

SPECIFICATIONS AND CONTRACT DOCUMENTS

**FOR THE
CONSTRUCTION OF**

**RINCONADA WATER TREATMENT PLANT
INTERIM SITE RESTORATION PROJECT**

Project No. 93294057

Contract No. C0670

APRIL 2021



Valley Water

Clean Water • Healthy Environment • Flood Protection

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PROJECT NO. 93294057

CONTRACT NO. C0670

SANTA CLARA VALLEY WATER DISTRICT

MARCH 2021

Approval by:



Russell Vadenais, P.E.
Project Engineer
CDM Smith

03/01/2021

Date



Accepted by:



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Treatment Plants Project Delivery
Unit Manager
Santa Clara Valley Water District

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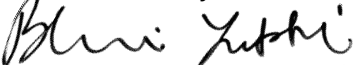
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Heath McMahon, P.E.
Deputy Operating Officer
Water Utility Capital Division
Santa Clara Valley Water District

3/23/2021

Date



Bhavani Yerrapotu, P.E.
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3/23/2021

Date

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Linda J. LeZotte, Chair

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District 2
District 3
District 4

Nai Hsueh
Tony Estremera, Chair
Gary Kremen Vice Chair

District 5
District 6
District 7

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TECHNICAL PROVISIONS

DIVISION 1 GENERAL REQUIREMENTS

NOT USED

DIVISION 2 SITE CONSTRUCTION

02084	Utility Structures
02220	Demolition
02240	Dewatering
02260	Excavation Support and Protection
02300	Earthwork
02313	Controlled Low-Strength Material
02315	Fill and Backfill Materials
02632	Storm Drainage Piping
02722	Aggregate Base Course
02742	Asphaltic Concrete Paving
02762	Painted Traffic Lines and Markings
02772	Concrete Curbs, Gutters, and V-Gutters
02924	Hydroseeding and Soil Preparation
02952	Erosion Control – Post Construction BMPs
02970	Extended Landscape Maintenance

DIVISION 3 CONCRETE

03100	Concrete Forms and Accessories
03200	Concrete Reinforcement
03300	Cast-in-Place Concrete
03350	Concrete Finishing
03600	Grouts
03922	Modifications and Repairs to Concrete

DIVISION 4 MASONRY

NOT USED

DIVISION 5 METALS

05500	Miscellaneous Metals
05510.10	Modification of Existing Aluminum Stairs
05520	Handrails and Railings

DIVISION 6	WOOD AND PLASTICS
NOT USED	
DIVISION 7	THERMAL AND MOISTURE PROTECTION
07100	Dampproofing
DIVISION 8	DOORS AND WINDOWS
NOT USED	
DIVISION 9	FINISHES
09250	Gypsum Board
09653	Resilient Wall Base and Accessories
09910	Paints
DIVISION 10	SPECIALTIES
NOT USED	
DIVISION 11	EQUIPMENT
11217	Submersible Sump Pumps
DIVISION 12	FURNISHINGS
NOT USED	
DIVISION 13	SPECIAL CONSTRUCTION
13490	Commissioning of Process Control Systems
DIVISION 14	CONVEYING SYSTEMS
NOT USED	
DIVISION 15	MECHANICAL
15061	Pipe Supports and Anchors
15082	Piping Insulation
15110	Valves – General Requirements
15111	Ball Valves
15112	Butterfly Valves
15113	Plastic Valves
15119	Air-Vacuum Relief Valves
15120.10	Flanged Coupling Adapters
15232	Steel Piping
15234	Stainless Steel Piping and Tubing

15238 Plastic Piping
15400.10 Emergency Shower and Eyewash Modification

DIVISION 16 ELECTRICAL

NOT USED

APPENDIX A

Payment Bond
Performance Bond

APPENDIX B

Guidelines for Contractors As-Built Mark-Ups

APPENDIX C

CPM Scheduler Statement of Experience

STANDARD PROVISIONS

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STANDARD PROVISIONS

SECTION 1. DEFINITIONS

Whenever in these Specifications and other Contract Documents the following abbreviations and terms or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISI	American Iron and Steel Institute
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
API	American Petroleum Institute
AREA	American Railway Engineering Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AWG	American Wire Gage
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BAAQMD	Bay Area Air Quality Management District
Cal EPA	California Environmental Protection Agency
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CWA	Federal Clean Water Act
DHS	California Department of Health Services
HSC	California Health and Safety Code
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPDES	National Pollution Discharge Elimination System
NTP	Notice to Proceed
RWQCB	California Regional Water Quality Control Board
SAE	Society of Automotive Engineers
SDS	Safety Data Sheet
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
UBC	Uniform Building Code
UL	Underwriters Laboratories
USEPA/EPA	United States Environmental Protection Agency
WCLB	West Coast Lumber Inspection Bureau
WWPA	Western Wood Products Association

DEFINITIONS

Acceptance: The formal, written acceptance of the Contract by the District's Board of Directors, as documented in a recorded Notice of Completion of Contract and Acceptance of Work. Acceptance indicates that all Work has been completed in all respects in accordance with the Drawings and Specifications and with any modifications thereof previously approved.

Activity Hazard Analysis (AHA)/Job Hazard Analysis (JHA): A form used to identify the task and break it down into steps, identify the hazards associated with each step, and identify the control measures used for each step to protect the worker, environment, or public. This form is also commonly referred to as a Job Safety Analysis (JSA).

Addendum: Written or graphic instruments issued prior to the opening of Proposals that make changes, additions, or deletions to the Bid Documents, or Contract Documents.

Agreement: The written document executed by the parties formalizing the Contract.

Approved, Directed, Ordered, or Required: Whenever these words or their derivatives are used, it is the intent, unless otherwise clearly stated, that approval or direction by the Engineer is indicated.

Article: A numbered subsection of a Section.

Bid: The completed Proposal and all associated Bid Forms, including Bidder's Bond or other Bidder's security. Bids not accompanied by the required documents are considered incomplete bids and are nonresponsive.

Bid Documents: All documents to be considered when preparing a Bid. The Notice to Bidders, Instructions to Bidders, Proposal and all accompanying Bid Forms, Bidder's Bond or other Bidder's security, and Contract Documents.

Bidder: Any individual, firm, partnership, corporation, or combination thereof, submitting a proposal for the Work contemplated, acting directly or through a duly authorized representative.

Board, Board of Directors: The Board of Directors of the District.

Certified Industrial Hygienist: A professional who is certified by the American Board of Industrial Hygienists as trained to evaluate safety and health hazards and to determine safety measures necessary for personnel working under hazardous conditions.

Code: The terms Government Code, Labor Code, etc., refer to codes of the State of California.

Competent Person: A person capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt, corrective measures to eliminate those conditions.

Construction Equipment: Equipment used for the performance of work but not incorporated into the Project.

Contract: The written Agreement between the Contractor and the District comprised of the Contract Documents.

Contract Documents: Refer to Article 2.01. Contract Documents and Precedence.

Contract Time(s): The time (Days) allowed for completion of the entire Work or portion thereof as defined by specified Milestones that meets the requirements of the Contract Documents and is accepted by the Engineer. See also Project Completion and Milestone Completion.

Contract Price(s): The price (dollars) for completion of the entire Work set forth in the Contract Documents.

Contractor: The entity or person with whom the District has executed the Contract and has identified as such therein and referred to throughout the Contract Documents as singular in number and neuter in gender. The term "Contractor" means Contractor, its employees or its authorized representative(s).

Controlling Item of Work: Any feature or combination of features of the Work considered at the time by the Engineer, which if delayed, will delay the completion of Work associated with a specified Contract Time(s).

Days: Calendar days, unless otherwise designated.

Delay: An increase in the duration or length of time for performing the Work that is caused by any event, action, inaction, or factor. The five types of delay are defined in Article 3.08. Change in Contract Time(s).

Definable Feature of Work: A task that is separate and distinct from other tasks and that has separate control requirements.

District: The Santa Clara Valley Water District. Also referred to as "Valley Water" throughout the Contract Documents.

Drawings: The official Drawings, working Drawings, detail Drawings, and supplemental Drawings, or reproductions thereof, that show the location, character, dimension, and details of the Work to be done and that are to be considered as part of the Contract.

Engineer: The designated Engineer as defined in Article 3.02. Engineer of the Standard Provisions who, acting either directly or through a properly designated representative, assumes all duties and responsibilities, and has all rights and authority in accordance with the Contract Documents.

Equipment: Equipment incorporated or to be incorporated into the Project.

First Chargeable Day: The first day of Contract Time allowed for completion of the entire Work. The First Chargeable Day will be specified in the Notice to Proceed.

Fixed Costs: Any necessary labor, Material, and Equipment costs directly expended on the item or items under consideration that remain constant regardless of the quantity of Work done.

Hazardous Material: (A) Any substance, product, waste, or other Material of any nature whatsoever that is or that becomes listed, regulated, or addressed pursuant to any Federal, State, or Local Statute, Law, Ordinance, Resolution, Code, Rule, Regulation, Order, or Decree regulating, relating to, or imposing liability (including, but not limited to, response, removal, and Remediation costs) or standards of conduct or performance concerning any hazardous, toxic, explosive, corrosive, flammable, infectious, radioactive, carcinogenic, mutagenic, or as otherwise dangerous waste, substance, or Material; (B) any substance, product, waste, or other Material of any nature whatsoever whose presence in and of itself may give rise to liability under any of the above Statutes or under any statutory or common law theory based on negligence, trespass, intentional tort, nuisance, strict, or absolute liability or under any reported decisions of a State or Federal court; (C) any substance without limitation that contains petroleum or crude oil, including, but not limited to, petroleum and petroleum products.

Hazardous Waste: Any substance or Material as defined in the California Hazardous Waste Control Act Health and Safety Code, Chapter 6.5, Sections 25100–25257.1, or in the Resource Conservation and Recovery Act, 42 U.S.C. 6901 et seq.

Liquidated Damages: The amount stated in the Specifications, as provided for in Government Code Section 53069.85, to be paid to the District or to be deducted from any payments due or to become due the Contractor for each Day of Inexcusable Delay in completing the whole or any specified portion of the Work beyond the specified Contract Time(s) or any other amount specifically stated as a Liquidated Damage in the Contract.

Material: Material incorporated or to be incorporated into the Project or managed by the Contractor.

Milestone: A specified portion of the Work identified in the Contract as a Milestone that is to be completed under the Contract.

Milestone Completion: The date determined by the District when the Milestone is to be complete. Milestone Completion does not constitute Acceptance but does establish the completion date of the Milestone for the purpose of assessing Liquidated Damages, if any, associated with the Milestone.

Notice to Proceed: Refer to Article 5.02. Notice to Proceed.

Personnel Protection: Equipment and procedures that minimize human exposure to Regulated Material, Hazardous Material, Hazardous Waste, or unsafe situations.

Plans, Construction Plans: See Drawings.

Project: The erection, construction, alteration, repair, or improvement to be accomplished under the Contract. Refer to Work.

Project Completion: The stage at which the whole Work is complete per the Contract Documents, and the Engineer has performed the final inspection and issued a Project Completion letter.

Proposal: The Proposal states the price for which the Bidder proposes and agrees to perform the Work. See Proposal and Bid Items, Bid Form No. 1.

Qualified Biologist: A biologist who has the experience, education and training necessary to perform specific tasks related to the biological subject discipline, and in an unbiased fashion. The term 'qualified biologist' is used generically to mean a biologist who is trained to perform the given task; specifically, a fisheries biologist, wildlife biologist, or botanist. Training must be in the field to which the task is related. (Refer to the appendices for specific fields of study).

Reasonable Accuracy: Within the tolerances as shown on the Drawings or as indicated in the Specifications.

Regulated Material: Any substance or combination of substances for which Federal, State, or Local regulations require special management, storage, disposal, or handling practices. This includes, but is not limited to, material defined as Hazardous Material and Waste; designated waste (California Water Code Section 13173); and special waste (California Code of Regulations, Title 22, Div. 4.5 [Environmental Health Standards for the Management of Hazardous Waste]).

Remediation: Restoration of contaminated soil, groundwater, or other Materials to its pre-contaminated level or to a level acceptable to the District and Local, State, and Federal agencies.

Responsible Bidder: Responsible Bidder as defined in California Public Contract Code Section 1103.

Specifications: The directions, provisions, and requirements contained in the Standard Provisions, Special Provisions, and Technical Provisions.

Subcontractor: An entity or person contracting with the Contractor or with another Subcontractor to perform any portion of the Work. The term "Subcontractor" is referred to throughout the Contract Documents as singular in number and neuter in gender and means a Subcontractor, its employees or its authorized representative(s).

Supplier: An entity or person contracted with the District, the Contractor or its Subcontractors to provide Materials and/or equipment for any portion of the Work. The term "Supplier" is referred to throughout the Contract Documents as singular in number and neuter in gender and means a Supplier or its authorized representative.

Total Bid Price: The sum stated in the Bid for which the Bidder offers to perform the Work described in the Bid Documents. The Total Bid Price shall include the entire cost of all Work necessary for a complete and fully operational structure or facility in accordance with the requirements of the Contract Documents.

Work: Refer to Article 3.01. Work to be Done, paragraph A. References in the Contract Documents to "Work" may be to specific items of Work.

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SECTION 2. CONTRACT DOCUMENTS

2.01. Contract Documents and Precedence

- A. The Contract Documents comprise the entire Agreement between the District and the Contractor concerning the Work. The Contractor shall properly perform all requirements of the Contract Documents.
- B. The Contract Documents include the District's Contract form and any exhibits attached thereto, including the Notice to Bidders, Instructions to Bidders, Proposal, Standard Provisions, Special Provisions, Technical Provisions, Drawings, Specifications, Addenda, Appendices, approved Change Orders, and Directed Change Orders (DCO) as defined in Section 3, if any.
- C. The Contract Documents are intended to be complementary and include all items necessary for the Contractor's proper execution and completion of the Work. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be as if shown or mentioned in both. Any part of the Work not shown or mentioned in the Drawings or in the Specifications that is inferable or implied by either, or that is necessary or usual for proper performance of the Work, shall be provided by the Contractor at its own expense.
- D. In case of conflicts, errors, and discrepancies in any of the Contract Documents, the order of precedence (from highest to lowest priority) is as follows. Within the same order of precedence, specific requirements shall take precedence over general requirements:
 - 1. Change Orders (CO) or DCO
 - 2. Agreement
 - 3. Addenda
 - 4. Special Provisions
 - 5. Technical Provisions
 - 6. Drawings/Plans
 - 7. Standard Provisions
 - 8. Instructions to Bidders
 - 9. State Specifications and Plans
 - 10. Appendices
- E. With reference to the Drawings:
 - 1. Figures or numerical dimensions govern over scaled dimensions.
 - 2. Detail Drawings govern over general Drawings.
 - 3. Addenda/CO or DCO Drawings govern over Contract Drawings.
 - 4. Contract Drawings govern over standard Drawings.

5. Notes apply only to the Drawings where the notes appear, unless classified as “typical,” “general,” or “universally applicable,” in which case they apply to all Drawings where the conditions or circumstances noted occur.
6. Typical details apply to all Drawings, unless a specific, different detail is shown.

2.02. State Specifications and Plans

- A. Unless otherwise stated, State Specifications and Plans referred to in these Specifications shall be the latest published edition of the State of California Department of Transportation Standard Specifications and Standard Plans and updates thereto and are by reference made a part of these Specifications the same as though set out in full, as to the provisions requiring compliance.
- B. When specifically stated to follow the State Specifications and Plans for an item, the Work set forth in these Contract Documents shall be accomplished in accordance with the appropriate provisions and details of the State Standard Specifications and Standard Plans.

2.03. Clarification of Contract

- A. The following interpretative rules apply throughout the Contract Documents:
 1. The provisions of the Contract Documents are complementary and should be interpreted to view the Contract Documents as a whole.
 2. A concept phrased in the singular should be interpreted in the plural as required.
 3. Masculine includes feminine and feminine includes masculine.
 4. The words “shall,” “will,” and “must” in any of their tenses indicate mandatory requirements. The word “may” indicates “may apply” or “may not apply.”
 5. The use of examples (e.g., “such as” or “including”) does not limit or exclude examples not specifically mentioned.
 6. The words “provide,” “furnish,” “perform,” “construct,” and “install” mean that the Contractor shall provide, perform, construct, and install and shall include all services necessary to provide, perform, construct, and install unless preceded by the word “only.”
- B. The Contract Documents are not complete in every detail but show the purpose and intent only. The Contractor shall comply with their true intent and meaning, taken as a whole, and shall not avail itself of any manifest error, omission,

discrepancy, or ambiguity that appears in the Contract Documents, instructions, or work performed by others.

- C. All corrections of readily apparent errors or omissions in the Contract may be made by the Engineer when such corrections are necessary for the proper fulfillment of their intention as construed by the Engineer. The misplacement, addition, or omission of any word, letter, figure, or punctuation mark that has no substantive legal effect will in no way change the due spirit, intent, or meaning of these Specifications.
- D. Any part of the Work not shown on the Drawings or described in these Specifications, but that is reasonably or ordinarily implied by either, shall be furnished and installed by the Contractor as if fully described in these Specifications and shown upon the Drawings.
- E. **Contract Document Clarifications (CDC):** A document initiated by the District consisting of supplementary details, instructions, or information issued by the District that clarifies or supplements the Contract Documents. Contract Document Clarifications do not constitute a change in Contract Work, Contract Price(s), or an extension in Contract Time(s) unless requested by the Contractor and approved by the District in accordance with the Contract Documents.
- F. Payment for items of Work that are called for in the Specifications or that are shown on the Drawings but that are not separately identified in the Proposal, shall be compensated as part of the Bid price of one or more of the items that are listed; no additional payment shall be made.

2.04. Requests for Information

- A. **Request for Information (RFI):** A document prepared by the Contractor requesting information from the District regarding the Project or Contract Documents.
- B. Contractor shall be responsible for its costs and the costs of its Subcontractors to review Contract Documents and field conditions and to implement and administer an RFI system throughout the Contract Time(s) in accordance with the requirements of the Contract. The Contractor shall be responsible for costs incurred by the District for the Work of the District's consultants and District administrative efforts in answering Contractor RFIs where the answer could reasonably be found by reviewing the Contract Documents.
- C. The Contractor shall carefully review the appropriate portions of the Contract Documents a minimum of 30 Fs in advance of the Work to be executed for the express purposes of checking for manifest errors, omissions, discrepancies, or ambiguities. The Contractor shall not be entitled to any compensation for Delays, disruptions, inefficiencies, or additional administrative effort caused by the Contractor's untimely review of the Contract Documents.

- D. Should it appear that the Work to be done or any of the matters relative thereto are not sufficiently detailed or explained in the Specifications or on the Drawings, or if the Contractor discovers any discrepancies between the Contract Drawings and conditions in the field, or any errors or omissions in the Contract, or in the layout given by stakes, points, or instructions, the Contractor shall submit a written RFI to the Engineer. If the Contractor proceeds with any such Work without receiving such clarification or RFI reply, it shall be responsible for correcting all resulting damage and any nonconforming Work.
- E. The Engineer will issue written clarification or interpretation of Contract Document requirements in response to the Contractor's requests and other sources of information. The Engineer's decision thereon shall be final; the Contractor shall conform to it as part of the Contract.

2.05. Examination of Drawings, Specifications, and Site of Work

- A. As noted in the Notice to Bidders, the Contractor's submission of a Proposal is conclusive evidence that the Contractor investigated and is fully aware of the conditions and difficulties to be encountered of the character, quality, and quantities of Work to be performed, the Material to be furnished, and the requirements of the Proposal, Drawings, Specifications, and other Contract Documents.
- B. Where investigation of subsurface conditions has been made by the District in respect to foundation, characterization of soils, groundwater, or other design, Bidders may inspect the records of the District as to such investigation, including examination of samples and drill cores, if any. When logs of test boring showing a record of the data obtained by the District's investigation of subsurface conditions are made available, these logs represent only the opinion of the District as to the character of Material encountered by it in its test borings and are made available only for the convenience of Bidders.
- C. Note that the District's investigation of subsurface conditions is made for the purpose of design. The District assumes no responsibility whatsoever in respect to the sufficiency of test borings, or to accuracy of the log of test borings, or to other preliminary investigations, or of the interpretation thereof. There is no guarantee, expressed or implied, that the conditions indicated are representative of those existing throughout the Work, or to any part of it, or that unforeseen developments may not occur.
- D. Making such information available to the Contractor is not to be construed in any way as a waiver of the provisions of this Article; Bidders must satisfy themselves through their own investigations, analyses, and interpretations as to conditions to be encountered.
- E. No information derived from such inspection of records or from preliminary investigations made by the District, or from the Engineer, or from assistants, or from the maps, Specifications, profiles, or Drawings will in any way relieve the Contractor from any risk or from properly fulfilling all the terms of the Contract.

F. Site Investigation

1. The Contractor shall not be entitled to any adjustment in the Contract Price(s) or in Contract Time(s) if the existence of the condition that caused an impact alleged by the Contractor:
 - a. Could have been reasonably discovered or revealed as a result of examination, investigation, exploration, test, or study of the site and of contiguous areas required by the Contract Documents to be conducted by or for the Contractor prior to commencing the Work; or
 - b. Could have been inferred from the presence of other visible features, such as boulders, buildings, meters, and junction boxes on or adjacent to the site.

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SECTION 3. SCOPE OF WORK

3.01. Work to be Done

- A. The performance by the Contractor of all of its responsibilities and obligations set forth in the Contract Documents. Work includes, but is not limited to, providing labor, Materials, Equipment, testing, services, and documentation required by the Contract Documents. References in the Contract Documents to "Work" may be to specific items of Work. All Work performed is to be in compliance with the Contract Documents.
- B. During construction, the Contractor shall keep the worksite, areas adjacent to the worksite or otherwise impacted by the Contractor's operations and access roads in an orderly condition, free and clear of debris and discarded Materials.

3.02. Engineer

- A. The Engineer of the District shall be the District's representative who assumes all duties and responsibility and has all rights and authority as assigned in the Contract Documents.
- B. The Engineer of the District is the Deputy Operating Officer or Assistant Operating Officer of the Water Utility Capital or Watershed Capital or Water Utility Technical Support Division or Office of Watersheds as applicable. Administrative hearings, if required, will be conducted by an Operating Officer of a different Division or Office.
- C. Authority of Engineer: The Engineer shall decide all questions that may arise as to the quality or acceptability of Material furnished, Work performed, and rate of progress of the Work; all questions that may arise as to the interpretation of the Drawings and Specifications; and all questions as to the acceptable fulfillment of the Contract on the part of the Contractor. The Engineer's decisions shall be final. The Engineer has the authority to enforce these decisions and provide direction to the Contractor, which the Contractor shall carry out promptly.

3.03. Contractor Staffing

- A. A project manager and superintendent shall be provided as specified below:
 - 1. The Contractor shall submit for approval in writing before starting the Work the name of the project manager and superintendent who shall have complete authority to represent and act for the Contractor. This submittal shall also include a list of reference projects with the following information: (i) the individual's name; (ii) the project name that serves as the basis of qualification; (iii) the project site location; (iv) a brief project description; and (v) the name and mailing address of the project owner.
 - 2. The project manager shall have at a minimum seven (7) years' experience as a contractor's project manager on public works with not less than four (4) years' experience as a project manager on projects with

- complexity and configuration similar to the Work described in the Contract Documents.
3. The superintendent shall have at a minimum seven (7) years' experience as a contractor's general superintendent on public works with not less than four (4) years' experience as a superintendent on projects with complexity and configuration similar to the Work described in the Contract Documents.
 4. The superintendent of the Contractor shall normally be present at the site of the Work at all times while Work is actually in progress on the Contract. During any period when Work is suspended, arrangements acceptable to the Engineer shall be made for any emergency Work that may be required to be done by the Contractor.
 5. Whenever the Contractor or an authorized representative is not present on any part of the Work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the superintendent who may have charge of the particular Work in reference to which the orders are given. Any order given by the Engineer not otherwise required by the Specifications to be in writing will, on the request of the Contractor, be given or be confirmed by the Engineer in writing.
 6. If the project manager or superintendent is not deemed qualified or if the project manager's or superintendent's performance on the Work is determined to be unsatisfactory by the Engineer, the project manager or superintendent shall be immediately removed from the Project. The Contractor shall submit for approval the same information described in this article for a proposed substitute project manager or superintendent.
 7. The Contractor shall designate, in writing, the names and telephone numbers of at least three (3) representatives who can be contacted at any time in the event that an emergency occurs.
- B. A Professional Scheduler shall be provided unless removed in the Special Provisions. The Professional Scheduler shall meet the requirements specified in Article 5.05. Professional Scheduler. If Professional Scheduler is not required, the Contractor is responsible for providing adequate resources required to develop and to maintain schedules.
- C. A Site Safety and Health Supervisor shall be provided unless removed in the Special Provisions. The Site Safety and Health Supervisor shall meet the requirements specified in Article 8.11. Site Safety and Health Supervisor.
- D. A Field Quality Control Manager shall be provided if required in the Special Provisions. The Field Quality Control Manager shall meet the requirements specified in the Special Provisions Article 20.04.02. Contractor's Quality Staffing Requirements.

3.04. Character of Workers

- A. Any Subcontractor or person employed by the Contractor or Subcontractor who fails or refuses to carry out the directions of the Engineer, or who appears to the Engineer to be incompetent, or who acts in a disorderly or improper manner shall be removed from the Work immediately on the written request of the Engineer; such person shall not again be employed on the Work.

3.05. Layout of Work and Surveys**3.05.01. Responsibility of District**

- A. The District shall establish survey control points and reference points as shown on the Drawings for required field layout by the Contractor.
- B. The District shall provide only the minimum survey crew services essential for orderly performance of the Work; District survey crews will not be available at all times for the Work under these Specifications.
- C. The District shall provide to the Contractor the station(s) and offset distance(s) to all reference points and benchmarks that were provided by the District in paragraph A.
- D. The District shall establish required stakes only once. Survey stakes destroyed or removed will be replaced by the District at the Contractor's expense.

3.05.02. Responsibility of Contractor

- A. When the Contractor requires stakes or marks as provided for in paragraph A, it shall clear and grub the area to be staked and then notify the Engineer of such requirements in a reasonable length of time in advance of starting operations that require such stakes or marks. In no event shall a notice of less than seven (7) Days be considered a reasonable length of time.
- B. Where construction operations require removal of the District's stakes or other survey marks, the Contractor shall reference such points in an approved manner. Survey stakes or marks established by the District shall be preserved by the Contractor until their removal is authorized. In case of their unauthorized destruction or removal by the Contractor's forces, they will be replaced at the Contractor's expense. Any cost to the District of replacing survey stakes or marks will be deducted from payments due the Contractor. Such cost will include a reasonable charge for use of District supplies, labor, and Equipment, plus overhead.
- C. The Contractor is solely responsible for the measurements and layout of the Project from the given survey control points and reference points provided by the District. Any questions with regard to interpretation of Project layout shall be resolved by the Engineer.

- D. The Contractor shall not remove or disturb survey monuments and permanent markers unless otherwise approved by the Engineer and not until the District has recorded and referenced the locations. The Contractor shall be charged at a reasonable rate for the restoration or replacement of survey monuments and permanent markers by the District.
- E. No survey monuments, permanent markers for the District right of way, or District survey control points shall be removed or disturbed until the Engineer has recorded the locations thereof and a permit for such removal has been received from the agency having jurisdiction. When the construction Work has been completed, the Contractor shall replace said monuments accurately in the locations as referenced by the Engineer at no cost to the District.
- F. If any marker or monument is destroyed by the Contractor without prior written approval of the Engineer, the Contractor shall be responsible for the accurate replacement of that marker or monument at no expense to the District by a Land Surveyor licensed by the State of California in accordance with the California Business and Professions Code Chapter 15, Land Surveyors, Section 8771.

3.06. Changes in the Work

- A. **Change Order:** A written document that changes the Contract and has been fully executed bilaterally by the District and Contractor that authorizes an addition, deletion, or revision in the Work; an adjustment in the Contract Price(s); and/or the Contract Time(s), including Milestone Completion dates or durations.
- B. **Directed Change Order (DCO):** The District's written order that is a Change Order unilaterally executed by the District to order additions, deletions, or revisions in the Contract Work. If deemed necessary and/or appropriate by the Engineer, the DCO will include an adjustment in the Contract Price(s) and/or in the Contract Time(s) and/or in other terms and conditions that the District, at its sole discretion, deems reasonable for the change.
- C. **Potential Change Order (PCO):** The District's written request to the Contractor for a proposal to perform PCO Work prior to the District's issuance of a Change Order or DCO. A PCO may also be created by the District to track disputed Work.

3.06.01. Potential Change Orders and Change Orders

- A. The District may at any time, or from time to time and without notice to the Contractor's surety, order additions, deletions, or revisions to the Work and/or to the Contract Time(s) and may request a proposal from the Contractor for a PCO for such additions, deletions, or revisions in the Work and/or in the Contract Time(s). Pursuant to Articles 3.07. Change in Contract Price(s) and 3.08. Change in Contract Time(s), the Contractor shall submit any requests for adjustments in the Contract Price(s) and/or in the Contract Time(s).

- B. Notwithstanding the time limits stated in Article 3.06.01. Potential Change Orders and Change Orders, upon receipt of such request, the Contractor shall furnish a detailed estimate of increase or decrease in costs and/or in time, together with cost and schedule breakdowns and other supporting data within the time specified in the request, but no later than 30 Days after receipt of such a request unless the Engineer allows additional response time. The Engineer shall review and respond in writing to the Contractor's estimate prior to proceeding with the Work.
- C. Changes in the Contract Price(s) shall be determined and paid in accordance with Article 3.07. Change in Contract Price(s). Changes in the Contract Time(s) shall be determined and adjusted in accordance with Article 3.08. Change in Contract Time(s).
- D. The District and the Contractor shall execute appropriate Change Orders covering:
 - 1. changes in the Work that are Ordered by the District pursuant to paragraph "A" above;
 - 2. changes in the Contract Price(s) and/or Contract Time(s) that are agreed to by the parties; or
 - 3. any other changes agreed to by the parties.
- E. The Contractor shall not be entitled to an increase in the Contract Price(s) nor to an extension of the Contract Time(s) with respect to any Work performed that is not required by the Contract, except in the case of an emergency or in the case of uncovering Work as provided in Article 9.06.01. Inspection, paragraph H.

3.06.02. Change Order Request

- A. Should the District's Contract Document Clarifications (CDC) or other written directive, in the opinion of Contractor, materially exceed or change the requirements of the Contract Documents, the Contractor shall submit to the District a written Change Order Request (COR) within seven (7) Days of receipt of the CDCs or of other written directive.
- B. A COR shall reference the CDC or other written directive and the relevant Specifications and Drawings.
- C. A COR shall also include a cost proposal and/or time adjustment proposal as a good faith estimate of any additional compensation or time associated with the affected Work.
- D. Failure to submit a timely, documented COR shall constitute a waiver of any future claim for additional compensation or time relating to such Work.

3.06.03. Directed Change Orders

- A. In situations where (i) the Contractor fails to submit a proposal for a PCO within the time specified; or (ii) when the District and the Contractor cannot agree on the terms and conditions of a PCO within a reasonable amount of time as determined by District; or (iii) if, in the judgment of the Engineer, it is impracticable because of the nature of the change or for any other reason for the parties to determine and agree on the costs and schedule impacts before the change must be performed, the District has the right to issue to the Contractor a DCO signed by the District only, with compensation based on the Engineer's estimate of cost, time, and other impacts associated with performance of changes in the Work.
- B. A DCO may be issued by the District as a result of, but not limited to, any of the following conditions:
 - 1. Responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in Article 3.09. Differing Conditions.
 - 2. Responding to any damage to improvements of property or to an emergency affecting the safety of life or property as provided in Article 4.10. Preservation of Property.
 - 3. Utility relocation as provided in Article 4.25. Coordination With Utilities.
 - 4. Emergency work as provided in Article 4.10. Preservation of Property and in the Special Provisions.
 - 5. Protested Work under Article 3.11.01. Protest.
 - 6. PCO work.
- C. Upon receipt of a DCO, the Contractor shall immediately act upon the Work Ordered by the District, all in accordance with the applicable terms and conditions of the Contract Documents.
- D. The District's issuance of a DCO is for the purpose of unilaterally modifying the Contract Work, and/or Contract Price(s), and/or Contract Time(s), as deemed necessary by the Engineer. The parties may subsequently negotiate mutually acceptable terms and conditions of a Change Order to replace the DCO, as provided in this Article.
- E. The Contractor may, at any time after the District's issuance of a DCO, furnish a detailed estimate of increases or decreases in costs and/or time, cost and schedule breakdowns, and references to relevant Contract Specifications in support of its position with regard to the unilateral directive.

- F. Should the Contractor disagree with the terms of the DCO, the Contractor may protest in accordance with Article 3.11.01. Protest. This action shall not delay the requirement to immediately act upon the Work as provided herein.

3.06.04. Allowable Quantity Variations

- A. General: Increases or decreases in the quantity of a Contract item of Work shall be determined by comparing the actual pay quantity of an item of Work with the approximate quantity in the listing of the Bid items contained in the Proposal.
1. If the actual pay quantity of an item of Work varies from the approximate quantity by 25 percent or less, payment shall be made for the actual quantity of Work performed at the Contract unit price listed in the Proposal.
 2. If the actual pay quantity of an item of Work varies from the approximate quantity by more than 25 percent, in the absence of an executed Contract Change Order or DCO specifying the compensation to be paid, the compensation payable to the Contractor shall be determined in accordance with this Article.
 - a. Increases of More Than 25 Percent: If the actual pay quantity of an item of Work exceeds the approximate quantity by more than 25 percent, the amount of Work in excess of 125 percent of the approximate quantity may be paid for by adjusting the Contract unit price, subject to the following conditions: (i) the Contractor can demonstrate to the satisfaction of the Engineer that an adjustment in the Contract unit price is warranted; and (ii) the adjusted unit prices are reasonable and approved by the Engineer. Such adjustment of the Contract unit price shall be the positive or negative difference between the Contract unit price and the actual unit cost of the total pay quantity of the item. At the sole option of the Engineer, the actual unit cost of the Work involved in such excess shall be determined in accordance with Article 3.07.01.G.2. (by mutual acceptance of a lump sum) or with Article 3.07.02. Cost of Extra Work (based on Time and Materials); such unit costs shall include an appropriate portion of the Contractor's allowable overhead and profit.
 - (1) If the cost of an item of Work includes Fixed Costs, the Fixed Costs shall be deemed to have been recovered by the Contractor by the payments made for 125 percent of the approximate quantity at the Contract unit price for the item; in computing the actual unit cost, the Fixed Costs shall be excluded.
 - (2) When the compensation payable for the quantity of Work performed in excess of 125 percent of the approximate quantity is less than \$5,000 at the Contract unit price, no

adjustment in the Contract unit price shall be made unless requested in writing by the Contractor within 14 Days from the date the Contractor became aware, or should have reasonably become aware, of the increase in quantity.

- b. Decreases of More Than 25 Percent: If the actual pay quantity of an item of Work is less than 75 percent of the approximate quantity, an adjustment in unit price shall not be made unless the Contractor makes a request in writing within 14 Days from the date the Contractor became aware, or should have reasonably become aware, of the decrease in quantity. If the Contractor makes a request, the actual pay quantity of this item of Work performed may be paid for by adjusting the Contract unit price, subject to the following conditions: (i) the Contractor can demonstrate to the satisfaction of the Engineer that an adjustment in Contract unit price is warranted; and (ii) the adjusted unit prices are reasonable and approved by the Engineer. Such adjustment of the Contract unit price shall be the positive or negative difference between the Contract unit price and the actual unit cost of the total pay quantity of the item, including Fixed Costs. At the sole option of the Engineer, payment for the actual quantity of Work shall be made by mutual acceptance of a lump sum amount or cost of Work based on Time and Materials; such unit costs shall include an appropriate portion of the Contractor's allowable overhead and profit.
 - (1) Payment for the actual pay quantity of such item of Work shall in no case exceed the payment that would have been made for the performance of 75 percent of the approximate quantity of such item at the Contract unit price.
- B. Eliminated Items: If any Contract item of the Work is eliminated in its entirety, the Contract Sum shall be reduced by the amount bid for that Bid item, including overhead and profit. Payment shall be made to the Contractor for the actual cost incurred in connection with the eliminated Contract item if incurred prior to the date of notification in writing by the Engineer of such elimination.
 - 1. If acceptable Material is ordered by the Contractor for an eliminated Contract item prior to the date of notification of the elimination by the Engineer, and if orders for the Material cannot be canceled, payment for the Material shall be made at the actual cost to the Contractor. In this case, the Material shall become the property of the District. If the Material can be returned to the vendor and if the Engineer so directs, the Material shall be returned, and the Contractor shall be paid for the actual cost for returning the Material.
 - 2. The actual costs to be paid by the District to the Contractor in accordance with this Article will be computed in accordance with Article 3.07.02. Cost of Extra Work, which shall include an allowance for overhead and profit.

3. In the event the Contractor and the District are unable to agree on the credit amount due, the District shall unilaterally determine the amount.
- C. Supplemental Contract Items: Items noted as "Supplemental" in the Proposal may be deleted entirely or in part at the sole discretion of the District. The provisions of Articles associated with Allowable Quantity Variations or Eliminated Items shall not apply to Supplemental Contract Items.

3.07. Change in Contract Price(s)**3.07.01. General**

- A. The Contract Price(s) constitutes the total compensation payable to the Contractor for performing the Work. All duties, responsibilities, and obligations assigned to or undertaken by the Contractor to perform the Work shall be at the Contractor's expense without a change in the Contract Price(s).
- B. The Contract Price(s) shall only be changed by a fully executed Change Order or by a DCO. Any requests by the Contractor for an increase or decrease in the Contract Price(s) shall be based on a written Change Order Request (COR) delivered promptly by the Contractor to the Engineer by no later than seven (7) Days after the date of the occurrence of the event giving rise to the request and stating the general nature of the request, unless the time is modified in the Special Provisions.
- C. The COR by the Contractor shall be substantiated within 30 Days after submittal of the written notice with a cost proposal quantifying the costs and schedule impacts associated with the request with supporting data, unless the Engineer allows an additional period of time for the Contractor to ascertain more accurate data in support of the request, or unless the time is modified in the Special Provisions.
- D. No request by the Contractor for an adjustment in the Contract Price(s) shall be valid if not submitted timely in accordance with this Article; failure to submit a timely and fully documented request shall constitute a waiver of any future requests or Claims for additional compensation or a time extension related to such Work.
- E. Any request for an adjustment in the Contract Price(s) and/or in the Contract Time(s) shall include, but shall not be limited to:
 1. a written description of the event or issue or combination of events/issues that gave rise to the request, including and without limitation, the start date of the event or events and the anticipated or actual finish date;
 2. a written description of the legal basis of the request with specific references to the Contract provisions upon which the Contractor relies;

3. an identification of the Work (e.g., activities with the current updated Detailed Progress Schedule and similar information) affected by the event(s);
 4. relevant correspondence and other information related to and supporting entitlement;
 5. written documentation pursuant to Article 3.07.02. Cost of Extra Work through 3.07.05. Compensation for Time Extension related to pricing of the requested change;
 6. a written description of the effect of the request on the progress of the Work;
 7. a detailed schedule analysis based on the most current Detailed Progress Schedule that identifies the critical and/or controlling portions of the Work impacted by the change and the anticipated dates of the impact;
 8. the specific number of Days of time extension requested for any impacted Contract Time(s);
 9. a written proposal for any additional compensation being requested that would fully compensate the Contractor for all costs of acceleration of the related Work needed to overcome the associated Delay, if any; and
 10. a written statement from the Contractor that the proposed adjustment is the entire adjustment of the Contract Price(s) and/or of the Contract Time(s).
- F. The Engineer shall review the Contractor's COR within 14 Days after receipt of the cost proposal and supporting documents, and render its determination in writing, unless the time is modified in the Special Provisions, Work, and Contract Time. If the Engineer requires a longer period for its determination, it will provide written notice to the Contractor within the initial 14-Day period. If the Engineer does not issue a determination within the initial or extended period, the request shall be deemed rejected and the provisions of Article 3.11. Disputes shall apply.
- G. The value of any Work covered by a PCO, Change Order, DCO, or any request for an increase or decrease in the Contract Price(s) shall be determined in one of the following ways:
1. Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved; or
 2. By mutual acceptance of a lump sum, which shall follow the basic pricing rules set forth under Article 3.07.02. Cost of Extra Work and include an allowance for overhead and profit in accordance with Article 3.07.02.G. Contractor's Fee; unless otherwise approved by the Engineer; or

3. On the basis of the cost of Work (determined as provided in Articles 3.07.02. Cost of Extra Work and in 3.07.04. Special Services) plus a Contractor's fee for overhead and profit (determined as provided in Article 3.07.02. Cost of Extra Work). For this payment basis, the Engineer will direct the Contractor to proceed on a Time-and-Materials basis and may also establish a Not-to-Exceed (NTE) budget for the change.

3.07.02. Cost of Extra Work

- A. The term "cost of extra Work" means the sum of all direct costs necessarily incurred and paid by the Contractor or estimated to be incurred and paid by the Contractor for labor, Materials, and Equipment in the proper performance of Work, plus a markup for overhead and profit as defined in this Article. Except as otherwise may be agreed to in writing by the District, such costs shall be in amounts no higher than those prevailing in the locality of the Project.
- B. Labor: The direct cost of labor used in performing Work by the Contractor, a Subcontractor, or by other forces will be the sum of the following:
 1. The actual or estimated wages paid plus any employer payments to or on behalf of workers for fringe benefits, including health and welfare, pension, vacation, and similar purposes.
 2. There shall be added to the actual or estimated wages as defined above a percentage set forth in the latest "Labor Surcharge and Equipment Rental Rates" in use by the California State Department of Transportation, which is in effect on the date upon which the Work is accomplished. This percentage shall constitute full compensation for all payments imposed by State and Federal laws, including, but not limited to, workers' compensation insurance and Social Security payments.
 3. The amount paid or estimated to be paid for subsistence and travel required by collective bargaining agreements.
 4. For Equipment operators, payment for the actual or estimated cost of labor and subsistence or travel allowance shall be made at the rates paid, or estimated to be paid, by the Contractor to other workers operating similar Equipment already on the Work, or in the absence of such labor, established by collective bargaining agreements for the type of workers and location of the extra Work, whether or not the operator is actually covered by such an agreement. A labor surcharge shall be added to the cost of labor described herein in accordance with the provisions in this Article, which surcharge shall constitute full compensation for payments imposed by State and Federal laws, and all other payments made to on behalf of workers other than actual or estimated wages.
- C. Materials: The direct cost of Materials used or to be used in performing Work shall be the actual or estimated cost to the purchaser, including sales tax,

whether the Contractor or a Subcontractor, from the Supplier thereof, except as the following are applicable:

1. Trade discounts available to the purchaser shall be credited to the District notwithstanding that such discounts may not have been taken by the Contractor.
 2. For Materials secured other than by a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid, or estimated to be paid, to the actual Supplier as determined by the Engineer. Markup, except for actual or estimated costs incurred in the handling of such Materials, shall not be allowed.
 3. Payment for Materials from sources owned wholly or in part by the purchaser shall not exceed the price paid, or estimated to be paid, by the purchaser for similar Materials from said sources on extra Work items or the current wholesale price for such Materials delivered to the worksite, whichever price is lower.
 4. The Contractor is responsible for and shall not be compensated for any increases in Material costs beyond those included in its Contract Price(s), including, but not limited to, sudden market changes or unexpected Material price increases.
 5. If, in the opinion of the Engineer, the estimated or actual cost of Materials is excessive or the Contractor does not furnish satisfactory evidence of the cost of such Material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned delivered to the worksite, less any trade discount. The District reserves the right to furnish Material for the extra Work; no Claim shall be made by the Contractor for costs and profit on such Material.
- D. Equipment: The Contractor shall be paid for the use of Equipment at the rental rate listed for such Equipment specified in the current edition of the Department of Transportation publication entitled, *Labor Surcharge and Equipment Rental Rates*, which is in effect on the date upon which the Work is accomplished. Such rental rates shall be used to compute payments for Equipment whether the Equipment is under the Contractor's control through direct ownership, leasing, renting, or under another method of acquisition. The rental rate to be applied for use of each item of Equipment shall be the rate resulting in the least total cost to the District for the total period of use. If it is deemed necessary by the Contractor to use Equipment not listed in the foregoing publication, an equitable rental rate for the Equipment will be established by the Engineer. The Contractor shall furnish cost data, which might assist the Engineer in establishing the rental rate.
1. The rental rates paid, or estimated to be paid, as above provided shall include the cost of fuel, oil, lubrication supplies, small tools, necessary attachments, repairs, and maintenance of all kinds; depreciation, storage, insurance, and all incidentals, unless the Equipment is idle due to a

Delay. Operators of Equipment will be separately paid for as provided in paragraph 4 of Article 3.07.02.B. Labor.

2. All Equipment shall be in good working condition and suitable for the purpose for which the Equipment is to be used.
 3. Before construction Equipment is used on the extra Work, the Contractor shall plainly stencil or stamp an identifying number thereon at a conspicuous location and shall furnish to the Engineer, in duplicate, a description of the Equipment and its identifying number.
 4. Unless otherwise specified, manufacturer ratings and manufacturer-approved modifications shall be used to classify Equipment to determine applicable rental rates. Equipment that has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.
 5. Individual pieces of Equipment or tools having a replacement value of \$500 or less, whether or not consumed by use, shall be considered to be small tools; no payment shall be made.
 6. Compensation for idle time of Equipment shall include the ownership costs only, not including operating costs, in accordance with the following:
 - a. The Equipment rental rate shall be based on the delay factor in the edition of the Department of Transportation's publication entitled, *Labor Surcharge and Equipment Rental Rates*, in effect on the date the Work is accomplished.
 - b. Daily number of payable hours equals the normal working hours during the delay, not to exceed eight (8) hours per Day or 40 hours per week.
 - c. Delay Days exclude nonworking Days.
 - d. Markups are not added.
- E. Owner-Operated Equipment: When owner-operated Equipment is used, or anticipated to be used, to perform Work and is to be paid for as extra Work, the Contractor shall be paid for the Equipment and for the operator as follows:
1. Payment for the Equipment shall be made in accordance with the provisions in Contractor's Article 3.07.02.D. Equipment.
 2. Payment for the cost of labor and subsistence or travel allowance shall be made at the rates paid, or estimated to be paid, by the Contractor to other workers operating similar Equipment already on the Project, or, in the absence of such other workers, at the rates for such labor established by collective bargaining agreement for the type of worker and location of the

Work, whether or not the owner-operator is actually covered by such an agreement. A labor surcharge shall be added to the cost of labor described herein in accordance with the provisions in paragraph 2 of Article 3.07.02.B. Labor.

3. Markup for Equipment rental and labor as provided in Article 3.07.02.G. Contractor's Fee shall be added to the direct cost of Equipment rental and labor, computed as provided herein.

F. Equipment Time: The rental time to be paid, or estimated to be paid, for Equipment on the Work shall be the time the Equipment is in productive operation on the Work being performed and shall include the time required to move the Equipment to the new location and return it to the original location or to another location, requiring no more time than that required to return it to its original location. Moving time shall not be paid if the Equipment is used on Work other than the extra Work. Loading and transporting costs shall be allowed, in lieu of moving time, when the Equipment is moved by means other than by its own power. No payment shall be made for loading and transporting costs when the Equipment is used at the site of the extra Work on other than the extra Work. The following shall be used in computing the rental time of Equipment on the Work:

1. When hourly rates are listed, any part of an hour less than 30 minutes of operation shall be considered to be a half hour of operation, and any part of an hour in excess of 30 minutes will be considered one (1) hour of operation.
2. When daily rates are listed, operation for any part of a Day less than four (4) hours shall be considered to be a half Day of operation.
3. Rental time will not be allowed while Equipment is inoperative due to breakdowns or due to Contractor-caused Delays.

G. Contractor's Fee

1. Work Ordered on the basis of Time and Materials or forward-priced lump sum will be paid for at the estimated or actual and necessary cost as determined by the Engineer, plus allowances for overhead and profit; said allowances shall constitute the Contractor's Fee. For extra Work involving a combination of increases and decreases in the Work, the estimated or actual and necessary cost will be the arithmetic sum of the additive and deductive costs.
2. To the total of the direct costs computed as provided above, there will be added a markup for overhead and profit as specified below. The markup shall constitute full compensation for all direct and indirect overhead costs and profit, which shall be deemed to include all items of expense not specifically listed above as direct costs. No separate allowance or itemization for overhead costs shall be allowed. The following list, though

not intended to be comprehensive, indicates the types of costs that are included in the markup for overhead and profit for all Change Orders, including Time-and-Material Work:

- a. Field and home office personnel, including, but not limited to, principals, project managers, superintendents, supervisory foremen, estimators, project engineers, detailers, draftspersons, schedulers, consultants, watchpersons, payroll clerks, administrative assistants, and secretaries.
- b. All field and home office expenses, including, but not limited to, field trailers, parking, storage sheds, office equipment and supplies, telephone service at the Site, long-distance telephone calls, fax machines, computers and software, Internet and e-mail services, temporary utilities, sanitary facilities and services, janitorial services, small tools and Equipment with a cost under \$500 each, portable scaffolding, blocking, shores, appliances, job vehicles, security and fencing, conformance to all regulatory requirements, including compliance with safety regulations, safety programs and meetings, cartage, warranties, record documents, and all related maintenance costs.
- c. Administrative functions, including, but not limited to, reviewing, coordinating, distributing, processing, posting, recording, estimating, negotiating, scheduling, schedule updating and revising, expediting, surveying, engineering, drawing, detailing, revising shop Drawings, preparing record Drawings, carting, cleaning, protecting the Work, and other incidental Work related to the Change Order.
- d. All other costs and taxes required to be paid, but not included under direct costs as defined in this Article.

3. The allowance for overhead and profit shall be made in accordance with the following schedule:

Element of the Work	Overhead and Profit Allowance
Labor	33 percent
Materials	15 percent
Equipment	15 percent

4. Subcontractor Markup: Labor, Materials, and Equipment may be furnished by the Contractor or by a Subcontractor on behalf of the Contractor. When all or any part of the extra Work is performed by a Subcontractor, the allowance specified in the above subparagraph "c" shall only be applied to the labor, Material, and Equipment costs of the Subcontractors to which the Contractor may add no more than five (5) percent of the Subcontractor's total cost for the extra Work. In no case shall the sum of the individual markups applied to a Change Order

exceed ten (10) percent regardless of the number of Subcontractor tiers involved in performing the Work.

