures.
- 5. No utility services, such as water, gas, sewers, electricity, telephone, communication, and fire protection system serving the Buildings or parts thereof, shall be interrupted without prior written approval of the District, and other authorities having jurisdiction.
- 6. Damage caused by the Contractor to existing structures, grounds, pavements, utilities or flora, or work done by others, shall be repaired by the Contractor at his expense and left in as good condition as existed before the damaging, except where such existing work is shown to be removed, or replaced by new work.

D. Access:

- 1. During the life of the Contract, maintain access to site, and within the site to the buildings for fire-fighting equipment, ambulance and police vehicles.
- 2. Required accessways and other accessways not required but so designated by the District or Contract Documents shall not be blocked so as not to interfere with access to adjacent areas, facilities or new work area and cause least possible interference with activities of other contractors, District's personnel or the public.

1.02 SURVEY AND RE-SURVEY OF EXISTING CONDITIONS

- A. Intent of Drawings is to show existing site and buildings conditions with information developed from original construction documents, field surveys, and District's records, and to generally show the extent and type of demolition required to complete the Work.
 - 1. Information shown on the Drawings is not a guarantee of existing conditions.
 - 2. Contractor/Bidder is invited to survey the site of the work after making arrangements to do so with the District.

- B. After award of Contract and before starting work, the Contractor, the District's representative, and the Architect shall together make a thorough survey of the existing facilities, and areas to be used for staging, storage or accessways to or from the Work.
 - 1. Contractor shall list, and photograph if he/she desires, existing conditions not requiring alterations, shall note discrepancies between Drawings and existing conditions, and shall designate areas of storage and routes of access agreed upon by the District.
 - 2. Where necessary, Architect will issue clarifications and instructions.
 - 3. Do not proceed where such conflicts or discrepancies occur prior to receipt of Architect's instructions.
- C. At a mutually agreed upon time before completion of Work, the Contractor, the District and Architect shall re-survey the same areas.
 - 1. Contractor shall furnish a report on conditions then existing compared with conditions as first noted.
 - 2. The report of re-survey shall be signed by the Architect, and forwarded by the Contractor to the District.
 - 3. Damage indicated in the report that was caused by the Contractor, or anyone employed by or under contract to the Contractor, shall be repaired by the Contractor at his expense and left in as good condition as existed before the damaging.

1.03 RESTRICTIONS

- A. Noise control: Exercise caution to prevent generation of unnecessary noise and keep work-generated noise levels to minimum possible. Do not exceed CAL/OSHA standards at any time. Discontinue noise producing operations, when requested by the District, and reschedule at a mutually acceptable time.
 - 1. Equip internal combustion engines with suitable mufflers. Do not use internal combustion engines in enclosed spaces, including the buildings, without the District's written approval.
 - 2. Mount rolling equipment on pneumatic tires.
- B. Dust control:
 - 1. Control dust by methods acceptable to the District and the C. M.
 - 2. Provide dust-tight partitions to prevent dust escaping into other parts of the building where work is not in progress.
 - 3. Assume liability for claims related to flying dust and debris.

C. Water control:

1. Control the use of water to prevent damage to the existing facilities and site improvements to remain. Provide wet vacuum equipment where water, such as waste cooling water from concrete sawing, is used in and adjacent to existing buildings.
2. Provide impermeable floor coverings and suitable dams to prevent damage by water, and immediately clean-up and remove all surplus water, and water spilled in non-working areas.

D. Security: Coordinate security with the District.

1. Take all necessary precautions to keep trespassers out of work and demolition areas.
2. Properly secure work and demolition areas from entry when work is not in progress but do not block required exitways.

END OF SECTION

SECTION 01 36 00
CUTTING AND PATCHING

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section establishes general requirements pertaining to cutting (including excavating), fitting, and patching of the Work required to:
 - 1. Make the several parts fit properly;
 - 2. Uncover work to provide for installing, inspecting, or both, of ill-timed work;
 - 3. Remove and replace work not conforming to requirements of the Contract Documents; and
 - 4. Remove and replace defective work.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. In addition to other requirements specified, upon the District's request uncover work to provide for inspection by the District of covered work, and remove samples of installed materials for testing.
 - 3. Do not cut or alter work performed under separate contracts without the District's written permission.

1.2 SUBMITTALS

- A. Request for District's consent:
 - 1. Prior to cutting which affects structural safety, submit written request to the Project Manager for permission to proceed with cutting.
 - 2. Should conditions of the Work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify the Project Manager and secure his written permission and the required Change Order prior to proceeding.
- B. Notices to the Project Manager:
 - 1. Prior to cutting and patching performed pursuant to the District's instructions, submit cost estimate to the Project Manager. Secure the Project Manager's approval of cost estimates and type of reimbursement before proceeding with cutting and patching.

2. Submit written notice to the Project Manager designating the time the Work will be uncovered, to provide for the District's observation.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. For replacement of items removed, use materials complying with pertinent Sections of these Specifications.

2.2 PAYMENT FOR COSTS

- A. The Owner will reimburse the Contractor for cutting and patching performed pursuant to a written Change Order, after claim for such reimbursement is submitted by the Contractor. Perform other cutting and patching needed to comply with the Contract Documents at no additional cost to the Owner.

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:
 1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, patching, and backfilling.
 2. After uncovering the work, inspect conditions affecting installation of new work.
- B. Discrepancies:
 1. If uncovered conditions are not as anticipated, immediately notify the Architect and secure needed directions.
 2. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION PRIOR TO CUTTING

- A. Provide required protection including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work.

3.3 PERFORMANCE

- A. Perform required excavating and backfilling as required under pertinent other Sections of these Specifications and OSHA standards for such work.
 - 1. Perform cutting and demolition by methods which will prevent damage to other portions of the Work and provide proper surfaces to receive installation of repair and new work.
 - 2. Perform fitting and adjusting of products to provide finished installation complying with the specified tolerances and finishes.
 - 3. Typically chip back existing adjoining plaster surfaces to expose the lath and building paper to permit proper lapping on new infill materials.

END OF SECTION

SECTION 01 40 00
QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections:
 - 1. Divisions 2 through 33 Sections for specific test and inspection requirements.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
- D. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

- E. Product Testing: Tests and inspections that are performed by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.4 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems.
 - 1. Seismic-force resisting system, designated seismic system, or component listed in the designated seismic system quality assurance plan prepared by the Architect.

2. Main wind-force resisting system or a wind-resisting component listed in the wind-force-resisting system quality assurance plan prepared by the Architect.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

1.5 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.
- B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 5. Other required items indicated in individual Specification Sections.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect

installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. When testing is complete, remove test specimens, assemblies, mockups; do not reuse products on Project.
 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, a DSA accepted testing laboratory directly employed by the District (Owner) shall conduct all the required tests and inspections for the project.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 - 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
 - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - 2. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
 - 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.
- D. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency and/or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Statement of Special Inspections attached to this Section, and as follows:

- B. Special Tests and Inspections: Conducted by a qualified testing agency or special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and re-inspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 1.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 45 29
TESTING AND INSPECTION REQUIREMENTS

1.01 SUMMARY

- A. Section Includes: Cooperate with the Owner's selected testing agency, the Project Inspector, and others responsible for testing and inspecting the Work, and assist the Owner by coordinating such testing and inspecting services as specified in this Section and/or elsewhere in the Contract Documents including the attached Division of State Architect Structural Tests and Inspections sheet (enclosed).
- B. Related Work Specified Elsewhere:
 - 1. Requirements for testing may be required in other Sections of these Specifications.
 - 2. Where no testing requirements are specified or required by reference standards or authorities having jurisdiction, the Owner may require such testing to be performed under current pertinent standards for testing. Payment for such testing will be made as described herein.
- C. Work Not Included:
 - 1. The Owner will select a pre-qualified independent testing laboratory and Inspector as approved by the Division of the State Architect, Office of Regulation Services.
 - 2. The Owner will pay for initial services of the testing laboratory as further described hereinafter.

1.02 QUALITY ASSURANCE

- A. The Owner will select an independent testing laboratory to conduct the tests. Selection of the material required to be tested shall be by the laboratory or the Owner's representative and not by the Contractor.
- B. Qualifications of Testing Laboratory: The testing laboratory shall be qualified to the Owner's acceptance in accordance with ASTM E 329. The testing laboratory shall be a DSA accepted testing laboratory.
- C. Codes and Standards: Testing, when required, will be in accordance with pertinent codes and regulations and with selected standards of the American Society for Testing and Materials and other organizations or agencies which publish recognized codes, standards, or tests. Refer to Article 3.04 – Required Testing of this Section.
- D. The project specifications shall be in accordance with the provisions of the Standard Specifications for Public Works Construction (SSPWC) 2012 Edition.

1.03 TEST REPORT DISTRIBUTION

- A. Promptly process and distribute required copies of test reports and related instructions to ensure necessary retesting and/or replacement of materials with the least possible delay in progress of the Work.
- B. One copy of test reports shall be forwarded to the Division of the State Architect by the testing agency. Such reports shall include tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. The reports shall show that the material or materials were sampled and tested in accordance with the requirements of Title 24 and with the approved specifications. Test reports shall show the specified design strength. They shall also state definitely whether or not the material or materials tested comply with requirements.
- C. Each testing agency shall submit to the Division of the State Architect a verified report in duplicate covering tests which are required to be made by that agency during the progress of the project. Such report shall be furnished each time that work on the project is suspended, including tests up to that time, and at the completion of the project.

1.04 PAYMENT FOR TESTING SERVICES

- A. Initial Services: The Owner will pay for initial testing and inspection except as specifically modified herein-after or as specified otherwise in technical sections. Provided the results of inspection indicating compliance with the Contract Documents.
- B. Retesting: When initial tests or inspection indicate noncompliance with the Contract Documents, subsequent retesting or re-inspection occasioned by the noncompliance shall be performed by the same testing laboratory or Inspector and the costs thereof will be deducted by the Owner from the Contract Sum. Retesting and re-inspection will continue until test or inspection results indicate compliance.
- C. Code Compliance Testing: Inspections and tests required by codes or ordinances, or by authorities having jurisdiction and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Owner, but back charged to the Contractor in case of retesting due to noncompliance.
- D. Specified Inspections and Tests: Tests and inspections specified in the Specifications, directly or by reference, shall be coordinated by the Contractor at his expense and paid for by the Owner. Corrections of noncompliance and test failures shall be paid for by the Owner, but shall be back charged to the Contractor. Re-inspection and retesting shall be in accordance with paragraph 1.04-B.
- E. Contractor's Convenience Testing: Inspecting or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of and at the expense of the Contractor.

1.05 INSPECTION BY THE OWNER

- A. The Owner and his representatives will have access, for the purpose of inspection, to parts of the work and to the shops wherein the work is in preparation, and the Contractor shall maintain proper facilities and provide safe access for such inspection.
- B. The Owner shall have the right to reject materials and workmanship which are defective, and to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the Owner. If the Contractor does not correct such rejected within a reasonable time, fixed by written notice, the Owner may correct rejected work and charge the expense to the Contractor.
- C. Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish necessary facilities, labor and materials. If such work is found to be defective in respect due to fault of the Contractor or his subcontractor, he shall defray expenses of such examinations and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the additional cost of labor and material necessarily involved in the examination and replacement will be allowed the Contractor.

1.06 PROJECT INSPECTOR

- A. A "DSA Certified" project inspector employed by the Owner in accordance with the requirements of State of California Building Code, Title 24, Part 1, and qualified in accordance with Division of State Architect will be assigned to the work. His duties are specifically defined in Title 24, Part 1, Section 4-342, reprinted herein:

42. Duties of the Project Inspector.

- (A) General: The Project Inspector shall act under the direction of the A/E/Engineer.
- (B) Duties: The general duties of the Project Inspector in fulfilling his or her responsibilities are as follows:
 - (1) Inspection: He or she must have actual personal knowledge, obtained by his personal inspection of the work of construction in stages of its progress, that the requirements of the approved plans and specifications are being completely executed.

Inspection means complete inspection of every part of the work. Work, such as concrete work or brick work which can be inspected only as it is placed, shall require the constant presence of the Project Inspector. Other types of work which can be completely inspected after the work is installed may be carried on while the Inspector is not present. In any case,

the Project Inspector must personally inspect every part of the work. In no case shall the Project Inspector have or assume duties which will prevent him or her from providing inspection.

The Project Inspector may obtain personal knowledge of the work of construction, either on-site or off-site, performed under the inspection of a Special Inspector or Assistant Inspector from the reporting of others on testing or inspection of materials and workmanship for compliance with the plans, specifications and applicable standards. The exercise of reasonable diligence to obtain the facts shall be required.

- (2) Relations with A/E/Engineer: The Project Inspector shall work under the general direction of the A/E/Engineer. Inconsistencies or seeming errors in the A/E/Engineer for his interpretation and instructions. In no case, however, shall the instruction of the A/E/Engineer be construed to cause work to be done which is not in conformity with the approved plans, specifications, and change orders.
- (3) Job File: The Project Inspector shall keep a file of approved plans and specifications (including approved addenda or change orders) on the job, and shall immediately return unapproved documents to the A/E for proper action. The Project Inspector, as a condition of his employment, shall have and maintain on the job, codes and documents referred to in the plans and specifications.
- (4) Project Inspector's Semi-Monthly Reports: The Project Inspector shall keep the A/E/Engineer thoroughly informed as to the progress of the work by making semi-monthly reports in writing as required in Section 37.
- (5) Not Used.
- (6) Construction Procedure Records: The Project Inspector shall keep a record of certain phases of construction procedure. All such records of construction procedure shall be kept on the job until the completion of the work. These records shall be made a part of the permanent school records.
- (7) Deviations: The Project Inspector shall notify the Contractor, in writing, of deviations from the approved plans and specifications which are not immediately corrected by the Contractor when brought to his or her attention. Copies of such notice shall be forwarded immediately to the A/E/Engineer.

Failure on the part of the Project Inspector to notify the

Contractor of deviations from the approved plans and specifications shall in no way relieve the Contractor of responsibility to complete the work covered by his or her contract in accordance with the approved plans and specifications and laws and regulations.

- (8) Verified Reports: The Project and Special Inspectors shall each make and submit to the Division of the State Architect verified reports.

The Project Inspector shall prepare and deliver to the Division of the State Architect detailed statements of fact regarding materials, operations, etc., when requested.

- (c) Violations: Failure, refusal, or neglect on the part of the Inspector to notify the Contractor of work which does not comply with the requirements of the approved plans and specifications, or failure, refusal, or neglect to report immediately, in writing, such violation to the A/E/Engineer, to the School Board, and to the Division of the State Architect shall constitute a violation of the act and shall be cause for the Division of the State Architect to take action.

Note: Authority cited: Section 39152 and 81142, Education Code. Reference: Sections 39151, 39153, 81141 and 81143, Education Code."

- B. The work of construction in stages of progress shall be subject to the personal continuous observation of the Project Inspector as continuous observation is defined by Title 24. He shall have free access to all parts of the work at any time. The Contractor shall furnish the Project Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of the materials. Inspection of the work shall not relieve the Contractor from obligation to fulfill this Contract.

1.07 OWNER'S OTHER PERSONNEL

- A. From time to time, other personnel in the employ of the Owner may inspect the Work when the Work is in progress but shall have no authority to direct the Contractor or request changes in the Work except as may be provided elsewhere in the Contract Documents.

1.08 REPRESENTATIVE OF THE DIVISION OF THE STATE ARCHITECT

- A. Architect shall have access to the site in accordance with Title 24, Part 1, 4-333.
- B. Field Engineers and Inspectors from D.S.A. Structural Safety Section, Fire & Life Safety Review and Access Compliance shall have access to the site in accordance with Title 24, Part 1, 4-334.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.01 COOPERATION WITH TESTING LABORATORY AND INSPECTORS

- A. Inspectors and representatives of the testing laboratory shall have access to the work. Provide facilities for such access in order that the testing, inspection, and the obtaining of samples may be done properly.
- B. Contractor shall deliver material specimens to the Owner's testing lab, which must by terms of the Contract be tested prior to inclusion in the Project, at least 45 days prior to scheduled delivery to the job site.
- C. Material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required shall not be incorporated in the job.

3.02 TAKING SPECIMENS

- A. Field specimens and samples for testing, unless otherwise provided in these Contract Documents, shall be selected and taken by the Testing Laboratory or Project Inspector and not the Contractor. Sampling equipment and personnel will be provided by the testing laboratory. Deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory. Soil samples for approval of import fill shall be picked-up by the Testing Laboratory.

3.03 SCHEDULES FOR TESTING

- A. Establishing Schedule:
 - 1. By advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings.
 - 2. Provide required time within the construction schedule.
- B. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate such changes of schedule with the testing laboratory as required.
- C. Adherence to Schedule: When the testing laboratory is ready to test according to the determined schedules, but is prevented from testing or taking specimens due to incompleteness of the work, extra charges for testing attributable to the delay may be back-charged to the Contractor and will be deducted by the Owner from the Contract Sum.

3.04 REQUIRED TESTING

Tests and inspections for the following items, where applicable, will be required in accordance with referenced Sections/Chapters of California Building Code, 2022 Edition, Title 24, Part 2:

A. FOUNDATIONS:

1. INSPECTION:

- a. Inspection of Cast-In-Place Deep Foundation
1705.8

B. CONCRETE (Chapter 19A)

1. MATERIALS:

- a. Portland Cement
1704A.4.1;
1910A.2
- b. Concrete Aggregates
1704A.4.1;
1903A.5
- c. Not Used
- d. Reinforcing Bars
1704A.4.1;
1910A.2

2. QUALITY:

- a. Strength Tests of Concrete
1903A.1;
1905A.6

3. INSPECTION:

- a. Batch Plant
1705A.3.3
- b. Waiver of Batch Plant
1705A.3.3.1
- c. Reinforcing Bar Welding
1705A.3;
Table 1704A.3
- d. Post-Installed Anchors in Concrete
1705A.3.8

C. LIGHT WEIGHT METALS

1. MATERIALS

- a. Alloys
2002.1

	b.	Identification	2002.1
2.		INSPECTION	
	a.	Welding	2003.1
D.		STRUCTURAL STEEL	
1.		MATERIALS	
	a.	Structural Steel	2205A.1
	b.	Cold Form Steel	2209A.1
	c.	Identification	2203A.1
2.		QUALITY	
	a.	Tests of Structural and Cold Form Steel	2210A.1
	b.	Tests of End Welded Studs	2212A.2
	c.	Steel Joists	2206A; 1704A.3.2.1
	d.	Non-Destructive Weld Tests	1704A.3.1
3.		INSPECTION	
	a.	Shop Fabrication	1704A.2 1704A.4.3
	b.	Welding	1704A.3.1
	c.	Nelson Stud Welding	1704A.3
E.		WOOD	
1.		MATERIALS:	
	a.	Lumber and plywood	2303.1

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES

PART 1 – GENERAL

1.01 SUMMARY

- A. Provide all temporary facilities and controls required for the performance of the Work.
- B. Supervise the use of all temporary facilities and controls. Enforce compliance with applicable standards. Prevent abuses of services.

1.02 SAFETY

- A. Guard machinery, equipment, and all hazards in accordance with the safety provisions of the latest edition of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable law.
 - 1. Protect all hazards with adequately constructed guard rails or barricades and provide lanterns, warning lights, and the like, as necessary. Eliminate all attractive nuisance from the work and the room site.
 - 2. To this end, dispose, store, guard, and protect the premises and all work materials, equipment and both permanent and temporary construction so as to preclude the unauthorized use thereof by children or others and particularly to eliminate possible consequent injury to all persons.
- B. Structural design of all items used in the construction of the building and not a permanent part thereof, including, shoring for concrete and masonry work, the temporary bracing for structural steel, and the shoring of cut earth banks, its the sole responsibility of the Contractor.

1.03 SCAFFOLDING AND HOISTS

- A. Furnish and maintain hoists, staging, rigging, scaffolding, and runways required in the prosecution of the work. Erect, equip and maintain such temporary work in accordance with statutes, laws, ordinances, rules or regulations of the State of California and other authorities and Insurance Companies having jurisdiction.

1.04 DUST CONTROL

- A. During the life of the Contract, provide effective means of dust control both within the structure and on the surrounding site.
- B. Obtain the Architect's approval before use of any means except water.
- C. Water all active construction areas as often as needed to control dust.
- D. Cover all trucks hauling soil, sand and other loose materials or require all trucks to

maintain at least 2 feet of freeboard.

- E. Apply water 3 times daily, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction site.
- F. Sweep daily with water sweeper, all paved access roads, parking areas and staging areas at construction site.
- G. Sweep streets daily with water sweeper, if visible soil material is carried onto adjacent public streets.
- H. Hydroseed or apply non-toxic stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- I. Enclose, cover water twice daily or apply non-toxic soil binders to exposed stockpiles of dirt, sand and other loose materials.
- J. Limit traffic speed on unpaved roads to 15 mph.
- K. Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- L. Replant vegetation in disturbed areas as quickly as possible.

1.05 MAINTENANCE OF TRAFFIC

- A. Maintain traffic on all streets adjacent to or leading to the site.
- B. Where construction operations interfere with the free movement of traffic, provide traffic controls, flagmen or similar devices to efficiently control traffic movement.
- C. Provide a traffic control permit from the local authorities if required.
- D. Schedule delivery of materials and construction activities so that they do not interfere with student/public traffic at drop-off and pick-up.

