CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT
PURCHASING DEPARTMENT

August 22, 2022

Addendum No. 01
INVITATION TO BID.: Bid No. B21/22-13
Chabot College Fire Water System Upgrades Project

To: All Prospective Bidders

This Addendum ONE (1) is issued to incorporate the following changes, additions or deletions to the IFB (B21/22-13). Any modifications/changes made by this addendum affect only the portions or paragraphs specifically identified herein; all remaining portions of the IFB (B21/22-13) to remain in force. It is the responsibility of all responders to conform to this addendum.

A. ADDITIONS, CHANGES AND/OR CLARIFICATIONS:

ADDITIONS:

1. Updated Technical Specifications for the project attached.

CHANGES:

1. SECTION 32 12 33 PART 2 – PRODUCTS

a. 2.01 MATERIALS:

B. Select Fill Material: Imported soil conforming to requirements for fill material contained in ~~geotechnical report for this project~~. these Specifications.

REMOVALS:

1. Removal of the following requirements from SECTION 32 12 33

PART 1 – GENERAL
1.04 ASSURANCE

F. Site Information:
~~1. Geotechnical Investigation Reports are available for examination by Contractor~~.

REMOVALS (CONT):

1.06 PROJECT CONDITIONS:

~~A. Site Information: Review the geotechnical report identified in Section 02 30 00 SUBSURFACE INVESTIGATION.~~

~~1. The character of the material to be excavated or used for subgrade is not necessarily as indicated.~~

~~2. Ground water elevations indicated are those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.~~

PART 2 - PRODUCTS

2.01 MATERIALS:

A. General:

3. ~~The Geotechnical Engineer's report on acceptability shall be final and binding.~~

4. ~~During grading operations, soil types other than those analyzed in the geotechnical report for the project, may be encountered.~~

B. Native Fill Requirements:

2. ~~Fill to be treated with lime per Geotechnical report recommendations.~~

***All other terms and conditions remain unchanged*.**

Michael McClung - Buyer, Purchasing and Warehouse Services
Chabot-Las Positas Community College District

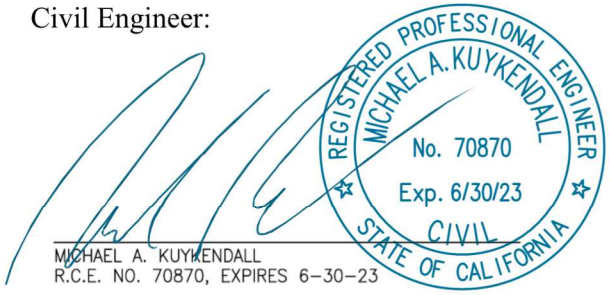
DOCUMENT 000107.30

SEALS PAGE – CIVIL ENGINEER OF RECORD

PART 1 - GENERAL

1.1 DESIGN PROFESSIONALS OF RECORD

Civil Engineer:



END OF DOCUMENT 000107.20

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 01-120049 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 06/24/22

SECTION 00 01 10

TABLE OF CONTENTS

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

A. This section includes summary of work including:

1. Work covered by Contract Documents
2. Bid items, Allowances and Alternates
3. Work under other contracts
4. Future work
5. Work sequence
6. Cooperation of contractor and coordination with other work
7. Maintenance
8. Occupancy requirements
9. Reference Standards
10. Products ordered in advance
11. CLPCCD furnished products

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. Carry out site improvements works including (but not limited to) new sidewalk installation, pavement resurfacing, pavement striping, installation of new signage and installation of drainage inlets

B. The work shall include all work shown and specified except for work indicated “N.I.C” or “Not in Contract”.

C. During construction, all buildings will remain in service and be occupied during normal campus hours as this campus will remain active throughout the entire project. No work is to take place in any classrooms while they are in use.

D. The Contractor must maintain access to the existing buildings at all times during the project. The contractor is to provide secure fencing and/or barricades to keep the general public from entering exterior work areas. Fencing is required to have a privacy screen. While work can take place in unoccupied rooms during the day, many classrooms remain in use until 10:00 p.m.

E. Unless provided otherwise in the Contract Documents, all risk of loss of Work covered by the Contract Documents shall rest with the Contractor until Final Completion and Acceptance of the Work. Installation of utilities needed for connection of dental simulation chairs. Patching and paving to be included.

1.03 BID ITEMS

A. Base Bid- Furnish and install all work shown on Drawings and described in Specifications and all other Contract Documents, including connections to existing systems for a complete and operation product.

B. Allowance- An Owner’s unspecified allowance is as noted in Paragraph 1.1 of the Bid Proposal.

1.04 WORK UNDER OTHER CONTRACTS

Not Applicable

1.05 FUTURE WORK

Not Applicable.

1.06 WORK SEQUENCE

A. The contractor shall coordinate their work with the Construction Manager. Work will be performed on an active college campus. Campus buildings are generally in use from 7:30AM to 10:00PM Monday through Friday. Contractor shall presume interior work in classrooms must be performed at times other than when a campus building is in use. Exterior work can occur during normal working hours.

1.07 COOPERATION OF CONTRACTOR AND COORDINATION WITH OTHER WORK.

A. Should construction work, or work of any other nature, be underway by other forces or by other contractors within or adjacent to the limits of the Work at the time the Work was advertised for bids, the Contractor shall cooperate with all such other contractors or forces to the end that any delay or hindrance to their work will be avoided. The cost of such cooperation will be considered as included in the prices bid and no direct or additional payment will be made therefore. Contractor shall coordinate with such other contractors and forces as required by General Conditions.

B. CLPCCD reserves the right to perform other or additional work, within or adjacent to the limits of the work specified, at any time by the use of other forces. Contractor shall coordinate with CLPCCD and any CLPCCD forces, or other forces, engaged by CLPCCD, as required by General Conditions. In the event that the performance of such other or additional work materially increases or decreases Contractor's costs, the work and the amount to be paid therefore will be appropriately adjusted as determined by the Construction Manager.

C. Limit use of the Site for Work and for construction operations to allow for:

   a. CLPCCD operation

   b. Work by other contractors and tenants

D. Coordinate use of the Site and access to site with other contractors, utilities, and CLPCCD forces, as required by General Conditions. Construction Manager has final authority over coordination, use of the Site, and access to site.

E. Cooperate with CLPCCD and others who may occupy and begin work on site and inside building prior to completion of Work of this Contract.

F. Cooperate with contractors for other area work, not included in Contract, but which may take place during construction period.

1.08 MAINTENANCE

A. Cost of maintenance of systems and equipment prior to Final Acceptance will be considered as included in prices bid and no direct or additional payment will be made therefore.

1.09 OCCUPANCY REQUIREMENTS

A. Whenever, in the opinion of Construction Manager, Work or any part thereof is in a condition suitable for use, and the best interest of CLPCCD requires such use, CLPCCD may take beneficial occupancy of and connect to, open for public use, or use the Work or such part thereof. In such case, CLPCCD will request Architect/Engineer to inspect the Work or part thereof, and issue a Certificate of Substantial Completion for that part of Work.

B. Prior to date of Final Acceptance of the Work by CLPCCD, all necessary repairs or renewals in Work or part thereof so used, not due to ordinary wear and tear, but due to defective materials or workmanship or to operations of Contractor, shall be made at expense of Contractor, as required in General Conditions.

C. Use by CLPCCD of Work or part thereof as contemplated by this section shall in no case be construed as constituting acceptance of Work or any part thereof. Such use shall neither relieve Contractor of any responsibilities under Contract, nor act as waiver by CLPCCD of any of the conditions thereof.

D. CLPCCD may specify in the Contract Documents that portions of the Work, including electrical and mechanical systems or separate structures, shall be substantially completed on milestone dates prior to substantial completion of all of the Work. Contractor shall notify Architect/Engineer in writing when Contractor considers any such part of the Work ready for its intended use and substantially complete and request Architect/Engineer to issue a Certificate of Substantial Completion for that part of the Work.

PART 2 – PRODUCTS

2.01 REFERENCE STANDARDS

A. For products specified by association or trade standards, comply with requirements of standard, except where more rigid requirements are specified or are required by applicable codes.

2.02 PRODUCTS ORDERED IN ADVANCE

Not applicable.

2.03 CLPCCD FURNISHED PRODUCTS

For CLPCCD furnished products as specified, if any, shall be indicated on Construction Documents.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

A. This section describes general procedural requirements for alterations, modifications and extras.

B. Related Sections

1. Section 01 11 00: Summary of Work

1.02 GENERAL

A. Any change in scope of work or deviation from Drawings or Specifications shall be accomplished only when authorized in writing by Construction Manager. As appropriate, change orders are subject to approval by the Division of the State Architect. Refer to section 4-338, Part 1, Title 24, California Code of Regulations.

B. Changes in scope of Work or deviation from Drawings or Specifications may be initiated only by the Contractor or the Construction Manager.

1. Contractor may initiate changes by submitting Requests for Information (RFI), Requests for Substitution (RFS), Notice of Concealed or Unknown Conditions, or Notice of Hazardous Waste Conditions.

a. RFI's shall be submitted to seek clarification of Contract Documents.

b. RFS's shall be submitted in accordance with paragraph 4.8.2 of General Conditions to request substitution of materials or methods of execution.

c. Notices of Changes shall be submitted in accordance with paragraph 9.6 of General Conditions.

d. Notices of Hazardous Waste Conditions shall be submitted in accordance with paragraph 4.17 of General Conditions.

e. Notices of concealed or unknown conditions shall be submitted to make Owner aware of a potential change in scope of the work.

2. Contractor shall be responsible for its costs to implement and administer RFI's and RFS's throughout the Contract duration. Regardless of the number of RFI's submitted, Contractor will not be entitled to additional compensation. Contractor shall be responsible for both CLPCCD's and Architect's administrative costs for answering its RFI's where the answer could reasonably be found by reviewing the Contract Documents, as determined by CLPCCD; such costs will be deducted from progress payments.

3. Architect/Engineer may initiate changes by issuing a Supplemental Instruction (which shall require written approval of the Construction Manager).

4. Construction Manager may initiate changes by issuing Requests for Proposal (RFP) or a Field Change Notice (FCN) to Contractor. Such RFP’s or FCN’s will detail all proposed changes in the Work and request a quotation of changes in Contract Sum and Contract Times from

Contractor. An RFP or FCN may require Contractor to expedite the work and proceed on a time and material (force account) basis.

1.03 PROCEDURE

A. Contractor shall submit RFI to Construction manager. Contractor shall reference each RFI to an activity on its Progress Schedule and note the time criticality of the RFI, indicating the time in which the response is required. Architect/Engineer shall respond by issuing a Clarification.

1. If Contractor is satisfied with the Clarification and does not request change in Contract Sum or Contract Times, then the Clarification shall be executed without a change.

2. If Contractor believes that the Clarification results in change in Contract Sum or Contract Times, Contractor shall notify Construction Manager who may then deny request for change or issue RFP.

B. Contractor shall submit RFS to Construction Manager who may then deny request or issue RFP.

C. Contractor shall submit Notices of Changes to resolve unanticipated conditions incurred in the execution of the Work. Procedures in Paragraph 9.6 of General Conditions shall be followed. If Construction Manager determines that a change in Contract Sum or contract Times is justified, Construction Manager shall issue RFP.

D. Contractor shall submit Notices of Hazardous Waste Conditions to resolve problems regarding hazardous materials encountered in the execution of the Work. Procedures in Paragraph 4.17 of General Conditions shall be followed. If Construction Manager determines that a change in Contract Sum or contract Times is justified, Construction Manager shall issue RFP.

E. Architect/Engineer shall issue Supplemental Instruction to the Construction Manager who shall forward onto Contractor. Contractor shall not proceed with Supplemental Instruction until Construction Manager approves it in writing.

1. If Contractor is satisfied with Supplemental Instruction and does not request change in Contract Sum or Contract Times, then Supplemental Instruction shall be executed without a Change Order.

2. If Contractor believes that Supplemental Instruction results in change in Contract Sum or Contract Times, Contractor shall notify Construction Manager. Construction Manager may then deny request for change, cancel Clarification or issue RFP.

F. Responses by recipients shall be within a reasonable time.

G. Contractor shall respond to Construction Manager's RFP within fifteen (15) working days by furnishing a complete breakdown of costs of both credits and extras; itemizing materials, labor, taxes, overhead and profit. Subcontract work shall be so indicated.

H. Upon approval of RFP, Construction Manager will issue a Change Order directing Contractor to proceed with extra work.

I. Payment shall be made as follows:

1. Change Orders which increase Contract Sum or Contract Times shall be included in next Contract Modification Form, signed by Construction Manager, accepted by Contractor.
2. Payment shall be made for Change Order work along with other work in progress payment following completion of Change Order work. Partial completion of Change Order work shall be paid for that part completed during the period covered by the monthly payment request.

1.04 COST DETERMINATION

A. Total cost of extra work shall be the sum of labor costs, material costs, equipment rental costs and specialist costs as defined herein plus overhead and profit as allowed herein. This limit applies in all cases of claims for extra work, whether calculating Change Orders, RFIs, or calculating claims of all types, and applies even in the event of fault, negligence, strict liability, or tort claims of all kinds, including misrepresentation, concealment, strict liability or negligence. No other costs arising out of or connected with the performance of extra work, of any nature, may be recovered by Contractor. No special, incidental or consequential damages may be claimed or recovered against CLPCCD, its representatives or agents, whether arising from breach of contract, negligence or strict liability, unless specifically authorized in the Contract Documents.

B. Overhead:

1. Overhead shall be as defined in Article 1.08.

C. Taxes:

1. Alameda County Sales Tax should be included.
2. Federal and Excise Tax shall not be included.

D. Owner Operated Equipment

When owner-operated equipment is used to perform extra work, Contractor will be paid for equipment and operator as follows:

1. Payment for equipment will be made in accordance with Paragraph 1.05. C.
2. Payment for cost of labor will be made at no more than rates of such labor established by collective bargaining agreements for type of worker and location of work, whether or not owner-operator is actually covered by such an agreement.

1.05 COST BREAKDOWN

A. Labor - Contractor will be paid cost of labor for workers (including fore persons when authorized by Construction Manager) used in actual and direct performance of extra work. Labor rate, whether employer is Contractor, subcontractor or other forces, will be sum of following:

1. **Actual Wages** - Actual wages paid shall be limited to the applicable prevailing wage rate for the classification of labor actually and reasonably necessary to complete a Change. Prevailing wage rates shall be deemed to include all direct payment of wages to workers completing a Change and all employer burdens thereon, including without limitation all employer

payments to or on behalf of workers for Workers Compensation, health and welfare, pension, vacation and other similar labor burdens. Contractors and subcontractors are required to provide their corresponding wage rate breakdown for the classification of labor under which they will complete a Change and on the form provided by the Owner for review and approval by the Owner and Construction Manager prior to processing and approval of payment for any completed Change.

B. **Material** - Only materials furnished by Contractor and necessarily used in performance of extra work will be paid for. Cost of such materials will be cost, including sales tax, to purchaser (Contractor, subcontractor or other forces) from supplier thereof, except, as the following are applicable:

1. If cash or trade discount by actual supplier is offered or available to purchaser, it shall be credited to CLPCCD notwithstanding fact that such discount may not have been taken.

2. For materials salvaged upon completion of extra work, salvage value of materials shall be deducted from cost, less discount, of materials.

3. If cost of a material is, in opinion of Construction Manager, excessive, then cost of material shall be deemed to be lowest current wholesale price at which material is available in quantities concerned delivered to Site, less any discounts as provided in subparagraph 1 above.

C. Equipment Rental

For Contractor or subcontractor-owned equipment, payment will be made at the lesser of actual rental rates or the rental rates listed for equipment in California Department of Transportation official equipment rental rate schedule which is in effect on date upon which extra work is accomplished and which schedule is incorporated herein by reference as though fully set forth herein. For rented equipment, payment will be made based on actual rental invoices. Equipment used on extra work shall be of proper size and type. If, however, equipment of unwarranted size or type and cost is used, cost of use of equipment shall be calculated at rental rate for equipment of proper size and type. Rental rates paid shall be deemed to cover cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals. Unless otherwise specified, manufacturer's ratings, and manufacturer-approved modifications, shall be used to classify equipment for determination of applicable rental rates. Individual pieces of equipment or tools not listed in said publication and having a replacement value of five hundred dollars ($500) or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore as payment is included in payment for labor. Rental time will not be allowed while equipment is inoperative due to breakdowns.

1. For equipment on Site, rental time to be paid for equipment shall be the time equipment is in operation on extra work being performed. The following shall be used in computing rental time of equipment:

a. When hourly rates are listed, less than thirty (30) minutes of operation shall be considered to be one-half (1/2) hour of operation.

b. When daily rates are listed, less than four (4) hours of operation shall

be considered to be one-half (1/2) day of operation. Anything over four (4) hours and not more than eight (8) hours is considered one (1) full day of operation.

2. For equipment, which must be brought to Site to be used exclusively on extra work, cost of transporting equipment to Site and its return to its original location shall be determined as follows:

   a. CLPCCD will pay for costs of loading and unloading equipment.

   b. Cost of transporting equipment in low bed trailers shall not exceed hourly rates charged by established haulers.

   c. Cost of transporting equipment shall not exceed applicable minimum established rates of California Public Utilities Commission.

   d. Payment for transporting, and loading and unloading equipment as above provided will not be made if equipment is used on Work in any other way than upon extra work.

3. Rental period shall begin at time equipment is unloaded at Site of extra work and terminate at end of day on which Construction Manager directs Contractor to discontinue use of equipment. Excluding Saturdays, Sundays, and legal holidays, unless equipment is used to perform extra work on such days, rental time to be paid per day shall be four (4) hours for zero (0) hours of operation, six (6) hours for four (4) hours of operation and eight (8) hours for eight (8) hours of operation, time being prorated between these parameters. Hours to be paid for equipment, which is operated less than eight (8) hours due to breakdowns, shall not exceed eight (8) less number of hours equipment is inoperative due to breakdowns.

D. Work Performed by Special Forces or Other Special Services

When Construction Manager and Contractor, by agreement, determine that special service or item of extra work cannot be performed by forces of Contractor or those of any subcontractors, service or extra work item may be performed by specialist. Invoices for service or item of extra work on basis of current market price thereof may be accepted without complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with established practice of special service industry to provide complete itemization. In those instances wherein Contractor is required to perform extra work necessitating a fabrication or machining process in a fabrication or machine shop facility away from Site, charges for that portion of extra work performed in such facility may, by agreement, be accepted as a specialist billing. Construction Manager must be notified in advance of all offsite work. To specialist invoice price, less credit to CLPCCD for any cash or trade discount offered or available, whether or not such discount may have been taken, will be added 15 percent (15%) in lieu of overhead and profit provided in Paragraph 1.04.B.

1.06 FORCE-ACCOUNT

A. If it is impracticable because of nature of work, or for any other reason, to fix an increase or decrease in price definitely in advance, Change Order may fix a maximum price which shall not under any circumstances be exceeded, and

subject to such limitation, such alteration, modification or extra shall be paid for at actual necessary cost as determined by CLPCCD Authority, which cost shall be determined pursuant to Article 1.04, and shall be known as Force-Account work.

B. Whenever any Force-Account work is in progress, definite price for which has not been agreed on in advance, Contractor shall report to Construction Manager each day in writing in detail amount and cost of labor and material used, and any other expense incurred in Force-Account work on preceding work day, and no claim for compensation for Force-Account work will be allowed unless report shall have been made. Daily report(s) shall be delivered to Construction Manager within one (1) business day of the day the work was performed. No late reports will be accepted. The intent is to have daily agreement on hours expended for labor and equipment on Force-Account work.

C. Above described methods of determining payment for work and materials shall not apply to performance of work or furnishings of material, which, in judgment of Construction Manager, may properly be classified under items for which prices are established in Contract.

1.07 CLPCCD FURNISHED MATERIALS

CLPCCD reserves right to furnish materials, as it deems advisable, and Contractor shall have no claims for costs and overhead and profit on such materials.

1.08 OVERHEAD DEFINED

The following constitutes charges that are included in overhead for all contract modifications, including Force-Account work:

1. Drawings: field drawings, shop drawings, etc. including submissions of drawings
2. Routine field inspection of work proposed
3. General Superintendence
4. General administration and preparation of change orders
5. Computer services
6. Reproduction services
7. Salaries of project engineer, Construction Manager, superintendent, timekeeper, storekeeper and secretaries
8. Janitorial services
9. Temporary on-site facilities
    a. Offices
    b. Telephones
    c. Plumbing
    d. Electrical: Power, lighting
    e. Platforms
    f. Fencing, etc.
10. Home office expenses

11. Insurance Premium
12. Procurement and use of vehicles and fuel used coincidentally in base bid work
13. Surveying
14. Estimating
15. Protection of work
16. Final cleanup
17. Other incidental work
18. Record Drawings
19. Warranty
20. Transportation expense to site for labor

1.09 RECORDS AND CERTIFICATION

A. Force-Account (cost reimbursement) charges shall be recorded daily upon Cost Breakdown for Contract Modification Form obtained from Inspector. Contractor or authorized representative shall complete and sign form. Inspector shall sign form for approval. Contract Modification Form shall provide names and classifications of workers and hours worked by each, itemize materials used, and also list size type and identification number of equipment, and hours operated, and shall indicate work done by specialists.

B. No payment for Force-Account work shall be made until Contractor submits original invoices substantiating materials and specialist charges.

C. CLPCCD shall have the right to audit all records in possession of Contractor relating to activities covered by Contractor's claims for modification of Contract, including Force-Account work, as set forth in General Conditions.

D. Further, CLPCCD shall have right to audit, inspect, or copy all records maintained in connection with this Contract, including financial records, in possession of Contractor relating to any transaction or activity occurring or arising out of, or by virtue of, Contract. If Contractor is a joint venture, right of CLPCCD shall apply collaterally to same extent to records of joint venture sponsor, and of each individual joint venture member.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

Not applicable to this section.

SAMPLE ONLY
COST BREAKDOWN FORM FOR CONTRACT MODIFICATION

One separate form shall be used by Contractor, each first-tier subcontractor and each lower tier subcontractor. One form for each shall be used for each change order. One form for each, for each day shall be used for Force-Account work.

COST BREAKDOWN FOR CONTRACTOR PRICE PROPOSAL

SHEET 1 OF 3

GENERAL CONTRACTOR FORM

PROJECT NUMBER: _____

PROJECT NAME: _____

CONTRACTOR: _____

CHANGE ORDER NUMBER: _____ **DATE:** _____

CHANGE ORDER DESCRIPTION: _____

SUMMARY OF TOTAL COSTS			
1. TOTAL LABOR COSTS	$ -		
2. Fifteen percent (15%) of Line 1	$ -		
3. Sum of Lines 1 & 2		$ -	
4. TOTAL MATERIAL COSTS	$ -		
5. Fifteen percent (15%) of Line 4	$ -		
6. Sum of Lines 4 & 5		$ -	
7. TOTAL EQUIPMENT RENTAL COSTS	$ -		
8. Fifteen percent (15%) of line 7	$ -		
9. Sum of lines 7 & 8		$ -	
10. TOTAL OF SUBCONTRACTED COSTS	$ -		
11. Five percent (5%) of line 10 (excluding subcontractor markup)	$ -		
12. Sum of Lines 10 & 11		$ -	
SUBTOTAL OF DIRECT COSTS & MARK-UP			$ -
COST OF BONDS (does not apply to subcontractors)			$ -
TOTAL OF CONTRACT MODIFICATION			**$ -**

COST BREAKDOWN FOR CONTRACTOR PRICE PROPOSAL

SHEET 2 OF 3

CONTRACTOR: _____

CHANGE ORDER NUMBER: _____ DATE: _____

CHANGE ORDER DESCRIPTION: _____

LABOR				
NAME	**CLASSIFICATION**	**HOURS**	**RATE**	**TOTAL**
				$ -
				$ -
				$ -
				$ -
TOTAL LABOR COSTS (Transfers to Line 1 of Sheet 1)				$ -

MATERIALS	
DESCRIPTION	**COST**
	$ -
	$ -
	$ -
SUBTOTAL MATERIAL COSTS (Without Sales Tax)	$ -
SALES TAX ON MATERIAL AT 9.00%	$ -
TOTAL MATERIAL COSTS (Transfers to Line 4 of Sheet 1)	$ -

EQUIPMENT				
SIZE AND TYPE	**I.D. #**	**HOURS**	**RATE**	**TOTAL**
				$ -
				$ -
				$ -
				$ -
TOTAL EQUIPMENT RENTAL COSTS (Transfers to Line 7 of Sheet 1)				$ -

COST BREAKDOWN FORM FOR CONTRACT MODIFICATION

SHEET 3 OF 3

CHANGE ORDER NUMBER: _____ DATE: _____

CHANGE ORDER DESCRIPTION: _____

SUBCONTRACTED WORK		
SUBCONTRACTOR	**DESCRIPTION OF WORK SUBCONTRACTED**	**COST**
TOTAL COST OF SUBCONTRACTED WORK (Transfers to Line 10 of Sheet 1)		

CONTRACTOR: _____ Date: _____

VERIFIED BY INSPECTOR: _____ Date: _____

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Project coordination.

B. Field engineering.

C. Coordination drawings.

D. Workmanship.

E. Incidental costs.

F. Correspondence and Notices.

G. Miscellaneous provisions.

H. Damage and restoration.

1.02 RELATED SECTIONS

A. Section 011100 - Summary of Work.

B. Section 014500 - Quality Control.

C. Section 015000 – Temporary Facilities.

D. Section 017000 - Contract Closeout.

1.03 PROJECT COORDINATION

A. Coordination scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of mechanical and electrical work, which are indicted diagrammatically on drawings. Follow route shown for pipes, ducts, and conduit, as closely as practicable: place runs parallel with line of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finished elements.

E. Submit a copy of site drawing and certificate signed by the Civil Engineer that the elevations and locations of the Work of separate Sections in preparation for Substantial Completion.

F. Coordinate completion and cleanup of Work of separate Sections in preparation for Substantial Completion.

G. After Owner occupancy of the Site, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.04 FIELD ENGINEERING

A. Contractor shall locate and protect survey control and reference points.

B. Control datum for survey is that shown on drawings.

C. Contractor shall verify setbacks and easements; confirm drawing dimensions and elevations.

D. Provide field engineering services. Contractor shall establish lines, and levels, utilizing recognized engineering practices

1.05 COORDINATION DRAWINGS

A. Provide information required by Architect for preparation of coordination drawings.

B. Review drawings prior to submission to Architect.

1.06 WORKMANSHIP

A. Work shall be performed by craftsmen well experienced and competent in their particular trade.

B. Workmanship shall be thorough, finished and complete in every detail for finest quality installations as intended under these specifications.

1.07 INCIDENTAL COSTS

A. In addition to cost associated with GC Article 6: Insurance; Indemnity; Bonds:

1. Utilities: Refer to Section 01 50 00.

2. Contractors and Subcontractors shall furnish at their own cost and expense all tools, consumable supplies, appliances, equipment, etc., necessary for execution of their work; and shall be responsible for care and guarding thereof.

3. Contractors and Subcontractors shall be entirely responsible for professional, trade, business or other licenses required by state statute or local government.

1.08 CORRESPONDENCE AND NOTICES

A. Clearly identify correspondence, notices and submittals with project name, subject and detailed references to drawings and specifications.

B. Notify Inspector or the Construction Manager two (2) working days in advance of required inspection.

1.09 MISCELLANEOUS PROVISIONS

A. Contractor shall immediately refer to the Construction Manager any requirement shown or specified which Contractor in their experience and background finds or believes:

1. Is not equal to industry standards for achieving a first quality installation as intended;
2. Is excessive in cost or effort to effect the intended results;
3. Is below standard for proper enforcement of the guarantees required;
4. Or, is at variance with governing laws, regulations, codes or standards.

B. Work operations relative to any matter referred to Architect for consideration shall not proceed until receipt of appropriate instructions from Architect.

C. Inspection of Work and Materials: Contractor shall immediately make a close and thorough inspection of all materials as delivered and all work in progress; shall promptly reject and return all defective materials and re-do; and shall check and verify adequate performance or satisfactory results of all tests and inspections before allowing sub-work to proceed.

D. Warranty Period: During warranty periods, supervise investigation and correction of deficiencies found or occurring in the work.

E. Shop Fabricate and pre-assemble interrelated parts where possible.

F. Closing up of walls, partitions or furred spaces, backfilling and other covering up operations shall not proceed until all enclosed or covered work and inspections have been completed. Verify before proceeding.

G. Provide holes, slots, cutouts, blocking, screeds, nailers, chases and similar preparation as the work progresses, as required to receive or pass subsequent work without damage to previously completed work.

H. Exterior Work shall be made tight against direct or indirect entry of water into the concealed or interior spaces of the building. Seal joints or penetrations below grade or behind exterior trim and other conditions where water might enter the structure, as for exposed exterior work.

I. Structural Connections and Fasteners: Include as required for complete fabrication and installation of the work; of materials, types and sizes adequate for the purposes.

1. Place in concealed or obscured locations where possible.
2. Include suitable welding or brazing where required.

J. Powder Activated Fasteners: Limited to uses particularly shown, specified or approved by Architect. Operators shall be certified in accordance with California Industry Safety orders.

K. Ferrous Work permanently exposed to exterior or below grade shall be galvanized; related accessory members and fastening non-ferrous, galvanized or made rustproof by approved methods.

L. Galvanizing, prime painting and related touch-up and repair shall comply with requirements for metal fabricating and painting in Section 13125 - Relocatable Buildings.

M. Isolation: Provide between ferrous and non-ferrous or dissimilar metal components to protect the work against electrolysis, as follows:

1. For architectural work, provide cork fillers, asphaltic coatings, neoprene gaskets or similar separation as necessary; and use stainless steel fastenings only where interconnecting dissimilar parts.
2. For mechanical and electrical work, provide dielectric unions or similar separation. In particular, provide isolation as necessary between exterior underground systems and interior above-grade systems where they meet dissimilar metals.

N. Prior to starting a particular type or kind of work, examine for relevant information, all contract documents and subsequent data issued to the project.

1.10 DAMAGE AND RESTORATION

A. Damage to previously existing or newly placed facilities caused by movement of equipment or other operations, whether accidental or made necessary by reason of Contract requirements, shall be restored or replaced as specified or directed by Architect or Construction Manager.

B. Restoration shall be equal to the structural qualities or performance capacities of the original work, and finishes shall match the appearance of, as nearly as possible, like existing adjacent work. Restorations shall be subject to approval by Architect and shall be made as necessary at no added expense to Owner unless otherwise particularly provided for.

C. Work not properly restored or where not capable of being restored as intended under these Specifications shall be removed and replaced as directed by Architect at no added expense to Owner.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

3.01 CUTTING AND PATCHING

A Employ skilled and experienced installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements, which affects:

1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Visual qualities of sight-exposed elements.

C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:

1. Fit the several parts together, to integrate with other Work.
2. Uncover Work to install or correct ill-timed work.
3. Remove and replace defective and non-conforming Work.
4. Remove samples of installed Work for testing.

5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute work by methods, which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.

E. Cut rigid materials using masonry saw or core drill.

F. Restore Work with new products in accordance with requirements of Contract Document.

G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

J. Identify any hazardous substance or condition exposed during the Work to the Construction Manager for decision or remedy.

END OF SECTION

PART1 – GENERAL

1.01 SUMMARY

A. This section describes the required meetings for this work. These meetings include:

1. Pre-construction Conference
2. Scheduling Meetings
3. Progress Meetings
4. Special Meetings

B. Related Sections

1. Section 01 11 00: Summary of Work
3. Section 01 32 00: Progress Schedules and Reports
4. Section 01 33 00: Submittals

1.02 PRECONSTRUCTION CONFERENCE

A. Construction Manager will call for and administer Pre-construction Conference at time and place to be announced. Conference will occur as soon after award as can be reasonably scheduled.

B. Contractor, all subcontractors, and major suppliers shall attend Pre-construction Conference.

C. Agenda will include, but not be limited to, the following items:

1. Schedules
2. Personnel
3. Use of the Site
4. Temporary Utilities
5. Location of Contractor's on-site facilities
6. Project access
7. Employee parking
8. Security/Safety
9. Housekeeping
10. Submittals
11. Inspection and testing procedures, on-site and off-site
12. Utility shutdown procedures
13. Control and reference point survey procedures
14. Injury and Illness Prevention Program
15. Contractor's Initial CPM Schedule
16. Contractor Invoicing, Schedule of Values, Approval Procedures

D. Construction Manager will distribute copies of minutes to attendees. Attendees shall have five (5) working days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of the Pre-construction Conference.

1.03 SCHEDULING MEETINGS

A. Meet with Construction Manager and Architect on Start Date of Contract and conduct initial review of Contractor's draft Shop Drawing and Sample Submittal Schedule, and draft Schedule of Values and Initial Construction Schedule ("Schedule Review Meeting").

B. Authorized representative in Contractor's organization, designated in writing, who will be responsible for working and coordinating with Construction Manager's representative(s) and Architect relative to preparation and maintenance of Progress Schedule shall attend initial Schedule Review Meeting.

C. Contractor shall, within thirty (30) days from the Notice to Proceed date, meet with Construction Manager and Architect to review the Original CPM Schedule submittal.

1. Contractor shall have its manager, superintendent, scheduler, and key subcontractor representatives, as required by CLPCCD, in attendance. The meeting will take place over a continuous one-day period.

2. CLPCCD's review of Schedule Submittals will be limited to conformance to Contract requirements, including, but not limited to, coordination requirements. However, review may also include:

   a. Clarifications of Contract Requirements

   b. Directions to include activities and information missing from submittal

   c. Requests to Contractor to clarify its schedule

3. Within five (5) days of the initial Schedule Review Meeting, Contractor shall respond in writing to all questions and comments expressed by CLPCCD at the meeting.

D. Construction Manager will administer scheduling meetings and shall distribute minutes of scheduling meetings to attendees. Attendees shall have five (5) working days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of the scheduling meetings.

1.04 PROGRESS MEETINGS

A. Construction Manager and Architect will schedule and administer Progress Meetings throughout duration of Work. Progress meetings will be held weekly unless otherwise directed by Construction Manager.

1. Meetings shall be held at Construction Manager's on-site office unless otherwise directed by Construction Manager.

2. Construction Manager will prepare agenda and distribute to Contractor, Inspector and Architect/Engineer 24 hours in advance of meeting.

3. Construction Manager will preside at meeting.

4. Architect will record and distribute minutes to Contractor, Inspector, Construction Manager, all other participants, and those affected by decisions made at meeting, within three (3) working days after meeting. Attendees shall have five (5) working days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of progress meetings.

B. Progress Meetings shall be attended by Contractor's job superintendent, major subcontractors and suppliers, when requested by Construction Manager or as appropriate, Construction Manager, Architect/Engineer, Inspector and others as appropriate to agenda topics for each meeting.