5. Bond and Insurance: Only the actual cost of bond and insurance premiums required because of the Change Order, with no markup for overhead and profit, will be allowed.

3.07.03. Time-and-Materials Work

- A. If an NTE budget is established by the Engineer for Time-and-Material Work, the Contractor shall notify the Engineer when the cumulative costs incurred by the Contractor for Time-and-Material Work equal 80 percent of the pre-established budget. The Contractor may not be compensated for such Work that exceeds the NTE budget if the Contractor fails to provide the required notice before exceeding 80 percent of the established budget.
- B. If Work being performed on a Time-and-Material basis is expected to take more than one (1) month, the Engineer may, in its sole discretion, issue an allowance Change Order to allow timely payment to the Contractor for undisputed Work performed. The dollar value of the Change Order shall be an allowance amount equal to or greater than the NTE. Any amount remaining after all Time-and-Materials sheets are priced shall revert to the District.
- C. Cost of Work Documentation: For Time-and-Material Work, the Contractor shall furnish the Engineer extra work reports on a daily basis covering the direct costs of labor and Materials and charges for Equipment whether furnished by the Contractor, Subcontractor, or by other forces. The District shall provide the extra daily work report forms to the Contractor. The Contractor or an authorized agent shall sign each daily extra work report. The daily extra work report shall provide names and classifications of workers and hours worked; size, type, and identification number of Equipment; and the hours operated. Copies of certified payrolls and statements of fringe benefits shall substantiate labor charges. Valid copies of vendor invoices shall substantiate Material charges.
- D. The Engineer shall make any necessary adjustments. When these reports are agreed upon and signed by both parties, they shall become the basis of payment for the undisputed Work performed but shall not preclude subsequent adjustment based on a later audit.
- E. The Contractor shall inform the Engineer when extra Work will begin so that the District inspector can concur with the daily extra work reports. Failure to conform to these requirements may impact the Contractor's ability to receive proper compensation.
- F. The Contractor shall price and submit to the Engineer in both electronic format and in hard copy a native Microsoft Excel-based cost summary of the daily extra work reports on no less than a weekly basis. This summary report shall total all costs incurred to date and compare them to the NTE amount with a percent-spent-to-date amount prominently displayed. The Contractor shall be

fully responsible for tracking the costs and for notifying the Engineer when the costs exceed 80 percent of the NTE value. The summary report shall not be considered a substitute for the notice required in this Section.

3.07.04. Special Services

- A. Special services are defined as that Work characterized by extraordinary complexity, sophistication, or innovations, or a combination of the foregoing attributes that are unique to the construction industry. The following may be considered by the Engineer in reviewing or approving estimates for payment for special services:
 - 1. When the Engineer and the Contractor, by Agreement, determine that a special service is required that cannot be performed by the forces of the Contractor or by those of any of its Subcontractors, the special service shall be performed by an entity especially skilled in the Work to be performed. After validation of invoices and determination of market values by the Engineer, invoices for special services based upon the current fair market value thereof may be accepted without complete itemization of labor, Materials, and Equipment rental costs if backup provided is acceptable to the Engineer.
 - 2. When the Contractor is required to perform Work necessitating special fabrication or machining process in a fabrication or a machine shop facility away from the job site, charges for that portion of the Work performed at the off-site facility may, by Agreement, be accepted as a special service, and accordingly, invoices for the Work may be accepted without detailed itemization at the Engineer's discretion.
- B. All invoices for special services shall be adjusted by deducting all trade discounts offered or available, whether the discounts were taken or not. In lieu of the allowances for overhead and profit on labor, Materials, and Equipment specified herein, a single allowance of ten (10) percent will be added to invoices for special services.

3.07.05. Compensation for Time Extensions

- A. Adjustments in compensation for adjustments in Contract Time(s) shall be allowed only for causes in Article 3.08.01. Change in Contract Time(s), General, paragraphs "E.1." through "E.5." computed in accordance with Article 3.07.02. Cost of Extra Work. No adjustments in compensation shall be allowed when District-caused Delays to a Controlling Item of Work and Contractor-caused Delays to a Controlling Item of Work occur concurrently or for causes stated in Article 3.08. Change in Contract Time(s).

3.08. Change in Contract Time(s)**3.08.01. General**

- A. The Contract Time(s) for the Contract is specified in the Special Provisions. The Contract Time(s) shall only be changed or adjusted by a fully executed Change Order or by a DCO.
- B. Notice and Substantiation: Any request for a change in the Contract Time(s) shall comply with the notice and substantiation requirements shown in Article 3.07. Change in Contract Price(s). No request for an adjustment in the Contract Time(s) will be valid if not submitted in accordance with the requirements of this Article.
- C. The Contract Time(s) shall only be extended when a Delay occurs that impacts a Controlling Item of Work as shown in the most recently accepted Detailed Progress Schedule. Time extensions shall be allowed only if the cause is beyond the control and without the fault or negligence of the Contractor. Time extensions may also be allowed when District-caused delays to a Controlling Item of Work and Contractor-caused Delays to a Controlling Item of Work occur concurrently. The Contractor shall be notified if the Engineer determines that a time extension is not justified.
- D. Types of Delays are defined below:
 - 1. Compensable Delay: An Excusable Delay for which the Contractor is entitled to receive additional compensation for delay-related costs if (a) the delay was caused by the District or within its control or responsibility; (b) the Delay results in additional costs incurred by the Contractor; and (c) the Contractor has not assumed the risk of the Delay.
 - 2. Concurrent Delay: Two or more independent causes of Delay to the Contractor's performance of Work that meet all of the following criteria: (a) the Delays occur at the same time during all or a portion of the delay period being considered; (b) the Delays directly prevent the Contractor from performing a Controlling Item of Work; (c) each Delay would have delayed the Contractor's performance of a Controlling Item of Work even in the absence of any of the other Delays.
 - 3. Excusable Delay: A Delay to the completion of a specified Contract Time(s) that is due to causes that are unforeseeable and beyond the control and responsibility of the Contractor for which a time extension may be granted.
 - 4. Inexcusable Delay: A Delay to the completion of a specified Contract Time(s) that was reasonably foreseeable or within the control and responsibility of the Contractor for which no compensation or time extension will be granted.

5. Non-compensable Delay: An Excusable Delay for which the Contractor may be entitled to an extension of time without additional compensation for delay-related costs.
- E. The Contract Time(s) shall be extended in an amount equal to time lost due to Excusable Delays if a request is made thereof as provided in this Article. An extension in Contract Time(s) shall only be granted for Days on which the Contractor is prevented from proceeding with at least 75 percent of the normal labor and Equipment force actually engaged on the Work by occurrences or conditions resulting immediately therefrom that impact a Controlling Item of Work as determined by the Engineer. Causes of such Delays shall include:
1. changes;
 2. failure of the District to furnish access, right of way, completed facilities of related projects, Drawings, Material, Equipment, or services for which the District is responsible;
 3. survey error by the District;
 4. suspension of Work pursuant to Article 5.07. Temporary Suspension of Work, paragraph C;
 5. differing site conditions;
 6. occurrences of a severe and unusual nature, including, but not limited to, acts of God, wars, riots, insurrections, fires, and excusable inclement weather. An "act of God" is defined as an earthquake, flood, cloudburst, cyclone, or other cataclysmic phenomena of nature beyond the power of the Contractor to foresee or to make preparation for in defense against, but does not include ordinary inclement weather; and
 7. act of the public enemy, act of another governmental entity, act of a public utility or other third party outside the control of the District, epidemic, quarantine restriction, freight embargo, strike, or labor dispute. A delay to a Subcontractor or Supplier due to the above circumstances will be taken into consideration for extensions to the time of completion.

3.08.02. Inclement Weather

- A. Inclement weather is any weather condition, the duration of which varies in excess of the average conditions expected, that is unusual for the particular time and place where the Work is to be performed or that could not have been reasonably anticipated by the Contractor as provided for in the Special Provisions.
- B. The Contract Time(s) shall only be extended for Days in excess of the number of Days of inclement weather where the Contractor is prevented by inclement weather, or by conditions resulting immediately therefrom, from proceeding with

at least 75 percent of the normal labor and Equipment force engaged on Controlling Items of Work as shown on the current, updated, and accepted Detailed Progress Schedule.

- C. Should the Contractor prepare to begin Work at the regular starting time at the beginning of any regular work shift on any Day on which inclement weather, or the conditions resulting from the weather, prevents Work from beginning at the usual starting time and the crew is dismissed as a result thereof, the Contractor shall be entitled to a one (1)-Day extension, whether or not conditions change thereafter during that Day and the major portion of the Day could be considered suitable for such construction operations.
- D. The Contractor shall include a calendar in all of its Progress Schedules that includes nonworking Days for the number of inclement weather Days specified in the Special Provisions. This calendar shall be used for all weather-sensitive Work.
- E. No extension in the Contract Time(s) due to inclement weather shall be considered until after the number of Days of inclement weather Days specified in the Special Provisions has been reached. No reduction in Contract Time(s) shall be made if the number of Days of inclement weather is not reached.
- F. The Contractor shall not be entitled to additional compensation for Delays caused by inclement weather.

3.09. Differing Conditions

- A. If any Work involves digging trenches or other excavations below the surface, the Contractor shall promptly, and before the following conditions are disturbed, notify the District in writing of any:
 - 1. material that the Contractor believes may be a Regulated Material that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law;
 - 2. subsurface or latent physical conditions at the site differing from those indicated in this Contract (Type I Differing Site Condition); and
 - 3. unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered, and generally recognized as inherent in Work of the character provided for in the Contract (Type II Differing Site Condition).
- B. The Contractor's written notice shall inform the District as to how such conditions affect its Work and shall recommend methods to overcome such conditions.

- C. Differing Conditions shall not include:
1. all that is indicated or reasonably interpreted from the Contract Documents or reference documents;
 2. all that could be seen on or could have reasonably been discovered or revealed as a result of examination, investigation, exploration, test, or study of the Project site. Reference is made to Article 2.05. Examination of Drawings, Specifications, and Site of Work;
 3. conditions that are materially similar to or characteristically the same as those indicated or described in the Contract Documents or reference documents; and
 4. conditions where the location of a building component is in the proximity where indicated in or reasonably interpreted from the Contract Documents or reference documents.
- D. The District will promptly investigate the condition. If it finds that the conditions do materially so differ or do involve Regulated Material and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work, the District may issue a Change Order or a DCO under the procedures described in this Contract. For Regulated Material, the District reserves the right to use other forces for exploratory work to identify and determine the extent of such Material and for removing Regulated Material from such areas.
- E. In the event that a dispute arises between the District and the Contractor on whether the conditions materially differ or on the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from any scheduled completion date provided for by this Contract but shall proceed with all Work to be performed under the Contract. The Contractor shall retain any and all rights provided either by this Contract or by law that pertain to the resolution of disputes and protests between the contracting parties.
- F. The Contractor shall be responsible for the safety and protection of the affected area of the Work for the duration of the District's investigation of potential differing conditions.

3.10. Cost Reduction Incentive

- A. The Contractor may submit to the Engineer, in writing, proposals for modifying the Drawings, Specifications, or other requirements of the Contract for the sole purpose of reducing the total cost of construction (known as value engineering change proposals) as provided for in State Specifications Section 4-1.07B wherein the words "State" and "Department" shall mean the District.

3.11. Disputes

- A. Claim: A written demand by the Contractor for an adjustment in the Contract Price(s) or in the Contract Time(s), or both, that is submitted in accordance with the requirements of the Contract Documents. Within the context of this Contract, a Claim is associated with a dispute as described in Articles 3.11. Disputes through 3.13. Dispute Review Board.
- B. It is the intention of this Article that disputes between parties arising under and by virtue of the Contract be brought to the attention of the Engineer at the earliest possible time in order that matters may be resolved, if possible, or other appropriate action promptly taken. Disputes are divided into four categories: (i) protest, (ii) notice, (iii) potential Claim, and (iv) Claim. During the course of the Project and up to receiving the proposed final estimate, the Contractor must submit a Contract dispute in the form of a written notice, protest, potential Claim, or Claim to the Engineer.
- C. Any disputes from Subcontractors or Suppliers that the Contractor passes through to the District for review and consideration shall be certified in the same manner the Contractor would certify its own disputes.

3.11.01. Protest

- A. If the Contractor considers any Work demanded to be outside of the requirements of the Contract, or considers any records or ruling or act or omission of the Engineer to be unfair, the Contractor shall immediately, upon such Work being demanded or such record or ruling being made, ask in writing for written instructions or decisions, whereupon the Contractor shall proceed without delay to perform the Work or to conform to the record or ruling and, within seven (7) Days after date of receipt of the written instructions or decisions, shall file a written protest with the Engineer stating clearly in detail the basis of the protest. Except for such protests as are made of record in the manner herein specified and within the time limit stated, the records, rulings, instructions, decisions, and acts or omissions of the Engineer shall be final and conclusive. Instructions and decisions of the Engineer contained in letters transmitting Drawings to the Contractor shall be considered as written instructions and decisions subject to protest as herein provided.

3.11.02. Notice of Potential Claims

- A. The Contractor is not entitled to additional compensation for any cause unless the Contractor submits to the District a written Notice of Potential Claim as hereinafter specified.
- B. The written Notice of Potential Claim must set forth the reasons for which the Contractor believes additional compensation and/or adjustments in the specified Contract Time(s) will or may be due, the nature of the costs and/or time involved, and, insofar as possible, the amount of the potential Claim. This notice as above required must have been submitted to the District before the Contractor performs

the Work giving rise to the potential Claim for additional compensation and/or time, if based on an act or failure to act by the District, or in all other cases, within seven (7) Days after the happening of the event, thing, or occurrence giving rise to the potential Claim.

- C. The Notice of Potential Claim shall be certified as required in Article 3.12. Claims.
- D. Compliance with the foregoing shall not be a prerequisite to any Claim that is based on differences in measurement or errors of computations as to Contract quantities.

3.12. Claims

- A. Claims by the Contractor must be submitted to the Engineer before the date of final payment. The Claim shall relate directly to the circumstances addressed in the Notice of Potential Claim and may not raise new issues or circumstances that were not identified in the Notice of Potential Claim. Claims shall be in writing, shall specify the basis for each Claim, shall refer to the applicable provision or provisions of the Contract, and shall show the method of computation and the actual amount claimed. The Claim shall include documents necessary to substantiate the Claim and to establish liability, causation, and damages. All other factual data, including documentation of actual costs pertaining to that Claim, shall be submitted. Each issue contained in a Claim must include documentation, including background, chronology, Contractor's position, supporting documentation of merit, supporting documentation of damages, schedules (if appropriate), and productivity exhibits (if appropriate). The Claim shall clearly state that it is a Claim being submitted under this Article. Failure to submit a written Claim within the 30-Day period waives any right to recover compensation or to an extension in the Contract Time(s) due to the issues referenced in the Notice of Potential Claim. In addition to the foregoing, to substantiate any Claim, the Contractor shall provide the information required by Article 3.07. Change in Contract Price(s).
- B. Pricing of Claims shall be consistent and compliant with the requirements herein for adjustments in the Contract Price(s) and adjustments in the Contract Time(s).
- C. Claims must be certified using the following language:

I, _____, BEING THE _____ (MUST BE AN OFFICER) OF _____ (CONTRACTOR), DECLARE UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA, AND DO PERSONALLY CERTIFY AND ATTEST THAT: I HAVE THOROUGHLY REVIEWED THE ATTACHED CLAIM FOR ADDITIONAL COMPENSATION AND/OR EXTENSION OF TIME FOR WORK PERFORMED BY THE CONTRACTOR AND/OR ANY SUBCONTRACTOR CLAIMS THAT ARE BEING PASSED THROUGH TO THE DISTRICT, AND KNOW ITS CONTENTS, AND SAID CLAIM IS TRUTHFUL AND ACCURATE; THAT THE AMOUNT REQUESTED ACCURATELY REFLECTS THE CONTRACT ADJUSTMENT FOR WHICH THE DISTRICT IS LIABLE; AND, FURTHER,

THAT I HAVE REVIEWED AND AM FAMILIAR WITH BOTH CALIFORNIA PENAL CODE SECTION 72 AND CALIFORNIA GOVERNMENT CODE SECTION 12650, ET SEQ., PERTAINING TO FALSE CLAIMS, AND FURTHER KNOW AND UNDERSTAND THAT SUBMISSION OR CERTIFICATION OF A FALSE CLAIM MAY LEAD TO FINES, IMPRISONMENT, AND/OR OTHER SEVERE LEGAL CONSEQUENCES.

- D. The District, or its authorized representatives, shall have access, upon reasonable notice during normal business hours, to Contractor and Subcontractor books, documents, and accounting records, including, but not limited to, Bid worksheets, Bids, Subcontractor Bids and proposals, estimates, cost accounting data, accounting records, payroll records, time sheets, canceled checks, profit and loss statements, balance sheets, Project correspondence, including, but not limited to, all correspondence between the Contractor and its sureties and Subcontractors/vendors, Project files, scheduling information, and other records of the Contractor and all Subcontractors directly or indirectly pertinent to the Work of the Project; original as well as changed and claimed extra Work to verify and evaluate the accuracy of cost and pricing data submitted with any Claim for which additional compensation has been requested or Notice of Potential Claim has been tendered. Such access shall include the right to examine and audit such records and make excerpts, transcriptions, and photocopies at the District's cost.
- E. The parties agree that in the event the Contractor or any Subcontractor fails to comply with this Article, the Claim will not be considered by the District. The Contractor agrees to impose upon its Subcontractors by appropriate subcontract provisions the obligations of this Article of the Standard Provisions.
- F. No Claim shall be considered where there has been a failure to comply with the requirements relative to protest and Notice of Potential Claim as written elsewhere in these Specifications.
- G. The presentation of a Claim shall be an express condition precedent to the Contractor's recourse to (i) informal conference; (ii) nonbinding mediation; and (iii) judicial arbitration to resolve disputes on construction Claims of three hundred seventy-five thousand dollars (\$375,000) or less or court action upon the Contract for Claims in excess of three hundred seventy-five thousand dollars (\$375,000) in compliance with Public Contract Code Section 20104 et seq.

3.12.01. Claims Less Than Fifty Thousand Dollars

- A. For Claims less than fifty thousand dollars (\$50,000), the Engineer shall respond in writing to any written Claim within 45 Days of receipt of the Claim or may request in writing within 30 Days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or Claims the District may have against the Contractor.

- B. If additional information is thereafter required, it shall be requested and provided pursuant to this Article upon mutual agreement of the Engineer and of the Contractor.
- C. The Engineer's written response to the Claim, as further documented, shall be submitted to the Contractor within 15 Days after receipt of further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information, whichever is greater.

3.12.02. Claims From Fifty Thousand Dollars to Three Hundred and Seventy-Five Thousand Dollars

- A. For Claims greater than or equal to fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the Engineer shall respond in writing to any written Claims within 60 Days of receipt of the Claim or may request in writing within 30 Days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or Claims the District may have against the Contractor.
- B. If additional information is thereafter required, it shall be requested and provided pursuant to this Article upon mutual agreement of the Engineer and of the Contractor.
- C. The Engineer's written response to the Claims, as further documented, shall be submitted to the Contractor within 30 Days after receipt of further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

3.12.03. Informal Conferences

- A. If the Contractor disputes the Engineer's written response or if the Engineer fails to respond within the time prescribed, the Contractor may so notify the Engineer in writing either within 15 Days of receipt of the Engineer's response, or within 15 Days of the Engineer's failure to respond within the time prescribed respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon such demand, the Engineer shall schedule a meet-and-confer conference within 30 Days for settlement of the dispute.
- B. If, following the meet-and-confer conference, the Claim or any portion remains in dispute, the Contractor may file a Claim pursuant to California Government Code, Title 1, Division 3.6, Part 3, Chapter 1 commencing with Section 900 and Chapter 2 commencing with Section 910. For purposes of those provisions, the running of the period of time within which a Claim must be filed shall be tolled from the time the Contractor submits its written Claim until the time the Claim is denied, including any period of time utilized by the meet-and-confer process conference.

3.12.04. Civil Actions

- A. The following procedures are established for all civil actions filed to resolve Claims:
 - 1. Within 60 Days, but no earlier than 30 Days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 Days by both parties of a disinterested third person as mediator, shall be commenced within 30 Days of the submittal, and shall be concluded within 15 Days from the commencement of the mediation unless a time requirement is extended upon a good-cause showing to the court.
 - 2. If the matter remains in dispute, the parties agree to resolve their dispute by binding judicial arbitration pursuant to the Local Civil Rules of the County of Santa Clara Superior Court; notwithstanding, anything in such Local Civil Rules, the parties agree that the Civil Discovery Act of 1986 (Code of Civil Procedure, Title 3, Part 4, Chapter 3, Article 3 commencing with Section 2016 of Chapter 3 of Title 3 of Part 4 of Code of Civil Procedure) shall apply to any proceeding brought under this subdivision.
- B. In addition to the Code of Civil Procedure, Part 3, Title 3, Chapter 2.5 commencing with Section 1141.10, (i) arbitrators shall, when possible, be experienced in construction law; and (ii) any party appealing an arbitration award who does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, also pay the attorney's fees on appeal of the other party.

3.13. Dispute Review Board

- A. When specified in the Special Provisions that a Dispute Review Board (DRB) process is required, the DRB process shall be in accordance with these Specification Provisions.

3.13.01. General

- A. A DRB is to assist in and facilitate the avoidance and timely, impartial resolution of disputes.
- B. All disputes referred to the DRB shall be subject to the dispute resolution process herein described as a condition precedent to initiating a subsequent dispute resolution process, such as arbitration or litigation, for that dispute.
- C. Except as explicitly otherwise provided, all disputes that are actionable under the provisions of the prime Contract between the District and the Contractor may be referred to the DRB.

- D. The DRB shall be utilized when dispute or potential Claim resolution at the Project level is unsuccessful. The DRB shall function until the Day of Acceptance of the Work by the District Board of Directors, at which time the work of the DRB will cease except for completion of unfinished dispute hearings and reports.
- E. The Contractor shall include in all subcontracts that Subcontractors and Suppliers of any tier (i) agree to submit Subcontractor Claims to the Contractor in a proper form and in sufficient time to allow processing by the Contractor in conformance with the DRB resolution specifications; (ii) agree to be bound by the terms of the DRB provisions to the extent applicable to Subcontractor Claims; (iii) agree that, to the extent a Subcontractor Claim is involved, completion of all steps required under these DRB Special Provisions shall be a condition precedent to pursuit by the Subcontractor of other remedies permitted by law, including without limitation of a lawsuit against the Contractor; and (iv) agree that the existence of a dispute resolution process for disputes involving Subcontractor Claims shall not be deemed to create any Claim, right, or cause of action by any Subcontractor or Supplier against the District.
- F. The DRB reports shall not be binding on the District or on the Contractor and shall be admissible in subsequent dispute resolution proceedings.
- G. Immediately after award of the Contract, the District and the Contractor shall meet and discuss and establish the qualifications upon which nominees for the DRB are to be evaluated and jointly select prospective nominees.
- H. The District, the Contractor, and the DRB shall execute an agreement similar to the Dispute Resolution Board Foundation's Three Party Agreement form included as an appendix to these Specifications. If there are any conflicts between the provisions of that agreement and these Specifications, the provisions of that agreement shall take precedence.
- I. The District and the Contractor shall each bear their respective in-house costs and costs of providing those DRB-related services for which responsibility has been allocated herein. The cost of the DRB panelists shall be split evenly between the Contractor and the District in the manner as described in paragraph "J" in this Article.
- J. The Contractor shall pay the full amount of any invoice or costs incurred from the DRB members in accordance with and as set forth in the DRB agreement and in these Specifications. The Contractor shall be reimbursed for 50 percent of these services utilizing the DRB Bid item, or Contract Change Order if no Bid item is specified.

3.13.02. DRB Qualifications

- A. Board members shall be experienced in the interpretation of Contract Documents and the resolution of construction disputes and in the type of construction to be performed.

- B. The following definitions apply for the purpose of setting forth experience and disclosure requirements:
1. Party directly involved: The District or the Contractor of this Project.
 2. Contractor includes all joint-venture partners individually.
 3. Party indirectly involved: The construction manager, designers, architects, engineers, or other professional service firms or consultants, joint-venture partners, Subcontractors of any tier, and Suppliers on this Project.
 4. Financial ties: Any ownership interest, loans, receivables, or payables.
- C. Eligibility
1. Direct Employment
 - a. Current employees of any of the parties directly or indirectly involved are prohibited from serving as Board members.
 - b. Prospective Board members who were past employees of one of the parties directly involved must obtain permission from the other party prior to appointment.
 - c. Previous, direct employment by one of the parties indirectly involved must be disclosed.
 2. Consulting Assignments
 - a. Individuals who are employed in a consulting capacity by any of the parties directly involved are prohibited from serving as Board members.
 - b. Prospective Board members who are currently employed as a consultant by one of the parties indirectly involved must obtain permission from the other party prior to appointment.
 - c. Previous employment as a consultant by any party directly or indirectly involved must be disclosed.
 3. Financial Ties
 - a. Individuals with financial ties to any of the parties directly involved are prohibited from serving as Board members.
 - b. Current financial ties to any of the parties indirectly involved must be disclosed.
 - c. Previous financial ties with any party directly or indirectly involved must be disclosed.

4. Close Personal or Professional Relationships
 - a. Individuals with close personal or professional relationships with a key member of any party directly involved are prohibited from serving as Board members.
 - b. Such current relationships with a member of any party indirectly involved in the Contract must be disclosed.
 - c. All past personal or professional relationships with a key member of one of the parties directly or indirectly involved must be disclosed.
5. All past and current service as a Board member on projects where any of the parties directly or indirectly involved in this Contract were also involved must be disclosed.
6. No member shall have had substantial prior involvement in the Project in the judgment of the District and the Contractor.
7. Ongoing Responsibilities: While serving as a Board member on the DRB, no member shall participate in any discussion contemplating the creation of an agreement or making an agreement with any party directly or indirectly involved in the Contract regarding employment, or fee-based consulting services, or any other business arrangement after the Contract is completed.

3.13.03. Establishment of the DRB

- A. The District and the Contractor shall jointly participate in the evaluation and selection of prospective nominees for the DRB.
- B. The District and the Contractor shall provide to the DRB nominees a list of the construction manager, designers, architects, engineers, professional service firms, consultants, joint-venture partners, Subcontractors, and Suppliers involved or likely to be involved in the Project with a list of each party's key personnel.
- C. DRB nominees shall provide the following, pursuant to the above requirements and in addition to the nominee's full name and contact information, to both parties:
 1. Résumé showing construction experience qualifying the person as a DRB member.
 2. Résumé showing past DRB participation, if any. List each DRB assignment separately, indicating the name and location of the Project, dates of DRB service, name of owner, name of contractor, Contract value, nominating party, if applicable, names of the other Board members, and the number of disputes heard.

3. Disclosure statement describing past, present, and anticipated relationships, including indirect relationships through the nominee's full-time employer, if any, to the Project, with all parties directly and indirectly involved in the Contract. Disclose close professional or personal relationships with key members of all of these parties.
 4. Disclosure is a continuing obligation of all Board members throughout the life of the Contract.
- D. The District and the Contractor shall then have three (3) weeks to solicit and receive information from prospective candidates, and another two (2) weeks to review and to jointly agree on the final selection of the three (3) members to serve on the DRB. In the event that all three (3) members were not selected from the initial pool of nominees, the process shall be repeated.
- E. If the DRB Chair has not already been appointed as part of the selection process, as soon as is practicable, the Board members shall nominate the Chair and submit the nominee's résumé and request approval by the District and by the Contractor.

3.13.04. DRB Meetings

- A. The DRB shall visit the Project site and meet with representatives of the parties at periodic intervals and at other times requested by the parties.
- B. Each meeting shall consist of an informal discussion and a field observation of the Work in progress. The discussion and field observation shall be attended by personnel of the District and by the Contractor.

3.13.05. Dispute Resolution

- A. Prior Good-Faith Negotiation
1. The District and the Contractor shall enter into good-faith negotiations to settle a dispute before referring the dispute to the DRB.
 2. These good-faith negotiations shall be founded on the principle of full and timely disclosure of each party's position to the other party, including the exchange of pertinent supporting records, analyses, expert reports, and similar documentation, and shall proceed without delay following the inception of the dispute. Such good-faith negotiations may involve the solicitation and rendering of a DRB advisory opinion as described herein.
- B. Dispute Referral
1. A dispute may be referred to the DRB by either the District or by the Contractor. The dispute referral shall be made in writing to the DRB Chair with a copy concurrently provided to the other Board members and to the other party.

2. If the Contract stipulates a precedent dispute resolution process prior to referral to the DRB and if one party fails to meet or adhere to the time requirements set forth under the Contract for this process, the other party may then refer the dispute to the DRB. In the event that the Contract does not specify a precedent process or specifies a precedent process without time requirements, either party may refer the dispute to the DRB after passage of a reasonable period of time without progress toward a negotiated settlement; the DRB will determine if the dispute should be heard.
3. The dispute referral shall concisely define the nature and specifics of the dispute that are to be considered by the DRB and the scope of the recommendation requested.
4. The DRB Chair shall confer with the parties to establish a due date for delivering pre-hearing submittals, and a date, time, and location for convening the DRB hearing. Hearings shall be convened at the next periodic meeting, unless the parties agree to a shorter or longer period.

C. Pre-hearing Submittal

1. The District and the Contractor shall each prepare a pre-hearing submittal and transmit it to all three (3) members of the DRB and to the other party. The pre-hearing submittal, comprised of a position paper with such backup data as is referenced in the position paper, shall be tabbed, indexed, and the pages consecutively numbered.
2. Both position papers shall, at a minimum, contain the following:
 - a. A joint statement of the dispute and the scope of the desired report placed in a prominent location. The language of this joint statement shall summarize in a few sentences the nature of the dispute. If the parties are unable to agree on the wording of the joint statement of dispute, each party's position paper shall contain both statements and identify the party authoring each statement.
 - b. The basis and justification for the party's position with reference to Contract language and other supporting documents for each element of the dispute. To minimize duplication and repetitiveness, the parties may identify a common set of documents that will be referred to by both parties and submit it in a separate package.
 - c. When the scope of the hearing includes quantum, the referring party shall include a schedule impact analysis and full cost details, calculated in accordance with methods set forth in the Contract. This requirement does not apply if the report is to be made for entitlement alone or for entitlement with guidelines for quantum.

3. The number of copies, distribution requirements, and time for submittal will be established by the DRB and communicated to the parties by the Chair.

D. DRB Hearings

1. The District will arrange for or will provide hearing facilities at or near the site.
2. Attendance
 - a. The District and Contractor shall both limit attendance at the hearing to personnel directly involved in the dispute and participants in the good-faith negotiations that were conducted prior to submittal to the DRB except as noted below.
 - b. Prior to the date established for the hearing, each party shall provide a list of proposed attendees to the DRB and to the other party. In the event of any disagreement, the DRB shall make the final determination as to who attends the hearing.
 - c. Attorneys shall not participate in the hearing. Attorneys representing the parties are permitted to attend dispute hearings provided that prior permission is obtained from the other party.
 - d. At DRB hearings regarding Claims by a Subcontractor, including pass-through Claims by a lower tier Subcontractor or Supplier against the Contractor that are actionable by the Contractor against the District, the Contractor shall require and ensure that each Subcontractor involved in the dispute has presented an authorized representative with actual knowledge of the facts underlying the Subcontractor Claims.
3. The conduct of the hearing shall be established by the DRB according to its operating procedures and be generally consistent with the following guidelines:
 - a. The party who referred the dispute to the DRB shall present its position first, followed by the other party.
 - b. Both parties shall be allowed successive rebuttals, assuring a full and adequate opportunity to present their position, and to rebut the opposing party's position, until, in the DRB's opinion, all aspects of the dispute have been fully and fairly covered.
 - c. The DRB shall be fully prepared to, and may at any time, ask questions, request clarifications, or ask for additional data and/or for job records.

- d. Either party may request that the DRB direct a question to or request a clarification from the other party. The DRB shall determine at what point in the proceedings such requests may be made and if they will be granted. In general, the DRB will not allow one party to be questioned directly by the other party.
 - e. In difficult or complex cases, additional hearings may be necessary to facilitate full consideration and understanding of the dispute.
 - f. The DRB, in its discretion, may allow introduction of arguments, exhibits, handouts, or documentary evidence that were not included in that party's pre-hearing position paper and that had not been previously submitted to the other party. In such cases, the other party will be granted time to review and prepare a rebuttal to the new material.
- E. Failure to Prepare a Pre-hearing Submittal or Attend a DRB Hearing
 - 1. In the event that either party fails to deliver a pre-hearing submittal by the date established by the DRB, the DRB shall, at its discretion, determine whether the hearing shall proceed as originally scheduled or whether additional time shall be provided and a new date established. On the final date and time established for the hearing, the DRB shall proceed with the hearing utilizing the information that has been submitted.
 - 2. In the event that some or all of the representatives of either party fail to appear at the appointed time of a DRB hearing, the DRB shall proceed with the hearing. The hearing shall take place as if all party representatives were in attendance. The DRB shall consider all evidence brought before it and hear testimony from those party representatives who are present.
- F. Use of Outside Experts
 - 1. By the District or by the Contractor
 - a. A party intending to offer an outside expert's analysis at the hearing shall disclose such intention in writing to the other party and to the DRB no less than 30 Days prior to the due date for delivering the pre-hearing submittal. The expert's name and a general statement of the area of the dispute that will be covered by his/her testimony shall be included in the disclosure.
 - b. Upon receipt of the above disclosure, the other party shall have the opportunity to secure the services of an outside expert to address or respond to those issues that may be raised by the other party's outside expert. The disclosure requirements shall be

the same as that specified above, except the time requirement is ten (10) Days.

- c. The cost for securing outside expert services shall be borne by the party securing such services.

2. By the DRB

- a. Prior to arranging for outside experts, the DRB shall obtain prior approval from the District and from the Contractor by providing:
 - (1) A statement explaining why the expert assistance is needed.
 - (2) An estimate of the cost of the expert assistance.
 - (3) A disclosure statement in accordance with the requirements of Article 3.13.03. Establishment of the DRB herein using the criteria established in Article 3.13.02. DRB Qualifications.
 - (4) A confidentiality statement, consistent with the DRB's agreement, executed by the proposed expert.
 - (5) The Contractor and the District shall equally bear the cost of the services of the outside expert employed by the DRB.

G. DRB Report

- 1. The DRB's recommendations for resolution of a dispute will be formalized in a written report with a format as determined by the DRB and signed by all Board members. The report should consist of a concise description of the dispute, short statements of each party's position, findings as to the facts of the dispute, discussion and rationale for the recommendation(s), and the recommendation(s). The report shall be submitted concurrently to the parties as soon as possible after completion of the hearing as agreed by all parties.
- 2. If the DRB cannot arrive at a unanimous report, the Board shall prepare minority findings and recommendation(s), which, together with the majority findings and recommendation(s), shall comprise the DRB report. The report shall identify the issues of disagreement along with the reasons for disagreement.
- 3. Clarification
 - a. Either party may request clarification of a report within ten (10) Days following receipt of the report. Within a reasonable

period of time, the DRB shall provide written clarification to both parties.

- b. Requests for clarification shall be submitted in writing simultaneously to the DRB and to the other party.
- c. Only one request for clarification per dispute from each party shall be allowed.

4. Reconsideration

- a. Either party may request reconsideration of a report within ten (10) Days following receipt of the report when new information is obtained or developed that was not known at the time of the hearing, or when, in the party's opinion, the DRB misunderstood or failed to consider pertinent facts of the dispute. Within a reasonable period of time, the DRB shall provide written reconsideration to both parties.
- b. Requests for reconsideration shall be submitted in writing simultaneously to the DRB and to the other party.
- c. The Board will not entertain requests for reconsideration that amount to a renewal of a prior argument or an additional argument based on facts available at the time of the hearing.
- d. Only one request for reconsideration per dispute from each party shall be allowed.

5. Acceptance

- a. The District and the Contractor shall submit their written acceptance or rejection of the report concurrently to the other party and to the DRB within 14 Days of receipt of the report or following receipt of responses to requests for clarification or reconsideration.
- b. Failure by either party to accept or reject within the specified period shall be construed as acceptance of the report by that party.
- c. Acceptance by the District of a report on entitlement only, or on entitlement with guidelines for quantum, does not obligate the District to any particular quantum amount.

H. Advisory Opinions

- 1. An advisory opinion serves as a method for potentially avoiding a DRB hearing. It is not intended to replace the dispute resolution process

specified herein but may be implemented as part of the good-faith negotiations conducted between the parties.

2. When mutually agreed to by the District and by the Contractor, the DRB may, at its discretion, provide an advisory opinion on any issue.

3.14. Escrow Bid Documents

- A. When required by the Special Provisions, Escrow Bid Documents shall be prepared and submitted as specified herein.

3.14.01. Introduction

- A. The Escrow Bid Documents shall include complete documentation of all backup information used in the preparation of the Contractor's Bid prices for this Project as described below. The Escrow Bid Documents of the successful Bidder will be held in escrow for the duration of the Contract or until all Claims are resolved, whichever is later.
- B. The Escrow Bid Documents are, and shall always remain, the property of the Contractor, subject to joint review by the District and by the Contractor as provided herein.
- C. The District stipulates and expressly acknowledges that the Escrow Bid Documents, as defined herein, constitute trade secrets.
 1. This acknowledgement is based on the District's express understanding that the information contained in the Escrow Bid Documents is not known outside the Bidder's business, is known only to a limited extent and by a limited number of employees of the Bidder, is safeguarded while in the Bidder's possession, and is extremely valuable to the Bidder's competitors by virtue of its reflecting Bidder's construction strategies, assumptions, and intended means, methods, and techniques of construction.
 2. The District acknowledges that the Bidder expended substantial sums of money in developing the information included in the Escrow Bid Documents and further acknowledges that it would be difficult for a competitor to replicate the information contained therein.
 3. The District further acknowledges that the Escrow Bid Documents and the information contained therein are being provided to the District only because it is an express prerequisite to award of the Contract.
 4. The District further acknowledges that the Escrow Bid Documents include a compilation of information used in the Bidder's business intended to give the Bidder an opportunity to obtain an advantage over competitors who do not know or do not use the contents of such information.

- 5. The District further agrees, to the fullest extent permitted by law, to safeguard the Escrow Bid Documents against disclosure and not provide as public records.
- D. The successful Bidder agrees, as a condition of award of the Contract, that the Escrow Bid Documents constitute all of the information used in the preparation of its Bid for this Work and that no other Bid preparation information shall be considered in resolving disputes or Claims. The successful Bidder also agrees that nothing in the Escrow Bid Documents shall change or modify the terms or conditions of the Contract Documents.

3.14.02. Purpose

- A. The Escrow Bid Documents will be used solely to assist in the settlement of disputes and Claims. They will not be used for pre-award evaluation of the Contractor's anticipated methods of construction nor to assess the Contractor's qualifications for performing the Work.

3.14.03. Format and Contents

- A. The Bidders may submit the Escrow Bid Documents in their usual cost estimating format; a standard format is not required. However, sufficient detail shall be included to ensure that the Escrow Bid Documents enable complete understanding and proper interpretation of their content.
- B. The Escrow Bid Documents shall clearly itemize and separate the estimated cost of performing each major activity for each Bid item contained in the Bid. Bid items should be separated into sub-items to present a detailed cost estimate. Crews, Equipment, estimated quantities, and the rate of production shall be detailed. Increments of cost shall include, but shall not be limited to, such items as direct labor, permanent Material, supplies, consumables, subcontracts, Equipment charges, and allocation of overhead and profit. Plant, Equipment, and indirect costs should be detailed. All costs included in the Bid prices must be specifically identified and the methods of application described.
- C. The Escrow Bid Documents shall include all quantity takeoffs; calculations of rates of production and progress; copies of quotes from Subcontractors and Suppliers; and memoranda, narratives, and all other information used by the Bidder to arrive at the prices contained in its Bid.

3.14.04. Submittal

- A. Escrow Bid Documents must be submitted by the Bidders submitting the three apparent low Bids. The Escrow Bid Documents must be submitted in a sealed container, separate from the Bidder's Bid Proposal, no later than 5 p.m. on the third business day following the Bid opening. Each container must be clearly marked on the outside with the Bidder's name, date of submittal, Project name, and the words "Escrow Bid Documents." Timely submission of these forms is considered material by the District.

- B. The Escrow Bid Documents must be accompanied by a separate certification, "Bid Form 10 – Escrow Bid Documents Certification of Completeness," signed by an individual authorized by the Bidder to execute the Bid Proposal. The Bidder certifies that the material in the Escrow Bid Documents constitutes all of the documentary information used in preparation of this Bid, and that the Bidder's authorized individual has personally examined the contents of the Escrow Bid Documents container and has determined that the Documents in the container are complete.
- C. The Escrow Bid Documents of the apparent successful Bidder will be opened and examined by an appointed member of the District in the presence of the Bidder before the Contract is awarded. The apparent successful Bidder must attend this examination.
- D. This examination is to ensure that the Escrow Bid Documents are legible and complete. It will not include a review of, or constitute approval of, proposed construction methods, estimating assumptions, or interpretations of the Contract Documents. The examination will not alter any condition or term of the Contract. Should the examination indicate that any data is incomplete or missing, the Bidder shall supply the missing information within 24 hours or at such other time as is mutually agreeable.
- E. The timely submittal of complete Escrow Bid Documents is an essential element of the Bid process and a prerequisite to Contract award. Failure to provide the necessary Escrow Bid Documents will be sufficient cause for the District to reject the Bid as nonresponsive.
- F. If the Contract is not awarded to the apparent successful Bidder, the Escrow Bid Documents of the Bidder submitting the next lowest responsive Bid shall be processed as described above. The Escrow Bid Documents of unsuccessful Bidders will be held unopened until such time that they are returned after execution of the Contract by the successful Bidder.
- G. If any Bidder's Proposal is based on subcontracting any part of the Work, each Subcontractor whose total subcontract price exceeds the percentage of the total Bid price specified in the Special Provisions, shall provide separate Escrow Bid Documents to be included with those of the Bidder. At the District's discretion, such Documents shall be opened and reviewed, in the presence of the Subcontractor only in the same manner and at the same time as the review described above for the apparent successful Bidder.
- H. In accordance with state law, if the Contractor substitutes a Subcontractor after Contract award, the District retains the right to require the new Subcontractor to submit Escrow Bid Documents.

3.14.05. Storage

- A. Upon completion of the examination, receipt of the apparent successful Bidder's Escrow Bid Documents will be acknowledged in writing by the District. The

documents will be placed in escrow for the life of the Contract at an escrow firm within the greater Santa Clara County area chosen by the District. The District will pay for storage and maintenance of the Escrow Bid Documents.

3.14.06. Examination

- A. The Escrow Bid Documents may be examined at any time deemed necessary by either the District or by the Contractor to assist in settling disputes and Claims.
- B. An examination of the Escrow Bid Documents is subject to the following conditions:
 - 1. As trade secrets, Escrow Bid Documents are proprietary and confidential.
 - 2. The District and the Contractor (and any Subcontractor to the extent Escrow Bid Documents are required by a Subcontractor) shall each designate in writing to the other party seven (7) Days prior to any examination representatives who are authorized to examine the Escrow Bid Documents. With the consent of both the District and the Contractor, members of the DRB may participate in the examination of the Escrow Bid Documents. No other person shall have access to the Escrow Bid Documents.
 - 3. Access to the Escrow Bid Documents may take place only in the presence of a duly designated representative of both the District and the Contractor. If the Contractor fails to designate a representative or fails to appear for joint examination on seven (7) Days' notice, then the District representative may examine the Escrow Bid Documents upon an additional three (3) Days' notice.

3.14.07. Final Deposition

- A. The Escrow Bid Documents will be returned to the Contractor after the Work has been completed and accepted and after all Claims and disputes involving this Work have been settled. The Contractor will thereupon be required to waive, in writing, any right to lodge further Claims involving this Work.

3.15. Partnering**3.15.01. Partnering Relationship**

- A. The District encourages a partnering relationship with the Contractor to effectively complete the Contract to the benefit of both parties. The purpose of this relationship will be to maintain cooperative communication and to mutually resolve conflicts at the lowest possible management level.

3.15.02. Professionally Facilitated Project Partnering

- A. To further the partnering relationship, Professionally Facilitated Project Partnering can be implemented by one of two methods:
 - 1. The District requires Professionally Facilitated Project Partnering. The Contractor shall comply with the Special Provisions regarding this requirement.
 - 2. The Contractor submits a written request for Professionally Facilitated Project Partnering. However, this method can only be implemented if the Engineer approves the request in writing.
- B. Implementation of Professionally Facilitated Project Partnering
 - 1. Scheduling the Professionally Facilitated Project Partnering workshops, selecting the Professional Partnering Facilitator and workshop site, and other administrative details shall be as agreed to by both parties.
 - 2. Partnering workshops will be held on a quarterly basis during construction, or as needed, and as determined by the Engineer and by the Contractor. Both parties will determine workshop attendees, agenda, and duration. Persons required to be in attendance will be the Engineer and/or the Engineer's authorized agents and key Project personnel; the Contractor's authorized representative, on-site Project manager, and key Project supervision personnel of both the prime and principal Subcontractors and Suppliers; and other personnel as deemed necessary by the District and by the Contractor.
 - 3. The Contractor shall secure the Professional Partnering Facilitator and the off-site meeting room. The District will pay in full for the services of a Professional Partnering Facilitator and for the off-site meeting room based on invoices priced without markup. Payment for these services shall be made utilizing the Professionally Facilitated Project Partnering Bid item or Contract Change Order if no Bid item is specified. All other costs associated with the partnering workshops will be borne separately by the party incurring the costs (e.g., wages and travel expenses); no additional payment shall be made.
- C. The establishment of Professionally Facilitated Project Partnering will not change or modify the terms and conditions of the Contract and will not relieve either party of its legal requirements of the Contract.

3.16. Claims and Disputes per Public Contract Code Section 9204

- A. Public Contract Code Section 9204 (PCC 9204) applies to all contracts entered into on or after January 1, 2017. PCC 9204 shall remain in effect only until January 1, 2020, and as of that date is repealed, unless a later enacted statute,

that is enacted before January 1, 2020, deletes or extends that date. The provisions of PCC 9204 are set forth below.

- B. The Legislature has found and declared that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner. PCC 9204 shall apply to any claim by a contractor in connection with a public works project.
- C. Prior to submitting a claim per PCC 9204, the Contractor shall comply with Article 3.11.01. Protest, Article 3.11.02 Notice of Potential Claims, 3.12. Claims, A. through F.
- D. For purposes of PCC 9204, the following definitions apply:
 - 1. "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:
 - a. A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.
 - b. Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.
 - c. Payment of an amount that is disputed by the public entity.
 - 2. "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.
 - 3. "Public entity" means, without limitation, except as provided in subparagraph (b), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.
 - 4. "Public works project" means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.

5. "Subcontractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.
- E.
 - 1.a. Upon receipt of a claim pursuant to PCC 9204, the District shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the Contractor a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, the District and Contractor may, by mutual agreement, extend the time period provided in this Article.
 - 1.b. The Contractor shall furnish reasonable documentation to support the claim.
 - 1.c. If the District needs approval from the Board to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the claim, and the Board does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the District shall have up to three (3) days following the next Board meeting after the 45-Day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.
 - 1.d. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the District issues its written statement. If the District fails to issue a written statement, paragraph 3. below shall apply.
 - 2.a. If the Contractor disputes the District's written response, or if the District fails to respond to a claim issued pursuant to this Article within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the District shall schedule a meet and confer conference within 30 days for settlement of the dispute.
 - 2.b. Within 10 business Days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the District shall provide the Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the District issues its written statement. Any disputed portion of the claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the District and the Contractor sharing the associated costs equally. The District and Contractor shall mutually agree to a mediator within ten (10) business days after the disputed portion of the claim has been

identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this Article.

- 2.c. For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this Article.
- 2.d. Unless otherwise agreed to by the District and the Contractor in writing, the mediation conducted pursuant to this Article shall excuse any further obligation under Public Contract Code Section 20104.4 (see Article 3.12.01. Claims Less Than Fifty Thousand Dollars through Article 3.12.04. Civil Actions) to mediate after litigation has been commenced.
- 2.e. This Article does not preclude the District from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this Article does not resolve the parties' dispute.
- 3. Failure by the District to respond to a claim from a Contractor within the time periods described in this Article shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the District's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this Article, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the Contractor.
- 4. Amounts not paid in a timely manner as required by this Article shall bear interest at 7 percent per annum.
- 5. If a Subcontractor or a lower tier Subcontractor lacks legal standing to assert a claim against the District because privity of contract does not exist, the Contractor may present to the District a claim on behalf of a Subcontractor or lower tier Subcontractor. A Subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier Subcontractor, that the Contractor present a claim for work which was performed by the Subcontractor or by a lower tier Subcontractor on behalf of the Subcontractor. The Subcontractor requesting that the claim be presented to the District shall furnish reasonable documentation to support the claim. Within 45 Days of receipt of this written request, the Contractor shall notify the Subcontractor in writing as to whether the Contractor presented the claim to the District and, if the original

Contractor did not present the claim, provide the Subcontractor with a statement of the reasons for not having done so.

- F. A waiver of the rights granted by PCC 9204 is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of PCC 9204, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in PCC 9204.
- G. Nothing in PCC 9204 shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.

SECTION 4. LEGAL REGULATIONS AND RESPONSIBILITY

4.01. Laws to be Observed

- A. The Contractor shall remain informed of and in compliance with the latest version of applicable existing and future Federal, State, County, and Municipal laws, ordinances, rules, and regulations, including, but not limited to, those cited herein.