1.06 DEWATERING

- A. Furnish and maintain all pumps or other dewatering devices required by this Work.

1.07 PROJECT OFFICE

- A. Provide and maintain, for the duration of the Contract, a project office, complete with heat, light, ventilation and convenience outlets. The office shall be of sufficient size for the Contractor's personnel and operators and shall provide desk space for use by the Architect and for inspection personnel.

1.08 TELEPHONE

- A. Provide and pay for all necessary temporary telephone service.

- B. Maintain telephone(s) in continuous service on the project site during the course of the Work and make available at all times, free and unrestricted, to the Architect's and District's representatives for calls in direct connection with the Work.

1.09 TEMPORARY TOILETS

- A. Provide temporary toilet facilities for all personnel employed on the Project. Maintain toilets in a clean and sanitary condition at all times. Remove at Project completion.

1.10 CONSTRUCTION WATER AND POWER

- A. Make arrangements for all water and power required for the Project. Provide all temporary lines and arrange for billing to go directly to District. Remove temporary facilities at Project completion.

1.11 FENCES AND BARRICADES/SECURITY

- A. Around the construction site, erect fences and barricades with gates, as required by local governing authorities, for security and to prevent unauthorized entry to the Work site. Maintain in good condition until completion of the Project.

1.12 SIGNS

- A. Furnish and erect a ¾ in. x 48 in. x 96 in. job sign painted and lettered to identify the Project, the Architect and the Contractor. Mount on post and brace as indicated by the Architect. Sign shall be lettered by a professional sign painter, and the layout shall be as indicated by the Architect.
- B. Keep the premises free from all other posters, signs, and miscellaneous decorations, except those required by Code and to indicate unsafe conditions.

1.13 COPIES OF STANDARDS AND CODES

- A. Copies of applicable referenced standards are not bound in this Project manual.
- B. Copies of standards and California Building Code, Title 24, Parts I and II and shall be kept and available at the Project Site, available to the Contractor's personnel, Sub-contractors, District, Inspectors and Architect.

END OF SECTION

SECTION 01 66 00
PRODUCT HANDLING

1.00 GENERAL

1.01 SUMMARY

A. Section includes:

1. This Section establishes general requirements for product handling and storage, whether on or off site, and supplements similar provisions found elsewhere in the Contract Documents.

1.02 HANDLING

A. General: Transport, deliver, handle, and store all materials and equipment used on the Project to prevent the intrusions of foreign matter, moisture, and to prevent damage. In all cases comply with the following.

1. Material and equipment manufacturer's printed instructions regarding temperature limitations.
2. Other environmental conditions which are required to maintain original quality of materials and equipment.

B. Packaging:

1. Provide packaged materials in their manufacturer's original containers with seals unbroken and labels intact until incorporating into the Work.
2. Wrapped or bundled materials shall clearly bear the manufacturer's name and trade mark.

C. Damaged materials: Remove damaged or otherwise unsuitable material and equipment promptly from the site. Do not install damaged materials.

1.03 STORAGE

A. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.

B. Store products at the site to facilitate inspection and measurement of quantity or counting of units.

C. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.

1. Do not subject slabs-on-grade to excessive loading by shoring, storage of materials or operation of construction equipment unless adequately protected

by heavy planking. Maintenance of slabs in good condition is the responsibility of the Contractor who shall remove damaged areas of such slabs and replace them with new work, to the Architect's satisfaction, at no cost to the Owner.

- D. Store products subject to damage by elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.
- E. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
- F. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
- G. Locate storage piles, stacks or bins to avoid being disturbed, and protect from damage of any sort.
- H. Store materials and equipment in accord with their manufacturer's instructions, above grade, and properly protected from weather and construction activities.
- I. Payment may be withheld for improperly packaged and stored materials.

1.04 PROTECTION

- A. Protect all finished surfaces, including floors, jambs, and soffits of all openings used as passageways or through which materials and equipment must travel.
- B. Carts, hand trucks, wheelbarrows and similar wheeled conveyances used on or in any portion of the buildings shall be equipped with pneumatic tires, unless otherwise authorized by the Architect.
- C. Keep finished surfaces clean and unmarred until the date of acceptance.
- D. Refer to individual Specification Sections for additional specific product handling and protection requirements.

2.00 PRODUCTS

Not used.

3.00 EXECUTION

Not used.

END OF SECTION

SECTION 01 74 00
CLEANING

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Keep premises, and adjacent private and public properties free from accumulations of waste, debris and rubbish caused by construction operations.
2. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all exposed surfaces. Remove remaining mock-ups and sample panels.
3. Leave Project clean and ready for occupancy.

1.02 SAFETY REQUIREMENTS

A. Standards: Maintain Project in accord with State and local safety and insurance standards.

B. Hazard control:

1. Store volatile wastes in covered metal containers, and remove from premises daily.
2. Prevent accumulation of wastes which create hazardous conditions.
3. Provide adequate ventilation during use of volatile or noxious substances.

C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on Project site.
2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains. Store in containers with tight-fitting lids and remove to legal dump site or to recycling center.

2.00 PRODUCTS

Not used.

3.00 EXECUTION

3.01 DURING CONSTRUCTION

- A. Keep premises, and adjacent private and public properties free from accumulations of waste materials and rubbish. Remove debris and dirt from public property promptly; sweep sidewalks and adjacent streets daily when soiled by work performed under this Contract.
- B. Wet down materials and rubbish to lay dust and prevent it from blowing.
- C. At least once a week, or more often if required, clean site and dispose of waste materials, debris and rubbish off the site in a legal manner. Remove combustible materials such as paper and cardboard daily.
- D. Provide on-site containers for collection of waste materials, debris and rubbish. Provide a collection can at each location used as an eating area. Pick-up all garbage daily.
- E. Remove waste materials, debris and rubbish from site and legally dispose of at legal public or private dumping areas or recycling center off District's property.
- F. Do not allow debris and combustible materials to accumulate in, voids, cavities, and plenums created by wall, partition, and ceiling construction. These areas must be thoroughly cleaned out before being sealed or closed off by installation of finish materials.
- G. Do not allow debris to clog drains. Clean roof drains, scuppers, floor drains and area drains free of debris. Verify that they drain properly. Keep drains clean of debris at all times.
- H. Vacuum clean interior areas when ready to be painted. Refer to Section 09 90 00 for other provisions on preparation of surfaces to be painted.
- I. Handle materials in a controlled manner with as few handling as possible; do not drop or throw materials from heights.
- J. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

3.02 FINAL CLEANING

- A. Employ experienced workers, or professional cleaners, for final cleaning.
- B. In preparation for Substantial Completion or Occupancy conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
- C. Remove labels that are not permanent labels.
- D. Clean transparent materials, including mirrors and glass in doors and windows. Remove misplaced glazing compound and other substances. Replace chipped or broken glass and other damaged transparent materials.

- E. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
- F. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
- G. Clean the site, including landscaped areas, of rubbish, litter and other foreign substances.
 - 1. Contaminated earth:
 - a. Final clean-up operation includes the removal and disposal of earth contaminated or unsuitable for support of plant life in planting areas, and filling of resulting excavations with suitable soil.
 - b. Contaminated areas include those used for disposal of waste concrete, mortar, plaster, masonry, and similar materials, areas in which washing out of concrete and plaster mixers or washing of tools and like cleaning operations have been performed, and areas that have been oiled, paved, or chemically-treated.
 - c. Do not dispose of waste oil, solvents, paints, solutions, or like penetrating material by depositing or burying on District's property.
 - 2. Sweep paved areas broom clean; remove stains, spills and other foreign deposits.
 - 3. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
- H. Keep Project clean until it is occupied by District.

END OF SECTION

SECTION 01 77 20
PROJECT RECORD DOCUMENTS

1.00 GENERAL

1.01 SUMMARY

- A. Section includes: General requirements for preparation, maintenance and delivery of record documents.

1.02 SUBMITTALS

- A. Deliver record documents and transparencies to Architect at completion of Project.
- B. Accompany submittal with transmittal letter, in duplicate, containing date, Project title and number, Contractor's name and address, title and number of each record document, certification that each document as submitted is complete and accurate, and signature of Contractor or its authorized representative.

2.00 PRODUCTS

Not Used.

3.00 EXECUTION

3.01 DOCUMENT MAINTENANCE

- A. Maintain one copy of the following in Contractor's field office at the site:
 - 1. Contract Drawings, including the DSA stamped set.
 - 2. Specifications and Addenda.
 - 3. Reviewed shop drawings.
 - 4. Bulletins and change orders, field change authorization and notice of clarification, and other modifications to Contract.
 - 5. Field test records.
- B. File record documents apart from constructions documents and maintain in clean, dry, legible condition. Make record documents available for review by the Owner and Architect during regular business hours.
- C. Do not use record documents for construction purpose.
- D. Record documents will be subject to a monthly review by the Architect prior to approval of each progress payment.

3.02 RECORDING

- A. Clearly label each document "PROJECT RECORD".
- B. Keep record documents current.
- C. Record and properly dimension deviations on the record drawings within 24 hours after work in affected area is completed. Dimensions shall be accurate to within 1 in.
 - 1. Use a fine felt or nylon tip pen with waterproof colored ink for marking.
 - 2. Legibly mark to record actual construction of the following:
 - a. Depths of various elements of foundation in relation to first floor level.
 - b. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements. Cut-off points and point of connections of utilities.
 - c. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - d. Field changes of dimension and detail.
 - e. Changes made by Change Order, Field Change Authorization and Notice of Clarification.
 - f. Details not on original Contract Drawings.
 - g. Do not permanently conceal any work until required information has been recorded.
- D. Legibly mark-up each Section of the Specifications to record the following.
 - 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment installed.
 - 2. Changes made by change order, field change authorization and notice of clarification.
 - 3. Other matters not originally specified.
- E. Maintain shop drawings as record documents. Legibly annotate to record changes made after approval.

END OF SECTION

SECTION 01 78 23
OPERATING AND MAINTENANCE DATA

1.00 GENERAL

1.01 SUMMARY

- A. Prepare all maintenance manuals and operating instructions required by the Specifications.
- B. Bind manuals and instructions in durable plastic binders as follows:
 - 1. Identify the front cover and binding edge of the manual with the name of the Project and
"OPERATING AND MAINTENANCE DATA."
 - 2. Provide typewritten table of contents near the front of manual with page numbers to quickly locate the information.
 - 3. Provide complete instructions regarding operation and maintenance of all equipment involved, including but not limited to, start-up and shut-down procedures, and safety precautions.
 - 4. Provide complete nomenclature of all replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts.
 - 5. Provide copy of guarantees and warranties issued by the equipment manufacturers.
 - 6. Provide copy of the approved shop drawings, as applicable to the content of the manual, with all data concerning changes made during construction.
 - 7. Use 8-1/2 in. by 11 in. sheets, except that larger sheets may be used when folded to this size and used as a pull-out.
- C. Where content of manuals include manufacturers' catalog pages, clearly indicate the precise items included in this installation and delete, or otherwise clearly indicate all manufacturers' data with which this installation is not concerned.
- D. Unless otherwise specified, provide one copy of each manual.

END OF SECTION

SECTION 02 31 00
TRENCHING AND BACKFILLING FOR UTILITIES

1.00 GENERAL

1.01 SUMMARY

A. Section includes:

1. Trenching, backfilling and compacting for utilities.
2. Bedding material for pipes.

B. Related work:

1. All other trenching, shoring and bracing, backfilling, and compacting: Section 02 31 00.
2. Installation and tests of utilities: Division 33.

1.02 QUALITY ASSURANCE

A. Obtain District's Geotechnical Engineer's approval of backfill materials, method of placement, and of the completed work of this Section.

B. Reference data: Maps, soil investigation reports, and similar reference data are made available to Contractor for information only. District and Architect assume no responsibility for conclusions the Contractor may draw there from.

C. Reference standard:

2. Perform all work in compliance with applicable provisions of "Standard Specifications for Public Works Construction" (SSPWC). Mention herein of section numbers refers to sections of the reference standard.
3. Where reference standard refers to "Agency," substitute the word "District." Where reference standard is in conflict with these Specifications, these Specifications govern.

1.03 SOIL INVESTIGATION REPORT

A. Refer to the General Conditions.

1.04 WARRANTY

A. Any settling of backfill in trenches which may occur during the one-year period after Substantial Completion shall be repaired to District's satisfaction by Contractor without expense to District, including complete restoration of damaged paving, walks, and other materials or installations of every kind.

2.00 PRODUCTS

2.01 IMPORTED MATERIAL

Not used.

2.02 ON-SITE MATERIALS

A. Materials from cuts or excavations, approved by the Geotechnical Engineer, free of debris and without soft, spongy, organic and other deleterious materials.

1. Do not use cobbles or boulders larger than 4 in. in largest dimensions at any depth.
2. Do not use rocks greater than 2-1/2 in. in largest dimension in backfill within 12 in. of the top of pipe or structure, and within 12 in. of the top of pavement subgrade.
3. Where rocks are included in backfill, mix with suitable materials to eliminate voids.

2.03 BEDDING MATERIALS

A. Complying with section 306.1.2.1, Bedding, of the reference standard.

3.00 EXECUTION

3.01 INSPECTION

A. Verify conditions and measurements affecting the work of this Section at site. Make sure that detrimental conditions are corrected before proceeding with installation.

3.02 PROTECTIVE MEASURES

A. Utilities: Protect existing utility lines.

B. Settlement:

1. In areas where compacted backfill has been placed, additional consolidation will occur after completion due to changes in moisture content and surcharge.
2. Install utility connections crossing this backfill to the building, and improvements adjoining the building at the backfill line, to take into account this additional consolidation, or schedule sufficient time between backfilling operations and such improvements to allow this consolidation to take place.

3.03 COMPACTION CONTROL

A. Notification: Notify the Geotechnical Engineer whenever trench backfill work is being performed as part of this Section.

- B. Replacement: Geotechnical Engineer will determine if work performed without inspection meets the requirements of these Specifications. Where directed by Geotechnical Engineer, uncover and replace work performed without inspection at no additional cost to the District.

3.04 TRENCH EXCAVATION

- A. Before opening any new excavations, uncover all intersecting existing utility lines located between the ground surface and one foot below the bottom of the new trench line.

- 1. General:

- a. Where unidentified existing utilities are encountered, determine whether these are active or abandoned.
- b. Remove interfering portions of abandoned utilities and cap or plug open ends of pipe to remain.
- c. The cap or plug must seal the opening in such a manner that would permit remaining portion of the utility to be reactivated.
- d. Notify Architect for instructions on utilities which are determined to be active. Any relocation work performed on an active utility without obtaining prior approval of Architect will be done at the Contractor's risk and expense.
- e. Do not proceed without instructions, except to correct an immediate hazard or emergency condition.

- 2. Trench width:

- a. Maximum width of trench shall be 20 in. more than greatest diameter of pipe up to a point 6 in. above top of the pipe, except that it may be widened enough to place sheeting.
- b. Make trenches at least 12 in. wider than greatest exterior diameter of pipe or conduit except that trenches for concrete-encased ducts may be the same width as duct encasement.

- 3. Dimensional tolerance:

- a. Maintain accuracy of gravity utility lines designated for gradients less than 1% to 1/8 in. at any point and cumulative within 1/2 in./100 ft.
- b. For all gravity lines, check each section of pipe for proper gravity slope direction with a string line set over the pipe by a surveyor.
- c. Non-gravity utility line subgrades shall be accurate within +2 in.

3.05 PIPE BEDDING

- A. Where bedding is required, provide a minimum of 4 in. of bedding material in the bottom of the trench, in addition to the requirements of section 306-1.2.1 of the reference standard, before installing pipes or conduits.
- B. Do not allow water to accumulate in the trench.

3.06 DEWATERING

- A. At no time shall water be allowed to back up into pipe in place. Securely plug terminal ends of pipe before work is abandoned at end of day or when laying is interrupted.

3.07 TRENCH BACKFILL

- A. Backfilling of utility trenches shall not be undertaken (1) for 24 hours after Geotechnical Engineer has been notified of same, (2) until required tests and inspections have been completed, and (3) until "as-built" location notes have been recorded.
- B. Place backfill material in compliance with section 306-1.3.2 of the reference standard, and to achieve at least 90% of the maximum density in compliance with ASTM D 1557. The top 12 in. of backfill in the building and under paved areas shall be compacted to 95% of maximum density.
- C. Compaction by jetting, ponding or flooding is not permitted.
- D. Remove surplus earth left after backfilling, and grade top of trench to match adjacent grades.
- E. Backfill voids left by removal of sheeting, piles, and similar sheeting supports immediately with clean sand to assure dense and complete filling of voids.

END OF SECTION

SECTION 02 41 19
SITE DEMOLITION AND CLEARING

1.00 STANDARDS

1.01 SUMMARY

A. Section includes:

1. Demolition and removal from Owner's property concrete and asphalt pavement and curbs.
2. Demolition and removal from Owner's property landscaping, trees designated to be removed and irrigation piping and related items.
3. Demolition and removal from Owner's property underground utilities where shown on drawings and as required to complete project.
4. Abandon facilities and utilities.
5. Backfilling voids created by removing demolished items.
6. Contacting contaminated soils.
7. Disposal of demolished/removed items.
8. Dust control.
9. Erosion control.
10. Tree protection.

1.02 REQUIREMENTS

- A. Geotechnical Engineering Report has been prepared by Earth Systems for the Tropico Middle School expansion project. Copies of this report and any addenda are available for review at the office of the Owner's Representative.
- B. Construction materials and methods shall be in accordance with the site-specific recommendations and standard specifications contained in the Geotechnical Engineering Report.
- C. A Geotechnical Engineer employed by the Owner to perform observation, testing and reporting during construction in accordance with the contract documents (hereinafter referred to as the Construction-Phase Geotechnical Engineer).
- D. Observation:
 1. Refer to Section 01 45 29, Testing Laboratory and Inspection Services, for additional requirements.

2. Clearing and grubbing operations shall be observed by the Construction Phase Geotechnical Engineer.
3. Demolition operations requiring excavation more than 12 inches below existing ground surface shall be continuously observed by the Construction-Phase Geotechnical Engineer.
4. All plugging of pipelines or conduits allowed to be abandoned in place outside of building and pavement areas shall be observed by the Construction-Phase Geotechnical Engineer.
5. Contractor shall notify the Construction-Phase Geotechnical Engineer and the Owner's Representative at least five (5) working days prior to commencement of clearing operations.
6. The cost of observation by the Construction-Phase Geotechnical Engineer shall be borne by the Owner.
7. The Construction-Phase Geotechnical Engineer shall certify that site demolition was properly completed in conformance with the Drawings and Specifications. Certification shall be in the form of a report to the Owner's Representative.

2.00 MATERIALS (Not Used)

3.00 EXECUTION

3.01 LOCATING AND MARKING FACILITIES

- A. Before beginning clearing or other excavation, determine the location of all existing buried conduits and structures which are to remain within the work area and mark these locations at the site with paint and/or flags.

3.02 CLEARING AND GRUBBING

- A. Prior to commencing grading operations, clear the existing ground surface of areas to be graded of all organic material vegetation (except trees indicated on the Drawings to remain), whether living or dead, including large roots, as well as all trash and debris, as determined by the Construction Phase Geotechnical Engineer.
- B. Prior to commencing grading operations, excavate and remove from areas to be graded all existing non-complying fill and soil containing debris, organics, pavement and other unsuitable material as determined by the Construction Phase Geotechnical Engineer.

3.03 DEMOLITION

- A. Where demolition areas are indicated on the Drawings and/or called for in the Specifications, clear old pavements, old foundations, slabs, curbs, gutters, abandoned pipelines and conduits, and soils contaminated during demolition operations as determined by the Construction Phase Geotechnical Engineer, EXCEPT WHERE SUCH CLEARING OPERATIONS MAY JEOPARDIZE EXISTING TREES OR STRUCTURES TO REMAIN ("jeopardize" with respect to a tree shall mean excavation within the drip line and "jeopardize" with respect to a structure shall mean excavation below a line projected downward at a 2 horizontal to 1 vertical slope from a point 1 foot above the bottom of the foundation); in such case, request direction from the Owner's Representative before proceeding with the work.
1. In addition to demolition, which may be indicated on the Drawings, make a thorough search for abandoned facilities such as septic systems, wells, fuel or water storage tanks, and pipelines or conduits. Remove any such abandoned facilities encountered, EXCEPT WHERE SUCH REMOVAL OPERATIONS MAY JEOPARDIZE EXISTING TREES OR STRUCTURES TO REMAIN ("jeopardize" with respect to a tree shall mean excavation within the drip line and "jeopardize" with respect to a structure shall mean excavation below a line projected downward at a 2 horizontal to 1 vertical slope from a point 1 foot above the bottom of the foundation); in such case, request direction from the Owner's Representative before proceeding with the work.
- B. Abandoned facilities shall not remain in place within building and pavement areas. Building area is defined as that area within, and extending a minimum of 5 feet outside of, the perimeter of the building and the perimeter of steps, landings, patios, walkways and the like which are contiguous with the building. Pavement area is defined as that area within, and extending a minimum of 3 feet outside of, the limits of asphalt or concrete pavement and the limits of curb, gutter, and sidewalk contiguous with the pavement.
- C. If pipelines or conduits are allowed to be abandoned in place outside of building and pavement areas, plug all exposed openings with stiff concrete placed within the pipeline/conduit to a minimum of five (5) lineal feet beyond the opening and rodded to remove voids. All such plugging operations shall be observed by the Construction-Phase Geotechnical Engineer.