C. Agenda will contain the following items as appropriate:

1. Review of work progress
2. Status of Construction Schedule, adjustments
3. Submittals
4. Delivery schedules
5. Utility shutdowns, traffic disruptions, and interferences with public scheduled during the subsequent 2 weeks
6. Quality control
7. Pending changes
8. Substitutions
9. Review of Contractor's safety program activities and results, including report on all serious injury and/or damage accidents
10. Safety
11. Other items affecting progress of work

D. A separate meeting will be held on approximately the 25th of each month to review the schedule update submittal and progress payment application.

1. At this meeting, at a minimum, the following items will be reviewed:

   a. percent complete of each activity

   b. time impact evaluations for Change Orders and Time Extension Request

   c. actual and anticipated activity sequence changes

   d. actual and anticipated duration changes

   e. actual and anticipated contractor delays

2. These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, these meetings shall be attended by Contractor's General Superintendent and Scheduler.

3. Contractor shall plan on progress meetings taking no less than four (4) hours.

1.05 SPECIAL MEETINGS

A. Special meetings may be called by any party by notifying all desired participants, Construction Manager, Architect, and Inspector four (4) working days in

advance, giving reason for meeting. Special Meetings may be held without advance notice in emergency situations.

B. At any time during the progress of the Work, CLPCCD shall have authority to require Contractor to attend conference of any or all of the contractors engaged in the Work or in other work, and notice of such conference shall be duly observed and complied with by Contractor.

C. Contractor shall schedule and conduct coordination meetings as necessary to discharge coordination responsibilities in the General Conditions. Construction Manager shall be given five (5) days written notice of coordination meetings. Contractors shall maintain minutes of coordination meetings. Attendees shall have five (5) working days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of the meetings.

D. Pre-installation meetings of manufactures' warranty scope of work, i.e., roofing, water-proofing, curtain wall, etc.

E. LEED kick-off meeting.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

A. Scheduling of Work under this Contract shall be performed by Contractor in accordance with requirements of this Section.

1. Development of schedule, cost and manpower loading of the schedule and schedule updates, monthly payment requests and project status reporting requirements of the Contract shall employ computerized Critical Path Method (CPM) scheduling.

2. Submit schedules and reports as specified in General Conditions.

B. Upon Award of Contract, Contractor shall immediately commence development of Initial and Original CPM Schedules to ensure compliance with CPM schedule submittal requirements.

C. Related Sections:

1. Section 01 11 00: Summary of Work

2. Section 01 33 00: Submittals

D. Definitions: The following definitions apply to this section:

ACTIVITY: A task, event or other project element on a schedule that contributes to completing the project. Activities have a description, start date, finish date, duration and one or more logic ties.

BASELINE SCHEDULE: The initial schedule representing the Contractor's work plan on the first day of the project.

CRITICAL PATH: The longest continuous chain of activities for the project that has the least amount of total float of all chains. In general, a delay on the critical path will extend the scheduled completion date.

CRITICAL PATH METHOD (CPM): A network based planning technique using activity durations and the relationships between activities to mathematically calculate a schedule for the entire project.

DATA DATE: The day after the date through which a schedule is current. Everything occurring earlier than the data date is "as-built" and everything on or after the data date is "planned".

EARLY COMPLETION TIME: The difference in time between an early scheduled completion date and the contract completion date.

FLOAT: The difference between the earliest and latest start or finish times for an activity.

MILESTONE: An event activity that has zero duration and is typically used to represent the beginning or end of a certain stage of the project.

NARRATIVE REPORT: A document submitted with each schedule that discusses topics related to project progress and scheduling.

NEAR CRITICAL PATH: A chain of activities with total float exceeding that of the critical path but having no more than 14 calendar days of total float.

SCHEDULED COMPLETION DATE: The planned project finish date shown on the current accepted schedule.

SUBSTANTIAL COMPLETION: The stage in the progress of the work when the work is complete in accordance with the Contract Documents, so that District can occupy or use the work for its intended purpose.

TIME IMPACT ANALYSIS: A schedule and narrative report developed specifically to demonstrate what effect a proposed change or delay has on the current scheduled completion date.

TIME-SCALED NETWORK DIAGRAM: A graphic depiction of a CPM schedule comprised of activity bars with relationships for each activity represented by arrows. The tail of each arrow connects to the activity bar for the predecessor and points to the successor.

TOTAL FLOAT: The amount of time that an activity or chain of activities can be delayed before extending the scheduled completion date.

UPDATED SCHEDULE: A current schedule developed from the baseline or subsequent schedule through regular monthly review to incorporate as-built progress and any planned changes.

1.02 QUALIFICATIONS

A. Contractor shall employ experienced scheduling personnel qualified to use the latest version of Primavera Project Planner or Microsoft Project scheduling software. Experience level required is set forth below. Contractor may employ such personnel directly or may employ a consultant for this purpose. After bid opening, the apparent successful low bidder shall provide CLPCCD a written verification that Contractor has the required personnel under its employ or that Contractor will employ the required CPM scheduling consultant.

1. The written statement shall identify individual who will perform CPM scheduling.
2. Capability and experience shall be verified by description of construction projects on which individual has successfully applied computerized CPM.
3. Required level of experience shall include at least two projects of similar nature, scope and value not less than three-fourths the Total Bid Price of this Project. The written statement shall provide contact persons for referenced projects with current telephone and address information.

B. CLPCCD reserves right to approve Contractor's scheduler, or consultant, and right to reject them at any time. CLPCCD also reserves right to refuse replacement of Contractor's scheduler or consultant, if it believes such replacement will negatively affect Contract.

1.03 GENERAL

A. Progress Schedule shall be based on and incorporate milestones and completion dates specified in Contract Documents. Submit to the Owner baseline, monthly updated, and final updated schedules, each consistent in all respects with the time and order of work requirements of the contract. Work must be executed in the sequence indicated on the current accepted schedule. Schedules must show the order in which you propose to execute the work with logical links between time-scaled work activities and calculations made using the critical path method to determine the controlling activities. You are responsible for assuring that all activity sequences are logical and that each schedule shows a coordinated plan for complete performance of the work.

B. Overall time of completion and time of completion for each milestone shown on Progress Schedule shall adhere to times as stated in Contract Agreement, unless an earlier (advanced) time of completion is requested by Contractor and agreed to by CLPCCD. Any such agreement shall be formalized by a Change Order.

1. CLPCCD is not required to accept an earlier (advanced) schedule, i.e., one that shows early completion dates for the Contract Times.
2. Contractor shall not be entitled to extra compensation in the event agreement is reached on an earlier (advanced) schedule and Contractor completes its Work, for whatever

reason (excepting approved changes with added time components) beyond completion date shown in earlier (advanced) schedule but within the Contract Times.

3. A schedule showing the work completed in less than the Contract Times, which has been accepted by CLPCCD, shall be considered to have Project Float. The Project Float is the time between the scheduled completion of the work and Contract Substantial Completion. Project Float is a resource available to both CLPCCD and the Contractor.

C. Float Ownership: Neither CLPCCD nor Contractor owns float. The Project owns the float. As such, liability for delay of the Substantial Completion Date rests with the party whose actions, last in time, actually cause delay to the Substantial Completion Date.

1. For example, if Party A uses some, but not all of the float and Party B later uses remainder of the float as well as additional time beyond the float, Party B shall be liable for the time that represents a delay to the Substantial Completion Date.

2. Party A would not be responsible for the time since it did not consume the entire float and additional float remained; therefore, the Substantial Completion Date was unaffected.

D. Progress Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests associated with the changes. Responsibility for developing Contract CPM schedule and monitoring actual progress as compared to Progress Schedule rests with Contractor.

E. The Owner’s review and acceptance of schedules does not waive any contract requirements and does not relieve Contractor of any obligation or responsibility for submitting complete and accurate information. Correct rejected schedules and resubmit corrected schedules to the Owner within seven (7) days of notification by the Owner, at which time a new review period of seven (7) days will begin.

Errors or omissions on schedules do not relieve Contractor from finishing all work within the time limit specified for completion of the contract. If, after a schedule has been accepted by the Owner, either the Contractor or the Owner discovers that any aspect of the schedule has an error or omission, it must be corrected on the next updated schedule.

F. Use Microsoft Project for Windows or Primavera P6. Such software shall be compatible with Windows operating system. Contractor shall transmit contract schedule files to CLPCCD on CD-ROM or flash drive at times requested by CLPCCD.

G. Transmit each item under form approved by CLPCCD.

1. Identify Project with CLPCCD Contract number and name of Contractor and file by date, project, and update number.

2. Provide space for Contractor's approval stamp and CLPCCD's review stamps.

3. Submittals received from sources other than Contractor will be returned to the Contractor without CLPCCD's review.

1.04 INITIAL CRITICAL PATH METHOD (CPM) SCHEDULE

A. Initial CPM Schedule submitted for review at the pre-construction conference shall serve as Contractor's schedule for up to ninety (90) calendar days after the Notice to Proceed.

B. Indicate detailed plan for the Work to be completed in first sixty (60) days of the Contract; details of planned mobilization of plant and equipment; sequence of early operations; and procurement of materials and equipment. Show Work beyond sixty (60) calendar days in summary form.

C. Initial CPM Schedule shall be time-scaled.

D. Initial CPM Schedule shall be cost and manpower loaded. Accepted cost and manpower-loaded schedule will be used as basis for monthly progress payments until acceptance of the Original

CPM Schedule. Use of Initial CPM Schedule for progress payments shall not exceed sixty (60) calendar days.

E. CLPCCD and Contractor shall meet to review and discuss the Initial CPM Schedule within seven (7) calendar days after it has been submitted to CLPCCD.

1. CLPCCD's review and comment on the schedule shall be limited to Contract conformance (with sequencing, coordination, and milestone requirements) and accepted CPM principals.

2. Contractor shall make corrections to schedule necessary to comply with Contract requirements and shall adjust schedule to incorporate any missing information requested by CLPCCD. Contractor shall resubmit Initial CPM Schedule if requested by CLPCCD.

F. If, during the first sixty (60) days after Notice-to-Proceed, the Contractor is of the opinion that any of the Work included on its Initial CPM Schedule has been impacted, the Contractor shall submit to CLPCCD a written Time Impact Evaluation (TIE) in accordance with Article 1.09 of this Section. The TIE shall be based on the most current update of the Initial CPM Schedule.

1.05 ORIGINAL CRITICAL PATH METHOD (CPM) SCHEDULE

A. Submit a detailed proposed Original CPM Schedule presenting an orderly and realistic plan for completion of the Work, in conformance with requirements as specified herein.

B. The baseline schedule must not extend beyond the number of contract days. The baseline schedule must have a data date of the first working day of the contract and not include any completed work to date. The baseline schedule must not attribute negative float or negative lag to any activity.

C. Progress Schedule shall include or comply with following requirements:

1. Time scaled, cost and manpower loaded CPM schedule.

2. No activity on schedule shall have duration longer than twenty-one (21) calendar days, with exception of submittal, approval, fabrication and procurement activities, unless otherwise approved by CLPCCD.

a. Activity durations shall be total number of actual days required to perform that activity.

b. Activity coding capabilities to sort by responsibility, location, phase and CSI division.

3. The start and completion dates of all items of Work, their major components, and milestone completion dates, if any.

4. CLPCCD-furnished materials and equipment, if any, identified as separate activities.

5. Completion of the last activity in the schedule shall be constrained by the contract completion date. Schedule calculations shall result in a negative float when the calculated early finish date of the last activity is later than the contract completion date. The Contractor shall include as the last activity in the project schedule an activity called “Final Completion”. The “Final Completion” activity shall have an “LF” constraint date equal to the contract completion date for the project, and with a zero day duration or by using the “project must finish by” date in the scheduling software. The schedule shall have no constrained dates other than those specified in the contract. The use of artificial float constraints such as “zero free float” or “zero total float” are typically prohibited. There shall only be two (2) open ended activities: Start Project (or NTP) with no predecessor logic and Final Completion with no successor logic.

6. Processing/approval of submittals and shop drawings for all Contract-required material and equipment. Activities that are dependent on submittal acceptance or material delivery shall not be scheduled to start earlier than expected acceptance or delivery dates.

a. Include time for submittals, resubmittals, and reviews by CLPCCD. Coordinate with accepted schedule for submission of shop drawings, samples and other submittals.

b. Contractor shall be responsible for all impacts resulting from resubmittal of shop drawings and submittals.

7. Procurement of all contract required material and equipment, identified as separate activity.

   a. Include time for fabrication and delivery of manufactured products for the Work.

   b. Show dependencies between procurement and construction.

8. Complete activity description; what Work is to be accomplished and where.

9. The total cost of performing each activity shall be total of labor, material, equipment, excluding overhead and profit of Contractor. Total overhead and profit of the General Contractor shall be shown on a separate activity in the schedule. Sum of cost for all activities shall equal total Contract value.

10. Resources required (labor) to perform each activity.

11. Responsibility code for each activity corresponding to Contractor or Subcontractor responsible for performing the Work.

12. Identify the activities, which constitute the controlling operations or critical path. No more than twenty-five (25%) of the activities shall be critical or near critical. Near critical is defined as float in the range of one (1) to ten (10) days.

13. At least twenty-eight (28) calendar days for developing punch list(s), completion of punch list items and final clean-up for the Work or any designated portion thereof. No other activities shall be scheduled during this period.

14. Interface with the work of other contractors, CLPCCD, and agencies such as, but not limited to, utility companies.

15. Show detailed Subcontractor Work activities. In addition, furnish copies of Subcontractor schedules upon which CPM was built.

    a. Also furnish for each Subcontractor, as determined by CLPCCD, submitted on Subcontractor letterhead a statement certifying that Subcontractor concurs with Contractor's Original CPM Schedule and that Subcontractor's related schedules have been incorporated, including activity duration, cost and resource loading.

    b. Subcontractor schedules shall be independently derived and not a copy of Contractor's schedule.

    c. In addition to Contractor's schedule and resource loading, obtain from electrical, mechanical and plumbing Subcontractors, and other Subcontractors as required by CLPCCD, productivity calculations common to their trades, such as units per person day, feet of pipe per day per person, feet of wiring per day per person, and similar information.

    d. Furnish schedule for Contractor/Subcontractor CPM Schedule meetings which shall be held prior to submission of Original CPM Schedule to CLPCCD. CLPCCD shall be permitted to attend scheduled meetings as an observer.

16. Activity durations shall be in calendar days.

17. Submit with the schedule a list of anticipated non-Work days, such as weekends and holidays.

D. Original CPM Schedule Review Meeting: Contractor shall, within thirty (30) calendar days from the Notice to Proceed date, meet with CLPCCD to review the Original CPM Schedule submittal.

1. Contractor shall have its Construction Manager, Project Superintendent, Project Scheduler, and key Subcontractor representatives, as required by CLPCCD, in attendance. The meeting will take place over a continuous one-day period.

2. CLPCCD's review will be limited to submittal's conformance to Contract requirements, including, but not limited to, coordination requirements. However, review may also include:
    a. Accepted critical path method principles and tenets.
    b. Clarifications of Contract Requirements.
    c. Directions to include activities and information missing from submittal.
    d. Requests to Contractor to clarify its schedule.
3. Within five (5) days of the Schedule Review Meeting, Contractor shall respond in writing to all questions and comments expressed by CLPCCD at the Meeting.

1.06 ADJUSTMENTS TO CRITICAL PATH METHOD (CPM) SCHEDULE

A. Adjustments to Original CPM Schedule: Contractor shall have adjusted the Original CPM Schedule submittal to address all review comments from original CPM Schedule review meeting and resubmit network diagrams and reports for CLPCCD's review.
    1. CLPCCD, within fourteen (14) days from date that Contractor submitted the revised schedule, will either:
        a. accept schedule and cost and resource loaded activities as submitted, or
        b. advise Contractor in writing to review any part or parts of schedule which either do not meet Contract requirements or are unsatisfactory for CLPCCD to monitor Project's progress, resources and status or evaluate monthly payment request by Contractor.
    2. CLPCCD may accept schedule with conditions that the first monthly CPM schedule update be revised to correct deficiencies identified.
    3. When schedule is accepted, it shall be considered as the "Original CPM Schedule" which will then be immediately updated to reflect the current status of the work.
    4. CLPCCD reserves the right to require Contractor to adjust, add to, or clarify any portion of schedule which may later be discovered to be insufficient for monitoring of Work or approval of partial payment requests. No additional compensation will be provided for such adjustments, additions, or clarifications.
B. Acceptance of Contractor's schedule by CLPCCD will be based upon schedule's compliance with Contract requirements and accepted CPM principles.
    1. By way of Contractor assigning activity durations and proposing sequence of Work, Contractor agrees to utilize sufficient and necessary management and other resources to perform work in accordance with the schedule.
    2. Upon submittal of schedule update, updated schedule shall be considered "current" CPM schedule.
    3. Submission of Contractor's schedule to CLPCCD shall not relieve Contractor of total responsibility for scheduling, sequencing, and pursuing Work to comply with requirements of Contract Documents, including adverse effects such as delays resulting from ill-timed work.
C. Submittal of Original CPM Schedule, and subsequent schedule updates, shall be understood to be Contractor's representation that the Schedule meets requirements of Contract Documents and that Work shall be executed in sequence indicated on the schedule.
D. Contractor shall distribute Original CPM Schedule to Subcontractors for review and written acceptance, which shall be noted on Subcontractors' letterhead to Contractor and transmitted to CLPCCD for the record.

1.07 MONTHLY CPM SCHEDULE UPDATE SUBMITTALS

A. Following acceptance of Contractor's Original CPM Schedule, Contractor shall monitor progress of Work and adjust schedule each month to reflect actual progress and any pre-approved changes to planned activities or logic.

1. Each schedule update submitted shall be complete, including all information requested for the Original CPM Schedule submittal.

2. Each update shall continue to show all work activities including those already completed. These completed activities shall accurately reflect "as built" information by indicating when activities were actually started and completed.

B. A meeting will be held on approximately the twenty-fifth (25th) of each month to review the schedule update submittal and progress payment application.

1. At this meeting, at a minimum, the following items will be reviewed: Percent complete of each activity; time impact evaluations for Change Orders and Time Extension Request; anticipated activity sequence changes; anticipated duration changes; actual and anticipated contractor delays.

2. These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, these meetings shall be attended by Contractor's General Superintendent and Scheduler.

3. Contractor shall plan on the meeting taking no less than four (4) hours.

C. Within seven (7) calendar days after monthly schedule update meeting, Contractor shall submit the updated CPM Schedule update.

D. Within seven (7) calendar days of receipt of above noted revised submittals, CLPCCD will either accept or reject monthly schedule update submittal.

1. If accepted, percent complete shown in monthly update will be basis for Application for Payment by the Contractor. The schedule update shall be submitted as part of the Contractor's Application for Payment.

2. If rejected, update shall be corrected and resubmitted by Contractor before the Application for Payment is submitted.

E. Updating, changing or revising of any report, curve, schedule or narrative submitted to CLPCCD by Contractor under this Contract, nor CLPCCD's review or acceptance of any such report, curve, schedule or narrative shall not have the effect of amending or modifying, in any way, the Contract Substantial Completion date or milestone dates or of modifying or limiting, in any way, Contractor's obligations under this Contract.

F. Final Updated Schedule. Submit final updated, as-built schedule with actual start and finish dates for the activities, within 30 days after completion of contract work. Provide a written certificate with this submittal signed by your Project Manager or an officer of the company stating, “To my knowledge and belief, the enclosed final update schedule reflects that actual start date and finish dates of the actual activities for the project contained herein”. An officer of the company may delegate in writing the authority to sign the certificate to a responsible manager.

1.08 SCHEDULE REVISIONS

A. Updating the Schedule to reflect actual progress shall not be considered revisions to the Schedule. Since scheduling is a dynamic process, revisions to activity durations and sequences are expected on a monthly basis.

B. To reflect revisions to the schedule, the Contractor shall provide CLPCCD with a written narrative with a full description and reasons for each Work activity revised. For revisions affecting the sequence of work, the Contractor shall provide a schedule diagram which compares the original sequence to the revised sequence of work. The Contractor shall provide

the written narrative and schedule diagram for revisions two (2) working days in advance of the monthly schedule update meeting.

C. Schedule revisions shall not be incorporated into any schedule update until the revisions have been reviewed by CLPCCD. CLPCCD may request further information and justification for schedule revisions and Contractor shall, within three (3) days, provide CLPCCD with a complete written narrative response to CLPCCD's request.

D. If the Contractor's revision is still not accepted by CLPCCD, and the Contractor disagrees with CLPCCD's position, the Contractor has seven (7) calendar days from receipt of CLPCCD's letter rejecting the revision, to provide a written narrative providing full justification and explanation for the revision. The Contractor's failure to respond in writing within seven (7) calendar days of CLPCCD's written rejection of a schedule revision shall be contractually interpreted as acceptance of CLPCCD's position, and the Contractor waives its rights to subsequently dispute or file a claim regarding CLPCCD's position.

E. At CLPCCD's discretion, the Contractor can be required to provide subcontractor certifications of performance regarding proposed schedule revisions affecting said subcontractors.

1.09 RECOVERY SCHEDULE

A. If the Schedule Update shows a substantial completion date fourteen (14) calendar days beyond the Contract Substantial Completion date, or individual milestone completion dates, the Contractor shall submit to CLPCCD the proposed revisions to recover the lost time within seven (7) calendar days. As part of this submittal, the Contractor shall provide a written narrative for each revision made to recapture the lost time. If the revisions include sequence changes, the Contractor shall provide a schedule diagram comparing the original sequence to the revised sequence of work.

B. The revisions shall not be incorporated into any schedule update until the revisions have been reviewed by CLPCCD.

C. If the Contractor's revisions are not accepted by CLPCCD, CLPCCD and the Contractor shall follow the procedures in paragraph 1.08.C, 1.08.D and 1.08.E above.

D. At CLPCCD's discretion, the Contractor can be required to provide subcontractor certifications for revisions affecting said subcontractors.

1.10 TIME IMPACTS EVALUATION (TIE) FOR CHANGE ORDERS, AND OTHER DELAYS

A. Time Impact Analysis (TIA). Submit a written TIA to the Owner with each request for adjustment of contract time, or when the Contractor or the Owner considers that an approved or anticipated change may impact the critical path or contract progress.
The TIA must illustrate the impacts of each change or delay on the current scheduled completion date or internal milestone, as appropriate. The analysis must use the accepted schedule that has a data date closest to and before the event. If the Owner determines that the accepted schedule used does not appropriately represent the conditions before the event, the accepted schedule must be updated to the day before the event being analyzed. The TIA must include an impact schedule developed from incorporating the event into the accepted schedule by adding or deleting activities, or by changing durations or logic of existing activities. If the impact schedule shows that incorporating the event modifies the critical path and scheduled completion date of the accepted schedule, the difference between scheduled completion dates of the two schedules must be equal to the adjustment of contract time. The Owner may construct and use an appropriate project schedule or other recognized method to determine adjustments in contract time until the Contractor provide the TIA.

B. Contractor shall be required to comply with the requirements of Paragraph 1.09.A for all types of delays such as, but not limited to, Contractor/Subcontractor delays, adverse weather delays, strikes, procurement delays, fabrication delays, etc.

C. Contractor shall be responsible for all costs associated with the preparation of Time Impact Evaluations, and the process of incorporating them into the current schedule update. The Contractor shall provide CLPCCD with 4 copies of each TIE.

D. Once agreement has been reached on a TIE, the Contract Times will be adjusted accordingly. If agreement is not reached on a TIE, the Contract Times may be extended in an amount CLPCCD allows, and the Contractor may submit a claim for additional time claimed by Contractor.

1.11 TIME EXTENSIONS

A. The Contractor is responsible for requesting time extensions for time impacts that, in the opinion of the Contractor, impact the critical path of the current schedule update. Notice of time impacts shall be given in accord with Articles 1.12 and 1.15 of Contract Document General Conditions.

B. Where an event for which CLPCCD is responsible impacts the projected Substantial Completion date, the Contractor shall provide a written mitigation plan, including a schedule diagram, which explains how (e.g., increase crew size, overtime, etc.) the impact can be mitigated. The Contractor shall also include a detailed cost breakdown of the labor; equipment and material the Contractor would expend to mitigate CLPCCD caused time impact. The Contractor shall submit its mitigation plan to CLPCCD within fourteen (14) calendar days from the date of discovery of said impact. The Contractor is responsible for the cost to prepare the mitigation plan.

C. Failure to request time, provides TIE, or provides the required mitigation plan will result in Contractor waiving its right to a time extension and cost to mitigate the delay.

D. No time will be granted under this Contract for cumulative effect of changes.

E. CLPCCD will not be obligated to consider any time extension request unless requirements of Contract Documents are complied with.

F. Failure of the Contractor to perform in accordance with the current schedule update shall not be excused by submittal of time extension requests.

G. If the Contractor does not submit a TIE within the required fourteen (14) calendar days for any issue, it is mutually agreed that the Contractor does not require a time extension for said issue.

1.12 SCHEDULE REPORTS

A. Submit four (4) copies of the following reports with the Initial CPM Schedule, the Original CPM Schedule, and each monthly update.

B. Required Reports:

1. Two (2) activity-listing reports: one sorted by activity number and one by total float. These reports shall also include each activity's early/late and actual start and finish dates, original and remaining duration, float, responsibility code and the logic relationship of activities.

2. Cost report sorted by activity number including each activity's associated cost, percentage of Work accomplished, earned value to-date, previous payments and amount earned for current update period.

3. Schedule plots presenting time scaled network diagram showing activities and their relationships with the controlling operations or critical path clearly highlighted.

4. Cash flow report calculated by early start, late start and indicating actual progress. Provide an exhibit depicting this information in graphic form.

C. Furnish CLPCCD with report files in CD ROM and containing all Microsoft Project .mpp or Primavera .xer schedule files along with report files.

1.13 PROJECT STATUS REPORTING

A. In addition to submittal requirements for CPM scheduling identified in this Section, Contractor shall provide a monthly project status report (i.e., written narrative report) to be submitted in

conjunction with each CPM Schedule as specified herein. Status reporting shall be in form specified below.

B. Contractor shall prepare monthly written narrative reports of status of Project for submission to CLPCCD. Written status reports shall include:

1. Transmittal letter
2. Work completed during the period, percent complete of activities
3. Identification of unusual conditions or restrictions regarding labor, equipment or material: including multiple shifts, 6-day work weeks, specified overtime or work at times other than regular days or hours
4. Description of the current critical path
5. Changes to the critical path and scheduled completion date since the last schedule submittal
6. Description of problem areas
7. Current and anticipated delays:
   7.1 Cause of delay
   7.2 Impact of delay on other activities, milestones and completion dates
   7.3 Corrective action and schedule adjustments to correct the delay
8. Contractor may include any other information pertinent to status of Project. Contractor shall include additional status information requested by CLPCCD at no additional cost.
9. Status reports, and the information contained therein, shall not be construed by the Contractor as claims, notice of claims, notice of delay, or requests for changes or compensation.

1.14 WEEKLY SCHEDULE REPORT

At the Weekly Progress Meeting, the Contractor shall provide and present a time scaled four (4) week schedule one (1) week behind and three (3) week look ahead schedule that is based and correlated by activity number to the current schedule (i.e., Initial, Original CPM, or Schedule Update).

1.15 DAILY CONSTRUCTION REPORTS

On a daily basis, Contractor shall submit a daily activity report to CLPCCD for each workday, including weekends and holidays, when worked. Contractor shall develop the daily construction reports on a computer generated database capable of sorting daily Work, manpower and man-hours by Contractor, Subcontractor, area, sub area, and change order work. Upon request of CLPCCD, furnish computer disk of this database. Obtain CLPCCD's written approval of daily construction report database format prior to implementation. Include in report:

A. Project name and Project number.

B. Contractor's name and address.

C. Weather, temperature and any unusual site conditions.

D. Brief description and location of the day's scheduled activities and any special problems and accidents, including Work of Subcontractors. Descriptions shall be referenced to CPM scheduled activities.

E. Worker quantities for its own Work force and for Subcontractors of any tier.

F. Equipment, other than hand tools, utilized by Contractor and Subcontractors.

1.16 PERIODIC VERIFIED REPORTS

The Contractor shall complete and submit the Final Verified Report required by DSA. In addition to other conditions precedent to Final Payment, the Contractor's completion and submission of the Final Verified Report is an express condition precedent to the District's obligation to make the Final Payment. In

addition to completion and submission of the Final Verified Report, as a material obligation under the Contract Documents, the Contractor shall comply all DSA requests for reports or other data relating to the Work, the status thereof or conformity of the Work to the Contract Documents.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

Not applicable to this section.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals including:

1. Procedures
2. Schedule of Shop Drawing and Sample Submittals
3. Safety Plan
4. Progress Schedule
5. Product Data
6. Shop Drawings
7. Samples
8. Quality Control Submittals
9. Design Data
10. Test Reports
11. Certificates
12. Manufacturers' Instructions
13. Machine Inventory Sheets Operations and Maintenance Manuals Computer Programs
14. Project Record Documents
15. LEED Submittals

1.3 RELATED SECTIONS

A. Section 01 11 00: Summary of Work.

B. Section 01 26 00: Contract Modification Procedures.

C. Section 01 32 00: "Progress Schedules and Reports" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.

D. Section 01 70 00: Contract Closeout

E. Section 01 78 00: Project Record Documents.

1.4 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.5 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings are always through Architect for Contractor's use in preparing submittals. Files are used as background use only.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Construction Manager's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 workdays for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Construction Manager will advise Contractor when a submittal being processed must be delayed for coordination.
2. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

E. Submit at own expense, a minimum of two (2) printed sets or copies and one (1) electronic PDF set- Schedule of Shop Drawing and Sample Submittals, Safety Plans, Progress Schedule, Product Data, Shop Drawings, Samples, Quality Control Data, Machine Inventory Sheets, Operations and Maintenance Manuals, Computer Programs, and Project Record Documents required by the Contract Documents.

F. Transmit each item with a standard letter of transmittal in form approved by Construction Manager.

G. Identify project, Contractor, subcontractor, major supplier, pertinent drawing sheet and detail number, and specification section number as appropriate. Provide space for Contractor, Construction Manager and Architect/Engineer review stamps.

H. Where manufacturer's standard drawings or data sheets are used, they shall be marked clearly to show those portions of the data, which are applicable to this project.

I. Submit Shop Drawings, Samples and other submittals to Construction Manager for review and approval by Architect/Engineer in accordance with accepted schedule of Shop Drawings and Samples submittals. If no such schedule is agreed upon, then all Shop Drawing, Samples and product data submittals shall be completed within ninety (90) days after receipt of Notice to Proceed from CLPCCD.

J. The data shown on the Shop Drawings shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show Architect/Engineer the materials and equipment Contractor proposes to provide and to enable Architect/Engineer to review the information for the limited purposes specified below. Samples shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which it is intended and otherwise as Architect/Engineer may require enabling Architect/Engineer to review the submittal. The number of each Sample to be submitted will be as specified in the Specifications.

K. At the time of each submission, Contractor shall give Construction Manager, Architect/Engineer, and Inspector specific written notice of all variations, if any; that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, and the reasons therefore. This written notice shall be in a written communication separate from the submittal. In addition, Contractor shall cause a specific notation to be made on each Shop Drawing and Sample submitted to Construction Manager for review and approval of each such variation by Architect/Engineer. The Architect/Engineer may make adjustments to submittals that may result in changes to the contract. The appropriate change order request should be prepared by the Contractor within ten (10) days of receipt of submittals.

L. If CLPCCD accepts deviation, CLPCCD shall issue appropriate Contract Modification.

M. Submittal coordination and verification is responsibility of Contractor; this responsibility shall not be delegated in whole or in part to subcontractors or suppliers. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

1. All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto;
2. All materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work; and
3. All information relative to Contractor's sole responsibilities and of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

N. Contractor shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

O. Contractor's submission to Construction Manager of a Shop Drawing or Sample submittal will constitute Contractor's representation that it has satisfied its obligations under the Contract Documents, and as set forth immediately above, with respect to Contractor's review and approval of that submittal.

P. Designation of work "by others", if shown in submittals, shall mean that work will be responsibility of Contractor rather than subcontractor or supplier who has prepared submittals.

Q. After review by Architect/Engineer of each of Contractor's submittals, one electronic set will be returned to Contractor with actions defined as follows:

1. NO ACTION TAKEN – Submittal is unreviewed.
2. NO EXCEPTIONS TAKEN - Accepted subject to its compatibility with future submittals and additional partial submittals for portions of the work not covered in this submittal. Does not constitute approval or deletion of specified or required items not shown on the submittal.
3. MAKE CORRECTIONS NOTED (NO RESUBMISSIONS REQUIRED) - Same as 2. above, except that minor corrections as noted shall be made by Contractor.
4. REVISE AND RESUBMIT - Rejected because of major inconsistencies or errors which shall be resolved or corrected by Contractor prior to subsequent review by Architect/Engineer.
5. REJECTED (RESUBMIT) - Submitted material does not conform to Plans and Specifications in major respect, i.e.: wrong size, model, capacity, or material.

R. It is considered reasonable that Contractor shall make a complete and acceptable submittal at least by second submission.

1. CLPCCD reserves the right to deduct monies from payments due Contractor to cover additional costs of Architect's/Engineer's review beyond the second submission. Illegible submittals will be rejected and returned to Contractor for resubmission.

S. Favorable review will not constitute acceptance by CLPCCD or Architect/Engineer of any responsibility for the accuracy, coordination and completeness of the submittals. Accuracy, coordination, and completeness of Submittals shall be sole responsibility of Contractor, including

responsibility to back check comments, corrections, and modifications from CLPCCD's or Architect's/Engineer's review before fabrications. Submittals may be prepared by Contractor, subcontractors, or suppliers, but Contractor shall ascertain that submittals meet requirements of Contract Documents, while conforming to structural space and access conditions at point of installation. Architect/Engineer's review will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Favorable review of submittal, method of work, or information regarding materials and equipment Contractor proposes to furnish shall not relieve Contractor of responsibility for errors therein and shall not be regarded as assumption of risks or liability by Architect/Engineer or CLPCCD, or any officer or employee thereof, and Contractor shall have no claim under Contract on account of failure or partial failure or inefficiency or insufficiency of any plan or method of work or material and equipment so accepted. Favorable review shall be considered to mean merely that Architect/Engineer or CLPCCD has no objection to Contractor using, upon his own full responsibility, plan or method of work proposed, or furnishing materials and equipment proposed.

T. Architect's/Engineer's review will not extend the means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

U. Submit complete initial submittal for those items where required by individual specification Sections. Complete submittal shall contain sufficient data to demonstrate that items comply with Specifications, shall meet minimum requirements for submissions cited in technical specifications, shall include motor data and seismic anchorage certifications, where required, and shall include necessary revisions required for equipment other than first named. If Contractor submits incomplete initial submittal, when complete submittal is required, submittal may be returned to Contractor without review.

V. It shall be Contractor's responsibility to copy, conform and distribute reviewed submittals in sufficient numbers for Contractor's files, subcontractors and vendors.