4.02. Equal Opportunity Requirements

- A. The Santa Clara Valley Water District is an equal opportunity employer and requires its Contractors to have and adhere to a policy of equal opportunity and nondiscrimination. In the performance of the Agreement, the Contractor will comply with all applicable Federal, State, Local Laws and Regulations, and will not discriminate against any Subcontractor, employee, or applicant for employment in the recruitment, hiring, employment, utilization, promotion, classification or reclassification, transfer, recruitment advertising, evaluation, treatment, demotion, layoff, termination, rates of pay or other forms of compensation, and selection for professional development training (including apprenticeship); or against any other person on the basis of sex (which includes pregnancy, childbirth, breastfeeding, and medical conditions related to pregnancy, childbirth, or breastfeeding); race, religion, color, national origin (including language-use restrictions); ancestry, religious creed (including religious dress and grooming practices); political affiliation, disability (mental and physical, including HIV or AIDS); medical condition (cancer and genetic characteristics) and genetic information; marital status, parental status, gender, age (40 and over); pregnancy, military, and veteran status; sexual orientation, gender identity, and gender expression; the exercise of family and medical care leave; the exercise of pregnancy disability leave; or the request, exercise, or need for reasonable accommodation.
- B. The Contractor's policy must conform with applicable State and Federal guidelines, including the Federal Equal Opportunity Clause, "Section 60-1.4 of Title 41, Part 60 of the Code of Federal Regulations;" Title VII of the Civil Rights Act of 1964 as amended; the American's with Disabilities Act of 1990; the Rehabilitation Act of 1973 (Sections 503 and 504); the Age Discrimination Act of 1975 (42 U.S.C. Section 6101 et. seq.); California Fair Employment and Housing Act (Government Code Section 12900 et. seq.); and California Labor Code Sections 1101 and 1102.

4.03. Employment of Labor

- A. In the employment of labor in the performance of the Contract, the District desires that the Contractor and all Subcontractors give first consideration to residents of the District.

4.04. Prevailing Wages

- A. The Work to be performed pursuant to this Contract is “public works” subject to the California Prevailing Wage Law, California Labor Code Section 1720, et seq. and the applicable implementing regulations (the Prevailing Wage Law) with which the Contractor must comply. The General Prevailing Wage Rates issued by the California Department of Industrial Relations may be adjusted by the State during the term of this Contract. Notwithstanding any other provisions of this Contract, the Contractor will not be entitled to any adjustment in compensation in the event there are adjustments to the General Prevailing Wage Rates.
1. In accordance with the Prevailing Wage Law, the Director of the Department of Industrial Relations has ascertained the general prevailing rate of wages and employer payments for health and welfare, pension, vacation, and similar purposes available to the particular craft, classification, or type of workers employed on the Work. These rates are set forth in the latest determination obtained from the Director, which is on file in the office of the Clerk of the Board of Directors and incorporated herein by reference the same as though set out in full. The rates are also available on the State of California Department of Industrial Relations website at <http://www.dir.ca.gov>.
 2. The Contractor shall pay a penalty to the District of \$200 for each Day, or portion thereof, for each worker paid less than the stipulated prevailing rate for any public Work done under the Contract by the Contractor or by any Subcontractor in violation of the provisions of the Prevailing Wage Law.
- B. Each Contractor and Subcontractor shall keep an accurate payroll record, showing the name, address, Social Security number, work classification, straight time, and overtime hours worked each Day and week, and the actual per-diem wages paid to each journeyman, apprentice, worker, or other employee by him/her in connection with the public Work. The payroll records shall be certified and shall be available for inspection at all reasonable hours at the principal office of the Contractor in accordance with the Prevailing Wage Law.
1. The Contractor and each Subcontractor, pursuant to California Labor Code Section 1776, must submit certified weekly payroll(s) within ten (10) Days after the Owner’s request for submission of certified weekly payroll records. The certified payroll(s) must include the date of actual payment of wages for each worker employed on the Project and a breakdown of each payment, including all fringe benefits included in such wage for each worker.
 2. In the event that the Contractor fails to comply with the ten (10)-Day submission deadline of California Labor Code Section 1776, the Contractor shall pay a penalty to the District of \$100 for each Calendar Day or portion thereof, for each worker, until the Contractor achieves compliance with Section 1776.

3. The Contractor shall inform the District of the location of the payroll records—including the street address, city, and county—and shall, within five (5) working Days, provide a notice of a change in location and address. The Contractor is responsible for compliance with payroll record requirements imposed by Section 1776 of the Labor Code.
- C. The Contractor must submit certified weekly payroll(s) in support of the monthly request for payment as required herein. Certified weekly payroll(s) must be submitted within ten (10) Calendar Days from the progress payment end date. Payroll(s) shall contain the full name, address, and Social Security number of each employee; his/her correct classification and rate of pay; daily and weekly number of hours worked; itemized deductions made; and actual wages paid. Payroll shall also indicate apprentices and ratio of apprentices to journeymen. The employee's address and Social Security number need only appear on the first payroll on which his/her name appears. The payroll(s) shall be accompanied by a Statement of Compliance signed by the employer or agent indicating that the payroll(s) is correct and complete and that the wage rates contained therein are not less than those required by the Contract. The Statement of Compliance shall be on forms furnished by the District or on any form with identical wording. The Contractor shall be responsible for the submission of copies of the payroll(s) of all Subcontractors, including sub-Subcontractors.
1. This project is subject to compliance monitoring and enforcement by the State of California Department of Industrial Relations. The Contractor and Subcontractors must furnish the records specified in Section 1776 directly to the Labor Commissioner in the following manner: monthly, in a format prescribed by the Labor Commissioner.
 2. The District will take all actions reasonably necessary to enforce the prevailing wage requirements of this Contract, including retaining progress payment funds not supported by certified payroll(s).
 3. Retentions for failure to submit satisfactory payroll(s) are in addition to all other retentions provided for in the Contract.
- D. The Contractor and each Subcontractor shall preserve their respective payroll records for a period of four (4) years from the date of filing a Notice of Completion and Acceptance under the Contract.
1. The work of installing, assembling, repairing, or reconditioning—or other work of any nature on machinery, Equipment, or tools used in or upon the Work—is considered a part of the Work to be performed under the Contract; any laborers, workers, or mechanics working on such machinery, Equipment, or tools are subject to all of the requirements relating to labor set forth in the Contract.
 2. The construction, erection, and operation of Material production, proportioning, or mixing plants from which Material is used wholly on the Contract or on contracts under the supervision of the District shall be

considered a part of the Work to be performed under the Contract; any laborers, workers, or mechanics working on such plants shall be subject to all of the requirements relating to labor set forth in the Contract.

4.05. Hours of Labor

- A. Eight (8) hours of labor constitutes a legal Day of work. The Contractor shall pay a penalty to the District of \$25 for each worker employed in the execution of the Contract by the Contractor or by any Subcontractor for each Day during which such worker is required or permitted to labor more than eight (8) hours in violation of Labor Code Sections 1810 to 1815, inclusive.

4.06. Apprentices

- A. The Contractor shall comply with Sections 1777.5, 1777.6, and 1777.7 of the Labor Code concerning the employment of apprentices by the Contractor or by any Subcontractor.
- B. Section 1777.5 requires the Contractor or Subcontractor employing persons as defined in any apprenticeable occupation to apply for a certificate of approval to the joint apprenticeship committee that is nearest the site of the public works project and that administers the apprenticeship program in that trade. The certificate will also fix the ratio of apprentices to journeymen that will be used in the performance of the Contract. The ratio of work performed by apprentices to journeymen in such cases shall not be less than one (1) hour to five (5) hours, except when the committee finds that any one of the following conditions are met:
 - 1. In the event unemployment for the previous three (3)-month period in the Project site area exceeds an average of 15 percent; or
 - 2. In the event the number of apprentices in the area exceeds a ratio of one (1) to five (5); or
 - 3. If there is a showing that the apprenticeable craft or trade is replacing at least one thirtieth of its journeymen annually through apprenticeship training either (i) on a statewide basis, or (ii) on a local basis; or
 - 4. If assignment of an apprentice to any Work performed under a public works contract would create a condition that would jeopardize his/her life; or the life, safety, or property of fellow employees; or the public at large; or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyman.
- C. The Contractor is required to make contributions to funds established for the administration of apprenticeship programs if the Contractor employs registered apprentices or journeymen in any apprenticeable trade on such contracts and if other contractors on the public works site are making such contributions.

- D. The Contractor and any Subcontractor shall comply with the requirements of Sections 1777.5 and 1777.6 in the employment of apprentices.
- E. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, ex officio the Administrator of Apprenticeship, San Francisco, CA, or from the Division of Apprenticeship Standards and its branch offices.

4.07. Permits and Licenses

- A. The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the prosecution of the Work, except as provided in the Special Provisions.

4.08. Patents and Copyrights

- A. The Contractor shall assume all costs, including any costs of defense arising from the use of any copyrighted composition, secret process, patented or unpatented invention, article, Equipment, device, or appliance manufactured, furnished, or used in the performance of the Contract, including their use by the District, unless otherwise specifically stipulated in the Specifications.

4.09. Interference With Fire Hydrants, Highways, and Fences

- A. The Contractor shall conduct operations so as not to close or obstruct any portion of any highway, road, or street, or prevent in any way free access to fire hydrants until permits have been obtained thereof from the proper authorities. If any highway required to be kept open shall be rendered unsafe by the Contractor's operations, the Contractor shall make such repairs or provide such temporary guards as shall be acceptable to the authorities having jurisdiction and to the Engineer. Any highway or street maintenance or repair work required by local authorities in connection with necessary operations under the Contract shall be performed by the Contractor at the Contractor's own cost and expense. Fences subject to interference shall be maintained as effective barriers consistent with the original intent; upon approval of the Engineer, they may be moved or rearranged to facilitate prosecution of the Work until the Work is finished, after which they shall be restored to their original location in an equal or better condition than existed prior to rearrangement.

4.10. Preservation of Property

- A. The Contractor shall exercise due care to avoid damage to existing improvements, utility facilities, and adjacent property, real and personal. The fact that any existing underground improvement or facility is not shown on the Drawings shall not relieve the Contractor of the responsibility to ascertain the existence of any underground improvement or facility that may be subject to damage by reason of the Contractor's operations.

- B. Any damage to improvements or property—whether above or below ground, private or public, within or adjacent to the Project limits—arising from or in consequence of the performance of the Contract shall be promptly repaired by the Contractor.
- C. If the Engineer requires such repair to be made prior to the execution or continued performance of any part of the Work included in this Contract, the Engineer will so notify the Contractor who shall delay or discontinue the performance of that part of the Work until the necessary repair has been made. Such delay shall be considered Inexcusable Delay; no extension of time for completion of the Contract will be allowed. The Contractor will be subject to Contract damages for any impact to the Contract Milestones resulting from its damage to property or from failure to make timely repairs.
- D. When Ordered by the Engineer to make any such repair, the Contractor shall start work thereon within 4 hours and shall prosecute the same with diligence to completion. Upon failure of the Contractor to so comply with such order, or upon the Contractor's failure to make immediate emergency repairs reasonably determined by the Engineer to be necessary in the best interests of the public, the Engineer shall have authority to cause the repair to be made and to deduct the costs thereof from any money due, or which may become due, the Contractor.
- E. In an emergency affecting the safety of life or property, including adjoining property, the Contractor shall act to prevent, to the extent possible, such threatened loss or injury whether instructed or not to do so by the Engineer.

4.11. Contractor's Responsibility for the Work

- A. Until the Acceptance of the Work, the Contractor shall have the charge and care of the Work and of the Material to be used therein and shall bear the risk of injury, loss, or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from non-execution of the Work. The Material to be used in the Work include both those furnished by the District and those furnished by the Contractor, including Material for which the Contractor has received partial payment.

4.12. Indemnification

- A. The Contractor shall defend, indemnify, and hold harmless the District and its Directors, officers, employees, and agents from liability, loss, suits, actions, or claims brought for or on account of violation of Laws, Ordinances, Rules, or Regulations, or injury, damage, or loss (including death) caused by acts or omissions of the Contractor, its employees, or its agents.
- B. The Contractor shall defend, indemnify, and hold harmless the agencies/parties named in Article 14.16. Insurance, of the Special Provisions—including their officers, employees, and agents—from liability, loss, suits, actions, or claims brought for or on account of any violation of Laws, Ordinances, Rules, or

Regulations, or injury, damage, or loss (including death) caused by acts or omissions of the Contractor, its employees, or its agents.

4.13. Contractor's Insurance**4.13.01. General**

- A. The insurance procured by the Contractor for the benefit of Santa Clara Valley Water District shall not be deemed to release or limit any liability of the Contractor. Damages recoverable by Santa Clara Valley Water District for any liability of the Contractor shall, in any event, not be limited by the amount of the required insurance coverage. Failure by the Contractor to maintain all required insurance at all times during the performance of this Contract and until Acceptance by the District, shall, at the discretion of the District, result in temporary suspension of Work, or termination of control, or termination of the Contract as indicated herein, and shall not be a basis for a time extension. The Contractor's insurance shall be primary with respect to any other insurance that may be carried by Santa Clara Valley Water District.
- B. The District has the right to require the Contractor to provide complete, certified copies of all required pertinent insurance policies, including endorsements affecting the coverage required by the Agreement.
- C. The specific insurance requirements and coverages shall be in accordance with the Special Provisions.

4.13.02. Insurance on Work and Material

- A. The Contractor shall secure and maintain such direct damage insurance against such perils as the Contractor may deem necessary to protect the Work called for in this Contract, including Work completed, Material in place or to be used in the performance of this Contract, and such other miscellaneous items as may be necessary to the performance of this Contract.

4.14. Payment of Taxes

- A. Except as otherwise specifically provided in the Special Provisions, the Contract Price(s) shall include full compensation for all current and future taxes that the Contractor is required to pay, whether imposed by Federal, State, or local government; no tax exemption certificate or any other document designed to exempt the Contractor from payment of tax will be furnished to the Contractor by the District.

4.15. Cooperation With Others

- A. The District reserves the right to access and do other work, maintenance or operations on or near the Project. The Contractor shall cooperate with others and coordinate its Work with planned or ongoing work of the District or of other District contractors within or adjacent to the limits of the Contract Work. The

Contractor shall conduct the Work so as to facilitate work by the District or by others and prevent delay, additional expense, or hindrance thereto, and allow for the satisfactory prosecution of the Work.

- B. The Contractor shall request from, and exchange with others, Drawings, data, and information as necessary to ensure proper completion of the Project and of the work of others. The Contractor shall furnish to the Engineer copies of correspondence and Drawings exchanged with other contractors.
- C. The Contractor shall complete the following activities as requested by the Engineer to assist in the coordination of Contract Work with work by others: attend planning meetings; review and comment on Project documents relative to coordination aspects; schedule Work to promote efficient installation of all improvements; move Material, Equipment, or vehicles to allow work by others to proceed; and other reasonable activities.
- D. No additional payment shall be made or Claims considered for Delay due to the Contractor's failure to coordinate the Work or because of conflicts with other construction, including that of the District.
- E. The Contractor agrees to reimburse the District for any payments made to other Contractors that were incurred as a result of the Contractor's Inexcusable Delays.

4.16. Property Rights in Material

- A. Nothing in the Contract shall be construed as vesting in the Contractor any right of property in the Material used after they have been attached or affixed to the Work or after payment has been made for 90 percent of the value of Material delivered to the site of the Work, whether or not they have been so attached or affixed. All such Materials shall become the property of the District upon being so attached or affixed or upon payment of 90 percent of the value of Material delivered by the Contractor to the worksite and not used as provided herein.

4.17. Rights in Land and Improvements

- A. Nothing in these Standards shall be construed as allowing the Contractor to make any arrangements with any person to permit occupancy or use of any land, structure, or building within the limits of the Contract for any purpose whatsoever, either with or without compensation, in conflict with any agreement between the District and any owner, former owner, or tenant of such land, structure, or building.

4.18. Title to Material Found on the Work

- A. The title to all water and to the right to use all water; and all soil, stone, gravel, sand, minerals; and all other Material developed or obtained in the excavation or other operations by the Contractor, or by any Subcontractor, and the right to use or dispose of the same are hereby expressly reserved by the District; neither the

Contractor, nor any Subcontractor, shall have any right, title, or interest in, or to any part thereof; neither shall they, nor any of them, assert or make any claim thereto. The Contractor may be permitted to use in the Work, without charge, any such Material that meet the requirements of these Specifications.

4.19. Trespass

- A. The Contractor shall be responsible for all damage or injury that may be caused on or to any property by trespass by the Contractor or any Subcontractor in the course of their employment, whether the said trespass was committed with or without the consent or knowledge of the Contractor.

4.20. Subcontracting

- A. The Contractor shall comply with the Subletting and Subcontracting Fair Practices Act commencing with Public Contract Code Section 4100. Violations shall subject the Contractor to penalties described therein.
- B. For the purposes of consenting to substitution of a designated Subcontractor in accordance with Public Contract Code Section 4107, 4109, and 4110, the Administrative Hearing Officer will be in accordance with Article 3.02. Engineer.
- C. The Engineer reserves the right to order the Contractor to terminate any subcontract if, in the Engineer's opinion, the Subcontractor fails to comply with the applicable requirements of this Contract.
- D. Nothing herein contained shall create any contractual relation between any Subcontractor and the District or shall relieve the Contractor of any liability or obligation hereunder.
- E. All contracts with Subcontractors and lower-tier Subcontractors and purchase agreements with Suppliers and lower-tier Suppliers shall provide that they are freely assignable to the District or to the District's designee under the following conditions:
 - 1. The District terminates the Contractor's control of the Work in accordance with Article 4.22. Termination of Control; and
 - 2. The District directs such assignment.

4.21. Assignment of Antitrust Claims

- A. Government Code Sections 4550 through 4554 pertaining to the assignment of antitrust claims are incorporated herein in full by this reference.

4.22. Termination of Control

- A. The District may terminate the Contractor's control of the Work at any time upon a determination that the same is in the best interests of the District.

4.23. Termination of Contract

- A. The District may terminate the Contract at any time upon a determination that the same is in the best interests of the District. Upon such termination, the rights, duties, and obligations of the parties shall be as stated in Section 8-1.14 of the 2010 State Specifications, wherein the words "Director" and "Engineer" shall mean the Engineer and the words "State" and "Department" shall mean District. Payment after termination of Contract shall be in accordance with the District's Standard and Special Provisions.

4.24. Contractor's Cost Data

- A. The District or any of its duly authorized representatives shall, until the expiration of four (4) years after filing the Notice of Completion and Acceptance under this Contract or any subcontract under it, have access to and the right to examine any Contractor or Subcontractor payroll, records of personnel, invoices of Material, records of plant and Equipment costs, and any and all other directly pertinent books, documents, papers, and records of such Contractor or Subcontractors involving transactions related to the said Contract or subcontracts. In the event State or Federal funds are involved in financing the Project, the State or Federal Government shall have the same rights of inspection as the District.

4.25. Utilities

- A. In general, the location of existing utility facilities as shown on the Drawings is approximate. This information has been obtained from utility maps furnished by the various agencies involved; the District does not guarantee either the correctness of the locations or the extent of such locations.
- B. California Government Code Section 4215 does not require public agencies to indicate the presence of service laterals or appurtenances whenever the presence of such utilities can be inferred from the presence of other visible facilities (e.g., buildings, meter boxes, junction boxes) on or adjacent to the construction site. Service laterals (e.g., house sanitary, water, electrical, gas, cable TV, storm or telephone cables, appurtenances) may not all be shown on the Drawings. No changes in the Contract Price(s) or the Contract Time(s) shall be made due to the presence of unidentified or incorrectly located service laterals or appurtenances. It shall be the responsibility of the Contractor to ascertain the exact location of the utility facilities.
- C. Unless otherwise indicated on the Drawings or specified in the Specifications, the Contractor shall maintain in service all utilities, including house services, power, lighting, and telephone conduits, and any other surface or subsurface structure or facility of any nature that may be affected by the Work; provided, however, that the Contractor, for convenience, may arrange with the owner to temporarily disconnect house service lines or other facilities along the line of the Work. The cost of disconnecting and restoring such utilities shall be borne by the Contractor.

- D. In the event that a main or trunk-line utility facility is encountered that interferes with the Work and that is neither shown on the Drawings nor specified in the Specifications, the Contractor shall immediately notify the District in writing. The District may have the appropriate utility company or public agency relocate the facility, or the District may direct the Contractor to relocate the facility in accordance with Article 3.06. Changes in the Work.
- E. In the event that a main or trunk-line utility facility is encountered that interferes with the Work and that the Contractor believes is not shown on the Drawings or indicated in the Specifications with Reasonable Accuracy, the Contractor shall immediately notify the District in writing.
 - 1. If the Engineer determines that the main or trunk-line utility facility was shown on the Drawings or was indicated in the Specifications with Reasonable Accuracy, the Contractor shall be solely responsible for relocation or removal; no additional time shall be granted nor additional payment made, for any additional Work required.
 - 2. If the Engineer determines that the main or trunk-line utility facility was not shown on the Drawings or was not indicated in the Specifications with Reasonable Accuracy, the District may have the appropriate utility company or public agency relocate the facility, or the District may direct the Contractor to relocate the facility in accordance with Article 3.06. Changes in the Work.
- F. When a delay in the completion of the Project is caused by the failure of the District or by the owner of a utility facility to provide for removal or relocation of existing main or trunk-line utility facilities that are not shown on the Drawings or that are not indicated in the Specifications or that are not shown on the Drawings or indicated in the Specifications with Reasonable Accuracy, the Contract Time(s) shall be extended in accordance with Article 3.08. Change in Contract Time(s).
- G. Various existing utilities, both above and below ground, may be encountered during construction. The Contractor shall perform all Work in such a manner so as to avoid damage to existing utilities. The Contractor is responsible for any damage due to failure to exercise due care.
- H. The Contractor shall notify underground service alert (U.S.A.) a minimum of five (5) working days prior to the start of excavation or demolition in accordance with California Government Code requirements. The Contractor is responsible for coordinating the U.S.A. notification according to the Contractor's schedule; any delay due to utility markings through the U.S.A. process is the responsibility of the Contractor.
- I. The Contractor shall verify the exact location of all indicated or field marked utilities and shall make a sufficient number of exploratory excavations of all utilities that may interfere with the Work sufficiently in advance of the construction. The Contractor shall promptly notify the Engineer when such

exploratory excavations show the utility location as shown on the Drawings to be in error.

- J. The Contractor shall not interrupt the service function or disturb the support of any utility without authority from the utility owner or an order from the Engineer. All valves, switches, vaults, and meters shall be maintained and readily accessible for emergency shutoff.
- K. The District and the owners of utilities or their authorized agents reserve the right to enter upon the right of way at all times for the purpose of operations and maintenance of their facilities or for making necessary connections or repairs to their properties. The Contractor shall cooperate with the District and with the affected utilities engaged in such Work to avoid any unnecessary Delay or hindrance to such Work.
- L. The Contractor is responsible for doing all Work and furnishing all Materials required for protecting in place or restoring all existing above- and below-ground utilities disturbed or damaged during construction to a condition equal to or better than that existing prior to construction.
- M. The Contractor shall protect all utilities that may be impacted by the Work. All exposed utilities shall be supported firmly and uniformly conforming to the utility requirements. No utilities shall be left exposed for a period exceeding eight (8) hours unless approved by the utility and by the Engineer. Unless otherwise shown on the Drawings, all utilities shall be backfilled with at least 12 inches of select imported backfill around the utility.
- N. All utility pole and guy anchors shall be protected, and, where the walls of a trench are within five (5) feet of a pole or anchor, lateral support to the pole shall be provided by the Contractor.
- O. The Contractor shall immediately notify the utility owner and the Engineer if any existing utilities have sustained damage prior to excavation or if the Contractor disturbs or damages the existing utility during the excavation. The Contractor shall bear the cost of repair or replacement of any utility damaged as a result of construction operation.

4.26. Asbestos-Related Work

- A. The Contractor shall comply with California Business and Professions Code Section 7058.5, which states that no Contractor shall engage in asbestos-related work, as defined, unless certified by the Contractor's State License Board to do so.
- B. The Contractor shall comply with California Labor Code Section 6501.5 relative to asbestos related work, the applicable provisions of the Code of Regulations, Title 8 General Industry Safety Orders, and BAAQMD Regulation 11, Rule 2.

SECTION 5. PROSECUTION AND PROGRESS OF WORK

5.01. Assignment

- A. The performance of the Contract may not be assigned except upon consent of the Board of Directors. Consent shall not be given to any proposed assignment that would relieve the original Contractor or surety of its responsibilities set forth in the Contract.
- B. The Contractor may assign moneys due in accordance with the Contract; such assignment shall be recognized by the District if given proper notice thereof, to the extent permitted by law. Assignment of moneys shall be subject to all proper setoffs in favor of the District and to all deductions provided for in the Contract. All money withheld, whether assigned or not, shall be controlled by the District.

5.02. Notice to Proceed

- A. The Notice to Proceed (NTP) shall be issued by the Engineer within ten (10) Days after receipt of the signed Agreement and after approval by the District of the contract bonds and insurance documents. The NTP authorizes the Contractor to proceed with the Work and establishes the First Chargeable Day of the Contract.

5.03. Commencement of Work

- A. The First Chargeable Day as specified in the NTP will be at least ten (10) Days after the date of said Notice.
- B. The Contractor shall provide written notice to the Engineer, at least 2 working days in advance, of the date the Contractor intends to start work on site.

5.04. Meeting Requirements

- A. This Article includes requirements for scheduling, attending, and conducting Project meetings for the purpose of addressing issues related to the Work and for reviewing and coordinating progress of the Work. Project meetings include the preconstruction meeting, progress meetings, coordination meetings, and special meetings as specified herein.
- B. Qualifications of meeting participants: Representatives of firms and organizations participating in each meeting shall be qualified and authorized to act on behalf of the firm or organization they represent.

5.04.01. Preconstruction Meeting

- A. The purpose of the preconstruction meeting is to review the Project, designate responsible personnel, and inform the Contractor of the District's Contract administrative procedures, correspondence communication protocol, and other special requirements of the Contract. The Contractor shall come prepared to discuss its staffing, how it will successfully perform the Work, and discuss its plan

for temporary utilities, safe Work environment, environmental compliance, emergency response, and any tie-ins, outages, or shutdowns. The Contractor shall also be prepared to review and discuss the Contractor's markup breakdown, Change Order pricing structure, the Standards to be used on the Project, and what the Contractor must provide as backup for Change Orders or for extra Work pricing.

- B. The Engineer will arrange the preconstruction meeting and will notify the Contractor regarding the meeting time, date, and place. The meeting shall be attended by the Contractor and its Superintendent and all representatives of Subcontractors or suppliers whom the Contractor may desire to invite or whom the District may request with the intent being a full understanding of the issues discussed by all parties. The Engineer shall prepare the agenda, preside at the meeting, and record meeting minutes.

5.04.02. Progress Meetings

- A. The Engineer shall conduct progress meetings on a regular weekday and at a time mutually agreed to by the Contractor and by the Engineer. The purpose of the progress meetings is to review construction progress; submittal status; Potential Change Order, Change Order, and DCO status; construction safety issues and concerns; conflicts; environmental compliance; public/neighborhood issues; progress payments; and any other subject as deemed appropriate.
- B. The Contractor shall allow for one (1) meeting a week.
- C. Subject to the Engineer's approval, the frequency of the progress meetings may be reduced at the beginning and at the end of the construction period.
- D. The Contractor's superintendent, suppliers, and Subcontractors shall attend the meetings as required. Third parties, such as agency representatives and utilities, may be invited by the Engineer to attend as deemed appropriate.
- E. Typical agenda. Typical agenda items can include:
 - 1. Review and approval of previous meeting minutes.
 - 2. Review of progress since the previous meeting.
 - 3. Contractor's Progress Schedules, including Look-Ahead Schedules.
 - a. Review of off-site fabrication and delivery schedules.
 - b. Problems that may affect the Contractor's schedule performance.
 - c. Corrective measures to recover from forecasted Delays whether Excusable or Inexcusable.
 - d. Updates and/or revisions to the Contractor's Detailed Progress Schedules.

4. Interface with operations.
5. Safety and security.
6. Review of submittals schedule.
7. Status of RFIs.
8. Field observations, problems, and conflicts.
9. Status of QC inspections and corrections.
10. Environmental issues.
11. Housekeeping.
12. Status of submittal review.
13. Status of PCOs.
14. Status of COs.
15. Other business.
16. A review of the monthly billing once per month.

5.05. Professional Scheduler

- A. All Detailed Progress Schedules shall be prepared and updated throughout the Contract Time(s) by a Schedule Professional who has, at a minimum, five (5) years of recent, verifiable experience in preparing, updating, and maintaining computerized Critical Path Method (CPM) construction schedules using Oracle Primavera, Microsoft Project, or similar scheduling software on at least two (2) completed construction projects of a similar size and degree of complexity as this Project.
- B. Prior to the Contractor's submission of the initial Detailed Progress Schedule, the Contractor shall submit and receive a favorable review of the résumé and professional references of the proposed Scheduler. The references shall be from at least two (2) project owners or construction managers familiar with the Scheduler's work on projects identified in the Scheduler's résumé. The District reserves the right to reject the proposed Scheduler based on lack of qualifications as defined in this Article.

5.06. Progress Schedules

- A. The Contractor is responsible for scheduling the sequence of its Work in all Progress Schedule(s) as described below.

5.06.01. Preliminary Progress Schedule

- A. Within ten (10) Days of the First Chargeable Day of the Contract as specified in the NTP, the Contractor shall submit to the Engineer a Preliminary Progress Schedule. This schedule shall include all activities that are planned to occur within the first 45 Days of the Contract.

5.06.02. Baseline Progress Schedule

- A. Within 30 Days of the First Chargeable Day of the Contract as specified in the NTP, the Contractor shall submit its initial Detailed Progress Schedule, which, if accepted, shall become the Baseline Progress Schedule for the Project. The submittal shall be in hard copy and native electronic format and shall fully conform to the numbered items below:
 - 1. The schedule shall be prepared using Oracle Primavera, Microsoft Project or similar Precedence Diagramming Method (PDM) scheduling software.
 - 2. The Baseline Progress Schedule shall be a Critical Path Method (CPM) schedule that is comprehensive, credible, well-constructed, and controlled. The schedule shall include input from its major Subcontractors and Suppliers and represent the complete scope of work. It shall represent the planned order of significant activities to complete the Work within the time allowed under this Contract. Any Detailed Progress Schedules shall be presented in sufficient detail such that sequence and interdependence of activities of the Project can be identified. The schedule shall include proper logic and adequate activity durations and show a logical critical path and Controlling Items of Work.
 - 3. The schedule shall account for on-site and off-site activities, including, but not limited to, permits, mobilization, and submittals (prepare and submit, review and approve, revise and resubmit); fabrication and delivery, installation, construction, system shutdowns, testing and start-up; training of District personnel; deficiency list; closeout; and demobilization. The schedule shall include key Milestones; reviews by the District, regulatory agencies, and other third parties of the Work; construction and sequencing constraints as specified in these Specifications; construction Work by the District forces or other third parties that interface with the Work; District-managed activities, such as the District furnishing Equipment; removal or relocation of interfering utilities by third parties; delivery of operation and maintenance manuals; and adequate time for Work completion and closeout activities.
 - 4. Activity calendars shall reflect the planning basis and any Contract restrictions. All non-work Days and work hours shall be explained for each calendar.

5. The schedule shall reflect any limitations on work hours required by the Contract and any permit restrictions and conditions that are required.
6. Each schedule activity shall include a unique ID number and description, pertinent predecessors and successors, start/finish dates, an assigned workday calendar, a duration, percent complete, calculated float and activity codes to group the Work into Work Breakdown Structure (WBS) categories, location, responsibility, trade, and other rational groupings to facilitate sorting and filtering of the schedule activities.
7. Activities making up the critical path for the entire Contract and the critical path for each specific designated portion of the Work shall be identified. The network diagram shall be organized to indicate a continuous flow of progress of activities from left to right.
8. Except for concrete curing, submittal review, Equipment fabrication and deliveries, schedule activities shall be no longer than 20 working days. Activities longer than 20 working days shall be subdivided into sub-elements of work.
9. The Contractor shall submit a tabular listing of the schedule along with the network diagram.
10. The use of float suppression techniques, such as preferential sequencing (arranging critical path through activities more susceptible to District-caused delay); special lead/lag logic restraints; zero-total or free-float constraints; extended activity times; or imposing constraint dates other than required by this Contract shall be cause for rejection of the schedule using such techniques. The use of Resource Leveling (or similar software features) for the purpose of artificially adjusting activity durations to consume float and influence the critical path shall also be cause for rejection.
11. The Engineer's favorable review of the schedule shall not relieve the Contractor of errors and omissions in tasks, durations, or logic. No time extensions shall be granted because of errors or omissions on the schedule. It is the Contractor's responsibility to incorporate all necessary activities to cover the entire Work scope.
12. A favorably reviewed Baseline Progress Schedule is a condition precedent to payment.

B. Cost Loading

1. Work activities other than third-party and District-managed activities shall be cost loaded. No activity shall have a value greater than \$50,000 except for activities representing major Equipment purchases or installation. Progress Schedules exhibiting front-loaded costs are unacceptable. The Contractor shall revise the Schedule of Values (SOV)

pursuant to Article 6.01. Schedule of Values until accepted by the Engineer.

2. The Contractor shall create two (2) hierarchical schedule activity codes in the scheduling software: (i) Bid Item and (ii) SOV. Each code shall have line item name corresponding to the accepted Bid items and SOV titles. Costs shall progressively roll up from the activity level to the SOV level; SOV codes shall roll up to the Bid Item level.
3. Each cost-loaded schedule activity shall be assigned one of the SOV codes. An activity shall not contain work assigned to more than one SOV code. The SOV code will be used to summarize cost-loaded activity values to produce the required SOV submittal. Table 6-1, referenced in Article 6.01.02. Submittal, is an acceptable form for this submittal. The SOV submittal shall be produced from the Progress Schedule software.
4. The sum of the monetary values of the activities assigned to each SOV code shall be equal to the accepted amount of that SOV line item. The sum of all the cost-loaded activities in the latest accepted schedule update shall total the latest approved Contract amount.

C. Early Completion Schedule

1. The District is not required to accept an earlier (advanced) schedule (i.e., one that shows early completion date[s] but within the specified Contract Time[s]). Time(s) for completion of Work shall adhere to the Contract Time(s) specified in these Specifications unless earlier time(s) of completion is requested by the Contractor and agreed to by the District. Any such agreement shall be formalized by a Change Order or by a DCO.
2. If the Contractor submits any Baseline Progress Schedule or Detailed Progress Schedules showing any Contract Time(s) earlier than a corresponding, specified Contract Time(s) and that early completion date is not agreed to by both parties through a Change Order or through a DCO, the duration from such early completion date and from the specified Contract Time(s) is considered "float" and shall belong to the Project.
3. Accordingly, the Contractor in this situation is to show in the Baseline Progress Schedule or in the Detailed Progress Schedules a specific activity identified as Project Completion Float, which may be adjusted as that float is used or increased. The Contractor shall not be entitled to a time extension due to any cause or reason that consumes Project Completion Float.

5.06.03. Revised Baseline Schedules

- A. If the Contractor desires to make a change to the Baseline Progress Schedule after commencing construction, a revised Baseline Progress Schedule and

associated narrative shall be submitted to the District at least 15 Days prior to any such change.

- B. The narrative shall state the reasons for the change; any change to the Baseline Progress Schedule shall be discussed in the submittal to the District.
- C. A revised Baseline Progress Schedule shall not become effective until accepted by the District.

5.06.04. Updates to the Detailed Progress Schedules

- A. Any and all updates or revisions to the initial Detailed Progress Schedule shall conform to the same requirements as the Baseline Schedule in Article 5.06. Progress Schedules.
- B. The Contractor shall submit an update of the prior month's Detailed Progress Schedule to the Engineer before the 25th Day of each month.
- C. Each schedule update shall incorporate all current information, including progress. Actual start and finish dates shall be updated and shall match daily reports. Work completed shall be shown with actual start and finish dates for each activity. Work in progress shall be shown with the actual start date and the percentage of Work completed as of the last date of the previous month.
- D. The Contractor shall also submit a narrative report that shall include a description of problem areas, state the reasons for any changes made to the schedule activities, current and anticipated delaying factors and their impact, and an explanation of corrective actions taken or proposed.
- E. Progress status shall be evaluated on the basis of float on the critical path at the time of updating, with negative float indicating the Project is behind schedule and positive float indicating ahead-of-schedule status.
- F. Acceptance of the Detailed Progress Schedule updates is a condition precedent to payment.
- G. Recovery Schedules
 - 1. At any time that construction progress lags behind any Baseline Progress Schedule or any updated/revised Detailed Progress Schedule accepted by the Engineer by either ten (10) working Days or by five (5) percent of the remaining time to complete the Contract, whichever is less, the Contractor shall prepare and submit a Recovery Schedule to the Engineer. This Recovery Schedule shall demonstrate how construction will be expedited and executed to achieve the contractual completion dates (either Milestone Completion or Project Completion dates).
 - 2. Activity ID numbers shall be the same as in the most current and accepted and updated Detailed Progress Schedule. ID numbers of

deleted activities shall not be reused on the Recovery Schedule. New ID numbers (not used in the most current and accepted Detailed Progress Schedule) shall be used for new activities.

3. A revised narrative describing the remaining Work as reflected in the Recovery Schedule shall be included and shall include a separate listing of all activities deleted, changed, or added with an explanation for each change.
4. Once favorably reviewed by the Engineer, the Recovery Schedule shall become the current, revised Detailed Progress Schedule against which future progress is to be measured.

5.06.05. Time Impact Analysis

- A. If the Contractor foresees that an Excusable Delay, as defined, will impact a Controlling Item of Work, a written request for adjustment of the impacted Contract Time(s) and supporting data shall be promptly submitted to the Engineer in accordance with Article 3.08. Change in Contract Time(s). To substantiate the Contractor's request, the supporting data shall include a Time Impact Analysis (TIA) based on the updated and accepted Detailed Progress Schedule for the month preceding the Excusable Delay.
- B. The TIA shall represent Excusable Delays as separate activities or as groups of activities. These activities shall be entered into the relevant part of the schedule update that was accepted just prior to the time the Excusable Delay occurred. In case of a deductive change reducing the quantity of Work, activities representing the deleted scope shall be dissolved or its estimated duration adjusted to reflect the reduction.
- C. The Contractor shall submit a written report with the TIA describing the Excusable Delay by the occurrence and the impact of the event time computation on all affected activities.
- D. Only changes or delays that affect or create Controlling Items of Work as defined by the schedule shall result in time adjustments. The Engineer shall determine if a request for time extension is warranted.
- E. Total float or slack is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date of any activity in the schedule. Total float or slack is not for the exclusive use or benefit of either the District or the Contractor. It is an expiring resource available to either party on a first-come, first-served basis.

5.06.06. "Three-Week-Look-Ahead" Schedules

- A. The Contractor shall provide Three-Week-Look-Ahead Schedules on a weekly basis and present them at the weekly progress meetings.

- B. The Three-Week-Look-Ahead Schedules shall be prepared in the form of a bar chart breaking down activities into detailed subtasks on the Contractor's Detailed Progress Schedules. Subtasks shall identify related activities on the Detailed Progress Schedules and responsibility for completion of the sub task.
- C. The Contractor shall notify the Engineer in writing of any deviation from the current Three-Week-Look-Ahead Schedule within 24 hours of identification of said deviation.
- D. The Three-Week-Look-Ahead Schedules shall indicate inspections by the Engineer or by regulatory agencies and construction Work by the District forces or by other third parties that interface with the Work.

5.06.07. Payment

- A. Contractor shall submit a Baseline Progress Schedule, detailed monthly Progress Schedule updates, and Recovery Schedules to the District. The schedules shall be favorably reviewed by the District before a pending payment request is approved.
- B. Full compensation for furnishing, updating, revising, and submitting Detailed Progress Schedules and associated reports shall be considered as included in various Contract items of work; no additional payment shall be made.
- C. Submittal and favorable review of Detailed Progress Schedules and their components that meet the requirements of Article 5.05. Progress Schedules in this Section is a condition precedent to making a payment request.

5.07. Temporary Suspension of Work

- A. By written order to the Contractor, the Engineer may suspend the Work, wholly or in part, for an indefinite period or for such period as the Engineer may deem necessary, for any of the following reasons:
 - 1. Weather conditions or other conditions that are unfavorable for the proper prosecution of the Work;
 - 2. Failure of the Contractor to carry out orders given or to perform any provisions of the Contract; and
 - 3. For the convenience and benefit of the District.
- B. Such suspension shall be effective upon receipt by the Contractor of the written order suspending the Work and shall be terminated upon receipt by the Contractor of the written order terminating the suspension.
- C. If the Engineer orders a suspension of all or of a portion of the Work that is on a critical path, pursuant to A.1 or A.3 in this Article, this shall be cause for a time extension if it impacts Milestone completion.

5.08. Liquidated Damages

- A. If the Work is not finished or completed by the Milestone dates in the Contract, it is agreed that damage shall be sustained by the District and that it is and shall be impracticable and extremely difficult to ascertain and determine actual damage that the District will sustain. It is agreed that the Contractor shall pay to the District the sum(s) set forth in the Special Provisions. Liquidated Damages shall be assessed separately and independently.
- B. The Contractor agrees to pay Liquidated Damages herein provided for, and further agrees that the District may deduct the amount thereof from any moneys due, or that may become due, to the Contractor under the Contract. Imposition of Liquidated Damages shall not preclude the District from taking other action as deemed appropriate to ensure performance of the Contract and shall not relieve the Contractor of its responsibility to comply with these Specifications.

SECTION 6. MEASUREMENT AND PAYMENT

6.01. Schedule of Values

6.01.01. Preparation

- A. The Contractor shall develop the Schedule of Values (SOV) in the Baseline Progress Schedule.
- B. Progress payments shall not be made until the SOV has received a favorable review by the Engineer.
- C. Each schedule activity representing a component of lump-sum Bid items shall include a directly proportional amount of the Contractor's overhead and profit. The Contractor's overhead and profit shall be completely distributed among all schedule activities. The Contractor shall provide additional cost documentation to the Engineer when requested so that values can be verified.
- D. The Contractor shall list and maintain separately on the SOV and on any Detailed Progress Schedule all values for items of Equipment that will be submitted for on-site Material payment. These Material items shall not be "progressed" as a part of the physical progress assessment.
- E. The Contractor shall prepare a Cash Flow Summary and a corresponding Cash Flow "S" Curve indicating the total dollar amount of Work planned for each month of the Project and shall equate the sum of monthly amounts to the Total Bid Price.

6.01.02. Submittal

- A. The Contractor shall submit to the Engineer the detailed SOV that conforms to Table 6-1 as part of its Baseline Progress Schedule and Detailed Progress Schedule Update submittals.
- B. The SOV submittals shall include a Cash Flow Summary and a Cash Flow "S" Curve.

6.01.03. Revision

- A. All construction Change Order authorizations shall be added to updated and revised Detailed Progress Schedules as cost-loaded activities and shall be coded to appropriate SOV line items. Additional cost documentation shall be provided to the Engineer when requested.
- B. The Contractor shall not change the final approved SOV without the approval of the Engineer. The SOV has a one-to-one direct relationship to the list of activities on the Contractor's Progress Schedule. Additions or deletions of activities on the Contractor's Detailed Progress Schedules shall require line item additions or deletions in the SOV. Any revision to the SOV shall be submitted with the monthly Detailed Progress Schedule updates.

6.02. Application for Payment

- A. Applications for payment shall be based upon actual progress as measured on the accepted Detailed Progress Schedules and as in the SOV.

6.02.01. Preparation

- A. Measurement of Quantities and Percent Complete
 - 1. All Work, except Work based on Time and Materials, shall be paid for at the Contract Price(s) per unit of measurement and shall be measured by the Engineer in accordance with the English system of measurement. Unless otherwise specifically provided, the Engineer shall compute quantities by a method that, in the Engineer's opinion, is best suited to obtain an accurate determination. The weights of metalwork, pipe, and other metal parts to be paid for on the basis of weight shall be determined by the Engineer. The District will not provide scales for weighing Material. The Engineer shall determine the weight of each part or item in the most practicable manner and shall use for that purpose manufacturer weights, or in their absence, catalog weights or estimated weights, in that order; weights of nonmetallic coatings shall be excluded.
 - 2. Unless otherwise agreed to by the Engineer, progress payments shall be based on percent complete for each applicable cost-loaded schedule activity as determined by visual observation of the Project by the Contractor and by the Engineer on a monthly basis. The schedule activity shall be updated to reflect percent complete. The schedule shall roll up activities to an activity code for each SOV and for each Bid Item.
- B. Inclusion of Material On-Site
 - 1. Partial payments may be made by the District to the Contractor for Material and Equipment furnished and delivered to the Project site but not yet incorporated into the Work, at the District's sole discretion, and only if the Material and/or Equipment meet all of the following requirements:
 - a. Material and/or Equipment are fabricated and/or are manufactured goods or Equipment relatively unique to the Project.
 - b. The Contractor can transfer clear title to the District.
 - c. If the Contractor does not have Builder's Risk coverage, the Contractor shall, at no additional cost to the District, (i) insure the Material against theft, fire, loss, vandalism, and malicious mischief; (ii) name the District as additional insured; (iii) deliver this policy or certificate of this insurance to the District; and (iv) receive the District's acceptance of the policy or certificate of insurance. Insurance shall be specific to material and be separate from other insurance required by the Contract. Insurance shall not

be cancelable for at least 30 days; cancellation shall not be effective until certificate thereof is given to the District.

- d. Submittals for the Material and/or Equipment have been favorably reviewed by the District.
 - e. The Material and/or Equipment have been delivered, identified as property of the District, and physically separated from other Material; protected, properly stored, and maintained at the site in accordance with manufacturer requirements.
- 2. Only the Contractor's actual cost for Material may be paid prior to inclusion in the Work. The Contractor's actual cost for the Material must be supported by Supplier invoices, proof of payment by the Contractor, and other supporting documentation warranting that the Contractor has received and owns the Material or Equipment free and clear of all liens, charges, security interests, and encumbrances.
 - 3. Material delivered to the site fewer than 30 days prior to their scheduled incorporation shall not qualify for partial payment consideration.
 - 4. Temporary construction material (e.g., shoring) do not qualify for partial payment.
 - 5. Final payment shall be made only for Material or Equipment incorporated into the Work. Upon Acceptance of the Work, all Material remaining for which advance payments had been made shall revert to the Contractor, unless otherwise agreed; partial payments made for these items shall be deducted from the final payment for the Work.
 - 6. Payment for Material on-site does not relieve the Contractor of its obligations pursuant to the Contract.

6.02.02. Submittal of Application for Payment

- A. On the 25th of each month, the Contractor shall prepare and submit the application for payment to the District. Each progress pay request is to include payment for Work completed up to and including the 25th of the month. The basis for partial payments of lump sum or other unit Contract items shall be determined by agreement between the Engineer and the Contractor.
- B. Each application for payment shall be transmitted under the signature of the responsible authorized representative of the Contractor.

- C. The Contractor's properly submitted application for payment request and request for final payment shall include the following substantiating data:
1. Cover letter identifying:
 - a. the Project name and Project number;
 - b. application number and date; and
 - c. a detailed list of enclosures.
 2. Contractor monthly Progress Pay Estimate summary sheet:
 - a. The pay request submitted by the Contractor shall contain a source document that provides backup information on how the estimate was prepared;
 - b. A source document is defined as the basic document used to record or calculate quantities; and
 - c. The source document must contain the appropriate Contract Bid Item, the location of the installation, the necessary measurement and/or calculations, and the name of the person preparing the document.
 3. Request for payment that meets the criteria listed in 6.02.01.B. Inclusion of Materials On Site:
 - a. This form requires a description of each specific Material, quantity, value, and submittal review status substantiating evidence of purchase and cost and a completed affidavit.
 4. Certified weekly payroll(s) for the pay estimate period in accordance with the Contract Prevailing Wage requirements.
 5. Small/Micro Business Enterprise Utilization Report, if required.
 6. Favorably reviewed Detailed Progress Schedule update with Cash Flow Summary and Cash Flow "S" Curve.
 7. Daily Extra Work Report Form signed by both the District inspector and by the Contractor's representative, if applicable.
 8. Satisfactory evidence that the Engineer has approved the action taken to correct any Noncompliance Notices and a numbered copy of the noncompliance log.
 9. Written acknowledgement by the Engineer that the as-built Drawings have been updated that month.

6.02.03. Review of Application for Payment

- A. Upon receipt of a payment request, the District shall review the payment request for the purpose of determining that the payment request is a proper payment request. Any payment request determined not to be a proper payment request suitable for payment shall be returned to the Contractor no later than seven (7) days after receipt. A payment request returned pursuant to this paragraph shall be accompanied by a letter citing reasons why the payment request is not proper. The following are examples of an improper payment request:
1. The item of Work requested to be paid was not performed.
 2. The Work being requested to be paid has already been paid in previous Progress Pay Estimates.
 3. The Work performed and requested to be paid was not done in accordance with the Contract (noncompliance).
 4. The quality of the finished product is unacceptable.
 5. The source documentation is inaccurate.
 6. The Daily Extra Work Reports are not properly filled out.
 7. There is a failure to submit an approved SBE Utilization Report, if required.
 8. There is a failure to submit any of the Substantiating Documentation in Article 6.02.02. Submittal of Application for Payment.

6.02.04. Payment

- A. Payment for all items of Work at the unit or lump-sum price shall be considered as full compensation for furnishing all labor, Material, tools, Equipment, and incidentals necessary to complete the item of Work; no additional payment shall be made. Payment for items of Work called for in the Specifications or shown on the Drawings but that are not separately identified in the Proposal shall be compensated as part of the Bid price of one or more of the items that are listed; no additional payment shall be made.
- B. Non-Waiver: No progress payment made to the Contractor or the Contractor's sureties shall constitute a waiver of the right to assess Liquidated Damages pursuant to the Contract Documents.
- C. The District shall pay within 30 Days valid, undisputed amounts, less any retention, withholds required by law or allowed by this Contract.