3.04 BACKFILLING VOIDS

- A. Immediately replace voids or disturbed areas created during clearing and demolition operations, and which extend below the recommended over-excavation depth, with native fill compacted to at least 90 percent relative compaction as determined by the latest approved edition of ASTM D1557. Do not place any fill until the underlying soil has been observed by the Construction-Phase Geotechnical Engineer. All fill and backfill shall be observed, tested and approved by the Construction-Phase Geotechnical Engineer.

3.05 CONTAMINATED SOIL

- A. If abandoned septic tanks or fuel tanks or other potential sources of contamination or hazardous waste are encountered or if soil, which appears to be contaminated, is encountered, immediately notify the Owner's Representative.

3.06 DISPOSAL

- A. Remove from the work area, transport to a suitable location, and legally dispose of all unsuitable soil materials, rubbish, and debris resulting from clearing, demolition, and grading operations.
- B. Burning is not permitted.

3.07 DUST CONTROL

- A. Employ all labor, equipment and methods required to prevent construction operations from producing dust in amounts damaging to persons, property, vegetation and animals or causing a nuisance to persons occupying buildings in the vicinity of the job site. Continue dust abatement measures until relief is granted by the Owner's Representative.
 - 1. Contractor shall be responsible for any damage caused by dust resulting from his operations.

3.08 EROSION CONTROL

- A. Develop and implement an erosion control plan to provide for containment of siltation resulting from storm and other water runoff to prevent damage to the environment and adjacent property.

3.09 TREE PROTECTION

- A. All clearing and grading operations within the drip line of trees to remain shall be approved in advance and observed by Landscape Architect or Arborist employed by the Owner.
- B. Comply with tree protection requirements, see specification section 028120.

4.00 SUBMITTALS (Not Used)

END OF SECTION

SECTION 03 11 14
CONCRETE FORMWORK

1.00 GENERAL

1.01 SUMMARY

A. Section includes:

1. Forms for cast-in-place concrete.
2. Shoring, bracing, accessories and form coating.

B. Work installed but furnished in other Sections:

1. Inserts, bolts, anchors and other items furnished by other trades for installation in formed concrete.

1.02 QUALITY ASSURANCE

- A. Lumber and plywood shall be grade-marked by a grading agency acceptable to the DSA and Title 24 CAC.

1.03 HANDLING

- A. Store form facing materials above ground on framework or blocking. Protect from moisture and damage. Handle form facing materials to prevent damages which could be transferred to the concrete.

2.00 PRODUCTS

2.01 MATERIALS

- A. Forms for exposed concrete surfaces: Plywood, metal, metal-framed/plywood faced, or FRP, providing continuous, flat, smooth exposed concrete surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on Drawings where indicated.
- B. Forms for concealed concrete surfaces: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form ties and spreaders: Cone or snap type ties designed to be completely removed from wall, or to break off and provide minimum 1-1/2 in. coverage over ends of the portion of snap tie remaining in the concrete.
1. Do not use wire ties, wood spreaders, or embedded types in which embedded portion is less than 1-1/2 in. from exterior face of concrete.
- D. Chamfer strips: Extruded PVC, with 3/4 in. diagonal faces unless otherwise indicated, by The

Burke Co., Greenstreak Plastic Products Co., or Sonneborn-Rexnord, Inc., or oiled softwood shapes with the same profile.

- E. Form coatings: Commercial formulation form-coating compounds with a maximum VOC of 350 mg/l that will not bond with, stain or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- F. Prefabricated construction joint keyways: Key-Loc by Form-A-Key Products Div., or Keyed Kold Joint by The Burke Co., complete with all accessories.

3.00 EXECUTION

3.01 INSPECTION

- A. Verify conditions and measurements affecting the work of this Section at site. Make sure that detrimental conditions are corrected before proceeding with installation.

3.02 FORM TYPES

- A. General: Comply with the applicable provisions of ACI 347, Guide to Formwork for Concrete, and APA Design/Construction Guide, Concrete Forming.
 - 1. Design and construction of forms is Contractor's responsibility, but shall comply with specified requirements.
 - 2. Form contact surfaces shall be clean, free from dents, holes and other imperfections.
 - 3. Establish and maintain benchmarks, lines and controls necessary to achieve specified tolerances. Take an accurate survey of the form location just prior to concrete pour.
- B. Earth bank: Except for exterior face of wall footings and grade beams which must be formed, earth banks may be used to form footings and grade beams if the soil is firm, neatly trimmed, and will retain concrete in the required size and shape.
 - 1. The concrete coverage shall be increased as noted on the Drawings when concrete is cast against earth.
- C. Wood forms:
 - 1. Construct with plywood panels as large as practicable. Where because of their height walls or columns have a horizontal form joints, the horizontal joint shall be aligned throughout the same floor, or area, unless otherwise acceptable to the Architect.
 - 2. Seal joints between plywood panels flush with compound specifically designed to seal forms, or other approved material to prevent concrete paste leakage.
 - 3. Provide sharp, clean corners at form intersecting planes, without visible edges and offsets. Back joints with additional studs or girts.
 - 4. Form recesses and projections with smooth finish materials, and install in forms with

sealed joints to prevent displacement.

5. Drill holes accurately in forms to fit ties used. Prevent leakage of concrete around tie holes. Do not drive ties through undersized or improperly prepared holes.
6. Kerf backside of wood inserts used for forming keyways, reglets, recesses and similar treatments, to allow wood to swell without spalling concrete, and to assure easy removal.

D. Metal forms:

1. Fasten sections of forms tightly and interlock securely.
2. Provide precisely cut openings required by other trades.
3. Cut or drill forms for attaching sleeves or other items to be embedded in concrete.

E. Re-use of forms: Form materials may be re-used if they produce finished surfaces equal to finished surfaces where new form materials are used.

1. Before re-use, thoroughly clean, recondition in every respect, suitable for their re-use purpose.

F. Tolerances: To obtain cast-in-place concrete not exceeding the tolerances specified in Section 033000, except support form facing material to limit deflection to L/360 between supports for concrete exposed to view, and L/270 for all other concrete.

3.03 FORM CONSTRUCTION

A. Construction:

1. Rigidly support and construct forms to lines, surfaces and profiles necessary to produce concrete of the design indicated.
2. Construct forms to be removable without prying against concrete.
3. Make forms tight, without cracks or holes, to prevent leakage of mortar or loss of fine particles from concrete.
4. Cover or fill holes that are not used and cracks that have opened-up flush with adjacent surfaces.

B. Wales and studs: Of adequate size and spacing to prevent form failure and to obtain concrete within the tolerances specified.

C. Ties and spreaders: Place ties symmetrically, equally spaced, in plumb and level rows. Do not permit wood, other than built-in treated bucks or nailing blocks, to remain permanently in the forms.

D. Form contact surfaces:

1. As specified above and as best suited to prevailing conditions; may be constructed of plywood, FRP, plastic, or steel.
 2. Block plywood edges which do not occur at bearing points to eliminate joint offsets.
- E. Special features:
1. Corners: Install chamfer strips in corners of all other forms, unless otherwise indicated. Miter chamfer strip at changes in direction.
 - a. Corners which will be concealed in the Work may be formed either square or chamfered.
 2. Openings and recesses: Form as indicated or necessary to receive, pass and clear other work.
 - a. Verify sizes and locations with other trades before forming.
 - b. Closely cooperate in locating boxes, cans and sleeves furnished by other trades.
- F. Form release agent: Thoroughly clean forms and coat with release agent prior to initial use (except when mill-oiled) and before each reuse.
1. Apply form coating in compliance with its manufacturer's printed instructions and coverage rates.
 2. Coat steel forms with a non-staining, rust-preventative material. Rust-stained steel formwork is not acceptable.
 3. Provide a coating of uniform thickness. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete against which fresh concrete will be placed.
 4. Apply form coating before reinforcement is placed.

3.04 FORM REMOVAL

- A. Remove forms only after concrete has developed sufficient strength to not be damaged by form removal operation, and to safely sustain its own weight and superimposed loads, as determined by testing field-cured concrete cylinders, but not sooner than specified in ACI 347 or CBC Section 1906A.2.
- B. Take care when removing forms that concrete surfaces are not marred or gouged, and corners are true, sharp and unbroken. Do not pry against concrete when removing forms.
- C. Cut-off nails flush in concealed concrete surfaces. Cut back tie wires and nails in exposed concrete surfaces at least 1-1/2 in. Remove rod and cone ties and separators or similar devices and pull inward away from finished surfaces.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.2 ACTION SUBMITTALS

- A. Design Mixtures: For each concrete mixture.
- B. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1.4 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.5 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1.
 - 1. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301.
 - 1. Do not pour concrete when the temperature exceeds 90 ° F or 80 ° F when the wind exceeds 12 mph.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301

2. ACI 117

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed for bar No. 5 and larger, ASTM A 615, Grade 40, deformed for No. 4 and smaller.
 - 1. At grade beams and concrete frames, all reinforcement shall conform to ASTM A 706 rebar.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706, deformed.
- C. Where corrosion-resistant reinforcement is specified, use MFX2 rebar ASTM A 1035 Grade 690 and 830.

2.3 CONCRETE MATERIALS

- A. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150
 - 2. Fly Ash: ASTM C 618
 - 3. Slag Cement: ASTM C 989
 - 4. Blended Hydraulic Cement: ASTM C 595, excluding Type IS (≥ 70) and Type IT (S ≥ 70)
- B. Normal-Weight Aggregates: ASTM C 33, graded.
 - 1. Footings: 1" Max.
 - 2. Slab-on-grade, grade beams: $\frac{3}{4}$ " Max.
 - 3. Elevated Struct. Slabs, Beams, Framed Columns: $\frac{3}{8}$ " Max.
 - 4. Remainder: $\frac{3}{4}$ " Max.
 - 5. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Lightweight Aggregate: ASTM C 330
 - 1. Footings: 1" Max.
 - 2. Slab-on-grade, grade beams: $\frac{3}{4}$ " Max.
 - 3. Elevated Struct. Slabs, Beams, Framed Columns: $\frac{3}{8}$ " Max.
 - 4. Remainder: $\frac{3}{4}$ " Max.
 - 5. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

- D. Air-Entraining Admixture: ASTM C 260 where specified on plan.
- E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494, Type A.
 - 2. Retarding Admixture: ASTM C 494, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.
- F. Water: ASTM C 1602.

2.4 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.

2.5 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Normal-Weight Concrete:
 - 1. Provide concrete with the following minimum compressive strength (f'c) at 28 days unless noted otherwise:
 - a. Slabs on grade: 3000 psi (Hardrock)
 - b. Spread footing: 3000 psi (Hardrock)

- c. Continuous Footings: 3000 psi (Hardrock)
 - d. Footing under concrete shear walls: 4000 psi (Hardrock)
 - e. Retaining Walls: 3000 psi (Hardrock)
 - f. Structural Slabs: 5000 psi (Hardrock)
 - g. Columns: 4000 psi (Hardrock)
 - h. Beams: 5000 psi (Hardrock)
 - i. Deep Foundations (piles, caissons, etc.): 4000 psi (Hardrock)
 - j. Other Walls: 3000 psi (Hardrock)
 - k. Concrete over metal deck: 4000 psi (Lightweight)
- 2. Maximum W/C Ratio: 0.65
 - 3. Slump Limit: 4 inches +/- 1" for footings, slab on grade, and mass concrete, and 5 inches +/- 1" for other concrete. Slump may be increased when chemical admixtures are used, provided that admixture-treated concrete has the same or lower water:cement material ratio (ACI 211 Table 6.3.1).
 - 4. Where air entrained concrete is specified, the volume of air in the mortar fraction of concrete mix shall be 9% +/- 1%.

2.6 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.2 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.3 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

3.4 WATERSTOP INSTALLATION

- A. Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions.

3.5 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

3.6 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.7 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.8 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION

SECTION 03 32 01
CONCRETE REINFORCEMENT

1.00 GENERAL

1.01 SUMMARY

A. Section includes:

1. Reinforcing steel (rods and mesh) for cast-in-place concrete.
2. Accessories such as chairs and tie wires.

1.02 SUBMITTALS

- A. Procedure: In accordance with Section 01 33 23.
- B. Shop drawings: For reinforcement deviating from that shown on the Drawings.
- C. Bar drawings and schedules: With corresponding placing diagrams. Drawings shall be complete for any specific area of Project when submitted.
- D. Data: Copies of mill reports and test data for reinforcing steel sampled and tested, prior to starting this work.

1.03 QUALITY ASSURANCE

- A. Codes: Conform to Part 2 of Title 24, CCR and 2022 California Building Code.
- B. Source quality control: Obtain mill reports for all types and sizes of reinforcing steel.
 2. Mill reports shall contain steel source, description, heat number, yield point, ultimate tensile strength, elongation percentage, bend test and chemical analysis that comply with ASTM standards.
 - a. If the reports show that material is satisfactory no tests will be required.
 - b. For foreign steel, testing as specified below will be required by a testing laboratory acceptable to the District.
 - c. Certification from any other sources will not be acceptable.
 3. Ensure that the material delivered for use is that represented by the mill reports and obtain copies of mill reports, examine them, certify whether the material represented complies with Specifications requirements, and make distribution of reports as required. Report chemical composition of each heat, as determined by ladle analysis.
 4. Where materials proposed for use cannot be identified, pay for an DSA approved testing laboratory to make one series of tests (tensile and bend) from each 2.5

tons, or fraction thereof, of each size and kind of reinforcing steel. Include 2 samples minimum, of sufficient length to allow tests to be made on the as-rolled bar. Include chemical analysis testing for reinforcements to be welded per CBC 1903.A.7.

1.04 HANDLING

- A. Deliver reinforcement to site bundled, tagged and marked; handle to prevent damage to material. Use metal tags indicating size, length and other markings shown on placement drawings. Maintain tags after bundles are broken.

2.00 PRODUCTS

2.01 MATERIALS

- A. Reinforcing steel: ASTM A 615, grade indicated on Drawings.
- B. Reinforcing mesh: ASTM A 185. Provide welded wire fabric in flat sheets, not rolls.
- C. Tie wire: ASTM A 82, 16 gage (minimum) annealed steel wire.
- D. Supports for reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire-bar-type supports complying with CRSI specifications.
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs, or precast concrete block chairs with embedded wire ties.
 - 2. Over vapor barriers, use precast concrete chairs to prevent puncturing of membrane.

2.02 FABRICATION

- A. General: Except as modified by the Drawings and the Specifications, comply with Chapter 7 of CRSI Manual of Standard Practice for fabrication of reinforcing steel.
- B. Bending and forming:
 - 1. Fabricate steel bars, wire and fabric of indicated sizes, lengths and gages, and accurately form to shapes indicated by methods that will not injure the materials.
 - 2. Heating reinforcement for bending is prohibited. Do not install bars with unscheduled kinks or bends.
- C. Tolerances: Comply with ACI 117.

3.00 EXECUTION

3.01 INSPECTION

- A. Verify conditions and measurements affecting the work of this Section at site. Make sure that detrimental conditions are corrected before proceeding with installation.

3.02 PLACING

- A. Placement inspection: Place reinforcement under the continuous inspection of the District's DSA Inspector.
- B. Cleaning: Clean reinforcement of loose mill scale, excessive rust, oil, and other coating that might destroy or reduce its bond before placing it.
- C. Placing: Comply with the listed reference standards as applicable.
 - 1. ACI 315, Manual of Standard Practice for Detailing Reinforced Concrete Structures.
 - 2. CRSI, Manual of Standard Practice.
- D. Spacing of reinforcement: Space reinforcement to maintain the proper distance and clearance between parallel bars and between bars and forms.
- E. Splices:
 - 1. Do not splice reinforcing bars except where indicated. Bars shall be in contact, unless noted otherwise on the Drawings, at lapped splices and shall be firmly wired together before placing concrete.
 - 2. Extend stubs and dowels required to receive and engage subsequent work a sufficient length to develop the strength of the bar. Place dowel and stub bars in the forms and secure against displacement during placing of concrete.
- F. Fabric reinforcement:
 - 1. Straighten, cut to required size where required and lay flat in place. Lap fabric one full mesh plus 2 in. Securely wire together and to other reinforcement at approximately 24 in. o.c.
 - 2. Extend fabric to within 1 in. of expansion, construction and contraction joints. Chair fabric as concrete is placed to insure proper embedment at position indicated.
- G. Clearance: Maintain clear distances between reinforced steel and face of concrete indicated on the Drawings.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.
3. Latex joint sealants.
4. Preformed joint sealants.

1.2 PRECONSTRUCTION TESTING

- A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers eight samples of materials that will contact or affect joint sealants. Use ASTM C 1087 or manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples: For each kind and color of joint sealant required.
- C. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
 2. Joint-sealant manufacturer and product name.
 3. Joint-sealant formulation.
 4. Joint-sealant color.
- D. Product test reports.
- E. Preconstruction compatibility and adhesion test reports.
- F. Preconstruction field-adhesion test reports.

G. Field-adhesion test reports.

H. Warranties.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

B. Pre-installation Conference: Conduct conference at Project site.

1.5 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.

2. Sealant Primers for Nonporous Substrates: 250 g/L.

3. Sealant Primers for Porous Substrates: 775 g/L.

B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

C. Stain-Test-Response Characteristics: Where sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

2.2 SILICONE JOINT SEALANTS

A. Neutral-Curing Silicone Joint Sealant: ASTM C 920.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Building Systems.
 - b. Dow Corning Corporation.
 - c. GE Advanced Materials - Silicones.
 - d. Pecora Corporation.
 - e. Polymeric Systems, Inc.
 - f. Schnee-Morehead, Inc.
 - g. Sika Corporation; Construction Products Division.
 - h. Tremco Incorporated.
2. Type: Single component (S) or multicomponent (M).
3. Grade: Pourable (P) or nonsag (NS).
4. Class: 100/50.
5. Uses Related to Exposure: Traffic (T).

2.3 LATEX JOINT SEALANTS

- A. Latex Joint Sealant [LS-~~<#>~~]: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Building Systems.
 - b. Bostik, Inc.
 - c. Pecora Corporation.
 - d. Schnee-Morehead, Inc.
 - e. Tremco Incorporated.

2.4 JOINT SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
 - 1. Remove laitance and form-release agents from concrete.
 - 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

- A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
- F. Acoustical Sealant Installation: Comply with ASTM C 919 and with manufacturer's written recommendations.
- G. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.3 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 5 tests for the first 500 feet (300 m)] of joint length for each kind of sealant and joint substrate.
 - b. Perform 1 test for each 1000 feet (300 m) of joint length thereafter.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
- B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to

comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.4 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Tile control and expansion joints.
 - c. Joints between different materials listed above.
 - d. Other joints as indicated.
2. Joint Sealant: Silicone.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal non-traffic surfaces.

1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Joints between different materials listed above.
 - d. Perimeter joints between materials listed above and frames of doors, windows and louvers.
 - e. Control and expansion joints in ceilings and other overhead surfaces.
 - f. Other joints as indicated.
2. Joint Sealant: Silicone.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints as indicated.

2. Joint Sealant: Silicone.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal non-traffic surfaces.
1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Tile control and expansion joints.
 - d. Vertical joints on exposed surfaces of interior unit masonry, concrete, walls and partitions.
 - e. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
 - f. Other joints as indicated.
 2. Joint Sealant: Latex.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal non-traffic surfaces.
1. Joint Sealant Location:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated.
 2. Joint Sealant: Silicone.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

SECTION 31 10 00 SITE CLEARING

1.0 GENERAL

1.01 SUMMARY

- A. This Section requires the selective removal and subsequent off-site disposal of the following:
 - 1. Removal and offsite disposal of grass and root mat.
 - 2. Demolition of asphalt concrete and pavements as indicated on the drawings to straight, neatly saw cut surface.
 - 3. All other removals which may or may not been shown on plans as required for the project construction.

1.02 SITE CONDITIONS

- A. Protections: Contractor shall provide temporary barricades and other forms of protection to protect general public from injury due to demolition work.
- B. Traffic: Conduct demolition operations and debris removal to ensure minimum interference with roads, streets, walks, bike paths, and other adjacent occupied or used facilities. Access must be coordinated with District's Representative.
- C. Utility Services: Maintain all existing utilities to remain in service and protect them against damage during demolition operations.
- D. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations and County Air Pollution Control District pertaining to environmental protection. Do not use water when it may create hazardous or objectionable conditions such as flooding and pollution.

1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (Green Book), latest edition.

2.0 PRODUCTS (NOT APPLICABLE)

3.0 EXECUTION

3.01 DEMOLITION

- A. General: Perform demolition work in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with governing regulations.

- B. Provide services for effective air and water pollution controls as required by County Air Pollution Control District regulations.
- C. Prior to commencing grading operations, soil containing debris, organics, pavement, or other unsuitable materials, shall be stripped from the foundation and pavement areas. Demolition areas shall be cleared of old foundations, slabs, abandoned utilities, tree roots, and soil disturbed during the demolition process. Depressions or disturbed areas left from the removal of such material shall be replaced with compacted fill under observation by the Geotechnical representative.