W. After Architect/Engineer review of submittal, revise and resubmit as required. Identify changes made since previous submittal.

1. Begin no fabrication or work, which require submittals until return of submittals not requiring resubmittal.
2. Normally, submittals will be processed and returned to Construction Manager within fifteen (15) working days of receipt by Architect. The processing time spent to review submittals by Construction Manager shall be in addition to the fifteen (15) days.
3. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

1.6 SCHEDULE OF SHOP DRAWING, DSA DEFERRED APPROVAL SUBMITTALS AND SAMPLE SUBMITTALS

A. Submit preliminary Schedule of Shop Drawing and Sample Submittals as required by General Conditions. Submit two (2) copies and one (1) electronic PDF of final and accepted schedule of submittals of shop drawings and samples as required by General Conditions, and in no event later than thirty (30) days following Notice of Award.

B. Schedule of Shop Drawing and Sample Submittals will be used by Architect/Engineer to schedule their activities relating to review of submittals. Schedule of submittals shall indicate a spreading out of submittals and early submittals of long lead-time items and of items, which require extensive review.

C. Schedule of Shop Drawing and Sample Submittals shall be reviewed by Construction Manager and shall be revised and resubmitted until accepted by Construction Manager.

D. DSA Deferred Approval Submittals shall be prepared for review by the Architect/Engineer within 30 days of receipt of Notice to Proceed. Contractor shall promptly make corrections to documents for Architect to submit to DSA for approval. Contractor shall have the sole responsibility for obtaining DSA approval via the Architect's office for all deferred approval submittals in a timely manner. There will be no time extensions granted for delay in obtaining such approval.

1.7 SAFETY PLAN

A. Submit one (1) copies and one (1) electronic PDF of Safety Plan specific to this Contract to Construction Manager within fifteen (15) calendar days after Start Date of the Contract Time.

B. No on-site work shall be started until Safety Plan has been reviewed and accepted by CLPCCD. Acceptance of Safety Plan shall not affect Contractor's responsibility for maintaining a safe working place and instituting safety programs in connection with project in full compliance with local, state and federal regulations.

1.8 PROGRESS SCHEDULE

A. Schedule all items requiring Architect action for submission during first 25 percent of construction period.

B. See Section 01 32 00 "Progress Schedules and Reports" for schedule and report requirements.

C. Submit (3) print copies, one (1) electronic report file in PDF format, and either Microsoft Project .mpp or Primavera .xer schedule program files:

1. Initial CPM Schedule at the Pre-construction Conference.
2. Original CPM Schedule within thirty (30) days of Notice to Proceed (NTP).
3. Adjustments to the CPM Schedule as required.
4. CPM Schedule updates monthly, five (5) days prior to monthly progress meeting.

D. Submit three (3) copies and one (1) electronic PDF copy of the reports listed in Section 01 32 00 "Progress Schedules and Reports" with:

1. Initial CPM Schedule
2. Original CPM Schedule
3. Each monthly Schedule update
4. Each weekly three (3) week look ahead Schedule

E. Progress Schedules and Reports shall be submitted electronically, in addition to hard copies as specified above.

1.9 QUALITY CONTROL SUBMITTALS

A. Design Data: Not applicable.

B. Test Reports: Three (3) copies minimum. One (1) copy will be marked with Architect's/Engineer's review comments and returned to Contractor.

1. Indicate that material or product conforms to or exceeds specified requirements.
2. Reports may be from recent or previous tests on material or product, but must be acceptable to Construction Manager. Comply with requirements of each individual specification Section.

C. Certificates: Three (3) copies minimum. One (1) copy will be marked with Architect's/Engineer's review comments and returned to Contractor.
   1. Indicate that material or product conforms to or exceeds specified requirements.
   2. Submit supporting reference data, affidavits, and certifications as appropriate.
   3. Certificates may be recent or from previous test results on material or product but must be acceptable to Construction Manager.

D. Manufacturers' Instructions: Three (3) copies minimum. One (1) copy will be marked with Architect's/Engineer's review comments and returned to Contractor.
   1. Include manufacturer's printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing.
   2. Identify conflicts between manufacturer's instructions and Contract Documents.

1.10 COMPUTER PROGRAMS

A. When any equipment requires operation by computer programs, submit copy of program on CD(s) plus all user manuals and guides for operating the programs and making changes in the programs for upgrading and expanding the databases. Provide required licenses to CLPCCD at no additional cost.
   1. Include at least three (3) years prepaid software license renewals, which includes software upgrades and updates.

1.11 PROJECT RECORD DOCUMENTS

A. Submit one copy of each of the Project Record Documents listed in Section 01 70 00 Contract Closeout.

1.12 DELAY OF SUBMITTALS

A. Delay of submittals by Contractor is considered avoidable delay. Liquidated damages incurred because of late submittals will be assessed to the Contractor.

PART 2 - PRODUCTS

2.1 SUBMITTALS

A. Within fifteen (15) calendar days after Start Date of the Contract Time submit two (2) copies and one (1) electronic PDF of complete list of substitutions of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. Contractor shall be responsible for and make all submissions.
   1. Submit items specified herein to Architect and Construction Manager.
   2. Submit all submittals through the Construction Manager’s Electronic Submittal Program.
   3. Identify each transmittal using the 6-digit specification number, i.e., metal handrails might be numbered 05 5000, along with an individual submittal number for each section number. Submittal numbers shall be sequential. If returning submittal “12” for re-submission, second submission would be identified as “12A”. Should submittal be rejected multiple times (12b, 12c, etc), the Contractor may be required to reimburse the Owner/Architect for labor to review subsequent submissions.
   4. Develop, for maintenance by the Construction Manager, a schedule of all submittals and their status. Refer to Paragraph 1.3 below. The schedule will be reviewed each week at the project meeting.

C. Transmittals, shop drawings, or samples submitted to Architect shall have the Contractor's stamp on it with his signature and be marked "approved." Contractor's stamp on these items indicates that Contractor has performed the following:

1. Verified field dimensions and quantities.
2. Verified field construction criteria, materials, catalog numbers and similar data.
3. Reviewed and coordinated submittal data with requirements of the Work and the Contract Documents.
4. ITEMS NOT STAMPED BY THE CONTRACTOR WILL BE RETURNED UNREVIEWED.

D. Indicate any item, component, material or portion of Work, which deviates from Contract Documents. Unless such departures are accepted as indicated in paragraph "Review" below, such departures will not be permitted.

E. Make submittals sufficiently in advance of data required to allow Architect reasonable time for review and additional resubmission and review cycles if necessary.

1. Items submitted without Contractor's review stamp will be returned, without action, for resubmission.
2. Items not submitted in accordance with provisions of this Section will be returned, without action, for resubmission.
3. Submissions on items not approved for use by specifications or addenda will be rejected.
4. Drawings transmitted by other than the Prime Contractor will be returned to the Prime Contractor without action of any kind. Drawings will not be returned to subcontractors.

2.2 SUBMITTALS – PRODUCT DATA

A. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

B. Tabulate products by specification section number.

C. Supplemental Data:

1. Submit number of copies, which Contractor requires, plus three (3) copies, which will be retained by Construction Manager.
2. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to Project.

D. Provide copies for Project Record Documents described in Section 01 70 00 Contract Closeout.

2.3 SUBMITTALS - SHOP DRAWINGS

A. Identify drawings with manufacturer, item, use, type, project designation, specification section or drawing detail reference.

B. Minimum Sheet Size: 8-1/2 inches by 11 inches. All others: Multiples of 8-1/2 inches by 11 inches, 34 inches by 44 inches maximum.

C. For 8-1/2 inch by 11 inch and 11 inch by 17-inch sheets, submit number of copies, which contractor requires plus three (3) copies, which will be retained by Construction Manager.

D. For 17 inch by 22 inch through 34 inch by 44-inch sheets, submit one [1] electronic and a minimum of three [3] prints. After review, reproduce and distribute.

E. Original sheet or reproducible transparency will be marked with Architect's/Engineer's review comments and returned to Contractor.

F. Each sheet/copy must include project name and project number and bid number on all sheets.

G. Mark each copy to identify applicable Products, models, options, and other data; supplement manufacturers' standard data to provide information unique to Work.

H. Include manufacturers' installation instructions when required by specification section.

I. Submit a copy of the Shop Drawing Transmittal Form with each submittal and resubmittal.

2.4 SUBMITTALS - SAMPLES

A. Identify samples with manufacturer's name, item, use, type, project designation, specification section or drawing detail reference, color, range, texture, finish and other pertinent data.
   1. Submit samples to illustrate functional and aesthetic characteristics of Product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.

B. Submit full range of manufacturers' standard colors, textures, and patterns for Construction Manager's selection.

C. Submit a minimum of three (3) samples unless otherwise specified in the construction documents.

D. Sizes: Unless otherwise specified, provide the following:
   1. Paint Chips: Manufacturers' standard
   2. Flat or Sheet Products: Minimum 6 inches square, maximum 12 inches square
   3. Linear Products: Minimum 6 inches, maximum 12 inches long
   4. Bulk Products: Minimum 1 pint, maximum 1 gallon

E. Full size samples may be used in Work upon approval.

F. Mock-ups:
   1. Erect field samples and mock-ups at Project site in accordance with requirements of Specification sections.
   2. Modify or make additional field samples and mock-ups as required to provide appearance and finishes approved by Construction Manager.
   3. Approved field samples and mock-ups may be used in Work upon approval.

G. Architect may, at his option, retain samples for comparison purposes until completion of Work.
   1. Samples will be returned or may be used in the Work unless the technical section specifically indicates otherwise.
   2. Remove samples when directed.
   3. Pay all costs of furnishing or constructing, and removing samples.

H. Resubmit samples of rejected items.

I. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
   1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

J. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design

professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect and Construction Manager.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT REVIEW

A. General: Architect and Construction Manager will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect and Construction Manager will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect and Construction Manager will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

C. Reproduce and distribute submittals that the Architect reviews and stamps as follows, to indicate the action taken:

1. Reviewed: Where submittal is marked "Reviewed," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
2. Reviewed -- Additional Information Required: Where submittal is marked "Reviewed -- Additional Information Required," the information submitted has been reviewed and approved as noted. However, additional information as noted and/or required by Contract Documents needs to be submitted.
3. Make Corrections As Noted: When submittal is marked "Furnish As Corrected," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
4. Submit Specified Item: When submittal is marked "Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
    a. Do not permit submittals marked "Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.
5. Rejected: When submittal is marked "Rejected," information submitted is not in compliance with Contract Documents. Resubmit submittal as required by Contract Documents.

D. Contractor shall retain 1 copy of each "Reviewed," "Reviewed -- Additional Information Required" or "Furnish as Corrected" submittal on file at the job site.

E. Architect shall retain 1 copy of each "Reviewed," "Reviewed -- Additional Information Required" or "Furnish as Corrected" submittal in the project file.

F. Contractor shall resubmit items stamped "Revise and Resubmit" or "Rejected" by Architect.
   1. Provide a print of previous drawing with resubmission for comparison.
   2. Add letter suffix to previous transmittal number, to indicate resubmission.
   3. It shall be the Contractor's responsibility to assure that previously approved documents are destroyed when they are superseded by a resubmittal.

G. Architect review is general and does not:
   1. Permit departure from Contract Documents.
   2. Relieve Contractor from responsibility for errors in detail, in dimensions or related items.
   3. Approve departure from previous instructions or details.
   4. Relieve Contractor of the responsibility to provide all components, wiring, etc., required to make item operable or usable.
   5. Imply acceptance of items for which no data is submitted.

H. For items constituting a departure from Contract Documents see Section 01 2500.

I. Reviewed samples submitted or constructed and approved by Architect constitute criterion for judging completed work. Finish work or items not equal to samples will be rejected.

J. Start of work which requires submittals, prior to return of submittals with Architect or Owner's stamp indicating review and approval is at Contractor's risk.

3.3 DISTRIBUTION

A. Contractor shall copy and distribute all "Reviewed," "Reviewed -- Additional Information Required" or "Furnish as Corrected" submittals, including one copy to the Owner.

- END OF SECTION -

PART 1 – GENERAL

1.01 SUMMARY

This section includes regulatory requirements applicable to Contract.

1.02 REFERENCES TO REGULATORY REQUIREMENTS

A. Codes, laws, ordinances, rules and regulations referred to shall have full force and effect as though printed in full in these specifications.

B. Conform to referenced codes, laws, ordinances, rules and regulations, which are in effect on date of receipt of bids.

1.03 CODES

Codes, which apply to Contract, include, but are not limited to, the following:

A. 2007 California Building Code (Part 2, Title 24, C.C.R.)

B. 2007 California Electrical Code (Part 3, Title 24, C.C.R.)

C. 2007 California Mechanical Code (Part 4, Title 24, C.C.R.)

D. 2007 California Plumbing Code (Part 5, Title 24, C.C.R),

E. 2007 State Elevator Safety Regulations (Part 7, Title 24, C.C.R.)

F. 2007 California Fire Code (Part 9, Title 24, C.C.R.)

G. 2007 California Energy Code (Part 6, Title 24, C.C.R.)

1.04 LAWS, ORDINANCES, RULES AND REGULATIONS

A. During prosecution of Work to be done under Contract, comply with applicable laws, ordinances, rules and regulations, including, but not limited to, the following:

B. Federal

1. Americans With Disabilities Act
2. 29 CFR, Section 1910.1001, Asbestos
3. 40 CFR, Subpart M, National Emission Standards for Asbestos
4. Executive Order 11246

C. State of California

1. California Code of Regulations, Titles 5, 8, 19, 21, 24
2. California Education Code
3. California Public Contract Code
4. California Health and Safety Code
5. California Government Code
6. California Labor Code
7. California Civil Code
8. California Code of Civil Procedure
9. CPUC General Order 95, Rules for Overhead Electric Line Construction
10. CPUC General Order 128, Rules for Construction of Underground Electric Supply and Communications Systems

D. State of California Agencies

Bay Area Air Quality Management District (BAAQMD / www.baaqmd.gov)

State and Consumer Services Agency

Department of General Services

Division of the State Architect Office of the State Fire Marshall Office of Public School Construction

E. Local Agencies:

City of Hayward, California (www.ci.hayward.ca.us)

1.06 COMPLIANCE WITH AMERICANS WITH DISABILITIES ACT

A. Contractor acknowledges that, pursuant to the Americans with Disabilities Act (ADA), programs, services and other activities provided by a public entity to the public, whether directly or through a contractor, must be accessible to the disabled public. Contractor shall provide the services specified in this Agreement in a manner that complies with the ADA and any and all other applicable federal, state and local disability rights legislation. Contractor agrees not to discriminate against disabled persons in the provision of services, benefits or activities provided under this Agreement and further agrees that any violation of this prohibition on the part of Contractor, its employees, agents or assigns shall constitute a material breach of this Agreement.

PART 2 – PRODUCTS

Not applicable.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

A. This section includes regulatory requirements applicable to Contract work in connection with hazardous waste abatement and disposal, including, but not limited to, asbestos and asbestos containing materials, lead based paint, polychlorinated biphenyls, petroleum contaminated soils and materials, construction and demolition debris and any other hazardous substance or hazardous waste.

B. This section supplements Section 01 41 00 and the work specific listings of applicable regulatory requirements elsewhere in the specifications.

C. Related Sections.

1. Section 01 41 00: Regulatory Requirements.

1.02 REFERENCES TO REGULATORY REQUIREMENTS

A. Codes, laws, ordinances, rules and regulations applicable to the Work shall have full force and effect as though printed in full in these specifications. Codes, laws, ordinances, rules and regulations are not furnished to Contractor, since Contractor is assumed to be familiar with their requirements. The listing herein of applicable codes, laws and regulations for hazardous waste abatement work is supplied to Contractor as a courtesy and shall not limit Contractor's responsibility for complying with all applicable laws, regulations or ordinances having application to the Work. Where conflict among the requirements or with these specifications exists, the most stringent requirements shall be used.

B. Contractor's work shall conform to all applicable codes, laws, ordinances, rules and regulations that are in effect on date of receipt of bids.

1.03 LAWS, ORDINANCES, RULES AND REGULATIONS

A. During prosecution of Work under Contract, Contractor shall comply with applicable laws, ordinances, rules and regulations, including, but not limited to, those listed below.

B. Federal:

1. Statutory Requirements:

a. Resource Conservation and Recovery Act, 42 U.S.C.. 6901 et seq.

b. Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986,42 U.S. *C"* 9601 et seq.

c. Toxic Substances Control Act of 1976,15 U.S.C.. 2601 et seq.

d. Hazardous Materials Transportation Act of 1975, 49 U.S. *C"* 1801 et seq.

e. Clean Water Act, 33 U.S.C.. 1251 et seq.

f. Safe Drinking Water Act, 42 U.S. C.. 3001 et seq.

g. Clean Air Act, section 112, 42 U.S. C.. 7412

h. Occupational Safety and Health Act of 1970, 29 U.S.C.. 651 et seq.

i. Underground Storage Tank Law, 42 U.S. C.. 6991 et seq.

j. The Emergency Planning and Community Right to Know Act of 1986,42 U.S.C.. 11001 et seq. j.

2. Environmental Protection Agency (EPA):

a. 40 C.F.R. Parts. 260, 264, 265, 268, 270

b. 40 C.F.R. Parts 258 et seq.

c. 40 C.F.R. Part 761

d. 40 C.F.R. Parts 122-124

3. Occupational Safety and Health Administration (OSHA):

a. OSHA Worker Protection Standards, Title 29 CFR Part 1926.58, Construction Standards and 29 CFR 1910.1001 General Industry Standard

b. OSHA, 29 C. F. R. Part 1926.1101, Construction Standards for Asbestos

c. OSHA, Lead Exposure in Construction: Interim Final Rule, 29 C.F.R. 1926.62

d. National Emission Standard for Hazardous Air Pollutants, Title 40 CFR Part 61

e. Asbestos Hazardous Emergency Response Act, Title 40 C.F.R. 763

4. Department of Transportation:

a. Title 49 C.F.R. 173.1090

b. Title 49 C.F.R.172

c. Title 49 C.F.R. 173

d. DOT, HM 181 and MH126f

C. State of California Requirements:

1. Statutory Law:

a. The Carpenter-Presley-Tanner Hazardous Substance Account Act, Cal. Health & Saf. Cod~ 25300 et seq.

b. Health and Safety Cod~ 25359.4

c. Hazardous Waste Control Law, Health & Safety Code. 25100 § seq.

d. Porter Cologne Water Quality Control Act, Cal. Water Cod~ 13000 et seq.

e. Health and Safety Cod~ 25915-25924

f. Cal. Labor Code Chapter 6, including, without limitation,. 6382, 6501.5-6501.9,6503.5, 9021.5, 9080

g. Cal. Bus. and Prof. Code, including without limitation,. 7058.5, 7065.01, 7118.5. Underground Storage of Hazardous Substance Act,

h. Cal. Health & Saf. Cod~ 25280 § seq.

i. Petroleum Underground Storage Tank Cleanup, Health and Safety Cod~ 25299.10 et seq.

j. Safe Drinking Water and Toxic Enforcement Act of 1986, Health & Saf. Cod~ 25249.5 et seq. (Proposition 65)

k. Above Ground Petroleum Storage Act, Health and Safety Code. 25270 et seq.

2. Hazardous Materials Release Response Plans and Inventory, California Health and Safety Code Chapter 6.95.

3. Administrative Code and Regulations:

   a. 22 C.C.R.. 6600 et seq.

   b. Title 22 C.C.R.. Standards for Management of Hazardous and Extremely Hazardous Waste

   c. DTSC Treatment Standard for PCB Wastes, Title 22 C.C.R.,. 66268.110

   d. Cal OSHA Worker Protection Standards, Title 8 C.C.R.. 1529, 5208

   e. Title 8 C. C. R.. 1532.1, Lead in Construction

   f. 22 C.C.R.. 66999(b)

   g. Title 23 C.C.R.. 2610 et seq.

4. Local Agency Requirements:

   a. Bay Area Air Quality Management District, Fugitive Dust Rules

   b. Bay Area Air Quality Management District Regulation 11-2-303

   c. State Water Resource Control Board, General Construction Activity Stormwater Permit Requirements (Order 92-0S DWQ)

5. City Requirements:

   a. Hayward Fire Department (www.haywardcal.us/fire_dept/fd.htm)

   b. Ordinances

1.04 PERMITS

A. Contractor shall comply with, implement or acknowledge effectiveness of all CLPCCD held permits, and initiate and cooperate in securing all required notifications or approvals therefore, including but not limited to permits affecting environmental work and the following:

   1. BAAQMD, Permit to Excavate or Treat Contaminated Soil;

   2. State Water Resources Control Board, General Construction Activity Stormwater Permit

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

A. This section includes reference standards, abbreviations, symbols and definitions used in Contract Documents.

B. Full titles and edition dates are given in this section for standards cited in other sections of Specifications.

C. Material and workmanship specified by reference to number, symbol, or title of specific standard such as state standard, commercial standard, federal specifications, technical society, or trade association standard, or other similar standard shall comply with requirements of standards except when more rigid requirements are specified or required by applicable codes.

D. Standards referred to, except as modified herein, shall have full force and effect as though printed in the Contract Documents. Standards are not furnished to Contractor, since manufacturers and trades involved are assumed to be familiar with their requirements.

1.02 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES; REPORTING AND RESOLVING DISCREPANCIES:

A. Reference to standards, specifications, manuals or codes of any technical society, organization or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code or laws or regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated in the Contract Documents.

B. If during the performance of the Work, Contractor discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual or code or of any instruction of any supplier, Contractor shall report it in writing at once to Inspector, with copies to Construction Manager and Architect, and Contractor shall not proceed with the Work affected thereby until consent to do so is given by the Construction Manager.

C. Except as otherwise specifically stated in the Contract Documents or as may be provided by Change Order, or supplemental instruction, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity or discrepancy between the Contract Documents and:

1. The provisions of any such standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

2. The provisions of any such laws or regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such law or regulation).

No provision of any such standard, specification, manual, code or instruction shall be effective to change the duties and responsibilities of CLPCCD, Contractor, Construction Manager, or Architect/Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents, nor shall it be effective to assign to CLPCCD, Architect/Engineer, Construction Manager, or any of their consultants, agents or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

1.03 STANDARDS

A. ACI (American Concrete Institute)

Standard 318, Building Code Requirements for Reinforced Concrete

B. AISC (American Institute of Steel Construction

Specifications and Code of Standard Practice for Steel Buildings and Bridges

C. ANSI (American National Standards Institute, formerly American Standards Association)

Standard *C2,* NESC (National Electrical Safety Code)

D. ASTM (American Society for Testing and Materials)

1. *C31,* Making and Curing Concrete Test Specimens in the Field
2. *C42,* Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
3. *C143,* Test Method for Slump of Portland Cement Concrete

E. IAPMO (International Association of Plumbing and Mechanical Officials)

F. ICC (International Code Council)

1. Refer to Section 01 41 00 – Regulatory Requirements

G. NEMA (National Electric Manufacturer's Association)

H. NFPA (National Fire Protection Association)

1. Pamphlet 1, Fire Prevention Code
2. Pamphlet 13, Sprinkler Systems, Installation
3. Pamphlet 24, Private Fire Service Mains
4. Pamphlet 70, NEC (National Electric Code)
5. Pamphlet 71, Signaling Systems, Central Station
6. Pamphlet 80, Fire Doors and Windows
7. Pamphlet 101, Life Safety Code

I. UL (Underwriters' Laboratories, Inc.)

1.04 ABBREVIATIONS

A. Following abbreviations may be used in Contract Documents:

AAP	Affirmative Action Program
ACI	American Concrete Institute
ADA	American Disabled Act
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute (formerly American Standards Association)
ASI	Architect's Supplemental Instructions
ASTM	American Society for Testing and Materials
BIL	Basic Insulation Level
Cal/OSHA	California Occupational Safety and Health Administration
CCD	Construction Change Directive
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CO	Change Order
CPUC	California Public Utilities Commission
CPM	Critical Path Method
DSA	Division of State Architect
HVAC	Heating, Ventilating and Air Conditioning

IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
I.D.	Identification
JATC	Joint Apprenticeship Training Committee
JV	Joint Venture
Kw	Kilowatt
LBE	Local Business Enterprise
MBE	Minority Business Enterprise
M/WBE	Minority and Woman-Owned Business Enterprise
ml	milliliter
mm	millimeter
NEC	National Electric Code
NEMA	National Electric Manufacturer's Association National Electrical Safety Code
NFPA	National Fire Protection Association
PM	Preventive Maintenance
PR	Proposal Request
RFI	Request for Information
RFS	Request for Substitution
SFM	State of California, Office of State Fire Marshal
CBC	California Building Code
CFC	California Fire Code
UL	Underwriters' Laboratories, Inc.
CMC	California Mechanical Code
CPC	California Plumbing Code
WOBE	Woman-Owned Business Enterprise
WMBE	Woman/Minority Business Enterprise

B. Additional abbreviations, used only on drawings, are listed thereon.

1.05 SYMBOLS

Symbols, used only on Drawings, are shown thereon.

1.06 DEFINITIONS

A. Wherever any of the words or phrases defined below, or a pronoun used in place thereof, is used in any part of the Contract Documents, it shall have the meaning here set forth:

ADDENDA: Written or graphic instruments issued prior to the opening of Bids, which clarify, correct or change the bidding requirements or the Contract Documents. Addenda shall not include the minutes of the Pre-bid Conference and Site Visit.

ADDITIVE BID: The sum to be added to the Base Bid if the change in scope of work as described in Additive Bid is accepted by CLPCCD.

AGREEMENT: Agreement is the basic contract document that binds the parties to construction Work. Agreement defines relationships and obligations between CLPCCD and Contractor and by reference incorporates Conditions of Contract, Drawings, and Specifications and contains Addenda and all Modifications subsequent to execution of Contract.

ALTERNATE: Work added to or deducted from the Base Bid, if accepted by CLPCCD.

APPROVED EQUAL: Approved in writing by CLPCCD as being of equivalent quality, utility and appearance.

ARCHITECT or ARCHITECT/ENGINEER: The person holding a valid California State Architect's license, whose firm has been designated within the Contract Documents as the

Architect to provide architectural services on the project. Refer to Section 341, Part 1, Title 24, C. C. R.

When the Architect is referred to within the Contract Documents and no Architect has in fact been designated, then the matter shall be referred to CLPCCD. The term Architect shall be construed to include all its consultants retained for the project, as well as employees of the Architect. When the designated Architect is an employee of CLPCCD, his authorized representations on the project within the district will be included under the term Architect.

BID: The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

BIDDER: One who submits a Bid.

CLPCCD: Chabot-Las Positas Community College District. Unless otherwise expressly indicated or required by the context of usage, the terms "District" and "Owner" as used in the Contract Documents shall be deemed references to CLPCCD.

CLPCCD-**FURNISHED**, **CONTRACTOR**-**INSTALLED**: Items furnished by CLPCCD at its cost for installation by Contractor at its cost under this Contract.

CLPCCD REPRESENTATIVE(S): The person or persons assigned by CLPCCD to be CLPCCD's representatives or, if so designated, agent(s) at the site.

BY CLPCCD: Work that will be performed by CLPCCD or its agents at the CLPCCD's expense.

BY OTHERS: Work that is outside scope of Work to be performed by Contractor under this Contract, which will be performed by CLPCCD, other contractors, or other means.

CHANGE ORDER: A written instrument prepared by CLPCCD and signed by CLPCCD and Contractor, stating their agreement upon all of the following:

a. a change in the Work,

b. the amount of the adjustment in the Contract Sum, if any, and

c. the amount of the adjustment in the Contract Time, if any.

As appropriate, change orders are subject to approval by the Division of the State Architect. Refer to section 4-338, Part 1, Title 24, California Code of Regulations.

CONCEALED: Work not exposed to view in the finished Work, including within or behind various construction elements.

CONTRACT CONDITIONS: Conditions of Contract define basic rights, responsibilities and relationships of Contractor and CLPCCD and consists of two parts: General Conditions and Supplementary Conditions.

a. General Conditions are general clauses, which are common to the CLPCCD Contracts.

b. Supplementary conditions modify or supplement General Conditions to meet specific requirements for this Contract.

CONSTRUCTION MANAGER: CLPCCD's authorized representative, who shall represent CLPCCD in all matters relative to this Contract. Construction Manager may authorize agents and representatives to act in carrying out Construction Manager's duties, including a "Project Manager", to act under the authority of the Construction Manager. As CLPCCD's agent, the

Construction Manager is the beneficiary of all contract obligations of Contractor to CLPCCD, including without limitation, all releases and indemnities. Construction Manager shall not have any personal liability arising from this Contract or any activity there under and Contractor releases Construction Manager fully from all loss, cost, damage, expense or liability arising out of or connected with this Project, whether arising from contract, negligence or tort claims of all kinds.

CONTRACT DOCUMENTS: Contract Documents shall consist of the documents identified as the Contract Documents in Contract Agreement, plus all changes, addenda and modifications thereto.

CONTRACT MODIFICATION: Either:

a. a written amendment to Contract signed by Contractor and CLPCCD; or
b. a Change Order; or
c. a written directive for a minor change in the Work issued by CLPCCD.

CONTRACT SUM: The sum stated in the Agreement and, including authorized adjustments, the total amount payable by CLPCCD to Contractor for performance of the Work and the Contract Documents. (Also referred to as the CONTRACT PRICE.)

CONTRACT TIMES: The number or numbers of days or the dates stated in the Agreement (i) to achieve substantial completion of the Work or designated milestones and/or (ii) to complete the Work so that it is ready for final payment and is accepted.

CONTRACTOR: The person or entity identified as such in the Agreement and referred to throughout the Contract Documents as if singular in number and neuter in gender. The term "Contractor" means the Contractor or its authorized representative.

CONTRACTOR'S EMPLOYEES: Persons engaged in execution of Work under Contract as direct employees of Contractor, as subcontractors, or as employees of subcontractors.

DATE OF SUBSTANTIAL COMPLETION: Date of Substantial Completion of Work or designated portion thereof is date certified by Construction Manager when construction is sufficiently complete in accordance with Contract Documents for CLPCCD to occupy Work or designated portion thereof for its use for which it is intended.

DAY: One calendar day, unless the word "day" is specifically modified to the contrary.

DEDUCTIVE BID: The sum to be subtracting to the Base Bid if the change in scope of work as described in Deductive Bid is accepted by CLPCCD.

DEFECTIVE: An adjective which, when modifying the word "Work", refers to Work that is unsatisfactory or unsuited for the use intended, faulty, or deficient, that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents (including but not limited to approval of samples and "or equal" items), or has been damaged prior to final payment (unless responsibility for the protection thereof has been assumed by CLPCCD). Construction Manager is the judge of whether Work is defective.

DRAWINGS: The graphic and pictorial portions of Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

ENGINEER: Where referenced in the Contract Documents, the person holding a valid California State Engineer's license, whose firm has been designated (if any designated) within the Contract

Documents as the Engineer to provide engineering services on the project. Refer to section 4-341, Part 1, Title 24, C.C.R.

EQUAL: Equal in opinion of Architect. Burden of proof of equality is responsibility of Contractor.

EXPOSED: Work exposed to view in the finished Work, including behind louvers, grilles, registers and various other construction elements.

FINAL ACCEPTANCE or FINAL COMPLETION: All Work satisfactorily completed in accordance with Contract Documents. It includes, but is not limited to:

a. All Systems having been tested and accepted as having met requirements of Contract Documents.

b. All required instructions and training sessions having been given by Contractor.

c. All as-built drawings and operations and maintenance manuals and Machine Inventory Sheets having been submitted by Contractor, reviewed by Architect/Engineer and accepted by CLPCCD.

d. All punch list work, as directed by CLPCCD, having been completed by Contractor.

e. Generally all work, except Contractor maintenance after Final Acceptance, having been completed to satisfaction of CLPCCD.

FORCE-ACCOUNT: Work directed to be performed without prior agreement as to lump sum or unit price cost thereof, and which is to be billed at cost for labor, materials, equipment, taxes, and other costs, plus a specified percentage for overhead and profit.

FURNISH: Supply only, do not install.

INDICATED: Shown or noted on the Drawings.

INSPECTOR: The person engaged by CLPCCD to inspect the workmanship, materials, or manner of construction of buildings or portions of buildings, to determine if such construction complies with the Contract Documents and applicable codes. The inspector is subject to approval by the Architect, CLPCCD and, as appropriate, Division of the State Architect, and he will report to CLPCCD. Refer to section 4-333 and section 4-342, Part 1, Title 24, California Code of Regulations. The terms "Inspector" and "Project Inspector" are used interchangeably in the Contract Documents.

INSTALL: Install or apply only, do not furnish.

LATENT: Not apparent by reasonable inspection, including but not limited to, the inspections and research required as a condition to bidding under the General Conditions.

MATERIAL OR MATERIALS: These words shall be construed to embrace machinery, manufactured articles, materials of construction (fabricated or otherwise), and any other classes of material to be furnished in connection with Contract, except where a more limited meaning is indicated by context.

MILESTONE: A principal event specified in Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all Work.

MODIFICATION: Same as Contract Modification.

NOT IN CONTRACT: Work that is outside the scope of work to be performed by Contractor under this Contract.

NOTICE OF AWARD: A written notice given by CLPCCD to lowest responsive, responsible bidder advising that Bidder's bid and other qualifying information is acceptable to CLPCCD, requiring Bidder to fulfill the requirements of Article 1.03 of Document 00600 General Conditions.

NOTICE TO PROCEED: A written notice given by CLPCCD to Contractor fixing the date on which the Contract Time will commence to run and on which contractor shall start to perform Contractor's obligations under the Contract Documents.

OFF SITE: Outside geographical location of the Project.

OWNER: Chabot Las Positas Community College District (CLPCCD).

PROGRESS REPORT: a periodic report submitted by Contractor to CLPCCD with progress payment invoices accompanying actual work accomplished to the Project Schedule. See Section 01310 Progress Schedules and Reports, Document 00600 General Conditions.

PROJECT: Total construction of which Work performed under this Contract may be whole or part.

PROJECT MANUAL: Project Manual consists of Bidding Requirements, Agreement, Bonds, Certificates, Contract Conditions, and Specifications. The Project Manual is deemed to include and incorporate all matters noted in any Addenda issued by or on behalf of the District during the bidding for the Work.

PROJECT STABILIZATION AGREEMENT: The Contractor or Subcontractor (CONTRACTOR) on this project accepts and agrees to be bound by the terms and conditions of the “Chabot-Las Positas Project Stabilization Agreement”, together with any and all amendments and supplements now existing or which are later made by executing the Letter of Assent.

PROVIDE: Furnish and install.

REQUEST FOR INFORMATION (RFI): A document prepared by Contractor, CLPCCD or Architect/Engineer requesting information from one of the parties regarding the Project or Contract Documents. The RFI system is also a means for CLPCCD and Architect to submit Contract Document clarifications or supplements to Contractor.