- D. If the District fails to make any progress payment within 30 Days after receipt of an undisputed and properly submitted payment request from the Contractor, the District shall pay interest to the Contractor equivalent to the legal rate set forth in the Code of Civil Procedure, Section 685.010, subdivision (a).
- E. The number of Days available to the District to make a payment without incurring interest pursuant to this Section shall be reduced by the number of Days by which the District exceeds the seven (7)-Day return requirement set forth in Article 6.02.03. Review of application for payment, paragraph A.
- F. Unless otherwise indicated in the Special Provisions, the District shall retain five (5) percent of the estimated value of Work done and five (5) percent of the value of the Material so estimated to have been furnished and delivered and unused as aforesaid and shall pay to the Contractor, while carrying on the Work, the balance not retained as aforesaid after deducting there from all previous payments and all sums to be kept or retained under the provisions of the Contract. No estimate or payment shall be required to be made when, in the judgment of the Engineer, the Work is not proceeding in accordance with the provisions of the Contract, or when, in the Engineer's judgment, the total value of the Work done since the last estimate amounts to less than \$1,000. No estimate or payment shall be considered to be Acceptance of the Work. All progress estimates and payments shall be subject to correction in the final estimate.
- G. Escrow in Lieu of Retention
 - 1. At the request of the Contractor, the District shall permit the substitution of securities or certificates of deposit equivalent to the amount of any monies withheld by the District as above provided. The deposit shall, in that event, be with the District or with a State- or Federal-chartered bank in California as the escrow agent.
 - 2. Alternatively, upon written request of the Contractor, the District shall make payments of the retention as it is earned directly to the escrow agent.
 - 3. The Contractor shall bear the expense of the District and of the escrow agent in connection with the escrow deposit made.
 - 4. Securities or certificates of deposit to be placed in escrow shall include those listed in Government Code Section 16430, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and by the District. Unless otherwise permitted by the escrow agreement, securities or certificates of deposit to be placed in escrow shall be of a value at least equivalent to the amounts of retention to be paid to the Contractor pursuant to this Section.

5. When the District makes payment of retentions directly to the escrow agent, the Contractor may direct, subject to approval of the District, the investment of the payments into securities.
6. The Contractor shall enter into an escrow agreement satisfactory to the District; this Agreement shall be substantially similar to that specified in Public Contract Code Section 22300.
7. The Contractor shall obtain the written consent of the surety to the agreement.

6.02.05. Withholding From Payments

- A. The District may, at its option and at any time, withhold progress payment(s) or retain from any amounts due the Contractor sums sufficient to cover for one (1) or more of the following reasons:
 1. Stop-Payment Notice Claims filed pursuant to the Civil and Labor Code.
 2. Contractor has failed to comply with State law prompt payment requirements with regard to payments to Subcontractors.
 3. Third-party claims have been filed or there is reasonable evidence indicating probable filing of these claims.
 4. Liquidated Damages due or expected.
 5. The Contract sum has been reduced by Change Orders.
 6. Damage has occurred to the District or to another Contractor.
 7. The Engineer determines that:
 - a. the Work cannot be completed for the unpaid balance of the Contract sum;
 - b. if any Contractor's Detailed Progress Schedule forecasts inexcusable late completion, or if the District determines that the Work will not be completed within the Contract Time(s), and that the current unpaid balance and retention will not be adequate to cover actual or Liquidated Damages for the anticipated Delay;
 - c. the Contractor persistently fails to perform the Work in accordance with the Contract Documents;
 - d. the Contractor fails to submit timely Change Order cost proposal breakdowns and documentation in accordance with the Contract Documents;

- e. the Contractor fails to timely submit the Preliminary Progress Schedules, or Detailed Progress Schedules, or any updates or revisions to those submittals, and reports in accordance with the Contract Documents;
- f. the Contractor fails to maintain detailed, timely, updated as-built documents or closeout items;
- g. the Contractor fails to submit certified payroll records in accordance with the Contract Documents and prevailing wage requirements;
- h. the Contractor has not submitted an approved SBE utilization report;
- i. the Contractor fails to submit a proper payment request in accordance with the Contract Documents;
- j. the Contractor fails to comply with the submittal requirements requiring rereview of the submittal;
- k. the Contractor fails to submit a fully compliant Quality Control Plan;
- l. there has been material noncompliance with the insurance requirements; or
- m. the Contractor fails to comply with any other requirements of the Contract Documents.

6.03. Final Payment

- A. As soon as practicable after completion of the Work, the Engineer shall prepare in writing and furnish to the Contractor the final estimate of the quantities of Work done and all payments due as part of the Contract; this estimate will show deductions for prior payments and any other amounts to be retained or withheld as part of the Contract. The amount determined due, less the amount retained and/or withheld, shall be paid.
- B. The retained amount will not be due or payable until 35 days after the filing of the Notice of Completion of Contract and Acceptance of Work, subject to any withholds required by law or by the Contract.
- C. Prior to release of the retained amount, the Contractor shall furnish the District with a release of all Claims by the Contractor against the District arising by virtue of this Contract. The release of Claims may include disputed Contract Claims in stated amounts as the Contractor may specifically exclude from the operation of the release pursuant to acceptance of Final Payment.

Measurement and Payment

Section 6

Tesla Update 1 received 6/23/09			Schedule of Values Detail - Chris Saldon				07-Jul-09 13:19		
Cost Account ID#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Budgeted Total Cost	Actual Total Cost	Cost % Complete
Total			609.5d	21-Oct-08 A	16-Dec-11	139.5d	\$81,420,562.00	\$15,965,462.65	19.61%
1.A.1.1			17.0d	10-Nov-08 A	10-Dec-08 A		\$1,120,000.00	\$1,120,000.00	100%
1.A.1.1	P101040130	30% DESIGN	15.0d	10-Nov-08 A	10-Dec-08 A		\$1,120,000.00	\$1,120,000.00	100%
1.A.1.2			30.0d	11-Dec-08 A	23-Feb-09 A		\$2,140,000.00	\$2,140,000.00	100%
1.A.1.2	P101040150	60% DESIGN	30.0d	11-Dec-08 A	23-Feb-09 A		\$2,140,000.00	\$2,140,000.00	100%
1.A.1.3			87.1d	11-Dec-08 A	28-May-09 A		\$1,240,000.00	\$878,500.00	70.85%
1.A.1.3	P101040160	SITE CIVIL DESIGN 90%	30.0d	11-Dec-08 A	23-Feb-09 A		\$0.00	\$0.00	0%
1.A.1.3	P101040190	ARCHITECTURAL 90%	30.0d	11-Dec-08 A	23-Feb-09 A		\$0.00	\$0.00	0%
1.A.1.3	P101040250	90% DESIGN	48.0d	24-Feb-09 A	28-May-09 A		\$1,240,000.00	\$878,500.00	70.85%
1.A.1.4			30.0d	10-Nov-08 A	19-Dec-08 A		\$100,000.00	\$82,190.23	82.19%
1.A.1.4	P101040100	ONSITE GEOTECHNICAL INVESTIG...	28.0d	10-Nov-08 A	19-Dec-08 A		\$100,000.00	\$82,190.23	82.19%
1.A.1.5			17.0d	10-Nov-08 A	28-Nov-08 A		\$25,000.00	\$25,000.00	100%
1.A.1.5	P101040110	POTHOLE RESULTS & SITE SURVE...	15.0d	10-Nov-08 A	28-Nov-08 A		\$25,000.00	\$25,000.00	100%
1.A.2.1			83.0d	01-Jun-09	26-Aug-09	253.0d	\$2,624,000.00	\$0.00	0%
1.A.2.1	2A01040100	100% DESIGN	35.0d	01-Jun-09	20-Jul-09	48.0d	\$2,500,000.00	\$0.00	0%
1.A.2.1	2A01040120	ADDRESS REVIEW COMMENTS & ...	5.0d	20-Aug-09	26-Aug-09	244.0d	\$324,000.00	\$0.00	0%
1.B.1.1			328.0d	21-Oct-08 A	30-Nov-09	9.0d	\$2,217,000.00	\$2,155,000.00	49.3%
1.B.1.1	SU02574100	SUBMIT STEEL PIPE & FABRICATE...	0.0d	21-Oct-08 A			\$1,000.00	\$1,000.00	0.05%
1.B.1.1	SU02574110	SUBMIT STEEL PIPE FABRICATION...	5.0d	03-Dec-08 A	17-Dec-08 A		\$1,000.00	\$972.00	97.2%
1.B.1.1	PR02574100	PROCURE 144" & 84" HEADERS (S...	115.0d	06-Nov-08 A	18-Jun-09	10.0d	\$959,481.00	\$932,596.00	97.2%
1.B.1.1	PR02574110	PROCURE 120" & 144" PIPE (S.D. - ...	149.0d	06-Nov-08 A	29-Sep-09	4.0d	\$491,674.00	\$477,907.13	97.2%
1.B.1.1	PR02574120	PROCURE INLET & OUTLET TIE-IN...	231.0d	06-Nov-08 A	30-Nov-09	9.0d	\$296,578.00	\$288,245.78	97.19%
1.B.1.1	PR02574130	PROCURE 48" BRANCH PIPING (S...	110.0d	06-Nov-08 A	18-Jun-09	36.0d	\$467,287.00	\$454,279.00	97.22%
1.B.1.10			0.0d	10-Nov-08 A	10-Nov-08 A		\$2,594,444.00	\$1,026,157.00	39.55%
1.B.1.10	P101040120	BONDS & INSURANCE	0.0d	10-Nov-08 A			\$2,594,444.00	\$1,026,157.00	39.55%
1.B.1.2			253.0d	03-Nov-08 A	30-Sep-09	8.5d	\$757,077.00	\$757,077.00	100%
1.B.1.2	SU15100100	SUBMIT 84" & 144" VALVES (S.D. - ...	5.0d	03-Nov-08 A	12-Nov-08 A		\$1,000.00	\$1,000.00	100%
1.B.1.2	PR15100100	PROCURE 84" VALVES (S.D. - REQ...	149.0d	06-Jan-09 A	29-Sep-09	4.0d	\$251,773.00	\$251,773.00	100%
1.B.1.2	PR15100110	PROCURE 144" VALVES (S.D. - RE...	185.0d	25-Nov-08 A	30-Sep-09	8.5d	\$504,304.00	\$504,304.00	100%
1.B.1.3			202.0d	10-Dec-08 A	15-Jan-10	0.8d	\$1,102,273.00	\$1,051,281.00	95.37%
1.B.1.3	SU15100110	SUBMIT DaZURIK VALVES (S.D. - R...	5.0d	10-Dec-08 A	15-Dec-08 A		\$1,000.00	\$1,000.00	100%
1.B.1.3	PR15100120	PROCURE 48" DaZURIK VALVES (S...	150.0d	02-Mar-09 A	15-Jan-10	-25.4d	\$550,636.00	\$525,306.74	95.4%
1.B.1.3	PR15100130	PROCURE 90", 78", 66" & 60" DaZUR...	158.0d	02-Mar-09 A	21-Aug-09	100.5d	\$550,637.00	\$524,974.26	95.34%
1.B.1.4			265.0d	13-Mar-09 A	05-Apr-10	67.0d	\$307,500.00	\$0.00	0%
1.B.1.4	SU11298100	SUBMIT CO2 SYSTEM	10.0d	13-Mar-09 A	08-Oct-09	65.0d	\$1,000.00	\$0.00	0%
1.B.1.4	PR11298100	PROCURE CO2 SYSTEM	110.0d	26-Oct-09	05-Apr-10	65.0d	\$306,500.00	\$0.00	0%
1.B.1.5			102.0d	29-Sep-09	18-Feb-10	44.5d	\$109,680.00	\$0.00	0%
1.B.1.5	SU11241100	SUBMIT CHEMICAL TANKS	5.0d	29-Sep-09	08-Oct-09	44.5d	\$1,000.00	\$0.00	0%
1.B.1.5	PR11241100	PROCURE CHEMICAL TANKS	80.0d	21-Oct-09	18-Feb-10	44.5d	\$108,680.00	\$0.00	0%
1.B.1.6			244.0d	01-Jun-09	06-May-10	49.0d	\$1,289,069.00	\$184,500.00	14.31%
1.B.1.6	SU15280100	SUBMIT EMERGENCY GENERATO...	5.0d	01-Jun-09	05-Jun-09	47.0d	\$1,000.00	\$1,000.00	100%
1.B.1.6	PR15280100	PROCURE EMERGENCY GENERAT...	220.0d	23-Jun-09	06-May-10	47.0d	\$1,288,069.00	\$183,500.00	14.25%
1.B.1.7			269.0d	23-Dec-08 A	15-Jan-10	-27.4d	\$75,605.00	\$75,605.00	100%
1.B.1.7	SU13420100	SUBMIT 48-IN MAG METERS (S.D. - ...	5.0d	23-Dec-08 A	28-Dec-08 A		\$1,000.00	\$1,000.00	100%
1.B.1.7	PR13420100	PROCURE 48-IN MAG METERS (S.D...	200.0d	19-Jan-09 A	15-Jan-10	-25.4d	\$74,605.00	\$74,605.00	100%
1.B.1.8			117.0d	11-Sep-09	23-Feb-10	53.5d	\$128,825.00	\$0.00	0%
1.B.1.8	SU11240100	SUBMIT CHEMICAL METERING PU...	5.0d	11-Sep-09	18-Sep-09	53.5d	\$1,000.00	\$0.00	0%
1.B.1.8	PR11240100	PROCURE CHEMICAL METERING P...	95.0d	05-Oct-09	23-Feb-10	53.5d	\$127,825.00	\$0.00	0%
1.B.1.9			143.0d	06-Aug-09	23-Feb-10	53.5d	\$15,750.00	\$0.00	0%
1.B.1.9	SU11247100	SUBMIT CHEMICAL TRANSFER PU...	5.0d	06-Aug-09	13-Aug-09	53.5d	\$1,000.00	\$0.00	0%
1.B.1.9	PR11247100	PROCURE CHEMICAL TRANSFER P...	120.0d	28-Aug-09	23-Feb-10	53.5d	\$14,750.00	\$0.00	0%
1.B.2.1.1			357.5d	21-Apr-09 A	03-Nov-10	38.5d	\$1,289,346.00	\$99,175.00	7.81%
1.B.2.1.1	SW02900100	PLANT TREES & TEMP IRR. SYSTEM	15.0d	06-Oct-10	27-Oct-10	34.5d	\$90,000.00	\$0.00	0%
1.B.2.1.1	SW02900110	HYDROSEED	4.0d	27-Oct-10	03-Nov-10	34.5d	\$16,000.00	\$0.00	0%
1.B.2.1.1	SW02200110	PREP ROAD SUBGRADE	10.0d	20-Jul-10	03-Aug-10	34.5d	\$155,000.00	\$0.00	0%
1.B.2.1.1	SW02520100	CONSTRUCT ROADS TO TOP OF S...	15.0d	17-Aug-10	08-Sep-10	54.5d	\$167,500.00	\$0.00	0%
1.B.2.1.1	SW02770100	CURBS & GUTTERS	15.0d	03-Aug-10	24-Aug-10	54.5d	\$87,448.00	\$0.00	0%
1.B.2.1.1	SW02510110	PAVE ROADS	10.0d	31-Aug-10	15-Sep-10	68.5d	\$161,331.75	\$0.00	0%
1.B.2.1.1	SW01500120	RELOCATE DSL LINE (S.D. - REQU...	15.0d	21-Apr-09 A	11-May-09 A		\$14,900.00	\$14,900.00	100%
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TABLE 6-1. SCHEDULE OF VALUES SAMPLE

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SECTION 7. SUBMITTAL MANAGEMENT

7.01. Submittal Requirements

- A. This Article includes requirements and procedures for preparing and submitting submittals and other information required by the Contract Documents.
- B. Drawings listed in the Specifications shall be supplemented by the Contractor with the submittals required throughout the Contract Documents for the prosecution of the Work and for approval of Equipment. Submittals may include shop detail Drawings, fabrication Drawings, falsework and formwork Drawings, pipe layouts, and similar classes of Drawings, calculations, specifications, product data, samples, manuals, spare parts, photographs, survey data, schedules, or similar items required to be submitted to the Engineer by the Contract Documents.
- C. These submittals shall be favorably reviewed by the Engineer before any Work involving these submittals is performed. No change shall be made by the Contractor to any submittal after it has been favorably reviewed by the Engineer.
- D. Submittals shall contain all required, detailed information at a reasonable scale with enough views to clearly show the Work to be done or the item to be furnished and shall be properly checked.

7.02. Master Submittal List

- A. Within 30 Days of the First Chargeable Day of the Contract as specified in the NTP and monthly thereafter, the Contractor shall submit an electronic copy of the Master Submittal List to the Engineer. This list shall be in Microsoft Excel spreadsheet format and shall identify all originally planned submittals. The purpose of this list is to assist in planning for submittal creation and review and to provide a monthly update of submittal review status. Items on this list shall be sorted by Specifications Number and shall include, at a minimum, the following information:
 - 1. Item number.
 - 2. Reference Specification Section number and paragraph.
 - 3. Description of submittal.
 - 4. Type of submittal (e.g., Shop Drawing, catalog, sample, certificate, test data, manual, other).
 - 5. Original preparer of the submittal to include preparer's name, firm name, telephone number, and email address.
 - 6. Estimated date for submission to the Engineer by the Contractor. Dates shall be coordinated with the Contractor's Progress Schedules to ensure sufficient time is allowed for processing submittals and for procurement of

Material prior to the start of a construction activity. The Contractor shall include submittals as activities in the Detailed Progress Schedules.

7. Actual date sent by the Contractor to the District.
 8. Actual date returned by the District to the Contractor.
 9. Submittal status.
- B. The Contractor shall identify in the master submittal list the submittals that may require long-lead times for manufacturing and/or for delivery and that must be submitted early to the Engineer for review.

7.03. Timing of Submittals

- A. The Contractor shall make submittals promptly in accordance with the accepted Detailed Progress Schedules and in such sequence as to cause no Delay in the Work. The time allowed by the Contractor for submittal review shall also provide sufficient time for disapproval and resubmission.
- B. The sequence of submission of submittals shall be such that all information is available to the Engineer for review of each submittal as it is received. The Contractor is responsible for furnishing submittals in sufficient time for approval action, including resubmittal, without delaying construction.

7.04. Submittal Format

- A. One (1) electronic copy and five (5) paper copies of each submittal shall be submitted.
- B. All submittals shall be clearly identified by reference to the Project name, Specification Section, Article, paragraph, Drawing number, or detail as applicable. Submittals shall be well organized, clear, and legible, and of sufficient size for clear presentation of the data. Data submitted shall describe the Materials, Equipment, or other items to be furnished, and where applicable, the system in sufficient detail to indicate full compliance with the requirements of these Contract Documents. Data shall consist of complete Materials and Equipment lists accompanied by catalog data sheets, cuts, performance curves, diagrams, or similar descriptive materials. Materials and Equipment lists shall give, in each case, the name of the manufacturer, trade name, catalog reference, size, finish, and all other pertinent data.
- C. All submittals shall be in the English language and per the customary Imperial System units of measure and weight (i.e., feet, inches, pounds, degrees in Fahrenheit, etc.). Metric units may be provided in addition to the customary Imperial System units of measure and weight.

- D. All submittals and supporting data, catalogs, schedules, etc., shall be submitted as the instruments of the Contractor, who shall be responsible for their accuracy, completeness, coordination, and conformance with the Contract Documents. These submittals may be prepared by the Contractor, Subcontractors, or Suppliers; the Contractor shall review and ascertain that submittals meet all of the requirements of the Contract Documents while conforming to structural, space, and access conditions at the point of installation prior to submission to the Engineer. Designation of Work "by others" if shown in submittals shall mean that the Work shall be the responsibility of the Contractor rather than of the Subcontractor or of the Supplier who prepared these submittals. The Contractor shall ensure that there is no conflict with other submittals. The Contractor shall ensure coordination of submittals among the related crafts and Subcontractors.
- E. If the submittals show any deviations from the Contract requirements, the Contractor shall include with the submittal a separate written description of such deviations and the reasons therefore. If any deviations from the Contract requirements are not clearly noted and prominently identified on the submittal, the review of the submittal shall not constitute acceptance of such deviations.
- F. The Contractor shall review all submittals before submitting them to the Engineer and shall certify on each transmittal letter and on each submittal that the submittal has been checked, is in compliance with the Contract Documents except as specifically noted, and that each deviation from the Contract Documents is specifically noted.
- G. Submittals shall include the following:
 - 1. A separate transmittal form shall be used for each specific item, class of Material, Equipment, and items specified in separate, discrete Specification Section or Article, for which a submittal is required. Submittal documents common to more than one (1) piece of Equipment shall be identified with all appropriate Equipment numbers. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or reviewing the group or package as a whole. The Specification Section or Article to which the submittal is related shall be indicated on the transmittal form.
 - 2. A sequential number in chronological order shall be assigned for each submittal and shall be noted on the transmittal form. Submittal numbers shall have the following format: XXX.Y, where XXX is the sequential number (001 to 999) assigned by the Contractor; and Y is the re-submittal number (0 to 9). For each item submitted, the Contractor shall include the applicable Specification number on the submittal and on the transmittal form.
 - 3. A separate written description of deviations from the Contract Documents, if any.

4. The date of submission and the dates of any previous submissions.
5. The District's name and the Project title and number.
6. Contractor identification.
7. The names of the following (as applicable):
 - a. Subcontractor
 - b. Supplier
 - c. Manufacturer
8. Identification of the product with the Specification Section or Article number, page, and paragraph(s).
9. Field dimensions clearly identified as such.
10. Relation to adjacent or critical features of the Work or Material.
11. Applicable standards (e.g., ASTM).
12. Identification of revisions on resubmittals.

7.05. Submittals to be Furnished by the Contractor**A. Shop Drawings**

1. Shop Drawings include, but are not necessarily limited to, custom prepared data (e.g., fabrication on erection/installation [working] Drawings, scheduled information, setting diagrams, actual shop work manufacturing instructions, custom templates, special wiring diagrams, coordination Drawings, individual system or Equipment inspection and test reports), including performance curves and certifications, as applicable to the Work.
2. Submittal of shop Drawings by simply annotating copies of the Contract Drawings is subject to rejection.

B. Product Data

1. Product data as specified in the individual Section or Article, includes, but is not necessarily limited to, standard, prepared data for manufactured products (sometimes referred to as catalog data or "cuts"), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliance and applicability, roughing in diagrams and templates, product photographs, standard wiring diagrams, printed performance curves and operational range diagrams, production or quality control inspection and test reports and certifications, mill reports, product

operating and maintenance instructions, recommended spare parts listing, and printed product warranties, as applicable to the Work.

C. Samples

1. Samples specified in individual Sections or Articles, include, but are not necessarily limited to, physical examples of the Work, such as sections of manufactured or fabricated work, small cuts or containers of Material, complete units of repetitively used products, color/texture/pattern swatches and range sets, specimens of coordination of visual effects, graphic symbols and units of work to be used by the Engineer or by others for independent inspection and testing, as applicable to the Work.

D. Concrete Reinforcement Submittals

1. Submittals for concrete reinforcement shall not simply be annotated copies of the Contract Drawings. New scale Drawings shall be prepared showing plans, all vertical structure elevations, sections, and details as required to clearly delineate the reinforcing to be furnished and installed. Submittals shall show and tabulate reinforcement dimensions, sizes, grades, shapes, splices, laps, splice locations, dowel lengths, and all similar information needed for construction, material takeoffs, and Engineer's review to determine compliance with the structural design. Submittals shall show reinforcement dimensioning and placement that reflect the Contractor's intended and approved concrete placement sequence.

E. Electrical and Instrumentation Equipment Submittals

1. Submittals as described herein shall be provided for all electrical and instrumentation Equipment and systems furnished as part of products and systems specified in these Specifications. These submittals shall include, but are not necessarily limited to, the following:
 - a. An Equipment list tabulating all components furnished, followed by the manufacturer's name, manufacturer's model number, and a cross-reference to its location on the submittals.
 - b. A complete conduit riser diagram and conduit schedule shall be prepared and submitted for the interconnection of all electrically powered Equipment. The riser diagram and conduit schedule shall detail conduit identification numbers as shown on the Drawings, as well as size, wires, and location. Where the riser diagram requires either more wires or larger conduits than detailed in the Drawings, the Contractor shall coordinate any required changes with the electrical Subcontractor, if any, before installation begins.
 - c. Interior and exterior panel elevation Drawings for all panels, consoles, and Equipment enclosures. The elevations shall be

drawn to scale and shall detail all Equipment in or on the panel. Nameplates, conduit access locations, mounting provisions, panel construction details, manufacturer's model number, and panel color (or color samples) shall be included.

- d. Drawings and descriptive data and brochures of each item of Equipment. Electrical characteristics and requirements, enclosure types, manufacturer, and model number shall be included. Sheets or Drawings showing more than the particular item under consideration shall have crossed out all but the description of the item for which the review is requested.
 - e. Schematics and connection diagrams. A manufacturer's standard connection diagram or schematic showing more than one (1) scheme of connection shall not be accepted unless it is clearly marked to show the intended, work specific connections; terminal numbers shall be included. A written operation theory shall be included for all complex control schemes.
2. For each instrument furnished with mechanical systems, submittals shall include an Instrumentation, Systems, and Automation Society (ISA) S20 Data Sheet and technical bulletins or brochures. The summary data sheets and the technical bulletins shall include, but shall not necessarily be limited to, the following:
- a. tag numbers per the Process and Instrumentation Drawings;
 - b. the manufacturer's model or other ordering designation;
 - c. product (item) names used on the Drawings;
 - d. physical location where installed;
 - e. input output characteristics;
 - f. range, size, and graduations as required;
 - g. physical size with dimensions and mounting details;
 - h. quantity and quality requirements for electric power, air, and/or water supply;
 - i. Materials in contact with or otherwise exposed to the process;
 - j. certified calibration and/or calibration curves where applicable; and
 - k. Detailed Instrumentation, Systems, and Automation Society (ISA) loop wiring diagrams showing requirements for each instrument that is furnished under this Section. The diagram shall identify all

device terminal points, as well as any intermediate terminal blocks. Power supplies, loop grounds, wire/cable number, etc., shall be detailed. Such loop wiring diagrams shall be prepared per ANSI/ISA S5.4. Optional items 1, 3, 4, 6, and 7 from paragraph 5.3 of S5.4 are also required. Note that the District loop numbering protocol used in these documents and required for submittals does not comply with ISA standards.

3. Submittal of motor data for acceptance shall include complete nameplate data in accordance with NEMA Standards and, in addition, the following information for motors typical of the units furnished:
 - a. Ambient temperature setting
 - b. Service factor
 - c. Efficiency at $\frac{1}{2}$, $\frac{3}{4}$, and full load
 - d. Power factor at $\frac{1}{2}$, $\frac{3}{4}$, and full load
 - e. Motor outline, dimensions, and weight
 - f. Descriptive bulletins, including full description of insulation system
 - g. Bearing design data
 - h. Special features (i.e., space heaters, temperature detectors, etc.)

7.06. Submittal Review Procedures

- A. Review of submittals has as its primary objective the completion of the Work in full conformance with the Contract Documents, unmarred by field corrections and within the construction time provided. In addition to this primary objective, submittal review as a secondary objective shall assist the Contractor in its procurement of Equipment that shall meet all requirements of the Contract Documents; shall fit the structures detailed on the Drawings; shall be completed with respect to piping, electrical, and control connections; shall have the proper functional characteristics; and shall become an integral part of a complete operating facility.
- B. For submittals that require the Engineer's review, one (1) copy shall be returned to the Contractor within 20 Days after receipt. The Contractor shall make any necessary corrections and revisions to the returned submittals and shall resubmit the submittals within 20 Days after receipt. The Contractor is responsible for furnishing submittals in sufficient time for approval action, including resubmittal without delaying construction.
- C. The Contractor shall be solely responsible for agreement and conformity of submittals with the Contract Drawings and with the Specifications. The review of submittals shall be for general conformance with the design concept and with the Contract Documents. It is expressly understood that the Engineer's review of the Contractor's submittals shall not relieve the Contractor of any responsibility for:
 1. accuracy of dimensions and details;
 2. coordinating the Work with all other associated Work and trades;
 3. selecting fabrication processes;

4. techniques of assembly;
 5. departing from details furnished by the Engineer;
 6. its obligation to meet safety requirements;
 7. its obligation to meet all other requirements of laws;
 8. compliance with the Contract requirements; and
 9. errors, including details, dimensions, and Material.
- D. Favorable review of all submittals (returned “No Exceptions Noted” “In Receipt of” or “Make Corrections as Noted”) shall apply in general design only and shall in no way relieve the Contractor of responsibility for errors or omissions contained therein. Favorable review shall not relieve the Contractor of its obligations to meet safety requirements and all other requirements of laws nor shall it constitute a Change Order authorization. Favorable review shall not constitute acceptance by the District of any responsibility for the accuracy, coordination, and completeness of the submittals or for the items of Equipment represented on the submittals, nor shall it constitute a Change Order authorization.
- E. If the Contractor submits an incomplete or disorganized submittal, the submittal shall be considered “Rejected” and shall be returned to the Contractor without review. The Engineer may, at its sole discretion, elect to provide a list of, or mark the submittal indicating some or all of, the areas that are incomplete. A complete submittal shall contain sufficient data to demonstrate that items comply with the Contract Documents; shall meet the minimum requirements for submissions cited in the Technical Specifications; and shall include any necessary revisions required for Equipment other than the first named manufacturer. The Engineer’s determination of whether a submittal is complete shall be final. The District reserves the right to return a submittal that requires coordination with another or other submittals not yet received by the District.
- F. After review by the Engineer of each of the Contractor’s submissions, the submittal shall be returned to the Contractor with actions defined as follows:
1. No Exceptions Noted: The favorable review of a submittal is subject to its compatibility with future submissions and with additional partial submissions for portions of the Work not covered in this submission. It does not constitute approval or deletion of specified or required items not shown in the partial submission. The Contractor may proceed with the Work shown in the submittal.
 2. Make Corrections As Noted: Same as 1 except that minor corrections as noted shall be made by the Contractor. The Contractor may proceed with the Work, providing corrections have been made; resubmission is not required.
 3. Revise and Resubmit: Rejected because of inconsistencies or errors that shall be resolved or corrected by the Contractor prior to subsequent resubmission. The Contractor may not proceed with the Work shown in the submittal.

4. Rejected: Submitted material does not conform to Drawings and Specifications in major respects (i.e., wrong size, model, capacity, or material). The Contractor may not proceed with the Work shown in the submittal.
5. In Receipt Of: Receipt of submittal is acknowledged by the Engineer.
- G. Resubmittals shall be processed in the same manner as first submittals. On resubmittals, the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop Drawings by use of revision triangles or other similar methods, to revisions from previous submissions. Any such revisions that are not clearly identified shall be made at the risk of the Contractor. If any such revisions are installed, all portions thereof that do not fully conform to the Contract Documents shall be corrected by the Contractor at its expense and as required by the Engineer.
- H. The favorable review of submittals (returned "No Exceptions Noted" or "Make Corrections as Noted") shall be obtained from the Engineer prior to the fabrication, delivery, and construction of items requiring submittals.
- I. All resubmittals shall be accompanied by a memorandum or letter from the Contractor that responds to each written review comment provided by the Engineer in the previous submittal. Each response shall describe the corrective action taken or reason for the Contractor's actions.
- J. The Contractor shall make a complete and acceptable submittal to the Engineer at least by the second submission. If a returned submittal is required to be resubmitted more than once due to the Contractor's failure to comply with submittal requirements, the Contractor may be charged all costs associated with rereview of the submittal. The charges may be deducted from a progress payment due, or that will become due, to the Contractor and shall be based on actual review hours recorded by the Engineer, District staff, and by the Engineer's consultants, multiplied by their actual, fully burdened labor rates.

7.07. Substitutions

- A. Substitutions are considered changes to the Contract. If Materials, Equipment, item, means, method, technique, sequence, or procedure of construction is required by the Contract Documents, the Contractor may furnish or utilize a substitute item, means, method, sequence, technique, or procedure of construction acceptable to the Engineer, unless identified as a sole/single-source item. Substitutions shall be formally submitted as a Request for Substitution. The Contractor must submit sufficient information to allow the Engineer to determine whether the substitution proposed is equivalent to that indicated or as required by the Contract Documents.
- B. The Engineer shall respond in writing to the Contractor within ten (10) Days indicating the time necessary to evaluate each proposed substitution.

- C. The Engineer shall be the sole judge in this matter. In the event the Engineer rejects the proposed items, the Contractor shall submit the Specified Items.
- D. No substitution shall be ordered, installed, or utilized without the Engineer's prior written acceptance, which shall be evidenced by either a favorably reviewed Request for Substitution, Change Order, or by a DCO. The District may require the Contractor to furnish, at the Contractor's expense, a special performance guarantee with respect to any approved substitution.
- E. The Engineer shall record time required by the Engineer, District staff, and by the Engineer's consultants to evaluate substitutions proposed by the Contractor and to make changes in the Contract Documents occasioned thereby. Regardless of whether or not the Engineer accepts a proposed substitution, the Contractor shall reimburse the District for the charges of the Engineer and for the Engineer's consultants for evaluating each proposed substitution.
- F. Cost or time impacts to other items of Work that are caused by any Contractor-initiated Request for Substitution, whether anticipated or unforeseen, shall be the responsibility of the Contractor.
- G. Request for Substitution: Submission of items that are proposed as equivalent to any other item, means, method, sequence, technique, or procedure of construction shall be evaluated in accordance with the provisions outlined below. Burden of proof as to the submitted items being equivalent to the items required by the Contract Documents is the responsibility of the Contractor.
 - 1. All provisions and evaluation criteria under Article 7.08. "Or Equal" Items, paragraph E in this Article shall apply to the proposed substitutions.
 - 2. No submission of proposed substitutions shall be accepted or considered by the Engineer prior to Contract award.
 - 3. Other additional provisions and/or criteria as deemed necessary by the Engineer.
 - 4. Substitution(s) of Specified Item(s) item, means, method, sequence, technique, or procedure of construction proposed by the Contractor may require modifications in the Project design, Project schedule, and/or in the construction sequencing. The Contractor shall identify all necessary Project modifications required for the substitution(s). Necessary Project modifications may include, but may not be limited to, electrical, instrumentation, structural, mechanical, architectural, testing, engineering costs, and other related modifications.
 - 5. The Contractor shall be responsible for all costs associated with the substitution(s), including submittal reviews and any Project redesign and modification. Contractor refusal to accept any of these costs shall be just cause for disapproval of the substitution(s).

6. If the proposed items are accepted, 50 percent of all savings shall be credited to the District. Total cost savings shall be less any design costs required for substitution(s) implementation.

7.08. "Or Equal" Items

- A. Specified Item: Materials, Equipment, product, thing, or service referenced in the Contract Documents that has been identified by one (1) or more specific brand, manufacturer, Supplier, company, catalog number, or trade name. Whenever such designations shall be deemed to be used for the purpose of facilitating the description of the Specified Item and shall be deemed to be followed by the words "Or Approved Equal," whether explicitly stated or not, unless specifically noted to the contrary, in these instances, the Contractor may presume the specific brands are the only product known to the District that meet the requirements of the Contract Documents; the Contractor may propose the provision of Materials or Equipment that are equal to the Specified Item.
- B. Equal Item: Item as referenced in these Contract Documents are those that, to the Engineer's knowledge, meet the requirements of the Contract Documents and are considered equal to the Specified Items.
- C. The Contractor shall submit sufficient data, Drawings, samples, literature, calculations, and all other information as requested by the District to demonstrate to the Engineer that the proposed items are equal to the Specified Items.
- D. Failure of the Contractor to submit the proposed Equal Item for review in the manner and time described in this Article shall be sufficient cause for rejection by the Engineer of the proposed Equal Item.
- E. The Engineer's evaluation of the submitted items proposed as being equivalent to the Specified Items is based on, but is not limited to, the following:
 1. Performance.
 2. Functionality and efficiency.
 3. Durability.
 4. Life cycle costs.
 5. Ease and economy of maintenance and operation.
 6. Construction and physical characteristics as compared to the Specified Items or as delineated in the Contract Documents.
 7. Dimensional compatibility with the Material it combined to produce a unified design system.
 8. Compatibility with products in use.

- 9. All aspects of finished appearance, including form, texture, and color, that may affect other design elements.
- 10. Impacts to Project design, construction schedule, or construction sequencing.
- F. The Engineer shall be the sole judge in this matter. In the event the Engineer rejects the proposed items, the Contractor shall submit the Specified Items.
- G. The Contractor shall submit to the Engineer, in accordance with Public Contract Code Section 3400, after Contract award, no later than 35 Days after the date of NTP, a proposal for replacing a specified item with an equal item. At the sole discretion of the Engineer, the District may give written consent to the submission of the proposed Equivalent Item after the expiration of a 35-Day time limit.

7.09. Sole/Single Source

- A. No substitution of designated Sole/Single Source items listed in the Contract Documents shall be allowed.
- B. Wherever the District has made a finding and specified in the Contract Documents that a Sole/Single Source is required for one (1) or more of the listed reasons stated in the Public Contract Code Section 3400(c), the Material or Equipment specification shall list only one (1) manufacturer, catalog number, or trade name, followed by the designation "No Equal," "No Others Acceptable," "No Alternatives Allowed," "No Other Manufacturers Accepted," and/or similar language.

SECTION 8. SAFETY AND SECURITY MANAGEMENT

8.01. Public Safety

- A. The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during the performance of the Work, except from the District's sole negligence or intentional misconduct. The Contractor's compliance with this requirement is not limited to normal working hours.
- B. At all times, the Contractor shall provide for public safety and convenience. The Contractor's operations shall be conducted so as to offer the least possible obstruction and inconvenience to the public along with the greatest safety to the public. At no time shall the Contractor have more Work underway than can be prosecuted with proper regard to these considerations to the public.
- C. At all times, the Contractor shall provide sufficient measures, such as, but not limited to, fences, barriers, barricades, railings, lights, signs, and any other warning devices and shall provide flagging and guards as are necessary to give adequate warning of any dangerous condition to the public and to reasonably and prudently provide for the greatest public safety and convenience. The Contractor shall comply with all reasonable requirements of the Engineer or public agency having jurisdiction in interpreting this subparagraph.

8.02. Accident Prevention

- A. The Contractor is hereby informed that Work on this Project could be hazardous. The Contractor shall instruct all personnel working in potentially hazardous work areas of the potential dangers and shall provide safety Equipment and instruction as is necessary to prevent injury to personnel and damage to property. Special care shall be exercised relative to Work around high-voltage wires, high-pressure gas mains, high-pressure water pipelines, and other utilities. Temporary supports, as required by the utility company, shall be provided by the Contractor to protect utility facilities.
- B. The Contractor shall strictly comply with all applicable City, County, and State Rules, Ordinances, Regulations, and Codes, including, but not limited to, CAL OSHA Labor Code Section 6300 et seq. and California Code of Regulations Title 8, Chapter 4. Nothing in these Specifications shall be construed to permit Work not conforming to governing Codes. When Contract Documents differ from governing Codes, the Contractor shall furnish and install the higher standards called for without additional charge. The Contractor shall also take, or cause to be taken, additional measures as may be necessary for the prevention of accidents.
- C. The Contractor shall maintain an accurate record of, and shall report to the Engineer in writing, exposure data and all accidents resulting in death, traumatic injury, occupational disease, or damage to property, Material, supplies, or Equipment incident to Work performed under the Contract.

- D. If the Engineer notifies the Contractor of any noncompliance with the foregoing provisions, the Contractor shall, after receipt of this notice, immediately take corrective action. If the Contractor fails or refuses to comply immediately, the matter may be referred to the proper authority. No part of the time lost due to any stop order issued by a proper authority shall be made the subject of a Claim for extension of time or for extra costs or damages by the Contractor.
- E. Compliance by Subcontractors with the provisions of this Article shall be the responsibility of the Contractor.

8.03. Explosives and Stream Pollution

- A. When the use of explosives is necessary for the prosecution of the Work, the Contractor shall not endanger life or property.
- B. The Contractor must obtain and comply with permit(s) from all regulatory agencies for the storage and use of explosives.
- C. The Contractor must obtain a permit from the California Department of Fish and Wildlife, if required, in advance of the use of underwater explosives. The Contractor shall comply with all applicable requirements of the Fish and Game Code relating to stream pollution, particularly Section 5650.

8.04. Fires

- A. The Contractor must obtain and comply with the permit(s) from all regulatory agencies, including from the Bay Area Air Quality Management District (BAAQMD) if required, for fire-related activities.

8.05. Excavation Safety Plans

- A. In accordance with Labor Code Section 6705, Miscellaneous safety Provisions, excavations five (5) feet or more in depth shall not begin until the Contractor has submitted, and the Engineer has returned indicating "In Receipt Of," the Contractor's detailed plan for worker protection from the hazards of caving ground during these excavations. The plan may be reviewed by the Engineer for completeness in accordance with Federal, State, and local regulations. The Engineer shall not be responsible for reviewing the accuracy of assumptions, data and information used, and procedures contained in the plan, or for the adequacy thereof. The plan shall show the details of the design of shoring, bracing, sloping, or other provisions to be made for worker protection during the excavations. The plan shall not allow the use of shoring, sloping, or a protective system less effective than that required by the Construction safety Orders. If the plan varies from the shoring system standards established by the Construction safety Orders, the plan (including calculations) shall be prepared, signed, and stamped by a registered Civil or Structural Engineer and by a registered Geotechnical Engineer in the State of California.

- B. These plans shall be accompanied by a copy of a Permit to Excavate that has been issued by the Division of Occupational safety and Health as required by Labor Code Section 6500 et seq.
- C. This Article shall be applicable regardless of the Contract Price(s).
- D. The Contractor's Engineer shall review the adequacy of the Contractor's work methods, Equipment, bracing, or scaffolding, or safety measures, in, on, or near the construction site.

8.06. Tunnel Construction Safety

- A. The Contractor shall comply with all applicable requirements of Labor Code Section 7950 et seq. regarding tunnel safety.
- B. The Contractor shall notify the California Division of Occupational Safety and Health and the Engineer before any initial construction may be started at any tunnels.
- C. The Contractor shall schedule a pre-job safety conference with representatives of the Division, District, employer, and employees before Work begins as required by Labor Code Section 7955. This conference shall include the employer's review of the construction plan and any special Equipment, practices, and potential safety and health problems. The Engineer shall be notified of the time and place of the conference.
- D. The District shall obtain the tunnel classification prepared by the Division of Occupational Safety and Health prior to the request for bids, whenever possible, and make it available to the Contractor. A notice of the classification and any special orders, rules, or regulations to be used in construction, remodeling, demolition, or operation of the tunnel or underground mine shall be prominently posted at the site by the Contractor.

8.07. Confined Space Program

- A. The Contractor working in or supporting work in a confined space shall have a Confined Space Program.
- B. The Contractor shall submit a copy of its confined space program document to the Engineer. The program document shall be in compliance with all requirements of California Code of Regulations Title 8, Sections 1950–1962, and other applicable confined space requirements. Entry into a confined space shall not occur until the Contractor has submitted, and the Engineer has returned, indicating "In Receipt of," the Contractor's Confined Space Program document.
- C. The Contractor shall ensure that all of its employees and Subcontractors working in or supporting Work in a confined space have received all training mandated by Cal/OSHA and meet any other Cal/OSHA requirements related to the Work. All entries into confined spaces shall be coordinated with the Engineer.

- D. The Contractor shall provide confined-space rescue services for all Work performed in a permit-required confined space and for all entrants to a permit-required confined space regardless of the entrant's employer.
- E. All employees of the Contractor or Subcontractor performing rescue services shall have received previous training, as applicable, in (i) atmospheric monitoring and ventilation; (ii) communication; (iii) emergency, self-rescue, and non-entry rescue operations; (iv) permit systems; (v) signs, symptoms, and consequences of exposure to contaminants; (vi) first aid and CPR; (vii) lockout/tagout; (viii) fall protection; (ix) electrical safety; and (x) respiratory protection.
- F. The required training as described in Paragraph E above, shall be per established industry standards (i.e., the latest version of ANSI Z117.1, Safety Requirements for Confined Spaces, American National Standards Institute); and per Cal/OSHA regulations (i.e., California Code of Regulations, Title 8, Sections 1960[b] and 5157[k].) All rescue personnel shall also have practiced making permit space rescues at least once every 12 months by means of simulated rescue operations in which they remove dummies, mannequins, or actual persons from actual permit spaces or from representative permit spaces. Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed. This training shall have taken place no more than 12 months before the Work to be performed on this Project begins.
- G. Prior to the start of Work, the Contractor or any Subcontractor performing Rescue Services, shall submit to the District for review, a Rescue Training Certification (District Form FC 1767) included at the end of this Section, if/when it becomes necessary for District staff to enter a permit required confined space.
- H. Prior to entry, the Contractor shall post the most current copy of its Rescue Training Certification form (without its attachments) at the worksite where rescue services are to be provided.
- I. The Contractor shall submit an updated Rescue Training Certification form to the Engineer prior to the performance of each rescue service event. In addition, the Contractor shall submit an updated form to include any personnel not previously identified.

8.08. Temporary Facilities

- A. Use construction hoists, elevators, scaffolds, stages, shoring, and similar temporary facilities of ample size and capacity to adequately support and move loads to which they will be subjected. Provide railings, kick plates, enclosures, safety devices, and controls required by law or regulation or for adequate protection of life and property.
- B. Staging and falsework: Temporary support (e.g., formwork, falsework, or shoring) shall be designed and constructed in accordance with Construction Safety Orders, California Code of Regulations, Title 8, Sections 1541.1 and 1717. The

falsework plan, shoring plan, and any required calculations shall be submitted, and the Engineer has returned indicating "In Receipt of," prior to commencement of any associated work on site.

- C. Warning devices and barricades: Identify and guard hazardous areas and conditions by visual warning devices, and, where necessary, by physical barriers per Cal/OSHA requirements; by the latest version of the California Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD); and by State agency permit conditions.
- D. Barricades: Place barriers at ends of excavations and along excavations to warn pedestrian and vehicle traffic of excavations. Provide barriers with flashing lights after dark. Keep barriers in place until excavations are entirely backfilled and fully compacted. Barricade excavations to prevent persons from entering excavation areas in streets, roadways, parking lots, or other public or private areas associated with the Project.
- E. Temporary enclosures: When sandblasting, spray painting, spraying of insulation, fireproofing, or other activities inconveniencing or dangerous to property or to the health of employees, District staff, or the public are in progress, the area of activity shall be enclosed adequately to contain the dust, over spray, or other hazard. In the event that there are no permanent enclosures of the area or that enclosures are incomplete or inadequate, the Contractor shall provide suitable, temporary enclosures. The Contractor shall submit to the Engineer a temporary enclosure plan for protection of open bodies of water from contamination. Temporary enclosures shall not hinder or adversely affect treatment plant operations.
- F. Above-grade protection: On multilevel structures, the Contractor shall provide safety protection that, as a minimum, shall meet the requirements of California Code of Regulations, Title 8 Industrial Relations.
- G. Fences: Enclose Work site with fencing adequate to protect the Work as necessary against acts of theft, violence, and vandalism. When entire site or part thereof is to be permanently fenced, permanent fencing may be built to serve as both permanent and temporary protection of the Work site, provided that any damaged or defaced fencing is replaced prior to final acceptance.

8.09. Injury and Illness Prevention Program

- A. Work shall not commence until the Contractor has submitted, and the Engineer has returned indicating "In Receipt of," the Contractor's Injury and Illness Prevention Program (IIPP). The IIPP shall comply with Cal/OSHA requirements California Code of Regulations, Title 8, Section 1509 (Construction), Section 3203 (General Industry), and other regulations as applicable. A copy of the program shall be available at all times at the job site. The Contractor shall designate a Safety Officer who will monitor and enforce the IIPP.

8.10. Safety and Health Program for Hazardous Waste Operations

- A. The Contractor shall comply with California Code of Regulations, Title 8, Section 5192 and shall develop and implement a written safety and health program and a site-specific safety and health plan for employees involved in Hazardous Waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards and provide for emergency response for Hazardous Waste operations. In compliance with Title 8, Section 5192, the written safety and health program shall incorporate:
 - 1. an organizational structure;
 - 2. a comprehensive work plan;
 - 3. a Site-Specific Safety and Health Plan;
 - 4. a safety and health training program;
 - 5. a medical surveillance program;
 - 6. the Contractor's standard operating procedures for safety and health; and
 - 7. any necessary interface between general program and site specific activities.

8.11. Site Safety and Health Supervisor

- A. The Contractor shall provide a site safety and health supervisor who has the responsibility and authority to develop and implement the site-specific safety and health plan and to verify compliance in accordance with California Code of Regulations.
- B. The site safety and health supervisor shall be a qualified and experienced safety and health professional whose sole duty is safety, health, environmental control, and monitoring and who shall be on site during normal working periods and available 24 hours a Day, seven (7) Days a week by telephone or by other approved means. Safety representatives from Subcontractors shall not be substituted for the Contractor's safety representative.
- C. The site safety and health supervisor shall meet, at a minimum, the following qualifications: five (5) years of construction project safety management experience on similar projects with OSHA 30-hour certified construction training or certified safety professionals (CSP) with experience in construction-related projects. The safety officer or other competent person shall maintain current training certificates in first aid and in CPR.

8.12. Site-Specific Safety and Health Plan

- A. The Contractor shall develop, implement, and verify compliance of a site-specific safety and health plan for Work on this Project.

- B. The safety and health plan shall conform to the requirements of all local, state, and federal ordinances, rules, regulations, and guidelines concerning occupational health and safety issues. It shall also include protocol to be utilized in the event unexpected Materials or substances are encountered.
- C. The safety and health plan shall consist of procedures for the protection of the Contractor's personnel, including Subcontractors, District personnel, consultants, inspectors, and Supplier personnel working with Hazardous Material and the general public from Site-specific hazards.
- D. The safety and health plan shall be prepared and signed by a Certified Industrial Hygienist (CIH). The safety and health plan shall identify the site safety and health supervisor who is responsible for the implementation of the plan.
- E. Should the types of activities and associated hazards change during the course of work, the Contractor's CIH shall amend the appropriate sections of the safety and health plan to reflect the changed site conditions. The revisions shall address the specific potential hazards to workers and to any others who will be involved in the construction that could result from exposure to the new hazard(s).
- F. The Contractor shall keep a copy of the safety and health plan at the job site at all times and shall provide a copy to all personnel working on site. All Contractor personnel performing work on site shall be required to read the safety and health plan and shall be required to sign an acknowledgment that he/she has obtained and read a copy of the safety and health plan. No worker shall be allowed to perform Work on the site until a copy of his/her signed acknowledgment has been submitted to the Engineer by the Contractor. At a minimum, the safety and health plan shall consist of the following items:
 - 1. Project Organization: To include project manager, project site safety officer, superintendent, forepersons, Subcontractors, any team leaders, and other workers and shall address their roles and responsibilities.
 - 2. Work Plan: Address anticipated Project activities and objectives of the site operations; identify performance tasks for the Project, methods, and activities for accomplishing these tasks, task hazard analysis for each task activity listed in the safety and health plan, personnel requirements, personnel training requirements, and medical monitoring requirements for site personnel.
 - 3. Site Safety Meetings: Include the frequency of the meetings, who will conduct the meetings, time of Day meetings will be held, general topics that will be covered at the meetings, and documentation protocol.
 - 4. Employee Training Assignments: Discuss the training elements and the employees who received the training.