3.02 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from Project site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose of off site.
- B. If hazardous materials are encountered during demolition operations, contact District's Representative.
- C. Burning of removed materials is not permitted on project site.

3.03 HAZARDOUS MATERIALS

- A. Except as otherwise specified, in the event Contractor encounters on the Project site material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or other hazardous materials which have not been rendered harmless, Contractor shall immediately stop Work in the area affected and report the condition to the District's Representative in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Contractor if in fact the material is asbestos, PCB, or other hazardous materials and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos, PCB, or other hazardous materials, or when such materials have been rendered harmless.
- B. Construction involving asbestos cement (transite) pipe shall be performed by qualified personnel in accordance with the standards and specifications set forth by American Water Works Association (AWWA), the Occupational Safety and Health Act (OSHA) and the Environmental Protection Agency (EPA), as well as location jurisdictional codes.

3.04 CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove tools, equipment and demolished materials from site.
 - 1. Repair demolition performed in excess of that required. Return elements of construction and surfaces to existing condition prior to start of operations. Repair adjacent construction or surfaces soiled or damaged by demolition work.

END OF SECTION

SECTION 31 20 00
EARTHWORK

1.00 GENERAL

1.01 SUMMARY

- A. Section includes: Excavation, Compaction and Fill.

1.02 REFERENCE

- A. Standard Specifications for Public Works Construction (SSPWC), latest edition.
- B. Geotechnical Engineering and Geohazards Report, Tropico Middle School Expansion Project, dated April 27, 2022, File No. 300234-002, prepared by Earth Systems Pacific and shall be superseded by the most current version.

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork in compliance with applicable requirements of governing authorities having jurisdiction.
1. Standard Specifications for Public Works Construction (SSPWC), latest edition.
 2. CAL/OSHA Construction Safety Order Requirements.
- B. Soil Testing Service
1. The District will engage a soil testing service to include testing soil materials proposed for use in the Work and for quality control testing during grading operations.
 2. Samples of materials shall be furnished to the testing service by the Contractor at least one week before their anticipated use.
 3. Work for this Section includes smoothing out areas for density tests and otherwise facilitate testing work, as directed.
 4. Shoring Systems: Pre-engineered systems, clearly labeled as such, may be used. Refer to the Geotechnical Study for further requirements.

1.04 PROJECT CONDITIONS

- A. The Contractor shall visit the site and familiarize himself with existing site conditions.
- B. Additional test borings and other exploratory operations may be made by the Contractor at no cost or liability to the District.
- C. Existing Utilities:
1. Where uncharted or incorrectly charted piping or other utilities are encountered during excavation, consult District 's Representative immediately for directions.

Cooperate with the District's Representative in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of the District's Representative at no cost to the District. Disturbed trench sections shall be replaced in kind.

2. Contractor to coordinate with the District 's Representative to obtain all required permits and schedule inspections.

- D. Protection of Subgrade: Do not allow equipment to pump, rut, or disturb subgrade, stripped areas, or other areas prepared for Project.
- E. Contractor shall implement measures to prevent soil erosion, and where possible, sediment shall be retained onsite.
- F. Contractor shall implement all necessary recommendations contained in the Geotechnical Study.

2.00 PRODUCTS (Not Applicable)

3.00 EXECUTION

3.01 SITE PREPARATION

A. General:

1. Remove vegetation, improvements, or obstructions interfering with installation of new construction. Transport and legally dispose of off site. Removal includes stumps and roots. Contractor shall utilize the best construction method to minimize the erosive effect from the removal of site vegetation.
2. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction. Paint cuts over one inch in size with tree pruning compound. Care shall be taken so as not to scar any area of the tree's bark.
3. In order to protect from sediment transfer or contamination from urban run-off during construction, the following grading and erosion control practices shall be followed:
 - a. If grading occurs during the rainy season (November through April), sediment traps, barriers, covers or other methods shall be used to reduce erosion and sedimentation.
 - b. Excavated materials shall not be deposited or stored where the material can be washed away by high water or storm run-off.
 - c. Grading operations on site shall be conducted so as to prevent damaging effects of sediment production and dust on the site and on adjoining properties.

- d. When vegetation has to be removed on site, the methods shall be one that minimizes the erosive effects from the removal.
- e. Exposure of soil to erosion by removing vegetation shall be limited to the area required for construction operations. The construction area shall be fenced to define the project.
- f. Temporary mulching, seeding, or other suitable stabilization shall be used to protect areas during construction or other land disturbance activities on site.
- g. Topsoil, removed from the surface in preparation for grading and construction activities on Campus is to be stored on or near the site and protected from erosion while grading operations are underway, provided that such storage may not be located where it would cause suffocation of root systems of trees to be preserved. After completion of such grading, topsoil is to be restored to exposed cut and fill embankments of building pads so as to provide a suitable base of seeding and planting.
- h. Sediment basins, sediment traps, or similar control measures shall be installed before extensive clearing and grading operations begin for site development.
- i. Water or dust palliatives shall be applied to exposed earth services as necessary to control dust emissions.
- j. Revegetation or stabilization of exposed earth surfaces shall take place as soon as possible.

B. Removals

- 1. Clear the site of trees, shrubs, and other vegetation, which is indicated to be removed.
- 2. Completely remove stumps, roots, and other debris to avoid problems with future utilities.
- 3. Use only hand methods for grubbing inside the drip line of trees indicated to be left standing.
- 4. Existing fills, soil containing debris, organics, pavement, or other unsuitable materials shall be excavated and removed prior to commencing grading operations. Demolition areas shall be cleared of old foundations, slabs, abandoned utilities, landscaping, and soils disturbed during the demolition process. Depressions or disturbed areas left from the removal of such material shall be replaced with compacted fill.
- 5. The limits and depths for removal of existing fill materials shall be evaluated by project soils engineer during grading.
- 6. Revegetation or stabilization of exposed earth surface shall take place as soon as possible.

C. Removal of Improvements

1. Remove above-grade and below-grade improvements necessary to permit construction and other work as indicated.
2. Remove from site and legally dispose of off-site, existing fill materials, soil debris, or other unsuitable materials prior to commencing grading operations.

3.02 EXCAVATION

- A. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown, within a tolerance of plus or minus 0.04 foot.
- B. Excavation for Planting Areas: Conform to cross-sections, elevations and dimensions shown, within a tolerance of plus or minus 0.10 foot.

3.03 COMPACTION

- A. General: Control soil compaction during construction providing minimum percentage of density specified for each area, under the provisions of the Geotechnical Study.
- B. Percentage of Maximum Density Requirements: Compact soil to not less than the percentages of maximum dry density specified in the Geotechnical Study and in accordance with ASTM D1557-91 method of compaction.
- C. Moisture Control:
 1. When moisture content of exposed scarified soil and/or fill material is below that sufficient to achieve recommended compaction, water shall be added to the soil and/or fill. While water is being added, soil shall be bladed and mixed to provide relatively uniform moisture content throughout the material.
 2. When moisture content of exposed scarified soil and/or fill material is excessive, material shall be aerated by blading or other methods. Fill placed in pavement areas shall be compacted at near optimum moisture content. Jetting is not permitted for compaction.

3.04 FILL

- A. In all excavations, use satisfactory excavated or borrow material sampled and tested by the District's Testing Laboratory. Fill selection shall be per Geotechnical Study.
- B. Fill excavations as promptly as Work permits, but not until completion of the following:
 1. Acceptance by District's Representative of construction below finish grade including, where applicable, waterproofing, damp-proofing, and drainage pipe.
 2. Examination, testing, approval and recording locations of underground utilities.
 3. Removal of concrete formwork.

4. Removal of shoring and bracing and backfilling of voids with satisfactory materials.
 5. Removal of trash and debris.
 6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
 7. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.
- C. Continual dust control, as required by the District, and in accordance with County Air Pollution Control District's Standards shall be required for the project construction.

3.05 GRADING

- A. General: To provide support for building floor slabs, all existing fill and unsuitable natural soils shall be excavated and replaced as properly compacted fill.
- B. Compaction: After grading, compact subgrade surfaces to the depth and percentage of compaction for each area classification.
- C. Fill placement and grading operations shall be performed only under the observation of the District's Testing Laboratory.
- D. The exterior grades around building areas shall be sloped to drain away from the buildings to prevent ponding of water adjacent to foundations.
- E. Grading operation shall be conducted so as to prevent damaging effects of sediment product and dust on the site and adjoining properties.

3.06 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Transport excess excavated material and legally dispose of off site.

3.07 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: District's Testing Laboratory will observe, test and approve subgrades and fill layers before further construction Work can be performed. The District's Representative will determine the frequency of tests. Subgrade: Allow at least one field density test of subgrade to be made for every 2000 sq. ft. of paved area, but in no case less than 3 tests.
- B. Field examination and testing will be performed by the District's Testing Laboratory. The Contractor shall cooperate with such testing and shall give the District's Representative advance notice of grading scheduling.
- C. Frequency of Tests for Trenching: As specified in Geotechnical Study Section 8 and as determined by the District's Representative.

- D. If in the opinion of the District's Representative, based on soil testing reports and observations, subgrades or fills which have been placed are below specified density, provide corrective work as specified at no additional expense to the District, and pay for retesting of the soil.

3.08 PROTECTION

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work as specified, with retesting, prior to further construction.

END OF SECTION

SECTION 31 23 33
TRENCHING AND BACKFILLING

1.00 GENERAL

1.01 SUMMARY

- A. Excavating trenches for construction of utilities.
- B. Trench backfill materials.
- C. Backfilling and compacting requirements.

1.02 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), latest edition.
- B. Geotechnical Engineering and Geohazards Report, Tropico Middle School Expansion Project, dated April 27, 2022, File No. 300234-002, prepared by Earth Systems Pacific and shall be superseded by the most current version.

1.03 SUBMITTALS

- A. Materials source.
- B. Sand equivalent test reports per ASTM D2419.
- C. Certificates.
- D. Drawings for shoring, bracing, sloping, or other provisions for worker protection for any excavation shall conform to the requirements of the CAL/OSHA Construction Safety Orders Requirements.

1.04 EXISTING UTILITIES

- A. Drawings show existing major underground utilities from reference drawings. Prior to excavation, the Contractor shall notify the District's Representative to obtain any additional information which may be applicable to the Work.
- B. Any incident of a utility being inadvertently damaged by the Contractor shall be immediately shutoff and then be immediately repaired by the Contractor at no cost to the District.
- C. Contractor to pothole all utility connections and verify exact size, location and material prior to beginning construction and notify engineer of any discrepancies.

2.00 MATERIALS

2.01 APPROVALS

- A. Imported material shall be approved by the District's Representative prior to being

brought to the site. Provide a sample of the material in sufficient quantity for the District's Representative's use in evaluating the material.

2.02 TRENCH BACKFILL MATERIAL

- A. Sand bedding shall have a sand equivalent (SE) of 30 or greater. The SE shall be evaluated during grading. Materials shall conform to the specification of the Geotechnical Study.
- B. Backfill material shall conform to the requirements of Section 217-2 of the SSPWC.
- C. Aggregate base course shall be per Plan.
- D. Topsoil removed from trenches shall be stockpiled at locations approved by the District's Representative.

2.03 SOURCE QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Representative.

3.00 EXECUTION

3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum.

3.02 TRENCH EXCAVATION

- A. All saw cutting shall be neat, straight cuts and shall conform to Section 306-3 of the SSPWC. All cuts shall be square unless otherwise specifically noted on plans.
- B. Trench excavation shall conform to Section 306-3 of the SSPWC and the following requirements:
 - 1. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. Suitable excavations shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustments to line and grade shall be made by scraping away or filling in with sand under the body of the pipe and not by wedging or blocking.
 - 2. If the trench is excavated below the required grade, correct any part of the trench excavated below the grade, at no additional cost to the District per the Geotechnical Study. Place the backfill material over the full width of trench in compacted layers not exceeding 6 inches deep to the established grade with allowance for the pipe base. If shoring is required, the trenches shall be shored and braced in accordance with the Trench Construction Safety Orders of the Division of Industrial Safety.
 - 3. When subgrade is encountered that in the opinion of the District's Representative is unsuitable for pipe support, the District's Representative may order the excavation to be carried to an approved depth below the bottom of the

pipe and backfilled with sand, to the lines and grades shown on the drawings and specified by the District's Representative.

4. The minimum width of the trench at the top of the pipe zone shall be as necessary to install the pipe. The utility lines shall be centered in the trench. In the event of (1) actual physical interference between existing crossing subsurface utilities and the proposed utility lines and (2) vertical discrepancy in connecting proposed utility lines to existing utility system, a minimum clearance of 0.5 feet between the utility line and the crossing, interfering utility shall be provided, unless otherwise indicated on the plans.
5. Where existing utilities or tree roots are to be protected, trench excavation shall be by hand. No mechanical excavating equipment shall be used within 6 inches of any utility or root.
6. Trenching machinery may be used for excavations provided the specified trench width can be maintained.

3.03 TRENCH BACKFILL

- A. Pipe bedding and trench backfill materials: pipe bedding shall be either crushed rock or sand as specified on the plans. Sand bedding and backfill for utilities shall consist of material having a sand equivalent of at least 30. The backfill material shall be placed within the pipe zone that extends from the bottom of the pipe to at least 12 inches above the top of the pipe for the full width of the trench. The horizontal distance between the spring line of the pipe and the side walls of the trench shall be such that bedding material can be properly placed and compacted below the haunches of the pipe. Pipe bedding and pipe zone backfill shall be compacted to at least 95 percent relative compaction. Backfill material placement shall conform to provisions of Geotechnical Study.
- B. Trench backfill placed above the pipe zone shall consist of suitable onsite or imported soil per Geotechnical Study. Mechanical compaction of trench backfill shall be performed and water consolidation (jetting) methods of compaction shall not be permitted. Trench backfill in landscape areas shall be compacted to a minimum of 90 percent relative compaction or per landscape specifications.
- C. Trench Backfilling shall conform to the requirements of Sections 306-12 of the SSPWC and Geotechnical Study:
 1. During the process of laying pipe in trenches, sufficient material shall be carefully placed and hand tamped about the pipe to hold it firmly to established line and grade. Oversized material, broken rock or shale, if encountered, shall not be used for backfill.
 2. No motor driven mechanical compacting equipment shall be used over pipelines until the backfill has been compacted to 12 inches over the crown of the pipe.
 3. All backfill material shall be deposited in horizontal layers not exceeding the thickness specified in Section 306-12 of the SSPWC and not exceeding 8 inches in thickness. The distribution of materials shall be such that all material following compaction and consolidation will form a homogeneous mass free of voids, pockets, streaks or other imperfections. Backfilling shall be done with earth free

from lumps, hardpan, chunks, paving material, organic matter or other deleterious substances.

4. Jetting of bedding or backfill material to obtain specific moisture content or for compaction shall not be permitted. If encountered, existing fill in the utility excavation shall be excavated and recompactd or removed and replaced with new fill materials per requirements of Section 2.02.
5. Compaction of all backfill material for trenches, pavements or structures, shall be per provisions of the Geotechnical Study. Appropriate warning detector tape shall be placed over all utilities.
6. Prior to final cleanup or resurfacing, the District's Representative shall take compaction tests in any backfill area and at any depth, with the Contractor providing equipment and operator to assist in such test. If any such compaction test fails, the Contractor shall correct such failure and pay for any retesting that is required. The District's Representative shall make as many tests as he feels is required to receive a satisfactory and acceptable job.

3.04 STOCKPILING

- A. Stockpiling of imported materials or excavated materials shall direct surface water away from approved stockpile site to prevent erosion.
- B. After stockpiles are removed, leave area in a clean and neat condition.

3.05 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by District's Representative.

END OF SECTION

SECTION 32 11 23
AGGREGATE BASE COURSES

1.00 GENERAL

1.01 SUMMARY

- A. Aggregate base course for curbs, gutters, sidewalks, and fire access driveway.

1.02 RELATED SECTIONS

- A. Section 31 20 00 Earthwork.
- B. Section 32 12 16 Asphalt Concrete Paving.
- C. Section 32 16 00 Curbs, Gutters, Sidewalks, and Driveways.

1.03 REFERENCES

- A. Standard Specifications for Public Works (SSPWC), latest edition.
- B. ASTM Standards.
- C. State Standard Specifications (SSS), Caltrans, latest edition.
- D. Geotechnical Engineering and Geohazards Report, Tropico Middle School Expansion Project, dated April 27, 2022, File No. 300234-002, prepared by Earth Systems Pacific and shall be superseded by the most current version.

1.04 SUBMITTALS:

- A. Submit material samples and reports in accordance with requirements of District.
- B. Submit samples in sufficient quantities for material testing.

2.00 PRODUCTS

2.01 MATERIALS

- A. Aggregate Base Material shall be Class 2 Aggregate Base conforming to SSS Section 26-1.02A. Aggregate Base shall have a minimum sand equivalence of 22 and a minimum R-value of 78 and shall be free of organic materials and other deleterious substances.
- B. Aggregate Base materials used within building areas shall be free of asphaltic materials.

3.00 EXECUTION

3.01 EXAMINATION

- A. Verify substrate has been inspected; gradients and elevations are correct, and dry.

3.02 AGGREGATE BASE PLACEMENT

- A. Aggregate base placement shall conform to the provisions of the SSPWC, Section 301-2.
- B. Level and contour surfaces to elevations and gradients indicated.
- C. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- D. Where the required aggregate base thickness is 6 inches or less, the watered base may be spread and compacted in one layer. Where the required thickness is more than 6 inches, the aggregate base material shall be spread and compacted in 2 or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.
- E. Aggregate base course shall be dense and unyielding upon proof-rolling with full water truck.

3.03 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch.
- B. Scheduled Compacted Thickness shall conform to the provisions of the SSPWC Section 301-2.2.

3.04 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Testing Laboratory. Compaction testing will be performed in accordance with ASTM D1557, latest edition.
- B. If tests indicate work does not meet specified requirements, remove work, replace and retest at Contractor's expense.

END OF SECTION

SECTION 32 12 16
ASPHALT CONCRETE PAVING

1.00 GENERAL

1.01 SUMMARY

- A. Asphaltic concrete paving for parking lots and driveway pavements.

1.02 RELATED SECTIONS

- A. Section 31 20 00 Earthwork.
- B. Section 32 11 23 Aggregate Base Course.

1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), latest edition.
- B. ASTM Standards.
- C. Geotechnical Engineering and Geohazards Report, Tropico Middle School Expansion Project, dated April 27, 2022, File No. 300234-002, prepared by Earth Systems Pacific and shall be superseded by the most current version.

1.04 SUBMITTALS

- A. Submit asphalt concrete mix design(s) for approval of the District Representative.

1.05 TESTING AND INSPECTION

- A. Testing and inspection of asphalt pavement mix(es) and testing of placed stabilizing base course and asphalt pavement will be performed by the District's Testing Laboratory. Testing and inspection will be performed so as to minimize disruption of work.
- B. Allow the District's Testing Laboratory access to the mixing plant for verification of weights or proportions, character of materials used and determination of temperatures used in the preparation of asphaltic concrete mix.

2.00 PRODUCTS

2.01 GENERAL

- A. Provide the aggregate base, and bituminous surface conforming to the requirements of the Standard Specifications for Public Works Construction (SSPWC).

2.02 PAVING MATERIALS

- A. Asphalt Concrete: Asphalt concrete material shall be C2-PG 70-10 per SSPWC Section 203-6. The grading and proportioning of aggregates shall be such that the combined mineral aggregate conforms to the specified requirements.
- B. Asphalt Emulsion: SSPWC Section 203-3, Grade SS-1h.
- C. Prime Coat: Grade SC-70 per SSPWC Section 203-2.
- D. Aggregates for base course shall conform to requirements of Specification Section 32 11 23, Aggregate Base Course.

2.03 ASPHALT PAVEMENT MIX

- A. Combine mineral constituents in proportions to produce a mixture conforming to requirements of the SSPWC Section 203-6.
- B. Percentage by weight of asphalt cement in mixture shall be in accordance with SSPWC Section 203-6.
- C. Maintain thorough and uniform mixture.
- D. Bring asphalt and mineral constituents to required temperatures before mixing. Ensure aggregates are sufficiently dry so as not to cause foaming in mixture.

3.00 EXECUTION

3.01 GENERAL

- A. Execute Work in accordance with SSPWC Section 302 and the Geotechnical Study.

3.02 PREPARATION

- A. Ensure grading of subgrade to required elevation. Subgrade preparation shall be per SSPWC Section 301.
- B. Before final rolling, shape entire section, add additional sub-soil if necessary, and compact subgrade to provide grades, elevation and cross-section indicated. Points of finished subgrade surface shall be within 0.04 foot of elevations indicated on the Drawings.

3.03 BASE COURSE

- A. Place aggregate base in accordance with requirements of SSPWC Section 301 and to the thickness shown on the Drawings. Grade and compact in 6-inch layers to at least 95 percent of compaction (ASTM D1557).

3.04 MAINTENANCE

- A. Maintain the base course until the asphaltic pavement is in place. Maintenance shall include drainage, rolling, shaping and water as necessary to maintain the course in proper condition. Maintain sufficient moisture at the surface to prevent a dusty condition. Areas of completed base course that are damaged shall be conditioned, reshaped and re-compacted in accordance with the requirements of the Specifications without additional cost to the District.