RFI-REPLY: A document consisting of supplementary details, instructions or information issued by the Architect/Engineer, which clarifies or supplements Contract Documents and with which Contractor shall comply. RFI-Replies do not constitute changes in Contract Sum or Contract Times except as otherwise agreed in writing by CLPCCD. RFI-Replies will be issued through the RFI administrative system.

SAMPLES: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

SHOP DRAWINGS: All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the work.

SHOWN: As indicated on Drawings.

SITE: The particular geographical location of Work performed pursuant to Contract, including staging areas, work areas, storage and lay down areas, access and parking.

SPECIFICATIONS: The written portion of the Contract Documents consisting of requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services; and are contained in Divisions 1 through 32.

SPECIFIED: As written in Specifications.

SUBCONTRACTOR: A person or entity who has a direct contract with Contractor to perform a portion of the Work at the site. The term "subcontractor" is referred to throughout the Contract Documents as if singular in number and neuter in gender and means a subcontractor or an authorized representative of the subcontractor. The term "subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

SUBSTANTIAL COMPLETION: The Work (or a specified part thereof) has progressed to the point where, in the opinion of the Construction Manager and the Architect/Engineer as evidenced by a Certificate of Substantial Completion, it is sufficiently complete, in accordance with Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work is complete and ready for final payment is evidenced by written recommendation of the Construction Manager and the Architect/Engineer for final payment. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

SUPPLEMENTAL INSTRUCTION: A written work change directive to Contractor from Architect/Engineer, approved by Construction Manager, ordering alterations or modifications which do not result in change in Contract Sum or Contract Times, and do not substantially change Drawings or Specifications.

UNDERGROUND FACILITIES: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: Electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

VERIFIED REPORT: A periodic verified report submitted to DSA. Refer to sections 4-336, 4-337 and 4-343, Part 1, Title 24, California Code of Regulations.

WORK: The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all is required by the Contract Documents. Wherever the word "work" is used, rather than the word "Work", it shall be understood to have its ordinary and customary meaning.

A. Wherever words "as directed", "as required", "as permitted", or words of like effect are used, it shall be understood that direction, requirements, or permission of CLPCCD or Construction Manager is intended. Words "sufficient", "necessary", "proper", and the like shall mean sufficient, necessary or proper in judgment of CLPCCD or Construction Manager. Words "approved", "acceptable", "satisfactory", "favorably reviewed" or words of like import, shall mean approved by, or acceptable to, or satisfactory to, or favorably reviewed by CLPCCD or Construction Manager.

B. Wherever the word "may" is used, the action to which it refers is discretionary. Wherever the word "shall" is used, the action to which it refers is mandatory.

PART 2 – PRODUCTS

Not applicable.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Quality assurance and control of installation.

B. References.

C. Mock-Up.

D. Inspection and testing laboratory services.

E. Manufacturer's field services.

1.02 RELATED SECTIONS

A. Submission of manufacturers' instructions and

B. Sections requiring Laboratory Testing:

1. Section 01 33 00 - Submittals: certificates
2. Section 31 00 00 - Earthwork
3. Section 32 12 16 - Asphalt Concrete Paving
4. Section 32 13 13 - Portland Cement Concrete Paving Section xx xx - Concrete Reinforcement
5. Section 03 30 00 - Cast-in-Place Concrete
6. Section 04 22 00 - Concrete Unit Masonry
7. Section 05 12 00 - Structural Steel
8. Section 05 50 10 - Metal Fabrications

1.03 QUALITY ASSURANCE AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including each step in sequence.

C. If manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.04 REFERENCES

A. Conform to reference standard by date of issue current on date specified in product sections.

B. Should specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 MOCK-UP

A. Mock-up and sample panels will be performed under various sections and identified as sample panels or mock-ups.

B. Assemble and erect specified items with specified attachments, anchorage, flashing, seals and finishes.

C. Where mock-up has been accepted by Architect/Engineer and is specified in product specification section to be removed, remove mock-up and clear area as directed.

D. Whereas, mock-up submittals will be submitted until the acceptance by Architect/Engineer and Construction Manager.

1.06 INSPECTION AND TESTING LABORATORY SERVICES

A. CLPCCD will appoint, employ and pay for services of an independent firm to perform inspection and testing.

B. The independent firm will perform inspections, tests, and other services specified in individual specification sections and as required by the Architect/Engineer. Promptly notify Construction Manager, Architect/Engineer, DSA, Project Inspector, and Contractor of observed irregularities or deficiencies of work or products.

C. Reports will be submitted by the independent firm, one copy each, to the Construction Manager, Architect, Engineer, Division of the State Architect, Contractor and Project Inspector. Indicate observations and results of tests and indicate compliance or non-compliance with Contract Documents and Title 24, C.C.R. specifically, each report will include the following:

1. Date issued; date and time of sampling or inspection; date of test.
2. Project title and number; testing laboratory name, address and telephone number; name and signature of laboratory inspector.
3. Location of sampling or test; temperature and weather condition.
4. Type of inspection or test; identification of product and specification section; results of test and compliance with Contract Documents and Title 24, C.C.R.
5. Perform additional tests as required by Architect/Engineer and/or Project Inspector; interpret test results, when requested by Architect/Engineer.
6. Special Inspections: as shown on attached Tests & Inspections (T&I) list for each section.

D. Contractor shall cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.

1. Notify Architect/Engineer 72 hours in advance and/or independent firm 24 hours prior to expected time for operations requiring services.
2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
3. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the work of the contract.

E. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer and/or Project Inspector. Payment for retesting will be paid by the Contractor by deducting inspection or testing charges from the Contract Sum on the next scheduled payment.

1.07 MANUFACTURER'S FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Construction Manager thirty (30) calendar days in advance of required observations. Observer shall be subject to approval of Construction Manager and Architect/Engineer.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Refer to Section 01 33 00 - Submittals: Manufacturers' Instructions.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

Not applicable to this section.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

This section describes the temporary facilities required for the Project site. The Project site shall be maintained by Contractor as set forth in this section.

1.02 TEMPORARY FACILITIES

A Contractor shall obtain permits for, install and maintain in safe condition, whatever scaffolds, hoisting equipment, barricades, walkways, or other temporary structures, which may be required to accomplish the work on the Project. Contractor shall enclose and secure Project Site, including lay down area with a temporary chain link fence. Such structures shall be adequate for the intended use and capable of safely accepting all loads that may be imposed upon them. They shall be installed and maintained in accordance with all applicable State and local codes and regulations.

B. Contractor shall provide and maintain temporary heat from an approved source whenever in the course of the Work it may become necessary for curing and drying of materials or to warm spaces as may be required for the installation of materials or finishes.

C. Contractor shall provide and maintain any and all facilities that may be required for dewatering in order that work may proceed on the Project. If it is necessary for dewatering to occur continually, Contractor shall have on hand whatever spare parts or equipment that may be required to prevent interruption of dewatering.

D. Contractor shall provide and maintain all utility services necessary to perform the work under this Contract. These may include, but are not limited to, temporary electricity, water, gas, sewer and telephone, including charges and installation fees. Contractor shall furnish and maintain all means of distribution of utility services required within the site to properly complete the Project.

E. Materials, tools, accessories, etc., shall be stored only where directed by CLPCCD. Storage area shall be kept neat and clean. Security of stored items shall be Contractor's responsibility.

F. When flammable materials are stored on site, extra precautions, including clear identification, shall be the responsibility of Contractor.

G. Contractor shall provide and maintain temporary toilets in quantities and locations as required by CAL/OSHA and other local codes and regulations. They shall be maintained and supplied in a usable and sanitary condition at all times.

H. If water at construction site is determined to be non-potable by Inspector, Contractor shall provide and maintain adequate potable water stations at site until final completion of the Project.

I. Contractor shall maintain an office at the Project site, which will be his headquarters for the Project. Any communications delivered to this office shall be considered as delivered to Contractor. Location and size of office shall be such that it will adequately serve the needs of Contractor's superintendent and assistants in the performance of their duties.

J. Contractor shall also provide and maintain the following temporary facilities for the duration of the project. Contractor shall obtain approval of the plans and specifications for all the following temporary facilities from Construction Manager prior to delivery to job site. Construction Manager shall have the option to reject said facilities if they do not meet Construction Manager's needs.

K. Contractor shall promptly remove all such Temporary Facilities when they are no longer needed for the work or for completion of the Project, mutually agreed upon by Contractor and CLPCCD.

L. Contractor shall provide and maintain in the Temporary Facilities a copy of the California Code of Regulations Title 24 (latest edition) Parts I & II.

1.03 SIGNS

No signs may be displayed on or about CLPCCD's property (except those required by law) without CLPCCD's specific approval; the size, content, and location to be as specified by CLPCCD.

1.04 USE OF ROADWAYS AND WALKWAYS

Contractor shall never block or interfere with use of any existing roadway, walkway or other facility for vehicular or pedestrian traffic, from any party entitled to use it. Wherever and whenever such interference becomes necessary for the proper and convenient performance of the Work, and no satisfactory detour route exists, Contractor shall, before beginning the interference, provide a satisfactory detour, including temporary bridge if necessary, or other proper facility for traffic to pass around or over the interference. Contractor shall maintain the detour in a safe and satisfactory condition as long as the interference continues, all without extra payment unless otherwise expressly stipulated in the Specifications.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Products

B. Transportation and handling.

C. Storage and protection.

1.02 RELATED SECTIONS

A. Section 01 11 00 - Summary of Work.

B. Section 01 45 00 - Quality Control: Product Quality Monitoring.

1.03 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work.

B. Provide interchangeable components of the same manufacturer, for similar components.

1.04 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions and construction schedules. Coordinate to avoid conflict with work and conditions at the site.

B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.05 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

B. For exterior storage of fabricated products, place on sloped supports, above ground, to prevent soiling and staining.

C. Provide off-site storage and protection when site does not permit on-site storage or protection.

D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.
H. Provide substantial covering and protection after installation of products from damage due to traffic and subsequent construction operations. Remove when no longer needed.

PART 2–PRODUCTS

Not applicable to this section.

PART 3–EXECUTION

Not applicable to this section.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

A. Procedures are described for selecting products and requesting substitutions of unlisted materials in lieu of materials named in the specifications or approved for use in addenda.

B. Related Sections

1. Section 01 26 00: Contract Modification Procedures
2. Section 01 33 00: Submittals

1.02 CONTRACTOR'S OPTIONS

A. For products specified only by reference standard: Select any product meeting that standard.

B. For products specified by naming one or more products or manufacturers:

1. Select products of any named manufacturer meeting specifications.
2. For any product or manufacturer, which is not specifically named, submit Request for Substitution (RFS).

C. For products indicated or specified by naming only one product and manufacturer, followed by the words “no substitution allowed”, there is no option.

1.03 SUBSTITUTIONS

A. No substitutions shall be allowed for District standard systems, products, and/or materials unless approved in writing from the Architect’s office five (5) days prior to bid. The entire District Standard systems, products, and/or materials can be found on the District’s website at:

http://www.clpccd.org/facilities/DistrictStandardsandGuidelines-ChabotCollege.php

B. Within a period of thirty-five (35) days after Award of Contract, Construction Manager and Architect/Engineer will consider RFS from Contractor. After that period, requests will be considered only when product becomes unavailable due to no fault of Contractor. Requests for review of proposed substitute items will not be accepted from anyone other than Contractor. The RFS will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of substantial completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with CLPCCD for work on the Project).

C. Submit separate RFS for each product and support each request with:

1. Product identification
2. Manufacturer's literature
3. Samples, as applicable

4. Name and address of similar projects on which product has been used, and date of installation
5. Name, address and telephone number of manufacturer's representative or sales engineer
6. Where DSA approval is required, product shall be reviewed and approved by DSA

D. Itemize a comparison of the proposed substitution with product specified and list significant variations. If variation from product specified is not pointed out in submittal, variation will be rejected even though submittal was favorably reviewed.

E. State whether the substitute will require a change in any of the Contract documents (or provisions of any other direct contract with CLPCCD for work on the Project) to adapt the design of the proposed substitute, and whether or not incorporation or use of the substitute in connection with Work is subject to payment of any license fee or royalty. Submit data relating to changes in construction schedule.

F. All variations of the proposed substitute from that specified will be identified in the RFS and available maintenance, repair and replacement service will be indicated.

G. Include accurate cost data comparing proposed substitution with product and amount of net change in Contract price, including but not limited to, an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors effected by the resulting change, all of which will be considered by Construction Manager and Architect/Engineer in evaluating the proposed substitute. Construction Manager and Architect/Engineer may require Contractor to furnish additional data about the proposed substitute.

H. Substitutions will not be considered for acceptance when:

1. They will result in delay meeting construction milestones or completion dates.
2. They are indicated or implied on submittals without formal request from Contractor.
3. They are requested directly by subcontractor or supplier.
4. Acceptance will require substantial revision of Contract Documents.
5. They disrupt Contractor's job rhythm or ability to perform efficiently.

I. Substitute products shall not be ordered without written acceptance of Construction Manager and Architect/Engineer.

J. Construction Manager and Architect/Engineer will determine acceptability of proposed substitutions and reserve right to reject proposals due to insufficient information.

K. Accepted substitutions will be evidenced by a change order or Supplemental Instruction. All Contract requirements apply to Work involving substitutions.

1.04 CONTRACTOR'S REPRESENTATION AND WARRANTY

A. Requests constitute a representation and warranty that Contractor:

1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product
2. Will provide the same warranty for substitution as for specified product
3. Will coordinate installation and make other changes, which may be required for Work to be complete in all respects
4. Waives claims for additional costs, which may subsequently become apparent
5. Will compensate CLPCCD for additional redesign costs associated with substitution, if required
6. Will be responsible for Construction Schedule slippage due to substitution
7. Will be responsible for Construction Schedule delay due to late ordering of available specified products caused by requests for substitution, which is subsequently rejected by Construction Manager
8. Will compensate CLPCCD for all costs; including extra costs of Contract, extra cost to other contractors, and any claims brought against CLPCCD, caused by late requests for substitutions or late ordering of products.

1.05 CONSTRUCTION MANAGER'S AND ARCHITECT/ENGINEER'S DUTIES

A. Review Contractor's RFS within seven (7) working days.

B. Notify Contractor in writing of decision to accept or reject requested substitution within seven (7) working days.

1.06 COST OF REVIEW

A. Construction Manager and Engineer will record time required in evaluating substitutes proposed or submitted by Contractor. Whether or not Construction Manager or Architect/Engineer accepts the substitute item so proposed or submitted by Contractor, Contractor shall reimburse CLPCCD for the charges of Architect/Engineer and Construction Manager for evaluating each such proposed substitute item.

B. The CLPCCD reserves the right to waive the requirement of paragraph A above.

PART 2–PRODUCTS

Not used.

PART 3–EXECUTION

Not used.

.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

This section describes contract closeout procedures including:

1. Removal of temporary construction facilities
2. Substantial completion
3. Final completion
4. Final cleaning
5. Project record documents
6. Material, equipment and finish data
7. Project guarantee
8. Warranties
9. Turn-in
10. Release of claims
11. Guaranty and Maintenance Bonds

1.02 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion Inspection.

B. Clean and repair damage caused by installation or use of temporary facilities.

C. Restore permanent facilities used during construction to specified condition.

1.03 SUBSTANTIAL COMPLETION

A. When Contractor considers Work or designated portion thereof as substantially complete, submit written notice, with list of items to be completed or corrected to Construction Manager.

B. Within reasonable time, Construction Manager and Architect/Engineer will inspect to determine status of completion.

C. Should Construction Manager or Architect/Engineer determine that Work is not substantially complete; Construction Manager will promptly notify Contractor in writing, listing all defects and omissions.

D. Remedy deficiencies and send a second written notice of substantial completion. Architect/Engineer will reinspect the Work. If deficiencies previously noted are not corrected on reinspection, then Contractor shall pay the cost of the reinspection.

E. When Architect/Engineer determines that Work is substantially complete, Construction Manager will issue a Certificate of Substantial Completion.

F. Manufactured units, equipment and systems, which require startup, must have been started up and run for periods prescribed by Construction Manager, Architect/Engineer, or Owner before a Certificate of Substantial Completion will be issued.

1.04 FINAL COMPLETION

A. When Contractor considers Work is complete, submit written certification that:

1. Contractor has inspected Work for compliance with Contract Documents.

2. Work, except for Contractor maintenance after Final Acceptance, has been completed in accordance with Contract Documents and deficiencies listed with Certificate of Substantial Completion have been corrected.

3. Work is complete and ready for final inspection.
4. Contractor has achieved all requirements for Final Acceptance as that term is defined in Section 01 41 00 – Regulatory Requirements.

B. In addition to submittals required by conditions of Contract, provide submittals required by governing authorities and submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

C. When Architect/Engineer finds Work is acceptable and final submittal is complete, Construction Manager will issue final change order reflecting approved adjustments to Contract Sum not previously made by Change Order.

1.05 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

1. Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment operated during construction, clean ducts, blowers and coils of units operated without filters during construction.
2. Employ skilled workers for final cleaning.

C. Clean Site; mechanically sweep-paved areas.

D. Remove waste and surplus materials, rubbish, and construction facilities from Site.

1.06 PROJECT RECORD DOCUMENTS

A. General

1. Project Record Documents required include:
    a. Marked-up copies of Contract Drawings
    b. Marked-up copies of Shop Drawings
    c. Newly prepared Drawings
    d. Marked-up copies of Specifications, Addenda and Change Orders
    e. Marked-up Project Data submittals
    f. Record Samples
    g. Field records for variable and concealed conditions
    h. Record information on Work that is recorded only schematically
    i. Comments to all required DSA documentation
    j. All approved change orders
2. Specific Project Record Documents requirements that expand requirements of this Section are included in the individual Sections of Divisions 2 through 33.
3. Maintenance of Documents and Samples:
    a. Store Project Record Documents and samples in the field office apart from Contract Documents used for construction.
    b. Do not permit Project Record Documents to be used for construction purposes.
    c. Maintain Project Record Documents in good order, and in a clean, dry, legible condition.
    d. Make documents and samples available at all times for inspection by Architect/Engineer.

4. CLPCCD will provide one set of sepias and one blueline set of the construction drawings and one-project manuals for the Contractor's use and copying during construction.

B. Project Record Drawings

1. Mark-up Procedure: During the construction period, maintain a set of blueline or blackline prints of Contract Drawings and Shop Drawings for Project Record Document purposes.

2. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements, which would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to:

   a. Dimensional changes to the building

   b. Drawings Revisions to details shown on the Contract Drawings

   c. Drawings Depths of foundations below the first floor

   d. Locations and depths of underground utilities

   e. Revisions to routing of piping and conduits

   f. Revisions to electrical circuitry

   g. Actual equipment locations

   h. Duct size and routing

   i. Locations of concealed internal utilities

   j. Changes made by Change Order

   k. Details not on original Contract Drawings

3. Mark completely and accurately Project Record Drawing prints of Contract Drawings or Shop Drawings, whichever is the most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.

4. Mark Project Record Drawing sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.

5. Mark important additional information, which was either shown schematically or omitted from original Drawings.

6. Note construction change directive numbers; alternate numbers; Change Order numbers and similar identification.

7. Responsibility for Mark-up: Where feasible, the individual or entity who obtained Project Record Drawing data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on Project Record Drawings.

   a. Accurately record information in an understandable and legible drawing technique.

   b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.

8. At time of Substantial Completion, submit Project Record Drawings to Construction Manager for CLPCCD's records. Organize into sets, bind and label sets for CLPCCD's continued use.

9. All record documents shall be submitted in an electronic format and hard copy.

C. Preparation of Documents: Immediately prior to inspection for Certification of Substantial Completion, review completed marked-up Project Record Drawings with the Architect/Engineer. When authorized, prepare a full set of correct Contract Drawings and Shop Drawings.

1. Incorporate changes and additional information previously marked on print sets. Erase, redraw, and add details and notations where applicable. Identify and date each Drawing; include the printed designation "PROJECT RECORD DRAWINGS" in a prominent location on each Drawing.

2. Refer instances of uncertainty to the Architect/Engineer for resolution.

3. Review of Documents: Before copying and distributing, submit corrected drawings and the original marked-up prints to the Architect/Engineer for review. When acceptable, the Architect/Engineer will initial and date each document, indicating acceptance of general scope of changes and additional information recorded, and of the quality of drafting.

    a. Documents and the original marked-up prints will be returned to the Contractor for organizing into sets, printing, binding, and final submittal.

D. Copies and Distribution: After completing the preparation of Project Record Drawings, print three (3) blue-line or black-line prints of each Drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable paper cover sheets, with appropriate identification, including titles, dates and other information on cover sheets.

1. Organize and bind original marked-up set of prints that were maintained during the construction period in the same manner.

2. Organize Project Record Drawings into sets matching the print sets. Place these sets in durable tube-type drawing containers with end caps. Mark the end cap of each container with suitable identification.

3. Submit the marked-up Project Record Drawings set and three (3) copy sets to the Construction Manager for CLPCCD's records; the Architect/Engineer will retain one copy set.

E. PROJECT RECORD SPECIFICATIONS

During the construction period, maintain one copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.

1. Mark the Project Record Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and Modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to substitutions, selection of product options, and information on concealed installation that would be difficult to identify or measure and record later.

    a. In each Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.

    b. Record the name of the manufacturer, supplier and installer, and other information necessary to provide a record of selections made and to document coordination with Project Record Product Data submittals and maintenance manuals.

    c. Note related Project Record Product Data, where applicable, for each principal product specified, indicate whether Project Record Product Data has been submitted in maintenance manual instead of submitted as Project Record Product Data.

2. Upon completion of mark-up, submit Project Record Specifications to the Construction Manager for CLPCCD's records.

F. PROJECT RECORD PRODUCT DATA. During the construction period, maintain one copy of each Project Record Product Data submittal for Project Record Document purposes.

1. Mark Project Record Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Project Record Product Data submitted. Include significant changes in the product delivered to the site, and changes in manufacturer's instructions and recommendations for installation.

2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

3. Note related Change Orders and mark-up of Project Record Drawings, where applicable.

4. Upon completion of mark-up, submit a complete set of Project Record Product Data to the Construction Manager for CLPCCD's records.

5. Where Project Record Product Data is required as part of maintenance manuals, submit marked-up Project Record Product Data as an insert in the manual, instead of submittal as Project Record Product Data.
6. Each prime Contractor is responsible for mark-up and submittal of record Project Record Product Data for its own Work.

G. MATERIAL, EQUIPMENT AND FINISH DATA.

1. Provide data for primary materials, equipment and finishes as required under each specification section.
2. Submit two (2) sets prior to final inspection, bound in 8-1/2 inches by 11 inches three-ring binders with durable plastic covers; provide typewritten table of contents for each volume.
3. Arrange by Specification division and give names, addresses, and telephone numbers of subcontractors and suppliers. List:
   a. Trade names
   b. Model or type numbers
   c. Assembly diagrams
   d. Operating instructions
   e. Cleaning instructions
   f. Maintenance instructions
   g. Recommended spare parts
   h. Product data

H. FINAL AS-BUILT DRAWINGS, SPECIFICATIONS.

1. As-Built Drawings and Specifications are the official record drawing that documents what was constructed
2. These drawings shall be available to the Architect and shall be provided to the District upon completion of the of the work.
3. Requirements:
   a. One hard copy set of full size (24x36) or (36x48) As-Built Plans, with DSA App #, and “AS BUILT” stamped on each sheet in red.
   b. One hard copy set of half size As-Built Plans, with DSA App #, and “AS BUILT” stamped on each sheet in red.
   c. One hard copy set of specifications with “AS BUILT” stamped on the cover page in red.
   d. A CD/DVD in PDF and CAD formats (CAD format to be compatible with AutoCAD 2016) with the following naming convention for the CD/DVD cover:
      i. College Name
      ii. Project Name
      iii. DSA Application #
      iv. Do not check the “read only” option
      v. Do not password protect any files

1.08 MISCELLANEOUS PROJECT RECORD SUBMITTALS

Refer to other Specification Sections for miscellaneous record keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records

and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Construction Manager for CLPCCD's records.

Categories of requirements resulting in miscellaneous records include, but are not limited to the following:

a. Field records on excavations and foundations

b. Field records on underground construction and similar work

c. Survey showing locations and elevations of underground lines

d. Invert elevations of drainage piping

e. Surveys establishing building lines and levels

f. Authorized measurements utilizing unit prices or allowances

g. Records of plant treatment

h. Ambient and substrate condition tests

i. Certifications received in lieu of labels on bulk products

j. Batch mixing and bulk delivery records

k. Testing and qualification of tradespersons

l. Documented qualification of installation firms

m. load and performance testing

n. Inspections and certifications by governing authorities leakage and water-penetration tests

o. Fire resistance and flame spread test results

p. Final inspection and correction procedures

1.09 PROJECT GUARANTEE

A. Neither recordation of final acceptance nor final certificate for neither payment nor provision of the Contract nor partial or entire use or occupancy of the Site by CLPCCD shall constitute acceptance of Work not done in accordance with Contract Documents nor relieve Contractor of liability in respect to express warranties or responsibility for faulty materials or workmanship.

B. Requirements for Contractor's guarantee of completed Work are included in General Conditions, Article 1.09. Contractor shall guarantee Work done under Contract against failures, leaks or breaks or other unsatisfactory conditions due to defective equipment, materials or workmanship, and perform repair work or replacement required, at Contractor's sole expense, for period of 2 years from date of Final Acceptance, as required by paragraph 13.2 of General Conditions.

C. CLPCCD may make repairs to defective Work as set forth in paragraph 12.6 of General Conditions, if, within 5 working days after mailing of written notice of defective work to Contractor or authorized agent, Contractor shall neglect to make or undertake with due diligence repairs; provided, however, that in case of leak or emergency where, in opinion of CLPCCD, delay would cause hazard to health or serious loss or damage, repairs may be made without notice being sent to Contractor, and Contractor shall pay cost thereof.

D. If, after installation, operation or use of materials or equipment to be furnished under Contract proves to be unsatisfactory to Construction Manager, CLPCCD shall have right to operate and use materials or equipment until it can, without damage to CLPCCD, be taken out of service for correction or replacement. Period of use of defective materials or equipment pending correction or replacement shall in no way decrease guarantee period required for acceptable corrected or replaced items of materials or equipment.

E. Nothing in this Section shall be construed to limit, relieve or release Contractor's, subcontractors' and equipment suppliers' liability to CLPCCD for damages sustained as result of latent defects in equipment caused by negligence of suppliers' agents, employees or subcontractors. Stated in another manner, warranty contained in the Contract Documents shall not amount to, nor shall it be deemed to be, waiver by

CLPCCD of any rights or remedies (or time limits in which to enforce such rights or remedies) it may have for defective workmanship or defective materials under laws of this State pertaining to acts of negligence.

1.10 WARRANTIES AND BONDS

A. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers, and manufacturers.

1. Provide table of contents and assemble in 8-1/2 inches by 11 inches three-ring binder with durable plastic cover.
2. Assemble in Specification Section order.
3. Provide an electronic copy of all warranties on thumb drive in PDF format

B. Submit material prior to final application for payment.

1. For equipment put into use with CLPCCD's permission during construction, submit within ten (10) working days after first operation.
2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten (10) working days after acceptance, listing date of acceptance as start of warranty period.

C. Warranties are intended to protect CLPCCD against failure of work and against deficient, defective and faulty materials and workmanship, regardless of sources.

D. Limitations: Warranties are not intended to cover failures, which result from the following:

1. Unusual or abnormal phenomena of the elements
2. Vandalism after substantial completion
3. Insurrection or acts of aggression including war

E. Related Damages and Losses: Remove and replace Work which is damaged as result of defective Work, or which must be removed and replaced to provide access for correction of warranted Work.

F. Warranty Reinstatement: After correction of warranted Work, reinstate warranty for corrected Work to date of original warranty expiration or to a date not less than 365 days after corrected Work was done, whichever is later.

G. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.

H. Warranty Forms: Submit drafts to Construction Manager for approval prior to execution. Forms shall not detract from or confuse requirements or interpretations of Contract Documents.

1. Warranty shall be countersigned by manufacturers.
2. Where specified, warranty shall be countersigned by subcontractors and installers.

I. Rejection of Warranties: CLPCCD reserves right to reject unsolicited and coincidental product warranties, which detract from or confuse requirements or interpretations of Contract Documents.

J. Term of Warranties: For materials, equipment, systems and workmanship warranty period shall be two (2) years minimum from date of substantial completion of entire Work except where:

1. Detailed specifications for certain materials, equipment or systems require longer warranty periods.
2. Materials, equipment or systems are put into beneficial use of CLPCCD prior to Substantial Completion as agreed to in writing by Construction Manager.

K. Warranty of Title: No material, supplies, or equipment for Work under Contract shall be purchased subject to any chattel mortgage, security agreement, or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all work to deliver the Site, together with improvements and appurtenances constructed or placed thereon by

Contractor, to CLPCCD free from any claim, liens, security interest, or charges, and further agrees that neither Contractor nor any person, firm, or corporation furnishing any materials or labor for any Work covered by Contract shall have right to lien upon the Site or improvement or appurtenances thereon. Nothing contained in this Paragraph, however, shall defeat or impair right of persons furnishing materials or labor under bond given by Contractor for their protection or any rights under law permitting persons to look to funds due Contractor in hands of CLPCCD.

1.11 TURN-IN

Contract will not be closed out and final payment will not be made until all personnel Identification Media, vehicle permits and keys issued to Contractor during prosecution of Work are turned in to CLPCCD.

1.12 RELEASE OF CLAIMS

Contract will not be closed out and final payment will not be made until Contract Agreement and Release of Any and All Claims, is completed and executed by Contractor and CLPCCD.

1.13 FIRE INSPECTION COORDINATION

Contractor shall coordinate fire inspection and secure sufficient notice to CLPCCD to permit convenient scheduling.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

Not applicable to this section.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION

A. Work Included: This Section establishes general requirements pertaining to cutting, fitting, and patching of the work required to:

1. Make the several parts fit properly.
2. Uncover work to provide for installation, inspection, or both of ill-timed work.
3. Remove and replace work not conforming to requirements of the Contract Documents.
4. Remove and replace defective work.

1.3 QUALITY ASSURANCE

A. Perform all cutting and patching in accordance with pertinent requirements of the specifications and in the event no such requirements are determined, in conformance with the Architect's written direction. In the absence of either of the previous, the work shall be completed as a minimum to industry standards for the given scope and project.

B. In all cases, exercise extreme care in cutting operations and perform such operations under adequate supervision by competent mechanics skilled in the applicable trade. Openings shall be neatly cut and shall be kept as small as possible to avoid unnecessary damage. Careless and/or avoidable cutting damage, etc., will not be tolerated, and the Contractor will be held responsible for such avoidable or willful damage.

C. All replacing, patching, and repairing of materials and surfaces cut or damaged in the execution of the work shall be performed by experienced mechanics of the several trades involved. Such replacing, repairing, and/or patching shall be done with the applicable materials, in such a manner that all surfaces so replaced, etc., will upon completion of the work, match the surrounding similar surfaces.

1.4 SUBMITTALS

A. Request for the Architect's Consent:

1. Prior to cutting which affects structural safety, submit a written request to the Architect 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, notify the Architect and secure his written permission prior to proceeding.

B. Notices to the Architect:

1. Submit written notice to the Architect and Construction Manager designating the time the work will be uncovered, therefore providing a time for the Architect's observation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. For replacement of work removed, use materials which comply with the pertinent Section of these specifications. If materials are not covered within these documents, products and methods shall be provided and installed to match existing conditions.

2.2 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements, which affects:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   4. Visual qualities of sight-exposed elements.

C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed work.
   3. Remove and replace defective and non-conforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute work by methods, which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.

E. Cut rigid materials using masonry saw or core drill.

F. Restore Work with new products in accordance with requirements of Contract Document.

G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

J. Identify any hazardous substance or condition exposed during the Work to the Architect for decision or remedy.

PART 3 - EXECUTION

3.1 CONDITIONS

A. Inspect existing conditions, including elements subject to movement or damage during cutting and patching.

B. After uncovering the work, inspect conditions affecting installation of new work.

3.2 DISCREPANCIES

A. If uncovered conditions are not as anticipated, immediately notify the Architect through the Construction Manager and secure needed directions.

B. Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved.

3.3 PREPARATION PRIOR TO CUTTING

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

3.4 PERFORMANCE

A. Perform cutting and demolition by methods which will prevent damage to other portions of the work and will provide a proper surface to receive new installation or repair and new work. Perform fitting and adjustment of products to provide finished installation complying with the specified tolerance and finishes.

- END OF SECTION -

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Administrative and procedural requirements for Project Record Documents.
B. Project Record Documents required include:
   1. Marked-up copies of Drawings
   2. Marked-up copies of Shop Drawings
   3. Newly prepared Drawings
   4. Marked-up copies of Specifications, Addenda, Change Orders and CCDs
   5. Marked-up Product Data submittals
   6. Record Samples
   7. Field records for variable and concealed conditions
   8. Record information on Work that is recorded only schematically
   9. Maintenance forms for major equipment
C. Specific Project Record Documents requirements that expand requirements of this Section are included in the individual Sections of Divisions 2 through 33.
D. General Project closeout requirements are included in Section 01 70 00 (Contract Closeout).
E. Maintenance of Documents and Samples:
   1. Store Project Record Documents and Samples in the field office apart from Contract Documents used for construction.
   2. Do not permit Project Record Documents to be used for construction purposes.
   3. Maintain Project Record Documents in good order and in a clean, dry, legible condition.
   4. Make Documents and Samples available at all times for inspection by District.
F. District will provide one full size blueline set of the Drawings and one Project Manual for Contractor's use for recording as-built conditions.

1.02 PROJECT RECORD DRAWINGS

A. Mark-up Procedure: During the construction period, maintain a set of blueline or blackline prints of Contract Drawings and Shop Drawings for Project Record Documents purposes. Label each document (on first sheet or format page) "PROJECT RECORD" in 2-inch high printed letters. Keep record documents current. Note: A reference by number to a Change Order, CCD, RFI, RFQ, RFP, Field Order or other such document is not acceptable as sufficient record information on any record document. Do not permanently conceal any Work until required information has been recorded.
   1. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:
      a. Dimensional changes to the Drawings
      b. Revisions to details shown on the Drawings
      c. Depths of various elements of foundation in relation to main floor level or survey datum
      d. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements
      e. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure
      f. Locations of underground work, points of connection with existing utilities, changes in direction, valves, manholes, catch basins, capped stub outs, invert elevations, and similar items
      g. Actual numbering of each electrical circuit
      h. Field changes of dimension and detail
      i. Revisions to routing of piping and conduits
      j. Revisions to electrical circuitry
      k. Actual equipment locations
      l. Duct size and routing
      m. Changes made by Change Order or CCD

n. Details not on original Contract Drawings

2. Mark completely and accurately Project Record Drawing prints of Contract Drawings or Shop Drawings, whichever is the most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
3. Mark Project Record Drawing sets with red, erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.
4. Mark important additional information that was either shown schematically or omitted from original Drawings.
5. Note CCD numbers; alternate numbers, Change Order numbers, and similar identification.
6. Responsibility for Mark-up: Where feasible, the individual or entity who obtained Project Record Drawing data, whether the individual or entity is the installer, Subcontractor, or similar entity, is required to prepare the mark-up on Project Record Drawings.
   a. Accurately record information in an understandable and legible drawing technique.
   b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.