5. Review of the Site History for Overall Hazard Characteristics: Discuss physical and health hazards, site characterization, and known and potential exposures to Hazardous Material.
6. Site Control Program: At a minimum, specify the site work zones, site personnel training requirements for each class/type of worker, site protective clothing requirements, safe working practices, and site communication.
7. Personnel Medical Monitoring Requirements: Discuss requirements for each class/type of worker to be on site and special condition hazards.
8. Personnel Protective Equipment Program: At a minimum, specify selection, personnel training requirements, Equipment storage requirements, Equipment maintenance and repair requirements, Equipment decontamination requirements, and Equipment limitations.
9. Engineering Controls: Specify additional engineering controls to be used for workplace safety, if any.
10. Monitoring: As applicable, at a minimum, specify monitoring methodology, frequency of monitoring, personnel training requirements to monitor, Equipment to be used, Equipment calibration methodology, and documentation protocol.
11. Material Handling: As applicable, specify machinery and Equipment to be used, tools to be used, containers to be used, and personnel training requirements for operators.
12. Decontamination: As applicable, specify procedures for decontamination area construction, personnel decontamination, Equipment decontamination, reinstate control, protective clothing debris control, and decontamination station personnel requirements.
13. Emergency Response Program: At a minimum, specify directions to the nearest medical facility, decontamination procedures for injured workers, and emergency Equipment available on site.
14. Spill Contamination Contingency Program: Shall include provisions for gases, liquids, and solids.
15. Sanitation Facilities: Identify availability for workers and provisions for different sexes.
16. Illumination: If used during the Project, specify the condition requirements for use, type of illumination to be provided, and illumination locations on site.

17. Confined Space Entry: Discuss personnel protective Equipment, ventilation method and Equipment, illumination method and Equipment, atmosphere testing and Equipment, safety protocol, and documentation protocol.
 18. Site Excavation: Discuss types of Equipment to be used, personnel training requirements, safety practices to be utilized, open excavation construction, and personnel entry safety.
 19. Safety Inspections: Identify scope of inspections, frequency and time of inspections, personnel qualification of inspector, and communications protocol.
- G. The Contractor shall comply with the safety and health plan. Noncompliance with the safety and health plan shall be grounds for temporary suspension of all Work. Suspension of Work for noncompliance shall not be grounds for additional time or compensation.
- H. The safety and health plan may be revised and/or amended by the Contractor and the Contractor's CIH as necessary during Work progress and as specified in these Specifications. Revisions and/or amendments to the safety and health plan shall be considered incidental to this item of Work; no additional payment shall be made.

8.13. Safety and Health Plan Implementation

- A. Providing for worker safety and personal protection is the Contractor's responsibility and shall be in accordance with the Contractor's safety and health plan. The Contractor is responsible for providing any and all training, monitoring, personal protective Equipment, protective clothing, devices, Equipment, and/or facilities necessary for ensuring worker safety as may be recommended and/or as specified in the Contractor's safety and health plan.
- B. The Contractor is responsible for ensuring that its personnel understand and comply with all site health and safety requirements specified in the safety and health plan.

8.14. Submittals

- A. This Article summarizes required safety-related submittals. This Article is not intended to be all inclusive. In addition, some submittal requirements specified below may not apply depending on the specific Work under this Contract. Contractor is solely responsible for identifying and submitting to the District and/or to appropriate authorities having jurisdiction all Submittals required by applicable laws, rules, and regulations. The Contractor shall submit at a minimum the following items:
1. Injury Illness Prevention Program (IIPP): Shall be submitted and favorably reviewed by the Engineer prior to commencement of any Work on site.

The District may review or comment on the IIPP. The District's review or comment on the IIPP does not in any way relieve the Contractor of (i) any responsibility or liability for the IIPP, and (ii) being solely, fully, and completely responsible for the safety of all persons and property at the job site.

2. Site-Specific Safety and Health Plan: Shall be submitted and favorably reviewed by the Engineer prior to commencement of any Work on site (if applicable). The District may review or comment on the safety and health plan. The District's review or comment on the plan does not in any way relieve the Contractor of (i) any responsibility or liability for the plan, and (ii) being solely, fully, and completely responsible for the safety of all persons and property at the job site.
3. Names and qualifications (résumés including education, training, experience, and certifications) for the designated site safety and health supervisor and other competent and qualified personnel to be used on the Project in support of job site safety requirements.
4. Completed Activity Hazard Analysis (AHA) or Job Hazard Analysis (JHA) submitted for all significant activities and tasks with a high-risk potential, describing the job steps, hazards associated with each job step, and the controls used to remove or minimize the associated hazards. No hazardous Work shall be allowed without an approved AHA or JHA.
5. Incident Investigation Reports: Submitted to the Engineer within 24 hours of the Project incident.
6. Project-Specific Hazardous Substances Communications Plan: Contractor shall prepare and submit plan and receive favorable review by the Engineer prior to commencement of sitework activities.
7. Safety Meeting Attendance Sheet ("Toolbox" meetings): Submitted to the Engineer within seven (7) working Days of the last working Day of the month.
8. Air Monitoring Results/Reports: Submitted to the Engineer on request (if applicable).
9. Monthly Field Project Report (including man-hours, incident/injury, and property damage reports): Submitted to the Engineer on a monthly basis within seven (7) Days of the last working Day of the month.
10. Heavy Equipment Inspection Forms: Submitted to the Engineer on request (if applicable).
11. Documentation for all Individuals Applicable to Regulatory Medical Surveillance Guidelines and HAZWOPER Training per Cal/OSHA

Requirements: Submitted to the Engineer for review prior to beginning any Work associated with these requirements (if applicable).

12. Critical Lift Plans: Submitted to the Engineer on request (if applicable).
13. Crane Inspection Certifications: Submitted to the Engineer on request (if applicable).
14. Crane Operators Certification: Submitted to the Engineer on request (if applicable).
15. Applicable employee training and required medical approval documentation in compliance with Cal/OSHA standards.
16. Copies of detailed and documented quarterly crane inspections conducted by qualified individuals (if applicable).
17. Written crane inspections submitted to the Engineer on a daily basis.

8.15. Security Requirements at Job Site

- A. The Contractor shall make adequate provision for the protection of the Work area against fire, weather, theft, and vandalism and for the protection of the public against exposure to injury. All costs arising from theft, fire, or vandalism of the construction Material and Equipment shall be borne by the Contractor.
- B. During night hours, weekends, holidays, and during other times when no Work is performed at the site, the Contractor shall provide temporary closures or enlist services of security guards to protect temporary openings.
- C. The Contractor shall not allow its staff to stay at the Project site outside of specified hours of Work.

8.16. General

- A. The Contractor shall comply with the security requirements specified herein during the entire construction duration. These requirements are not to be construed to relieve the Contractor of its responsibility for the Work as specified in Article 4.11. Contractor's Responsibility for the Work.
- B. The Contractor's personnel includes the Contractor's own staff, including, but not limited to, all tiers of Subcontractor staff, manufacturer representatives, technicians, delivery drivers, etc.

8.17. Identification and Badging

- A. All Contractor personnel who enter the Project site are required to possess and carry a valid photographic identification. A current driver's license, or identification card issued by the California Department of Motor Vehicles or by other States, or a current passport is considered valid photographic identification.

This identification shall be presented to District staff and security guards upon request. Contractor personnel without this identification shall be denied access to or shall be asked to leave the site.

- B. The District shall provide Project-specific identification badges for use by Contractor personnel. The District shall issue a photographic identification badge to each person who works at the site for more than five (5) continuous Days and generic (nonphotographic), temporary badges for Contractor personnel who work on an occasional basis (less than five [5] continuous Days).
- C. The Contractor shall submit to the Engineer for approval a list of all Contractor personnel intended to work at the site for more than five (5) continuous Days. The list shall include the name, employer, and work phone number of each person. Upon approval by the Engineer, the Contractor shall complete a District furnished identification badge application for each eligible employee and make arrangements with the Engineer to have Contractor employee photographs taken at the District for the purpose of obtaining District-furnished photographic identification badges. Approved applications and valid photographic identifications shall be required before issuance of District photographic identification badges.
- D. Planned, occasional site access. The Contractor shall plan in advance all occasional (less than five [5] continuous Days) site accesses. The Contractor shall notify the Engineer of the name and employer of the Contractor's personnel requiring occasional site access at least one (1) Day in advance of each occasional site access. After sign in, the District's security guard will issue a generic, temporary badge to the occasional visitor. The occasional visitor shall return his/her badge to the security guard upon leaving the site.
- E. Emergency or unplanned site access. For emergency or unplanned access, as determined by the Contractor and approved by the Engineer and upon notification by the District's security guard, the Contractor designee shall verify to the District's security guard the identity of the Contractor personnel requiring emergency or unplanned site access. After sign in, the District's security guard will issue a generic, temporary badge to the emergency or unplanned visitor. The emergency or unplanned visitor shall return his/her badge to the security guard upon leaving the site.
- F. The Contractor shall ensure that all Contractor personnel display their District issued photographic identification badge or generic, temporary badge in plain view at all times while on site. Any Contractor personnel who does not display his/her photographic identification badge or generic, temporary badge while on site shall be required to leave the site.
- G. Lost or missing photographic identification badges shall be reported immediately to the Engineer; a generic, temporary badge shall be issued by the District's security guard. The District shall deduct \$100 for each lost or missing photographic identification badge from the Contract amount.

- H. Lost or missing generic, temporary badges shall be reported immediately to the Engineer; a generic, temporary badge shall be issued by the District's security guard. The District shall deduct \$100 for each lost generic, temporary badge from the Contract amount.
- I. The Contractor shall maintain a list of Contractor personnel in possession of a photographic identification badge. The Contractor shall record, at a minimum, the following information: employee name, employer, work phone number, badge issuance date, date when employee ceases working at the site, and date when badge was missing, lost, or returned to the District. The Contractor shall submit updated badge lists to the Engineer on or before the fifth Day of each month. The District may deduct from the Contract amount \$200 for each badge list not submitted on time. Approved lists shall be the basis for determination of the deductions for photographic badges not returned within the allowed time limit.
- J. The Contractor shall collect and return to the District photographic identification badges from all Contractor personnel within 30 Days from the date of their employment termination or when their assignment onsite is complete. If the Contractor fails to return the badges within 30 Days of the employee's termination or assignment completion, the District shall deduct \$100 from the Contract amount for each photographic badge not returned on time.
- K. At the completion of the Project, the Contractor shall return all District-issued photographic identification badges to the District. The District shall deduct \$100 from the Contract amount for each photographic badge unreturned or returned after Project Completion.

8.18. Background Checks

- A. The District reserves the right to request and receive this information as allowed by law and as required to complete a background check on any Contractor personnel who must enter the site.
- B. The District reserves the right to deny access to the site to any person, as allowed by law.

8.19. Site Access Control

- A. The District may maintain a security checkpoint at the gate(s) and facility(ies). The security checkpoint(s) may be staffed by a District security guard during normal working hours, and at other hours, on an as-needed basis. District roving guard(s) may also patrol the property.
- B. Unless otherwise specifically required in these Specifications, the entire site perimeter, including all fences and gates, are to remain intact and functional throughout the construction period. Fences and gates that are accidentally breached by the Contractor shall be restored by the Contractor at no additional cost to the District by the end of the workday at the latest. Perimeter breaches shall be secured by the Contractor until the breaches have been closed to the

satisfaction of the Engineer. For work requiring perimeter breaches, the Contractor shall work with the Engineer to arrange appropriate measures to secure the perimeter at the Contractor's cost. The Contractor shall promptly inform the District of any accidental perimeter breaches. No unauthorized entries shall be allowed in these breaches, including deliveries and Contractor personnel.

- C. All vehicles entering the Project site are subject to search by District guards.

8.20. Mail and Postal Deliveries to the Project Site

- A. Unless an exception is granted by the Engineer, the Contractor shall not have United States Postal Service, Federal Express, UPS, or similar mail and package deliveries addressed to any District facility. Under no circumstance shall mail/packages be delivered to the reception area of any District facility.

8.21. Productivity Lost for Noncompliance With Security Measures

- A. Costs and delays incurred by the Contractor due to security measures (e.g., deliveries or personnel held at the gate without badges or identification, refusal of package deliveries, etc.) shall not be cause for additional Contract Time(s) or for additional compensation for the Contractor.
- B. Failure to comply with these security measures may lead to delay or to stop of the Work with no additional Contract Time(s) or additional compensation granted to the Contractor.

8.22. Payment

- A. Full compensation for doing all Work and furnishing all Material required to comply with site safety and security requirements as specified in these Specifications shall be considered incidental and shall be included in other items of Work; no additional payment shall be made.



Enter Company Name Here
RESCUE TRAINING CERTIFICATION
FC 1767 (01-31-14)

Contractor shall ensure that all its employees working in or supporting work in a confined space have received all training mandated by Cal-OSHA and meet other Cal-OSHA requirements related to such work.

All employees of the Contractor or subcontractor performing rescue services must have received previous training in (1) Atmospheric monitoring and ventilation; (2) Communication; (3) Emergency, self-rescue, and non-entry rescue operations; (4) Permit system; (5) Signs; (6) First aid and CPR; (7) Lockout/tagout; (8) Fall protection; (9) Electrical safety; and (10) Respirator protection.

Rescue services training must have been performed consistent with established industry standards (ANSI Z117.1, Safety Requirements for Confined Spaces, American National Standards Institute and Cal/OSHA regulations). All trained employees must have practiced making permit required confined space rescues at least once every twelve months by means of simulated rescue operations in which they remove dummies, mannequins, or actual persons from actual permit spaces or from representative permit spaces. "Representative permit spaces" must, with respect to opening size, configuration and accessibility, simulate the types of permit spaces from which a rescue could be performed. Such training shall have taken place no more than twelve months before the work to be performed on this Project begins.

With regard to employees of Contractor or any subcontractor performing rescue services, prior to the start of work, Contractor shall submit for review and acceptance by the District all of the following information in the spaces designated below: a certification with the respective employee's name, the name(s) of the trainers, the dates of training, the dates of all rescue practice sessions, and brief descriptions of the rescue practice sessions. Copies of all written materials provided during the training courses or rescue practice sessions shall be attached to this form. Prior to entry, the Contractor shall post copies of such certifications (without their attachments) at the worksite where rescue services are to be provided.

EMPLOYEE'S NAME	DATE OF LAST INCLUSIVE TRAINING (1, 2, 3, 4, 5, 6, 7, 8, 9, 10)	DATE OF LAST PRACTICE RESCUE SESSION (ANNUAL)	TRAINER NAME/COMPANY	DESCRIPTION OF THE RESCUE PRACTICE SESSION (BRIEF)	COPIES OF ALL WRITTEN MATERIAL PROVIDED DURING THE TRAINING COURSES OR RESCUE PRACTICE SESSIONS
1					☐ Yes ☐ No
2					☐ Yes ☐ No
3					☐ Yes ☐ No
4					☐ Yes ☐ No
5					☐ Yes ☐ No
6					☐ Yes ☐ No
7					☐ Yes ☐ No
8					☐ Yes ☐ No
9					☐ Yes ☐ No
10					☐ Yes ☐ No

PREPARED BY _____ PHONE NO. _____ E-MAIL ADDRESS _____

I Certify that the information provided is true and correct.

SIGNATURE _____ PRINT NAME _____ TITLE _____
DATE PREPARED _____ COMPANY ADDRESS _____

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SECTION 9. QUALITY MANAGEMENT

9.01. General Quality Requirements

- A. This Section includes Quality Control (QC) requirements and procedures for Materials, products, Equipment, and workmanship; inspection procedures and limitations; sampling and testing of Materials; and Contractor's Quality Assurance/Quality Control (QA/QC) program.
- B. The Contractor shall provide and use Construction Equipment and plants capable of producing the quality and quantity of Work required. Construction Equipment shall be identified by readily visible numbers. If Ordered, the Contractor shall remove unsatisfactory Construction Equipment and discontinue the operation of unsatisfactory plants.

9.02. District Quality and Environmental Policy Training

- A. The following training requirements are minimum requirements. This training is required as part of the District's Quality and Environmental Management System (QEMS). Additional training may be required in accordance with the Special Provisions for environmentally sensitive Projects.
- B. The following applies to all Contractor and Subcontractor Project personnel:
 - 1. The Contractor is hereby informed that all supervisory-level personnel must attend QEMS training before Work begins on the Project site. All other Contractor personnel must attend QEMS training within seven (7) Days of beginning Work on the Project site.
 - 2. QEMS training will be administered by the District and will include one (1) 30-minute training session for all staff. It may be necessary to conduct training at the District's headquarters building. All personnel shall sign an acknowledgement that they have attended the subject training.
 - 3. Upon completion of training, personnel will be provided with a QEMS training sticker to be placed on their hard hats. The District may require training on an annual basis.

9.03. Contractor's Quality Control Program

- A. The Contractor's Quality Control (QC) program is the successful and systematic execution of a realistic plan to certify that required standards of quality design and construction are met and to preclude problems resulting from poor quality or lack of quality. In performing its QC function, the Contractor develops procedures to manage and control its Material, Equipment, personnel, and work so that the completed Work complies with the Contract requirements. The Contractor, in building to the quality standards in the Contract Documents, controls the quality of the Work.

- B. The Contractor shall establish and execute a QC program for services that are procured by the Contractor. The program shall provide the Contractor with adequate measures for verification of and conformance to defined Contract requirements by the Contractor's personnel and lower-tier Subcontractors (including fabricators, Suppliers, and Subcontractors).
- C. When required, as stated in the Special Provisions the Contractor shall submit to the Engineer a Project-specific QC plan. The QC plan shall contain a comprehensive account of the Contractor's QC procedures as applicable to this Work. Detailed requirements for this QC plan are delineated in the following paragraphs. The Engineer's review of the Contractor's QC plan shall not relieve the Contractor from any of its obligations for performing the Work. No Work shall start until the Contractor's QC plan has been favorably reviewed by the Engineer. No payments shall be made to the Contractor until the QC plan is favorably reviewed by the Engineer.
- D. The QC Plan shall demonstrate that it has qualified QC personnel who meet or exceed the requirements of Special Provisions Article 20.04.02. Contractor's Quality Staffing Requirements. The QC plan shall identify the independent testing firms to be used in accordance with Article 9.09. Testing.
- E. The Contractor's QC program shall ensure the achievement of adequate quality throughout all applicable areas of the Contract. The QC plan shall describe the program and include procedures, work instructions, and records. In addition, the Plan shall describe methods relating to areas that require special testing and procedures as noted in the Specifications.
- F. Identification and Control of Items and Material: Procedures to ensure that items or Material that have been accepted at the site are properly used and installed shall be described in the QC plan. The procedures shall provide for proper identification and storage and prevent the use of incorrect or defective Material.
- G. Inspection and Tests: The Contractor shall have written procedures and checklists defining a program for control of inspections performed; these procedures and checklists shall be described in the QC plan. Procedures shall include specific instructions for observing all Work in process and for comparing this Work with the Contract requirements (organized by Specification section), precluding the covering of deficient or rejected Work, halting or rejecting Work, and resolving differences between the Field QC Representative(s) and the production representative(s).
- H. A complete matrix listing all operational, performance, and QC tests and inspections required in the Contract Documents: Each entry in the matrix shall include the Specification Section and paragraph; test/inspection description;

procedure used; on/off site; test frequency and acceptance criteria; and testing firm conducting each test. Below is a sample showing one (1) particular test:

Test and Inspection Plan Table

Spec Section	Test/Inspection Description	Procedure Used	On/Off site	Frequency	Acceptance Criteria	Conducted by	Documentation /Report	Notes
15453.3.04.B	Hydraulic Pressure Test	15453.3.04.B	On	After leak test, 2 hours	30 ft	John Smith	Hydro-test Report	

- I. The QC plan shall identify all contractual hold/inspection points, as well as any Contractor-imposed hold/inspections points.
- J. The QC plan shall include procedures to provide verification and control of all testing provided by the Contractor.
- K. Supplier Quality Control (SQC): The QC plan shall include procedures to ensure that procured products and services conform to the requirements of the Specifications. This plan shall include periodic visits to the place of manufacture by the Contractor to perform QA activities. The District shall be notified of all such SQC visits a minimum of two (2) weeks in advance in case it elects to attend the visit. Requirements of these procedures shall be applied as appropriate to lower-tier Suppliers and/or to Subcontractors.
- L. Deficient and Nonconforming Work and Corrective Action: The QC plan shall include procedures for handling deficiencies and non-conformances. Deficiencies and non-conformances are defined as documentation, Drawings, Material, Equipment, or Work not conforming to the contractually specified requirements or procedures. The procedures shall prevent non-conformances by identification, documentation, evaluation, separation, disposition, and corrective action to prevent recurrence. Conditions having adverse effects on quality shall be promptly identified and reported to the Contractor's senior-level management and to the Engineer. The cause of conditions adverse to quality shall be determined and documented and measures implemented to prevent recurrence. In addition, at a minimum, this procedure shall address:
 1. Personnel responsible for identifying deficient and non-complying items within the Work.
 2. The manner/process and the name of personnel by which deficient and noncompliant items are documented "in the field."
 3. The personnel and process utilized for logging deficient and noncompliant work into a deficiency log at the end of each Day.
 4. Tracking processes and documentation for deficient and noncompliant items.
 5. Personnel responsible for achieving resolution of outstanding deficiencies.

- 6. Once resolved, the manner/process by which the resolutions are documented and by whom.
- M. Special Processes and Personnel Qualifications
 - 1. The QC plan shall include detailed procedures for the performance and control of special processes (e.g., welding, soldering, heat treating, cleaning, plating, nondestructive examination, etc.).
 - 2. Personnel performing special process tasks shall have experience, training, and certifications commensurate with the scope, complexity, or nature of the activity. The Contractor shall submit personnel qualifications information to the Engineer before the start of Work on the Project.
- N. The Contractor's QC staffing is subject to the Engineer's continued review. The Engineer, at its sole option and without cause, may direct the Contractor to remove and replace the Field QC Representative.
- O. Audits: The Contractor's QC program shall provide for documented audits on a quarterly basis to verify that QC procedures are being fully implemented by the Contractor as well as by its Subcontractors and Suppliers. Audit records shall be submitted to the Engineer within five (5) business days after an audit.
- P. The Engineer may perform independent QA audits to verify that actions specified in the Contractor's QC plan have been implemented. No Engineer audit finding or report shall in any way relieve the Contractor from any requirements of this Contract.

9.04. Quality Coordination Meetings

- A. The Contractor shall provide, at a minimum, five (5) working days' advance notice and shall participate in the following three (3) QC coordination meetings. Minutes for each meeting shall be prepared by the Contractor's Field QC Manager and submitted to the Engineer. The meetings shall be mentioned in the Contractor's daily inspection report with the minutes attached:
 - 1. Pre-submittal Conference
 - a. Prior to the Contractor's submittal of the QC plan, the Field QC Manager, its Superintendent, and other relevant personnel shall convene a QC coordination conference with the Engineer to review and discuss the QC plan. During the conference, mutual understanding of the QC plan requirements should be developed.
 - 2. Preparatory Meeting
 - a. Thirty (30) Days prior to beginning Work on each Definable Feature of Work (e.g., ceramic tile, fencing and gates, masonry, rough-in electrical, etc.), the Contractor's Field QC Manager,

Superintendent, other Contractor QC personnel (as applicable), and the foreman responsible for the Definable Feature of Work shall meet with the District Engineer. The meeting shall cover the following agenda, with minutes documented by the Contractor's Field QC Manager.

- (1) Review the Contract Plans and Specifications.
- (2) Review reference Codes and Standards.
- (3) Confirm that all required submittals have been approved.
- (4) Review relevant RFIs, field memos, and changes to the design of the Definable Feature of Work.
- (5) Review QC requirements for the Work, including inspection, testing, and acceptance and tolerance requirements.
- (6) Review critical installation procedures and quality compliance.
- (7) Examine Work area to assure that all required predecessor Work has been completed, that all required deficiencies have been corrected and approved, and that all documented, remaining deficiencies shall not impair the construction of the planned Definable Feature of Work.
- (8) Check availability of required resource and Equipment to perform the Work.
- (9) Review Activity Hazards to address safety precautions.
- (10) Determine commencement of the initial meeting.

3. Initial Meeting

- a. One (1) workday before the beginning of construction of a Definable Feature of Work, the Contractor's Field QC Manager, Superintendent, other CQC personnel (as applicable), and the foreman responsible for the Definable Feature of Work shall meet with the Engineer. The meeting shall cover the following agenda, with Minutes documented by the Contractor's Field QC Manager.
 - (1) Review minutes of the preparatory meeting.
 - (2) Verify specified Material and Equipment is on site.
 - (3) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards.

- (4) Compare with required samples and mockups as appropriate.
- (5) Verify adequacy of QC for the Work, including availability of test Equipment.
- (6) Resolve all differences.
- (7) Indicate exact location of initial phase in the minutes for future reference and comparison with follow-up phases.
- (8) Repeat the initial phase for each new crew to work on site or any time accepted or specified quality standards are not met.

9.05. Documented Quality Control Records

- A. The Contractor shall establish control methods of Contract Documents that describe how Drawings and Specifications are received and distributed to assure the correct issue of the document is being used. The methods shall also describe how as-built data are documented and furnished to the Engineer.
- B. The Contractor shall maintain evidence of activities affecting quality, including operating logs, records of inspections and tests, audit reports, Material analyses, personnel qualification and certification records, procedures, and document review records.
- C. Quality records shall be maintained in a manner that provides for timely retrieval, and traceability. Quality records shall be protected from deterioration, damage, and destruction.
- D. The Contractor shall provide a list of QC records as specified in the Contract Documents that will be furnished to the Engineer at the completion of activities.

9.06. Inspection and Daily Reports**9.06.01. Inspection**

- A. The Contractor shall utilize qualified individuals to perform and document inspections and tests. At a minimum, "qualified" shall mean having performed similar QC functions on similar-type projects. Records of personnel experience, training, and qualifications shall be maintained and made available for review by the Engineer upon request.
- B. The Engineer shall at all times have access to the Work during its construction and shall be furnished with every reasonable facility for ascertaining that the Material and the quality of performance are in accordance with the requirements and intentions of the Drawings and Specifications. All Work done shall be subject to the Engineer's inspection as well as by external parties.

- C. The day-to-day inspection performed by the various inspectors employed by the District shall not constitute approval or ratification of Work improperly done by the Contractor. The Engineer is the only person authorized to recommend Acceptance of Work and Material.
- D. The presence or absence of an inspector during performance of the work shall not relieve the Contractor of any obligation to fulfill the Contract. It shall be the duty of the Contractor to see that all provisions are complied with in detail, irrespective of the inspection given the Work during its progress by the Engineer or by representatives of the Engineer. The District and the Engineer shall assume no responsibility for any plan or method suggested to the Contractor by the Engineer or by an inspector that is not specified or required. Any such suggestion shall be used at the risk and responsibility of the Contractor.
- E. Inspection does not waive or alter the requirements or provisions of the Contract Documents. Inspection of the work or receipt of payment shall not relieve the Contractor of its obligation to fulfill all conditions of the Contract; improper work shall be subject to rejection.
- F. No portion of any work, installed material, products, or equipment shall be covered or concealed in any manner without first being inspected by the Engineer. Whenever the Contractor is ready to backfill, bury, cast in concrete, hide, or otherwise cover any Work under this Contract, the Contractor shall notify the Engineer not less than one (1) Work Day in advance to request inspection before beginning any such work of covering. Failure of the Contractor to notify the Engineer at least one (1) Work Day in advance of any such inspections shall be reasonable cause for the Engineer to order a sufficient delay in the Contractor's schedule to allow time for such inspection. If any Work, Material, products, or Equipment is covered prior to inspection or prior to the express approval of the Engineer, that Work, Material, products, or Equipment shall be uncovered at no additional cost to the District. All associated costs, including its impact on other portions of the Work, shall be borne by the Contractor.
- G. The Contractor shall not conceal any part of the Work until record Drawing information has been taken and recorded by the Contractor.
- H. Should it be considered necessary or advisable by the District at any time before acceptance of the entire Work to make an examination of Work already completed by removing or tearing out same, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and Material. If such Work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or of Subcontractors, the Contractor shall defray all of the expenses of this examination and of satisfactory reconstruction. If, however, the Work is found to meet the requirements of the Contract, an equitable adjustment shall be made in the Contract Price(s) to compensate the Contractor for the additional services involved in the examination and reconstruction, and if completion of the Work has been delayed thereby, the Contractor shall, in addition, be granted a suitable extension of time.

- I. Work, Material, products, and Equipment not conforming to the Contract Documents shall be considered defective and shall be corrected or removed and replaced with conforming Work, Material, products, and Equipment at no additional cost to the District.

9.06.02. Daily Inspection Reports

- A. The Contractor is required to submit a daily QC inspection report providing factual evidence that required QC activities and/or tests have been performed. These records shall include the Work of Subcontractors and Suppliers and shall be on a form acceptable by the Engineer. Reports shall be made available at the end of each Work Day or no later than prior to the beginning of the next Work Day. Such reports shall, at a minimum, include the following:
 1. Item(s) inspected.
 2. Quality characteristics in compliance.
 3. Quality characteristics not in compliance.
 4. Corrective/remedial actions taken.
 5. Statement of certification.
 6. Field QC Representative's signature.
 7. Contractor/Subcontractor and its/their area of responsibility.
 8. Test and/or control activities performed with results and references to Specification/Drawing requirements.
 9. Test reports as attachments.
 10. Contractor's completed QC checklists, where applicable.
 11. Records of any SQC reports performed off site as an attachment.
 12. Any Noncompliance Notices (NCN) issued.
 - a. An NCN shall be issued to document defective Work.
 - b. Corrective Action Reports (CAR) shall be completed to close out an NCN. An NCN may not be closed until the CAR is accepted by the Engineer.
 - c. A log of the NCN and the corresponding CAR shall be published at the end of each month.

13. A Contractor's verification statement stating that each daily report is a complete, true, and accurate account of that Day's construction activity.
 - a. These records in report form shall be prepared daily. The records shall be available in the field within 24 hours after the date covered by the report for review by the Engineer; all reports for that week shall be submitted weekly to the Engineer.
 - b. Reports need not be submitted for Days on which no Work is performed. At a minimum, one (1) report shall be prepared and submitted for every seven (7) Days of no Work and on the last Day of a no-Work period. All Days shall be accounted for throughout the life of the Contract. The first report following a Day of no Work shall be for that Day only.
 - c. Reports shall be signed and dated by the Contractor Field QC Manager. The report from the Contractor Field QC Manager shall include copies of reports prepared by all subordinate QC personnel.

9.07. Plant Inspection

- A. Material and Equipment that become a part of the completed Work shall be subject to inspection at the place of production or manufacture, at the shipping point, or at the site of the Work. Material and Equipment requiring inspection at the place of production or manufacture shall be designated by the Engineer. Where plant inspection is so designated, the Engineer shall be given a 14-Day advance notice of the start of manufacture or of production. For international locations and sites outside of the continental United States, a minimum notification of 30 working Days shall be provided. The Contractor's purchase orders for Material and Equipment, for which plant inspection has been designated by the Engineer, shall bear a suitable notation advising Suppliers and Subcontractors of inspection requirements.
- B. If the required notification is not given, the District shall schedule the inspection at its convenience, and the activity to be witnessed shall not proceed until the Engineer arrives or until the District notifies the Contractor that it is choosing to waive its witness inspection requirement.
- C. The Engineer or an authorized representative shall have free entry at all times to such parts of the plant as concerns the manufacture or production of Material and Equipment for the District. Adequate facilities shall be furnished free of charge to make the necessary inspection.
- D. The Engineer may attend scheduled inspections of the off-site plant for Material, Equipment, or software to be incorporated into the Work. The District assumes no obligation to inspect Material or Equipment at the place of manufacture or production or at the shipping point. Unless otherwise noted in the Special

Provisions, cost for District representatives to attend off-site inspections shall be borne by the District.

- E. In the absence of the Engineer, the District may reject the processes completed to date and require the activity to be redone. Delays resulting from waiting on the witness inspection for the reasons given above shall be considered an Inexcusable Delay. Expenses incurred by Delays or repeat of the Work process shall be borne by the Contractor.
- F. Should any inspection attended by the Engineer be delayed, the Contractor shall reimburse the District for the actual salary costs of District staff, consultants, and special inspection firms multiplied by their actual, fully burdened labor rates and shall reimburse the actual cost of other direct costs incurred due to the inspection Delay.
- G. The Contractor shall provide safe passage and access for inspection of the Work in any area. Off-site storage areas and warehouse facilities are also subject to inspection.
- H. Material, products, and Equipment that are specified to require testing and inspection at the point of origin shall receive and pass such testing and inspection prior to being shipped to the Project site.

9.08. Sampling of Material

- A. The Contractor shall furnish samples of Material as specified and as requested by the Engineer at no additional cost to the District. Samples shall be obtained and tested whenever necessary to determine the quality of the Material and compliance with the Contract Documents.
- B. The Contractor shall assist the Engineer, District staff, regulatory agency personnel, and third parties in collecting or providing samples.
- C. The Contractor shall not use Material specified to be tested in the Work until such testing indicates satisfactory compliance with the Contract Documents.

9.09. Testing

- A. Unless otherwise specified, the Contractor is responsible for completing all required testing at no additional cost to the District. All tests shall be performed by independent testing firms accredited by the appropriate authority.
- B. The testing firm shall be staffed with experienced personnel, properly equipped, and fully qualified to perform the tests in accordance with the specified standards. The Contractor shall submit documentation demonstrating that the testing firm and its personnel are properly accredited by the appropriate authority.

- C. The Engineer has the right to inspect Work performed by the independent testing firm. This may include inspection of the independent testing firm's internal QA records (e.g., QA manual, equipment calibrations, proficiency sample performance, etc.).
- D. Testing shall be completed in accordance with the specified standards in effect on the date bids are due. Where no standard is specified, testing shall be completed in accordance with the applicable ASTM and/or the latest published edition of the *State of California Department of Transportation Standard Specifications and Standard Plans* and updates thereto.
- E. The Contractor shall submit copies of all manufacturer test reports performed to satisfy the applicable Material standard specification or test standard (e.g., certified mill test reports). Reports shall identify the lot of Material represented by the test. The manufacturer test reports supplement the inspection, sampling, and testing provisions otherwise required by the Contract Documents.
- F. Content of Test Reports: Inspection and test results shall be documented and evaluated to ensure that requirements have been satisfied. Individual test records shall contain the following information:
 - 1. Date and time of test.
 - 2. Item tested, item number, and item description.
 - 3. Test designation.
 - 4. Test work sheet, including location the sample was obtained.
 - 5. Test results.
 - 6. Acceptance or rejection.
 - 7. Retest information, if applicable.
 - 8. Control requirements.
 - 9. Tester signature.
- G. The Contractor shall immediately inform the Engineer of all test results.
- H. Availability and Submittal of Test Reports: All test reports shall be made available to the District's representative for viewing within 24 hours and must be submitted to the Engineer within seven (7) Days after each test is completed, with the Contractor's weekly inspection reports. Each test report for each type of test shall be consecutively numbered. The Contractor shall maintain a copy of all test results on site.
- I. Control of Measuring and Test Equipment: Measuring and/or testing instruments shall be adequately maintained, calibrated, and adjusted to maintain accuracy within prescribed limits. Calibration shall be performed at specified periods against valid standards traceable to nationally recognized standards and documented.

9.10. District Quality Assurance

- A. Quality assurance (QA) involves the activities of the District that are separate from, but in coordination and cooperation with, the Contractor to monitor that the level of quality set by the Contract Documents is achieved. Through periodic review, inspections, and tests, the District monitors that the Contractor's QC is working effectively and that the end product complies with the level of quality established by the Contract.

9.10.01. Testing by the District

- A. The District may arrange for independent tests at its own cost. In such cases, the Contractor shall cooperate with the District's independent testing firm. This testing by the District shall not relieve the Contractor of its obligation to do the QC testing required under the Contract.
- B. If independent testing indicates noncompliance with the Contract Documents, any retesting shall be charged to the Contractor.
- C. Upon request, the Engineer will furnish the Contractor with copies of test results.

9.10.02. Defective Work

- A. All Work not conforming to the Contract shall be considered defective and subject to rejection by the Engineer regardless of when or where the deficiency is detected. Unless otherwise permitted by the Engineer, rejected Work shall be remedied, removed, or replaced by the Contractor in a manner acceptable to the Engineer and at no additional cost to the District.
- B. Noncompliance Notice (NCN): The Engineer may issue a NCN to the Contractor for any detected defective Work or a portion thereof.
- C. The Contractor shall provide a written response within five (5) working days after receipt of the NCN. The Contractor's response shall detail either (i) reasons it believes that the Work was performed in accordance with the Contract Documents; or (ii) the corrective action it intends to take to correct the defective Work.
- D. If the Contractor disputes issuance of the NCN, the Engineer shall respond after receipt of the dispute by either (i) withdrawing the NCN; or by (ii) directing the Contractor to correct the Work. If the Engineer directs the Contractor to correct the Work, the Contractor shall make such correction within five (5) working days after receipt of such direction from the Engineer or at such other time as may be agreed to with the Engineer.

- E. If the Contractor fails to promptly comply with any order of the Engineer to correct the defective Work, the Engineer may terminate the Contractor's right to proceed with the affected Work and cause the defective Work to be removed and replaced at the Contractor's expense.
 - 1. The District shall deduct from the Contractor's progress payment any cost it incurs in correcting the defective Work, including, but not limited to, rectifying the nonconforming Work, removing and storing salvageable Material and Equipment, discarding other Materials and Equipment, administrative costs, and all costs of repair or replacement of the Work of others.
 - 2. If the District self-performs the remediation of the Contractor's nonconforming Work, the Contractor shall also be charged for the District's overhead markup.
 - 3. If the current Contract unpaid balance and retention are insufficient to cover this amount, the Contractor shall reimburse the District.

9.11. Plumbing and Piping Quality

- A. The Contractor shall consult with industry and manufacturer representatives for all piping Material being used in the Work. The purpose of this consultation is to ensure that the Contractor's personnel are fully trained and knowledgeable, possess written instructions on proper assembly, and have all recommended tools for quality Work. Consultation shall also include discussions between industry and manufacturer representatives and Contractor management and construction staff on the causes of past plumbing and piping failures and of problems and methods of avoidance. The Contractor shall provide training for its forces as required to produce consistent, high-quality Work without failed tests and warranty problems.

9.12. Control of Materials and Equipment

- A. This Article includes general product requirements and requirements for delivery, storage, packing, loading, unloading, transportation, protection, and selection of Material and Equipment. Additional specific requirements for delivery, handling, protection, loading, and unloading may be specified within the Technical Specifications for Materials and Equipment.
- B. The Contractor shall furnish Materials and Equipment as specified. Only new Material and Equipment conforming to the requirements of the Contract shall be incorporated in the Work.

9.12.01. Source of Material and Equipment

- A. The Contractor shall furnish a list of sources of Material and Equipment to the Engineer in sufficient time to permit proper inspection and testing of Material and Equipment in advance of their use. Inspection and tests shall be made and

reports rendered. It is understood that such inspections and tests shall not be considered a guarantee of acceptance of any Material or Equipment that may be delivered later for incorporation in the Work. Any Equipment or Materials that, after has in any way become non-compliant with the Contract, shall not be used in the Work.

- B. At the option of the Engineer, the source of supply of each of the Material shall be approved before the delivery is started. All Material proposed for use may be inspected or tested at any time during their preparation and use. If it is determined that sources of supply that appeared satisfactory do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved Material from other sources.

9.12.02. Product Data and Samples

- A. The Contractor shall furnish without charge such samples as may be required.
- B. No Material or Equipment shall be delivered to the Work without prior approval of submittals by the Engineer.
- C. The Contractor shall provide products by the same manufacturer when products are of similar nature, unless otherwise specified; provide identical products when products are required in quantity; and provide products with interchangeable parts whenever possible.
- D. The Contractor shall require each Equipment manufacturer to have maintenance facilities meeting the following minimum requirements:
 - 1. Minimum three (3) years' operational experience.
 - 2. Located in the continental United States.
 - 3. Equipment and tools capable of making repairs.
 - 4. Staff qualified to make repairs.
 - 5. Inventory of maintenance spare parts.
- E. All Materials, products, and Equipment shall be new, of the specified quality, and free of defects. Where samples have been submitted, the Materials, products, and Equipment incorporated into the Work shall be equal to the samples that have been approved. Should Materials, products, and Equipment required by the Work not be specified or described on the Drawings, the Contractor shall provide Materials, products, and Equipment of high, generally accepted quality standards that are comparable to the Work and that meet the identifiable needs of the Work.

9.12.03. Transportation and Delivery

- A. The Contractor shall:
 - 1. Transport and handle items in accordance with manufacturer's instructions.

2. Schedule delivery to reduce long-term, on-site storage prior to installation and/or operation. Under no circumstances shall Equipment be delivered to the site more than one (1) month prior to installation without written authorization from the Engineer.
 3. Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged, or sensitive to deterioration.
 4. Deliver products to the site in the manufacturer's original sealed containers or other packing systems, complete with Safety Data Sheets (SDS) and instructions for handling, storing, unpacking, protecting, and installing.
- B. The Contractor may store Material and Equipment only in those locations approved by the Engineer. The Contractor is responsible for maintaining and restoring any affected areas as required by the Engineer.
- C. All items delivered to the site shall be unloaded and placed in a manner that shall not (i) impact the Contractor's normal construction operation or those of Subcontractors and other contractors; (ii) interfere with the flow of necessary traffic; and (iii) interfere with the District's normal operations and maintenance activities. In addition, the Contractor shall:
1. Provide necessary Equipment and personnel to receive, accept, and unload all items delivered to the site.
 2. Promptly inspect the shipment to assure that products comply with requirements, quantities are correct, and items are undamaged. For items furnished by others (i.e., the District, other Contractors), perform inspection in the presence of the Engineer and shall notify the Engineer verbally and in writing of any problems.

9.12.04. Storage and Protection of Material

- A. Store and protect products in accordance with the manufacturer's instructions with seals and labels intact and legible.
- B. Material and Equipment shall be stored to ensure preservation of quality and fitness for the Work. They shall be placed under cover when necessary and shall be stored in a manner that will facilitate prompt inspection.
- C. Loose granular Material shall be stored on solid, flat surfaces in a well-drained area. Mixing with foreign matter shall be prevented.
- D. Cement, lime, and similar moisture-sensitive Material shall be stored under a roof and off the ground and shall be kept dry at all times. All structural, miscellaneous, and reinforcing steel shall be stored off the ground or to otherwise prevent accumulation of dirt or grease and in a position to prevent accumulation of

standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete shall be handled and stored in a manner to prevent accumulation of dirt, standing water, staining, chipping, or cracking. Brick, block, and similar masonry products shall be handled and stored in a manner to reduce breakage, cracking, and spilling to a minimum.

- E. Material and Equipment storage areas shall be suitably secured to protect Material and Equipment from damage or from theft.
- F. Except as stated in the Contract Documents or as otherwise approved by the Engineer, locations and arrangements for storage sites for Material and Equipment shall be selected and maintained by the Contractor at the Contractor's expense. Full compensation for furnishing such storage sites as may be necessary or as required by the Contractor shall be considered as included in the Bid price; no additional payment shall be made.
- G. The storage and handling of potential pollutants and Hazardous Material, including, but not necessarily limited to, gasoline, diesel, oils, paint, and solvents shall be in accordance with all Federal, State, and local laws and all other requirements. Temporary special storage enclosures, double-walled tanks, berms, or other protective facilities shall be provided as required by law. All Hazardous Material shall be stored and handled in strict accordance with the SDS for each product. A copy of each SDS shall be maintained at the Project site by the Contractor.
- H. Any Equipment or Materials that, in the opinion of the Engineer, has become damaged as to be non-compliant with the Contract shall be promptly removed from the site of the Work. The Contractor shall receive no compensation for the Materials or Equipment removed or for removal costs.

9.12.05. Maintenance and Protection of Installed or Stored Equipment

- A. All mechanical and electrical Equipment and instruments subject to moisture or corrosive damage by the atmosphere if stored outdoors (even though covered) shall be stored in a weather-tight building and provided with adequate ventilation, as required, to prevent damage. The Contractor shall maintain temperature and humidity within the range required by the Equipment or instrumentation manufacturer. The building may be a temporary structure on the site or elsewhere, must be painted in a neutral color, and must be no larger than required.
- B. All Equipment shall be stored fully lubricated with oil, grease, and other lubricants unless otherwise instructed by the manufacturer.
- C. Moving parts shall be rotated or otherwise maintained in accordance with the manufacturer's instructions. Upon installation, the Contractor shall periodically exercise the Equipment to ensure that it does not deteriorate from lack of use.

- D. Lubricants shall be changed as frequently as required by the manufacturer between installation and acceptance. New lubricants shall be put into the Equipment at the time of acceptance.
- E. The Contractor shall maintain a preventive maintenance record for all Material and Equipment installed but not yet accepted that requires preventive maintenance by the manufacturer. A monthly report of all maintenance performed shall be submitted to the Engineer to certify maintenance has been performed as recommended by the manufacturer.
- F. The Contractor shall maintain and repair, as recommended by the manufacturer, any Equipment that has been installed but not yet accepted.
- G. The Contractor shall clean exposed Material and Equipment just prior to turnover to the District.
- H. Prior to the District's use or acceptance, the Contractor shall have the manufacturer inspect any Equipment valued at more than \$2,500 and stored longer than three (3) months and certify that its condition has not been detrimentally affected. Such certification must affirm that the Equipment has not been adversely impacted and the Equipment shall be guaranteed as specified. If such a certification is not provided, the Equipment shall be determined to be defective and shall be replaced at the Contractor's expense. Certification does not relieve the Contractor from meeting all testing requirements.

9.13. District-Furnished Material

- A. Material furnished by the District shall be available as designated in the Special Provisions. The Contractor shall load, unload, and haul such Materials to the site of the Work at the Contractor's expense. Once received by the Contractor, the Contractor is responsible for all Material furnished and shall pay any damages and storage charges.

9.14. Final Inspection of Work

- A. The Engineer shall make the final inspection of the Work in accordance with Section 11. Contract Closeout. The Contractor is directed to Section 11. Contract Closeout regarding the requirements necessary to obtain final inspection by the Engineer.

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SECTION 10. ENVIRONMENTAL

10.01. Good Neighbor Requirements

- A. The District is a public entity that takes seriously its responsibility to be a “Good Neighbor.” Accordingly, the District seeks to perform its activities, including construction of its facilities, in a manner that takes into consideration the needs of the neighborhood and that is minimally disruptive.
- B. The Contractor hereby acknowledges the critical importance of meeting the Contract requirements as set forth in these Specifications regarding “good neighbor requirements,” which include, but are not limited to, public safety, working hours, noise pollution and vibration, light pollution, air pollution, spillage and dust, traffic control, truck haul routes and parking restrictions, and storm water pollution.
- C. The Contractor shall adhere to the above “good neighbor requirements” which relate to the lessening of the impact causes by the Work being performed under this Contract. The Contractor acknowledges that its responsibility to observe the restrictions of this Contract relating to the above requirements is significant, critical, and a material provision of this Contract. Any non-compliance with these requirements may be cause for the District to suspend Work.

10.02. Storm Water Pollution Prevention Plan

- A. The Contractor shall prepare and submit to the District an electronic and hard copy Storm Water Pollution Prevention Plan (SWPPP) as required under the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharge Associated with Construction and Land Disturbance Activities Order No. 2009-009-SWQ, (as amended).
- B. The SWPPP shall incorporate all appropriate storm water Best Management Practices (BMPs) and all risk-based requirements to comply with the NPDES General Permit. The BMP descriptions and the template for the SWPPP shall be in accordance with the current California Stormwater Quality Association (CASQA) Construction BMP Handbook/Portal, which can be purchased at <http://www.cabmphandbooks.com>.
- C. The SWPPP shall be written, amended, certified, and stamped by a Qualified SWPPP Developer (QSD). The implementation of BMPs and all pollution control measures shall be overseen by a Qualified SWPPP Practitioner (QSP). The QSD and QSP shall be provided by the Contractor and shall meet the certification requirements as defined under Section VII of the NPDES General Permit.
- D. The District shall make available the following: base maps for the Contractor’s use in preparing the vicinity and site maps for the General Permit; a copy of preexisting site and site design information; and a copy of the completed Notice of Intent (NOI), if required.

- E. Prior to the commencement of any Work at the site(s), the SWPPP shall be favorably reviewed by the Engineer. Review by the Engineer shall not relieve the Contractor of responsibility for the completeness of the SWPPP nor for the accuracy of assumptions, data, and information used and procedures contained in the Contractor's SWPPP or the adequacy thereof.
- F. The SWPPP shall be revised and/or amended by the Contractor's QSD as necessary during the progress of Work to comply with Federal, State, and local regulations and the requirements of these Specifications. All revisions and amendments shall be submitted to the Engineer. Revisions and/or amendments to the SWPPP shall be considered incidental to this item of Work; no additional payment shall be made.
- G. The Contractor's personnel supervising the earthwork, sitework, erosion control, and sedimentation control and inspecting erosion controls shall be required to read the SWPPP. A copy of the SWPPP shall be maintained at the construction site by the Contractor and shall be available at all times for review by all Contractors, by the District, or by regulatory agency personnel.