3.05 TACK COAT

- A. Prior to the application of the asphalt concrete, a paint binder (tack coat) shall be applied to all surfaces of walkway, curbs, gutters, manholes and drainage structures which will be in contact with asphalt pavement per SSPWC Section 302-5.4.
- B. Coat surfaces of catch basins which are to remain free of asphalt with oil, or provide equivalent protection, to prevent asphalt adhesion.

3.06 PRIME COAT

- A. Prior to the application of the asphalt concrete, a prime coat shall be applied at a rate of 0.20 to 0.40 gallons per square yard.

3.07 ASPHALT CONCRETE

- A. Requirements: The bituminous concrete shall consist of mineral aggregate, uniformly mixed with bituminous material in a central plant in accordance with SSPWC Section 203-6. The percentage of asphalt binder shall be in accordance with SSPWC Section 203-6. The mixing plant and construction equipment shall conform to the requirements of SSPWC Sections 203-6 and 302-5.
- B. Placing: Deliver bituminous mixtures to the work site temperatures specified in SSPWC Section 302-5.5. Spread and place in accordance with SSPC Section 302-5.5. Asphalt surface shall be fog-sealed.
- C. Compaction: Initial or breakdown rolling and the final rolling of the uppermost layer of the asphalt concrete shall be in accordance with SSPWC Section 302-5.6. Compaction by vehicular traffic shall not be permitted.

3.08 JOINING PAVEMENT

- A. Carefully make joints between old and new pavements or between successive days work in such manner as to insure a continuous bond between old and new sections of the course in accordance with SSPWC Section 302.
- B. Expose and clean edges of existing pavement. Cut edge to straight, vertical surfaces. Paint all joints with a uniform coat of tack coat before the fresh mixture is placed. Prepare joints in the new pavement in accordance with SSPWC Section 302-5.7.

3.09 JOINING NON-PAVED AREAS

- A. Where paving will join landscape or other non-hardscape area a redwood header shall be installed.

3.10 TOLERANCES

- A. Flatness: Maximum variation of 1/8 inch when measured with a 10-foot straight edge.
- B. Variation from True Elevation: Within 1/4 inch.

3.11 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Testing Laboratory.
- B. Field inspection and testing will be performed by the District's Testing Laboratory. The Contractor shall cooperate with such testing and shall give the District Representative advance notice of paving scheduling. Sufficient "Advance Notice" shall be determined by the District Representative.
- C. If tests indicate materials do not meet specified requirement, replace material and retest at no additional cost to the District.
- D. Frequency of Test: As determined by the District's Testing Laboratory.

3.12 PROTECTION

- A. After placement, protect pavement from mechanical injury.

END OF SECTION

SECTION 32 16 00
CURBS, GUTTERS, SIDEWALKS

1.00 GENERAL

1.01 SUMMARY

- A. Concrete for curbs, gutters, sidewalks.

1.02 RELATED SECTIONS

- A. Section 31 20 00 – Earthwork

1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), latest edition.
- B. Geotechnical Engineering and Geohazards Report, Tropico Middle School Expansion Project, dated April 27, 2022, File No. 300234-002, prepared by Earth Systems Pacific and shall be superseded by the most current version.
- C. ASTM Standards.

1.04 SUBMITTALS

- A. Submit the following:
 - 1. Product Data: Provide data on admixtures and curing compounds.
 - 2. Concrete mix design(s).
 - 3. Certificates from the batch plant.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with the SSPWC, latest edition; and ASTM Standards, latest edition.
- B. Obtain cementitious materials from same source throughout.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not place concrete when base surface temperature is less than 40 degrees F or surface is wet.

2.00 PRODUCTS

2.01 FORM MATERIALS

- A. Form Materials: Section 303-5 of the SSPWC.

2.02 CONCRETE MATERIALS

A. Concrete Material for Curbs and Walks (Path of Travel):

1. Class 520-C-2500. Portland cement concrete per Standard Specifications for Public Works Construction Section 201-1.
2. Concrete reinforcements shall be constructed per the Project Plans and Specifications.

B. Concrete Material for Traffic Loaded Concrete:

1. Class 650-CW-4000. Portland cement concrete per Standard Specifications for Public Works Construction Section 201-1.
2. Concrete reinforcements shall be constructed per the Project Plans and Specifications.

2.03 ACCESSORIES

- ### A.
- Curing Compound shall conform to SSPWC Section 201-4. Pigmented compound shall not demonstrate any residual coloring of the concrete after one week.

2.04 CONCRETE MIX

- ### A.
- Mix and deliver concrete in accordance with ASTM C94.
- ### B.
- Use accelerating admixtures in cold weather only when approved by the District's Representative. Use of admixtures will not relax cold weather placement requirements.
- ### C.
- Use calcium chloride only when approved by the District 's Representative.
- ### D.
- Use set retarding admixtures during hot weather only when approved by the District 's Representative.

2.05 CONCRETE REINFORCEMENT

- ### A.
- Concrete reinforcement shall conform to SSPWC Section 201-2.

2.06 SOURCE QUALITY CONTROL

- ### A.
- Provide certificates of compliance from the batch plant.

3.00 EXECUTION

3.01 EXAMINATION

- ### A.
- Verify compacted subgrade is acceptable and ready to support imposed loads.
- ### B.
- Verify gradients and elevations of subgrade are correct.

3.02 PREPARATION

- A. Moisten subgrade to minimize absorption of water from fresh concrete. Over-excavate subgrade to a depth of 2 feet below existing or finish grade whichever is deeper. Scarify excavation bottom to 12", moisture condition to near or over optimum moisture content and recompact to 90% relative compaction. Place engineered fill in lifts, compacted to 90% relative compaction with upper 1 foot compacted to 95% relative compaction in parking and drive areas. Refer to geotechnical report for site subgrade preparation recommendations.
- B. Coat surfaces of catch basin frames with oil to prevent bond with concrete pavement.
- C. Notify District's Representative a minimum of 24 hours prior to commencement of concrete placement operations.

3.03 FORMING

- A. Place and secure forms to correct location, dimension, and profile.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.04 PLACING CONCRETE

- A. Place concrete in accordance with SSPWC Section 303-5.
- B. Install ½" thick fiberboard expansion joint and snap cap. Seal with Sikaflex self-leveling sealant after removal of snap cap (typical).
- C. Construct weakened plane joints conforming to SSPWC Section 303-5.4.3, 1 ¼" inch deep, at intervals not exceeding 12 feet.
- D. The top edges of curbs shall have 0.5" radius.

3.05 FINISHING

- A. Concrete finishes shall be per SSPWC Section 303-5.5.
- B. Portland cement concrete paving in all accessible walking surfaces shall have slip resistant finish.
- C. Walkway grades in excess of 5% shall conform to requirements of Section 11B-401 of the latest edition of the California Building Code.
- D. Place curing compound in accordance with SSPWC Section 303-5.6 on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.06 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Testing Laboratory.
- B. District 's Testing Laboratory will perform slump and compressive strength tests.
- C. Contractor shall maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.07 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, vandalism and mechanical injury.
- B. It is the Contractor's responsibility to replace all concrete work subject to vandalism and graffiti at no extra cost to the District.

END OF SECTION

SECTION 32 84 00
PLANTING IRRIGATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. General Conditions and Supplementary Conditions apply to this section.

1.2 WORK INCLUDED

- A. Supply material, pipe, pipe fittings, automatic valves, wiring, and labor to install a fully automatic sprinkler system. Restore any existing landscaping disturbed during the installation.

1.3 RELATED SECTIONS

- A. Section 32 93 00 - Landscaping
- B. Section 22 00 00 - Plumbing

1.4 QUALITY ASSURANCE & REQUIREMENTS

- A. Obtain and pay for any and all permits and inspections as required.
- B. Follow manufacturer's directions and detailed drawings in all cases when the manufacturers of products used in this contract furnish directions covering points not included in the drawings and specifications.
- C. All local, municipal and state laws, and rules and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these specifications, and their provisions shall be carried out by the Contractor. Anything contained in these specifications shall not be construed as conflicting with any such rules and regulations, or the requirements of the same. However, when these specifications and drawings call for or describe materials, workmanship, or construction of a better quality, higher standard, or larger size than is required by such rules and regulations, the provisions of these specifications and drawings shall take precedence.
- D. Superintendent:
 - 1. A superintendent satisfactory to the Owner's Representative shall be present on the site at all times during progress of the work.
 - 2. Do not change the Superintendent except with the consent of the Architect.
 - 3. The Superintendent shall be authorized to represent the Contractor.

E. Explanation of Drawings:

1. Due to the scale of drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which may be required. Carefully investigate the structural and finish conditions affecting this work and plan work accordingly, furnishing such offsets, fittings, sleeves, etc., as may be required to meet site conditions. Drawings are generally diagrammatic and indicative of the work to be installed. Install the work in such a manner as to avoid conflicts between irrigation systems, planting and architectural features.
2. The word Architect as used herein refers to the Owner's authorized representative.
3. Furnish and install all work called for on the drawings by notes or details whether or not specifically mentioned in the specifications.
4. Do not install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in area dimensions exist that might not have been considered in engineering. Bring such obstructions or differences to the attention of the Architect. Failure to do so will mean the Contractor is responsible for any revisions necessary.
5. Do not purchase or install materials as noted in legend on drawing when it is obvious there is an oversight or discrepancy. Failure to obtain prior material approval may result in rejection by the Architect. The Contractor will be responsible for any revisions necessary due to his failure to bring material discrepancies to the attention of Architect, or failure to comply with material submittals.
6. Coordinate as necessary the work of this Section which is allied with the work of other trades.
7. It is the intent of the drawings and specifications to describe a complete irrigation system providing uniform water coverage. If the plans or specifications appear in any way to be incomplete, misleading, conflicting, or subject to misinterpretation, it is the Contractor's responsibility to bring these concerns to the Architect's attention before bidding. If the Contractor fails to do so, the Contractor must accept the Architect's interpretation and any potential related financial impact that may occur.

F. Electrical wiring, controls, motors, and devices shall be Underwriters Laboratories listed, and labeled U.L.

1.5 SUBMITTALS

A. Material List:

1. Furnish the articles, equipment, materials, or processes specified by name in the drawings and specifications. Substitution is allowed only with prior written approval of the Architect.

2. Submit complete material list prior to performing any work. Material list shall include the manufacturer name, model number and description of all proposed materials and equipment.
3. Equipment or materials installed or furnished without prior approval of the Architect may be rejected and the Contractor required to remove such materials from the site at the Contractor's own expense.
4. If equipment proposed for use is as specified, a material list ONLY is required, and it is UNNECESSARY to submit manufacturer descriptive catalogs with submittal.

B. Record Drawings:

1. Provide and maintain up to date and complete project record documents (set of blue-line prints). Update daily and show all changes from the original drawings and specifications, as well as exact "as-built" locations, and sizes and types of equipment. Prints for this purpose may be acquired from the Architect. Keep this set of drawings on site and use only for such recording.
2. These drawings shall also serve as work progress prints and shall be the basis for measurement and payment for work completed. Drawings must be available at all times for site reviews, in a location designated by the Architect. Should the record blue-line progress prints be unavailable for review or fail to be up to date at the time of any site reviews (refer to Section 3.02-B-3 - Observation Schedule), it will be assumed no work has been completed and the Contractor will be assessed the cost of that site visit at the current billing rate of the Architect. No other inspections will take place until payment of that assessment.
3. Make neat and legible notations daily on the record progress prints as the work proceeds, showing the work as actually installed. Should equipment location differ from plan, indicate the new location in a graphic manner, matching the original symbols in the irrigation legend.
4. Before the final site review, transfer all information from the record prints to computer-generated reproducible drawings (or other approved method), and submit these reproducible drawings along with related CAD disk to the Architect for approval prior to preparing controller chart.
5. Dimension the following locations from two permanent points of reference (building corners, sidewalks, road intersections, etc.):
 - a. connection to existing water lines
 - b. gate valves
 - c. existing automatic controller(s) within project limit of work
 - d. existing backflow prevention unit(s) within project limit of work
 - e. tracer wires (main line routing)

- f. remote control valves
 - g. quick coupling valves
 - h. main line routing (every 50 ft.) and all directional turns.
 - i. sleeves and conduits
6. On or before the date of the final site review, deliver the updated and completed reproducible drawings to the Architect. Delivery of these drawings does not relieve the Contractor of responsibility for furnishing any required information that may have been omitted from the prints.

C. Controller Charts:

- 1. Record drawings must be approved by the Architect before controller charts are prepared.
- 2. Provide two controller charts for each controller installed.
- 3. The chart shall show the area controlled by the automatic controller and shall be the maximum size controller door will allow.
- 4. The chart shall be based on a record drawing, reduced to the maximum size that will fit inside controller housing (printed on two sides if required for graphic clarity).
- 5. The chart shall be a photocopy or black line print with colors to differentiate areas of coverage for each hydro-zone, using pastel or transparent colors.
- 6. When completed and approved, hermetically seal the chart between two pieces of plastic (thickness of each piece being minimum 10 mils).
- 7. These charts must be completed and approved prior to final acceptance of the irrigation system. Installation will not be accepted without charts.

D. Operation and Maintenance Manuals:

- 1. Prepare and deliver to the Architect within 10 calendar days prior to completion of construction two hardcover three ring binders containing the following information:
 - a. Index sheet stating Contractor's address and telephone number.
 - b. List of equipment with names, addresses, and telephone numbers of local manufacturer representative.
 - c. Catalog and parts sheets regarding material and equipment installed under this contract.
 - d. Warranty statement

- e. Complete operating and maintenance instruction on all major equipment
- 2. In addition to these maintenance manuals, instruct Owner's maintenance personnel regarding operation of major equipment and show written evidence to the Architect at the conclusion of the project that this service has been rendered.
- E. Equipment to be Furnished:
 - 1. Supply as part of this contract the following tools:
 - a. Two keys for opening valve boxes
 - b. One quick coupler key and matching hose swivel (per five quick coupling valves)
 - c. One 5-foot valve key for operation of gate valve
 - 3. Turn over this equipment to the Owner at the conclusion of the project. Before final acceptance can occur, written evidence that the Owner has received materials must be shown to the Architect.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Exercise care in handling, loading, unloading, and storing p.v.c. pipe and fittings. Transport p.v.c. pipe in a vehicle which allows the length of pipe to lie flat, to avoid undue bending or concentrated external load at any point. Any section of pipe dented or damaged must be discarded or, if installed, must be replaced with new piping.
- B. Cover any pipe stored outdoors to protect it from sunlight.

1.7 SUBSTITUTIONS

- A. To request substitution of any equipment or material in lieu of equipment or material listed on the irrigation drawings and in the specifications, provide the following information to the Architect for approval:
 - 1. Statement indicating the reason for making the substitution, using a separate sheet of paper for each requested substitution.
 - 2. Descriptive catalog literature and performance charts (if available) for each requested substitution
 - 3. Hydraulic calculations for proposed substitution, as applicable
 - 4. Itemized list of proposed substitution(s), noting difference in material and labor costs between substitution and item originally specified
 - 5. Written confirmation that Owner has received any credit resulting from approved substitution (with a copy sent to Architect)

- B. Approval of any substitution or alternate will be based on information and/or samples provided by the Contractor.
- C. Responsibility for the total performance of any substitution to equal or surpass the item originally specified in every respect rests with the Contractor.
- D. If the Architect determines the substitution has proven to be unsatisfactory, it shall be removed and replaced with the originally specified item as part of the work of this contract (both materials and labor).
- E. The Architect shall be solely responsible for accepting or rejecting any substitution as equal to equipment and materials listed on the irrigation drawings and in the specifications.

1.8 WARRANTY

- A. Sprinkler irrigation system warranty shall be according to the following form. The general and supplementary conditions of these specifications shall be filed with the Owner or his representative prior to acceptance of the irrigation system.
- B. Manufacturer warranties do not relieve the Contractor of his liability under the warranty. Such warranties only supplement the warranty.
- C. Include a copy of the warranty form in the Operations and Maintenance Manual.
- D. The following warranty form shall be typed on Contractor's letterhead:

WARRANTY FOR SPRINKLER IRRIGATION SYSTEM

We hereby warranty that the sprinkler irrigation system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the drawings and specifications, ordinary wear and tear, unusual abuse or neglect excepted. We agree to repair or replace any defects in material or workmanship which may develop during a period of one year from the date of acceptance, and also to repair or replace any damage resulting from the repairing or replacing of such defects, at no additional cost to the Owner. We will perform such repairs or replacements within three days after receipt of written notice. In the event of our failure to perform such repairs or replacements within a reasonable time after receipt of written notice from Owner, we authorize the Owner to proceed to complete said repairs or replacements at our expense and we will pay the costs and charges therefor upon demand.

PROJECT:

CONTRACTOR:

ADDRESS:

PHONE NO.:

BY:

DATE OF ACCEPTANCE:

BY:

1.9 TEMPORARY REPAIRS

- A. The Owner reserves the right to make temporary repairs as necessary to keep the sprinkler system equipment in operating condition. The exercise of this right by the Owner will not relieve the Contractor of responsibilities under the terms of the guarantee as herein specified.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Use only new materials of manufacturer and type noted on drawings and as specified herein, or approved equal.

2.2 PIPE & FITTINGS

- A. Pressure main line piping and fittings sizes 1-1/2 inches and smaller shall be p.v.c. Schedule 40.
- B. Pressure main line piping and fittings sizes 2 inches to 4 inches shall be p.v.c. class 315.
- C. Non-pressure lines (in-line drip tubing header lines) shall be p.v.c. Schedule 40. (1/2-inch pipe is not permitted.)
- D. Non-pressure lines (buried) shall be p.v.c. Schedule 40. (1/2-inch pipe is not permitted.)
- E. Sleeves or conduit lines smaller shall be p.v.c. Schedule 40.
- F. All p.v.c. pipe and fittings shall conform to following specific requirements:
 - 1. P.v.c. (Solvent Weld)
 - a. Pipe shall be manufactured from virgin polyvinyl chloride compound in accordance with ASTM D 1784 or ASTM D 2241, cell classification 12454 B, hydrostatic design stress rating not less than 2,000 p.s.i.
 - b. Fittings (solvent weld or thread) shall be standard weight, Schedule 40, side gated, injection molded p.v.c., complying with ASTM D 1784, cell classification 13454 B, including threads when required.
 - 2. P.v.c. nipples shall be Schedule 80, with molded threads.
 - 3. All p.v.c. pipe must bear the following markings:

- a. Manufacturer name
 - b. Nominal pipe size
 - c. Schedule or class
 - d. Date of extrusion
4. Solvent cement and primer for p.v.c. solvent-weld pipe and fittings shall be of type and installation method prescribed by the manufacturer.
 5. Solvent cement and primer for p.v.c. solvent-weld pipe and fittings shall be of type and installation method prescribed by the manufacturer.

H. In-Line Emitter Tubing and Accessories:

1. Tubing is a continuous self-cleaning, recycled content, pressure compensating dripline with built-in check valve and be Cupron® copper oxide infused for root intrusion deterrent. This low volume dripline has integral and evenly spaced pressure compensating check valve emitters welded to the inside of the tubing that is made with recycled content and is available with emitter discharge rate of 0.53 gallons per hour [GPH] evenly spaced at 12" on center.
2. Each emitter shall have the ability to independently regulate discharge rates, with an inlet pressure range of 21.8 - 58 pounds per square inch (psi), at a constant flow and with a manufacturer's coefficient of variability of 0.03 or less. Recommended operating pressure shall be between 21.8 - 58 psi. The emitter discharge rate shall be 0.53 gallons per hour (G.P.H.) utilizing a combination of turbulent flow and reduced pressure compensation by molded silicone diaphragm. The emitters shall be capable of continuously cleaning themselves while in operation and have an anti-siphon feature which prevents debris from entering outlet at system shutdown. The dripline shall be available with 12" spacing between emitters unless otherwise specified. For subsurface installation, tubing depth shall be 4" to 6". Maximum system pressure shall be 58 psi for maximum fitting integrity. Filtration shall be 120 mesh or finer. Bending radius shall not be smaller than 7" in order to avoid kinking of tubing.
3. Fittings shall be constructed in one of the following end configurations: Barbed insert fittings only, Male pipe threads (MPT) with barbed insert fittings, or Female pipe threads (FPT) with barbed insert fittings.
4. All fittings shall be constructed of injection molded, brown plastic having a nominal outside dimension of 17mm (0.56"). Female and male threaded ends shall be capable of mating to standard PVC pipe with tapered threads.

F. Brass Pipe and Fittings:

1. Brass pipe shall be 85 percent red brass, American National Standard Institute (ANSI), Schedule 40 screwed pipe.

2. Fittings shall be medium brass, screwed 125-pound class.

G. Copper Pipe and Fittings:

Pipe shall be Type K, hard tempered.

Fittings shall be wrought copper, solder joint type.

Joints shall be soldered with silver solder, 45 percent silver, 15 percent copper, 16 percent zinc, 24 percent cadmium, solidus at 1125 F. and liquidus at 1145 F.