B. Preparation of Record Drawings: Immediately prior to inspection for Certification of Substantial Completion, review completed marked-up Project Record Drawings with District. When authorized, prepare a full set of correct transparencies of Contract Drawings and Shop Drawings.
   1. Incorporate changes and additional information previously marked on print sets. Erase, redraw, and add details and notations where applicable. Identify and date each Drawing; include the printed designation “PROJECT RECORD DRAWING” in a prominent location on each Drawing.
   2. Refer instances of uncertainty to District for resolution.
   3. Distribution: Whether or not changes and additional information were recorded, organize and bind original marked-up set of prints that were maintained during the construction period into manageable sets. Bind the set with durable paper cover sheets, with appropriate identification, including titles, dates, and other information on cover sheets.

C. Distribution of Marked-Up Drawings: Submit three full, bound sets and one digital set in AutoCAD 2000 format, the marked-up Project Record Drawings set to District for District’s records.

D. Shop Drawings and Samples: Maintain as record documents; legibly annotate Shop Drawings and Samples to record changes made after review.

E. In addition to requirements of this Section, comply with supplemental requirements of Divisions 15 and 16.
   1. Divisions 15 and 16 of the Specifications require the preparation of large scale, detailed layout drawings of the Work of those Divisions. These layout drawings are not Shop Drawings as defined by General Conditions, but together with Shop Drawings or layout drawings of all other affected Sections are used to check, coordinate, and integrate the work of the various Sections.
   2. Include these layout drawings as part of the Project Record Documents.

1.03 PROJECT RECORD SPECIFICATIONS

A. During the construction period, maintain one copy of the Project Specifications, including addenda and modifications issued, for Project Record Documents purposes.

B. Mark the Project Record Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and Modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to substitutions, selection of product options, Change Order and Construction Change Directive work, and information on concealed installation that would be difficult to identify or measure and record later.
   1. In each Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.
   2. Record the name of the manufacturer, catalog number, supplier and installer, and other information necessary to provide a record of selections made and to document coordination with Project Record Product Data submittals and maintenance manuals.
   3. Note related Project Record Product Data, where applicable, for each principal product specified, indicate whether Project Record Product Data has been submitted in maintenance manual instead of submitted as Project Record Product Data.
   4. Upon completion of mark-up, submit Project Record Specifications to District for District’s records.

1.04 ADDITIONAL REQUIREMENTS FOR FINAL PROJECT RECORD DOCUMENTS

A. Prior to Substantial Completion of the Work, District will make available to Contractor originals of the Drawings and Specifications, as Microsoft® Word 2000 for Windows, and AutoCAD 2000 Land Development Desktop for Windows in drawing format (.DWG) files. Note all changes thereon for the final Project Record Documents and provide one set of mylar reproducibles, one set of revised Specifications and one set of disks or CDs to be submitted to District.

B. After Substantial Completion and before Final Completion, carefully transfer all data shown on the job set of Record Drawings to the corresponding computer files, coordinating the information as required.

C. Clearly indicate at each affected detail and other drawings a full description of changes made during construction, and the actual location of items as previously specified.

D. "Cloud" all affected areas.

E. Stamp each Record Drawing with the following information:
   1. Project Record Document.
   2. Prepared by: Contractor's name, permanent address.
   3. Date prepared.
   4. Contractor's signature.
   5. District Contract Number.

1.05 PROJECT RECORD PRODUCT DATA

A. During the construction period, maintain one copy of each Project Record Product Data submittal for Project Record Document purposes.
   1. Mark Project Record Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Project Record Product Data submitted. Include significant changes in the product delivered to the Site, and changes in manufacturer's instructions and recommendations for installation.
   2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   3. Note related Change Orders and mark-up of Project Record Drawings, where applicable.
   4. Upon completion of mark-up, submit a complete set of Project Record Product Data to District for District's records.
   5. Where Project Record Product Data is required as part of maintenance manuals, submit marked-up Project Record Product Data as an insert in the manual, instead of submittal as Project Record Product Data.
   6. Contractor is responsible for mark-up and submittal of Project Record Product Data for its own Work.

B. Material, Equipment, and Finish Data:
   1. Provide data for primary materials, equipment and finishes as required under each Specification Section.
   2. Submit three (3) hard copy sets and one (1) digital copy, on compact disc (CD) prior to final inspection, bound in 8-1/2 inches by 11 inches three-ring binders with durable plastic covers; provide typewritten table of contents for each volume.
   3. Arrange by Specification Section number and give names, addresses, and telephone numbers of Subcontractors and suppliers. List:
      a. Trade names.
      b. Model or type numbers.
      c. Assembly diagrams.
      d. Operating instructions.
      e. Cleaning instructions.
      f. Maintenance instructions.
      g. Recommended spare parts.
      h. Product data.

1.06 MISCELLANEOUS PROJECT RECORD SUBMITTALS

A. Refer to other Specification Sections for miscellaneous record keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready

for use and reference. Submit to the District for District's records. Categories of requirements resulting in miscellaneous records include, but are not limited to, the following:

1. Field records on excavations and foundations
2. Field records on underground construction and similar work
3. Survey showing locations and elevations of underground lines
4. Invert elevations of drainage piping
5. Surveys establishing building lines and levels
6. Authorized measurements utilizing unit prices or allowances
7. Records of plant treatment
8. Ambient and substrate condition tests
9. Certifications received in lieu of labels on bulk products
10. Batch mixing and bulk delivery records
11. Testing and qualification of tradespersons
12. Documented qualification of installation firms
13. Load and performance testing
14. Inspections and certifications by governing authorities
15. Leakage and water-penetration tests
16. Fire resistance and flame spread test results
17. Final inspection and correction procedures
18. Final As-Built Construction Schedule

PART 2 PRODUCTS

NOT APPLICABLE TO THIS SECTION.

PART 3 EXECUTION

3.01 RECORDING

Post changes and modifications to the Contract Documents as they occur. Do not wait until the end of the Project. District may periodically review Project Record Documents to assure compliance with this requirement.

3.02 SUBMITTAL

A. At completion of Project, deliver Project Record Documents to District.
B. Accompany submittal with transmittal letter containing:
   1. Date
   2. Project title and number
   3. Contractor's name and address
   4. Number and title of each Project Record Document
   5. Certification that each document as submitted is complete and accurate, and signature of Contractor or Contractor's authorized representative.

END OF SECTION

SECTION 26 42 00

CATHODIC PROTECTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section specifies complete galvanic sacrificial anode type cathodic protection systems for underground steel tanks and piping. The section also includes devices to electrically isolate the system being protected.

B. The services required include planning, installation, adjusting and testing of a cathodic protection system, using sacrificial anodes for cathodic protection of the Water, Fire Protection and Natural Gas line piping and above-ground appurtenances. The cathodic protection system shall include anodes, cables, connectors, corrosion protection test stations, and any other equipment required for a complete operating system providing the NACE criteria of protection as specified. Insulators are required whenever needed to insulate the pipes from any other structure. Any pipe crossing the water and fire protection pipe shall have a test station.

1.02 RELATED WORK

A. Section 33 10 00, WATER SYSTEMS

B. Section 32 50 00, RESTORATION OF SURFACES

1.03 QUALITY ASSURANCE

A. The Contractor shall be regularly engaged in the installation and testing of cathodic protection systems. Contractor's personnel shall be experienced and shall be supervised by an engineer who is accredited as a Corrosion Specialist or Cathodic Protection Specialist by the National Association of Corrosion Engineers (NACE) International.

B. Cathodic protection for underground metal piping tanks shall be designed in accordance with NACE SP0169-2013.

1.04 SUBMITTALS

A. In accordance with the following requirements:

1. Design Submittal: For cathodic protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the corrosion engineer responsible for their preparation.

    a. Conduct site tests necessary for design, including soil resistivity, close-interval potential surveys, testing during construction, interference testing, and training of District’s personnel.
    b. Provide system design calculations, stating the maximum recommended anode current output density, and the rate of gaseous production, if any, at that current density.

2. Furnish catalog cuts and shop drawings for the following items:

    a. Anodes.
    b. Cable and wire.

c. Test stations.
d. Terminal boxes.
e. Isolating flanges, unions, coatings, casing seals.
f. Exothermic welding devices.
g. Cable splice kits.
h. Layout drawings, wiring diagrams.
i. Test instruments.
j. Dielectric tape.
k. Test connection points.

3. Detail drawings consisting of a complete list of equipment and material and complete wiring and schematic diagrams, as well as any other details required to demonstrate that the system will function properly.

4. Designer's accreditation as a Corrosion Specialist or Cathodic Protection Specialist by NACE International.

5. Test reports in booklet form tabulating all field tests and measurements performed, upon completion and testing of the installed system and including close interval potential survey, casing and interference tests, final system test verifying protection, insulated joint and bond tests, and holiday coating test. A certified test report showing that the connecting method has passed a 120-day laboratory test without failure at the place of connection, wherein the anode is subjected to maximum recommended current output while immersed in a three percent sodium chloride solution.

6. Operation and Maintenance Manual:

   a. Basic system operation.
   b. Instructions for dielectric connections, interference and sacrificial-anode bonds; and precautions to ensure safe conditions during repair of pipe, tank or other metallic systems.
   c. Locations of all anodes, test stations, and insulating joints.
   d. Structure-to-reference cell potentials.
   e. Recommendations for maintenance testing, including instructions for pipe-to-reference cell potential measurements and frequency of testing.
   f. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.

7. Certifications: Two weeks prior to final inspection, submit the following:

   a. Certification by the manufacturer that the cathodic protection system conforms to the requirements of the drawings and specifications.
   b. Certification by the Contractor that the Cathodic protection system has been properly installed and adjusted.

1.05 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.

B. American Society for Testing and Materials (ASTM):

B8-11 ..... Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
B843-13 ..... Magnesium Alloy Anodes for Cathodic Protection

D1248-12 ..... Polyethylene Plastic Extrusion Materials for Wire and Cable
F1182-13..... Anodes, Sacrificial Zinc Alloy
G57-06..... Field Measurement of Soil Resistivity Using the Wenner Four-Electrode Method

C. American Society of Mechanical Engineers (ASME):

B16.1-15 ..... Pipe Flanges and Flanged Fittings

D. National Association of Corrosion Engineers (NACE) International:

SP0169-2013 ..... Control of External Corrosion on Underground or Submerged Metallic Piping Systems

PART 2 - PRODUCTS

2.01 ANODES

A. Type: Type II, factory-packed in cloth bag or box containing prepared backfill mixture, with lead wires.

B. Construction:

1. Alloy Specifications:

Element	Percent of Weight
Aluminum	0.010 Max.
Manganese	0.50 - 1.30
Zinc	0.05 Max.
Silicon	0.50 Max.
Copper	0.02 Max.
Nickel	0.001 Max.
Iron	0.03 Max.
Other	0.30 Max.
Magnesium	Remainder

2. Core: Galvanized steel.

3. Lead Wire: Factory installed, No. 12 solid copper, 3 M (10 feet) long, with TW or THWN insulation.

4. Lead Wire Attachment to Core: Silver solder the lead wire to the anode core, and seal the connection with an epoxy sealing compound. Dielectric material shall extend past the connection and cover the lead wire insulation by not less than 12 mm (1/2 inch).

5. Packaging: Permeable cloth bag or box with backfill mixture completely surrounding anode 12 mm (1/2 inch) minimum.

a. Components:

Hydrated Gypsum	75 percent
Powdered Bentonite	20 percent
Anhydrous Sodium Sulphate	5 percent

b. Center the anode in the firmly packed backfill using spacers.

2.02 INSULATED CABLE

A. Single conductor, stranded, annealed copper, Type HMWPE (high molecular weight polyethylene) insulation.

B. Construction:

1. Thickness of insulation:

AWG-SIZE	mm (inches)
No. 8	2.8 (7/64)
No. 6	2.8 (7/64)
No. 4	2.8 (7/64)
No. 2	2.8 (7/64)
No. 1	3.2 (8/64)
No. 1/0	3.2 (8/64)

2. Insulation: ASTM D1248, Type 1, Class C, Category 5, Grade E5.

3. Conductors: ASTM B8.

C. Lead wires terminating at a junction box or test station shall have a cable identification tag.

2.03 CABLE CONNECTIONS

A. Connections between cables and tank, pipes, casings, or structures shall be exothermic welding process. Connections between cables and between cables and leads shall be corrosion-resistant split bolts.

B. Insulation of Cable-to-Cable Connections: Epoxy-resin splice kits with two-part resin, mold, sealing mastic.

C. Coating of Cable Connections to Protected Structures: Field-applied coating similar to that on the protected structure.

2.04 CABLE AND WIRE IDENTIFICATION TAGS

A. Stainless steel material with engraved letters. Print letters and numbers a minimum of 5 mm (3/16 inch) in size. Provide identifier legend in accordance with the drawings.

2.05 TEST STATIONS

A. Type: Weatherproof, located at grade, or aboveground if so shown on the drawings. Enclosed terminals for anode leads, test leads, leads attached to protected system, and connection points for test instruments.

B. Construction:

1. Housing: The unit shall be of standard design, manufactured for use as a cathodic protection test station, complete with locking cover, terminal board, shunts, and brass or stainless steel hardware.

2. Provide terminal boards for anode junction boxes, bonding boxes, and test stations made of phenolic plastic. Insulated terminal boards shall have the required number of terminals (one terminal required for each conductor). Install solderless copper lugs and copper bus bars, shunts, and variable resistors on the terminal board as indicated. Test station terminal connections shall be permanently tagged to identify each termination of conductors (e.g. identify the conductors connected to the protected structure, anodes, and reference electrodes). Conductors shall be permanently identified by means of tags to indicate termination. Each conductor shall be color coded as follows:

   Anode lead wire – black
   Structure lead wire – white
   Reference electrode lead wire – red

2.06 PERMANENT REFERENCE ELECTRODES

A. Permanent reference electrodes shall be zinc specifically manufactured for underground use, 10 inch diameter, by 24 inches long, plastic tube with an ion trap to minimize contamination of the cell. The cell shall be prepackaged by the manufacturer with a backfill material as recommended by the manufacturer. Provide cells with No. 14 HMWPE cable of sufficient length to extend to the test station without splicing. Reference electrodes shall have a minimum 15 year life, and stability of plus or minus 5 millivolts under 3 microampere load.

2.07 DIELECTRIC TAPE

A. Vinyl plastic electrical tape, 0.18 to 0.25 mm (7 - 10 mils) thick, pressure-sensitive adhesive.

2.08 WARNING TAPE

A. 50 mm (2 inches) wide, detectable with metal detector, mylar-encased aluminum, orange color, imprinted "Cathodic Protection Cable Below" or similar.

2.09 DIELECTRIC INSULATION

A. Rubber-based, 13 mm (0.5 inch) thick.

PART 3 - PART 3 - EXECUTION

3.01 INSTALLATION

A. Anodes:

1. Excavate hole to a minimum 3 inches larger than the packaged anode diameter, and a minimum of two feet deep. Install in native soil, 3 feet minimum from protected structure, below centerline of protected structure, and at locations shown. Backfill shall be native soil. Install anodes adjacent to fuel tanks vertically.

2. Do not lift or support anode by the lead wire. Where applicable, remove manufacturer's plastic wrap/bag from the anode. Exercise care to preclude damaging the cloth bag and the lead wire insulation.

3. Center the packaged anode in the hole with native soil in layers not exceeding 150 mm (6 inches). Hand tamp each layer to remove voids taking care not to strike the anode lead wire. When the backfill is 6 inches above the top of the anode, pour not less than ten gallons of water into the hole to saturate the anode backfill and surrounding soil. Anodes shall not be backfilled prior to inspection and approval by the IOR or Corrosion Specialist.

B. Cables and Anode Leads:

1. Burial: 2 feet minimum below finished grade, 6 inches minimum separation from other underground structures, backfill material in contact with cable free of rocks and debris. Cover the lead wire trench bottom with a 3 inch layer of sand or stone free earth. Center wire on the backfill layer, do not stretch or kink the conductor. Place backfill over wire in layers not exceeding 6 inches deep, and compact each layer thoroughly. Do not place tree roots, wood scrap, vegetable matter and refuse in backfill. Place cable warning tape within 18 inches of finished grade, above cable and conduit.

2. Continuity Bonds: Use cable to connect adjacent protected structures, and protected structures separated by non-welded connectors. Provide 25 percent additional length as slack to allow differential movement of protected systems.

3. Connections: Provide clean, bright, bare metal surface at all connection points. Connect anode lead wire(s) to the test station terminal board(s) by use of exothermic welds. Clean the structure surface by scraping, filing or wire brushing to produce a clean, bright surface. Weld connections using exothermic kit(s) in accordance with the kit manufacturer's instructions. Check and verify adherence of the bond to the substrate for mechanical integrity by striking the weld with a 2 pound hammer. Cover connections with an electrically insulating coating which is compatible with the existing coating on the structure. Allow sufficient slack in the lead wire to compensate for movement during backfilling operation.

4. Warning Tape: Install 6 inches below grade, directly above cables.

C. Test Stations: Provide test stations and permanent reference electrodes as follows:

1. At all above-ground water, fire water and natural gas appurtenances.

2. At all insulating joints.

3. At both ends of casings.

4. Where the pipe crosses any other pipes.

5. Where the pipe connects to an existing piping system.

6. Where the pipe connects to a dissimilar metal pipe.

D. Anchor terminal board firmly 2 feet minimum above grade for above grade units. Connect all anodes and protected structure to the test stations.

E. Dielectric Insulation:

1. General: Provide complete dielectric insulation between protected and unprotected systems and between protected systems and structures which could ground the cathodic protection. Required insulation points include all pipe entrances to buildings, manholes, and pits.

2. Flanges: Install in locations open to view after completion of construction. Provide insulating gaskets, insulating sleeves on all bolts, insulating washers under bolt heads and nuts.

3. Unions: Install in locations open to view after completion of construction. Unions not permitted in pipe sizes over 2 inches.

4. Wall Penetration Seals: Install in space between pipes and wall sleeves at building and manhole walls.

5. Coatings: Completely coat all pipe or conduit areas that are in contact with concrete.

F. Permanent Reference Electrode Calibration and Installation:

1. Provide zinc reference electrode(s) as indicated on the drawings.

2. Prior to installation, soak the prepackaged reference electrode in a container of potable water for 30 minutes.

3. Calibrate the permanent reference electrode in the presence of the IOR or Corrosion Specialist measuring the potential difference between the permanent reference electrode and an independent (portable) calibrated reference electrode placed in the water adjacent to the permanent reference electrode. Potential differences between the two electrodes of the same generic type should not exceed 15 millivolts when the sensing windows of the two electrodes being compared are not more than 2 mm (1/16 inch) apart but not touching. Zinc permanent reference electrodes should be within the range of 1000 to 1150 millivolts when calibrated with an independent (portable) calibrated copper-copper sulfate reference electrode with the two electrodes being not more than 2 mm (1/16 inch) apart but not touching. Permanent reference electrodes not within these potential differences shall be removed and replaced at the Contractor's expense. Prior to completely backfilling over reference electrodes, again verify the accuracy of the reference electrode. The testing provision shall also apply to replacement reference electrodes as well.

3.02 RECONDITIONING OF SURFACES

A. Restoration of disturbed surfaces in kind, or as shown in the contract documents.

3.03 FIELD QUALITY CONTROL

A. Provide system with a calculated design life exceeding 40 years.

B. Pre-construction Survey: The Corrosion Specialist shall perform a soil resistivity survey using the Wenner Four-Pin Method as described in ASTM G57. Survey entire length of proposed protected system at the structure depth. Also survey native-state structure-to-soil potential, soil pH, and presence of stray currents.

C. Calculations: The Corrosion Specialist shall perform engineering calculations to verify the design of the system shown. Inform the Government of any recommended changes in the system design shown.

D. Field Inspections During Construction: The corrosion specialist shall inspect the work at least twice to ascertain that there is no grounding, short circuits, coating damage, and that installation is in accordance with requirements.

E. Final Inspection:

1. Performed by Corrosion Specialist; witnessed by IOR or District's Representative.

2. Test Instruments:

   a. Digital Volt-Ammeter with impedance of 7-10 mega-ohms/volt.
   b. Saturated copper-copper sulfate reference electrode.
   c. Other instruments as required.

3. Procedures: Conform to NACE RP0169.

4. Test Results Required for Acceptance:

   a. Potential of minus 0.85 volt between protected structure and reference electrode.
   b. Minimum shift of minus 300 millivolts upon application of protective current. Voltage measured between protected structure and reference electrode.
   c. Minimum shift of minus 100 millivolts upon interruption of protective current. Voltage measured between protected structure and reference electrode.
   d. Amperage value sufficient that anode life 40 years can be calculated. Provide calculations.

5. Test Report: Submit a complete report to IOR or District's Representative showing all test measurements, calculations, list of instruments used. All structure-to-electrolyte measurements, including initial potentials and anode outputs, shall be recorded on applicable forms. Identification of test locations, test station and anode test stations shall coordinate with the as-built drawings and be provided on system drawings included in the report. The contractor shall locate, correct, and report to the IOR or District's Representative any short circuits encountered during the checkout of the installed cathodic protection system.

6. One Year Warranty Period Testing: The Contractor shall inspect, test, and adjust the cathodic protection system semi-annually for one year, 2 interim inspections total, to ensure its continued conformance with the criteria outlined below. The performance period for these tests shall commence upon the completion of all cathodic protection work, including changes required to correct deficiencies identified during initial testing, and preliminary acceptance of the cathodic protection system by the IOR or Corrosion Specialist. Copies of the One Year Warranty Period Cathodic Protection System Field Test Report, including field data, and certified by the

Contractor's corrosion engineer shall be submitted to the IOR or District's Representative.

3.04 AS-BUILT DRAWINGS

A. Provide the District's Representative with one set of as-built drawings in hard copy and CD Rom showing dimensioned locations of all anodes, cables, test stations, and anode weights. Provide identification of test stations and anodes keyed to test reports.

3.05 INSTRUCTION

A. Furnish the services of a factory-trained technician for one 4-hour period to instruct personnel in the operation, maintenance, safety, and emergency procedures of the cathodic protection system on the date requested by the District. The instructions shall cover all items contained in the operation and maintenance manual.

END OF SECTION

SECTION 31 10 00

SITE PREPARATION AND DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

A. This section describes general requirements, products, and methods of execution relating to site preparation, unless otherwise noted. This section applies to:

1. Surface and subsurface demolition.
2. Backfilling of excavations and depressions.
3. Coordination, demolition and/or relocation of existing utilities.
4. Prior to start of demolition of facilities, shut-off, disconnect, cut, and cap where required, underground utility services to facilities.
5. Removal of A.C. pavement driveway and concrete pavement, concrete pads, and A.C. curbing.
6. Removal of cyclone wire, wood fences and barricades.
7. Removal of storm drainage piping, catch basins, and manholes.
8. Removal of vegetation and trees as specified herein.

B. Contractor shall provide labor, material and equipment required for demolishing, cutting, removing and disposing of existing construction as designated and shown on the drawings for the following as required, unless otherwise noted.

C. Coordinate all work with capping or sealing of existing utilities.

D. Related Sections:

1. Section 31 22 00 – EARTHWORK AND GRADING.
2. Section 31 23 33 – TRENCHING, BACKFILLING, AND COMPACTING.

1.02 SUBMITTALS

A. Comply with requirements of Section 01 33 00 – SUBMITTAL PROCEDURES.

B. Submit copies of all permits and certificates required for the project to the District's Representative, for record purposes.

C. Permits and notices authorizing demolition.

D. Submit copy of letters or certificates of severance of utilities services from the affected agencies or utilities.

E. Submit copies of proposed haul route(s) from the demolition worksite to an authorized disposal site as approved by authority having jurisdiction.

F. Submit copy of permit for transport and disposal of debris.

G. Make arrangements of disposing of waste and excess materials at a legally licensed landfill/disposal facility outside worksite and pay cost thereof.

H. Photograph existing conditions of existing structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File photographs with District's Representative prior to start of work.

I. Submit proposed dust control measures and a copy of approved permit.

J. Submit proposed noise control measures and a copy of approved permit.

K. Work Schedule: Submit a proposed schedule of work items to be performed, and a description of how the work is to be accomplished, for the review by the District's Representative.

L. Report of inspections conducted with the District's Representative and Architect both before and after performing work.

1.03 QUALITY ASSURANCE

A. Comply with the following Standards: American National Standards Institute, Inc. "American National Standard Safety Requirements for Demolition" (ANSI A10.6 and A10.8).

B. Regulatory Agencies:

1. Comply with rules and regulations of State of California, California Code of Regulations, Title 8, Industrial Relations, Chapter 4, Subchapter 4, "Construction Safety Order."

2. Comply with applicable local and state agencies having jurisdiction.

3. Comply with governing EPA notification regulations.

C. Secure all required Permits or Certificates for demolition or discontinuance of utilities, prior to beginning the work.

1.04 PROJECT CONDITIONS

A. District's Representative assumes no responsibility for actual condition of the site to be altered.

1. Conditions existing at time of inspection for bidding purpose will be maintained by District's Representative as far as practical.

B. Disposal of Existing Improvements:

1. All materials indicated to be removed shall become the property of the Contractor; dispose of these outside the project site.

a. Do not dispose of removed materials to the general public by sale, gift or in any other manner at the Site.

b. These provisions shall not be construed as limiting or prohibiting sale or disposal of such materials at the Site to duly licensed Contractors or material suppliers, provided materials are removed from the construction site by the Contractor.

2. All removal of debris from the site, including removal of inventory to site of storage, is part of this Contract and shall be done by Contractor's employees and no others.

C. Salvage and Reuse:

1. Where units or items of existing work are designated in Section 01 31 13 - PROJECT COORDINATION or Contract Plans to be removed and reused in the new work or are to become salvage, remove such units or items carefully.

a. Use tools and methods that will not damage such units or items.

b. Protect underlying or adjoining work from damage.

c. Salvaged items shall be cleaned by the Contractor.

2. Recycle AC pavement and Class II AB where practical.

3. Recycle concrete where practical.

4. Items indicated to be salvaged shall be removed carefully, cleaned, and returned to the District. Coordinate with the District's Representative.

D. Protection:

1. Erect and maintain temporary bracing, shoring, lights, and barricades, except construction barricades for subsequent new construction, warning signs, and guards necessary to protect public, the District's employees, finishes, improvements to remain and adjoining property from damage, all in accordance with applicable regulations.

2. Wet down areas affected by this work as required to prevent dust and dirt from rising.

E. Scheduling:

1. Coordinate with the District's Representative in scheduling noisy or dirty work.

2. Schedule work at the District's convenience to cause minimal interference with the District's normal operations.

3. Jack hammering will be allowed only during the following time periods 7:00 AM - 6:00 PM on weekdays.

F. Traffic Circulation: Ensure minimum interference with roads, streets, driveways, sidewalks, and adjacent facilities.

1. Do not close or obstruct public thoroughfares without first obtaining the required permit or permission of the responsible jurisdiction.

2. Where closing of a vehicular or pedestrian traffic circulation route is necessary, provide adequate directional signs to minimize the potential for confusion.

3. Maintain emergency access routes and coordinate any interruptions with local entities.

4. Provide pedestrian paths as necessary and coordinate with the District.

PART 2 – PRODUCTS

2.1. PIPE ABANDONMENT MATERIALS

A. Slurry cement backfill conforming to Caltrans Standard Specification 19-3.02E.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas affected by work of this Section and verify following:

1. Disconnection of utilities as required.

2. That utilities serving occupied portions of buildings on and off the site will not be disturbed.

3. Removal by the District of the District's personal property, movable furniture and equipment items not designated for relocation.

B. Document video and/or photograph, as necessary, existing items to remain that are damaged and submit photographs to District.

C. Where existing conditions conflict with representations of the Contract Documents, notify the District's Representative and obtain clarifications. Do not perform work affecting the conflicting conditions until clarification of the conflict is received.

3.2 PREPARATION

A. Verify that the area to be demolished or removed has been vacated, or adequate space made available to perform the work.

B. Arrange for, and verify, termination of utility services to include removing meters and capping of lines.

C. Lay out cutting work at Job Site and coordinate with related work for which cutting is required.

3.3 DEMOLITION

A. If known or suspected hazardous materials are encountered during operations, stop operations immediately and notify the District's Representative.

B. Perform work in accordance with ANSI A10.6-1969 unless otherwise noted.

C. Provide noise and dust abatement as required to prevent contamination of adjacent areas.

D. Remove all materials not designated as salvage, in their entirety.

E. Remove building foundations in their entirety, unless otherwise indicated on the plans.

F. Fill voids in the land left by the removal of existing structures as follows:

1. In accordance with the requirements of Section 31 22 00 – EARTHWORK AND GRADING. Grade finished remaining surface to the contours shown, or if not shown, to match the existing natural contours.

G. Lower, or remove, heavy structural framing members by hoist or crane.

H. Concrete and Masonry:

1. Demolish concrete and masonry in sections, less than 3 feet in any direction.

2. Method of cutting shall be limited to saw cutting and torch.

I. If unknown items such as human remains are encountered during operations, stop operations immediately and notify the District's Representative.

J. The District's Representative will provide a list of any items to be stockpiled for future use. Stockpile location will be a site on campus determined by the District's Representative.

3.4 DEMOLITION AND REMOVAL OF AC PAVEMENT:

A. Saw cut pavement at edge of demolition area.

B. Break pavement and remove.

C. Remove any base material, gravel, and/or or any other non-native soil.

3.5 CUTTING

A. Make new openings neat.

B. Do not cut or alter structural members and any utilities including appurtenances unless indicated to do so in the Construction Documents or written approval is received from the Architect.

C. Take care not to damage reinforcing or structural steel scheduled to remain in place.

D. Concrete: Cut new openings in concrete by coring and saw cutting. Saw run-bys will not be permitted.

3.6 PREPARATION FOR NEW FINISH WORK

A. Where demolished surfaces are scheduled to receive new finishes, Contractor shall restore such substrate to a condition ready to receive the scheduled new finishes, including grinding or leveling.

3.7 UTILITY REMOVAL:

A. Where utility removal is shown on the plans, excavate to expose existing utility, demolish and remove section of pipe or conduit indicated. Cap section of pipe or conduit to remain. Mark end of utility with stake, rebar, or Surveyor's marker.

B. Provide thrust block or other mechanical restraint where dead end is created on pressurized pipe systems. Thrust blocks shall be per NFPA 24 Standards.

C. Included in demolition are any appurtenances, including but not limited to valves, valve boxes, and irrigation system components.

D. Backfill trench in accordance with requirements of Section 31 23 33 – TRENCHING, BACKFILLING, AND COMPACTING.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

A. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning of demolished materials on-site is prohibited. Burning may be performed off-site of District's property provided it is done in a legal manner.

3.9 FIELD QUALITY CONTROL

A. The District's Representative and Architect will accompany the Contractor before and after performance of work to observe physical condition of existing structures or improvements involved.

END OF SECTION

SECTION 31 22 00

EARTHWORK AND GRADING

PART 1 - GENERAL

1.01 SUMMARY:

A. This section describes general requirements, products, and methods of execution relating to on-site earthwork. Any work within the public right-of-way shall be constructed to the standards of the City of Livermore and State of California Department of Transportation. Work includes, but is not limited to, the following:

1. Grading.
2. Material.
3. Excavation.
4. Filling and backfilling.
5. Soil Sterilant.
6. Termiticide.

B. Provide labor, material and equipment and services necessary to complete the excavations, re-compaction and finish grading as specified and indicated on Drawings.

1. Obtain permit from local authorities.
2. Provide surveying for grading operations.
3. Provide shoring design.
4. Provide dewatering operations.
5. Provide site grading, cut, fill and finish.
6. Provide excavation and backfill for filling construction, including trenches within building lines.
7. Preparation for subgrade for building slabs, walks, pavements, and landscaping.
8. Provide distribution of stockpiled topsoil.
9. Provide sub-base course for walks and pavements.
10. Provide engineered fills for building slabs and foundations.
11. Provide sand and gravel for capillary break/moisture barrier under building slabs.
12. Provide sub-surface drainage backfill for walls and trenches.

C. The work includes removal and legal disposal off the site of debris, rubbish and other materials resulting from clearing and grubbing operations.

D. Work specified in Related Sections:

1. Section 31 10 00 – SITE PREPARATION AND DEMOLITION.

2. Section 31 23 33 – TRENCHING, BACKFILLING, AND COMPACTING.

1.02 DEFINITIONS:

A. Select Fill:

1. Soil or soil-rock material approved by District's Representative used by the Contractor in order to raise grades or to backfill excavations.

2. The District's Testing Agency will make sufficient tests and/or observations for the purpose of issuing a written statement that material meets or exceeds the specification requirements.

B. On-site Material: Soil or earth material obtained from required on-site excavation.

C. Excavation: Consists of the removal of material encountered to subgrade elevations and the re-use or disposal of materials removed.

D. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below sub-base, drainage fill, rock base course, or topsoil materials.

E. Import Material: Soil material obtained off-site when sufficient approved soil material is not available from excavations.

F. Base Course: The layer placed between the sub-base and surface pavement in a paving system.

G. Relative Compaction: In-place dry density of soil expressed as percentage of maximum dry density of same materials, as determined by laboratory test procedure American Society for Testing and Materials (ASTM) D1557.

H. Over-excavation: Removal of material below required subgrade elevations.

1.03 SUBMITTALS:

A. Comply with provisions of Section 01 33 00 – SUBMITTAL PROCEDURES.

B. Product Data: Manufacturer's literature and data, including, where applicable, capacity, labels, or other markings on equipment made to the specified standards for materials, for the following:

1. Imported materials.

2. Class II aggregate base (Caltrans Section 26).

3. Soil Sterilant.

4. Termiticide.

5. Cement Treatment.

6. Geotextiles.
7. Subdrainage Pipe.
8. Aggregate for Structural Soil Mix.

C. Test Reports: Submit the following reports for import material directly to Architect from the Contractor's testing services:

1. Test reports on borrow material.
2. Density test reports.
3. One optimum moisture-maximum density curve for each type of soil encountered.
4. Not used.
5. Not used.
6. Soil percolation rate test for soils to be used in storm water treatment zones.
7. Structural Soil Mix Testing: Provide a two-gallon representative sample to approved testing laboratory for an analysis of the structural soil mix indicating the following:

   a. Particle size analysis, including the following gradient of mineral content (USDA Designation Size in mm):

      1. 3" (76mm)
      2. 2 ½" – 3" (63-76mm)
      3. 2" – 2 ½" (50-63mm)
      4. 1 ½" – 2" (37-50mm)
      5. 1" (25-37mm)
      6. ¾" (19-25mm)
      7. Fine gravel – 1/8" – ¾" (2-19mm)
      8. Sand – 0.05 -2mm
      9. Silt – 0.002-0.05mm
      10. Clay – minus 0.002mm

   b. Provide manufacturer's analysis of the following:

      1. Loose and rodded unit weight.
      2. Bulk specific gravity and absorbance.
      3. Gravel dimension and surface texture description.