10.02.01. Storm Water BMPs

- A. The SWPPP shall include appropriate BMPs, as required, to comply with the specified risk level for the Project.
- B. The Contractor shall design, construct, operate, inspect, and maintain the BMPs in accordance with the NPDES General Permit and with the instructions provided in the current CASQA Construction BMP Handbook/Portal.
- C. The BMPs shall include, but shall not be limited to, the following:
 - 1. Erosion control;
 - 2. Sediment control;
 - 3. Run-on/runoff control;
 - 4. Wind erosion control;
 - 5. Tracking control;
 - 6. Non-stormwater Management;
 - 7. Waste Management and Materials Pollution Control; and
 - 8. Project-specific Environmental BMPs as specified in the Contract.

10.02.02. Regulatory Fines

- A. The Contractor is responsible for any penalties or fines imposed upon the District by the Regional Water Quality Control Board (RWQCB) or by other regulatory bodies due to the Contractor's noncompliance with the requirements of the NPDES General Permit. The actual cost of such penalties or fines shall be subtracted from the amount due, or that may become due, the Contractor.

10.03. Water Pollution Discharges and Remedies

- A. The Contractor shall remedy immediately any public nuisance or deficiency arising from, or in consequence of, the Contractor's failure to perform the Work specified under Article 10.02. Storm Water Pollution Prevention Plan and Article 19.02. Other Discharge Permits.
- B. Upon the Contractor's failure to make appropriate and timely remedies as Directed by the Engineer in the best interests of the public, the Engineer may employ private or public workforces and Equipment to perform the Work. The Contractor shall be charged all costs associated with such remedy including actual hours recorded by District staff, District consultants, and District services, multiplied by their actual, fully burdened labor rates. Such action(s) taken by the Engineer shall not preclude the Engineer from taking other appropriate actions and shall not relieve the Contractor of responsibility to comply with these Specifications.

10.04. Water Quality

- A. The Contractor shall meet all applicable regulatory requirements to ensure that any discharges to surface waters will not cause violation to the State water quality standards or violation of regulatory permits issued by regulatory agencies.
- B. The Contractor shall prevent water quality degradation of water bodies and/or of storm drains. Water quality is measured in terms of pollution substances, turbidity, dissolved oxygen, pH, and temperature.
- C. Oily, greasy, or sediment-laden substances or other Materials that originate from the Contractor's operation shall not be allowed to enter, or be placed where they may later enter, any reservoir, river, creek, or stream.
- D. The Contractor shall comply with the requirements of the following permits, where applicable, and as specified in the Special Provisions, Article 19.04. Water Pollution Discharges:
 - 1. State Water Resources Control Board (SWRCB) and (NPDES), General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities.
 - 2. U.S. Army Corps of Engineers CWA Section 404 Permit, and Regional Water Quality Control Board/State Water Resources Control Board CWA Section 401 Water Quality Certification. And/or Waste Discharge Permit.
 - 3. Other individual RWQCB NPDES Permits.
 - 4. Department of Fish and Wildlife 1603 Stream Bed Alteration Agreement.
- E. The Contractor shall implement any additional water quality best management practices and mitigation measures described in these Specifications.

10.05. Burial Sites

- A. The Contractor shall comply with all applicable laws and regulations pertaining to burial sites, including, but not limited to, Ordinance Code Section B6-18 of the County of Santa Clara and requirements of Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5. Upon discovering or unearthing any burial site as evidenced by human skeletal remains, the person making the discovery shall immediately stop work and notify the County Coroner. The Contractor shall also notify the Engineer. The Contractor shall immediately secure the site and protect any human remains from further disturbance.
- B. Upon determination by the County Coroner that the remains are Native American, the Coroner may contact the California Native American Heritage Commission and the County Coordinator of Indian Affairs. No further excavation or disturbance of the site or of any nearby area reasonably suspected to overlie adjacent remains may be made except as authorized by the California Native American Heritage Commission and/or by the County Coordinator of Indian Affairs, and by the Engineer.
- C. The Contractor is advised that if burials are encountered, it may be necessary to suspend Work on the Project to comply with the above requirements. Payment for a Delay of more than one (1) workday for each occurrence shall be made in accordance with Article 3.07. Change in Contract Price(s) and with Article 3.08. Change in Contract Time(s).

10.06. Discovery of Archaeological and Cultural Resources

- A. The Contractor is advised that if archaeological artifacts are encountered, the Contractor will immediately notify the Engineer.
- B. Work at the location of the find will halt immediately within 100 feet of the find. If an archaeologist is not present at the time of the discovery, the Engineer will contact an archaeologist for identification and evaluation pursuant to Public Resources Code Section 21083.2, California Code of Regulations Section 15126.4 (California Environmental Quality Act [CEQA] Guidelines) and to the mitigation measures of the Project CEQA document. If the archaeologist determines that the artifact is not significant, the Engineer will authorize the Contractor to resume construction.
- C. If the archaeologist determines that the artifact is significant, the archaeologist will determine if the artifact can be avoided and, if so, will detail avoidance procedures. The Contractor will comply with these avoidance procedures.
- D. If the artifact cannot be avoided, the archaeologist will develop an action plan that will include provisions to minimize impacts and, if required, a data recovery plan for recovery of artifacts in accordance with Public Resources Code Section 21083.2 and CEQA Guidelines Section 15126.4.

- E. The Contractor shall delay Work until the action plan and, if required, the data recovery plan, are favorably reviewed by the Engineer. Once the action plan and the data recovery plan are favorably reviewed, the Contractor shall comply with the requirements of these plans.

10.07. Noise Pollution and Vibration

- A. The Contractor shall be responsible for ensuring that noise produced by construction activities does not exceed the applicable local noise ordinance standards and is in compliance with the performance standards set forth in Section 18. Permits and Regulations of the Special Provisions.
- B. At a minimum, the Contractor shall exercise precautionary measures listed below. Implementation of these measures shall in no way relieve the Contractor of the responsibility of compliance with the noise criteria.
 - 1. Air compressors and internal combustion engines shall be in good operating condition that meet or exceed original factory specifications and shall be equipped with high grade mufflers, air inlet silencers (where appropriate), and noise suppressers.
 - 2. All mobile or fixed noise-producing machinery and Equipment, including "package" Equipment (e.g., fans, cranes, arc welders, air compressors, electrical operators, etc.), shall be suitably housed, enclosed, shielded, and equipped with noise-control features or muffled to meet the noise limits specified in the Special Provisions.
 - 3. All mobile or fixed noise-producing Equipment used by the Contractor that is regulated for noise output by Federal, State, or local law shall comply with this regulation while in use. This shall include vehicles licensed for use on public highways.
 - 4. Electrically powered Equipment instead of pneumatic- or internal-combustion-powered Equipment shall be used where feasible.
 - 5. The use of noise producing signals, including horns, whistles, alarms, and bells, shall be for safety warning and emergency purposes only.
 - 6. No music system, including personal or vehicle radio, tape, CD players, or the like, shall be audible at the Project right-of-way line.
 - 7. Trucks or other mobile Equipment shall not use engine decompression ("Jake Brakes") for deceleration on grades where feasible.
- C. The Contractor shall take all necessary precautions during its operations to limit peak particle velocities from vibratory compaction or percussion Equipment so that they do not become a public nuisance or result in property damage.

- D. Any Equipment causing noncompliance with the noise or vibration criteria shall be removed from the job site as Directed by the Engineer.

10.08. Air Pollution

- A. The Contractor shall comply with all applicable requirements of the applicable air quality management or control district and California Air Resources Board regulations.
- B. Idling of internal combustion engines shall be held to an absolute minimum. All vehicles with internal combustion engines shall be fitted with spark arrestors.
- C. The Contractor shall not use any of the listed Materials banned by BAAQMD Regulation 8, Rule 15.
- D. Serpentine Materials that have average asbestos content greater than five (5) percent as determined by an aggregate bulk sample analysis pursuant to Air Resources Board Test Method 435 or an alternate method approved by the Air Resources Board or BAAQMD (see also California Code of Regulations, Title 17, Section 93106) shall not be used for surfacing.
- E. Except as provided by law, idling of heavy-duty diesel trucks with gross vehicular weight ratings of greater than 10,000 pounds shall be no more than five (5) minutes per California Code of Regulations, Title 13, Section 2485.
- F. The Contractor shall implement any additional air quality best management practices and mitigation measures described in these Specifications.

10.09. Spillage and Dust Control

- A. Care shall be taken to prevent spillage when hauling is done. Spillage resulting from hauling operations along or across any public-traveled way shall be removed immediately by the Contractor. The Contractor shall pay all expenses for removal of spillage.
- B. The Contractor shall control dust nuisances originating from the Contractor's operations either inside or outside the right of way.
- C. The Contractor shall provide all necessary precautionary measures to control dust and to prevent spillage on public-traveled ways. At a minimum, the Contractor shall provide the measures listed below and shall also implement additional dust control best management practices and mitigation measures described in these Specifications. Implementation of these measures shall in no way relieve the Contractor of the responsibility to comply with these Specifications.
 - 1. Active maintenance areas, unpaved access roads, and staging areas shall be kept sufficiently moist and watered as necessary or shall be applied with nontoxic soil stabilizers to control dust generation.

2. Trucks hauling sediments and other loose Material shall be covered and shall maintain at least six (6) inches of freeboard.
 3. Tailgates of trucks shall be sealed.
 4. Trucks shall be brushed down before leaving the site.
 5. Paved site access roads shall be swept using vacuum-powered street sweepers when visible soil Material is carried onto the roadway.
 6. During high winds, the excavation and grading activity shall be watered or the activity suspended, if necessary, to control dust.
 7. Inactive areas shall be sprayed with soil stabilizers or shall be seeded to avoid erosion or dust.
 8. Exposed stockpiles shall be watered, enclosed, covered, or sprayed with soil stabilizers.
 9. Traffic speeds within the Project right of way shall be limited to 15 mph. For off-site restriction, comply with local agency requirements.
 10. Sandbags or other bank protections shall be installed to prevent silt runoff to roadways.
- D. The Contractor shall immediately remedy any spillage and dust nuisance or deficiency arising from, or in consequence of, the Contractor's failure to perform the Work specified in these Specifications.
- E. Upon the Contractor's failure to make timely remedies determined by the Engineer to be necessary and in the best interests of the public, the Engineer may employ private or public workforces and Equipment to perform the Work. The Contractor shall be charged all costs associated with such remedy including actual hours recorded by District staff, District consultants, and District services, multiplied by their actual, fully burdened labor rates. Such action(s) taken by the Engineer shall not preclude the District from taking other actions as deemed appropriate and shall not relieve the Contractor of responsibility to comply with these Specifications.

10.10. Traffic Control

- A. Traffic control shall consist of all work and Materials necessary to maintain safe vehicular, pedestrian, and cyclist traffic during construction and to perform "best management practices" to mitigate high-peak and high-volume construction traffic, prevent idling and queuing, establish site access limitations and mitigation measures, identify haul routes, and provide overall control of all construction traffic entering, exiting, and operating within the Project site.

- B. All traffic control Work shall be performed in accordance with the requirements of the local agency having jurisdiction and California Department of Transportation requirements, if applicable. If required, the Contractor shall prepare a traffic control plan and submit said plan to the Engineer and to the appropriate agency having jurisdiction for favorable reviews in advance of the Work at the site.
- C. The Contractor shall cooperate with the local agency having jurisdiction relative to handling traffic around the construction area. The Contractor shall make its own arrangements relative to keeping the Work area clear of parked vehicles to maintain sight visibility and access to adjacent properties. Existing road signs shall not be blocked at any time.
- D. Truck traffic and haul routes shall be in compliance with local permits and ordinances. The Contractor shall obtain, at the Contractor's expense, any required haul route permit from the local authority having jurisdiction for transporting to and from the Project site construction Material and the disposal of surplus Material.
- E. The Contractor shall conduct its operations and schedule cleanups that cause the least possible obstruction and inconvenience to traffic, pedestrians, cyclists, and adjacent property owners.
- F. Damage done by the Contractor during the course of its Work to adjacent city, town, county, or private property shall be repaired or replaced in kind and as Directed by the Engineer.
- G. Personal vehicles of the Contractor's employees and the Contractor's Equipment and vehicles shall not, at any time, be parked on the traveled way, shoulders, medians, or lanes that have not been approved for closure. When entering or leaving roadways carrying public traffic, the Contractor's Equipment, whether empty or loaded, shall in all cases yield to public traffic and shall travel in the direction of the traffic. Flaggers and traffic signs may be required to control this activity. No driveways or private roads shall be blocked. Safe access must be maintained for pedestrian traffic throughout the Work areas at all times.
- H. Those parts of public streets, right of ways, and sidewalks that are allowed to be occupied by the Contractor shall be immediately vacated by the Contractor and returned to public use when the Contractor's use thereof is no longer necessary for the construction Work.
- I. The Contractor shall comply with and pay for all costs associated with Public Convenience Section 7-1.03; Public Safety Section 7-1.04; and Temporary Traffic Control Section 12 of the State Specifications; and Article 8.01. Public Safety, of these Standard Provisions Specifications. Nothing in these Specifications shall be construed as relieving the Contractor from its responsibility as provided in Public Safety Section 7-1.04 of the State Specifications.

- J. The Contractor shall coordinate with the appropriate local agencies having jurisdiction to receive their approval in the event any temporary lane closures on public streets are needed for the Contractor's operation. Any traffic signing and flaggers as approved by the local agencies for said lane closures shall be in place prior to closing the lane to traffic.

10.11. Regulated Material Management

- A. Regulated Material includes, but is not limited to, Hazardous Material and Hazardous Waste.
- B. The Contractor is responsible for and shall obtain all required permits and pay all fees and taxes for satisfying the requirements of any regulatory agency for the storage, testing, monitoring, usage, transportation, disposal, safety, and reporting, or for any other requirements regarding the management of Regulated Material on and off the Project site(s).
- C. The Contractor shall not allow Regulated Materials to spill on District property or on easements or on other public or private right of ways. Any spillage of Regulated Materials resulting from the Contractor's operation shall be removed immediately by the Contractor at the Contractor's expense.
- D. The Contractor shall immediately notify the Engineer of any potentially Hazardous Materials or Hazardous Waste encountered at the worksite and shall take all necessary action to prevent exposure of personnel until all Material is identified and proper action can be taken.
- E. Unless otherwise stated in the Contract Documents, Contractor shall be responsible for management, testing, transportation, and disposal of all regulated Material encountered on site in accordance with applicable local, state, and federal regulations.
- F. Waste Manifests for pre-existing Regulated Material: The District will be the Generator for all Regulated materials pre-existing on the worksite and will sign the associated waste manifests. The District shall be responsible for paying the State Superfund fees, the generator's fees, and other costs of testing and disposal of pre-existing regulated material wastes unless specifically stated otherwise in these Specifications.
- G. Prior to issuance of the Project Completion letter, the Contractor shall submit copies of all hazardous waste manifests signed by disposal facilities and certificates of disposal to prove that the Contractor has legally disposed such materials.

10.11.01. Contractor's Storage of Regulated Material

- A. Prior to the storage or use of any Regulated Materials, the Contractor shall submit to the Engineer a Regulated Materials Storage and Use Plan (Plan). The Plan shall include (i) an inventory of all Regulated Materials to be stored or used

at the Project site that equals or exceeds any of the following separate material phases: 55 gallons of liquid, 200 cubic feet of compressed gas, or 500 lbs. of solid; (ii) the maximum quantity of Materials to be stored; (iii) purpose of the Materials; (iv) the SDS for each Material; (v) a detailed description of how the Materials will be stored (including secondary containment where required by applicable regulatory agencies); (vi) a site plan drawn to scale; (vii) storage area maps drawn to scale; (viii) a detailed description of how the Materials will be monitored; (ix) a detailed description of how wastes from the Materials will be stored and/or disposed; and (x) a detailed description of the procedures to be followed in the event of an uncontrolled release of the Regulated Materials.

- B. The Plan shall be submitted to the Engineer and favorably reviewed at least 30 Days prior to the storage or use of any Regulated Materials. The Plan shall be updated and submitted to the Engineer by the Contractor upon the addition of new Regulated Materials not listed previously or upon a 100-percent (or greater) increase in quantity of a Regulated Materials that is listed in the plan.

10.11.02. Regulated Material Discharges or Releases by Contractor

- A. The Contractor is responsible for all discarded or abandoned Material, including Regulated Materials and Hazardous Waste, generated as a result of the Contractor's operations unless specifically noted otherwise in these Specifications. The Contractor shall comply with Article 3.09. Differing Conditions.
- B. In the event of a discharge or release of a Regulated Materials from the Contractor's operation, the Contractor is responsible for notifying the proper authorities, providing containment of the Material, identifying the contaminants, investigating the extent of all contaminants, testing and removing contaminated Materials, disposing of contaminated Materials, and verifying the removal of all contaminated Materials. These activities shall be performed to the satisfaction of the Engineer at the Contractor's cost. The Contractor shall perform any Work and provide any and all documentation required by the District and by all Federal, State, and local agencies. he Contractor shall provide to the Engineer copies of all correspondence and reports related to these activities. All Work performed to accomplish these activities shall be in accordance with Federal, State, and local regulations.
- C. In the event of a discharge or release of Regulated Material, the Contractor shall notify the Engineer immediately. Immediate notifications may be verbal. The Contractor shall submit a detailed written report to the Engineer within 24 hours of the discharge or release. The written report shall include: a description of events leading to the discharge or release; action taken to prevent or control the discharge or release; a description of the discharge or release; the quantity of Material discharged or released; method used to determine the quantity discharged or released; type of Material discharged or released; SDS for the Material(s) involved; a description of the area affected by the discharge or release; agencies notified and date and time of notification; and status of the

cleanup. The report shall also include the proposed investigation, cleanup, and verification sampling activities.

- D. All expenses incurred by the Contractor as a result of or to remedy the discharge or release of Regulated Materials shall be borne solely by the Contractor; no additional compensation shall be made. The Contractor shall be responsible for signing the non-hazardous waste manifests and the hazardous waste manifests and for paying the State Superfund fees, the generator's fees, and other costs of disposal of these wastes unless specifically stated otherwise in these Specifications. The Contractor shall be identified as the owner and generator of the wastes associated with unauthorized releases or discharges.

10.11.03. Hazardous Waste Management by Contractor

- A. In accordance with these Specifications, the Contractor must manage the Hazardous Waste generated:
1. Labeling: The Contractor shall completely fill out and affix a "Hazardous Waste" label to each Hazardous Waste container for the Contractor's operations. Each Hazardous Waste label shall contain, at a minimum, (i) the words "HAZARDOUS WASTE"; (ii) information on the generator (i.e., name, address, phone number); (iii) EPA identification number for the waste stream; (iv) EPA and/or California Waste Code; (v) waste accumulation starting date; (vi) identification and content of the waste; (vii) the physical state of the waste (i.e., solid or liquid); (viii) and the hazardous property (i.e., flammable, toxic, corrosive, reactive, etc.). If the primary container is placed inside a secondary container, then the Contractor shall also prepare and affix another Hazardous Waste label on the secondary container.
 2. Secondary containment: The Contractor shall provide appropriate secondary containment for all storage areas for Hazardous Materials and Hazardous Waste. In the case of an installation with one (1) primary container, the secondary containment shall contain at least 110 percent of the volume of the primary container. In the case of an installation with multiple primary containers, the secondary containment shall contain 150 percent of the volume of the largest container or ten (10) percent of the aggregate internal volume of all primary containers in the storage facility, whichever amount is greater. If the storage facility or storage system is open to rainfall, then the secondary containment must be able to additionally accommodate the volume of a 24-hour rainfall as determined by a 25-year storm history.

3. Accumulation time limit: The Contractor shall properly haul and dispose of all Hazardous Waste within 90 Days from the accumulation starting date identified on each Hazardous Waste label or on the completion date of the Contract, whichever event comes first. The waste accumulation starting date for each waste stream begins when the first drop of the waste is placed in the container.
 4. Hauling and disposal of waste: The Contractor shall be responsible for using appropriate Hazardous Waste haulers and disposing of all Hazardous Waste in accordance with Federal, State, and local regulations.
- B. Hazardous Waste Manifests: The Contractor will be the generator for all regulated materials introduced to the worksite by the Contractor or for any unauthorized releases of regulated materials occurring as a result of Contractor activities. In such cases, the Contractor will sign the associated waste manifests. The Contractor will pay the State Superfund fees, generator fees, and other costs of testing and disposal of regulated material.
- C. Prior to issuance of the Project Completion letter, the Contractor shall submit legible copies of all Hazardous Waste manifests signed by disposal facilities and certificates of disposal to document that the Contractor has legally disposed of such Materials.

10.12. Non-Regulated Material Management

- A. Non-Regulated Material is any substance that is not required by any Federal, State, or local regulations to require special management, storage, transportation, disposal, or handling practices. The Contractor is responsible for managing options for reuse and/or transportation and disposal of non-Regulated Material in accordance with this Article.

10.12.01. Disposal at State-Permitted Landfill

- A. Non-Regulated Material may be transported and disposed at state-permitted, non-hazardous waste landfills. The Contractor is responsible for and shall obtain all required permits and pay all fees and taxes for satisfying the requirements of any regulatory agency for the storage, testing, monitoring, usage, transportation, disposal, safety, and reporting, or for any other requirements regarding the management of non-Regulated Material on and off the Project site(s).
- B. The Contractor shall test Materials in accordance with the requirements of the Contract Documents and at the landfill to be used.
- C. Contractor shall submit to the Engineer copies of state-certified laboratory testing reports for the Materials to be disposed, including but not limited to metals, pesticides, petroleum hydrocarbons, volatile organic compounds, and asbestos using EPA Test Methods.

- D. Nonhazardous Waste Manifests: Prior to issuance of the Project Completion letter, the Contractor must submit legible copies of all non-hazardous waste manifests signed by disposal facilities and certificates of disposal to document that the Contractor has legally disposed of such Materials.

10.12.02. Disposal at District-Owned Sites

- A. This Article applies to reuse or disposal within the Project site or any other District-owned property.
- B. Material exceeding the applicable Environmental Screening Levels (ESLs) per the latest guidelines from the applicable Regional Water Quality Control Board (RWCCB) is subject to a case-by-case approval by the Engineer, per the requirements below.
- C. For non-Regulated Material to be reused or disposed of on site or at any District-owned site, the Contractor must obtain all required permits; agency and District approvals and agreements; and pay all fees and taxes for all services and Materials required in conjunction with the management, storage, testing, transportation, disposal, and reuse of non-Regulated Material. Material reused shall meet all other characteristic requirements of the Contract Documents.
- D. Prior to the transportation and disposal of Materials, the Contractor shall provide all applicable regulatory agency approvals and supporting information for disposal of Materials, including but not limited to, the following:
 - 1. Copies of all applicable regulatory agency permits, approvals, licenses, and environmental clearances;
 - 2. Site-specific health and ecological risk assessment and/or compliance with applicable regulatory agency regulations or guidelines, including, but not limited to, the applicable ESLs per the latest guidelines from the applicable RWQCB;
 - 3. Copies of documentation of communication by the Contractor with appropriate regulatory agencies on evaluation of regulatory requirements and regulatory agency approvals for disposal of Materials; and
 - 4. Copies of state-certified laboratory testing reports for the Materials to be disposed including but not limited to metals, pesticides, petroleum hydrocarbons, volatile organic compounds, and asbestos using EPA Test Methods.

10.12.03. Disposal at Other Locations

- A. This Article applies to reuse or disposal at any off-site location other than a state-permitted landfill, Project site, or other District-owned property.

- B. For Material to be reused or disposed of offsite (other than a state-permitted landfill or District-owned property), the Contractor must obtain all required permits, agency approvals, and property owner agreements and pay all fees and taxes for all services and Materials required in conjunction with the management, transportation, disposal, and reuse of Materials.
- C. Prior to the disposal of Materials, the Contractor shall provide all applicable regulatory agency approvals and supporting information for disposal of Materials, including but not limited to, the following:
 - 1. Copies of all applicable regulatory agency permits, approvals, licenses, and environmental clearances;
 - 2. Copies of documentation of communication made by the Contractor with appropriate regulatory agencies on evaluation of regulatory requirements and regulatory agency approvals for disposal of Materials; and
 - 3. Copies of state-certified laboratory testing reports for the Materials to be disposed for chemicals of concern including but not limited to metals, pesticides, petroleum hydrocarbons, volatile organic compounds, and asbestos using EPA Test Methods.
 - 4. If Material exceeds the RWQCB's ESLs, the Contractor shall provide a site-specific health and ecological risk assessment. At a minimum, this shall include soil testing of the Project's Natural Background Area (defined as: "native area representing natural geological characteristics not influenced by human activity at an appropriate distance away from project's boundary limits.") documenting that any RWQCB's ESL exceedances detected in the Materials also exist in the background area. The Contractor shall receive prior approval of the background sample locations and submit test reports.
- D. Materials, the Contractor shall obtain written consent from the property owner and submit a copy thereof to the Engineer. Documentation of consent must include:
 - 1. A written authorization from the property owner to accept Materials at duly noted quantities, types of Materials (e.g., soils, debris, etc.), and the disposal property location address; and
 - 2. A written release from the property owner fully absolving the Santa Clara Valley Water District from any and all responsibility and legal liability toward any damage to life and environment in connection with the disposal of the Materials on the property.
- E. Within 15 Days after the disposal of Materials at the property location, the Contractor shall submit an acknowledgement duly signed by the property owner certifying the date of receipt of the Materials, including quantity and types of

Materials received (e.g., soils, debris, etc.), to document that the Contractor has disposed of the Materials at the location designated in the agreement.

- F. Non-hazardous waste manifests: Prior to issuance of the Project Completion letter, the Contractor must submit legible copies of all non-hazardous waste manifests signed by disposal facilities and certificates of disposal to document that the Contractor has legally disposed of such Materials.

10.13. Imported Earthfill Material

10.13.01. General Requirements

- A. The Contractor shall not import earthfill material that is contaminated with Regulated Materials.
- B. For each imported earthfill Material to be used on the Project, the Contractor shall submit to the Engineer state-certified laboratory testing reports for chemicals of concern including but not limited to metals, pesticides, petroleum hydrocarbons, volatile organic compounds, and asbestos using EPA Test Methods.
- C. For each imported earthfill Material to be used on the Project, the Contractor shall execute and submit to the Engineer a completed Imported Materials Certification form, certifying that the imported material is not contaminated with Regulated Materials. This form is available from the Engineer. If the imported earthfill Materials are to be obtained from more than one source, the Contractor shall execute and submit a separate form for each source of earthfill Material. This form shall be submitted at least 30 Days prior to the delivery of the earthfill Material to the construction site and shall receive favorable review prior to delivery.
- D. If Contractor uses Regulated Materials on the Project Site, the Contractor must immediately remove the Regulated Material and dispose of it in accordance with all applicable laws, ordinances, and regulations. Contractor must conduct necessary sampling and monitoring to verify that all Regulated Material has been removed. Contractor must verify to the satisfaction of the Engineer and/or to the appropriate regulatory agencies, that any surrounding areas, soils, or water have not been impacted by the Regulated Materials. The subsequent disposal of the Regulated Material shall be the responsibility of the Contractor. No compensation shall be made to the Contractor by the District for removal, disposal, replacement, transportation, or chemical analysis, or for any other costs associated with the removal, disposal, and replacement of the Regulated Material.
- E. The Engineer may obtain soil samples and test them to monitor the Contractor's compliance with these Provisions.
- F. All imported earthfill Material is subject to approval by the Engineer.

10.13.02. Imported Earthfill Non-Regulated Material

- A. If the imported earthfill Material exceeds the applicable RWQCB's ESLs, the Contractor shall provide a site-specific health and ecological risk assessment and/or comply with applicable regulatory agency regulations or guidelines. At a minimum, this shall include soil testing of the Project's Natural Background Area (defined as: "native area representing natural geological characteristics not influenced by human activity at an appropriate distance away from project's boundary limits.") documenting that any RWQCB's ESL exceedances detected in the imported earthfill Material also exist in the background area.
- B. The Contractor's identification of the Natural Background Area and test reports are subject to approval by the Engineer.

10.14. Migratory Birds

- A. The Contractor shall comply with all applicable Federal and State laws, rules, and regulations related to the protection of migratory birds, including, but not necessarily limited to, the Federal Migratory Bird Treaty Act (16 USC 703-712 50 CFR Part 21 and 50 CFR Part 10) and the California Department of Fish and Game Code Sections 2000, 3503, 3503.5, 3513, and 3800.
- B. The Contractor shall carry out all activities in a manner consistent with the U.S. Fish and Wildlife Service's Migratory Bird Program. The Contractor shall not pursue, hunt, take, capture, kill, attempt to take, or possess any migratory bird listed in 50 CFR 10.13, or any part, nest, or egg of any such bird. Active nests are those containing either an egg (or eggs) or young and/or nests used by birds of prey, regardless of the presence of eggs or of young. To determine the occupancy of nests, the Contractor shall rely upon the professional expertise of a Qualified Biologist. See Section 19. Environmental.
- C. The Contractor shall coordinate several measures, including (i) awareness and training of the Contractor's personnel on which bird species are protected, their nesting seasons, and seasonal variability; (ii) surveys to determine the presence of nesting birds in the Project area; (iii) establishment, maintenance, and removal of protective buffer zones around nests; (iv) installation and maintenance of exclusion devices; (v) nest prevention activities; and (vi) monitoring to ensure the adequacy of the compliance measures.

10.14.01. Scope of Work

- A. The Contractor shall be aware of migratory bird nesting seasons (generally from January 15 to August 31) and variability; provide training to all Contractor personnel on the Project; monitor the Project site; perform preventative and deterrence measures to prevent birds from nesting; preserve and protect pre-established protective buffer zones; perform surveys to determine the potential for protected species to be in the Project area; establish new protective buffer zones around un-prevented nests, as required; install and/or maintain exclusion devices, such as netting and/or wire mesh screens; monitor to assure

the adequacy of the compliance measures; and perform any other Work as specified herein to comply with all applicable statutes.

- B. The Qualified Biologist shall monitor regulatory compliance, train Contractor personnel, and coordinate with the Engineer in conformance with (i) this Article; (ii) the Project specific Mitigation Monitoring and Reporting Program (MMRP) requirements relating to this Article; and (iii) all applicable permit conditions. The Qualified Biologist shall:
1. Provide bird nesting awareness training for all personnel working on the Project, including all Subcontractors.
 2. Monitor the Project site for nest starts and occurrences of active bird nests.
 3. Document the location, status, and species of bird for each active nest.
 4. Monitor the Work to ensure that protected birds are not disturbed in a manner that could result in noncompliance.
 5. Establish protective buffer zones around active nests as specified herein.
 6. Ensure protective buffer zones are maintained and nests are not disturbed. Advise when protective buffer zones are no longer needed and can be removed.
 7. Monitor the maintenance and effectiveness of bird exclusion devices.
 8. Provide recommendations concerning vegetation management, installation of additional exclusion devices, and maintenance of such devices to prevent bird nesting. Advise when exclusion devices are no longer needed and can be removed.
- C. Within 14 Days of the First Chargeable Day, the District will release the site to the Contractor. Prior to the release, the Engineer and the Contractor shall assess the site to determine the presence of nesting birds and any existing protective buffer zones and exclusion devices within or near the construction areas. In no case shall the District maintain responsibility for the site for more than 14 Days after the First Chargeable Day. Upon release of the site, the Contractor assumes complete responsibility for the site, including Work site monitoring, existing protective buffer zones, and exclusion devices and shall perform all required Work as specified herein.

10.14.02. Migratory Bird Surveys

- A. The Qualified Biologist shall perform migratory bird surveys prior to any Project related activity that could pose the potential to affect migratory birds.

- B. The Contractor shall include activities for Qualified Biologist surveys on Project Schedules with assurance that the appropriate migratory bird surveys have been coordinated with the Qualified Biologist and will be performed in advance of activities.

10.14.03. Migratory Bird Monitoring

- A. The Contractor is responsible for ongoing monitoring to ensure that migratory birds, their active nests, eggs, and young are not harmed in any way.
- B. The Contractor and Qualified Biologist shall inspect all areas that may be affected by Project activities, including all vegetation, grounds, structures, and bridge(s), with sufficient frequency as needed to identify any new and partially built bird nests.
- C. At the direction of the Engineer and the Qualified Biologist, the Contractor shall be responsible for the removal of any inactive or partially built bird nests with the exception of raptor nests. No birds, nests with eggs, or nests with hatchlings shall be disturbed, nor shall raptor nests be removed unless specified in the Special Provisions, Article 19. Environmental.

10.14.04. Protective Buffer Zones

- A. Existing protective buffer zones, if any, are shown on the Drawings or shall be communicated to the Contractor prior to the District releasing the site. In addition to District-established buffer zones, new protective buffer zones shall be required if a nest is established or discovered during the Contractor's activities. In the event that an active nest is discovered in the Project area, or in adjacent areas considered to have the potential to be disturbed by the Contractor's activities, the Contractor shall notify the Engineer and establish a protective buffer zone around the nest. The exact location of the boundaries of protective buffer zones shall be established by the Qualified Biologist and approved by the Engineer. The Contractor shall install temporary fencing at the boundary of each new protective buffer zone except as otherwise Directed by the Engineer. The fencing shall be Type ESA Temporary Fence per Caltrans Article 14-1.03. The Contractor shall attach signs labeled "Nesting Bird—Access Prohibited" at least every 50 feet along the fencing. The Contractor shall exclude Project activities to preserve and protect all protective buffer zones, including existing ones, at all times.
- B. In the event that an active nest is discovered by the Qualified Biologist, the Biologist shall immediately notify both the Contractor and the Engineer of the active nest and of the applicable protective buffer zone.
- C. The Qualified Biologist shall inspect all active nesting-bird protective buffer zones(s) on at least a weekly basis until such time as the nest is no longer active as confirmed by the Qualified Biologist. Once a nest is no longer active, the protective buffer zone shall be removed.

- D. The Contractor shall be responsible for any added costs or schedule Delays as a result of the establishment of new nests or of new protective buffer zones due to the Contractor's failure to perform bird exclusion responsibilities.
- E. The Contractor shall monitor protective buffer zone operations during the Project. Requirements for the protection of active nests may vary depending on the location and the species involved. The following are general guidelines to be followed by the Contractor when an active nest is encountered:
 - 1. Stop any activities that may harm the nest.
 - 2. Contact the Engineer immediately.
 - 3. Only the Qualified Biologist should approach the nest and only if necessary.
 - 4. The Contractor shall inform personnel of the presence of an active nest and take steps, described above, to avoid disturbing it.
 - 5. Until inspected by the Engineer or Qualified Biologist, a 20-foot-radius protective buffer zone shall be established around the nest of any non-raptor, ground nesting bird, and a 50-foot-radius protective buffer zone around nests established in shrubs, trees, on structures, on Equipment, etc., except for raptor nests. Furthermore, the protective buffer zone shall be 250 feet for nesting raptors (including hawks), owls and burrowing owls, falcons, eagles, herons, and egrets. The Qualified Biologist may recommend, for approval by the Engineer, modification of these zones.
 - 6. Refer to Section 19. Environmental for additional specific buffer zone requirements.

10.14.05. Exclusion Devices

- A. The Contractor shall install nesting exclusion devices to prevent potential establishment or occurrence of a nest in the Project area during Project activities. The Contractor shall maintain all nesting exclusions devices, including existing ones, throughout the nesting season or until completion of Work in an area makes the devices unnecessary. The Contractor shall be responsible for the maintenance, repair, or replacement of exclusion devices until all of the Work is complete. The Contractor shall remove and dispose of all exclusion devices, including those installed by the District, when Work in the area is complete.
- B. Bird exclusion devices shall be installed during the non-nesting season (generally September 1 through January 14). The Contractor shall obtain favorable review from the Engineer when installing bird exclusion devices during the nesting season (generally January 15 through August 31). At a minimum, all exclusion devices shall be inspected daily by the Contractor and weekly by the Qualified

Biologist to ensure integrity of the devices and to prohibit birds from nesting without causing them harm.

10.14.06. Nest Prevention

- A. The Contractor is hereby notified that all areas to be cleared of vegetation may be suitable nesting habitat for migratory birds. The Contractor shall perform all necessary clearing prior to the nesting season if at all possible. If clearing must occur during the nesting season, the Contractor shall obtain prior approval from the Engineer. If vegetation must be cut and maintained to prevent birds from nesting, it must be cut to less than six (6) inches in height and removed.
- B. The Contractor shall inspect and monitor bare areas and gravel areas prior to commencement of the nesting season and as frequently as necessary thereafter and provide deterrence measures if necessary to prevent ground-nesting birds, such as killdeer, from establishing a nest.
- C. Removal of vegetation (trees, shrubs, grasses, and herbaceous plants) shall be limited to areas shown on the Drawings designated for vegetation removal unless approval is obtained from the Engineer to remove vegetation from additional areas. No vegetation shall be trimmed back unnecessarily, including trees and/or shrubs growing near the right of way that overhang onto the worksite. Such overhanging foliage shall be protected and tied back if necessary. Landscaped areas and irrigation systems outside of the construction areas shall be preserved and protected from damage by the Contractor's activities.
- D. Pre-established Vegetation Management Areas: Some areas of vegetation removal, clearing, and eradication may be established and cleared by the District prior to the First Chargeable Day. In these areas, the Contractor shall be responsible for the continued clearing and eradication of all re-sprouts.

10.14.07. Submittals

- A. Submit a résumé of qualifications of the Qualified Biologist for the Engineer's favorable review. The Qualified Biologist's qualifications must meet the minimum requirements as specified for the Qualified Biologist listed in Section 19. Environmental. The résumé shall be submitted and must be favorably reviewed by the Engineer prior to any Work.
- B. Submit migratory bird survey reports to the Engineer within two (2) Days upon completion of the survey and at least two (2) Days prior to commencement of Project related activities.
- C. Submit the Qualified Biologists' training materials for favorable review by the Engineer, prior to presenting bird nesting awareness training to personnel.
- D. Submit to the Engineer no later than the 15th Day of each month a monthly report prepared and signed by the Qualified Biologist that documents the activities of the Contractor, including, at a minimum, the status of awareness trainings

provided, the installation, maintenance, or removal of any bird exclusion devices or protective buffer zones and their locations and monitoring results, and report the current status of previously documented bird nests.

- E. When requested by the Engineer, maintain and submit a log of weekly documentation (including photo-documentation) of the time, date, condition of the nests, and any nest-prevention actions taken during inspections.
- F. Submit to the Engineer product data for nesting exclusion devices, fencing for protective buffer zones, and any shop Drawings as deemed appropriate by the Engineer.
- G. If the Contractor wishes to modify the dimensions of any protective buffer zone or modify any bird exclusion device, a written proposal of such modification must be submitted and favorably reviewed by the Engineer. The submittal must contain the Qualified Biologist's written justification for the proposed modification and shall include a description of the anticipated effects on the active nest and on nesting birds.

10.15. Other Wildlife and Fish Species

- A. The Contractor shall comply with all regulatory and permit requirements pertaining to other wildlife and fish species as identified in Section 19. Environmental.

10.16. Sensitive Plants and Vegetation

- A. The Contractor shall comply with all regulatory and permit requirements pertaining to sensitive or listed plants and vegetation communities as identified in Section 19. Environmental.

10.17. Proper Pruning Techniques for Woody Vegetation Removal

- A. An International Society of Arboriculture (ISA) Certified Arborist or Tree Worker is to be present at all times during pruning. Contractor shall comply with the following:
 - 1. All pruning shall be in accordance with the most current editions of the Best Management Practices for Pruning (International Society of Arboriculture) and the American National Standard for Tree Care Operations (ANSI booklet Z133.1) and Pruning (ANSI booklet A300).
 - 2. Pruning for clearance: Selectively remove only branches required for passage and movement of construction equipment.
 - 3. Remove stubbed branches at the point of origin, outside the bark branch ridge.

4. No more than 25 percent of live foliage shall be removed from any tree at any one time (or in a given year).
5. Branch removal or reduction cuts (thinning cuts) are to be employed rather than heading cuts. Trees shall not be topped or headed back.
6. All cuts shall be distal to the branch bark ridge or, if present, the branch collar. The cuts shall be close to but shall not injure the branch collar. All final cuts shall be in one plane, with no torn bark.
7. Pruning cuts larger than 4 inches in diameter, except for dead or stubbed branches, shall be avoided.
8. Pruning operations shall be conducted in a manner that does not damage surrounding understory plants, if present.

SECTION 11. CONTRACT CLOSEOUT

11.01. Project Completion and Acceptance

11.01.01. Use Before Acceptance

- A. The District has the right to utilize or to place into service any item of Equipment or other usable portion of the Work before Acceptance of the entire Project. The District's exercise of said right shall hereinafter be referred to as Use Before Acceptance.
- B. Where Use Before Acceptance is identified in the Contract Documents, it shall be considered part of the Work; no additional compensation or payment shall be made.
- C. Should the District desire Use Before Acceptance that has not been identified in the Contract Documents, the Engineer shall notify the Contractor in writing, identifying the specific portion or portions of the Work proposed for Use Before Acceptance.
- D. The Contractor shall provide written notice within ten (10) Days after a request for Use Before Acceptance by the District stating whether the proposed portions of Work are suitable for Use Before Acceptance and if there are any associated costs, constraints, or other impacts.
- E. Until Use Before Acceptance, the Contractor is responsible for all care and maintenance of all items or portions of the Work.
- F. Unless the Engineer requires the Contractor to execute a Use Before Acceptance Guarantee as provided in Article 11.02.03. Use Before Acceptance Guarantee, upon the District's issuance of written notice of Use Before Acceptance, the District accepts responsibility for the protection and maintenance of all such items or portions of the Work described in the written notice, with the exception of any injury or damage resulting from the Contractor's actions or from negligence.
- G. If, by reason of the District's unidentified Use Before Acceptance, the premium for the Contractor's bodily injury and property damage insurance is increased, the District shall reimburse the Contractor for the additional amount necessarily incurred, allocable to the area and the period of the District's use up to the date of Acceptance of the Work.
- H. The District's Use Before Acceptance does not constitute Acceptance of the Work, or of any portion of the Work, by the District, nor does it relieve the Contractor of responsibility for correcting defective and/or deficient Work or Material found at any time before Acceptance of the Work or during the guarantee period after the District's Acceptance. Notwithstanding any Use Before Acceptance, the Contractor retains full responsibility for fulfilling all of the requirements of the Contract Documents.

11.01.02. Contractor's Responsibility to Manage Incomplete and Deficient Work

- A. The Contractor is responsible for identifying and managing incomplete and deficient Work. Incomplete and deficient Work includes, but is not limited to, noncompliance items, rework items, and nonconforming tests; deficiencies relating to inspections by the building official; administrative requirements; and items of Work not complete per the Contract.
- B. The preliminary final and final inspections shall not be conducted until:
 - 1. the entire Work of the Milestone/Project is complete;
 - 2. cleaning has occurred pursuant to Standard Provisions Article 11.04. Final Cleaning and to Special Provisions Article 22.06. Final Cleaning; and
 - 3. deficient Work identified in all outstanding noncompliance notices and/or deficiency lists has been corrected.
- C. For each Milestone Completion, the Contractor must include activities for conducting the preliminary final inspection, completion of deficiency list, and final inspection in the Contractor's Detailed Progress Schedules.
- D. The District may withhold the estimated cost of the incomplete and deficient Work and consequences thereof until it is completed in accordance with the requirements of the Contract Documents.

11.01.03. Milestone Completion Preliminary Final Inspection

- A. When the Contractor believes the Work of a Milestone or Project is complete, including final cleaning of the Work area associated with the Milestone, the Contractor shall submit to the Engineer a written certification that the Work of the Milestone is complete and shall request a preliminary final inspection of the work of the Milestone by the District.
- B. Prior to requesting the inspection, the Contractor shall furnish the following Milestone Completion Certification to District:

"To the best of my knowledge, all Work of Milestone (#) has been completed, inspected, and tested and is in full compliance with the requirements of the Contract."

Certified by Contractor: _____ Date: _____
(Signature)

- C. Within seven (7) Days of receipt of the Contractor's certification that all Work of a Milestone/Project is complete, the Engineer shall conduct a preliminary final inspection with the Contractor.

- D. If the Engineer determines that, based on the results of the preliminary final inspection, the incomplete/deficient Work identified is greater in substance and/or volume than can be appropriately declared on a Deficiency List, then the Work is not complete enough to complete the preliminary final inspection. The Contractor shall be so notified in writing. The Contractor must complete the Work and reinitiate procedures for another preliminary final inspection. Any costs to the District for more than two (2) preliminary inspections may be charged to the Contractor.
- E. If the results of the preliminary final inspection are satisfactory to the Engineer, a Deficiency List shall be prepared and issued to the Contractor. Neither the District's preparation of the Deficiency List, nor any omission from the Deficiency List of items of incomplete and/or deficient Work relieves the Contractor from completing all the Work required by the Contract.

11.01.04. Milestone Completion Final Inspection

- A. Prior to requesting the milestone completion final inspection, the Contractor shall furnish the following milestone completion certification to the District:

"The work of Milestone (#) has been completed, inspected, and tested and is in full compliance with the requirements of the Contract. All Deficiency List items identified during the Preliminary Final Inspection have been completed."

Certified by Contractor: _____ Date: _____
(Signature)

- B. Upon delivery of this certification to the Engineer and if the Engineer agrees with the Contractor's certification, a final inspection shall occur within ten (10) Days of the Contractor's delivery of the milestone completion certification.
- C. If the Engineer determines the Work is deficient, the Contractor shall again be furnished with a Deficiency List identifying the observed deficiencies in the Work. After all deficiencies have been corrected, the Contractor must initiate procedures for another final inspection. If more than two (2) final inspections are required, any costs to the District for additional final inspections may be charged to the Contractor.
- D. After Acceptance of the Contractor's milestone completion certification following the final inspection, the Engineer shall issue a milestone completion letter to the Contractor. This letter will establish the date of the completion of the milestone. The assessment of Liquidated Damages, if applicable, shall cease accruing as of the date of the milestone completion.
- E. The Contractor's Detailed Progress Schedules must include activities for final inspection of milestones.

11.01.05. Project Completion

- A. The Contractor shall certify that the entire Work of the Project is complete. Completion of the Project includes submission to and acceptance by the District of all milestone completion submittals. Article 22.05. Submission Closeout Items, describes in greater detail the submittal requirements for Contract Closeout.
- B. Prior to the Engineer issuing the Project completion letter, the Contractor shall furnish the following Project completion certification to the District. This certification is in addition to any intermediate Milestone completion certifications:

"The entire Work of the Project has been completed, inspected, and tested and is in full compliance with the requirements of the Contract Documents. All Deficiency List items have been completed. All items on the rework list have been completed. All Closeout Documents required by Article 22.05. Submission of Closeout Items, have been submitted to and accepted by the Engineer."

Certified by Contractor: _____ Date: _____
(Signature)

- C. The Contractor's certification shall also include the completion of all Deficiency List Work and the correction of all rework.
- D. After acceptance of the Contractor's final certification, the Engineer shall issue a Project completion letter to the Contractor. This letter shall establish the date of the completion of Project. The assessment of Liquidated Damages, if any, shall cease accruing as of the date of Project completion.

11.01.06. Acceptance of Work

- A. After issuing the Project Completion letter, the Engineer shall recommend that the District Board of Directors formally accept the Work.
- B. Acceptance of Work shall be made by the District Board of Directors and only after the Engineer has recommended acceptance.
- C. After the Board of Director's formal Acceptance of Work, the Clerk of the Board shall record a Notice of Completion of Contract and Acceptance of Work.
- D. The District's Acceptance of Work establishes conformity with the Contract except for Delays in completion, latent defects, fraud, or such gross errors as amount to fraud, willful misconduct, or gross negligence, and are subject to any guarantee and warranty, express or implied. Determinations by the Engineer that the Work is complete or Acceptance of Work by the Board of Directors does not bar any action by the District against the Contractor pursuant to Article 11.02. Guarantee and Guaranty Bond.

11.02. Guarantee and Guaranty Bond**11.02.01. Guarantee**

- A. The guarantee period for any item of Equipment or usable portion of the Work that the District utilizes or places into service shall commence on the date of the Notice of Completion of Contract and Acceptance of Work.
- B. The Contractor hereby agrees to make, at its own expense, all repairs or replacements necessitated by defects in Material or workmanship supplied or constructed under the terms of this Contract and to pay for any damage to other Work resulting from such defects that becomes evident within a minimum of three (3) years after the date of Notice of Completion of Contract and Acceptance of Work or within such period of time as may be prescribed by law. The Contractor further assumes responsibility for a similar guarantee for all Work and Materials provided by Subcontractors or by manufacturers of packaged Equipment components. The Contractor also agrees to indemnify, defend, and hold the District harmless from liability of any kind arising from damage due to said defects.
- C. The Contractor-furnished Guarantee and Guaranty Bond specified herein shall be in addition to any Equipment, workmanship or Material warranties specified elsewhere in the Contract or as provided by the manufacturer. The Contractor shall provide copies of all warranties required of the Specifications in addition to the Guarantee and Guaranty Bond.
- D. The Contractor shall execute and submit to the Engineer a completed Guarantee Form and Guarantee Bond for the Work in the format provided.
- E. The Contractor shall, upon receipt of notice in writing from the District, promptly make all repairs arising out of defective Materials, workmanship, or Equipment. If the Contractor has failed to make the repairs with due diligence within ten (10) Days after giving this notice to the Contractor, the District is hereby authorized to make such repairs. In case of emergency, where, in the opinion of the District, Delay could cause serious loss or damage, repairs may be made without notice sent to the Contractor. The Contractor and its Surety shall be liable for any expense in connection with repairs performed by the District or by its agents.
- F. Prior to the expiration of the guarantee period, the District reserves the right to hold a meeting and require the attendance of the Contractor and relevant Subcontractors and Suppliers at no cost to the District. The purpose of the meeting is to review guaranties, bonds, and maintenance requirements and to determine the required repair or replacement of defective items.
- G. For the purpose of this Article, Acceptance of the Work or a portion of the Work by the District shall not extinguish any covenant or Agreement on the part of the Contractor to be performed or fulfilled under this Contract that has not, in fact, been performed or fulfilled at the time of such acceptance. All covenants and

agreements shall continue to be binding on the Contractor until they have been fulfilled.

11.02.02. Guaranty Bond

- A. The Contractor shall furnish a written Guaranty Bond in the format provided below prior to issuance of the Project Completion letter. The Guaranty Bond shall be executed by both the Contractor and the surety (who must be an admitted surety in accordance with California Code of Civil Procedure Section 995.670). This Guaranty Bond shall be for a period of three (3) years after the date of Notice of Completion of Contract and Acceptance of Work and shall cover all Work.
- B. The amount of the Guaranty Bond shall be no less than 15 percent of the total Contract Price(s).