2.3 SMALL TURF SPRINKLER HEADS

A. Sprinklers shall be similar in all respects to type noted in legend on drawing.

B. Heads shall have screw adjustments.

C. Nozzle shall rise a minimum of 6 inches.

D. Body shall be equipped with a built-in check valve.

E. Provide pressure compensating screens (pcs) as noted on drawing.

F. Provide variable arc nozzles as necessary in irregular corners and due to planting area configuration.

G. Use pressure regulating type heads where noted.

2.4 TRACER WIRES

A. Install No. 14 polyethylene coated copper tracer wire with all non-metallic irrigation main lines, Paige P7079D or equal.

2.5 ELECTRICAL (LOW VOLTAGE)

A. Make connections between controller and remote control valves using direct burial AWG-UF 600-volt wire, insulation thickness 3/64 inch, utilizing low density, high molecular weight polyethylene insulation.

B. Waterproof splices (where permitted) using King Connectors or equal, and house in a box. Boxes for other irrigation uses may be utilized for this purpose when approved by Architect.

C. Wire shall be minimum #14 UF 600 volt underground wiring. Common wire shall be white, and all other wires any color except white.

D. All low voltage wires installed on-structure shall be installed inside conduit. Conduit provided under electrical section. Installation shall be coordinated with General Contractor prior to start of construction.

E. No multi-wire cables will be accepted. Unless required at controller location for tandem valve locations.

2.6 GATE VALVES

- A. Valves 3 inches and smaller shall be ASTM B 62 bronze body, 150 pound saturated steam rated with screwed joints, non-rising stem, screwed bonnet, and solid disc, unless otherwise noted on drawings. Provide with hand wheel.

2.7 QUICK COUPLING VALVES

- A. Valves shall have brass body, 150-pound class, with 3/4 inch female threads opening at base permitting operation with a special connecting device (coupler) designed for this purpose.
- B. Provide the controller assembly with a terminal strip clearly marking the positions for one rain sensor device. Wire the terminal strip through a clearly marked on/off switch mounted on the face of the controller to provide sensing bypass capability.

2.8 REMOTE CONTROL VALVES

- A. Valve shall be spring-loaded, packless diaphragm activated, normally closed type with a glass-filled nylon body, equipped with flow control and pressure regulation capabilities when noted on drawing.
- B. Valve solenoid shall be 24 volt a.c. 4.5-watt maximum, 500 mili-amp maximum surge, corrosion-proof, stainless steel construction, epoxy encapsulated to form a single integral unit.
- C. Valve shall be equipped with an internal bleeder to permit operation in the field without power at the controller.

2.10 VALVE BOXES

- A. Valve boxes shall be fabricated from a durable plastic material resistant to weather, sunlight and chemical action of soils, with green covers.
- B. Remote control valves shall be installed in rectangular plastic boxes, NDS Products or approved equal, with bolt down hinged covers.
- C. Gate valves and quick coupling valves shall have 10 inch round plastic boxes with exterior as required to properly protect valve, NDS Products or approved equal.

2.11 TREE IRRIGATORS/BUBBLER HEADS

- A. Bubbler heads shall be similar in all respects to type shown in detail and sprinkler legend.
- B. Provide assemblies as indicated on drawings (including vents) for tree well applications.
- C. Use Teflon tape on all threaded fittings.
- D. Install bubbler head away from walkway to minimize pedestrian hazard and unsightly conditions whenever possible.

- E. Nozzles shall be as specified in legend.
- F. Install check valve on riser as required for low head drainage.
- G. Provide pressure compensating screens (pcs) as noted on drawing.
- H. Refer to typical spacing of heads per drawing and adjust as required for actual field conditions.

PART 3 - EXECUTION

3.1 SITE CONDITIONS

- A. All scaled dimensions are approximate. Check and verify all dimensions per Architect's approval prior to proceeding with work under this section.
- B. Exercise extreme care in excavating and working near existing utilities. Coordinate excavations with underground service alert and utility companies. Damage to utilities caused by operations or neglect shall be repaired at Contractor's expense. Check existing utility drawings for locations.
- C. Coordinate installation of sprinkler irrigation materials, including pipe, so there will be NO interference with utilities or other construction, or difficulty in planting trees, shrubs, and ground covers.
- D. Carefully check all grades to ensure work on the sprinkler irrigation system may safely commence.

3.2 PREPARATION

- A. Water Supply:
 - 1. The Owner will provide new meters and pay all costs incurred.
 - 2. Connect sprinkler irrigation system to water supply points of connection as indicated on the drawings. Verify exact location on site, prior to start of construction.
 - 3. Connections as shown on drawings are approximate. Minor deviations (plus or minus 20 feet) required by actual site conditions shall be a part of this contract.
 - 4. Coordinate connection to meters, water outlets, etc. with General Contractor and other trades on site to ensure proper connection, prior to start of construction.
 - 5. Coordinate pipe crossing hardscapes, walks, etc., with appropriate trades to minimize disturbance to finish product. If a preferable route is noted on site, contact Architect to discuss alternative and obtain approval of same.

B. Observation Schedule:

1. Notify the Architect in advance for the following observation meetings, according to the time indicated:
 - a. Pre-job conference - 5 days
 - b. Backflow assembly and automatic controller location - 48 hours
 - c. Pressure supply line and control wire installation and testing - 48 hours
 - d. Lateral line and sprinkler installation - 48 hours
 - e. Coverage test - 48 hours
 - f. Final site review - 5 days
2. When observations are conducted by other than the Architect, show evidence in writing when and by whom these observations were made.
3. Maintain a set of current and up to date plans on the job site at all times. No site observations will commence without record drawings and current plans. In the event the Contractor calls for a site visit without record drawings, without current plans, without completing previously noted corrections, or without preparing the system for said visit, he shall be responsible for reimbursing the Architect based on his current billing rates per hour (portal to portal, plus transportation costs) for the inconvenience. No subsequent site visits will be scheduled until this charge has been paid.

C. Physical Layout:

1. All piping or equipment shown diagrammatically on drawings outside planting areas shall be installed inside planting area whenever possible, to exact dimensions noted in construction details unless otherwise approved.
2. Prior to installation, stake out all pressure supply line routing and sprinkler head locations.
3. Entire layout shall be approved by Architect prior to installation.

3.3 INSTALLATION

A. Piping:

1. Install all plastic pipe and fittings according to manufacturer instructions.
2. All lines shall have a minimum clearance of 6 inches from each other and from lines of other trades. Parallel lines shall not be installed directly over one another.

3. Coordinate installation of piping shown through walls as required with General Contractor to avoid penetrating walls if possible. If penetration is necessary, coordinate and waterproof.
4. Install concrete thrust blocks in accordance with pipe manufacturer recommendations for pressure supply piping 3 inches and larger.
5. Scale of drawing may not permit indicating all sleeves and conduits required. Provide sleeves and conduits for all piping or low voltage wires under paved and on-structure areas. Refer to sections that pertain to sleeving material, size, etc.
6. All major plumbing work using copper pipe shall be performed by a licensed and bonded Plumbing Contractor. Irrigation Contractor shall obtain all permits required.
7. Coordinate installation of piping shown through walls as required with General Contractor to avoid penetrating walls if possible. If penetration is necessary, coordinate and waterproof.
8. Scale of drawing may not permit indicating all sleeving required. Provide sleeves for all piping under paved areas. Refer to sections that pertain to sleeving material, size, etc.

B. Trenching:

1. Excavate trenches to required depths. Follow approved layout for each system.
2. Trench bottom shall be flat to ensure piping is supported continuously at prepared grade.
3. Where lines occur under paved areas, consider dimension to be below the subgrade.
4. Provide minimum coverage as follows:
 - a. Pressure supply lines (1-1/2 inches and smaller): 18 inches, unless otherwise noted on drawing.
 - b. Pressure supply lines (2 inches to 4 inches): 24 inches, unless otherwise noted on drawing.
 - c. Pressure supply lines under paving (1-1/2 inches and smaller): 24 inches, unless otherwise noted on drawing.
 - d. Pressure supply lines (2 inches to 4 inches): 30 inches, unless otherwise noted on drawing.
 - e. Non-pressure lines: 12 inches, unless otherwise noted on drawing.

- f. Non-pressure lines under paving: 18 inches, unless otherwise noted on drawing.
- g. Control wire: 18 inches, unless otherwise noted on drawing.

C. Tracer Wires:

- 1. Carefully place tracer wire on bottom of trench under vertical projection of pipe, avoiding stress from backfilling and running wire continuously throughout the length of pipe.
- 2. Tracer wire shall follow main line pipe and branch lines, terminating in a yard box with a gate valve that controls these main irrigation lines. Provide sufficient wire to reach surface grade, bending back end of wire to form a loop, and attach a Dymo-Tape type plastic label noting "TRACER WIRE."
- 3. All splices shall be made using Scotch-lok or equal, encased in epoxy resin to provide a permanent U.L. approved watertight connection.
- 4. Record locations of tracer wires and their termination points on as-built drawings.

D. Backfilling:

- 1. Buried pipe in trenches shall be center loaded only until all required tests are performed. Carefully backfill trenches with approved excavated materials such as earth, loam, sandy clay, sand, or other approved materials free from large clods of earth or stones. Mechanically compact backfill in landscaped areas to a dry density equal to adjacent undisturbed soil in planting areas. Backfill must conform to adjacent grades without dips, depressions, humps or other surface irregularities.
- 2. Place fine granular material backfill on all lines initially. No foreign matter larger than 1/2 inch in size will be permitted in the initial backfill.
- 3. Flooding of trenches will be permitted only with approval of the Architect.
- 4. If settlement occurs and subsequent adjustments in pipe, valves, sprinkler heads, lawn, planting, etc. are necessary, make all such adjustments without cost to the Owner.

E. Trenching and Backfill Under Paving:

- 1. Backfill trenches located in heavy clay soil under areas where paving, asphaltic concrete or concrete will be installed shall have sand 6 inches below and 3 inches above the pipe. Compact in layers to 95 percent compaction using manual or mechanical tamping devices. Compact trenches for piping to equal the compaction of the existing adjacent undisturbed soil and leave in a firm, unyielding condition. All trenches shall be flush with the adjoining grade. Pressure test all piping under paving prior to the paving work.

2. Install piping under existing walks by jacking, boring or hydraulic driving. Cut or break sidewalks and/or concrete as necessary and replace paving as a part of the contract cost. Obtain permission from the Architect to cut or break sidewalks and/or concrete. No hydraulic driving will be permitted under asphaltic concrete paving.
3. Coordinate installation of piping and sleeves under paved areas with General Contractor.
4. Install all p.v.c. piping crossing hardscape in a sleeve two pipe sizes larger than the piping, or as noted on drawing. Install wires under paving in separate sleeve of size required, or as authorized.

F. Assemblies:

1. Routing of sprinkler irrigation lines as indicated on the drawings is diagrammatic. Install lines and various assemblies to conform to details on plans.
2. Install NO multiple assemblies in plastic lines. Provide each assembly with its own outlet.
3. Perform all directional changes on pressure supply line using 45 degree elbows. No 90 degree elbows will be permitted without approval of Architect.
4. No more than one size may be used when reducing or increasing a fitting outlet, unless approved by Architect.
5. Install all assemblies specified herein in accordance with respective detail. In absence of detail drawings or specifications pertaining to specific items required to complete work, perform such work in accordance with best standard practice, with prior approval of the Architect.
6. Thoroughly clean p.v.c. pipe and fittings of dirt, dust and moisture before installation. Installation and solvent welding methods shall be as recommended by the pipe and fitting manufacturer.
7. On p.v.c. to metal connections, work the metal connections first. Use Teflon tape or approved equal on all threaded p.v.c. to p.v.c. and on all threaded p.v.c. to metal joints, with only light wrench pressure. Where threaded p.v.c. connections are required, use threaded p.v.c. adapters into which the pipe may be welded.
8. Verify exact location of all major equipment with the Architect before installation.
8. Install remote control valves in shrub areas and perpendicular to hardscape unless otherwise approved. Final location and configuration shall be approved by Landscape Architect prior to backfilling and finalizing installation.

9. Unless otherwise approved, locate quick coupling valves within 12 inches of hardscape or at separation between shrub and lawn areas. Final installed location to be approved by Landscape Architect prior to final installation.
 12. Locate tree irrigators at each tree. Install as indicated on drawings, including vents, strainers, etc.
- G. Automatic Controller (Existing):
1. Existing automatic controllers on site and within project limit of work shall remain and protected and kept operational during construction. Contractor to verify condition of existing controller prior to start of construction. Notify architect of any damaged or improper operation of controller immediately if any discrepancies are found.
- H. Flushing of System:
1. After all new sprinkler pipelines and risers are in place and connected, all necessary diversion work has been completed, and prior to installation of sprinkler heads, open the control valves and flush out the system using adequate pressure.
 2. Install sprinkler heads only after the system has been flushed to the complete satisfaction of the Architect.
- I. Sprinkler Heads:
1. Install the sprinkler systems per the drawings and according to their respective detail.
- J. Valve Boxes:
1. Install all buried valves and equipment in the specified box.
 2. Fill area under box with a minimum of 3 cubic feet of 3/4-inch gravel for remote control valves and two cubic feet for gate valves and quick coupling valves, before box is installed.
 3. Attach identification tags to each remote control valve, showing number that corresponds with controller sequence. Tags shall be manufactured of polyurethane Behr Desopaid, yellow in color with black letters, 2-3/4 inches by 2-1/4 inches. When connecting to existing controller, sequence numbers shall match sequencing on existing controller. Exact sequence to be determined on site.
 4. Brand (hot stamp) sequence number of each valve in minimum 2-inch-high numerals into box top.
 5. Install valve boxes in shrub areas unless otherwise approved.

6. Install valve boxes square to one another and to edges of adjacent hardscape, unless otherwise approved by Architect.

K. Electrical Supply:

1. Place low voltage wiring in the same trench and alongside of main lines unless otherwise approved.
2. When more than one wire is placed in a trench, tape wires together at maximum 12 feet on center.
3. Provide a 12-inch expansion loop at each connection and directional change for low voltage wires and two feet for stub outs.
4. Use a continuous wire between controller and remote control valves. Except as otherwise approved, do not splice wire at any point. Enclose all approved splices in an U.L. approved junction box.
5. Provide each controller with separate ground wire.
6. Provide pull box for low voltage wires approximately every 200 feet along continuous lineal runs.

L. Protective Pipe Covering:

1. Clean buried pipe & fittings of all foreign substances and film.
2. Coat all surfaces with adhesive primer.
3. Wrap pipe & fittings with three layers of polyvinyl chloride tape. Overlap each layer approximately two thirds the width of tape without stretching.
4. Total wrap thickness shall be no less than 10 mils over all surfaces, with no voids.
5. Wrap all piping, fittings, and equipment noted to be frost protected with three layers of burlap, secured with one wrap of p.v.c. tape.

3.4 FIELD QUALITY CONTROL

A. Adjustment of the System:

1. Adjust all sprinkler heads and valves for optimum performance.
2. If it is determined that adjustments in the irrigation equipment will provide proper or more adequate coverage, make such adjustments prior to planting.

B. Testing of Irrigation System:

1. Test all pressure lines under hydrostatic pressure of 150 pounds per square inch or 50 pounds more than normal static pressure (whichever is greater), and prove watertight.
2. Testing of pressure main lines must occur prior to installation of electric control valves, hose bibs or any other equipment that might prevent a proper test from being performed.
3. Test all piping under paved areas under hydrostatic pressure of 150 pounds per square inch, and prove watertight prior to paving.
4. Sustain pressure in lines for minimum 4 hours, unless otherwise authorized. If leaks develop (more than 5 percent), replace joints and repeat test until entire system is proven watertight.
5. All hydrostatic tests shall be conducted only in the presence of the Architect or other duly authorized representative of the Owner. Do not completely backfill pipe until it has been inspected, tested and approved in writing.
6. Furnish necessary force pump and all other test equipment if permanent connection is unavailable.
7. When the sprinkler irrigation system is completed, perform a coverage test in the presence of the Architect to confirm that water coverage for planting areas is complete and adequate. Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from plans, or where the system has been willfully installed as indicated on the drawings when it is obviously inadequate without notifying the Architect. This test shall be accomplished before any planting occurs.
8. Provide handheld walkie-talkie or personnel as necessary to accomplish this task expeditiously.
9. Upon completion of each phase of work, test and adjust entire system to meet site requirements.
10. Test any low voltage wiring more than 50 feet long installed under paving for continuity prior to paving.

C. Final Observation Prior to Acceptance:

1. Operate each system in its entirety for the Architect at time of final observation. Any items deemed unacceptable by the Architect due to noncompliance with the specifications and drawings shall be corrected to the complete satisfaction of the Architect.
2. Operate the following at conclusion of maintenance period to confirm proper performance:
 - a. existing automatic controller

- b. remote control valves (entire system from existing controller)
 - c. operate system with existing booster pump
- 3. Evidence must be shown to the Architect that the Owner has received all required equipment, controller charts, record drawings, etc. before final observation can occur.
- D. Conclusion of Maintenance Period:
 - 1. At end of maintenance period, submit written confirmation to Architect that the system is operating properly, as per final acceptance, and note any changes/adjustments made during maintenance period. Based on this, Architect may request additional site review.

3.5 EXISTING LANDSCAPING/IRRIGATION

- A. Protect all existing landscaping. Any existing landscaping removed or damaged shall be properly replaced, including sod, as directed by the Architect.
- B. Verify that fencing has been provided around trees, located at the dripline (line of furthest branch of tree plus 3 feet). Notify Architect to review and approve final location of the proposed irrigation system layout and trenching in the vicinity of existing trees to be retained.
- C. Do not excavate or install irrigation materials or equipment within the dripline of existing trees. Do not permit sprinkler heads to spray onto or within 5 feet of the trunks of existing trees. Use all possible care to avoid injury to trees and tree roots. Excavate by hand in areas where 2 inch and larger roots occur. Tunnel under all roots 2 inches and larger in diameter and heavily wrap with burlap, to prevent scarring or excessive drying.
- D. Do not use ditching machine within the dripline of existing trees. In no case shall more than two sides of an existing tree be trenched for irrigation lines. Confirm trenching locations at existing trees with Owner to obtain approval prior to trenching. Where roots are encountered outside the dripline, hand trim the wall of the trench adjacent to the tree, making clean cuts through. Paint roots 1 inch and larger in diameter with two coats of Tree Seal, or equivalent. Close trenches adjacent to tree within 24 hours. Where this is not possible, shade the side of the trench adjacent to the tree with burlap or canvas.
- E. All existing irrigation not a part of this phase of construction shall be protected and kept operational during construction. Installing contractor shall coordinate with S.K.U.S.D. maintenance personnel, prior to start of construction to minimize or avoid unnecessary damage or disruption to normal operation of existing systems.
- F. All damaged existing irrigation shall be repaired and or replaced to match existing conditions. S.K.U.S.D. maintenance personnel to approve all repair/replacements made.
- G. Refer to plans for additional information.

3.6 MAINTENANCE

- A. The entire sprinkler irrigation system shall be operated automatically for a period of seven days prior to any planting.
- B. The Architect reserves the right to waive or shorten the operation period.
- C. After maintenance period, demonstrate in presence of the Architect that the system is in proper operating order.

3.7 CLEANUP

- A. Perform cleanup as each portion of the work progresses. Remove refuse and excess dirt from the site and sweep or wash down all walks and paving. Repair any damage to the work of others and return to original condition.

3.8 OPERATING INSTRUCTIONS

- A. Train Owner's maintenance personnel in proper operation of all major equipment. Provide written confirmation of the person(s) so trained to the Architect.
- B. During maintenance period, establish infiltration rate of soil in all areas (particularly slopes). Schedule automatic controller to not exceed saturation point, and program repeat cycles as required to meet landscape needs while avoiding runoff. At conclusion of maintenance period, provide a typed record of the watering schedules for each valve during maintenance, including various schedules due to seasonal changes.

3.9 SERVICES/DATA TO BE PROVIDED BY THE CONTRACTOR

- A. Water schedules
- B. Training of Owner's personnel in proper operation of all major equipment
- C. Equipment to be supplied per Section 1.5, E.

END OF SECTION

SECTION 32 93 00
PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Plants.
- 2. Planting soils.
- 3. Tree stabilization.
- 4. Landscape edgings.

B. Related Sections:

- 1. Division 31 Section "Site Clearing" for topsoil stripping and stockpiling.
- 2. Division 31 Section "Earthwork" for excavation, filling and backfilling, and rough grading.
- 3. Division 32 Section "Planting Irrigation" for turf irrigation.
- 4. Division 33 Section "Storm Drainage Utilities" for below-grade drainage of landscaped areas, paved areas, and wall perimeters.

1.3 ALLOWANCES

A. Allowances for plants are specified in Division 01 Section "Allowances."

- 1. Perform planting work under quantity allowances and only as authorized. Authorized work includes work required by Drawings and the Specifications and work authorized in writing by Landscape Architect.
- 2. Notify Landscape Architect weekly of extent of work performed that is attributable to quantity allowances.
- 3. Perform work that exceeds quantity allowances only as authorized by Change Orders.