4. Aggregate soundness and L.A. abrasion.

c. Provide a percent pore space analysis defined as follows:

1. Rodded Unit Weight divided by the Bulk Specific Gravity x 100.

d. Sample Collection Procedure:

1. Collect a minimum of eight samples to make up the composite sample.

2. Take samples from random locations in the stockpile varying from the top to the bottom and around the stockpile.

3. Take at least half the samples from the lower third of the stockpile into a clean bucket

4. Thoroughly mix material after samples are taken.

5. Remove 2 gallon of material from bucket and fill a zip-lock plastic bag.

6. Double bag the composite sample and label the bag with a permanent marker indicating the material name and date sample was taken.]

D. Shoring Design: Where shoring is required by State Law or Contractor shall provide necessary design, provide proposed excavation shoring method for review prior to commencement of excavation requiring shoring. Include the following information:

1. Basic design assumptions.

2. Design Calculations.

3. Describe materials or shoring system to be used.

4. Indicate whether or not any components will remain after filling or backfilling.

5. The shop drawings for the proposed shoring system.

6. Coordinate with the Construction Documents and identify any proposed modifications or deviations.

7. Certification of the above by a registered professional civil or structural engineer licensed by the State of California.

8. Submittal will be reviewed for general conformance with project plans, but no review of calculations will be provided.

E. Dewatering Plan: Based upon site surface and subsurface conditions, including available geotechnical and hydrological data, provide a system to perform the following:

1. Lower the ground water level below bottom of excavation.

2. Relieve the hydrostatic pressure below the subgrade to prevent uplift.

3. Prevent surface drainage from accumulating within work area.

4. Legally discharge and dispose of excess water.

5. Submit description of basic components of proposed dewatering system and its planned method of operation.

F. Samples:

1. 20-lb. samples sealed in air-tight containers, of each proposed fill and backfill soil material from on-site or borrow sources. Provide to Geotechnical Engineer as requested.

2. 20-lb samples sealed in air tight containers of specialty soils for submission to a plant and soil testing facility for analysis. Include perc test and sieve analysis.

G. Pad Certification

1. Submit a pad certification stamped by a California Licensed Land Surveyor.

H. Storm Water Pollution Prevention / Erosion Control Plans/Water Pollution Control Plans

I. Permit/Notice of Intent (N.O.I.), for discharge of storm run-off from the construction site.

J. Haul Routes.

1.04 ASSURANCE:

A. Requirements of Regulatory Agencies:

1. Comply with State of California Business and Transportation Agency, California Department of Transportation (CDT, Caltrans) “Standard Specifications” (Caltrans Standard Specification).

2. Comply with State of California Code of Regulations (CCR).

3. Comply with State of California Construction Safety Orders, Latest Edition (CAL/OSHA).

4. City of Livermore Department of Public Works, Standards and Specifications and Drawings, latest edition.

5. BCDC, ACOE, Fish and Wildlife, if applicable.

B. Soil Testing:

1. District will engage a geotechnical testing agency, to include testing soil materials proposed for use in the work and for quality control testing during excavation and fill operations.

2. Test results will be distributed in compliance with Section 01 45 23 – TESTING AND INSPECTION SERVICES.

C. Codes and Standards:

1. Perform excavation work in compliance with applicable requirements of authorities

having jurisdiction.

2. Statewide General Permit to Discharge Storm Water associated with construction activity.

3. The project Storm Water Pollution Prevention and Monitoring Plan.

D. Comply with the latest editions of the following Standards and Regulations:

1. American Society for Testing and Materials (ASTM):

a. Concrete Aggregates.

b. C125: Standard Terminology Relating to Concrete and Concrete Aggregates.

c. C136: Sieve Analysis of Fine and Coarse Aggregates.

d. C566: Total Evaporable Moisture Content of Aggregate by Drying.

e. D421: Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants.

f. D422: Particle Size Analysis of Soil.

g. D854: Specific Gravity of Soils.

h. D1556: Density of Soil by the Sand Cone Method.

i. D1557: Laboratory Compaction Characteristics of Soil Using Modified Effort

j. D2216: Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.

k. D2487: Classification of Soils for Engineering Purposes.

l. D2922: Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

m. D2937: Density of Soil in Place by Drive Cylinder Method.

n. D3017: Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

o. D4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

2. California Code of Regulations, Title 24, Part 2 - Basic Building Regulations, Chapter 24 - Excavations, Foundations, and Retaining Walls.

3. California Department of Transportation (Caltrans) Standard Specifications:

a. Section 10: Watering.

b. Section 18: Dust Palliatives.

c. Section 19: Earthwork.

4. CAL/OSHA, Title 8.

5. City of Livermore Standard Plans and Specifications

6. Other authorities having jurisdiction

E. Geotechnical Engineering Services:

1. Geotechnical Engineer shall be provided by the District, as the District's Representative to observe grading observations during preparation offsite, excavation, and compaction of fill materials.

2. Make visits to site to familiarize him generally with progress and quality of work.

3. Make field observations and tests to enable him to form opinions regarding adequacy of site preparation, acceptability of fill materials and extent to which earthwork construction and relative compaction comply with specifications requirements.

4. Examine conditions exposed in foundation excavations.

F. Site Information:

~~1. Geotechnical Investigation Reports are available for examination by Contractor.~~

2. Additional soil borings and other exploratory operations may be made by Contractor at no cost to the District. Submit proposed boring locations for review prior to performing the work.

G. Contractor Qualifications:

1. Have successfully installed structural soil mixes similar to the quality specified for a period of not less than 5 years.

1.05 DELIVERY, STORAGE, AND HANDLING:

A. Protect materials of this section before, during and after installation; objects designated to be retained; and the installed work of other trades.

B. In the event of damage to any of these items, immediately make repairs or replacements necessary to the acceptance of the District's Representative and at no additional cost to the District.

C. Comply with provisions of Section 01 50 00 – TEMPORARY FACILITIES AND CONTROLS where necessary to control dust and noise on and near the work caused by operations during performance of the Work.

1.06 PROJECT CONDITIONS:

~~A. Site Information: Review the geotechnical report identified in Section 02 30 00 – SUBSURFACE INVESTIGATION.~~

~~1. The character of the material to be excavated or used for subgrade is not necessarily as indicated.~~

2. ~~Ground water elevations indicated are those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.~~

B. Environmental Requirements:

1. Comply with the project SWPPP.

2. When unfavorable weather conditions necessitate interrupting filling and grading operations, prepare areas by compaction of surface and grading to avoid collection of water.

3. Provide adequate temporary drainage to prevent erosion.

4. After interruption, reestablish compaction specified in last layer before resuming work.

5. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.

6. Protect existing streams, ditches and storm drain inlets from water-borne soil by means of straw bale dikes, filter fiber dams, or other methods.

C. Protections of open excavations.

1. Barricade open excavations and post with warning lights.

2. Comply with requirements of Section 01 50 00 –TEMPORARY FACILITIES AND CONTROLS.

3. Operate warning lights as recommended by authorities having jurisdiction.

4. Protect structures, utilities, sidewalks, pavements, and other facilities immediately adjacent to excavations, from damages caused by settlement, lateral movement, undermining, washout and other hazards.

D. Protection of Subgrade

1. Protection of Subgrade: Do not allow equipment to pump or rut subgrade, stripped areas, footing excavations, or other areas prepared for project.

2. At Contractor’s option, and with the Geotechnical Engineer’s approval, a working pad of granular material may be laid to protect footing and floor subgrade soils from disruption by traffic during wet conditions.

E. Transport of soils.

1. Transport all excess soils materials by legally approved methods to disposal areas.

2. Coordinate with the District’s Representative.

3. Sufficient topsoil and fill material shall be retained from the site to complete project requirements.

4. Any additional topsoil and fill requirements shall be the responsibility of the Contractor.

F. Blasting and use of explosives will not be permitted.

G. Dust Control Requirements: At all times during earthwork operations and until final completion and acceptance of the earthwork, the Contractor shall prevent the formation of an airborne dust and dirt nuisance from interfering with the surrounding normal operations. The Contractor shall effectively stabilize the site of work in such a manner that it will confine dust particles to the immediate surface of the work and to obtain a minimum of 40 percent emissions reduction by applying a dust palliative except in areas of active cut and fill. The dust palliative shall be non-petroleum based. Water alone is not considered to be a dust palliative. The dust palliative shall be applied at the rate and method in conformance with Section 18, “Dust Palliatives,” of the Caltrans Standard Specifications and as recommended and/or specified by the manufacturer. Contractor shall assume liability for all claims related to dust and dirt nuisances.

H. All areas to receive Structural Soil shall be inspected by the District’s Representative prior to beginning this work.

1.7 EXISTING UTILITIES

A. The District will contact local utility agencies prior to construction and arrange for the shut-off of all utilities serving the buildings to be demolished. Coordinate work required to abandon active lines with the Program Manager and the District.

B. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during excavation operations.

C. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the District’s Representative immediately for directions.

1. Cooperate with the District and public and private utility companies in keeping their respective services and facilities in operation.

2. Repair damaged utilities to the satisfaction of the District’s Representative.

D. Do not interrupt existing utilities serving facilities occupied and used by the District or others, except when permitted in writing by the District and then only after acceptable temporary utility services have been provided.

1.8 SEQUENCING AND SCHEDULING:

A. The schedule of operations shall be reviewed by the District’s Representative prior to commencement of any work.

B. Coordinate operations with other construction activities, such as relocation of existing utilities.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. General:

1. Fill material will be subject to approval of the Geotechnical Engineer.

2. For approval of imported fill material, notify the District's Representative at least 7 days in advance of intention to import material, designated proposed borrow area, and permit the Geotechnical Engineer to sample as necessary from borrow area for purpose of making acceptance tests to prove quality of material.

~~3. The Geotechnical Engineer's report on acceptability shall be final and binding.~~

~~4. During grading operations, soil types other than those analyzed in the geotechnical report for the project, may be encountered.~~

5. Consult the Geotechnical Engineer to determine the suitability of these soils.

B. Select Fill Material: Imported soil conforming to requirements for fill material contained in ~~geotechnical report for this project.~~ **these Specifications.**

C. Native Fill Requirements:

1. Approved native materials shall have a particle size not exceeding 3 inches as determined by ASTM D422, at least 90 percent by weight passing the 1 inch sieve and less than 3 percent organic content by weight.

~~2. Fill to be treated with lime per Geotechnical report recommendations.~~

D. Imported Fill Requirements: Imported fill, where required, shall be non expansive granular soil, free of organic matter and deleterious substances. In general, import fill should be tested and documents to be non-corrosive and free from hazardous material in concentrations above the level of concern. Imported fill material shall conform to the following requirements:

1. Grading:

U. S. Sieve Size	Percentage Passing Sieve
2 ½ inch	100
No. 8	25-45
No. 200	0-10

2. Be thoroughly compactable without excessive voids.

3. Fill to be treated with lime per Geotechnical report recommendations.

4. Meeting one of following plasticity requirements:

   a. Maximum Expansion Index of 50.

   b. Maximum Plasticity Index of 12, as determined by ASTM D4318.

E. Imported Fill for Planting Areas: Imported fill for use in planting areas shall be sandy loam weed free soil. Submit analysis from certified Soil and Plant Lab. Coordinate with Landscape Architect.

F. Topsoil: Friable clay loam surface soil found in a depth of not less than 10 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2 inches in diameter, and without weeds, roots and other objectionable material.

1. Use topsoil for top 2 feet of fill against exterior walls, except at paving and sidewalks.

2. Topsoil may also be used beyond the area within 5 feet of building, except under paving and sidewalks.

3. Confirm suitability of stockpiled materials.

G. Sand: Clean, well-graded fine to coarse sand with not more than 2 percent passing the No. 200 sieve based on wet sieve analysis. Provide at locations indicated in the construction documents.

Where coarse sand is required, provide sand no finer than No. 40 sieve.

H. Bioretention Soil Mixture

1. Follow Appendix L of the NPDES.

J. Drain Rock:

1. Washed, uniformly graded mineral aggregate ASTM D448 with percentage composition of dry weight conforming to following limits:

a. Passing 1-inch Sieve: 100 percent.

b. Passing 3/4-inch Sieve: 90-100 percent.

c. Passing No. 4 Sieve: 0-10 percent.

2. Base at Slab-on-Grade: As specified in the geotechnical report for this project.

3. Absorption of water to saturated-surface dry condition shall not exceed 3 percent of oven-dry weight of a sample.

K. Backfill material for use behind retaining walls shall be a granular material consisting of sand, broken rock, or a mixture of sand and gravel containing no size larger than 2 ½ inches and not more than 15 percent passing the No. 200 sieve.

L. Pea Gravel: 3/8 inch to ½ inch washed, uncrushed gravel. Use at drainage pipe and at other locations indicated.

M. Filter Fabric: Provide filter fabrics that meet or exceed the listed minimum physical properties determined according to ASTM D4759 and the referenced standard test method in parentheses.

4. Grab Tensile Strength (ASTM D4632): 120 lb.

5. Apparent Opening Size (ASTM D4751): #70 U.S. Standard sieve.

6. Permeability (ASTM D4491): 135 gallons per minute per square foot.

N. Drainage Pipe:

1. Perforated corrugated plastic drainage tubing meeting ASTM F667, with continuous integral nylon filter screen.

2. Acceptable Manufacturers and Products: Advanced Drainage Systems "DrainGuard," Hancor "Agri-Flow."

3. Provide couplings, elbows and other fittings as recommended by pipe manufacturer.

O. Water: Clean and free from deleterious amounts of acids, alkalis, salts and organic matter.

2.2 SOIL STERILANT:

A. Soil Sterilant shall be Treflan E.C. or approved equivalent.

2.3 TERMITICIDE:

A. Termiticide shall be Permethrin, Denon, or approved equivalent.

PART 3 - EXECUTION

3.01 GENERAL:

A. Prior to commencement of earthwork, become thoroughly familiar with site conditions.

B. If event discrepancies are found, immediately notify the District's Representative in writing, indicating the nature and extent of differing conditions.

C. Requirements:

1. Grades and elevations are to be established with reference to benchmarks referenced on Drawings.

2. Maintain engineering markers such as monuments, benchmarks and location stakes. If disturbed or destroyed, replace.

D. No earthwork shall be performed without physical presence or acceptance of the Geotechnical Engineer.

E. The Geotechnical Engineer's acceptance is required by these specifications; notify the District's Representative at least 48 hours prior to commencing any phase of earthwork.

1. No phase of work shall proceed until prior phase has been accepted by the Geotechnical Engineer.

2. Work shall not be covered up or continued until acceptance of the Geotechnical Engineer shall give written notice of conformance with the specifications upon completion of grading.

F. Compacting:

1. Compact by power tamping, rolling or combinations thereof as accepted by the Geotechnical Engineer.

2. Where impractical to use rollers in close proximity to walls, stairs, etc., compact by mechanical tamping.

3. Scarify and re-compact any layer not attaining compaction until required density is obtained.

4. Compaction by flooding, ponding or jetting will not be permitted, unless specifically accepted by the Geotechnical Engineer.

G. Hazardous Materials

1. If any materials are encountered that may be hazardous (as defined in Section 25117 of the California Health and Safety Code), inform the District's Representative verbally within 24 hours and in writing within 2 business days. Upon discovery, material is to remain undisturbed until investigation by State's representative is complete. The removal and disposal of hazardous materials, if discovered, is not part of the scope of work of this Division for this project.

3.02 SITE PREPARATION:

A. Protect structures, utilities, sidewalks, pavements, and other facilities which are to remain from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations. Set up tree protection measures prior to commencing grading or demolition operations.

B. Clearing and Grubbing:

1. Remove from area of designated project earthwork all improvements and obstructions, including designated concrete curbs or slabs, asphaltic concrete, all tree and shrub roots, any abandoned buried utility, any irrigation lines, and other matter determined by the Geotechnical Engineer to be deleterious.

   a. In all new planting areas, remove existing base material.

   b. Use only hand methods for grubbing inside the drip line of trees indicated to be left standing.

   c. Vegetation should be removed to such a depth that organic material is generally not present.

2. Remove from the site all trees and shrubs, unless otherwise indicated on the drawings as existing trees to be left standing.

3. Active utilities with the project limit should be rerouted or protected from damage by construction activities.

4. Rubble and excavated materials that do not meet the criteria of fill should be disposed of in an appropriate landfill.

5. Excavations resulting from the removal of buried utilities, tree stumps, or obstructions should be backfilled with compacted fill in accordance with the recommendations of the geotechnical report.

6. Existing Trees to remain:

    a. Verify the locations of existing trees to be preserved.

    b. Replace existing trees to remain that are damaged during construction at no additional cost to the District.

    c. Carefully make clean cuts at roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction. Paint cuts over ½ inch in size with tree pruning compound.

C. Topsoil:

1. Strip topsoil to whatever depths encountered in manner to prevent intermingling with the underlying subsoil or other objectionable material.

2. Remove heavy growths of grass from areas before stripping. Where trees are indicated to be left standing, stop topsoil stripping a sufficient distance to prevent damage to the main root system.

3. Stockpile topsoil in storage piles to freely drain surface water.

4. Cover storage piles if required to prevent windblown dust.

3.03 EXISTING UTILITIES:

A. Protect existing utilities that are to remain in operation as specified.

B. Demolish and completely remove from the site existing underground utilities indicated to be removed. See Section 31 10 00 – SITE PREPARATION AND DEMOLITION.

C. Movement of construction machinery and equipment over existing pipes and utilities during construction shall be at contractor's risk.

D. Excavation made with power-driven equipment is not permitted within 2 feet of any known utility or subsurface structure.

1. Use hand or light equipment for excavating immediately adjacent to or for excavations exposing a utility or buried structure.

2. Start hand or light equipment excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured.

3. Support uncovered lines or other existing work affected by excavation until approval for backfill is obtained.

4. Report damage of utility line or subsurface structures immediately to the District's Representative.

3.04 PREPARATION OF SUBGRADE:

E. Scarify exterior flatwork and pavement subgrade to a depth of at least 8 inches and work until uniform and free from large clods.

5. Bring expansive subgrades to not less than 3 percentage points above optimum moisture content (not less than 2 percentage points above optimum upper 6 inches of pavement subgrade) and compact to 90 percent of the maximum laboratory dry density, in accordance with ASTM D1557.

6. Bring non-expansive subgrades to or slightly above the optimum moisture content and compact to 90 percent of the maximum laboratory dry density in accordance with ASTM D1557.

7. Increase compaction of the upper 6 inches of pavement subgrades to 95 percent of the maximum laboratory dry density and at least 2 percent over the optimum moisture content per ASTM D1557 for non-expansive subgrades.

3.05 DEWATERING:

A. Do not allow water from surface drainage or underground sources to accumulate in excavations, unfinished fills, or other low areas.

B. Provide and maintain ample means and devices to remove water promptly and dispose properly of water entering excavations or other parts of the work to prevent softening of exposed surfaces.

C. Dewater by methods which will ensure dry excavation and preservation of finish lines and grades of excavation bottoms.

D. Prior to excavating below ground water level, place dewatering system in operation.

1. Lower the ground water level a minimum of 1 foot below the bottom of the excavation.

2. Relieve the hydrostatic pressure in pervious zones below the subgrade elevation to prevent uplift.

3. Use screens and gravel packs as necessary to prevent removal of fines from the soil.

E. Operate the dewatering system continuously, 24 hours a day, 7 days a week until construction work below existing ground water lever is completed.

1. Measure and record the performance of the dewatering system.

2. After placement of initial slabs and backfill, the ground water level may be allowed to rise.

3. At no time allow ground water to rise higher than 1 foot below the prevailing level of excavation or backfill.

4. Have a back-up pump and system available for immediate use.

F. Dispose of water away from the work in suitable manner without damage to adjacent property or menace to public health.

G. Do not drain water into work being built or under construction without prior acceptance of the District's Representative.

H. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.

3.06 SITE EXCAVATION:

A. General

1. All supports, shoring, and sheet piling required for the sides of excavations or for protection of adjacent existing improvements shall be provided and maintained by the Contractor. The adequacy of such systems shall be the complete responsibility of the Contractor.

2. Earth and rock, regardless of character and subsurface conditions, shall be excavated to depths shown on drawings and to the neat dimensions of the footings wherever practicable, to permit pouring of footings and grade beams without use of side forms, except at slab perimeters.

3. Large rocks, pieces of concrete or other obstructions, if encountered during the excavation/scarifying operations, shall be removed and disposed of by the Contractor off the site in a legal manner.

4. Where footing excavation is too deep, backfill shall be concrete. Where footings are over dug laterally, side forms shall be employed for backfill with rock fill or concrete backfill shall be used (Contractor's option).

5. Where forming is required, only that excavation necessary to permit placing and removal of forms shall be done.

6. Bottoms of all footings and foundations trenches shall be subject to testing by the Geotechnical Engineer. Corrective measures as directed by the State's representative shall be executed promptly.

B. Excavate subgrade as required to allow for finish grades shown on drawings, as required for structural fill or otherwise required for proper completion of the work.

C. Remove and replace subgrade materials designated by Geotechnical Engineer as unsuitable.

3.07 FILL AND COMPACTING:

A. General Requirements:

1. Backfill excavations as promptly as work permits.

2. Do not place select fill or backfill until rubbish and deleterious materials have been removed and areas have been approved by the District's Representative.

3. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

4. In excavations, use satisfactory excavated or borrow material.

5. Under grassed areas, use satisfactory excavated or borrow material.

B. After subgrade compaction has been approved by the Geotechnical Engineer, spread the engineered fill materials in lifts not exceeding 8 inches and uniformly mixed during the spreading operation.

1. Bring non-expansive fill materials to or slightly above the optimum moisture content and compacted to at least 90 percent of the maximum laboratory dry density, per ASTM D1557.

2. Bring non-expansive aggregate fill materials to or slightly above the optimum moisture content and compacted to at least 95 percent of the maximum laboratory dry density, per ASTM D1557.

3. Do not compact the top 12 inches of soil in the planting areas.

4. Fill sections greater than 5 feet in depth shall be compacted to at least 95 percent.

C. Repeat compaction procedure until proper grade is attained.

D. Rocks generated during site earthwork may be used in fill when conforming to material specifications.

3.08 MOISTURE CONTROL:

A. Do not place, spread or roll fill material during unfavorable weather conditions or when fill material is excessively wet.

B. Do not resume operations until moisture content and fill density are satisfactory to the Geotechnical Engineer.

C. Provide berms or channels to prevent surface water from flooding excavations. Promptly remove water collecting in depressions.

D. Where soil has been softened or eroded by flooding or by placement during unfavorable weather, remove damaged areas and re-compact as described for fill and compaction.

E. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material.

1. Prevent free water appearing on surface during or subsequent to compaction operation.

2. Remove and replace, or scarify and air dry, soil material too wet to permit compaction to specified density.

3. Soil material removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

3.09 GRADING:

A. General: Uniformly grade areas of work including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

1. All areas covered by the project, including excavated and filled areas and adjacent transition areas, shall be uniformly graded so that finished surfaces are at the elevations established by the plans. Planter areas to receive future topsoil shall be graded below finished grade to allow for such material.

2. Finished surfaces and surfaces to receive paving and aggregate base shall be smooth, compacted, and free from irregular surface drainage.

3. Ditches, gutters, and swales shall be finished to permit proper surface drainage.

4. All surface areas, except paved and sloped embankments exceeding 8:1, shall be hydroseeded in accordance with specifications in Landscaping Sections.

B. Grading Tolerances:

1. Excavations shall not exceed 0.10-foot variation from dimensions and elevations shown or noted, unless otherwise approved by the District's Representative.

2. Fill and backfill shall be placed with tolerance of plus or minus 0.10 foot if placed in layers.

3. Grading shall be done within plus or minus 0.10 foot typically; areas under slabs, walks or pavements shall be graded within tolerance of 0 to 0.10 foot.

4. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.

5. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.

6. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than ½ inch above or below required subgrade elevation.

C. Compaction: After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

3.10 SOIL STERILIZATION:

A. General: Soil sterilant shall be applied to prepared subgrade or after installation of rock or aggregate base as recommended by the manufacturer. Sterilant shall be applied uniformly at the rate recommended by the manufacturer to all areas beneath asphalt concrete pavement, brick pavement, concrete pavement, or on-grade concrete slabs

including sidewalks, curbs, and gutters and areas between the inner and outer security fences. In addition to ground areas treated, sterilant shall be applied below expansion or control joints, and at all areas where pipe, ducts, or other features penetrate slabs.

3.12 DISPOSAL OF EXCESS AND WASTE MATERIALS:

A. Removal of Excess Excavated Material: Excess material shall be removed by the Contractor off the site in a legal manner.

3.13 FIELD QUALITY CONTROL:

A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.

1. Perform field in-place density tests according to ASTM D1556 (sand cone method), ASTM D2167 (Rubber Balloon Method), or ASTM D2937 (Drive Cylinder Method), as applicable.

    a. Field in-place density tests may also be performed by the nuclear method according to ASTM D6938 , provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D1556. With each density calibration check, check the calibration curves furnished with the moisture gauges according to ASTM D6938

    b. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gauges at beginning of work on each different type of material encountered, and at intervals as directed by the Architect.

2. Footing Subgrade: At footing subgrades, use a hand probe and consult with the Geotechnical Engineer.

3. Paved and Building Slab Areas; At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2,000 square feet or less of paved area or building slab, but in no case fewer than three tests.

4. Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.

5. Trench Backfill: In each compacted initial and final backfill layer, perform at least one filed in-place density test for each 150 feet or less of trench, but not fewer than two tests.

B. Number and location of test shall be at option of the Geotechnical Engineer.

C. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, re-compact and retest until required density is obtained.

D. After grading is completed and the testing agency has completed observation of the work, permit no further excavation or filling, except as approved by the District's Representative.

3.14 PROTECTION:

A. Protect newly graded areas from traffic and erosion. In unpaved areas without landscaping, cover with straw erosion control blanket. Follow manufacturer's recommendations for installation. Provide and place straw wattles or biodegradable fiber logs across the slope at the midpoint and along the downhill edge of site. No soil is to be left uncovered at the completion of construction. Keep free of trash and debris.

B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

C. Where completed compacted areas are disturbed by subsequent construction operation or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work, including retesting, prior to further construction.

3.15 CLEAN-UP:

A. Comply with requirements of Section 01 74 00 – CLEANING.

3.16 TERMITICIDE:

A. Termiticide shall be applied to soils as recommended by the manufacturer. Termiticide shall be applied uniformly at the rate recommended by the manufacturer to all areas beneath and around wood frame structures.

END OF SECTION

SECTION 31 23 33

TRENCHING, BACKFILLING, AND COMPACTING

PART 1 – GENERAL

1.01 SUMMARY:

A. Provide labor, material, equipment, and services necessary to complete the backfilling and compacting as necessary for this project. Section includes, but is not limited to:

1. Initial Backfill Material.
2. Subsequent Backfill.
3. Detectable Tape.
4. Trench Excavation.
5. Pipe Bedding.
6. Trench Backfill.
7. Trench Surfacing.

B. Work specified in Related Sections include:

1. Section 31 22 00 – EARTHWORK AND GRADING.
2. Section 33 10 00 – WATER SYSTEMS.

1.02 DEFINITIONS:

A. Select Fill:

1. Soil or soil-rock material approved by the Engineer of Record and transported to the site by the Contractor in order to raise grades or to backfill excavations.
2. Contractor shall provide sufficient tests, and a written statement that all materials brought onto the project site comply with specification requirements.

B. Excavation: Consists of the removal of material encountered to subgrade elevations.

C. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below base.

D. Base: The layer placed between the subgrade and surface pavement in a paving system.

E. Relative Compaction: In-place dry density of soil expressed as percentage of maximum dry density of same materials, as determined by laboratory test procedure American Society for Testing and Materials (ASTM) D1557.

1.03 SYSTEM DESCRIPTION:

A. Requirements:

1. Comply with the recommendations of the Engineer of Record.

2. Protect existing trees to remain. No grading is permitted under the drip line of protected trees.

3. Excavations for appurtenant structures, such as, but not limited to, manholes, transition structures, junction structure, vaults, valve boxes, catch basins, thrust blocks, and boring pits, shall be deemed to be in the category of trench excavation.

4. Unless otherwise indicated in the Drawings, all excavation for pipelines shall be open cut.

1.04 SUBMITTALS:

A. Comply with provisions of Section 01 33 00 – SUBMITTAL PROCEDURES.

B. Test Reports: Submit the following report for import material directly to the District's Representative from the Contractor's testing services:

1. Compaction test reports for import materials.

C. Submit description of compactors proposed for use when requesting placement of base material.

1.05 QUALITY ASSURANCE:

A. Requirements of Regulatory Agencies:

1. Comply with State of California Business and Transportation Agency, Department of Transportation (Caltrans) latest edition of "Standard Specifications." (Caltrans Standard Specification).

2. Comply with State of California Code of Regulations (CCR).

3. Comply with State of California Construction Safety Orders, Latest Edition (CAL/OSHA).

B. Soil Testing:

1. District shall engage a geotechnical testing agency, to include compaction testing and for quality control testing during fill operations.

2. Test results will be submitted to the District's Representative.

C. Codes and Standards:

1. Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

2. NPDES Construction General Permit.

3. Project Storm Water Pollution Prevention Plan (SWPPP)

4. California Department of Transportation Standard Specifications (Caltrans Standard Specification):

    a. Section 19: Earthwork.

    b. Standard Test Methods: No. 202.

5. American Society for Testing and Materials (ASTM):

    a. D1556: Density of Soil by the Sand Cone Method.

    b. D1557: Moisture Density Relations of Soils and Soil-Aggregate Mixtures.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Protect materials before, during and after installation.

B. Comply with provisions of Section 01 57 00 – TEMPORARY FACILITIES AND CONTROLS where necessary to control dust and noise on and near the work caused by operations during construction activities.

1.07 PROJECT CONDITIONS:

A. Environmental Requirements:

1. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.

2. Protect existing streams, ditches and storm drain inlets during work on this project.

B. Barricade open excavations and post with warning lights.

1. Comply with requirements of Section 01 57 00 – TEMPORARY FACILITIES AND CONTROLS.

2. Operate warning lights and barricades as required.

3. Protect structures, utilities, sidewalks, pavements, and other facilities immediately adjacent to excavations, from damages caused by settlement, lateral movement, undermining, washout, and other hazards.

C. Protection of Subgrade: Do not allow equipment to pump or rut subgrade, stripped areas, footing excavations, or other areas prepared for project.

D. Transport all excess soils materials by legally approved methods to disposal areas.

1. Coordinate with the District’s Representative.

2. Any additional fill requirements shall be the responsibility of the Contractor.

1.08 EXISTING UTILITIES:

A. Locate existing underground utilities in the areas of work. For utilities that are to remain in place, provide adequate means of protection during excavation operations.

B. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult utility agency immediately for directions.

1. Cooperate with the District's Representative and public and private utility companies in keeping their respective services and facilities in operation.

2. Repair damaged utilities to the satisfaction of the utility owner.

C. Do not interrupt existing utilities serving facilities occupied and used by the District or others, except when permitted in writing by the District's Representative and then only after acceptable temporary utility services have been provided.

1.09 SEQUENCING AND SCHEDULING:

A. The sequence of operations shall be reviewed by the District's Representative prior to commencement of any work.

PART 2 – PRODUCTS

2.01 MATERIALS:

A. General:

1. Backfill materials will be subject to approval of the Engineer.

2. For approval of backfill fill material, notify the District's Representative at least 7 days in advance of intention to import material.

3. Consideration shall also be given to the environmental characteristics as well as the corrosion potential of backfill materials. Laboratory testing, including pH, soluble sulfates, chlorides, and resistivity shall be reviewed. Backfill materials shall not be more corrosive than the native materials.

B. Trench Sand:

1. Material free from clay, organic materials, and other deleterious substances and conforming to Caltrans Standard Specification Section 19-3.02F(2).

C. Trench Gravel:

1. Granular material free from clay, organic materials, and other deleterious substances and conforming to Class 1 Type A Permeable Material, per Caltrans Standard Specification Section 68-2.02F(2).

D. Approved Native Fill:

1. See Section 31 22 00 – EARTHWORK AND GRADING.

E. Imported Fill:

1. See Section 31 22 00 – EARTHWORK AND GRADING.

F. Class II Aggregate Base: ¾" maximum, Class II AB, free from organic matter and other deleterious substances and conforming to Caltrans Standard Specification Section 26-1.02A.

G. Controlled Low Strength Material (CLSM):

1. Low strength structural backfill with a compressive strength between 50 and 100 psi, conforming to Caltrans Standard Specifications Section 19-3.02G.

H. Water: Clean and free from deleterious amounts of acids, alkalis, salts and organic matter.

2.02 BURIED WARNING AND IDENTIFICATION TAPE

A. Polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 75 mm 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

1. Warning Tape Color Codes.

Red: Electric.

Yellow: Gas, Oil; Dangerous Materials.

Orange: Telephone and Other Communications.

Blue: Water Systems.

Green: Sewer Systems.

White: Steam Systems.

Gray: Compressed Air.

2. Warning Tape for Metallic Piping: Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

3. Detectable Warning Tape for Non-Metallic Piping: Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 920 mm 3 feet deep.

Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.03 DETECTION WIRE FOR NON-METALLIC PIPING

A. Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

PART 3 – EXECUTION

3.01 GENERAL:

A. Prior to commencement of work, become thoroughly familiar with site conditions.

B. In the event discrepancies are found, immediately notify the District's Representative in writing, indicating the nature and extent of differing conditions.

C. Backfill excavations as promptly as work permits.

D. Do not place engineered fill or backfill until rubbish and deleterious materials have been removed and areas have been approved by the District's Representative.

E. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

F. In excavations, use satisfactory excavated or borrow material.

G. Under grassed areas, use satisfactory excavated or borrow material.

3.02 COMPACTING:

A. Compact by power tamping, rolling or combinations thereof.

1. Where impractical to use rollers in close proximity to walls, stairs, etc., compact by mechanical tamping.

2. Scarify and re-compact any layer not attaining compaction until required density is obtained.

3.03 SITE PREPARATION:

A. Protect structures, utilities, sidewalks, pavements, and other facilities, which are to remain, from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.

3.04 EXISTING UTILITIES:

A. Identity the location of existing utilities.

1. Prior to trenching, the Contractor shall excavate at locations specifically indicated on the Drawings, if any, and where new lines cross other utilities of uncertain depth and determine the elevation of the utility in question to ensure that the new line will clear the potential obstruction.