SANTA CLARA VALLEY WATER DISTRICT**GUARANTEE FORM****Guarantee for****(Project Name and Project Number)****City, State**

We hereby guarantee the Project commonly known as _____ has been completed in accordance with the requirements of the Contract Documents and further agree that the Work to be free of defects in workmanship, Materials, and Equipment and to remain free of such defects for a period of three (3) years from the date of Acceptance of Work by the District's Board of Directors.

We agree that if any defects in Materials, workmanship, or Equipment become evident, we shall, within ten (10) Days after written notice of such defects, commence to repair or replace the same together with any other Work that may be damaged or displaced in so doing.

In the event of our failure to comply with the above-mentioned conditions within a reasonable time after being notified, or should the emergencies of the case require repairs or replacements to be made before we can be notified or respond to notification, we do hereby authorize the Santa Clara Valley Water District to proceed to have the defect repaired and made good at our expense; we shall pay the cost therefor upon demand.

The guarantee provided herein shall not be in lieu of, but shall be in addition to, any warranties or other obligations otherwise imposed by the Contract Documents and by law.

Contractor: _____

Signature: _____

Title: _____

Date: _____

**SANTA CLARA VALLEY WATER DISTRICT
GUARANTY BOND**

BE IT KNOWN BY THESE PRESENTS: That

WHEREAS, the Santa Clara Valley Water District, State of California, has awarded to _____ (hereinafter designated as "Principal") a Contract for _____; and

WHEREAS, said Principal is required under the terms of said Contract to furnish a Guaranty Bond for the faithful performance of said Contract's guarantee.

NOW, THEREFORE, we, the Principal and

_____ as Surety, are held and firmly bound unto the Santa Clara Valley Water District (hereinafter called "District") in the sum of

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

THE CONDITION OF THIS OBLIGATION IS SUCH that if the above Principal, or heirs, executors, administrators, successors, or assigns shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the said Contract and any alteration thereof made as therein provided, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the District, its officers, agents, and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

And the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the Work to be performed thereunder or to the Specifications accompanying the same shall in any way affect its obligation on this bond, and does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract or to the Work or to the Specifications.

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

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

_____ (Seal)	_____ (Seal)
_____ (Seal)	_____ (Seal)
_____ (Seal)	_____ (Seal)
<i>Principal</i>	<i>Surety</i>

Address: _____

NOTE: Signature of those executing for Surety must be properly acknowledged.

11.02.03. Use Before Acceptance Guarantee

- A. For Equipment or components of Equipment or other usable portions of the Work utilized or placed into service for the District's benefit during the progress of the Work and prior to Acceptance of Work, the Contractor shall submit the guarantee certificate below on the Contractor's letterhead.

(Contractor's Letterhead)

USE BEFORE ACCEPTANCE GUARANTEE

FOR

EQUIPMENT OR OTHER USABLE PORTION OF THE WORK INSTALLED BY
CONTRACTOR

AND

USED BY DISTRICT BEFORE ACCEPTANCE OF WORK

We (Name of Contractor), agree to maintain and repair as recommended by the manufacturer the following described Equipment (system) or other usable portion of the Work that has been utilized or placed into service by the personnel of the District prior to Acceptance of Work. The guarantee provided herein shall not be in lieu of, but shall be in addition to, any warranties, performance bond, payment bond, or other obligations otherwise imposed by the Contract Documents and by law.

Owner: Santa Clara Valley Water District

Description of Equipment or other portion of the Work: _____ (Include manufacturer name, model number, serial number, and such other information as needed to positively identify the Equipment/system or portion of Work.)

Location of Equipment: _____

Installed under: (Contract Number and Contract Title)

Date Installed: _____

Date of first utilization or placement into service by the District: _____

This guarantee is effective upon date shown herein under, and shall remain effective until the District's Acceptance of Work.

Name of Contractor: _____

By: _____

Address: _____

Phone: _____

License No.: _____

Date: _____

11.03. Submission of Closeout Items

- A. At completion of construction and prior to issuance of the Project Completion letter by the District, the Contractor shall deliver the following documents to the Engineer in the following form:
 - 1. One original set of As-Built Drawings in accordance with Article 14.11.01. As-Built Drawings.
 - 2. Field Test Records (two) 2 copies): Unless required to be submitted elsewhere in the Specifications, field test records shall be submitted as a closeout item bound into three ring vinyl binders with clear plastic spine label pockets with all pages numbered. A complete, neat, word processed table of contents for each binder with page numbers for each entry must be provided.
 - 3. Field survey record documentation.
 - 4. Evidence of compliance with and approval of Contractor obtained permits and associated inspections of authorities issuing the permits.
 - 5. Copies of all special guarantees, warranties, and bonds.
 - 6. Release of Claims in accordance with Article 6.03. Final Payment.
 - 7. Records indicating the District's receipt and acceptance of all tools, spare parts, and extra Material as specified in these Specifications.
 - 8. Records indicating the District's receipt and acceptance of all O&M manuals as specified in these Specifications.
 - 9. Any and all administrative paperwork required for closeout.
- B. Accompany the closeout document submittal with a transmittal letter in duplicate containing the following:
 - 1. Date
 - 2. Santa Clara Valley Water District Project name and Project number
 - 3. Contractor's name and address
 - 4. Title and number of each document
 - 5. Certification that each document as submitted is complete and accurate
 - 6. Signature of Contractor
- C. The Contractor shall turn over all keys to new and existing facilities to the Engineer. This includes keys that were loaned (if any) to Contractor staff by the District for use during the construction period. The Contractor shall provide a written description or schedule describing which keys correspond to which doors, gates, or other feature.

11.04. Final Cleaning**11.04.01. Scope and Schedule for Final Cleaning**

- A. Final cleaning is separate Work from cleaning done throughout the Project to maintain the Project site in a safe and presentable condition. Final cleaning shall be a comprehensive cleanup of all new and existing facilities affected by the Work prior to and finished within 30 Days of the District's approval for continuous use and occupancy. Final cleaning may be performed separately by structure or area at different time periods only if approved by the Engineer.
- B. Completion of this Work shall be planned and scheduled to accommodate the operational requirements of this District facility.

11.04.02. Final Cleanup

- A. Before final inspection, the Contractor shall clean the premises and, unless otherwise specified, remove from the worksite and areas adjacent to the worksite, all building Material, rubbish, debris, unused Material, concrete forms, falsework, temporary structures, and other Material and Equipment used during the construction. All parts of the Work shall be left in a neat and presentable condition to the satisfaction of the Engineer.

11.04.03. Structures

- A. Structures shall have the interiors and exterior surfaces cleaned by a professional industrial janitorial service fully knowledgeable in proper and effective cleaning methods.
- B. The structures shall be thoroughly cleaned and shall include, but shall not be limited to, the following cleaning activities:
 - 1. Paint, glazing compounds, and other Material shall be removed from glazing and skylights. Glazing and skylights shall be washed and polished on both sides. Care shall be exercised so that the glazing is not scratched or damaged.
 - 2. Interior surfaces, including walls, ceilings, light fixtures, doors, jambs, sills, piping, ducts, Equipment, electrical panels and conduits, handrails, guardrails, gratings, pipe trenches, drains, and miscellaneous fixtures shall be cleaned. Stains, spots, dirt, and dust shall be removed.
 - 3. Temporary floor protections shall be removed; floors shall be vacuumed and washed; floors other than concrete shall be waxed and buffed.
 - 4. Door and window hardware shall be cleaned and polished after all traces of stains, dirt, paints, and blemishes are removed.
 - 5. Casework and plastic laminate surfaces shall be cleaned and polished.

6. Marks, stains, fingerprints, soil, and blemishes shall be removed from painted, decorated, or stained interior surfaces.
 7. Spots, soil, paint, grout, plaster, concrete, and similar substances shall be removed from tile and the tile shall be washed.
 8. Exterior walls, doors, and louvers shall be washed.
 9. All interior and exterior signage shall be cleaned.
- C. All concrete decks and floors shall be swept and washed. Stains, including oil stains, metal rust, and weld splatter shall be removed. Spills of construction Materials, including paint, concrete, grout, adhesives, insulating Materials, chemicals, and similar Materials shall be removed and the underlying surfaces cleaned.

11.04.04. Streets, Roadways, Concrete Slabs, Sidewalks, and Paved Areas

- A. Streets, roadways, concrete slabs, sidewalks, and paved areas shall be cleaned and pressure washed so that they are free of debris, soil, and paint or construction Material spills. Painted construction markings on concrete and pavement shall be removed.
- B. All access roads and maintenance roads shall be graded, removing wheel tracks and smoothing up such roads, and restored to their specified condition, or if none specified, to the condition then existing prior to the start of construction.

11.04.05. Storm Drainage Facilities

- A. All gutters, V ditches, swales, storm drain pipe inlets, catch basins, drop inlets, and manholes shall be cleaned of soil, vegetation, and debris.

11.04.06. Unpaved Areas

- A. Unpaved areas between new facilities and between new and existing facilities shall be cleaned of all debris and construction Material. These areas shall be graded or raked to a smooth uniform surface without leaving holes, depressions, or tire tracks.

SPECIAL PROVISIONS

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SPECIAL PROVISIONS

SECTION 12. WORK AND CONTRACT TIME(S)

12.01. Summary of Work

- A. The Work to be completed under this Contract shall consist of furnishing all tools, Equipment, Materials, supplies, and manufactured articles, and all labor, transportation and services, including fuel, power, water, and essential communications, and for performing Work or other operations required to restore the Rinconada Water Treatment Plant to a safe, functional, stable site between phases 2 and 3 of the Reliability Improvements Project. Any quantities provided with Article 12.01. Summary of Work are approximate. Should there be a discrepancy between the quantities included herein and elsewhere in the Contract documents, those quantities specified elsewhere on the Contract shall govern. The Work includes, but is not limited to, the following:
1. Paving, grading, drainage, and stabilization of disturbed areas to restore road and slope surfaces and prevent erosion and sediment transport
 2. Modifications and repairs to a railing, grating, and a concrete stair landing
 3. Repair of sheet rock surrounding an indoor control panel
 4. Modification of a steel 20" pipe header to include a combination air-vacuum valve
 5. Installation and connection of sump pumps and minor electrical and control work
 6. Modifications to chemical metering pump piping
 7. Modifications to emergency shower eyewashes to install on finished grade
 8. Construction of concrete pipe supports
 9. Installation of drainage infrastructure and removal of temporary sump pumps
 10. New ramp into the detention basin

12.02. Drawings

- A. The Drawings are listed below.
1. G-1 COVER, VICINITY, AND LOCATION MAPS
 2. G-2 DRAWING INDEX 1 AND SHEET CODE LEGEND

3. G-3 GENERAL NOTES
4. G-4 GENERAL SYMBOLS
5. C-1 GRADING, PAVING AND DRAINAGE PLAN 1
6. C-2 GRADING, PAVING AND DRAINAGE PLAN 2
7. C-3 GRADING, PAVING AND DRAINAGE PLAN 3
8. C-4 GRADING, PAVING AND DRAINAGE PLAN 4
9. C-5 GRADING, PAVING AND DRAINAGE PLAN 5
10. C-6 GRADING, PAVING AND DRAINAGE PLAN 6
11. C-7 GRADING, PAVING AND DRAINAGE PLAN 7
12. C-8 ENLARGED PARTIAL PLAN CHEMICAL UNLOADING AREA
CONTAINMENT BERM RELOCATION
13. C-9 PROFILE AND SCCTIONS CHEMICAL UNLOADING AREA
CONTAINMENT BERM RELOCATION
14. CD-1 TYPICAL CIVIL DETAILS
15. CD-2 TYPICAL CIVIL DETAILS
16. CD-3 NEW CONCRETE STAIR LANDING
17. CD-4 ALUMINUM RAILING MODIFICATIONS
18. AD-1 ARCHITECTURAL DETAILS
19. MD-1 WWR DISCHARGE HEADER AIR VALVE INSTALLATION AND
PIPING MODIFICATIONS
20. MD-2 LEAK DETECTION VAULTS DETAILS
21. MD-3 LIQUID ALUM METERING PUMPS MODIFICATIONS
22. MD-4 POWDERED ACTIVATION CARBON METERING PUMPS
MODIFICATIONS
23. MD-5 POWDERED ACTIVATED CARBON METERING PUMPS
MODIFICATIONS
24. MD-6 EMERGENCY SHOWER EYEWASH REPAIR DETAILS
25. MD-7 PROCESS WATER LINE PIPE SUPPORT

12.03. Contract Time(s)

- A. The Contractor shall complete all Work required under this Contract before the expiration of 210 Days from the first chargeable Day of the Contract. The first chargeable Day of the Contract shall be defined in the NTP issued by the District.
- B. The Contractor is advised that dry conditions may not exist and that flow in various watercourses encountered in this Project may occur. In no case shall any extension of time be granted if the basis of a Claim is water flowing in a watercourse. No extension of time shall be given because of rain, or because of results of rain, except set forth in these Specifications.
- C. Work shall include the following Milestones:
 - 1. Milestone 1 – drainage infrastructure – complete within 130 days from NTP
 - 2. Milestone 2 – grading and paving – complete within 170 days from NTP
 - 3. Milestone 3 – balance of work – complete within 210 days from NTP
- D. There are constraints on the work hours (Section 16 and Section 18) and constraints on when the chemical pumps and WWR air release valve can be installed without affecting plant operation (Section 18).

12.04. Inclement Weather

- A. The time allowance for completion of Work is based upon the inclusion of 7 Days for inclement weather, which, pursuant to Standard Provisions Article 3.08.02. Inclement Weather may be excusable.
- B. The Contractor shall comply with Standard Provisions Article 3.08.02. Inclement Weather.

12.05. Liquidated Damages

- A. In accordance with Standard Provisions Article 5.08. Liquidated Damages, the District may assess as Liquidated Damages the following amounts:
 - 1. \$1000 per Day for failure to complete all Work included in the Contract within the time limit allowed.

(For failure to complete defined milestones)

- B. \$1,000 per Day for failure to complete all Work of Milestone 1 within the time limit allowed.
- C. \$1,000 per Day for failure to complete all Work of Milestone 2 within the time limit allowed.

(For failure to submit certain submittals)

- D. \$250 per Day for failure to submit the Preliminary Progress Schedules, any Detailed Progress Schedules, or master submittal list within the time limits allowed.

(For noncompliance with certain Contract provisions)

- E. \$150 for each truck operated by the Contractor, subcontractors and suppliers arriving during normal work days and hours when Contractor and responsible personnel fails to be present to properly receive delivery, hence requiring the District to reject the delivery.
- F. \$500 for each truck operated by the Contractor, subcontractors and suppliers arriving outside of normal work days and hours whether Contractor and responsible personnel are present receive delivery or not. District reserves right to reject delivery and require Contractor to reschedule delivery during normal working days and hours.
- G. \$500 for each truck operated by the Contractor, subcontractors and suppliers for each truck found to be idling or queuing at the plant entry gate or in the surrounding neighborhood without prior approval by the Engineer.
- H. \$500 for each truck operated by the Contractor, subcontractors or suppliers arriving or leaving the project site during the restricted periods of truck traffic passing by the Rolling Hills Middle School. Contractor's attention is directed to Article 18.08. for restricted periods.
- I. \$500 for each truck operated by the Contractor, subcontractors or suppliers that is found to be using residential streets (such as Wimbledon Drive, Wedgewood Avenue, Roxbury Lane, Granada Way, etc.) not specifically listed in Article 18.08. as an allowable truck route.
- J. \$2,500 per hour between November 15 and March 15 (low production period – under 50 mgd) in excess of the time allowed for a scheduled or for any unscheduled plant shutdown due to action(s) by the Contractor.
- K. \$5,000 per hour between March 16 and November 14 (high production period) in excess of the time allowed for a scheduled or for any unscheduled plant shutdown due to action(s) by the Contractor.

12.06. Bonus

- A. Not Applicable.

12.07. Changes (Not Used)

SECTION 13. GENERAL REQUIREMENTS

13.01. Abbreviations and Acronyms

In addition to the abbreviations provided under Section 1 of the Standard Provisions, the following abbreviations and acronyms shall apply for this Project:

ACIL	American Council of Independent Laboratories
AITC	American Institute of Timber Construction
APA	American Plywood Association
ASME	American Society of Mechanical Engineers
ICBO	International Conference of Building Officials
RWTP	Rinconada Water Treatment Plant

13.02. Definition of Key Terms

- A. Operational Facility Shutdown: The period of time when the normal, intended use of the facility cannot take place or when the facility is operating at less than its normal, intended production capability.
- B. Unscheduled Operational Facility Shutdown: Operational Facility Shutdowns initiated by or due to action by the Contractor that are beyond that anticipated or allowed in the Contract. Causes of unscheduled shutdowns could include, but are not limited to, actions causing a power outage; contaminating water such that State water quality regulations are violated or are in imminent danger of violation; and impeding chemical feed systems, water quality monitoring, or process operations.
- C. Operational: To be considered Operational, a facility or facility component must be functional in all manners intended for its use at its rated capacity and through its entire operation range. Operational facilities may require transmission facilities, storage facilities, process facilities, and support systems (e.g., chemicals, water, power, communication) to be fully functional and accessible. For a new facility to be considered operational, it must be installed and tested and District personnel must have received specified training by the Contractor in the facility's operation and maintenance.
- D. Continuous Operation: A completed system operating continuously, 24 hours a Day, without interruption, and without the need for intervention other than normal Operational adjustments by the District's operating personnel.

13.03. Web-Based Construction Document Management System

13.03.01. Summary

- A. The Contractor, and its subcontractors and suppliers shall utilize ProjectWise Construction Management (formerly EADOC) for submission of all data and documents throughout the duration of the Contract, unless specified otherwise in the Contract Documents. The term "Copy" or "Copies" shall refer to electronic

copies unless a hard copy is specified. Where a hard copy is specified, both electronic and paper versions shall be submitted:

1. ProjectWise is a web-based construction management application hosted by Bentley Systems, Inc. ProjectWise is a registered trademark of Bentley Systems, Inc.
 2. ProjectWise is paid for by the District.
 3. ProjectWise will be made available to all Contractor's personnel, subcontractor personnel and suppliers working under the Contract.
 4. ProjectWise will be made available to all Contractor's personnel, subcontractor personnel and suppliers working under the Contract.
 5. ProjectWise shall be the primary means of project information submission and management.
- B. Related Sections:
1. Article 7.01, Submittal Requirements and Article 20.01, Additional Submittal Requirements.
 2. Article 2.04. Requests for information.
 3. Article 5.06. Progress Schedules.
 4. Article 14.10. Operation and Maintenance Documents.
 5. Section 21—Payment Procedures.
- C. The Engineer will establish the Contractor's access to ProjectWise by allowing access and assigning user profiles to accepted Contractor personnel. User profiles will define levels of access into the system and determine assigned function-based authorizations and user privileges to enter and access information in ProjectWise. Subcontractors and suppliers will be given access to ProjectWise by and through the Contractor. Entry of information exchanged and transferred between the Contractor and its subcontractors and suppliers on ProjectWise shall be the responsibility of the Contractor.
- D. Within five (5) work days after receiving the Notice to Proceed, the Contractor shall submit:
1. List of Contractor's personnel responsible for ProjectWise administration, as well as that for the Contractor's subcontractors and suppliers.
 2. Include descriptions of key personnel's roles and responsibilities for this project. Contractor shall also identify its organization's administrator on the list.

- E. Data entered in a collaborative mode (entered with the intent to share as determined by permissions and workflows within the ProjectWise system) by the Engineer and the Contractor will be jointly owned.
- F. The Contractor is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. The District's acceptance via automated system notifications or audit logs extends only to the face value of the submitted documentation and does not constitute validation of the Contractor's submitted information.

13.03.02. Computer and Connectivity Requirements

- A. The Contractor shall use computer hardware and software that meets the requirements of ProjectWise system as recommended by Bentley Systems, Inc. and as described herein to access and utilize ProjectWise. As recommendations are modified by ProjectWise, the Contractor shall upgrade its system(s) to meet or exceed the recommendations. Upgrading of the Contractor's computer systems shall not be justification for a cost or time modification to the Contract.
- B. The Contractor shall ensure that connectivity to the ProjectWise system is accomplished through DSL, cable, T-1 or wireless communications systems. The minimum bandwidth requirement for using the system is 128 kb/s. It is recommended that a faster connection be used when uploading pictures and files into the system.
- C. ProjectWise currently supports Chrome, Firefox, Internet Explorer, and Safari web browsers for accessing the application.
- D. ProjectWise is a web-based environment and therefore, subject to the inherent speed and connectivity limitations of the internet. The Contractor is responsible for its own connectivity to the internet. ProjectWise response time is dependent on the Contractor's equipment, including processor speed, internet access speed, etc. and current traffic on the internet. The District will not be liable for any delays associated from the usage of ProjectWise including, but not limited to: slow response time, down time periods, connectivity problems, or loss of information. The Contractor shall ensure connectivity to the ProjectWise system (whether at the home office or job site). Under no circumstances will usage of ProjectWise be grounds for a time extension or cost adjustment to the Contract.

13.03.03. Contractor Responsibility

- A. Contractor shall be responsible for scanning or otherwise converting to electronic format all project submittals and Contractor correspondence, drawings, sketches, etc., and uploading them to the ProjectWise web site.
- B. The Contractor shall be responsible for the validity of its information placed in ProjectWise.

- C. Accepted users shall be knowledgeable in the use of computers, including internet browsers, email programs, CAD drawing applications, and Portable Document Format (PDF) document distribution program.
- D. The Contractor shall utilize the existing forms in ProjectWise to the maximum extent possible. If a required form does not exist in ProjectWise, the Contractor shall include a form of its own or one provided by the Engineer (if available) as an attachment to a submittal.
- E. PDF documents shall be created through electronic conversion rather than optically scanned whenever possible. If optically scanned, the document shall be converted through an Optical Character Reader so that all documents are searchable. If the documents have multiple sections, then the Contractor shall provide a "bookmark" for each section. The Contractor is responsible for the training of its personnel in the use of ProjectWise (outside what is provided by the District) and the other programs indicated above as needed. The Contractor shall disable all security so that copying and pasting of information from the PDF document is enabled.
- F. The Contractor shall provide a list of key ProjectWise personnel for the Engineer's acceptance. Contractor is responsible for informing the Engineer of additional personnel, subcontractors and suppliers to be added to the system, or of personnel, subcontractors and suppliers to be removed from the system. The Engineer reserves the right to perform a background check on all potential users.

13.03.04. Training

- A. The District will provide training consisting of two web-based seminars in conjunction with a conference call. Additionally, one classroom training seminar may also be required. The training seminars are 2 hours each.
- B. Contractor shall arrange and pay for the facilities and hardware/software required to facilitate the Contractor's own training.

13.03.05. ProjectWise Utilization

- A. ProjectWise shall be utilized in connection with all document and information management required by these Contract Documents. Documents and information to be submitted electronically include, but are not limited to, the documents described below.
- B. Submittals:
 - 1. Submittals shall be in accordance with Section 7—Submittal Management and Section 20—Submittal and Quality Requirements.

2. In addition to electronic copies transmitted via ProjectWise, the Contractor shall provide one hard copy of each favorably reviewed submittal. Favorable Review consists of those submittals returned to the Contractor with action marked as “No Exceptions Noted,” “Make Corrections as Noted,” or “In Receipt Of.”
- C. Administrative documents: All correspondence shall be submitted using ProjectWise. Examples include, but are not limited to:
1. Written correspondence (letters, memos, etc.).
 2. Requests for Information (RFI).
 3. Certified payroll.
 4. Survey requests.
 5. Compliance documentation (test reports, QA/QC reports, certifications).
- D. Schedules:
1. All schedules and associated updates shall be submitted in accordance with Article 5.06. Progress Schedules.
 2. All schedules and associated updates shall be submitted as specified in these Contract Documents and as a native backed-up file of the scheduling program being used. The schedule shall be posted as a PDF file in the format specified in these Contract Documents and as a backed-up file.
- E. Financial Documents:
1. Schedule of Values.
 2. Monthly applications for payment.
 3. Change Order requests and proposals.
 4. Change Order supporting documentation, including daily extra work reports.

Requirements for financial documents shall be in accordance with Section 21—Payment Procedures. Supporting material for financial documents shall be submitted on ProjectWise utilizing both the ProjectWise schedule of values format and as PDF attachments.

13.04. District-Furnished Reports (Not Used)**13.05. Contractor’s Engineering and Design**

- A. No Special Requirements

13.05.01. Seismic Design Criteria

- A. No Special Requirements

13.05.02. Wind Design Criteria

- A. No Special Requirements

13.05.03. Hydraulic Design Criteria

- A. No Special Requirements

13.05.04. Truck Loading

- A. Construction truck traffic loading shall not exceed H20-44 and HS20-44.
- B. Cast products used shall be designed for H20-44 truck loading except where specified otherwise.
- C. Areas within the work area that have plates overtop, are protecting utilities with shallow cover. Do not remove the plates unless indicated on the Plans.

SECTION 14. SPECIAL REQUIREMENTS

14.01. Engineer

- A. The Engineer is the designated representative of the Deputy Operating Officer of the Water Utility Capital Division.

14.02. Project Signs

- A. The Contractor shall install and maintain District-furnished Project identification signs at the locations shown on the Drawings and in accordance with the notes and details thereon and as specified in these Specifications.
- B. The signs shall be clearly visible to the public. The bottom edge of the sign shall be as shown on the Drawings. All hardware, posts, and fasteners shall be furnished and installed by the Contractor.
- C. The signs are to be picked up at the sign painter, arrangements to pick up the signs shall be made by contacting the sign painter at least two (2) working days in advance of the date of when the signs are to be picked up.
- D. The Contractor shall be responsible for transporting the signs to the job site and for ascertaining all information, dimensions, connections, and appurtenances required to provide satisfactory installation of the signs.
- E. The signs shall be installed prior to the start of construction and shall be maintained throughout the construction of the Project. Signs and supports shall be maintained in a neat, clean condition; and damages to structures, framings, or signs repaired until Project Completion. Remove or paint over graffiti and repair signs. Signs shall be straightened whenever they are not plumb.
- F. Upon completion and acceptance of the Project by the District, the Contractor shall remove the signs and framing and return them to the District warehouse at 5905 Winfield Boulevard, San Jose, CA 95123. Arrangement to return the signs shall be made by contacting Winfield Warehouse at (408) 265-2607, extension 3800, at least two (2) working days in advance of the date of when the signs are to be returned. The Contractor shall restore the sign-removal areas, backfill holes with soil and/or repair previous pavement saw cuts in kind, and clean the surrounding areas.
- G. Sign Installation
 - 1. Project signs furnished by the District will be approximately four (4) feet wide and up to eight (8) feet high.
 - 2. Sign support structure shall be two (2) 4-inch x 4-inch (surfaced four [4] sides) pressure-treated-wood post supports (grade No. 2 or better, straight, with no loose knots), one on each side of the sign. Fasten posts to District-furnished signboard with 4-inch-long minimum deck screws through posts, 8 inches on center. Top edges of each post shall have a

.5-inch chamfer all around. Two-thirds of the height of each sign board shall be fitted into a nominal .75-inch-deep dado (verify in field) centered on each support post.

3. Mounting hardware shall be galvanized steel, concealed or recessed fasteners.
4. Posts shall be painted with exterior quality paint, white semi-gloss.
5. Finishes and paints shall be adequate to withstand continuous exterior weathering for four (4) years without fading or damage to the appearance.
6. Sign support posts shall be installed plumb with a minimum of three (3) feet of burial in 12-inch-minimum diameter holes backfilled with concrete. The bottom of sign board shall be approximately 12 to 18 inches above grade as directed by Engineer. The top of the concrete shall be sloped away from posts all around.
7. Pull boxes for Project flyers shall be installed on the Project sign as directed by the Engineer. Pull-box flyers will be maintained by the District.

14.02.01. Payment

- A. Full compensation for doing all Work necessary to pick up and install the District furnished signs shall be included in the lump sum price Bid for mobilization.

14.03. Office Facilities**14.03.01. Engineer's Office**

- A. Office facilities for the Engineer will not be required for this Project.

14.03.02. Contractor's Office

- A. The District does not require the Contractor to have an office on site. If one is desired, the Contractor shall provide and maintain at the project site a suitable trailer office for Contractor's use. Location of Contractor and sub-contractor office trailers shall be at the Contractor's Staging Area shown on the Drawings and shall be as approved by the Engineer. Project copies of the Contract Documents, project progress records, project schedule, submittals, and other relevant documents which shall be accessible to the Engineer and other District employees during normal working hours shall be kept on site; if a Contractor office is provided, the documents shall be kept there.
- B. Contractor facilities shall observe COVID guidelines. This includes sanitation areas, signage, and disposable of used materials.

14.03.03. Removal and Disposal

- A. Office facilities, furnishings, and/or Equipment specified in this Special Provisions Article 14.03. Office Facilities shall be furnished, installed, and in operating condition prior to performing any other Contract Work under the Contract.
- B. Prior to issuance of the Project Completion letter by the District, the Contractor shall remove and dispose of its temporary facilities, Material, and Equipment and restore the site to its original or better condition.

14.03.04. Payment

- A. Full compensation for doing all Work necessary to provide office facilities, including operating and maintenance costs as specified herein, shall be included in the lump sum price Bid for mobilization.

14.04. Use of District Facilities

- A. Contractor's employees shall not use District restrooms, offices, lunch rooms, parking spaces, work rooms, or similar facilities.
- B. Contractor will not be allowed to use District owned equipment in the facility including forklifts and man-lifts, unless specifically authorized by these Specifications.

14.05. Temporary Utilities

- A. Temporary Electrical Power: All electrical power for the Contractor's construction operations, offices, storage spaces, lighting, testing, heating, cooling, ventilating, and security and to support other temporary utilities and facilities described herein shall be provided and paid for by the Contractor. The Contractor shall arrange with the Local electrical utility, at no additional cost to the District, the provision and removal of adequate, temporary electrical service and/or the provision of a temporary electrical generator. The location of the temporary electrical service will be subject to the approval of the Engineer.
- B. Temporary Lighting: The Contractor shall provide temporary lighting in all Work areas sufficient to maintain a lighting level during working hours not less than the lighting level required by California OSHA standards. As permanent lighting facilities are completed, these may be used in lieu of temporary facilities, provided, however, that bulbs, lamps, or tubes of such facilities used by the Contractor are replaced immediately prior to final Acceptance of the Work. All temporary exterior lighting shall be shielded and directed downward and toward the interior of the treatment plant to minimize its effects on treatment plant neighbors.
- C. Temporary Water: The Contractor shall (i) pay for and construct facilities necessary to furnish potable water for human consumption and non-potable water for use during construction; (ii) provide backflow-prevention devices

properly sized for use on the metered, potable water connection; and (c) post ample signs throughout the Work area warning of the usage of non-potable water if non-potable water is being used.

- D. Temporary Sanitary Facilities: Sanitary facilities for the Contractor and all Subcontractors shall be provided by the Contractor. Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view wherever possible. At least one (1) toilet shall be provided for every 20 workers.
- E. Solid and Liquid Waste Disposal: The Contractor shall provide a sufficient number of waste receptacles, dumpsters, and bins to contain all solid and liquid waste generated from construction operations. Existing waste receptacles owned by the District shall not be used by the Contractor. Waste receptacles shall be emptied weekly at a minimum and more frequently when full.
- F. Temporary Compressed Air: The Contractor shall provide compressors for compressed air for construction operations as required. Use of existing or new plant air compressor systems for construction operations is prohibited.

14.05.01. Payment

- A. Full compensation for doing all Work necessary to provide temporary utilities shall be included in the lump sum price Bid for mobilization.

14.06. Staging Area

- A. The staging area is shown on the Drawings and is already paved or covered with compacted aggregate base and may be used for parking vehicles and trailers; or for maintenance areas, Equipment, piping, formwork, rebar; or for storing masonry on pallets and metal product storage shall be graded, as required, and surfaced with a minimum of three (3) inches of compacted, aggregate-base rock over a high-modulus, woven, soil-separation geotextile. Areas storing aggregate base or other rock products shall also be placed on this same geotextile. The objective is to maintain separation between native and construction Material. Areas storing soils and sand are not required to be surfaced with aggregate-base course.
- B. Aggregate base shall be removed from all staging areas prior to Project Completion; surfaces shall be regraded to their original grades or to matching surrounding conditions as directed by the Engineer.
- C. Any soils contaminated with petroleum product or other Hazardous Material by the Contractor shall be removed by the Contractor and disposed of in accordance with Federal, State, and Local laws.
- D. The Contractor is responsible for weed control in staging and Material storage areas.

- E. Any area on-site that is not the designated staging area, the Contractor may temporarily stockpile material, however it must be removed from the site at the end of the work day.

14.06.01. Payment

- A. Unless noted otherwise, full compensation for Work involved in complying with all requirements under Special Provisions Section 14 shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time or payment shall be allowed.

14.07. District-Furnished Material and Equipment

- A. The District will furnish the following Material to the Contractor. The Contractor shall install the District-furnished Material at the locations shown on the Drawings.
 - 1. Sump pump and level switches and cables to be installed in LDV 3
 - 2. Sump pump and level switches and cables to be installed in LDV at the WWR facility
- B. Arrangements to inspect or pick up the Material shall be made by contacting Mae Siendo at (408) 510-2167, extension 2384 at least two (2) working days in advance of the date of when the Material is to be inspected or picked up.

14.07.01. Assignment of Contract for District-Procured Material

- A. No Special Requirements

14.08. Salvaged Material and Equipment

- A. The District owns the protective steel plates covers. Where they are no longer needed, the Contractor shall be relocated to an area designated by Plant Operations.
- B. The District owns all existing sump pumps. Where they are no longer needed, the Contractor shall be relocated to an area designated by Plant Operations.

14.09. Tools and Spare Parts

- A. No Special Requirements

14.10. Operation and Maintenance Documents

- A. No Special Requirements

14.11. Maintenance of Record Documents

- A. The Contractor shall maintain at the site the following record documents:
 - 1. As-Built Drawings (full size).
 - 2. Specifications and Addenda.
 - 3. Favorably reviewed submittals, including shop Drawings, product data, samples, calculations, and other submittals.
 - 4. PCOs, Change Orders, DCOs, field orders, and other Contract modifications.
 - 5. Field and shop testing records.
 - 6. Survey records.
 - 7. Correspondence.
- B. The Contractor shall provide files and racks for orderly storage of the documents; maintain the documents in clean, dry, legible condition, and make all documents and samples available during regular business hours for inspection and reproduction by the Engineer.
- C. The Contractor shall keep the record documents current with construction in progress. Completed construction Work shall not be permanently concealed until required information has been recorded on the As-Built Drawings.

14.11.01. As-Built Drawings

- A. The Contractor is required to keep on site and available for inspection at any time an accurately marked, legible, up-to-date set of Contract Drawings (as-built Drawings) for the Work installed. The Contractor shall record as the Work progresses changes to the original Contract Drawings, including, but not limited to, the following items:
 - 1. Field changes or adjustments in the final location or in the final dimensions or details of the Work.
 - 2. Changes resulting from RFIs, Change Orders, DCOs, and other Contract modifications.
 - 3. Locations of underground and above-ground utilities and appurtenances referenced to permanent, accessible features of the Work.
 - 4. Details not included in the original Contract Drawings but incorporated into the Work, referenced to approved shop Drawings, product data, samples, calculations, or other submittals.

- 5. Location of items embedded or concealed from view (e.g., conduits, cables, junction boxes, piping, etc.).
- B. Changes shall be clearly described on the Drawings by note as required.
- C. All entries shall be dated, calling attention to the entry by a “cloud” drawn around the area or areas affected.
- D. The as-built Drawings shall be kept in a safe place and protected from damage by weather and manhandling. As-built Drawings shall be stored apart from documents used for performing the Work and shall be kept in a dry, legible condition and in good order. Do not use as-built Drawings for construction at the job site.
- E. Changed Work or conditions of the Work covered up or concealed by the Contractor in advance of recordation on the as-built Drawings shall be uncovered to allow accurate recordation of the change then re-covered all at the Contractor’s expense.
- F. Changes shall be marked directly on the Contract Drawings in accordance with instructions provided during the kick-off meeting. If there is insufficient space on a Drawing to mark up the change, the Contractor shall draw additional sketches to completely show the change and shall attach the sketches to the Drawing.
- G. The Engineer has the right to review the Contractor’s as-built Drawings at any time to ascertain that they are being kept up to date and that they show sufficient detail. Should the Contractor’s as-built Drawings not be up to date or should they lack necessary detail per the as-built guidelines, the Engineer may withhold five (5) percent from each monthly progress payment until the Drawings are deemed acceptable by the Engineer. Such review by the Engineer shall not relieve the Contractor of its responsibility for keeping the as-built Drawings current and complete.
- H. The construction as-built Drawings shall be stamped “As-Built” and shall be, at completion of construction, signed and dated by the Contractor and submitted as required in Article 11.03 Submission of Closeout Items.

14.12. Emergency Work

- A. The Contractor shall have personnel available on call for emergency Work connected with those improvements, tie-ins, and modifications being completed as part of this Work. Contractor on-call personnel shall be able to be on-site within two (2) hours of verbal notice, 24 hours a day, seven (7) days a week. Telephone numbers for these individuals shall be provided to the Engineer and shall be kept current.

14.13. Dispute Review Board

- A. No Special Requirements

14.13.01. Payment

- A. No Special Requirements

14.14. Escrow Bid Documents

- A. Escrow Bid Documents are not required.

14.15. Partnering

- A. Professionally Facilitated Project Partnering (PFPP) is not required but may be requested by the Contractor. The Contractor's attention is directed to Standard Provisions Article 3.15.02. Professionally Facilitated Project Partnering.

14.15.01. Payment

- A. Full compensation for doing all Work necessary to comply with the partnering requirements as specified in these Specifications shall be included in the lump sum price Bid, Bid Item 28 Professionally Facilitated Project Partnering. Payment shall be in accordance with Standard Provisions Article 3.15.02. Professionally Facilitated Project Partnering.
- B. All bidders shall bid the amount shown on the bid form for each Bid Item Professionally Facilitated Project Partnering. This amount is estimated only and the Bid Item will be used to reimburse the Contractor in accordance with Standard Provisions Article 3.15.02. Professionally Facilitated Project Partnering.

14.16. Insurance

- A. Failure to file acceptable insurance documents within 10 Days after receiving the Notice of Contract Award letter shall be just cause for the District's annulment of award and forfeiture of the Bidder's security in accordance with the Instruction to Bidders, Paragraph 24 - Failure to Execute Contract. Failure to comply with the instructions below could also result in a delay in receiving the Notice to Proceed. The District will not be responsible for time lost or costs incurred due to failure to comply with these requirements. Please note the check-list of documents needed at the end of this Appendix IV insurance requirement.
- B. Without limiting the Contractor's indemnification of, or liability to, the District, the Contractor must provide and maintain at its own expense during the term of this Contract or as may be further required herein the insurance coverages and provisions in this article.
- C. The Contractor must provide its insurance broker(s)/agent(s) with a copy of these requirements and warrants that these requirements have been reviewed by the Contractor's insurance agent(s) and/or broker(s) who have been instructed by the Contractor to procure the insurance coverage required herein.

- D. In addition to certificates, the Contractor must furnish the District with copies of original endorsements affecting coverage required herein. The certificates and endorsements shall be signed by a person authorized by the insurer to bind coverage on its behalf. **All endorsements and certificates are to be received and approved by the District before the Contract is executed.** In the event of a Claim or dispute, the District has the right to require the Contractor's insurer to provide complete, certified copies of all required, and pertinent insurance policies, including endorsements affecting the coverages required herein.
- E. If your insurance broker has any questions about the above requirements, please advise him/her to call Mr. David Cahen, District Risk Manager at (408) 630-2213.

14.16.01. Certificates of Insurance

- A. Contractor shall furnish the District with a Certificate of Insurance. The certificates shall be issued on a standard ACORD Form.
- B. Contractor shall instruct their insurance broker/agent to submit all insurance certificates and required notices electronically in PDF format to the designated District Contract Administrator and email a copy to scvwdplanroom@valleywater.org.
- C. The certificates must:
 - 1. Identify the underwriters, the types of insurance, the insurance limits, the deductibles and the policy term;
 - 2. Include copies of all the actual policy endorsements required herein; and
 - 3. In the "Certificate Holder" box include:

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Contract No. (to be provided at time of bid)
 - 4. The Contract number must be included.
- D. In the Description of Operations/Locations/Vehicles/Special Items Box:
 - 1. Certificate Holder shall be named as Additional Insured;
 - 2. District agreement or project number shall appear;
 - 3. The list of policies scheduled as underlying on the Umbrella policy shall be listed; and
 - 4. Waiver of Subrogation must be indicated as endorsed to all policies.

- E. If Contractor receives any notice that any of the insurance policies required by this Contract may be cancelled or coverage reduced for any reason whatsoever, Contractor or insurer shall immediately provide written notice to the designated District Contract Administrator that such insurance policy as required herein is canceled or coverage is reduced.

14.16.02. Maintenance of Insurance

- A. If Contractor fails to maintain such insurance as is called for herein, District, at its option, may suspend payment for work performed and/or may order Contractor to suspend all Contractor's work at Contractor's expense until a new policy of insurance is in effect.

14.16.03. Renewal of Insurance

- A. Contractor will provide the District with a current Certificate of Insurance and endorsements within thirty (30) business days from the expiration of insurance.
- B. Contractor shall instruct its insurance broker/agent to:
 - 1. Submit all renewals of insurance certificates and required notices electronically in PDF format to: scvwdplanroom@valleywater.org
 - 2. Provide the following information in the "Certificate Holder" box:

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Contract No. C0670
 - 3. The Contract number must be included.

14.16.04. Required Coverages

- A. Commercial General/Business Liability Insurance
 - 1. **\$2,000,000** per occurrence/**\$2,000,000** aggregate limits for bodily injury and property damage.
 - 2. **\$2,000,000** Products/Completed Operations aggregate to be maintained for at least three (3) years following acceptance of the Work by the District's Board of Directors.
 - 3. General liability insurance must include the following:
 - a. Be written on standard ISO forms, or inspected by the District Risk Manager;
 - b. Include coverage at least as broad as found in standard ISO Form CG 00 01;

- c. Include Premises and Operations;
 - d. Include Contractual Liability expressly including liability assumed under this Contract;
 - e. If the Contractor shall be working within 50 feet of a railroad or light rail operation, any exclusion as to performance of operations within the vicinity of any railroad bridge, trestle, track, roadbed, tunnel, overpass, underpass, or crossway must be deleted or a railroad protective policy in the above amounts provided;
 - f. Owners and Contractors' Protective Liability;
 - g. Include Severability of Interest;
 - h. Include Explosion, Collapse, and Underground Hazards, (X, C, and U);
 - i. Include Broad Form Property Damage liability; and
 - j. Contain no restrictive exclusions (such as but not limited to CG 2153, CG 2144 or CG 2294)
4. The District reserves the right to require certain restrictive exclusions be removed to ensure compliance with the above.
- B. Business Auto Liability Insurance
- 1. **\$2,000,000** combined single limit for bodily injury and property damage per occurrence, covering all owned, non-owned and hired vehicles.
 - 2. **Excess or Umbrella policies** may be used to reach the above limits for the General Liability and/or Business Auto Liability insurance limits, however all such policies must contain a primacy clause and meet all other requirements as stated herein.
- C. Builders' Risk (Course of Construction) Insurance
- 1. Covering all risks of loss less policy exclusions for an amount equal to the completed value of the Project with no coinsurance penalty provisions.
 - 2. The Contractor's coverage shall provide the following:
 - a. Coverage shall be provided on an "all-risk" or "special forms" basis (including perils of earthquake and flood, unless waived by the District's Risk Manager), including coverage for "soft costs" such as design, engineering, and construction management fees.
 - b. Coverage shall be provided on the work and materials which are the subject to this Contract, whether in process or manufactured

or finished, including "in transit" coverage to the final agreed upon destination of delivery, and including loading and unloading operations, and such coverage shall be in force until the work and materials are accepted by the District's Board of Directors.

- c. Builder's Risk policy shall name Santa Clara Valley Water District as loss payee and additional insured as its interests may appear at the time of the loss.
- d. Deductible shall not exceed \$25,000 per occurrence and shall be borne by the Contractor, except that higher deductibles for earthquake and flood may be approved by the District's Risk Manager.
- e. Loss, if any, shall be adjustable with and payable to the District as trustees for all entities having an insurable interest, except in cases as may require payment of all or a proportion of such insurance to be made to a mortgagee as its interest may appear.
- f. The insurer shall agree to waive all rights of subrogation against the District.
- g. If the Contractor fails to maintain such insurance as is called for herein, the District, at its option, may order the Contractor to suspend work at Contractor's expense until a new policy of insurance is in effect and on file with the District's project manager.
- h. The policy shall provide Santa Clara Valley Water District the right to occupy the premises without termination of the policy until final acceptance of the project.

D. Workers' Compensation and Employer's Liability Insurance

- 1. Statutory California Workers' Compensation coverage covering all Work to be performed for the District.
- 2. Employer liability coverage for not less than **\$1,000,000** per occurrence.

E. Surety Bonds

- 1. The Contractor shall provide the following surety bonds:
 - a. **Bid bond** A written guarantee from a bank or insurer submitted by the Contractor to the District ensuring that, upon acceptance of the bid by the District, the contractor will proceed with the contract.

- b. **Performance bond** A written guarantee from a bank or insurer submitted by the Contractor ensuring payment of the contract in case Contractor fails in the full performance of the contract.
- c. **Payment bond** A deposit or guarantee backed by a third party that all sums owed by the Contractor to its employees, suppliers, subcontractors and other creditors will be paid on time and in full.

14.16.05. General Requirements

- A. Additional Insured Endorsement(s): Contractor must provide an additional insured endorsement for Commercial General/Business Liability (for both on-going and completed operations) and Business Automobile liability coverage naming the Santa Clara Valley Water District, its Directors, officers, employees, and agents, individually and collectively, as additional insureds, and must provide coverage for acts, omissions, etc. arising out of the named insureds' activities and work. Other public entities may also be added to the additional insured endorsement as applicable and the Contractor will be notified of such requirement(s) by the District. **NOTE:** This section does not apply to the Workers' Compensation and Professional Liability policies.
 - 1. **Primacy Clause** – Contractor will provide evidence (either through the Certificate of Insurance, endorsement or language in the insurance contract) that Contractor's insurance is primary with respect to any other insurance which may be carried by the District, its Directors, its officers, agents and employees, and the District's coverage must not be called upon to contribute or share in the loss. **NOTE:** This section does not apply to the Workers' Compensation policies.
 - 2. **Cancellation Clause** – Contractor will provide endorsements for all policies stating that the policy will not be cancelled without 30 Days prior notification to the District.
 - 3. **Acceptability of Insurers** – All coverages must be issued by companies admitted to conduct business in the State of California, which hold a current policy holder's alphabetic and financial size category rating of not less than A- V, according to the current Best's Key Rating Guide or a company of equal financial stability that is approved by the District's Risk Manager. Non-Admitted companies may be substituted on a very limited basis at the Risk Manager's sole discretion.
 - 4. **Self-Insured Retentions or Deductibles** – Any deductibles or self-insured retentions must be declared to and approved by the District. At the option of the District, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the District, its officers, officials, employees and volunteers; or the Contractor shall provide a financial guarantee satisfactory to the entity guaranteeing payment of losses and related investigations, claim administration, and defense expenses. Contractor agrees that in the event of a claim they will

pay down any agreed-upon SIR in a prompt manner as soon as bills are incurred in order to trigger the insurance related to the SIR.

5. **Subcontractors** – The Contractor shall secure and maintain or shall be responsible for ensuring that all subcontractors performing the Contract secure and maintain all insurance coverages appropriate to their tier and scope of work in a form and from insurance companies reasonably acceptable to the District.
6. **Amount of Liability Not Limited to Amount of Insurance** – The insurance procured by Contractor for the benefit of the District must not be deemed to release or limit any liability of Contractor. Damages recoverable by the District for any liability of Contractor must, in any event, not be limited by the amount of the required insurance coverage.
7. **Coverage to be Occurrence Based** – Except for Professional Liability, all coverage must be occurrence-based coverage. Claims-made coverage is not allowed.
8. **Waiver of Subrogation** – Contractor agrees to waive subrogation against the District to the extent any loss suffered by Contractor is covered by any Commercial General Liability policy, Automobile policy, Workers' Compensation policy described in **Required Coverages** above. Contractor agrees to advise its broker/agent/insurer and agrees to provide evidence (either through the Certificate of Insurance, endorsement or language in the insurance contract) that subrogation has been waived by its insurer.
9. **Non-compliance** – The District reserves the right to withhold payments to the Contractor and/or order Contractor to suspend all Work at Contractor's expense in the event of material noncompliance with the insurance requirements outlined above.

14.16.06. Payment

- A. Full compensation for doing all Work necessary to provide insurance as specified herein shall be included in the lump sum bid price for mobilization.

CHECKLIST OF DOCUMENTS NEEDED

The following checklist is a summary of generally required insurance documents that may be used as guidance.

General Liability:	A.	Limits (\$2,000,000)	
	B.	Additional Insured (Endorsement)	
	C.	Waiver of Subrogation (COI, Endorsement or policy language)	
	D.	Primacy (COI, Endorsement or policy language)	
	E.	Cancellation Endorsement	
Auto Liability:	A.	Limits (\$2,000,000)	
	B.	Additional Insured (Endorsement)	
	C.	Waiver of Subrogation (COI, Endorsement or policy language)	
	D.	Primacy (COI, Endorsement or policy language)	
	E.	Cancellation Endorsement	
Umbrella (optional):	A.	Limits (\$2,000,000)	
	B.	Primacy (Endorsement or policy language)	
Workers' Comp:	A.	Limits (\$1,000,000)	
	B.	Waiver of Subrogation (Endorsement or policy language)	
	C.	Cancellation Endorsement	
Builder's Risk:	A.	Limits (equal to completed value of project)	
	B.	Additional Insured (Endorsement)	
	C.	Waiver of Subrogation (COI, Endorsement or policy language)	
	D.	Cancellation Endorsement	

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SECTION 15. GENERAL COORDINATION

15.01. Coordination and Special Meetings

- A. The Engineer shall conduct other coordination and special meetings in addition to progress meetings when appropriate. The purpose of these meetings is to discuss and coordinate shutdowns, outages, utility tie-ins, and any other special issues as deemed necessary. The special meetings needed for the project will be discussed and decided during the kickoff meeting.
- B. Date, time, and location for coordination and special meetings shall be as mutually agreed to by the Engineer and by the Contractor. The Contractor shall ensure attendance of appropriate Contractor staff, Subcontractors, and suppliers.