B. Furnish trees as part of tree allowance.

1.4 UNIT PRICES

- A. Work of this Section is affected by unit prices specified in Division 01 Section "Unit Prices".
 - 1. Unit prices apply to authorized work covered by quantity allowances.
 - 2. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

1.5 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- C. Finish Grade: Elevation of finished surface of planting soil.
- D. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- E. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- F. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- G. Planting Area: Areas to be planted.
- H. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- I. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- J. Root Flare: Also called "trunk flare". The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- K. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

- L. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- M. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- N. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.6 SUBMITTALS

- A. Product Data: For each type of product indicated, including soils.
 - 1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
 - 2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.
 - 3. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.
- B. Samples for Verification: For each of the following:
 - 1. Manufactured Topsoil Backfill: 1-quart volume of manufactured topsoil required; in sealed plastic bags labeled with composition of materials by percentage of weight and source. Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
 - 2. Organic Mulch: 1-quart volume of organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
 - 3. Mineral Mulch (Decomposed Granite): 5 lb. of each mineral mulch required, in sealed plastic bags labeled with source of mulch. Sample shall be typical of the lot of material to be delivered and installed on the site; provide an accurate indication of color, texture, and makeup of the material.
 - 4. Weed Control Barrier: 12 by 12 inches.
 - 5. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.
 - 6. Root Barrier: Width of panel by 12 inches.
 - 7. Artificial Turf: Manufacturer's standard sample size.

- C. Qualification Data: For qualified landscape installer. Include list of similar projects completed by installer demonstrating installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- D. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 - 1. Manufacturer's certified analysis of standard products.
 - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.
- F. Warranty: Sample of special warranty.

1.7 AGRICULTURAL SUITABILITY ANALYSIS OF SOIL

- A. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory. Contractor shall collect soil from the existing front yard after significant grading work has been performed but prior to landscape work commencing. Soil reports shall be prepared by Soil and Plant Laboratory in Orange, CA (714) 282-8777 or Wallace Laboratories in El Segundo, CA (310) 615-0116 or equal.
- B. Components of Soil Analysis:

- 1. Must include pH measurement in the Saturation Extract, Electrical Conductivity of the saturation extract and Sodium Adsorption Ratio of the saturation extract. The approved procedures are the following:

pH	Method 21
Saturation Extract	Method 2
Sodium Adsorption Ratio	Method 20b

Methods of the United States Salinity Laboratory as published in the Agricultural Handbook Number 60 entitled "Diagnosis and Improvement of Saline and Alkali Soils".

- 2. The following nutrients and elements must be determined with an American Society of Agronomy or Soil Science Society of America approved extraction method. Interpretation data must be given citing concentrations which are considered to be low, medium and high:
 - a. boron, calcium, copper, iron, magnesium, manganese, molybdenum, phosphorus, potassium, sodium, sulfur, and zinc.
 - b. The approved methods are those cited by the Council on Soil Testing and Plant Analysis and those methods currently published by Soil Science

Society of America manuals, Communications in Soil Science and Plant Analysis, Soil Science and Soil Science Society of America Journal. Approved methods for phosphorus are Bray P1, Bray P2, Olsen P, DTPA, ammonium acetate, and ammonium bicarbonate-DTPA. Approved methods for boron are hot water extract and ammonium bicarbonate-DTPA extract.

3. The saturation extract must be analyzed for calcium, magnesium, sodium, boron, chloride, phosphorus, nitrate and sulfate.
4. The following trace metals must be measured by the DTPA extract:

aluminum, arsenic, cadmium, chromium, cobalt, lead, lithium, nickel, selenium, silver, strontium, tin and vanadium.
5. The presence of calcium carbonate and/or magnesium carbonate must be determined.
6. Soil Texture (gravel, sand, silt and clay) must be determined. Determine organic matter content by the measurement of organic carbon. The quality of the organic matter shall be determined by measuring organic carbon and total nitrogen.
7. Interpretation of nutritional deficiencies or excesses and potential toxicities must be given.

- C. Copies of the soil test results shall be provided to the Landscape Architect for review and confirmation of final soil amendment program proposed by the Installer.

1.8 QUALITY ASSURANCE

- A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 1. Pesticide Applicator: State licensed, commercial.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
 1. Selection of trees will be made by Landscape Architect, who will tag plants at their place of growth before they are prepared for delivery.
- C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
 1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 36 inches above the root flare for trees.
 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

- D. Plant Material Observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Landscape Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
 - 1. Notify Landscape Architect of sources of planting materials seven business days in advance of delivery to site.
 - 2. Contractor shall arrange for site observation/field visits with Landscape Architect:
 - a. At the time of tree and/or shrub plant delivery and layout but prior to planting.
 - b. At completion of substantial planting operations being completed for final inspection to establish the beginning of the 90-day maintenance period.
 - c. At the end of the 90-day maintenance period to determine acceptable turnover to the District for maintenance. Warranty time periods begin at the beginning of the 90-day maintenance period.
- E. Substitutions: substitutions for indicated plant materials must be approved by the Landscape Architect prior to delivery and are made at no additional cost to the owner.
- F. Pre-installation Conference: Conduct conference at project site.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. 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.
- B. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing planting areas or plants.
 - 2. 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.
 - 3. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.
- C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

- D. Handle planting stock by root ball.
- E. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1.10 PROJECT CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.11 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
 - b. Structural failures including plantings falling or blowing over.
 - 2. Warranty Periods from Date of substantial completion:
 - a. Trees: 12 months.
 - b. Shrubs, Vines, and Ornamental Grasses: 6 months.
 - c. Ground Covers, Biennials, Perennials, and Other Plants: 6 months.
 - d. Annuals: 3 months.
 - 3. Include the following remedial actions as a minimum:
 - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
 - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
 - c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.

- d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.12 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Provide maintenance by skilled employees of landscape installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.
 - 1. Maintenance Period for Trees and Shrubs: 3 months from date of planting completion & once the first punch list has been completed by the Landscape Architect.
 - 2. Maintenance Period for Ground Cover and Other Plants: 3 months from date of planting completion & once the first punch list has been completed by the Landscape Architect.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
- B. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- C. Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions of the equivalent climate zone as outlined in Sunset Western Garden Book before delivery.

2.2 INORGANIC SOIL AMENDMENTS

- A. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.
- B. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

2.3 ORGANIC SOIL AMENDMENTS

- A. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses, etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens, and other deleterious materials.
- B. Composted wood products are conditionally acceptable [stable humus must be present. Wood based products are not acceptable which are based on redwood or cedar.
- C. Organic soil amendment shall contain the follow:
1. Humus material shall have an acid-soluble ash content of no less than 6% and no more than 20%.
 2. The pH of the material shall be between 6 and 7.5.
 3. The salt content shall be less than 10 millimho/cm @ 25° C. on a saturated paste extract.
 4. Boron content of the saturated extract shall be less than 1.0 parts per million.
 5. Silicon content (acid-insoluble ash) shall be less than 50%.
 6. Calcium carbonate shall not be present if to be applied on alkaline soils.
 7. Sludge-based materials are not acceptable.
 8. Carbon:nitrogen ratio is less than 25:1.
 9. The compost shall be aerobic without malodorous presence of decomposition products.
 10. The maximum particle size shall be 0.5 inch, 80% or more shall pass a No. 4 screen for soil amending.
- D. Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

arsenic	20	copper	150	selenium	50
cadmium	15	lead	200	silver	10
chromium	300	mercury	10	vanadium	500
cobalt	50	molybdenum	20	zinc	300
		nickel	100		

Higher amounts of salinity or boron may be present if the soils are to be preleached to reduce the excess or if the plant species will tolerate the salinity and/or boron.

2.4 FERTILIZERS

- A. Triple Superphosphate: (0-45-0) – a minimum of 45 percent available phosphoric acid.

- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
1. Ammonium nitrate (34-0-0) – 17% nitrogen derived from ammoniacal nitrogen and 17% nitrogen derived from nitrate nitrogen.
 2. Ammonium sulfate: (21-0-0) – 21% nitrogen derived from ammoniacal nitrogen.
 3. Potassium sulfate (0-0-50) – 50% potash derived from sulfate of potash.
 4. 12-12-12 fertilizer – 12% nitrogen, 12% phosphorus oxide and 12% potash.
- C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
1. Urea formaldehyde (38-0-0) – A class of insoluble nitrogenous materials slowly available to plants.
 2. Sulfur-coated Urea – 40% Urea and 30% Sulfur coated with a sealant.
- D. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.
1. Size: 21 gram tablets.
 2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.5 PLANTING SOILS

- A. Planting Soil: shall be site native soil for planting on grade. Verify suitability of soil to produce viable planting soil by submitting a minimum of 3 separate soil samples to a testing laboratory such as Wallace Laboratories or Soil and Plant Laboratories. Soil samples (approximately 1 quart each) shall be taken from 3 distinct areas of the project from a depth of about 6" to 12" below the surface. Submit testing results to Landscape Architect for review and recommendations for modifications to the amendment rates shown below.
- B. Site native soil shall be clean soil of roots, plants, sod, stones, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. It shall not be infested with nematodes or other undesirable disease-causing organisms such as insects and plant pathogens. Topsoil shall be friable and have sufficient structure in order to give good tilth and aeration to the soil.
1. *Gradation limits* - soil shall be a sandy loam, loam, or clay loam. The definition of soil texture shall be the USDA classification scheme. Gravel over ¼-inch in diameter shall be less than 20% by weight.

2. *Permeability Rate* - Hydraulic conductivity rate shall be not less than one inch per hour nor more than 20 inches per hour when tested in accordance with the USDA Handbook Number 60, method 34b or other approved methods.
3. *Fertility* - The range of the essential elemental concentration in soil shall be as follows:

Ammonium Bicarbonate/DTPA Extraction
parts per million (mg/kilogram
dry weight basis

phosphorus	2 – 40
potassium	40 – 220
iron	2 – 35
manganese	0.3 – 6
zinc	0.6 – 8
copper	0.1 – 5
boron	0.2 – 1
magnesium	50 – 150
sodium	0 – 100
sulfur	25 – 500
molybdenum	0.1 – 2

Fertility - Concentration of nutrients for final acceptance:

Ammonium Bicarbonate/DTPA Extraction
parts per million (mg/kilogram
dry weight basis

phosphorus	10 - 40
potassium	100 - 220
iron	24- 35
manganese	0.6 - 6
zinc	1 - 8
copper	0.3 - 5
boron	0.2 - 1
magnesium	50 - 150
sodium	0 - 100
sulfur	25 - 500
molybdenum	0.1 - 2

4. *Acidity* - The soil pH range measured in the saturation extract (Method 21a, USDA Handbook Number 60) shall be 6.0 - 7.9.
5. *Salinity* - The salinity range measured in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 0.5 - 2.5 dS/m.
6. *Chloride* - The maximum concentration of soluble chloride in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 150 mg/l (parts per million).

7. *Boron* - The maximum concentration of soluble boron in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 1 mg/l (parts per million).
8. *Sodium Adsorption Ratio (SAR)* - The maximum SAR shall be 3 measured per Method 20b, USDA Handbook Number 60.
9. *Aluminum* – Available aluminum measured with the Ammonium Bicarbonate/DTPA Extraction shall be less than 3 parts per million.
10. *Soil Organic Matter Content* - Sufficient soil organic matter shall be present to impart good physical soil properties but not be excessive to cause toxicity or cause excessive reduction in the volume of soil due to decomposition of organic matter. The desirable range is 3% to 5%. The carbon:nitrogen ratio should be about 10. A high carbon:nitrogen ratio can indicate the presence of hydrocarbons or non-humified organic matter.
11. *Calcium Carbonate Content* - Free calcium carbonate (limestone) shall not be present for acid-loving plants.
12. *Heavy Metals* - The maximum permissible elemental concentration in the soil shall not exceed the following concentrations:

Ammonium Bicarbonate/DTPA Extraction
parts per million (mg/kilogram
dry weight basis

arsenic	1
cadmium	1
chromium	10
cobalt	2
lead	30
mercury	1
nickel	5
selenium	3
silver	0.5
vanadium	3

If the soil pH is between 6 and 7, the maximum permissible elemental concentration shall be reduced 50%. If the soil pH is less than 6.0, the maximum permissible elemental concentration shall be reduced 75%. No more than three metals shall be present at 50% or more of the above values.

13. *Phytotoxic constituent, herbicides, hydrocarbons etc.* - Germination and growth of monocots and dicots shall not be restricted more than 10%. Total petroleum hydrocarbons shall not exceed 50 mg/kg dry soil measured per the modified EPA Method No. 8015. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene and ethylbenzene) shall not exceed 0.5 mg/kg dry soil measured per EPA Methods No. 8020.
- C. Mix native soil on grade with the following soil amendments and fertilizers in the following quantities to produce planting soil per 1,000 sq. ft. and rototill to a 6" depth (FOR BIDDING PURPOSES ONLY – SOIL ANALYSIS RECOMMENDATIONS SHALL SUPERCEDE THESE QUANTITIES AND RATIOS):

1. Ratio of Loose Compost to Topsoil: 4 cu. yds.
2. Weight of Agricultural Gypsum: 30 lbs.
3. Weight of Triple Superphosphate: 20 lbs.
4. Weight of Commercial Fertilizer: 35 lbs.
5. Weight of Slow-Release Fertilizer: 30 lbs.

If recommendations from the soils laboratory indicate the incorporation of additional materials, or the quantities of specified materials should be changed, submit a revised cost for the work based on unit costs provided.

- D. Till the soil by rototilling or other approved method of blending in crossing directions to incorporate soil amendments evenly to a depth of 6" thoroughness of mix may be approved by the Landscape Architect.
- E. Contractor shall not bury soils high in organic matter or use imported topsoils high in organic matter to depths greater than 6 inches.
- F. Finish grade of all planting areas shall be 1 inch below grade of all types of adjacent pavement.

2.6 MULCHES

- A. Mineral Mulch: Decomposed Granite – see plans. Decomposed granite work shall consist of furnishing and placing decomposed granite, including site preparation and edging, as shown on the plans and in conformance with these special provisions, and as directed by the Landscape Architect.

1. Decomposed granite shall be 3/8" minus material and shall conform to the following:

Grading Requirements (AASHTO T11-82 and T27-82)

U.S. Sieve Size	Percent Passing
#3/8"	100
#4	95-100
#8	75-80
#16	55-65
#30	40-50
#50	25-35
#100	20-25
#200 to	5-15

2. Stabilized Decomposed granite shall be as described above and include a stabilizer binder:
 - a. Patented, non-toxic, organic binder that is a colorless and odorless concentrated powder that binds decomposed granite or crushed 3/8" or 1/4" minus aggregate.
 - b. Product to have 64% pre-consumer recycled content.

- c. Product shall have 25 years' experience at same formulation.
- 3. The color of decomposed granite shall be standard tan color. The Contractor shall submit a 5lb sample of decomposed granite to the Landscape Architect for approval prior to delivery of materials to the site.

2.7 WEED-CONTROL BARRIERS

- A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally-encountered chemicals, alkalis, and acids.
- B. Weed control fabric shall conform to the following:

Specification	Minimum Requirement
Grab Tensile Strength	59 kg
Grab Elongation	60%
UV Resistance	70% @ 150 hours
Mass	102 grams/square meter

- C. Staples shall be 50-mm wide, 200-mm in length, and 11-gauge wire.
- D. A copy of the manufacturer's product sheet together with instructions for installation shall be furnished to the Landscape Architect 5 days before installation.
- E. A Certificate of Compliance for the weed control mat shall be furnished to the Landscape Architect in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

2.8 PESTICIDES

- A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.9 TREE STABILIZATION MATERIALS

- A. Stakes and Guys:

1. Upright and Guy Stakes: Galvanized metal pipes, 2" diameter x 10ft. minimum length. All trees to be triple staked.
2. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.
 - a. "ArborTie", Soft Polypropylene materials by Deep Root, Inc. San Francisco, California.
 - b. "Cinch" tie – 24" minimum length.
 - c. "Gro Strait" tire rubber ties minimum 18" wide, 14 gauge galvanized wire tie rails.

2.10 LANDSCAPE EDGINGS

- A. Concrete mow strips: see Architect or Civil Engineer's plans.

2.11 MISCELLANEOUS PRODUCTS

- A. Root Barrier: Black, molded, modular panels manufactured with 50 percent recycled polyethylene plastic with ultraviolet inhibitors, 85 mils thick, with vertical root deflecting ribs protruding 3/4 inch out from panel, and each panel 24 inches wide.
- B. Filter Fabric: Nonwoven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.
- C. Artificial Turf: Olive Lush product by Easy Turf (877) 838-1587 – Code: GF-LIT-R-O. Pile Yarn Type UV-Resistant Polyethylene – 3/8" gauge with a pile height of 1-5/8" and face weight of 65 oz.
- D. Jute Matting: shall be of a uniform open plain weave, single jute yarn, not varying in thickness by more than one half its normal diameter. Jute matting shall be furnished in rolled strips as follows: Length, approximately 50 to 75 yards, width, 45 inches to 50 inches. Ludlow Soil Saver No. 48, or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.

3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and existing plants from damage caused by other planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.
- D. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.3 STABILIZED DECOMPOSED GRANITE INSTALLATION

- A. Verify proper drainage has been established allowing water to easily drain across the surface of the decomposed granite without leaving standing water or causing erosion.
- B. Before proceeding with installation, notify the Landscape Architect if unsuitable site/base conditions exist.
- C. Stabilizer shall be thoroughly pre-mixed at a rate of 15lbs per 1-ton of aggregate by the manufacturer's recommendations using an approved mechanical blending apparatus. Always blend stabilizer and aggregate dry.
- D. After pre-blending, placed stabilized aggregate directly on prepared sub-grade. Level to desired grade and cross section. Depth of pathways shall be 3".
- E. Watering: water heavily for full-depth moisture penetration of profile to activate the stabilizer. Apply 25-45 gallons of water per ton to achieve saturation. Randomly test for depth using a probing device which reaches full depth.
- F. Contractor shall wait a minimum of 6-72 hours or until such time that the stabilized aggregate is able to accept compaction from a 1 to 5 ton roller without separation, plowing or any other physical compromise of the aggregate. If surface aggregate dries

significantly quicker than the subsurface material, lightly mist the surface before compaction.

- G. Compact stabilizer aggregate to 85% relative compaction by equipment such as; a 2 to 5 ton double drum roller making 3 to 4 passes. Do not use a vibratory plate compactor or vibration feature roller. If pumping or pancaking of the surface occurs, surface is still too wet to roll.
- H. Take care in compacting surfaces when adjacent to planting and irrigation systems, use 8" or 10" hand tamp. Installation of stabilized aggregate greater than 3" thick shall be installed in lifts of approximately half the total depth.
- I. Lightly spray surface area following compaction. Do not disturb aggregate surface with spray action.
- J. Finished surface shall be smooth, uniform, and solid with no evidence of chipping or cracking. Loose material shall not be present on the surface after installation but may appear after use or environmental conditions. Any significant irregularities in path surface shall be repaired to the uniformity of the entire installation.
- K. Contractor shall provide protection around surface during the drying period which may take 12 to 72 hours after completion depending on weather conditions. Irrigation may need to be restricted until the drying period is complete.

3.4 PLANTING AREA ESTABLISHMENT

- A. Loosen subgrade of planting areas to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply soil amendments and fertilizer per soil analysis recommendations on surface and thoroughly blend planting soil but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is muddy or excessively wet.
 - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
- B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.
- C. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- D. Additional Agricultural Suitability Soil Testing shall be performed within 3 to 5 days after soil amendment and watering has occurred. Three (3) samples shall be taken from similar but not exactly the same locations as before. Test results shall be submitted to the Landscape Architect for review and possible additional amendment recommendations. Planting operations cannot begin until soil tests have been reviewed.

3.5 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 - 1. Excavate approximately three times as wide as ball diameter for container-grown stock.
 - 2. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 - 3. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 - 4. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 - 5. Maintain supervision of excavations during working hours.
 - 6. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
- B. Subsoil and topsoil removed from excavations may be used as planting soil.
- C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
 - 1. Hardpan Layer: Drill 6-inch diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.
 - 2. Utility lines, pipes, and vaults.
- D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.
- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.6 TREE, SHRUB, AND VINE PLANTING

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

- B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set container-grown stock plumb and in center of planting pit or trench with root flare 2-inches adjacent finish grades.
 - 1. Use planting soil for backfill.
 - 2. Carefully remove root ball from container without damaging root ball or plant.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.
- E. Water basins shall be constructed for plantings on slopes from available site soil and shall provide a large enough watering basin to fully surround the outside edge of the root ball and provide for a long term 6" of water depth during the establishment period.

3.7 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Landscape Architect.
- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

3.8 SODDED TURF INSTALLATION

- A. Complete fine grading and specified soil preparation before lawn installation.
- B. Apply starter fertilizer per supplier's recommendations.
- C. Sod or Roll Sod: type, thickness, and areas of installation shall be in accordance with Drawings and Specifications.