2. The Contractor shall contact Underground Service Alert (USA) at 811 for assistance in locating existing utilities.

3. If, after the excavation, a crossing utility does present an obstruction, then the line and grade of the new line will be adjusted as directed by the Engineer of Record to clear the utility.

B. Protect all existing utilities to remain in operation.

C. Movement of construction machinery and equipment over existing pipes and utilities during construction shall be at Contractor's risk.

D. Excavation made with power-driven equipment is not permitted within 2 feet of any known utility or subsurface structure.

1. Use hand or light equipment for excavating immediately adjacent to known utilities or for excavations exposing a utility or buried structure.

2. Start hand or light equipment excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured.

3. Support uncovered lines or other existing work affected by excavation until approval for backfill is obtained.

4. Report damage of utility line or subsurface structures immediately to the District's Representative.

E. Backfill trenches resulting from utility removal in accordance with this section.

3.05 TRENCH EXCAVATION

A. General:

1. Excavation shall include removal of all water and materials that interfere with construction. The Contractor shall remove any water which may be encountered in the trench by pumping or other methods during the pipe laying, bedding and backfill operations. Material shall be sufficiently dry to permit approved jointing.

2. Excavation shall include the construction and maintenance of bridges required for vehicular and pedestrian traffic, support for adjoining utilities.

3. The Contractor shall be responsible to safely direct vehicular and pedestrian traffic through or around his/her work area at all times.

4. The Contractor shall relocate, reconstruct, replace or repair, at his/her own expense, all improvements which are in the line of construction or which may be damaged, removed, disrupted or otherwise disturbed by the Contractor.

B. Existing Paving and Concrete:

1. Existing pavement over trench shall be saw cut, removed, and hauled away from the job. Existing pavement shall be neatly saw cut a minimum of 6-inches beyond the limits of excavations.

2. Existing concrete over the trench shall be saw cut to a full depth in straight lines either parallel to the curb or right angles to the alignment of the sidewalk.

3. Boards or other suitable material shall be placed under equipment out rigging to prevent damage to paved surfaces.

C. Trench Width:

1. The maximum allowable trench widths at the top of the pipe shall be as follows:

Pipe Type	Trench Width (Maximum)
Copper	Outside diameter of barrel plus 18 inches
Plastic	"
Vitrified Clay	"
Cast-Iron	Outside diameter of barrel plus 24 inches
Ductile-Iron	"
Reinforced Concrete	

   a. The maximum trench width shall be inclusive of all shoring.

   b. If the maximum trench width is exceeded, the District's Representative or Inspector of Record may direct the Contractor to encase or cradle the pipe in concrete at no additional charge.

2. For pipes 3 inch diameter and larger, the free working space on each side of the pipe barrel shall not be less than 6 inches.

D. Open Trench:

1. The maximum length of open trench shall be 300 feet or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is greater. No trench shall be left open at the end of the day.

2. Provisions for trench crossings and free access shall be made at all street crossings, driveways, water gate valves, and fire hydrants.

E. Excavation Bracing:

1. The excavation shall be supported and excavation operations shall be conducted in accordance with the California Industrial Accident Commission and CAL/OSHA.

2. The Contractor shall, at his/her own expense, furnish, put in place, and maintain such sheeting and bracing as may be required to support the sides of all excavations (whether above or below the pipe grade), and to prevent any movement which could in any way diminish the required trench section or otherwise injure or delay the work. The sheeting and bracing shall be withdrawn in a manner such as to prevent any earth movement that might overload the pipe.

F. Excavated Material:

1. All excavated material not required for backfill shall be immediately removed and properly disposed of in a legal manner by the Contractor.

2. Material excavated in streets and roadways shall be laid alongside the trench no closer than 2 feet from the trench edge and kept trimmed to minimize inconvenience to public traffic.

3. Provisions shall be made whereby all storm and wastewater can flow uninterrupted in gutters or drainage channels.

3.06 PIPE BEDDING

A. Bedding Excavation: The trench shall be excavated below the grade of the pipe bottom to the following minimum depths:

Pipe Type	Depth
Copper	3 inch
Reinforced Concrete	3 inch
Plastic: 2 inch diameter and smaller	3 inch
Cast/Ductile Iron	6 inch
Plastic: over 2 inch diameter	6 inch

1. Stabilization of Trench Bottom: When the trench bottom is unstable due to wet or spongy foundation, trench bottom shall be stabilized with gravel or crushed rock. The Inspector of Record will determine the suitability of the trench bottom and the amount of gravel or crushed rock needed to stabilize a soft foundation. Soft material shall be removed and replaced with gravel or crushed rock as necessary.

2. Placement of Bedding Material: The trench bottom shall be cleaned to remove all loose native material prior to placing pipe bedding material. Pipe bedding shall be trench sand or trench gravel, as defined in these specifications. Sufficient pipe bedding material shall be placed in trench and tamped to bring trench bottom up to grade of the bottom of pipe, plus 1/8th of the pipe diameter. The relative compaction of tamped material shall be not less than 90 percent.

It is the intention of these requirements to provide uniform bearing under the full length of pipe to a minimum width of 60 percent of the external diameter.

3.07 TRENCH BACKFILL

A. Initial Backfill:

1. Prior to trench backfill, the condition of the trench and lying of pipe must be inspected and approved by the Inspector of Record.

2. Trench Sand and Trench Gravel shall be used for initial backfill. After the pipe has been properly laid and inspected, initial backfill material shall be placed on both sides of the pipe and compacted to final depth as follows:

Pipe Type	Depth
Copper	6 inches above top of pipe
Cast Iron	6 inches above top of pipe
Plastic: less than 3 inches diameter	6 inches above top of pipe
Plastic: 3 inches diameter and larger	12 inches above top of pipe
Ductile Iron	12 inches above top of pipe
Reinforced Concrete	½ outside diameter of pipe (pipe spring line)

3. Compaction: Initial backfill compaction shall be by mechanical means. The initial backfill material shall be hand tamped in layers not exceeding 4 inches in un-compacted depth and shall be brought up uniformly on both sides of the pipe to avoid bending or distortional stress. After hand tamping, the relative compaction of the initial backfill material shall be not less than 90 percent.

4. Pipe Detection: In trenches containing pressurized plastic pipes, tracer wire shall be placed directly above the pipe and shall be connected to all valves, existing exposed tracer wires, and other appurtenances as appropriate.

5. For natural gas piping see also Section 33 50 00 – NATURAL GAS DISTRIBUTION PIPING Section 3.02.C.

B. Subsequent Backfill:

1. Subsequent backfill material shall consist of approved native material, imported fill, or Class II AB conforming to these specifications.

2. Structure and utility trench backfill should be moisture conditioned, placed in lifts eight inches or less in loose thickness, and mechanically compacted to at least 90 percent relative compaction except the relative compaction shall not be less than 95 percent within 2-1/2 feet of finished permanent surface grade or 1-1/2 feet below the finished subgrade, whichever is greater; jetting will not be permitted. The moderately expansive clay soils exposed in trenches should not be allowed to dry out prior to placement of trench backfill materials.

3. It must be the contractor's responsibility to select equipment and procedures that will accomplish the grading as described above. He/she must organize his/her work in such a manner that the Soil Engineer can test and/or observe each element of grading.

C. Controlled Low Strength Material (CLSM):

1. CLSM is permitted at Engineer of Records discretion or where indicated on the contract documents.

D. Jetting and Ponding:

1. Jetting of trench backfill is not permitted.

E. Compaction Testing:

1. Compaction testing shall be in accordance with California Test Method ASTM D1556 or D1557.

3.08 TRENCH SURFACING

A. Unpaved Areas:

1. In unimproved areas, the trench surface shall be restored to its original condition. No mounds of earth shall be left along the trench. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

2. Where completed compacted areas are disturbed by subsequent construction operation or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work, including retesting, prior to further construction.

B. Temporary Surfacing:

1. Temporary surfacing shall be a minimum of 2 inches of cutback asphalt on 10 inches of Class 2 aggregate base and shall be placed at all trench locations subject to vehicular or pedestrian traffic.

2. Temporary surfacing shall be laid within one day after backfilling (except where the Contractor elects to place permanent surfacing within this time period).

3. Before the trenching area is opened for traffic, all excess dirt, rock, and debris shall be removed, the street surface shall be swept clean and the pavement shall be washed down with a water truck and pressure nozzle.

4. Temporary surfacing shall be maintained to prevent the occurrence of mud holes and prevent the surface from settling below 1 inch or rising more than 1 inch from the existing pavement grade.

3.09 MOISTURE CONTROL:

A. Do not resume operations until moisture content and fill density are satisfactory to the Engineer.

3.10 DISPOSAL OF EXCESS AND WASTE MATERIALS:

A. Testing Services: Allow testing agency to test each backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.

B. When testing agency reports that backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, re-compact and retest until required density is obtained.

3.11 PROTECTION:

A. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

B. Where completed compacted areas are disturbed by subsequent construction operation or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work, including retesting, prior to further construction.

3.12 CLEAN-UP:

A. Remove all debris, equipment, tools and materials upon completion prior to final inspections to the satisfactions of the engineer.

B. In unpaved areas without landscaping, cover with straw erosion control blanket. Follow manufacturer’s recommendations for installation. Provide and place straw wattles or biodegradable fiber logs across the slope at the midpoint and along the downhill edge of site. No soil is to be left uncovered at the completions of construction.

END OF SECTION

SECTION 32 12 33

PAVING AND SURFACING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes (but is not necessarily limited to):

1. Asphalt Concrete Paving.
2. Portland Cement Concrete Paving.
3. Liquid Asphalt and Asphalt Emulsion.
4. Aggregate Base.
5. Concrete Pavers.
6. Decomposed Granite.
7. Sealants

B. Related work furnished under other sections but conforming to the provisions of this section:

1. Subgrade preparation.
2. Aggregate Base installation.

C. Related Sections:

1. Section 31 10 00 – SITE PREPARATION AND DEMOLITION.
2. Section 31 22 00 – EARTHWORK AND GRADING.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. A615: Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
2. C150: Portland Cement.
3. D1557: Moisture Unit Weight Relations of Soils and Aggregate Mixtures Using a 10 lb (4.5 kg) Rammer and 18 in. (457 mm) Drop.
4. D1682: Breaking Loads and Elongation of Textile Fabrics.

B. California Code of Regulations (CCR): Title 24, Chapter 2-71, Site Development Requirements for ADA Accessibility.

C. California Building Code (CBC): Title 24, Part 2 (Volumes 1 & 1), Chapter 11B, Accessibility to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing

D. California Department of Transportation (Caltrans):

1. Standard Specifications:

a. Section 24: Stabilized Soils.

b. Section 26: Aggregate Bases.

c. Section 37: Bituminous Seals.

d. Section 39: Asphalt Concrete.

e. Section 40: Concrete Pavement.

f. Section 41: Concrete Pavement Repair.

g. Section 51: Concrete Structures.

h. Section 52: Reinforcement.

i. Section 73: Concrete Curbs and Sidewalks.

j. Section 90: Portland Cement Concrete.

k. Section 92: Asphalts.

l. Section 93: Liquid Asphalts.

m. Section 94: Asphaltic Emulsions.

n. Section 95: Epoxy

2. Traffic Manual.

3. Highway Design.

E. Institute of Transportation Engineers: Transportation and Traffic Engineering Handbook.

F. American Concrete Institute Manual of Practice.

1.03 SUBMITTALS

A. Requirements: Refer to Section 01 33 00 – SUBMITTAL PROCEDURES.

B. Asphalt Concrete Paving:

1. Provide copies of material certificates signed by the material producer and the Contractor, certifying that each material item complies with or exceeds specified requirements.

2. The Contractor shall furnish a certified weight or load slip for each load of material used in the construction of the asphalt concrete pavement.

C. Concrete Paving: The Contractor shall furnish mill test reports on the cement, reinforcement bars, and aggregates, showing compliance with the respective specifications. The Testing Engineer may make concrete test cylinders and slump tests as deemed necessary to determine compliance with the Specifications.

D. Liquid Asphalt.

E. Pavement Reinforcement Fabric.

F. Tack Coat.

G. Pavement Reinforcement Mesh.

H. Structural Geotextile Fabric.

I. Concrete Pavers.

J. Slurry Seal.

K. Joint Sealants.

L. Backer Rod.

M. Joint Filler.

N. Epoxy Crack Filler.

O. Bonding Epoxy.

P. Concrete Quality Control Plan. Inclusive of the following:

Placing and timing of joints including a location plan for all joints

Bar placement, alignment

Concrete placement methods

Finishing and curing methods and timing.

Joint sealants and timing of placement

1.04 PROJECT CONDITIONS

A. Liquid Asphalt and Asphalt Emulsion:

1. Seal coat and paint binder shall be applied only when the ambient temperature is above 50° Fahrenheit and when temperature has not been below 35° Fahrenheit for 12 hours immediately prior to application.

2. Fog coat, seal coat, and paint binder shall not be applied when base or surfaces are wet or contain excess moisture.

B. Asphalt Concrete Paving: Asphalt concrete surfaces shall be constructed only when ambient temperature is above 50° Fahrenheit and when base is dry.

C. Portland Cement Concrete: Concrete shall be placed when the conditions will yield satisfactory results and when the ambient temperature will be above 40°F for 72 hours after placement with no threat of precipitation.

D. Joint Sealants: Sealants shall be placed per the manufacturers recommendations and when temperature is above 40°F for 2 days after and no threat of precipitation.

PART 2 - PRODUCTS

2.01 PAVING MATERIALS

A. Aggregate Base: Aggregate base shall conform to Caltrans Class 2 (R value 78 min) aggregate base, 3/4" maximum size, as specified in Section 26 of the Caltrans Standard Specifications.

B. Asphalt Concrete Paving:

1. Shall be Type A HMA, conforming to Section 39-2.02B of the Caltrans Standard Specifications.

2. Asphalt binder to be mixed with aggregate shall be performance-graded asphalt, PG64-10, conforming to Section 92 of the Caltrans Standard Specifications.

3. Aggregate size shall be as follows:

Total AC Thickness	Min # of AC lifts	Aggregate Grading
3/4 inch – 1-1/2 inch	1	1/2" max
2 inch – 2-1/2 inch	1	1/2" max
3 inch or greater	2	1/2" max for top lift and 3/4" max for initial lifts

4. If multiple lifts, apply a tack coat before placing a subsequent lift.

5. Asphaltic emulsion for paint binder, fog coat, and seal coat shall be emulsified asphalt, Type SS-1h, conforming to Section 94 of the Caltrans Standard Specifications.

C. Portland Cement Concrete:

1. Concrete shall be minor concrete conforming to Section 90-2 of the Caltrans Standard Specifications, except as modified by these specifications.

2. Concrete Pavement shall contain a minimum of 505 lbs/yard of cementitious material.

3. Cement shall be a combination of Type II or Type V Portland cement and supplemental cementitious materials conforming to Section 90-1.02B of the Caltrans Standard Specifications.

4. For minor concrete, the maximum aggregate size must not be larger than 1-1/2 inches or smaller than ¾ inch, per Section 90-2.02C of the Caltrans Standard Specifications.

5. Water shall be potable and free of organic matter and injurious amounts of oil, acid, alkali, or other deleterious substances.

6. Unless otherwise noted on the plans the concrete mix design shall provide a minimum compressive strength of 3,000 psi at 28 days.

7. Supplementary Cementitious Materials (SCM) shall comply with Section 90-1.02B(3) of the Caltrans Standard Specifications including chemical properties, physical properties, and proportioning.

8. Reinforcing bars shall be deformed and shall conform to ASTM A615, Grade 40 or 60.

9. Filled joints, unless noted otherwise on the Drawings, shall be 1/4-inch wide, the full depth of the concrete section and conforming to Section 51 of the Caltrans Standard Specifications.

10. Joint filler shall conform to Section 51 of the Caltrans Standard Specifications for pre-molded expansion joint filler and expanded polystyrene joint filler.

11. No admixtures will be allowed without prior approval of the Engineer of Record.

D. Epoxy shall meet the requirements of Section 95 of the Caltrans standard specifications.

1. Epoxy used to bond dowels to hardened concrete shall be Type 1, Grade 1, Class B or C per ASTM C881.

2. For high strength applications epoxy shall be Type IV.

E. Pavement Reinforcement Fabric: Pavement reinforcement fabric shall meet Caltrans Section 96-1.02J. BP Petromat, or approved equivalent.

F. Crack Sealant:

1. Crack sealant shall be rubberized hot-pour type and shall meet ASTM D 3405. Husky 1611, or approved equivalent.

2. Blotting Agent shall be one of: Screened sand, cement, or fly ash.

G. Tack coat: Tack coat shall meet Caltrans Section 39-2.01B(10).

H. Pavement reinforcement mesh: Pavement reinforcement mesh for use in overlays shall be Glasgrid Model 8501, or approved equivalent.

I. Structural geotextile fabric: Structural geotextile fabric shall be Mirafi 500X, or approved equivalent.

J. Joint Sealant:

1. Dow Corning 890-SL or approved silicone sealant conforming to ASTM D5893, C639, C1183, C679, C792, C66 and C792.

2. Conform to Caltrans Section 41-5.02B.

K. Backer Rod

1. Backer Rod shall be expanded, cross linked, crossed-cell polyethylene foam compiling to ASTM D5249, Type I.

2. Rod diameter shall be 25% greater than the saw cut joint width.

2.02 BITUMINOUS SEALS

A. Fog Seal: Fog Seal asphaltic emulsion shall conform to Caltrans Section 37-4.02.

B. Flush Coat: Flush Coat asphaltic emulsion shall conform to Caltrans Section 37-4.03. Sand for the flush coat shall comply with the fine aggregate grading in Caltrans Section 90-1.02C(3), sand must be free of organic material or clays.

C. Slurry Seal: Slurry seal shall conform to Caltrans Section 37-3.02B, and be Type II unless otherwise specified.

D. Chip Seal: Chip seal shall conform to Caltrans Section 37-2 for polymer modified asphaltic emulsion seal coat and included screenings per Caltrans Section 37-2.01B.

E. Crack Sealant: Crack Sealant shall conform to Caltrans Section 37-6.02, Type 2, unless otherwise specified.

PART 3 - EXECUTION

3.01 PREPARATION

A. Subgrade and Aggregate Base:

1. Prepare subgrade and over excavate per Section 31 22 00 – EARTHWORK AND GRADING.

2. Aggregate base shall be compacted to 95 percent ASTM D1557 per the Geotechnical report. Section 26-1.03E of the Caltrans Standard Specifications shall apply.

3. Soil sterilant shall be applied to prepared subgrade or after installation of rock or aggregate base uniformly at the rate recommended by the manufacturer.

B. Crack Sealing:

1. Before sealing, cracks shall be cleared of dirt, dust, and all other deleterious materials to a depth of 1/4-inch to 1/2-inch.

2. Cracks 1/8-inch in width and greater shall be sealed.

3. Application of crack sealer shall be in accordance with the manufacturer's recommendations unless otherwise directed.

3.02 ASPHALT CONCRETE PAVING

A. General:

1. Asphalt concrete shall be proportioned, mixed, placed, spread, and compacted in conformance with Section 39 of the Caltrans Standard Specifications.

2. Before placing asphalt concrete, an asphalt emulsion tack coat shall be applied to all vertical surfaces of existing pavement, curbs, gutters, construction joints, and all existing pavement to be surfaced, in conformance with Section 39 of the Caltrans Standard Specifications.

3. Spreading and compacting asphalt concrete shall be performed in accordance with Section 39 of the Caltrans Standard Specifications.

4. Fog seal shall be applied to all finished surfaces of asphalt concrete pavement at a rate of 0.05 gallons per square yard, in accordance with Section 37 of the Caltrans Standard Specifications.

5. After fog seal has been applied, ample time shall be allowed for drying before traffic is allowed on the pavement or paint striping is applied.

3.03 CONCRETE CONSTRUCTION

A. General:

1. All concrete shall be mixed in accordance with applicable provisions of Section 90 of the Caltrans Standard Specifications.

2. Construction of concrete substructures shall conform to applicable provisions of Section 51 of the Caltrans Standard Specifications. Unless noted otherwise in the Specifications, all exposed surfaces of structure shall have Class 1 surface finish. Finish shall match adjacent existing concrete paving.

3. Schedule of Locations for Concrete Finish Types, unless otherwise specified:

   a. Slabs or Stairs to receive toppings and fills: Scratched.

   b. Exposed Stairs Fills: Nonslip.

   c. Exterior Paved Areas: Light Broomed.

   d. Formed Surface to receive paint: Smooth Formed.

   e. Concealed Concrete Surfaces: Rough Formed.

4. Curing shall conform to provision of Caltrans Section 90-1.03B. No pigment shall be used in curing compounds for construction of concrete curbs, gutters, and structures.

5. All work shall be subject to field inspection. No concrete shall be placed until the Program Manager has approved the forms and reinforcement.

6. Expansion joints on curbs and gutters shall be placed 20 feet on centers, adjacent to structures, and at all returns, and shall be filled with joint filler. Control joints shall be formed 10 feet on centers.

7. Concrete shall not be dropped freely where reinforcing bars will cause segregation, nor shall it be dropped freely more than 6 feet. Spouts, elephant trunks, or other approved means shall be used to prevent segregation.

3.04 BITUMINOUS SEALS

A. General:

1. Mixing, spreading and placing shall be in accordance with applicable provisions of Section 37 of the Caltrans Standard Specifications.

3.05 SEALANTS AND BACKER ROD

A. General: Where indicated on the plans and/or specifications, Contractor shall seal joints with a sealant and backer rod.

1. Width and depth of joints shall meet project requirements and accommodate sealant and backer rod in conformance with Manufactures requirements.

2. Placements and shall conform to Manufactures requirements.

3.06 FIELD QUALITY CONTROL

A. Asphalt Concrete Paving:

1. Contractor shall perform a flood test in the presence of the engineer and/or District's Representative. Location of ponding greater than 1/8" in depth may impact proper drainage and shall be marked and remedied by the contractor.

2. The specified thickness of the finished pavement shown on the plans and specifications shall be the minimum acceptable.

3. Conforms shall form a smooth, pond-free transition between existing and new pavement.

4. Depressions in paving between high spots are not to exceed 1/8-inch when measured below a 10-foot long straight edged placed anywhere on surface in any direction.

5. The finished asphalt pavement shall have positive drainage without ponding.

3.07 CLEANUP

A. General:

1. Surplus material remaining upon completion of paving operations shall become the property of the Contractor, to be removed from the work site and disposed of in a lawful manner.

2. Surfaces shall be left in a clean, neat, and workmanlike condition, and all construction waste, rubbish, and debris shall be removed from the work site and disposed of in a lawful manner.

END OF SECTION

SECTION 33 10 00

WATER SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This section describes general requirements, products, and methods of execution relating to on-site domestic water and fire water systems serving all buildings and appurtenances. Unless otherwise noted, this section does not apply to irrigation water systems and water systems inside and within 5 feet of buildings. This section applies to:

1. Domestic water distribution and services.
2. Fire water distribution and services.
3. Water storage tanks.

B. Contractor shall provide all labor, equipment, materials, and testing services unless otherwise noted.

C. Related Sections:

1. Section 31 23 33 – TRENCHING, BACKFILLING, AND COMPACTING.

1.02 SUBMITTALS

A. Comply with requirements of Section 01 33 00 – SUBMITTAL PROCEDURES.

B. Product Data: Manufacturer's literature and data, including, where applicable, sizes, pressure rating, rated capacity, listing/approval stamps, labels, or other marking on equipment made to the specified standards for materials, and settings of selected models, for the following:

1. Piping and fittings.
2. Gaskets, couplings, sleeves, and assembly bolts and nuts.
3. Gate valves and ball valves.
4. Blow-off valves, air release and vacuum valves, and combination air valves.
5. Check valves.
6. Pressure reducing valves.
7. Backflow preventers.
8. Valve boxes, frames and covers.
9. Water meter boxes, frames and covers.

10. Post indicators.

11. Fire department connections and wet stand pipes.

12. Fire hydrants.

13. Thrust block concrete mix and/or restrained joints and fittings.

14. Tapping sleeves and tapping valves.

15. Service saddles and corporation stops.

16. Identification materials and devices.

17. Corrosion protection.

18. Water sampling stations.

C. Test Reports:

1. Bacteriologic Testing: Provide copies of the test results indicating water sample meets California Drinking Water Standards.

D. Samples: None specified. Provide as necessary.

1.03 QUALITY ASSURANCE

A. Comply with the latest edition of the following Standards and Regulations:

1. American Water Works Association (AWWA) and American National Standards Institute (ANSI):

a. C104/A21.4 ANSI Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

b. C105/A21.5 ANSI Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.

c. C110/A21.10 ANSI Standard for Ductile-Iron and Gray-Iron Fittings, 3 inch - 48 inch for Water.

d. C111/A21.11 ANSI Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

e. C115/A21.15 ANSI Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.

f. C116/A21.16 ANSI Standard for Protective Fusion-Bonded Epoxy Coatings Interior & Exterior Surfaces for Ductile-Iron and Gray-Iron Fittings.

g. C150/A21.50 ANSI Standard for Thickness Design of Ductile-Iron Pipe.

h. C151/A21.51 ANSI Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.

i. C153/A21.53 ANSI Standard for Ductile-Iron Compact Fittings for Water Service.

j. C500 Metal-Seated Gate Valves for Water Supply Service.

k. C502 Dry-Barrel Fire Hydrants.

l. C503 Wet-Barrel Fire Hydrants.

m. C504 Rubber-Seated Butterfly Valves.

n. C507 Ball Valves, 6 inches - 48 inches.

o. C508 Swing-Check Valves for Waterworks Service, 2 inches - 24 inches NPS.

p. C509 Resilient-Seated Gate Valves for Water Supply Service.

q. C510 Double Check Valve Backflow Prevention Assembly.

r. C511 Reduced-Pressure Principle Backflow Prevention Assembly.

s. C512 Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.

t. C550 Protective Epoxy Interior Coating for valves and Hydrants.

u. C600 Installation of Ductile-Iron Water Mains and their Appurtenances.

v. C602 Cement- Mortar Living of water Pipelines in place- 4 inches and larger.

w. C605 Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.

x. C651 Disinfecting Water Mains

y. C652 Disinfection of Water-Storage Facilities

z. C800 Underground Service Line Valves and Fittings for 1/2 inches - 2 inches.

aa. C900 Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 inches - 12 inches, for Water Distribution.

bb. C901 Polyethylene (PE) Pressure Pipe and Tubing, 1/2 inches through 3 inches, for Water Service.

cc. C905 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 inches - 48 inches.

dd. C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 inches - 63 inches, for Water Distribution and Transmission.

ee. C907 Polyvinyl Chloride (PVC) Pressure Fittings for Water, 4 inches - 8 inches.

ff. C908 PVC Self-Tapping Saddle Tees for Use on PVC Pipe.

gg. D103 Factory-Coated Bolted steel Tanks for water Storage.

2. National Fire Protection Association (NFPA):

    a. NFPA 13 Standard for the Installation of Sprinkler Systems.

    b. NFPA 14 Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems.

    c. NFPA 20 Standard for the Installation of Stationary Pumps for Fire Protection.

    d. NFPA 22 Standard for Water Tanks for Private Fire Protection.

    e. NFPA 24 Private Service Mains and their Appurtenances.

    f. NFPA 25 Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

3. Uni-Bell Plastic Pipe Association (UNI).

    a. PUB 3 PVC Pipe – Technology Serving the Water Industry.

    b. PUB 7 External Corrosion of Underground Water Distribution Piping Systems.

    c. PUB 8 Tapping Guide for AWWA C900 Pressure Pipe.

    d. PUB 9 Installation Guide for PVC Pressure Pipe.

    e. B-8 Recommended Practice for the Direct Tapping of Polyvinyl Chloride (PVC) Pressure Water Pipe (Nominal Diameters 6-12 inch).

4. American Society of Testing and Materials (ASTM).

    a. ASTM A536 Standard Specification for Ductile Iron Castings.

    b. ASTM A674 Standard Practice for Polyethylene Encasement for Ductile Iron Pipe for Water or Other Liquids.

    c. ASTM D1785 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

    d. ASTM D2241 Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe.

e. ASTM D2466 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

f. ASTM D2564 Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.

g. ASTM D2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.

h. ASTM D3139 Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

i. ASTM D3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

j. ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

k. ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

l. ASTM F1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.

m. ASTM F1056 Standard Specification for Socket Fusion Tools for Use in Socket Fusion Joining Polyethylene Pipe or Tubing and Fittings.

n. ASTM A53/A53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

o. ASTM A795 Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.

p. ASTM A865 Standard Specification for Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints.

q. ASTM B88 Standard Specification for Seamless Copper Water Tube.

5. American Society of Mechanical Engineers (ASME).

   a. ASME B16 series for valves, fittings, flanges, and gaskets applicable for use in water systems.

   b. ASME B1.20.1 American Standard Tapered Pipe Threads for factory-threaded pipe and pipe fittings.

6. National Sanitation Foundation (NSF).

a. NSF/ANSI 14 Plastics Piping System Components and Related Materials.

b. NSF/ANSI 61 Standard for Drinking Water Systems Components – Health Effects.

7. Underwriters Laboratories, Inc. (UL).

a. UL 157 Standard for Safety for Gaskets and Seals.

b. UL 194 Standard for Safety for Gasketed Joints for Ductile-Iron Pipe and Fittings for Fire Protection Service.

c. UL 213 Rubber Gasketed Fittings for Fire-Protection Service.

d. UL 246 Standard for Safety for Hydrants for Fire-Protection Service.

e. UL 262 Standard for Safety for Gate Valves for Fire-Protection Service.

f. UL 312 Standard for Safety for Check Valves for Fire-Protection Service.

g. UL 405 Standard for Safety for Fire Department Connections.

h. UL 448 Standard for Safety for Pumps for Fire-Protection Service.

i. UL 789 Standard for Safety for Indicator Posts for Fire-Protection Service.

j. UL 860 Pipe Unions for Flammable and Combustible Fluids and Fire-Protection Service.

k. UL 1091 Standard for Safety for Butterfly Valves for Fire-Protection Service.

l. UL 1285 Pipe and Couplings, Polyvinyl Chloride (PVC), for Underground Fire Service.

m. UL 1468 Direct Acting Pressure Reducing and Pressure Restricting Valves.

n. UL 1478 Standard for Safety for Fire Pump Relief Valves.

8. FM Global (FM).

a. FM 1020 Automatic Water Control Valves.

b. FM 1045 Waterflow Detector Check Valves.

c. FM 1110 Indicator Posts.

d. FM 1111 Post-Indicator-Valve-Assembly.

e. FM 1112 Indicating Butterfly Valves.

f. FM 1120 and FM 1130 Fire Service Water Control Valves (OS&Y and NRS Type Gate Valves).

g. FM 1210 Swing Check Valves.

h. FM 1221 Backflow Preventers (Reduced Pressure Principle and Double Check Valve Types).

i. FM 1311 Centrifugal Fire Pumps (Horizontal, Split-Case Type).

j. FM 1312 Centrifugal Fire Pumps (Vertical-Shaft, Turbine Type).

k. FM 1319 Centrifugal Fire Pumps (Horizontal, End Suction Type).

l. FM 1361 Water Pressure Relief Valve.

m. FM 1362 Pressure Reducing Valves.

n. FM 1371 Centrifugal Fire Pumps (In-Line Type).

o. FM 1510 Fire Hydrants (Dry Barrel Type) for Private Fire Service.

p. FM 1511 Fire Hydrants (Wet Barrel Type) for Private Fire Service.

q. FM 1530 Fire Department Connections.

r. FM 1610 Plastic Pipe & Fittings for Underground Fire Protection Service.

s. FM 1620 Pipe Joints & Anchor Fittings for Underground Fire Service Mains.

9. Plastics Pipe Institute (PPI).

   a. Underground Installation of Polyethylene Pipe.

   b. Polyethylene Joining Procedures.

   c. Inspections, Test and Safety Considerations.

10. American Association of State Highway and Transportation Officials (AASHTO) for H20 Loading.

11. American Concrete Institute (ACI).

    a. ACI 348 - Meter Pit Construction.

12. City of Livermore Standard Specifications and Details.

13. Livermore – Pleasanton Fire Department.

14. Other authorities having jurisdiction.

B. System Description: Grades and elevations are to be established with benchmarks referenced on Plans.

C. Comply with City of Livermore Standards and authorities having jurisdiction for the installation and testing of potable water piping and fire protection systems.

D. Comply with City of Livermore Standards and authorities having jurisdiction for the installation, testing and separation requirements of recycled/reclaimed water piping and fire protection systems.

E. All testing of systems specified in this section shall be witnessed by representatives of the local water department or local authority. Provide at least 7 days notice.

PART 2 - PRODUCTS

2.01 PIPING

A. Water Distribution Main (pipe size 4 inches and larger).

1. Ductile Iron Pipe (DIP): Pressure Class 350 pipe conforming to AWWA/ANSI C151/A21.5, cement-mortar lining conforming to AWWA/ANSI C104/A21.4, with standard thickness per AWWA/ANSI C150/A21.50. U.S. Pipe, American Cast Iron Pipe Company (ACIPCO), or approved equivalent.

    a. Flanged ends shall conform to AWWA/ANSI C115/A21.15.

    b. Rubber-gasket joints shall conform to AWWA/ANSI C111/A21.11.

2. Polyvinyl Chloride Pipe (PVC): Pressure Class 235, DR 18, spigot and gasket bell end, conforming to AWWA C900 or AWWA C905, with equivalent cast-iron pipe outer diameter (O.D.). J-M Manufacturing, PW Pipe, North American Pipe Company, or approved equivalent.

3. Polyethylene Pipe (PE): PE 4710, ASTM F714, Pressure Class 200, DR 9, conforming to AWWA C906, or approved equivalent.

B. Water Service Line (pipe size 3 inches and smaller)

1. Copper (Cu): Provide Type K soft or hard copper pipe conforming to ASTM B88.

2. High Density Polyethylene Pipe (HDPE): PE4710, Pressure Class 200, DR 9 conforming to AWWA C901. J-M Manufacturing PIPE or approved equivalent.

C. Recycled/Reclaimed Water piping shall be purple.

2.02 FITTINGS, GASKETS, COUPLINGS, SLEEVES, AND ASSEMBLY BOLTS AND NUTS

A. For DIP: Provide fittings with pressure rating greater than or equal to that of the pipe. Provide flanged joints, mechanical joints, push-on joints, and insulating joints where indicated. Fittings with push-on joint ends shall conform to the same requirements as fittings with mechanical-joint ends. Provide mechanically coupled type joints using a sleeve-type mechanical coupling where indicated.

Provide ends of pipe and fittings suitable for the specified joints. Fittings shall have cement-mortar lining conforming to AWWA/ANSI C104/A21.4.

1. Flanged Joints: Provide bolts, nuts, and gaskets in conformance with AWWA/ANSI C115/A21.15. Flanged fittings shall conform to AWWA/ANSI C110/A21.10 or C153/A21.53.

    a. Provide flange for set screwed flanges of ductile iron, ASTM A536, Grade 65-45-12, and conform to the applicable requirements of ASME B16.1, Class 250.

    b. Provide setscrews for set screwed flanges of 190,000 psi tensile strength, heat treated and zinc-coated steel.

    c. Gaskets for set screwed flanges shall conform to the applicable requirements for mechanical-joint gaskets specified in AWWA/ANSI C111/A21.11.

    d. Design of set screwed gaskets shall provide for confinement and compression of gasket when joint to adjoining flange is made.

    e. Unless otherwise required, above ground flange assembly bolts shall be standard hex-head, cadmium plated machine bolts with American Standard Heavy, hot-pressed, cadmium plated hexagonal nuts. Buried flange nuts and bolts shall be as above except they shall be of Type 304 stainless steel.

2. Mechanical Joints: Dimensional and material requirements for pipe ends, glands, bolts and nuts, and gaskets shall conform to AWWA/ANSI C111/A21.11.

3. Push-on Joints: Provide shape of pipe ends and fitting ends, gaskets, and lubricant for joint assembly conforming to AWWA/ANSI C111/A21.11. Modify bell design fittings, as approved.

4. Insulating Joints: Provide a rubber-gasketed or other suitable approved type of insulating joint or dielectric coupling which will effectively prevent metal-to-metal contact at the joint between adjacent sections of dissimilar metals.

    a. Provide joint of the flanged type with insulating gasket, insulating bolt sleeves, and insulating washers.

    b. Provide gasket of the dielectric type, full face, as recommended in AWWA/ANSI C115/A21.15.

    c. Provide bolts and nuts as recommended in AWWA/ANSI C115/A21.15.

    d. Fittings shall be epoxy lined and coated with a thickness not less than 6-mils.

B. For PVC: Fittings shall be DIP or PVC.

1. DIP fittings: Provide gray-iron or ductile-iron conforming to AWWA/ANSI C110/A21.10, with cement-mortar lining conforming to AWWA/ANSI C104/A21.4, and standard thickness, with equivalent cast-iron pipe O.D.

    a. Fittings with push-on joint ends shall conform to the same requirements as fittings with mechanical-joint ends, except the bell design shall be modified, as approved, for push-on joint suitable for use with PVC plastic pipe.

    b. Provide push-on joints, compression joints and mechanical joints where indicated between pipe and fittings, valves, and other accessories.

    c. Mechanical joints, glands, bolts and nuts, and gaskets shall conform to AWWA/ANSI C111/A21.11.

    d. Fittings shall be epoxy lined and coated with a thickness not less than 6-mils.

2. PVC fittings: Provide fabricated PVC fittings for pressure pipe conforming to AWWA C900, C905, or C907.

    a. PVC fittings shall conform to ASTM D2466.

    b. Push-on joints shall conform to ASTM D3139.

    c. Compression joints shall conform to ASTM D3139.

    d. Provide each joint connection with an elastomeric gasket suitable for the bell or coupling with which it is to be used. Gaskets shall conform to ASTM F477.

C. For PE: Fittings shall conform to AWWA C901 or AWWA C906. Driscopipe, or approved equivalent.

1. Socket type fittings shall conform to ASTM D2683.

2. Butt fusion fittings shall conform to ASTM D3261.

3. Electrofusion fittings shall comply with ASTM F1055.

D. For Cu:

1. Cast copper alloy solder-joint pressure fittings shall conform to ASME B16.18.

2. Wrought copper solder-joint pressure fittings or wrought copper alloy unions shall conform to ASME B16.22

3. Cast copper alloy flare fittings shall conform to ASME B16.26.

4. Wrought copper alloy body, hexagonal stock, metal-to-metal seating surfaces, and solder-joint threaded ends shall conform to ASME B1.20.1.

5. Compression connections shall be Mueller 110, Ford or approved equivalent.

E. For HDPE:

1. Cast Copper Fittings shall conform to ASME B16.18.

2. Cast Copper Compression Fittings and connections shall be Mueller 110 Ford or approved equivalent.

3. HDPE Fittings shall conform to PE4710, Pressure Class 200, DR 9 conforming to AWWA C901. Wolseley Industrial Group or approved equivalent.

2.03 GATE VALVES AND BALL VALVES

A. Gate Valves: Valves shall open by counterclockwise rotation of the valve stem. Provide valves with ends as appropriate for the adjoining pipe.

1. Stuffing boxes shall have O-ring stem seals. Provide stuffing boxes bolted and constructed so as to permit easy removal of parts for repair.

2. Valves (2-1/2 inches and larger):

a. Provide valves conforming to AWWA C500 or AWWA C509 and of one manufacturer. Valves shall have a non-rising stem, a 2-inch square nut, and double-disc gates. Valves shall be rated for 250 psi maximum working pressure. Mueller 2360 series, ACIPCO, or approved equivalent.

b. For the domestic water system, valves shall also conform to ANSI/NSF 61.

c. For the fire water system, valves 2 inches through 16 inches in size shall also conform to UL 262 and FM 1120 or FM 1130 to a working pressure of 200 psi.

3. Where a post indicator is shown, provide valve with an indicator post flange.

B. Ball Valves: Valves shall open by counterclockwise rotation of the valve stem. Provide valves with ends as appropriate for the adjoining pipe.

1. Valves (2-inches and smaller):

a. Provide valves conforming to AWWA C800 and of one manufacturer. Mueller 300 Series, Ford, or approved equivalent.

2. Provide valve with operating nut or handle as shown on the Construction Documents.

2.04 BLOW-OFF VALVES, AIR RELEASE AND VACUUM VALVES, AND COMBINATION AIR VALVES

A. Blow-off valves: Provide valve and service size as shown in the Contract Documents. Provide 2-inch valves at low points of the piping system, and 4-inch valves at dead-ends of the piping system, unless otherwise directed by the Engineer.

1. 2-inch blow-off shall have a 2-inch vertical female iron pipe (FIP) inlet and a 2-inch normal pressure and temperature (NPT) nozzle outlet with cap. Valve shall open by counterclockwise rotation of a top-mounted 9/16-inch square operating nut. All working parts shall be serviceable without excavation. Kupferle/Truflo Model TF550, or approved equivalent.

2. 4-inch blow-off shall have a 4-inch vertical FIP inlet and a 4-inch male iron pipe (MIP) outlet with cap. Valve shall open by counterclockwise rotation of a top-mounted 9/16-inch square operating nut. All working parts shall be serviceable without excavation. Kupferle/Truflo Model TF800, or approved equivalent.

B. Air release and vacuum valves: Provide valve and service size as shown on the Contract Documents, and where there is an increase in the downward slope or a decrease in the upward slope of the piping system. Valve shall have cast-iron single valve body, and shall conform to AWWA C512. A compound lever system shall have a maximum operating pressure of 300psi. Provide a protective cap for the outlet of the valve. Provide universal air-vacuum type valves, Crispin Model UL, Apco, or approved equivalent.

C. Combination air valves: Provide valve and service size as shown on the Contract Documents, and at high points and sharp changes in gradient of the pipe system. Valve shall have cast-iron single valve or double valve body, and shall conform to AWWA C512. A simple or compound lever system shall have a maximum operating pressure of 300psi. Provide a protective cap for the outlet of the valve. Crispin Model C, Apco, or approved equivalent.

2.05 CHECK VALVES

A. Valves: Valves shall have clear port opening and a cast-iron body. Provide spring-loaded or weight-loaded valves where indicated on the Construction Documents.

1. For the domestic water system, provide swing-check type valves conforming to AWWA C508. Provide valves of one manufacturer. Mueller, Apco, or approved equivalent.

2. For the fire water system, provide swing-check type valves conforming to FM 1210 and UL 312. Mueller, Watts, or approved equivalent.

2.06 PRESSURE REDUCING VALVES

A. Pressure Reducing Valves: Valves shall have a cast-iron body, conforming to ASTM A536, with epoxy interior coating conforming to AWWA, and rated to Pressure Class 300. Cla-Val Model 90-01, Singer, or approved equivalent.

1. Valves shall have flanged ends.

2. Valves sized 3-inches or smaller may have screwed ends.

2.07 POST INDICATORS

A. Posts Indicators shall withstand up to 900 ft-lbs of operating torque, be free-standing, and tamper-proof.

B. Post Indicators shall conform to UL 789 and FM 1110. Mueller, ACIPCO, or approved equivalent.

C. Post indicators on recycled/reclaimed systems shall be painted purple.

2.08 VALVE BOXES, METER BOXES, FRAMES AND COVERS

A. Water Valve Box: Provide pre-cast concrete valve box for each buried valve. Provide box with steel or cast iron traffic cover marked “WATER.” Christy Model G5 with G5C cover or approved equivalent.

B. Valve or Meter Boxes: Contractor shall verify box size required for water system appurtenances as shown in the Contract Documents. Provide a precast concrete utility box for each buried appurtenance. Provide a traffic-rated lid for H20 loading. A non-traffic rated lid may be used for boxes located in landscape areas. Christy, or approved equivalent.

C. Valve boxes, meter boxes, frames and covers on recycled/reclaimed systems shall be purple.

2.09 BACKFLOW PREVENTERS

A. Provide backflow preventers as shown on the Contract Documents. Subject to local water department approval. Backflow preventers on the fire water system shall be subject to approval by the local office of the Fire Marshal.

B. Reduced Pressure Principle Assemblies (RPPA): Provide a cast-iron body RPPA consisting of two independently operating check valves with a pressure differential relief valve located between the two check valves, two shut-off valves and four test cocks. RPPA shall be tamper-proof and conform to AWWA C511. Febco 860, Watts, or approved equivalent.

C. Double Check Detector Assemblies (DCDA): Provide a cast-iron body DCDA consisting of mainline double check assemblies in parallel with a bypass double check and meter assembly, two shut-off valves and four test cocks. DCDA shall be tamper-proof and conform to AWWA C510. Febco 806, Watts, or approved equivalent.

D. Backflow preventers on recycled/reclaimed systems shall be painted purple.

2.10 FIRE DEPARTMENT CONNECTIONS AND WET STAND PIPES

A. Fire Department Connections (FDC): Provide FDC’s with 2-1/2 inch female hose connections, sidewalk or free-standing type. Number of inlets shall be as shown on the Contract Documents. Clapper and spring check inlets shall each have a minimum capacity of 250 gpm, and be furnished with Knox FDC plug. Outlet shall be sized for simultaneous use of all inlets. Connection shall be branded “AUTO SPKR”.

1. 2-Way FDC: Connection shall conform to UL 405 or FM 1530. Elkhart, Croker, or approved equivalent.

2. 3-Way FDC: Connection shall be subject to approval by the local water department or fire marshal. Elkhart, Croker, Potter-Roemer or approved equivalent.

3. 4-Way FDC: Connection shall conform to UL 405. Potter-Roemer, Croker, or approved equivalent.

4. 6-Way FDC: Connection shall be subject to approval by the local water department or fire marshal. Croker, Potter-Roemer or approved equivalent.

B. Wet Stand Pipes (WSP): Provide 2-Way WSP's with valves and two (2) 2-1/2 inch male hose connections free-standing type, with a 4" inlet. Each outlet shall each have a minimum capacity of 250 gpm, and be furnished with a Knox cap. Water to the WSP shall be controlled with a remote valve. Connection shall be branded "HYDRANT." Subject to approval by the local water department or fire marshal. Croker, Elkhart, Potter-Roemer or approved equivalent.

C. Fire department connections and wet stand pipes on recycled/reclaimed systems shall be painted purple.

2.11 FDC AND WET STAND PIPE CAPS AND PLUGS

A. Provide Knox caps or plugs for all new FDC and wet-stand pipes included in the project. Coordinate the number of Knox keys as well as the key signage location with the local Fire Marshal.

2.12 FIRE HYDRANTS

A. Provide two 2-1/2 inch and one 4-1/2 inch outlets with a 6-inch nominal inside diameter inlet and break-away type bolts. Hydrant shall have a working pressure of 250 psi and shall conform to AWWA C502 or C503, and be UL listed and FM approved. Provide hydrants of one manufacturer. Clow 800 series, Mueller, ACIPCO, or approved equivalent, subject to approval by the local water department and Fire Marshal. Hydrants on recycled/reclaimed systems shall be painted purple.

2.13 THRUST BLOCKS AND PIPE RESTRAINTS

A. Blocks: Provide thrust blocks in accordance with NFPA 24 Standards. Use concrete conforming to ASTM C94 having a minimum compressive strength of 2,500 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2-1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.

B. Pipe Restraints: Provide thrust restraint systems for fittings and joints as required or as indicated on the Plans.

1. For mechanical joint fittings and joints: Pipe restraints shall be "Mega-Lug" pipe restraint system by EBBA Iron, Inc., or approved equivalent.

2. For push-on joint fittings and joints: Pipe restraints shall be "Field-Lok" gaskets by U.S. Pipe, or approved equivalent.

C. Thrust blocks, gravity blocks, or mechanical pipe restraints may be used at Contractor's option, unless otherwise indicated on the Plans.

D. Provide thrust blocks or mechanical pipe restraints at all fittings and changes in angle, alignment or elevation.

E. Where depth or location of water piping, existing utilities, or other structures prohibit the use of standard thrust blocks, gravity blocks or mechanical pipe restraints may be used. Conform to NFPA 24 Standards.

2.14 TAPPING SLEEVES AND TAPPING VALVES

A. Sleeves shall be epoxy coated and furnished with stainless steel washers, nuts and bolts. Mueller H-615 and H-619, Ford, or approved equivalent.

B. Tapping valves shall have flanged inlet, Class 125, conforming to ASME B16.1 and furnished with stainless steel washers, nuts and bolts. Tapping valves shall be constructed with a mechanical joint outlet. Mueller T-687, T-642, T-681, or approved equivalent.

2.15 SERVICE SADDLES AND CORPORATION STOPS

A. Service Saddles: Saddles shall conform to AWWA C800 and NSF 61.

1. For DIP: Provide bronze or stainless steel body, double strap type with a 200 psi maximum working pressure. Mueller BR2 Series, Ford, or approved equivalent.

2. For PVC: Provide bronze body, wide strap type. Mueller H-13000 Series, Ford, or approved equivalent.

3. For PE: Provide stainless steel body, double strap style with a 250 psi maximum working pressure. Ford FSP-323, or approved equivalent.

B. Corporation Stops: Provide ground key type; bronze conforming to ASTM B61 or ASTM B62, for a working pressure of 100 psi. and suitable for the working pressure of the system.

1. Ends shall be suitable for adjoining pipe and connections, solder-joint, or flared tube compression type joint.

2. Threaded ends shall conform to AWWA C800.

3. Coupling nut for connection to flared copper tubing shall conform to ASME B16.26.

4. Mueller H-15000 Series with "CC" threads and a copper flare straight connection outlet, Ford, or approved equivalent.

2.16 IDENTIFICATION MATERIALS AND DEVICES

A. Marker Tape: Provide marker tape consisting of metallic foil bonded to plastic film not less than 2-inches wide. Film shall be inert polyethylene plastic. Film and foil shall each not be less than 1-mil. thick. The tape shall be identified with lettering,

not less than 3/4-inch high, “CAUTION: WATER MAIN BELOW,” repeated at approximately 24-inch intervals.

B. Tracer Wire for Nonmetallic Piping: Provide 12 gage, coated copper or aluminum wire not less than 0.10 inch in diameter in sufficient length to be continuous over each separate run of nonmetallic pipe. Wire shall be tied in at all valves.

C. Recycled Water identification signage is required according to City of Livermore standards.

2.17 SETTLEMENT JOINTS

A. Flexible joints shall be used if a differential settlement of greater than 2-inches is anticipated. Flexible joints shall be ductile iron rated, rated for 350 psi working pressure and FM approved. Megalug Flextend or approved equivalent.

B. Provide pipe restraint on either side of flexible joint to resist thrust forces.

2.18 CORROSION PROTECTION

A. In soils with low resistivity, high sulfides, high/low ph, redox potential and/or poor surrounding drainage conditions, or as indicated in the Contract Documents, encase underground pipe and appurtenances in 4-mil, high-density cross-laminated (HDCL) polyethylene film or 8-mil linear low-density (LLD) polyethylene film in accordance with AWWA/ANSI C105/A21.5. U.S. Pipe, ACIPCO, or approved equivalent.

2.19 CATHODIC PROTECTION

A. See Section 26 42 00 for cathodic protection requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces and areas for suitable conditions where water service is being installed.

B. Do not begin installation until unsatisfactory conditions have been corrected.

3.02 LOCATION OF WATER LINES

A. Where the location of the water line is not clearly defined by dimensions on the Plans, do not lay water line closer than 10 feet horizontally from any sewer line.

B. Where water lines cross under gravity sewer lines, encase sewer line in concrete for a distance of at least 10 feet on each side of the crossing, unless sewer line is made of pressure pipe with rubber-gasketed joints and no joint is located within 3 feet horizontally of the crossing.

C. Where water lines cross sewer force mains and inverted siphons, install water line at least 2 feet above these sewer lines.

D. When joints in the sewer line are closer than 3 feet horizontally from the water line, encase sewer line joints in concrete.

E. Do not lay water lines in the same trench with other utilities.

F. Install water lines at 3'-0" minimum depth or as detailed on Plans.

3.03 INSTALLATION OF PIPING

A. Inspection:

1. Before placing in position, inspect pipe for noticeable defects. Clean the pipe, fittings, valves, and accessories, and maintain in a clean condition.

2. Remove fins and burrs from pipe and fittings.

B. Pipe laying and jointing:

1. Provide proper facilities for lowering sections of pipe into trenches.

2. Do not drop or dump pipe, fittings, valves, or any other water line material into trenches.

3. Cut pipe accurately to length established at the site and work into place without springing or forcing. Replace any pipe or fitting that does not allow sufficient space for proper installation of jointing material.

4. Blocking or wedging between bells and spigots will not be permitted. Lay bell-and-spigot pipe with the bell end pointing in the direction of lying.

5. Grade the pipeline in straight lines; avoid the formation of dips and low points.

6. Support pipe at proper elevation and grade.

7. Provide secure firm, uniform support. Wood support blocking will not be permitted.

8. Lay pipe so that the full length of each section of pipe and each fitting rests solidly on the pipe bedding; excavate recesses to accommodate bells, joints, and couplings.

9. Provide anchors and supports where indicated and where necessary for fastening work into place.

10. Make proper provision for expansion and contraction of pipelines.

11. Keep trenches free of water until joints have been properly made.

12. Do not lay pipe when conditions of trench or weather prevent proper installation.

13. All fittings shall be blocked with appropriately sized thrust blocks as shown in the Contract Documents.

C. Installation of Tracer Wire:

1. Install a continuous length of tracer wire for the full length of each run of nonmetallic pipe.

2. Attach wire to top of pipe in such manner that it will not be displaced during construction operations.

D. Connections to Existing Lines:

1. Make connections to existing water lines after approval is obtained and with a minimum interruption of service on the existing line.

2. Make connections to existing lines under pressure in accordance with the recommended procedures of a manufacturer of pipe of which the line being tapped is made.

E. The end of each work day, close open ends of pipe temporarily with wood blocks or bulkheads to keep out debris and contamination.

3.04 INSTALLATION OF DUCTILE-IRON PIPING

A. Install pipe and fittings in accordance with requirements of AWWA C600 for pipe installation, joint assembly, valve-and-fitting installation, and thrust restraint.

B. Jointing:

1. Provide push-on joints with the gaskets and lubricant specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly.

2. Provide mechanical joints with the gaskets, glands, bolts, and nuts specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly and with the recommendations of AWWA C111.

3. Provide flanged joints with the gaskets, bolts, and nuts specified for this type joint.

a. Install flanged joints up tight; avoid undue strain on flanges, fittings, valves, and other equipment and accessories.

b. Align bolt holes for each flanged joint.

c. Use full size bolts for the bolt holes; use of undersized bolts to make up for misalignment of bolt holes or for any other purpose will not be permitted.

d. Do not allow adjoining flange faces to be out of parallel to such degree that the flanged joint cannot be made watertight without over straining the flange.

e. Where flanged pipe and fitting have dimensions that do not allow the installation of a proper flanged joint as specified, replace it by one of proper dimensions.

f. Use set screwed flanges to make flanged joints where conditions prevent the use of full-length flanged pipe. Assemble in accordance with the recommendations of the set screwed flange manufacturer.

4. Provide insulating joints with the gaskets, sleeves, washers, bolts, and nuts previously specified for this type joint. Assemble insulating joints as specified for flanged joints. Bolts for insulating sleeves shall be full size for the bolt holes.

5. Ensure that there is no metal-to-metal contact between dissimilar metals after the joint has been assembled.

C. Exterior Protection: Completely encase buried ductile iron pipelines and underground appurtenances with polyethylene wrap. Install 8-mil linear low-density polyethylene (LLD) film or 4-mil high-density cross-laminated (HDCL) film per manufacturer's recommendations and in accordance with AWWA/ANSI C105/A21.5 and ASTM A674.

D. Pipe Anchorage:

1. Provide concrete thrust blocks or restrained joints for pipe anchorage, except where metal harness is indicated on the Construction Documents.

2. Pipe anchorage shall be in accordance with NFPA 24 Standards.

3.05 INSTALLATION OF POLYVINYL CHLORIDE PIPING

A. Install pipe and fittings in accordance with the requirements of UNI B-3 for the following:

1. The laying of pipe, joining PVC pipe to fittings and accessories.

2. The setting of hydrants, valves, and fittings.

B. Comply with the recommendations for pipe joint assembly and appurtenance installation in AWWA Manual M23, Chapter 7, "Installation."

C. Comply with the applicable requirements of AWWA C600 for joint assembly, and with the recommendations of Appendix A to AWWA C111.

D. Jointing:

1. Provide push-on joints with the elastomeric gaskets specified for this type joint, using either elastomeric-gasket bell-end pipe or elastomeric-gasket couplings.

2. For pipe-to-pipe push-on joint connections, use only pipe with push-on joint ends having factory-made bevel.

3. For push-on joint connections to metal fittings, valves, and other accessories, cut spigot end of pipe off square and re-bevel pipe end to a bevel approximately the same as that on ductile-iron pipe used for the same type of joint.

4. Use an approved lubricant recommended by the pipe manufacturer for push-on joints.

5. Assemble push-on joints for connection to fittings, valves, and other accessories in accordance with the requirements of UNI B-3 for joining PVC pipe to fittings and accessories and with the applicable requirements of AWWA C600 for joint assembly.

6. Make compression-type joints/mechanical-joints with the gaskets, glands, bolts, nuts, and internal stiffeners previously specified for this type joint. Cut off spigot end of pipe for compression-type joint or mechanical-joint connections and do not re-bevel.

7. Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer using internal stiffeners as previously specified for compression-type joints.

E. Pipe Anchorage:

1. Provide concrete thrust blocks or restrained joints for pipe anchorage, except where metal harness is indicated on the Construction Documents.

2. Anchorage shall be in accordance with the requirements of UNI B-3 and in accordance with NFPA 24 Standards for reaction or thrust blocking and plugging of dead ends, except that size and positioning of thrust blocks shall be as indicated on the Construction Documents.

3.06 INSTALLATION OF POLYETHYLENE PIPING

A. Install pipe, fittings, and appurtenances in accordance with PPI and Manufacturer's Recommendations.

B. Jointing:

1. Provide mechanical joints, compression fittings, or flanges as recommended by the manufacturer.

2. Jointing shall be performed using proper equipment and machinery by trained and certified personnel.

3. Joints, fittings and tools shall be clean and free of burrs, oil, and dirt.

4. Butt fusion:

a. Pipe ends shall be faced to establish clean, parallel mating surfaces.

b. Align and securely fasten the components to be joined squarely between the jaws of the joining machine.

c. Heat the ends of the pipe to the pipe manufacturer's recommended temperature interface pressure and time duration. A pyrometer or other surface temperature measuring device should be used to insure proper temperature of the heating tool. Temperature indicating

crayons shall not be used on a surface which will come into contact with the pipe or fitting.

d. Prevent molten plastic from sticking to the heater faces. Molten plastic on the heater faces shall be removed immediately according to the tool manufacturer's instructions.

e. Bring the molten ends together with sufficient pressure to properly mix the pipe materials and form a homogeneous joint. Hold the molten joint under pressure until cooled adequately to develop strength. Refer to the Manufacturer's recommendations for temperature, pressure, holding, and cooling times.

f. Remove the inside bead from the fusion process using Manufacturer's recommended procedure.

5. Socket fusion:

a. Mixing manufacturers' heating tools and depth gages will not be allowed unless the tools conform to ASTM F1056.

b. Pipe ends shall be faced square to establish clean, parallel mating surfaces.

c. Clamp the cold ring on the pipe at the proper position using a depth gauge.

d. Heat the tool to the pipe manufacturer's recommended temperature. A pyrometer or other surface temperature measuring device should be used to insure proper temperature. Temperature indicating crayons shall not be used on a surface which will come into contact with the pipe or fitting.

e. Follow manufacturer's recommendations for bringing the hot tool faces into contact with the outside surface of the end of the pipe and the inside surface of the socket fitting.

f. Simultaneously remove the pipe and fitting from the tool.

g. Inspect the melt pattern for uniformity and immediately insert the pipe squarely and fully into the socket of the fitting until the fitting contacts the cold ring. Do not twist the pipe or fitting during or after the insertion.

h. Hold or block the pipe in place during cooling.

6. Electrofusion:

a. Unless the operation is for a saddle-type electrofusion joint, pipe ends shall be faced square to establish clean, parallel mating surfaces.

b. Clamp the pipe and fitting at the proper position in the fixture.

c. Connect the electrofusion control box to the fitting and to the power source. Apply the electric current using manufacturer's instructions.

d. Allow the joint to cool before removing the clamping fixtures.

3.07 INSTALLATION OF VALVES

A. Install gate valves conforming to AWWA C500 and UL 262 in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix (Installation, operation, and Maintenance of Gate Valves) to AWWA C509.

B. Install gate valves conforming to AWWA C509 in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix (Installation, Operation, and Maintenance of Gate Valves) to AWWA C509.

C. Install gate valves on PVC water mains in addition in accordance with the recommendations for appurtenance installation in AWWA Manual M23, Chapter 7, "Installation."

D. Install check valves in accordance with the applicable requirements of AWWA C600 for valve-and-fitting installation, except as otherwise indicated.

E. Provide and assemble joints to gate valves and check valves as specified for making and assembling the same type joints between pipe and fittings.

3.08 INSTALLATION OF VALVE AND METER BOXES

A. Boxes shall be centered over the appurtenance so as not to transmit shock or stress. Covers shall be set flush with the surface of the finished pavement, or as shown in the Construction Documents. Backfill shall be placed around the boxes and compacted to the specified level in a manner that will not damage or displace the box from proper alignment or grade. Misaligned boxed shall be excavated, plumbed, and backfilled at no additional cost to the [District/Owner].

3.09 INSTALLATION OF HYDRANTS

A. Install hydrants, except for metal harness, plumbed vertical, in accordance with AWWA C600 for hydrant installation and as indicated.

B. Provide and assemble joints as specified for making and assembling the same type joints between pipe and fittings. Hydrants shall be set so that mounting bolts clear the top of finished grade by three inches so bolts may be easily replace if needed.

C. Provide metal harness as specified under pipe anchorage requirements for the respective pipeline material to which hydrant is attached.

3.10 SERVICE LINE CONNECTIONS TO WATER MAINS

A. Connect service lines of size shown on plans to the main with a rigid connection or a corporation stop and gooseneck. Install a gate valve on the service line.

B. Connect service lines to ductile-iron water mains in accordance with AWWA C600 for service taps.

C. Connect service lines to PVC plastic water mains in accordance with UNI-B-8 and the recommendations of AWWA Manual M231, Chapter 9, “Service Connections.”

3.11 INSTALLATION OF BACKFLOW PREVENTERS

A. Devices shall be installed horizontal and level, with three feet minimum clearances from obstructions.

B. Bottom of backflow device shall be 12-24” above grade.

3.12 WATER TANKS

A. Install water tanks per Manufacturer’s recommendations in conformance with AWWA D103.

3.14 HYDROSTATIC PIPELINE TESTING

A. Requirements:

1. After the pipe has been laid and backfilled, perform hydrostatic pressure tests.

2. Do not conduct tests until at least 12 hours have elapsed since pipe lying and at least 5 days have elapsed since placing of concrete thrust blocks.

3. Fill the pipe with water which shall remain without external application of pressure for 24 hours before tests are conducted.

4. Prior to hydrostatic testing, flush pipe system with fresh water until piping is free of dirt and foreign matter.

5. Apply pressure by a pump and measured by a test gage. All necessary apparatus and labor for conducting the pressure and leakage tests shall be furnished by the Contractor.

6. Ensure the release of air from the line during filling, and prevent collapse due to vacuum when dewatering the line.

7. For pressure test, use a hydrostatic pressure not less than 200 psi for fire water or combined water systems and 1 ½ times operating pressure for domestic water systems. The duration of the test shall not be less than 4 hours with the variation in pressure of not more than 5 psi for the duration of the test.

B. Leakage Tests:

1. At Contractor’s option, leakage tests can be performed at the same time as hydrostatic pressure tests.

2. Leakage rate shall be measured for at least 4 hours with a certified water meter, or other approved method. If requested, meter certification shall be submitted to the District for approval prior to testing.

3. Leakage shall not be measured by a drop in pressure in a test section over a period of time.

4. Leakage at mechanical couplings and joints, tapping sleeves, saddles, flanged joints, and copper piping will not be accepted. Correct any visible leaks.

5. Push-on joints: Test ductile iron pipe for leakage in accordance with AWWA C600 as shown in the following table:

TABLE 1

Allowable Leakage per 1000 feet of DIP Pipeline (Gal/Hr)

Average Test Pressure	Nominal Pipe Diameter - Inches									
(psi)	3	4	6	8	10	12	14	16	18	20
300	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60
275	0.37	0.50	0.75	1.00	.124	1.49	1.74	1.99	2.24	2.49
250	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.37
225	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12

6. When the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

7. Test polyvinyl chloride pipe for leakage in accordance with the recommendations of the Uni-Bell Plastic Pipe Association (UNI) as shown in the following table:

TABLE 2

Allowable Leakage per 1000 feet or 50 joints of PVC Pipeline (Gal/Hr)

Nominal Pipe Size (inches)	Average Test Pressure in Line (psi.)	
	200	250
4	0.38	0.43
6	0.57	0.64
8	0.76	0.85
10	0.96	1.07
12	1.15	1.28

Nominal Pipe Size (inches)	Average Test Pressure in Line (psi.)	
14	1.34	1.50
16	1.53	1.71
18	1.72	1.92
20	1.91	2.14

8. Should any section of new pipe fail to pass either test, locate and repair the defective pipe and repeat the test.

3.15 STERILIZATION AND FLUSHING

A. General:

1. Domestic water lines, mains, and branches by chlorination in accordance with AWWA C601 and as herein specified.

B. Sterilization Methods:

1. Liquid Chlorine Solution Method:

a. Flush all foreign matter from mains, branch runs, hydrant runs, and installed services.

b. Introduce liquid chlorine solution at appropriate locations to assure uniform distribution through the facilities at the proper concentration.

c. Do not use installed copper service lines to convey the concentrated chlorine solution to the mains.

d. The sanitizing solution shall be retained in the facilities for a period of 24 hours after which each service, hydrant run, branch run and dead end shall be flushed until:

i. Residual chlorine is less than 1 part per million.

ii. Residual chlorine is no greater than the concentration of chlorine in the water supplied for flushing.

e. Chlorine shall be a 1 percent solution (containing 10,000 parts per million available chlorine) or shall be obtained by use of dry chlorine in tablet form firmly attached to inside tope of the pipe.

f. The required concentration of chlorine in the pipe is 50 parts per million. This concentration may be attained by adding 5 gallons of the chlorine solution to 1,000 gallons of water.

g. The weight of chlorine or chlorine compound required to make a 1 percent chlorine solution is as follows:

TABLE 3

One-Percent Chlorine Solution Mix

AMOUNT OF PRODUCT COMPOUND		QUANTITY OF WATER (in gallons)
High-Test Calcium Hypochlorite (65-70% Cl)	1 pound	7.50
Chlorinated Lime (32-35% Cl)	2 pounds	7.50
Liquid Laundry Bleach (5.25% Cl)	1 gallon	4.25
Liquid Chlorine (100% available chlorine)	0.62 pounds	7.50

2. HTH Tablet Method:

   a. The required concentration of chlorine in the mains may be obtained by the use of HTH tablets as produced by Olin Mathieson in the following quantities or approved equivalent:

      TABLE 4

      HTH Tablet (70%) Dosage

      Number of Tablets Per Length of Pipe

Length of Section	DIAMETER OF PIPE				
	4 inches	6 inches	8 inches	10 inches	12 inches
13 feet	1	2	3	4	6
18 feet	1	2	3	5	6
20 feet	1	2	3	5	7
30 feet	2	3	5	7	10
36 feet	2	3	5	8	12
40 feet	2	4	6	9	14
100 feet	4	9	15	23	30

   b. Tablets are to be fastened to the inside top surface of each length of pipe using “Permatex No. 1" no earlier than the day pipe is laid.

   c. Tablets shall not be installed in the pipe and left overnight before laying and shall not be accessible at any time for casual pilferage by the general public or by children. Tablets shall be stored in a hermetically sealed container.

   d. The new water lines are to be slowly filled with water. Air is to be exhausted from each dead end, branch run, hydrant run, and installed service.

e. Water shall be retained for a period of 24 hours, after which each service, hydrant run, branch run and dead end shall be thoroughly flushed to clear foreign matter and until:

i. Residual chlorine concentration is less than 1 part per million

ii. Residual chlorine is no greater than the concentration of chlorine in the water supplied for flushing.

C. Bacteriological Testing:

1. Samples shall be gathered and tests conducted at the expense of the Contractor by a laboratory certified by the California Department of Health Services as an Environmental Testing Laboratory (ELAP).

2. Samples are to be taken at representative points as required by the District and authorities having jurisdiction.

3. The new water lines shall remain isolated and out of service until satisfactory test results have been obtained that:

a. Meet the requirements of the California Department of Health Services, Drinking Water Standards.

b. District has accepted the results as indicative of the bacteriological condition of the facilities.

c. If unsatisfactory or doubtful results are obtained from the initial sampling, repeat the chlorination process until acceptable test results are reported.

3.16 HYDRANT FLOW TESTING

A. After completion of the pipe and hydrant installation and service connections, the new hydrants shall be flow tested and results provided to the District's Representative and Engineer. The Contract shall provide the following information:

1. Who performed the test.

2. Testing date.

3. Hydrant location.

4. Static pressure (psig).

5. Residual pressure (psig).

6. Flow (gpm).

7. Orifice size (in).

END OF SECTION