- D. Remove roll sod netting prior to installation.
- E. Thickness of sod or roll sod shall be recommended thickness below finish grade. Complete soil conditioning and fine grading before installation. Do not operate heavy equipment over completed sub-grade. Sub-grade shall be moist when sod is installed. Install sod with closely fitted joints and stagger ends of strips. Plug opening with sod or topsoil.
- F. Lightly irrigate within two hours after installing sod and before rolling. Roll seams and joints until sod is well bonded to sub-grade.
- G. Water area thoroughly to penetrate sub-grade at least 8 inches. Repeat watering as necessary to keep sod moist until rooted in sub-grade. Protect sod areas against foot traffic until sod is well established. Replace damaged areas with new sod.
- H. Sod installation shall be complete at least 12 weeks prior to the opening of school.
- I. Repair of existing or newly installed sod area:
 - 1. Rake, drag, float and roll seed bed as often as necessary to produce a true, uniform, and smooth seed bed. Remove debris, stones, etcetera.
 - 2. Prior to any lawn installation, obtain approval on fine grading of bed for sod areas.
 - 3. Water seed bed thoroughly until a moisture penetration of 8 inches is achieved.
 - 4. Place new sod to fill in damaged areas so that no gaps, depressions, or rough edges are visible.
 - 5. Irrigate immediately after completion and irrigate as frequently as necessary to assure establishment of the areas most vulnerable to stress and temperature extremes.
 - 6. Good turf coverage will be required before final acceptance of work.
 - 7. Protect new sod from damage by erosion, trespass or any source. Safeguards and temporary fencing shall be erected where necessary, and precautions taken to prevent excessive runoff.

3.9 HYDROMULCH

- A. Certification of Materials: The hydroseed applicator shall be responsible for submitting all seed bag certification tags and a signed certificate list of the quantity and type of materials used in the hydroseed installation.
- B. Inspection: Site shall be properly prepared; weed control shall have been effective; coverage and other tests required in the Irrigation Section completed and depressions or other irregularities that resulted corrected; irrigation sprinklers shall have been programmed so its operation is compatible with the hydroseed work. Do not start seeding until all unsatisfactory conditions have been corrected.

- C. Within three days after trees in turf areas have been planted, apply the hydroseed mixture.
- D. Hydroseed Slurry Mix on Flat Ground will be a slurry mix containing mulch, seed, fertilizer and an organic stabilizer binder and green dye to insure even application:
 - 1. Conwed 100% Wood Fiber at 2000 lbs. per acre.
 - 2. Ecology Controls M-Binder at 150 lbs. per acre.
 - 3. AM-120 Mycorrhizal Inoculum-Desert Suite at 60 lbs. per acre.
 - 4. Seed Mix as specified – supplied by S&S Seeds
- E. E.Hydroseed Slurry Mix on 2:1 slopes or greater will be a slurry mix containing mulch, seed, fertilizer and an organic stabilizer binder and green dye to insure even application:
 - 1. Flexterra flexible growth medium at 3,500 lbs. per acre.
 - 2. AM-120 Mycorrhizal inoculums at 60 lbs. per acre.
 - 3. Tri C Humate at 800 lbs. per acre.
 - 4. Seed Mix as specified – supplied by S&S Seeds
- F. Hydroseed Slurry Mix of Athletic Turf Fields will contain a slurry mix containing mulch, seed, fertilizer, and an organic stabilizer binder and green dye to insure even application.
 - 1. Agrono-Mulch: 1,500 lbs. / acre
 - 2. Agrono-Tac binder: 120 lbs. / acre
 - 3. Pre-Emergent Herbicide: Tupersan at 12 lbs. / acre
 - 4. Seed rate: 15 lbs. / 1,000 sq. ft.
- G. Hydro-Mulching Application:
 - 1. Equipment: Hydraulic equipment used for the application of the fertilizer seed and slurry of prepared wood pulp shall be of the “Super Hydro-Seed” type as approved by the Landscape Architect. The equipment shall have a built-in agitation system and operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry containing not less than 40 lbs. of fiber mulch plus a combined total of 7 lbs. Fertilizer solids for each 100 gallons of water.
 - 2. The slurry distribution lines shall be large enough to prevent stoppage and shall be equipped with a set of hydraulic spray nozzles which will have a minimum capacity of 1, 500 gallons, and shall be mounted on a traveling unit, either self-propelled or drawn by a separate unit, which will place the slurry tank and spray nozzle within sufficient proximity to the areas to be seeded.
 - 3. Preparation: Prepare at site of the work.
 - a. Add water to tank, with equipment operating at half-speed.
 - b. When water level reaches height of agitator shaft and good recirculation has been established, add the seed.
 - c. After adding the seed and when the tank is at least 1/3 filled with water, add the fertilizer.

- d. Increase to full speed when tank is $\frac{1}{2}$ filled with water.
 - e. Start adding wood pulp mulch; all to be added by the time tank is between $\frac{2}{3}$ and $\frac{3}{4}$ filled.
- 4. Application: Begin spraying as soon as tank is full.
 - a. Apply slurry in an even uniform visible coat; use an arched stream in a sweeping motion so slurry will fall like rain allowing wood fibers to build on each other until a proper coating and required coverage has been achieved.
 - b. Reseed any bare or damaged areas as required to provide proper coverage.
- 5. Time Limit for use of Slurry Mixture: Slurry mixture must be applied within four hours of mixing, or it will be rejected and removed from the project at the Contractor's expense.
- 6. Protection: Special care should be exercised by the Contractor in preventing any of the slurry to be sprayed inside any reservoir basin or onto drainage ditches and channels which may impede the free flow of rain or irrigation water. Any slurry spilled onto restricted areas shall be cleaned up at the Contractor's expense.
 - a. It shall be the responsibility of the applicator to assure himself the site is properly prepared, the irrigation system is operating and programmed not to affect the results of his operations, and that the weed control has been effective.
 - b. The applicator shall be responsible for notifying the Contractor and Architect if he feels that the site is not properly prepared.
 - c. The applicator shall take responsibility for repairing all damage created by his equipment. Repairs shall be blended and floated to match surrounding areas and reseeded.
- H. Watering: After hydromulching, all seeded areas shall be thoroughly watered with a fine spray. Lawns shall be kept continually moist by watering as often as required.
- I. Seed shall be evenly sown at a time when little or no wind is blowing.
- J. Reseeding: Any lawn areas that do not show a prompt germination of grass shall be re-seeded at 10 day intervals until an acceptable stand of grass is assured.
- K. Clean-Up: Contractor shall remove all debris and equipment upon completion of operations and clean off all over-flow of hydromulch from walks, walls and fences.
- L. After lawn or turf areas have been prepared and sown, erect enclosing protection fences.
 - 1. Fences shall consist of 2 strands of #12 gauge galvanized wire strung on not less than 2 x 2 x 48" long stakes firmly driven into ground a minimum distance of 1'-0". Stakes shall be set at not more than 10'-0" centers with one wire 2" below top and

the other 12" above ground. Upon notification by the District, Contractor shall remove fences and dispose of them off site.

3.10 TREE STABILIZATION

- A. Install trunk stabilization as follows unless otherwise indicated:
 - 1. Upright Staking and Tying: Stake 15 gallon, 24-inch box, and 36-inch box trees – see detail on Sheet L2.02.
 - 2. Use a minimum of three metal stakes of length required to penetrate at least 18-inches below bottom of backfilled excavation and to extend a minimum 6 ft. above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
 - 3. Space stakes equally around trees. Larger trees or low branch/multi-trunk trees shall be guyed.
 - 4. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

3.11 ROOT-BARRIER INSTALLATION

- A. Install root barrier where trees are planted within 48 inches of paving or other hardscape elements, such as walls, curbs, and walkways unless otherwise shown on Drawings.
- B. Align root barrier vertically and run it linearly along and adjacent to the paving or other hardscape elements to be protected from invasive roots.
- C. Install root barrier continuously for a distance of 5 feet in each direction from the tree trunk, for a total distance of 10 feet per tree. If trees are spaced closer, use a single continuous piece of root barrier.
 - 1. Position top of root barrier flush with finish grade.
 - 2. Overlap root barrier a minimum of 12 inches at joints.
 - 3. Do not distort or bend root barrier during construction activities.
 - 4. Do not install root barrier surrounding the root ball of tree.

3.12 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated in even rows with triangular spacing.
- B. Use planting soil for backfill.
- C. Dig holes large enough to allow spreading of roots.
- D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.

- E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.13 PLANTING AREA TOPDRESSING

- A. Decomposed Granite: apply at 2" layer of non-stabilized decomposed granite. Make adjustments in rough grading by keeping grades at least minimum below adjacent paved areas so finish grade can be flush with adjacent paving to reduce trip hazard.
- B. Shall be applied to all shrub areas except turf and hydroseed slopes with jute netting.
- C. Sloped Planting Areas: all planting areas with slopes greater than 4:1 shall receive a cover of jute netting for soil stabilization and erosion control.

3.14 EDGING INSTALLATION

- A. Concrete Mow Strips: install concrete mow strips prior to planting all shrub or smaller plant materials but after tree and irrigation installation.

3.15 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.16 BANK STABILIZATION

- A. Where non-turf slopes on banks exceed a grade of 4:1, or if so indicated on Drawings, one or more of following bank stabilization methods shall be used:
- B. Jute Matting:
 - 1. Surface of slopes receiving matting shall be smooth and sufficiently loose to permit bedding of mesh fabric.

2. Roll matting onto slope vertically or horizontally overlapping 2" at edge and 6" at end of rolls. Secure to ground with #12 gage steel wire staples 6" deep at 3'-0" maximum on center at seams and 2'-0" maximum on center at outer perimeter to hold matting down. Extend matting 2'-0" beyond toe of slope. Bury ends of roll 8" deep to anchor on top or toe of slope.
3. After matting is secured in place, tamp or roll with approved equipment to press firmly into soil. Matting shall be flush with ground surface over entire sloped area so that flow of water will be over matting.
4. Plant groundcover through matting.
5. Maintain jute matting in good condition until all work of landscape planting has been completed and accepted by the District. Repair eroded areas and replace and restaple loose or undermined matting.
6. In addition to above, refer to and follow recommendations of jute mesh manufacturer.

3.17 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.18 FINAL INSPECTION

- A. Schedule the following inspections and notify the Landscape Architect and/or the District Inspector:
 1. When lawn or turf areas are finished graded, ready for sodding.
 2. When planting, sowing and all other indicated or specified work, except maintenance work, has been completed.
 3. Final inspection at the completion of the maintenance period.
- B. All plant materials shall be subject to inspection and approval of the District before planting.
- C. After completion of all construction and planting operations, request for a check inspection. Allow at least two (2) calendar days notice prior to inspection. This inspection,

with the approval of the District, will establish the start of the landscape maintenance period. If the Landscape Architect determines the work to be substantially complete and in conformance with the plans and specifications the Contractor will be advised that the basic maintenance period has started. In order to be substantially complete, at least the following must have been finished.

1. All fine grading, including elimination of low points that hold runoff.
2. A complete and operable irrigation system.
3. Installation of all plant materials.
4. Uniform germination of seeded areas.
5. Minor pick-up items may be completed during the basic maintenance period such as:
 - a. Replacement of damaged or non-conforming plant material.
 - b. Restaking or tying of trees.
 - c. Removal of watering basins.
 - d. Filling of settled areas caused by application of normal water.
 - e. Reseeding of bare and sparse areas in the retention basin shall be done within 30 days of the start of maintenance period to insure at least 60 days of growth before requesting an end of maintenance inspection.

D. At the end of the 90-day minimum maintenance period and when all pick-up items have been completed, and a dense and uniform turf exists, the Contractor may request a final inspection. Allow at least (2) calendar days notice prior to inspection. The Contractor will be advised by the Landscape Architect at the final inspection that he will recommend that the work is or is not satisfactory.

1. During the final inspection, the Landscape Architect will arrange with the Contractor to take an additional soil sample on site under the Landscape Architect's direction for testing of soil conditions after amendments and landscape operations are complete. Contractor shall be responsible for arranging the shipping of and cost of soil testing. Results and recommendations of the soil test shall be sent to the Landscape Architect and the Contractor shall follow soil amendment and corrective recommendations provided therein.
2. If the work is satisfactory, the basic maintenance period will end on the date of the final inspection.
3. If the work is unsatisfactory, the basic maintenance period will continue at no additional expense to the Owner until the work has been completed, inspected, and approved by the Landscape Architect.

- E. Guarantee: All trees shall be guaranteed for one year or a yearly growing cycle depending on the time of planting. All plant materials shall be guaranteed for a period of at least 90 days following planting which die or decline as a result of the planting or maintenance operation. Guarantees as required by other sections of these specifications shall be in effect after final inspection and acceptance by the Owner.
- F. Maintenance Period Extension: The Owner shall have the option to extend the maintenance period in 30 day increments for a maximum of 90 days. If the maintenance period is extended by the Owner, the unit price for the first 30-day maintenance periods.

3.19 MAINTENANCE

- A. Contractor shall continuously maintain all areas included in Contract during progress of work, maintenance period, and until final acceptance of work.
- B. Maintenance period shall be for a minimum of 90 calendar days.
- C. If plant materials are not acceptable at end of Contract, maintenance shall be continued by Contractor until acceptance by the District.
- D. Maintenance shall include continuous operations of watering, weeding, mowing, rolling, trimming, edging, cultivating, fertilizing, spraying, insect and pest control, re-seeding, replacement or any other operations necessary to ensure good normal growth. Contractor shall be responsible for applying lawn moth control sprays or other materials, as often as may be required to protect lawns and turf during entire Contract period.
- E. During installation period and during maintenance period, Contractor shall be responsible for maintaining adequate protection for all areas. Any damaged plantings shall be replaced at Contractor's expense.
- F. At completion of maintenance period all plant materials shall be live, healthy, undamaged and free of infestations.
- G. All lawn areas shall be completely covered with growing grass at time of final acceptance, leaving no barren spots larger than 3" x 3". Inferior plantings shall be replaced and brought to a satisfactory condition before final acceptance of work. All areas shall be neatly raked and free of weeds.
- H. Mowing: All turf areas shall be mowed with a hand propelled reel mower for the first cutting. The cutting blade shall be sharpened prior to the first cutting. The cutting height shall be set 2" above grade. All clippings shall be removed from turf after each mowing. The turf shall be mowed at least two times prior to final inspection, or as directed by the Landscape Architect.
- I. Replacements: Contractor shall replace any and all plant materials and grass that is dead or damaged. Replacements shall meet requirements for original plantings.
- J. All planted areas shall be kept free of debris and shall be cultivated and weeded at not more than 10 day intervals. Grass, when 3" high, shall be mowed to a 1-1/2" height. Once established, grass shall be mowed at least once per week during maintenance period.

- K. Water all plantings adequately to ensure complete germination of seed and continued growth of plants.
- L. In areas that do not have sprinkler coverage or which may require supplemental deep watering. This shall be accomplished by hose watering or temporary sprinklers on stands.
- M. Adjust all sprinkler heads in each area and zone of exposure so that optimum amount of water is applied according to capabilities of equipment and system on site.
- N. Chemical herbicides may be used to control weeds when approved by the District IPM Coordinator.
- O. Weed Control On Groundcover And Shrub Beds: Apply pre-emergent herbicide after planting. Herbicide shall be approved for use by the State and County and shall have minimal detrimental effect on groundcover plants. Rate and method of application shall conform to the written recommendations of manufacturer.
- P. Maintenance Fertilization Program for Entire Site:
 - 1. Uniformly broadcast Sulfur-Coated Urea (37-0-0) at the rate of 5 lbs. per 1,000 sq. ft. approximately 45 days after planting, with repeat applications every 60-90 days or as growth or color indicate.
 - 2. In Spring of the following year after planting, substitute a complete fertilizer such as 16-6-8, or equal, for the Sulfur-Coated Urea at the rate of 6 lbs. per 1,000 square feet.
- Q. Lawn Areas - Turf Areas:
 - 1. Upon observing any lawn spreading into shrubs or groundcover areas, Contractor shall initiate a program of mechanical removal and maintain this program throughout maintenance period.
 - 2. Any lawn appearing in paved areas shall receive an application of soil sterilant with the approval of the District IPM Coordinator.
 - 3. Lawn Weed Control: At first appearance of any broadleaf weed germinating in lawn areas, Contractor shall remove same. If weeds persist or if damage resulting from this operation becomes objectionable. Contractor shall control weed growth with a selective weed killer with approval of the District IPM Coordinator, and maintain such control throughout the maintenance period.
- R. Pruning Trees, Shrubs and Groundcover Areas:
 - 1. Pruning shall be performed only at direction of the District Tree Surgeon and only by a qualified pruner.
 - 2. All pruning shears, saws, etc. shall be sterilized prior to pruning each tree by total immersion in a solution of mercuric chloride or formalin.

3. All cuts larger than 3/4" diameter shall be immediately sealed with a compound produced specifically for that purpose such as "Tree Seal".
 - S. Insect and Fungus Control: Contractor shall be alert for signs of insect presence or presence of damage from plant fungi. Upon locating such evidence, Contractor shall report matter to the District Pest Control Specialist and take remedial action as directed by the District IPM Coordinator
 - T. Every 30 days during the maintenance period, before the application of fertilizer, the contractor shall obtain an agricultural suitability test for each of the areas tested previously following the same methods. Test results shall be forwarded to the Landscape Architect for review in determining final acceptance.
- 3.20 CLEANUP AND PROTECTION
- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.
 - B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
 - C. After installation and before substantial completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

END OF SECTION

SECTION 33 40 00
STORM DRAINAGE UTILITIES

1.00 GENERAL

1.01 SUMMARY

- A. Storm drainage piping, fittings, accessories, and bedding.
- B. Catch basins.
- C. Manholes.
- D. Inlet and outlet structures.

1.02 RELATED SECTIONS

- A. Section 31 20 00 Earthwork.
- B. Section 31 23 33 Trenching and Backfilling.

1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), latest edition.
- B. ASTM Standards.
- C. Kern County Drainage Standards

1.04 SUBMITTALS

- A. Submit the following in accordance with provisions in Division 1:
 - 1. Product Data: Provide data indicating pipe, pipe accessories and catch basin grates.
 - 2. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.
 - 3. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
 - 4. Layout diagram for storm drain components per plan.

1.05 PROJECT RECORD DOCUMENTS

- A. Submit record drawings. Accurately record locations of pipe runs, connections, catch basins, structures, manholes and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 FIELD MEASUREMENTS

- A. Verify that field measurements and elevations are as indicated on drawings.
- B. Complete pothole work per plans and notify the District of any discrepancy prior to commencing construction.

1.07 COORDINATION

- A. Coordinate the work with connection to existing storm drain mains, and trenching.

2.00 PRODUCTS

2.01 PIPE MATERIALS

- A. 12" Dia and Under: Polyvinyl Chloride (PVC) Pipe with water tight joints, per SSPWC Section 207-17.
- B. 18" Dia and Larger: High Density Polyethylene (HDPE) Pipe (N-12 WT) with water tight joints, per SSPWC Section 207-18.

2.02 PIPE ACCESSORIES

- A. PVC: Elastomeric Gasket water tight joints per SSPWC Section 207-17.3.2.
- B. HDPE: Water-Tight Joints per SSPWC Section 207-18.4.1.

2.03 CATCH BASINS AND MANHOLES

- A. Precast catch basins shall include grate, as manufactured by Brooks Precast or approved equal.
- B. Plastic drain basins shall include grates, as manufactured by ADS Nyloplast or approved equal.
- C. Manholes shall be per SPPWC Std Plan 321-2.

2.04 METAL

- A. All exposed metal parts are to be galvanized in accordance with SSPWC, Section 210-3.

2.05 CONCRETE

- A. All concrete shall be Class 560-C-3250, per SSPWC Section 201.

2.06 BEDDING MATERIALS

- A. Refer to Specification Section 31 23 33 Trenching and Backfilling for Bedding Material.

2.07 FILTER FABRIC

- A. Filter fabric shall be non-woven geotextile filter fabric Mirafi 140N or approved equal.

3.00 EXECUTION

3.01 EXAMINATION

- A. Verify that trench cut is ready to receive Work and excavations, dimensions, and elevations are as indicated on Drawings.

3.02 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with compacted bedding material.
- B. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

3.03 BEDDING

- A. Excavate pipe trench in accordance with Specification Section 31 23 33. Hand trim excavation for accurate placement of pipe to elevations indicated on Drawings.
- B. Place bedding material in trench bottom, level materials in continuous layer. Bedding shall be 4" thickness for pipe diameters less than or equal to 24" and 6" thickness for pipe diameters greater than 24" and shall be per SSPWC Section 217-1.2.

3.04 INSTALLATION - PIPE

- A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions and per SSPWC Section 207.
- B. Lay pipe to slope gradients noted on drawings; with maximum variation from true slope of 1/8 inch in 10 feet.
- C. Install backfill along sides and over top of pipe. Provide backfill over top of pipe to minimum compacted thickness of 12 inches, compacted to a minimum of 95 percent of maximum dry density.
- D. Refer to Specification Section 31 23 33 for Trenching Requirements. Do not displace or damage pipe when compacting.
- E. The compaction of the backfill material along the sides and one foot above the pipe shall be done with hand tampers or equal to protect the pipe.

3.05 INSTALLATION - CATCH BASINS, MANHOLES

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Form and place cast-in-place concrete base with provisions for storm drainage pipe end sections.

- C. Level top surface of concrete base to receive shaft sections.
- D. Establish elevations and pipe inverts for inlets and outlets as indicated on drawings.
- E. Compact top 12" of native materials below the bottom of catch basins and manholes to minimum 95 percent of maximum dry density.

3.06 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's representative.
- B. Request inspection prior to and immediately after placing backfill cover over pipe.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to the District.

3.07 PROTECTION

- A. Protect pipe and backfill cover from damage or displacement until backfilling operation is in progress.

END OF SECTION