15.02. Integration and Coordination with District Operations

15.02.01. Overview of Existing Systems and Facilities

- A. The following is a cursory overview of typical processes, functions, and Work at the Rinconada Water Treatment Plant (WTP). Not all items listed are shown on the Drawings.
 - 1. Water treatment:
 - a. Water flows from reservoirs and pipeline sources to Rinconada WTP. This as yet untreated water is called “raw water.”
 - b. Pumped raw water is treated by a series of treatment process: ozonation, flocculation, sedimentation, filtration, and chlorination.
 - 2. Operations
 - a. The treatment plant is staffed 24 hours a day, every day of the year, by licensed water treatment professionals. Staff monitor all plant facilities, operate Equipment and systems, and enter and exit the treatment plant grounds as required.
 - b. Chemical deliveries for the various treatment processes occur on an almost daily basis.
 - c. Deliveries of various supplies and Material occur on an almost daily basis.
 - d. Training and staff meetings occur on a regular basis.
 - e. Security guards check vehicles and people entering the gate(s) and patrol the property.

3. Maintenance
 - a. Various maintenance staff work at the treatment plant or use it as a resource center for Work at other District facilities. Staff enter and exit the treatment plant grounds regularly each Day and night as required.
4. District Staff
 - a. District staff of various professional disciplines work inside the operations building completing various Work assignments.

15.02.02. Requirements of an Operational Facility or System

- A. The Rinconada WTP is the regular source of potable water for a large portion of the service area of the Santa Clara Valley Water District. Facility operation must continue as described below at all times, 24 hours a day, every day of the year, during the construction of this Work. The plant has a rated production capacity of 100 million gallons per Day. Facilities or conditions required to keep the existing treatment plant operational include, but are not limited to, the following:
 1. Raw water pipelines and control and pressure-reducing valves.
 2. All pipelines (settled, backwash water and air supply, filtered, sludge, wash water return, drains, plant water, overflows, bypasses, etc.).
 3. All flocculation and sedimentation basins with sludge collection systems and connecting channels.
 4. All filters.
 5. Clearwell, including valve actuator power and instrumentation.
 6. All backwash pumps, constant head tank, flow meter, and appurtenances.
 7. All backwash blowers.
 8. Plant electrical, instrumentation, and SCADA systems.
 9. All existing chemical feed systems, including storage tanks, piping, pumps, control panels, instrumentation, diffusers, meters, mixers, and related facilities necessary to maintain uninterrupted, controlled feed of process chemicals.
 10. Plant water (pumps, hydro-pneumatic tank, pipelines, and appurtenances) and compressed-air systems.
 11. The existing standby power generators, fuel tank and supply piping, transfer and control panels, and all other accessories.

12. Operations building.
 13. Wash water recovery basins.
 14. Wash water/sludge pump station.
- B. Conduct the Work and provide temporary facilities as needed to keep the existing facility continuously operational.
- C. Do not remove or demolish existing facilities required to keep the existing facility operational at the capacities specified until the existing facilities are replaced by temporary, new, or upgraded facilities or Equipment.

15.03. Coordination of Work Activities**15.03.01. Work by Others**

- A. The Contractor shall coordinate its Work with the planned or ongoing Work of the District or of other District Contractors within or adjacent to the limits of the Contract Work in accordance with Article 4.15. Cooperation with Others. No additional payment shall be made or Claims considered for Delay caused due to the Contractor's failure to coordinate the Work.
- B. The Contractor shall complete the following activities as requested by the Engineer to assist in the coordination of Contract Work with Work by others: attend planning meetings; review and comment on Project documents relative to coordination aspects; schedule Work to promote efficient installation of all improvements; move Equipment, Material, or vehicles to allow Work by others to proceed; and other reasonable activities.
- C. The Contractor is advised that the following water treatment plant maintenance and miscellaneous improvements and Work may take place during the Work of this Contract:
1. District staff will be completing miscellaneous minor improvements, servicing, and repairs to all areas of this treatment plant during the course of this Work.
 2. The District shall contract with a variety of firms during the course of this Work to complete improvements that are outside the scope of this Work.
- D. The Contractor is advised that the known construction Projects may take place during the Work of this Contract:
1. Residuals Remediation Project: Construction of new sludge mixing tanks, installation of 2 new centrifuges and other plant improvements as detailed in the Residuals Remediation Project documents shall take place concurrently with this Work.

2. Reliability Improvement Project Phases 3-6: Sitewide improvements to existing treatment plant unit processes, demolition of abandoned unit processes and the construction/commissioning of new unit processes shall take place concurrently with this Work.

15.03.02. Coordination With Others

- A. District staff may be completing miscellaneous minor improvements, servicing, and repairs to all areas of this treatment plant during the course of this Work.

15.04. Construction Survey

- A. Set reference points (RPs) with elevations to key alignment stations: begin project; beginning of curves (BCs); end of curves (ECs); point of intersections (PIs); equation stations (Eq. Sta.); grade breaks; beginning and end points of vertical curves (VPC & VPT); and end project.

15.05. Public Notification

- A. No Special Requirements

SECTION 16. WORK CONSTRAINTS AND SITE RESTRICTIONS

16.01. General Work Constraints

- A. The WTP is in operation and requires daily access for truck deliveries and operation and maintenance activities. The Contractor shall submit a schedule to be approved by the District identifying the days, times and durations when the truck access route will need to be altered.
- B. The Contractor shall take all precautionary measures as necessary so as not to cause any disruption of the operation of the treatment plant. The activities discussed below do not include all items affecting the operation of the plant but are intended to describe certain actions that could disrupt the normal function, or cause shutdown, of the plant:
 - 1. Contractor delivery of materials including access, delivery vehicle and equipment on site, and blockage of certain service areas, or roads
 - 2. Contractor demolition or new work that will be unusable for normal plant operations
 - 3. Contractor removing or inadvertently interruption from service, restricting, or impeding the function of any utility, such as water, electrical, gas, telephone, compressed air, sanitary sewer, storm drain, sludge piping, overflow piping, and instrumentation system.
 - 4. Contractor removing from service, restricting, or impeding the function of any portion of District's SCADA system or underground electrical, signal, and communication system
 - 5. Contractor delaying or denying access to any District plant structure or area needed by District staff to complete their Work assignments.

16.02. Utilities

- A. The Contractor's attention is directed to Standard Provisions Article 4.10. Preservation of Property and Article 4.25. Utilities.
- B. Various existing utilities, both above and below ground, may be encountered during construction. The Contractor shall perform all Work in such a manner so as to avoid damage to existing utilities. The Contractor is responsible for any damage due to failure to exercise due care.
- C. The Contractor shall notify underground service alert (U.S.A.) a minimum of five (5) working Days prior to the start of excavation or demolition in accordance with California Government Code requirements. The Contractor is responsible for coordinating the U.S.A. notification according to the Contractor's schedule; any delay due to utility markings through the U.S.A. process is the responsibility of the Contractor. Areas within the plant identified for excavation shall be submitted

in writing for review and approval prior to excavation. ESUSA does not perform underground surveys inside the treatment plants. See next paragraph.

- D. Contractor will be required to include in their bid for an independent utility locator to determine underground conditions within the treatment plant.
- E. The Contractor shall verify the exact location of all indicated or field marked utilities and shall make a sufficient number of exploratory excavations of all utilities that may interfere with the Work sufficiently in advance of the construction. The Contractor shall promptly notify the Engineer when such exploratory excavations show the utility location as shown on the Drawings to be in error.
- F. The Contractor shall not interrupt the service function or disturb the support of any utility without authority from the utility owner or an order from the Engineer.
- G. All valves, switches, vaults, and meters shall be maintained and readily accessible for emergency shutoff

16.02.01. Utility Coordination

- A. No Special Requirements

16.02.02. Protection of Existing Utilities

- A. No Special Requirements. Maintain the use of the protective steel plates where currently installed and shown on plan to remain-in-place.

16.02.03. Utility Installation/Relocation by Others

- A. No Special Requirements

16.03. Protection of Existing Improvements

- A. The Contractor's attention is directed to Standard Provisions Article 4.10. Preservation of Property.

16.03.01. Survey Monuments

- A. No survey monuments, permanent markers for the District right of way, or District survey control points shall be removed or disturbed until the Engineer has recorded the locations thereof and a permit for such removal has been received from the agency having jurisdiction. When the construction Work has been completed, the Contractor shall replace the monuments accurately in the locations as referenced by the Engineer.
- B. If any marker or monument is destroyed by the Contractor without prior written approval of the Engineer, the Contractor shall be responsible for the accurate replacement of the marker or monument (i) by a land surveyor licensed by the State of California; (ii) in accordance with the California Business and

Professions Code Chapter 15 Land Surveyors, Section 8771; and (iii) at no expense to the District.

16.04. Preconstruction Surveys**16.04.01. Preconstruction Survey Within the Project Limits**

- A. After the Contract has been awarded and before commencement of the Work, the Contractor shall conduct a thorough examination of the Work areas within the Project limits only after notification and coordination with the Engineer.
- B. The Contractor shall inspect the condition of all areas that may have potential impacts, including, but not limited to, existing improvements, levees, ramps, buildings, landscape planting, architectural finishes, the size of structural cracking or settlement, the rate of leakage, and any other conditions deemed appropriate. The presence of the Engineer shall in no way relieve the Contractor of the responsibility for completely and accurately documenting all existing conditions.
- C. Records of all observations shall be prepared by the Contractor; every copy of all documents shall be signed by the authorized representative of the Contractor and provided to the Engineer. Photographs and videos with dates shall be made by the Contractor and included in the record of observations. One (1) signed copy of every document, photograph, and video will be kept on file in the office of the Engineer.
- D. The above records, photographs, and videos are intended for use as evidence in ascertaining the extent of any damage that may occur as a result of the Contractor's operations during the prosecution of the Work.
- E. Structural surveys, if required, shall be conducted by a licensed civil or structural engineer.

16.04.02. Surveys of Properties in the Vicinity of the Work

- A. No Special Requirements

16.04.03. Payment

- A. Full compensation for doing all Work necessary to comply with the requirements for Preconstruction Surveys as specified herein shall be included in the lump sum price Bid for Bid Item No. 23 Preconstruction Survey.

16.05. Rights of Way

- A. No Special Requirements

16.05.01. District-Furnished Right of Way

- A. No Special Requirements, all work is on-site.

16.05.02. Contractor-Furnished Right of Way

- A. Any additional rights of way desired by the Contractor for its convenience shall be acquired by the Contractor at no expense or obligation to the District. The Contractor shall provide the Engineer with copies of any agreements between the Contractor and property owners regarding disposal of excess Materials generated by the Contractor's activities, storage of Materials, or any use of property in conjunction with this Project. The agreement shall state that the agreement is solely between the Contractor and the property owner and that the District is not a party to the agreement and not responsible for compliance with any conditions stated in the agreement.

16.05.03. Temporary Construction Easements

- A. No Special Requirements

16.06. Access to Properties Owned by Others

- A. The Contractor shall conduct the construction operations in a manner that cause as little inconvenience as possible to adjacent property owners.
- B. Convenient access to driveways, houses, buildings, and businesses along the Work shall be maintained in operational condition; temporary approaches to crossings or to intersecting streets shall be provided and kept in good condition.
- C. When construction operation is directly within the driveway area, temporary access shall be provided. The existing access shall not be closed until the temporary replacement access is usable. Once construction is completed, access shall be restored to a condition equal to or better than the existing condition prior to the Contractor's operation.
- D. The Contractor shall comply with California Vehicle Code Sections 22500 Prohibited Stopping Standing or Parking and 22500.1 Additional Prohibited Stopping Standing or Parking Fire Lane regarding stopping, parking, or leaving any vehicle in front of a public or private driveway.

16.07. Access to the Job Site

- A. The Project location is shown on a map included in the Drawings. The Contractor may use the existing roads to access and perform the Work subject to the restrictions specified herein.
- B. It is the Contractor's responsibility to obtain any and all permits that may be required from all applicable regulatory agencies to move Materials and Equipment to the job site, dispose of excess Material created by the Contractor's operation, and for traffic control to, from, and on the Project sites.
- C. Access to the job site shall only be through the gates off More Avenue.

16.08. Access Roads Within the Job Site

- A. The Contractor shall maintain access roads to all staging, office trailer, storage areas, and to other areas to which frequent access is required. The Contractor shall maintain access to all other existing facilities on the site, including access for delivery of materials and for maintenance and operation.
- B. The Contractor shall submit a Traffic Plan showing proposed traffic routes and all staging and storage areas for each phase of work, including dates. The Contractor is responsible for providing all traffic control equipment and signage for the duration of the project. The Contractor shall submit updates to the Traffic Plan and dates with each submittal of the updated Detailed Progress Schedule.
- C. The Contractor is responsible for damages to buried utilities resulting from loads imposed on temporary roads constructed by the Contractor or other access routes used by the Contractor.
- D. The Contractor shall maintain on-site access roads free of mud. Under no circumstance shall vehicles leaving the site track mud or dirt off the site onto public rights of way.
- E. The Contractor shall be performing Work at an Operational facility that is critical and must remain in continuous operation at all times. The Contractor shall schedule and perform its Work such that there is no disruption to facility operations and access. Access to the facility and all portions of the facility shall be maintained at all times for the staff, chemical deliveries, and for all other delivery vehicles.
- F. Trenching for irrigation piping and electrical conduits will cross the access roads at the Solids Load-Out Structure and at several other locations as shown on the Drawings. The Contractor shall coordinate the trenching activities with the Engineer (Construction Manager) and shall provide traffic steel plates as required to maintain plant access. No access interruption to any portion of the Plant will be allowed. The Contractor shall notify the Engineer (Construction Manager) at least ten (10) Days in advance of any planned trenching or excavation crossing any access road.
- G. The Contractor shall provide a minimum of one (1) route for fire engine access to all structures (i.e., existing, new, and those under construction) at all times. Such a route shall be at least 20 feet wide and have a minimum of 13 feet 6 inches clear height. The Contractor shall post signs to indicate the vehicle travel route if it is not along the existing roadways so that travel route is evident to emergency vehicle operators. A turnaround adequate for a fire engine is required when any roadway to a structure is a "dead end" over 150 feet long.
- H. The District may receive chemical deliveries on any of the 5-working days each week. The breezeway and exit from the breezeway shall remain accessible during those deliveries. Contractor shall coordinate the timing of work in that area to avoid interruption in deliveries.

16.09. District Use of Facilities/Premises Within the Work Area

- A. The District reserves the right to access and use the following premises during performance of the Work to conduct operations and maintenance of District facilities.
- B. The Contractor shall coordinate all construction operations with the District to avoid conflict and to facilitate the District's use of the premises.
- C. Unless otherwise altered by the Work, the Contractor shall restore the premises to preexisting condition, and shall immediately repair any damages to the premises caused by the Contractor's operations.

SECTION 17. SAFETY AND SECURITY

17.01. Safety

- A. No Special Requirements

17.02. Safety and Health Program

- A. No Special Requirements

17.03. Security Requirements at Job Site

- A. No Special Requirements

17.03.01. General

- A. No Special Requirements

17.03.02. Identification and Badging

- A. No Special Requirements

17.03.03. Background Checks

- A. No Special Requirements

17.03.04. Site Access Control

- A. The District maintains a security checkpoint at *the service gate entrance* of the facility and visitor/employee main entrance as shown in the Special Provisions.

17.03.05. Mail and Postal Deliveries to the Project Site

- A. No Special Requirements

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SECTION 18. PERMITS AND REGULATIONS

18.01. Permits and Agreements

18.01.01. District-Obtained Permits

- A. The District has obtained permits for Work on this Project from the following agencies having jurisdiction:
 - 1. NPDES General Permit (see Standard Provisions)
- B. Copies of the SWPP to maintain compliance with the NPDES Permit will be made available to the selected Contractor.
- C. The Contractor shall refer to other Articles in the Specifications for requirements to comply with the above permits.
- D. The Contractor shall comply with other conditions of the above permits as listed below:
 - 1. Maintain the BMPs that are currently in place and inspects frequently to ensure no sediment enters into the drainage system
 - 2. Ensure no sediment transport off-site during construction
 - 3. Any sediment that is transported out of the areas of work is removed and complies with the SWPPP requirements

18.01.02. Contractor-Obtained Permits and Regulatory Deliverables

- A. In addition to the permits listed in the Standard Provisions, the Contractor shall obtain all permits listed below:
 - 1. Haul route permit from the town of Los Gatos
- B. The Contractor shall submit two (2) final signed copies of all Contractor obtained permits to the Engineer prior to beginning Work.
- C. The Contractor shall be responsible for complying with all applicable permit conditions and requirements.
- D. The Contractor shall obtain and pay for permits for work on this Project from the agencies having jurisdiction. No District reimbursement of these permit fees shall be provided.

18.01.03. Operation Regulations

- A. The District is not required to obtain a building permit from the local agency having jurisdiction (Town of Los Gatos), for this work as it is related to the conveyance of water per Government Code Section 53091 and 53096. However, the District's exemption from obtaining a permit does not eliminate the

requirement that all work be performed in accordance with applicable California Building, Plumbing, Mechanical, Electrical, Fire and Energy Code requirements.

- B. The treatment plant operations at the Rinconada Water Treatment Plant are regulated by the California Department of Public Health (CDPH). CDPH's Drinking Water Program consists of three branches in the Division of Drinking Water and Environmental Management (DDWEM). There are three Field Operation Branches under DDWEM which are responsible for the enforcement of the federal and California Safe Drinking Water Acts (SDWAs) and the regulatory oversight of the state's public water systems. The District works with the Northern California Field Operations Branch, District 17 of DDWEM.
- C. The Rinconada Reservoir is regulated under the California Division of Safety of Dams (DSOD) for dams.

18.02. Hours of Work

- A. Unless noted otherwise, no Work, including Material hauling to/from the site and Equipment movement, shall be performed during the Days and hours restricted by and set forth in this Article.
 - 1. Normal Working Hours and Days:
 - a. Normal working hours and days are defined as 8:00 a.m. to 5:00 p.m. on weekdays.
 - b. No Work shall take place between 5:00 p.m. and 8:00 a.m. on weekdays.
- B. Unless noted otherwise on the Drawings or in these Specifications or as approved in writing by the Engineer, no Work shall be performed on Saturdays or Sundays or on any holiday listed herein.
 - 1. Holidays are defined as:
 - a. New Year's Day, Martin Luther King's birthday, Presidents' Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the Friday after Thanksgiving, and Christmas Day. If any of the above holidays should fall on a Sunday, the following Monday shall also be considered a holiday. If a holiday should fall on a Saturday, the previous Friday shall also be considered a holiday.
- C. For additional restriction to hours of Work refer to Article 16.01. General Work Constraints

18.03. Noise Pollution and Vibration**18.03.01. Noise**

- A. No idling of trucks is allowed prior to 9am. See 18.08.01 below.

18.03.02. Noise Monitoring

- A. No Special Requirements

18.03.03. Vibration Monitoring

- A. No Special Requirements

18.03.04. Payment

- A. No Special Requirements

18.04. Light Pollution

- A. No Special Requirements

18.05. Air Pollution

- A. No Special Requirements

18.06. Spillage and Dust

- A. The Contractor shall be responsible for the implementation of spill prevention and dust control measures BMPs as required in the SWPPP.
- B. Dust Control measures shall be utilized for the duration of the project. The strict dust control measures shall use industry best-practices to minimize potential impact to nearby residences and the public. See 17.02 Safety and Health Program and Appendix H Phase II Hazardous Substance Liability Assessment. As a minimum, the following Bay Area Quality Management District (BAAQMD) Dust Control Measures shall be implemented (BMP AQ-1).

18.07. Traffic Control

- A. The Contractor shall control truck traffic such that, at any given time, only 1 truck shall be permitted on residential streets.

18.08. Truck Traffic and Hauling

- A. Truck traffic and hauling related to construction activities for the Project shall conform to the local haul route permit and to the additional restrictions described herein.
- B. Construction truck traffic and hauling will be required to use designated truck routes. Whereas cars may travel between Winchester Boulevard and More Avenue via the residential streets of Wimbledon Drive, Wedgewood Avenue, and Roxbury Lane, construction trucks will not be permitted on those roadways. Truck traffic and hauling shall use the route from Highway 17 (from the Camden Avenue/San Tomas Expressway exit or the Lark Avenue exit) following Winchester Boulevard to Knowles Drive, and then to Pollard Road and More Avenue. Trucks over 9,000 pounds gross weight are not permitted on Highway 85 between its southern terminus at Highway 101 and its junction with Interstate 280. Thus, no trucks shall use the Highway 85 on-ramp or off-ramp on Winchester Boulevard. No truck traffic or hauling shall be permitted on any other streets unless noted elsewhere in these Specifications.
- C. Truck traffic and hauling days and hours are restricted to normal working days and hours, as defined in Article 18.02., and shall not be allowed during holidays and weekends. Soil hauling to or from the Project site has the additional restriction of not being allowed between 7:00 a.m. and 9:00 a.m. and after 4:00 p.m. No extension in the hauling days and hours shall be allowed during plant shutdowns or outages.
- D. The Rolling Hills Middle School is located at More Avenue and Pollard Road which is along the anticipated truck haul and delivery route. While the Rolling Hills Middle School is in session, the Contractor and the Contractor's subcontractors and suppliers shall not schedule truck arrivals between 8:00 a.m. and 9:00 a.m. Monday through Friday and between the half hour prior to and the half hour following the end of the school day. Long lines of cars and children exiting cars, riding bikes and crossing the street occur during these times. School sessions typically begin the second week of August and end the second week of June. The times that school starts and ends may vary throughout the week. The Contractor's attention is directed to the school web site at <http://rollinghills.campbellusd.org> or the Campbell School District web site at <https://www.campbellusd.org> for current information on school days and hours. Truck traffic occurring during these prohibited times will subject the Contractor to Liquidated Damages as specified in Article 12.05.
- E. Exceptions to the truck traffic restrictions may be granted by the District on a case-by-case basis to the extent allowed by the Project environmental review documents under the California Environmental Quality Act. The Contractor's waiver requests must be submitted in writing to the Engineer two weeks in advance of the date needed. A waiver request shall include, at a minimum, the date and times the truck traffic restrictions need to be lifted, the amount of truck traffic expected during this period, justifications for such waiver, and description of traffic control measures to be implemented by the Contractor.

- F. The Contractor shall post information signs for truck drivers at approved locations along haul route indicating truck traffic hour restrictions. Signs shall be readily visible. Violators shall be warned or barred from the site at no additional cost to the District.
- G. All hauling and delivery truck schedules shall be submitted to the Engineer for review within 72 hours of the actual occurrence. Failure to do so may lead to entry delays to other traffic or rejection of trucks entry without proper security clearances established at no additional expense to the District.
- H. The Contractor shall not perform any loading or unloading activities or any other related operations outside the Project limits. In addition, no loading, unloading or any other related operations shall be performed at or near the plant entry gates.

18.08.01. Truck Arriving Early, Truck Idling, and Queuing

- A. The District actively seeks to avoid or minimize unnecessary disturbance of the neighborhood from construction activities. Accordingly, all Contractor's deliveries shall be coordinated to ensure that no Contractor delivery vehicles arrive at the site entry gates before 9:00 a.m. to prevent disruption of the neighborhood, unless otherwise specified in these Specifications.
- B. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage shall be provided for construction workers at all access points.
- C. No idling or queuing shall take place on any residential street in the surrounding neighborhood except for reasons noted below:
 - 1. Idling when the vehicle must remain motionless due to an official traffic control device, traffic control signal, or at the direction of a peace officer or traffic conditions over which the driver has no control.
 - 2. Idling when being forced to remain motionless due to adverse weather conditions or due to mechanical difficulties over which the driver has no control.
 - 3. Idling to verify that the vehicle is in safe operating condition as required by Law.
 - 4. Idling at the site entrance for security checks or for searches by District guards.
 - 5. Idling as allowed by local, State, and Federal laws.
- D. The Contractor shall control truck traffic such that, at any given time, only 1 truck shall be permitted on residential streets.

- E. The Contractor's attention is directed to the Special Provisions Article 12.05. Liquidated Damages assessment for violating the arrival time or idling/queuing requirements.

18.09. Parking

- A. Construction Equipment and worker vehicles arriving at the site shall park within the site in areas identified and approved by the District.

18.10. Discovery of Archeological and Cultural Resources

- A. No Special Requirements

18.11. Aesthetic Requirements

- A. No Special Requirements

18.12. Recreation

- A. No Special Requirements

18.13. Utilities and Service System

- A. No Special Requirements

18.14. Payment

- A. Unless noted otherwise, full compensation for Work involved in complying with all requirements under Special Provisions Section 18 Permits and Regulations shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time or payment shall be allowed.

SECTION 19. ENVIRONMENTAL

19.01. Compliance With NPDES General Permit

- A. The Contractor shall follow and maintain the installed BMPs and current SWPPP requirements at all times. A copy of the SWPPP will be provided by the District.

19.01.01. SWPPP

- A. No Special Requirements

19.01.02. Storm Water BMPs

- A. The Contractor shall comply with all Risk Level 2 requirements in accordance with Attachment D of the NPDES General Permit.

19.01.03. Payment

- A. Full compensation for doing all Work necessary to comply with the NPDES General Permit, including the preparation and implementation of the SWPPP; all Materials, labor, Equipment, service, supervision, documentation, and submittals shall be considered incidental and included in the other items of Work; no additional payment shall be made.

19.02. Other Discharge Permits

- A. No Special Requirements

19.03. BMP Action Plan

- A. BMPs that are currently in place shall be inspected daily and weekly that they are in-place and functional. Catch basin inserts are located throughout the site. In the area of work, the Contractor is responsible for inspecting, removal/disposal and replacement of the catch basin inserts. Sediment shall be prevented at all times from entering into the drainage collection system that is within the areas of work.

19.04. Water Pollution Discharges

- A. No Special Requirements

19.05. Regulated Material Management and Non-Regulated Material Management

- A. No special requirements.

19.05.01. Asbestos Management

- A. No Special Requirements

19.05.02. Lead Management

- A. No Special Requirements

19.06. Solid Materials Management**19.06.01. Definitions**

- A. Certified Facility: A reuse, recycling, composting, or Materials recovery facility meeting the required Diversion percentages set forth in this Specification, which the Engineer (i) has determined can accept diverted Material; (ii) has obtained all applicable Federal, State, and Local permits; and (iii) is in full compliance with all applicable regulations for reuse, recycling, composting, and/or Materials recovery.
- B. Construction Waste: Building and site improvement Materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste does not include any of the above specified Material/solid waste that contains contaminated or hazardous substances. Construction waste does not include excavated soil or groundwater.
- C. Demolition Waste: Building and site improvement Materials resulting from demolition or selective demolition operations. Demolition waste does not include any of the above specified Material/solid waste that contains contaminated or hazardous substances.
- D. Disposal: Removal off site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in a landfill or an incinerator acceptable to authorities having jurisdiction.
- E. Divert/Diversion: Use of Materials for any lawful purpose other than disposal in a landfill or in a transformation facility.
- F. Post-Consumer Recycled Content: The percentage of a new product that contains Materials that were recycled from product that was used by the end consumer and then collected for recycling.
- G. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for use in some other form.
- H. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in the same form in another facility.
- I. Transformation Facility: A facility whose function is to convert, combust, or otherwise process solid waste by incineration, pyrolysis, destructive distillation, or gasification or to chemically or biologically process solid waste for the purpose of volume reduction, synthetic fuel production, or energy recovery. A composting facility is not a transformation facility.

19.06.02. Construction and Demolition Waste Management

- A. The Contractor shall submit a Solid Materials Management Plan identifying procedure to be used for management of construction and demolition Waste

generated by the Work, including the facilities to be used for both disposal and recycling/salvaging and the estimated quantities and percentages (by weight) of construction demolition waste disposed and recycled/salvaged categorized by waste type. For each facility listed in the waste management and recycling plan, the Contractor shall provide the facility name and address, facility owner name, and contact information. This submittal shall be approved by the Engineer prior to commencement of any Work on the Project site.

- B. The Contractor is directed to the City of San Jose's Construction and Demolition Deposit Program Certified Facility List (http://www.sjrecycles.org/business/PDF/cddd_certified_list.PDF) for Local construction and Demolition Waste recycling service provider listings. Additional recycling resources are available at www.ciwmb.ca.gov/condemo/ and www.crra.com/cdc/index.html.
- C. At the conclusion of the Project, the Contractor shall complete and submit a solid materials management report form, which documents Materials recycled/salvaged and disposed and demonstrates compliance with the requirements specified herein, facilities utilized, and weights of construction and demolition waste generated by the Project. Receipts shall be attached as well that verify Materials and quantities disposed and recycled/salvaged. The Contractor shall complete and submit the form with the request for final payment; the form will be provided by the construction manager.
- D. Full compensation for completing the Solid Materials Management Plan and for completing the solid materials management report form shall be considered as included in the Contract Price(s) for various items of Work involved; no additional payment shall be made.

19.06.03. Post-Consumer Recycled Content Requirements

- A. At the conclusion of the Project, the Contractor shall list Materials furnished/installed that contains PCRC and document the percent content for each Material item listed. This information shall be included in the solid material management report form specified in Article 19.06. Solid Material Management.
- B. Full compensation for documenting the above specified information in the solid material management report form shall be considered as included in the Contract Price(s) for various items of Work involved; no additional payment shall be made.

19.07. Qualified Biologist

- A. No Special Requirements

19.08. Migratory Birds

- A. No Special Requirements

19.09. Other Wildlife and Fish Species

- A. No Special Requirements

19.10. Sensitive Plants and Vegetation

- A. No Special Requirements

19.11. Proper Pruning Techniques for Woody Vegetation Removal

- A. No Special Requirements

19.12. Plant Pathogen Management

- A. No Special Requirements

19.13. Payment

- A. Unless noted otherwise, full compensation for Work involved in complying with all requirements under Special Provisions Section 19 Environmental shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time or payment shall be allowed.

SECTION 20. SUBMITTAL AND QUALITY REQUIREMENTS

20.01. Additional Submittal Requirements

- A. This Article includes any additional submittal requirements. Also see Standard Provisions Section 7 Submittal Management.

20.01.01. General Requirements

- A. Submittals shall be in accordance with Standard Provisions Article 7.05. Submittals to be Furnished by the Contractor unless otherwise modified herein.

20.01.02. Immediate Submittals

- A. Physical construction Work cannot begin until the following immediate submittals have been favorably reviewed by the Engineer. These immediate submittals shall be submitted no later than 7 Days after the date of issuance of the NTP.
 - 1. Section 03 Résumé of Project Superintendent
 - 2. Section 08 Injury and Illness Prevention Plan
 - 3. Section 08 Site-Specific Safety and Health Plan

20.01.03. Special Review Cycle

- A. No special requirements.

20.01.04. Copies

- A. The number of copies of submittals described herein supersedes the submittal copy requirements described in Standard Provisions Article 7.05. Submittals to be Furnished by the Contractor and in Article 9.12.02. Product Data and Samples.
- B. The number of copies required is as follows:
 - 1. Shop Drawings and product data: Sufficient copies to allow five (5) copies to be retained by the Engineer plus one (1) copy to be returned to the Contractor for the Contractor's use.
 - 2. Samples: Sufficient numbers to allow two (2) samples of all structural and architectural products involving color, finish, texture, etc. and one (1) sample of other products to be retained by the Engineer plus one (1) sample to be returned to the Contractor for the Contractor's use.
 - 3. It shall be the Contractor's responsibility to copy and/or to conform reviewed submittals in sufficient numbers for its files and for Subcontractors and vendors.

20.02. Exclusive Testing by the District

- A. No special requirements.

20.03. Additional Testing Certifications

- A. For roadway Work, the Contractor's laboratory shall also be AASHTO accredited in ASTM C1077 "Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation"; ASTM D3740 "Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design/Construction"; and ASTM D3666 "Specifications for Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials."
- B. Materials in contact with potable water shall be NSF61 certified.

20.04. Contractor's Quality Control**20.04.01. Quality Control Plan**

- A. The Contractor is not required to prepare and submit a Project – Specific Quality Control plan.
- B. However, the Contractor is required to comply with its Quality Control program as outlined in Article 9.03. Contractor's Quality Control Program.

20.04.02. Contractor's Quality Control Staffing Requirements

- A. The Contractor shall provide a qualified Field QC Manager. Unless otherwise approved by the Engineer, the Field QC Manager shall perform no other functions other than quality management and shall have no supervisory or managerial responsibility over the Work force.
- B. The Field QC Manager has the overall responsibility to develop, manage, and implement the Contractor's QC program to ensure that all Work complies with the quality set forth in the Contract. The Field QC Manager shall be present on site, perform inspections throughout the Project duration, and bring in other QC personnel as necessary based on its expertise and on the need for continuous quality inspections at various Work areas. The Field QC Manager shall report directly to a senior manager of the Contractor to ensure organizational freedom, identify quality problems, and initiate and recommend solutions. The Contractor shall submit a letter signed by a principal officer of the Contractor's firm designating the Field QC Manager and specifying the authority delegated to the Field QC Manager to direct cessation or removal and replacement of defective Work.
- C. The Field QC Manager shall be on site whenever Work is permanently incorporated into the Project to verify that it is being performed properly and to document different stages of all Work in progress.
- D. The Field QC Manager shall have, at a minimum, a bachelor's degree in engineering, architecture, or construction management and a minimum of five years' construction experience on construction projects similar to this

Contract. The District will consider an additional five years' experience, for a total of 10 years' experience on construction projects similar to this Contract, as a substitution for a bachelor's degree. The Field QC Manager shall also have a certificate of completion of the course "Construction Quality Management for Contractors" or equivalent. (Note: This course is available through the Army Corps of Engineers and/or through the Naval Facilities Engineering Command.)

20.04.03. Payment

- A. Full compensation for doing all Work necessary to provide quality control shall be included in the Contract Price(s) for various items of Work involved; no separate payment shall be made.

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SECTION 21. PAYMENT PROCEDURES

21.01. Bid Items

21.01.01. General Requirements

- A. Refer to Bid Documents Bid Form No. 1 Bid items for the listing of Bid items.
- B. Unless otherwise indicated, all Bid Items include labor, Material, Equipment, and incidentals in accordance with the Drawings and Specifications to complete the Work.
- C. No separate payment will be made for any Work included in the Drawings and/or Specifications but not specifically set forth in the listing of Bid items. All costs shall be included in a Bid item.
- D. Where there is an overlap in the Work paid for under different Bid items, the Work will be paid for only once under the appropriate Bid item(s), as determined by the Engineer.
- E. Payment will not be made for any Work done beyond the lines and grades shown on the Drawings or established by the Engineer, or any extra work done without written authority. Such work will be considered as unauthorized. Acceptance of such Work by the Engineer will not constitute agreement to pay beyond the lines and grades shown on the Drawings or established by the Engineer, or any extra work done without written authority.

21.01.02. Description of Bid Items

- A. Bid Item No. 1—Mobilization
 - 1. Scope of Work: This Bid item shall include the preconstruction meeting, all preparatory Work, and appurtenant preconstruction operations, including, but not limited to, those necessary for the movement of personnel, Equipment, supplies, and incidentals to the Project site; installation of the project sign, building and removing any temporary construction areas; installation and removal of temporary facilities necessary for Work on the Project; other Work and operations that must be performed or costs incurred prior to beginning Work on the various Contract items on the Project site; and other Work as specified in these Specifications.
 - 2. Measurement and Payment: Full compensation for furnishing all Work and Material shall be included in the lump sum price Bid for Bid Item No. 1, Mobilization. Progress payments will be made in accordance with Section 9 Payment of the State Specifications.

- B. Bid Item No. 2—Storm Water Pollution Prevention Plan (SWPPP)
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for implementing the SWPPP. This work includes, but is not limited to, preparation and submission of the SWPPP, BMP installation, maintenance, removal, cleanup, and other Work as specified in these Specifications.
 2. Measurement and Payment: Full compensation for furnishing all Work and Material shall be included in the lump sum price Bid for Bid Item No. 2, Storm Water Pollution Prevention Plan (SWPPP). Progress payments will be made in accordance with Section 9 Payment of the State Specifications.
- C. Bid Item No. 3—Architectural Modifications
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for completing work related to aluminum floor plates, Aluminum Railings, Modification of Existing Aluminum Stairs, and Sheet Rock repair as shown on the Drawings and as specified in these Specifications. It shall include, but not be limited to, aluminum railing, aluminum plate, miscellaneous steel and stainless-steel including bolts and anchor bolts, gypsum board and resilient base, and paint. This item includes concrete coring and modification, grouting, concrete finishing, metals fabrication, and cleaning.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 3, Architectural Modifications.
- D. Bid Item No. 4—Concrete Pipe Supports
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary to construct concrete thrust restraints shown on the Drawings and as specified in these Specifications. It shall include, but not be limited to, excavation, reinforcing steel, concrete, bond breaker, backfill and compaction, and cleaning.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 4, Concrete Pipe Supports.
- E. Bid Item No. 5—Air-Vacuum Relief Valve Installation
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for installation of an air-vacuum valve on the wash water pipe header as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to,

removal and disposal of existing pipe elbow, connection of pipe tee, steel pipe, butterfly valve, air-vacuum valve, stainless steel piping, miscellaneous steel, flanged coupling adapter, cleaning, and leak testing.

2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 5, Air-Vacuum Relief Valve Installation.

F. Bid Item No. 6—Sump Pumps Installation

1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for installation of sump pumps in existing leak detection vaults as shown on the Drawings and as specified. It shall include but not be limited to, installation of Owner-supplied sump pumps and level switches, connection to existing control panels, discharge piping, and instrumentation system testing. This item includes plastic piping, pipe supports, miscellaneous steel including bolts, excavation, pipe laying, compaction and backfilling, concrete modifications, grouting, cleaning, and leak testing, and support of the operational testing and commissioning.
2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 6, Sump Pumps Installation.

G. Bid Item No. 7—Metering Pump Piping

1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for modification of existing liquid alum and powdered activated carbon metering pumps piping as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, removal and disposal of existing piping, supply and installation of plastic pipe, plastic hose, plastic valves, unions, couplings, joints, and appurtenances, pipe supports, cleaning, and leak testing.
2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 7, Metering Pump Piping.

H. Bid Item No. 8—Emergency Shower Eyewashes Modification

1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for modification of existing emergency shower eyewashes as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, steel pipe, pipe insulation, concrete, concrete modifications, miscellaneous steel and stainless-steel including bolts and anchor bolts, cleaning, leak testing, and testing of the emergency shower eyewash.

2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 8, Emergency Shower Eyewashes Modification.
- I. Bid Item No. 9—Storm Drain Manhole
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for construction of the storm drain manhole as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, excavation, reinforcing steel, miscellaneous iron and steel, metal frame and grate, de-watering, concrete, backfill and compaction, adjustment to grade, connection to drainage pipes, grouting, damp proofing, cleaning, and leak testing.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 9, Storm Drain Manhole.
- J. Bid Item No. 10—Curb Inlets and Catch Basins
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for construction of the curb and drop inlet as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, excavation, reinforcing steel, miscellaneous iron and steel, metal frame and grate, de-watering, concrete, curb, gutter, backfill and compaction, adjustment to grade, connection to drainage pipes, grouting, damp proofing, cleaning, and leak testing.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 10, Curb Inlets and Catch Basins.
- K. Bid Item No. 11—Trench Drain
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for construction of the trench drain as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, excavation, reinforcing steel, miscellaneous iron and steel, metal frame and grate, de-watering, concrete, curb, gutter, backfill and compaction, adjustment to grade, connection to drainage pipes, grouting, damp proofing, cleaning, and leak testing.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 11, Trench Drain.

- L. Bid Item No. 12—PVC Storm Drain Pipe (12")
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for installation of PVC pipe as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, excavation, trench shoring, de-watering, bedding, pipe, backfill, and compaction.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 12, PVC Storm Drain Pipe (12").
- M. Bid Item No. 13—PVC Storm Drain Pipe (15")
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for installation of PVC pipe as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, excavation, trench shoring, de-watering, bedding, pipe, backfill, and compaction.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 13, PVC Storm Drain Pipe (15").
- N. Bid Item No. 14—PVC Storm Drain Pipe (18")
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for installation of PVC pipe as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, excavation, trench shoring, de-watering, bedding, pipe, backfill, and compaction.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 14, PVC Storm Drain Pipe (18").
- O. Bid Item No. 15—AC Pavement (4" AC on 8" Class 2 Aggregate Base, 5" Aggregate Subbase)
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for completion of AC paving as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, the sawcut, removal and offsite disposal of existing asphalt, aggregate base, and subgrade materials to the limits determined in the field by the Engineer to provide a smooth transition. This item includes constructing permanent AC pavement complete in place, including grading, subgrade preparation, placement, preparation, and compaction of existing aggregate base, hauling, tack coat, joint

preparation, joint adhesive, AC pavement placement and compaction, slurry seal, and evaluation of surface tolerances.

2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 15, AC Pavement (4" AC on 8" Class 2 Aggregate Base, 5" Aggregate Subbase).

P. Bid Item No. 16—Temporary AC Pavement (4" AC on 8" Class 2 Aggregate Base, 5" Aggregate Subbase)

1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for completion of temporary AC paving and patching as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, the sawcut, removal and offsite disposal of existing asphalt, aggregate base, and subgrade materials to the limits determined in the field by the Engineer to provide a smooth transition. This item includes constructing temporary AC pavement roadways and patching of existing AC surfaces complete in place, including grading, subgrade preparation, placement, preparation, and compaction of existing aggregate base, hauling, tack coat, joint preparation, joint adhesive, AC pavement placement and compaction, and slurry seal.
2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 16, Temporary AC Pavement (4" AC on 8" Class 2 Aggregate Base, 5" Aggregate Subbase).

Q. Bid Item No. 17—AC Dike

1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for completion of AC dikes as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, cleaning of surface, tack coat, and pavement placement.
2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 17, AC Dike.

R. Bid Item No. 18—Concrete Curb

1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for construction of concrete curb only as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, the removal and offsite disposal of existing improvements including existing curb and gutter, aggregate base, asphalt concrete, and subgrade materials; saw cutting adjacent asphalt

pavement and/or concrete, and removal of existing materials required to construct the new curb. This item includes constructing concrete curb complete in place, including protection of utilities, grading, subgrade preparation, aggregate base, compaction, concrete, finishing, curing, and backfill.

2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 18, Concrete Curb.

S. Bid Item No. 19—Concrete Curb and Gutter

1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for construction of typical vertical and typical rolled concrete curb and gutter as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, the removal and offsite disposal of existing improvements including existing curb and gutter, aggregate base, asphalt concrete, and subgrade materials; saw cutting adjacent asphalt pavement and/or concrete, and removal of existing materials required to construct the new curb and gutter. This item includes constructing concrete curb and gutter complete in place, including protection of utilities, grading, subgrade preparation, aggregate base, compaction, concrete, finishing, curing, and backfill.
2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 19, Concrete Curb and Gutter.

T. Bid Item No. 20—Concrete V-Gutter

1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for construction of concrete V-gutter as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, the removal and offsite disposal of existing improvements including existing curb and gutter, aggregate base, asphalt concrete, and subgrade materials; saw cutting adjacent asphalt pavement and/or concrete, and removal of existing materials required to construct the new V-gutter. This item includes constructing concrete V-gutter complete in place, including protection of utilities, grading, subgrade preparation, aggregate base, compaction, concrete, finishing, curing, and backfill.
2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 20, Concrete V-Gutter.

U. Bid Item No. 21—Basin Access Ramp

1. Scope of Work: This bid items includes furnishing all labor, material, tools, equipment, and incidentals necessary for construction of a concrete basin access ramp as shown on the Drawings. It shall include but not be limited to, the clearing and removal of existing surface, grading and compaction of subgrade and structural fill, formwork and placement of concrete curbing, reinforced concrete and slab, concrete finishing, curing, and backfill, removal of formwork, and placement of rock slope protection (RSP).
2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 21, Basin Access Ramp.

V. Bid Item No. 22—Erosion Control – Post Construction BMPs

1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for construction and maintenance of post construction BMPs as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, removal of existing erosion control mat and straw rolls, earthwork, weeding, soil preparation, hydroseeding, and installation and maintenance of all material described herein.
2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 22, Erosion Control – Post Construction BMPs.

W. Bid Item No. 23—Preconstruction Survey

1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for preconstruction surveys as described in Section 16.04.
2. Measurement and Payment: Full compensation for doing all Work necessary to comply with the requirements for Preconstruction Surveys as specified herein shall be included in the lump sum price Bid for Bid Item No. 23, Preconstruction Survey.

X. Bid Item No. 24—Relocation of Large Tree Planters

1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for relocation of the existing tree planters as shown on the Drawings. It shall include but not be limited to, the removal and disposal of trees in the planters, removal and disposal of temporary irrigation piping, site preparation, grading, compaction, lifting and placement of tree planter boxes where shown on the Drawings.

2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 24, Relocation of Large Tree Planters.
- Y. Bid Item No. 25—Cobblestone Mulch Ground Cover
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for construction of the cobblestone mulch ground cover as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, clearing, grading, compaction, weed barrier, placement of a 6" to 8" layer of 2" to 4" cobblestone mulch ground cover.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 25, Cobblestone Mulch Ground Cover.
- Z. Bid Item No. 26—CCTV and Cleaning of Storm Drain
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for CCTV inspection and cleaning of the storm drain system located in the work area. It shall include, but not be limited to, the inspection of catch basins and inlets, water supply, cleaning of catch basin and inlets, piping, CCTV video inspection of the storm drain piping, and all connections, and removal and disposal of sediment and debris.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 26, CCTV and Cleaning of Storm Drain.
- AA. Bid Item No. 27—Miscellaneous Incidental Work
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for miscellaneous work not captured under other bid items. This work includes, but not limited to, supply and installation of guardrails, bollards fixed and removable, CMU concrete masonry unit retaining walls, concrete temporary k-rail, removal and relocation of trench plates, raising of castings in paved areas, additional removal of asphalt and concrete curbing where shown on the Drawings, construction of curb weep holes, removal and disposal of temporary sump pumps, installation of buried conduit and power cables for sump pumps to remain, replacement of electrical box covers, chemical containment asphalt berm relocations, downspout modification, evaluation and repair of sunken roadway, roadway painting and striping. This work includes excavation, grading, backfill, compaction, removal and disposing of material associated with all the items identified.

2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the lump sum price Bid for Bid Item No. 27, Miscellaneous Incidental Work.
- BB. Supplemental Bid Item No. 1—AC Pavement (4") and Aggregate Base (13") Demolition
1. Scope of Work: This Optional Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary to demolish existing AC pavement and aggregate base at the deliveries entrance as shown on the Drawings. This work includes, but is not limited to, the sawcut, removal and offsite disposal of existing asphalt, aggregate base, and subgrade materials to the limits determined in the field by the Engineer to provide a smooth transition.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the price Bid per cubic yard for Supplemental Bid Item No. 1, AC Pavement (4") and Aggregate Base (13") Demolition.
- CC. Supplemental Bid Item No. 2—AC Pavement (4")
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for construction of AC paving at the deliveries entrance as shown on the Drawings and as specified in these Specifications. It shall include but not be limited to, constructing permanent AC pavement complete in place, including AC pavement placement and compaction.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the price Bid per cubic yard for Supplemental Bid Item No. 2, AC Pavement (4").
- DD. Supplemental Bid Item No. 3—Class 2 Aggregate Base (8")
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for construction of aggregate base at the deliveries entrance as shown on the Drawings and as specified in these Specifications. It shall include Class 2 Aggregate Base placement, preparation, and compaction.
 2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the price Bid per cubic yard for Supplemental Bid Item No. 3, Class 2 Aggregate Base (8").
- EE. Supplemental Bid Item No. 4—Aggregate Subbase (5")
1. Scope of Work: This Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary for construction of aggregate

subbase at the deliveries entrance as shown on the Drawings and as specified in these Specifications. It shall include Aggregate Subbase placement, preparation, and compaction.

2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the price Bid per cubic yard for Supplemental Bid Item No. 32, Aggregate Subbase (5").

FF. Supplemental Bid Item No. 5—Slurry Seal

1. Scope of Work: This Optional Bid item includes furnishing all labor, Material, tools, Equipment, and incidentals necessary to apply a slurry seal to the deliveries entrance. This work includes cleaning of the paved area, protection of existing facilities, and slurry seal application for full coverage as specified in the Specifications.
2. Measurement and Payment: Full compensation for furnishing all labor and Material shall be included in the price Bid per square feet for Supplemental Bid Item No. 5, Slurry Seal.

21.02. Progress Payments and Schedule of Values

- A. No Special Requirements

21.03. Progress Payment Retention

- A. No Special Requirements

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SECTION 22. CONTRACT CLOSEOUT

22.01. Project Completion and Acceptance

22.01.01. Use Before Acceptance

- A. No Special Requirements

22.01.02. Milestone Completion Preliminary Final Inspection

- A. No Special Requirements

22.01.03. Phased Acceptance of Work

- A. No Special Requirements

22.02. Guarantee and Guaranty Bond

- A. The areas that hydroseed is applied are to be covered by the guarantee for 24 months from the start of maintenance, see Specification 02970. Materials shall be replaced by the Contractor at the Contractor's expense during that period of coverage.

22.03. Training

- A. No Special Requirements

22.04. Testing and Facility Start-Up

- A. No Special Requirements

22.04.01. Testing and Start-Up Overview

- A. No Special Requirements

22.04.02. Water Tightness Testing

- A. No Special Requirements

22.04.03. Operational Readiness Testing

- A. The Contractor shall perform initial checks in the presence and with the assistance of the District for the sump pumps.
- B. The Contractor shall assist the District's SCADA integrator on limited activities needed during the operational readiness testing in order to demonstrate proper operation of each instrument loop function, including alarms, local and remote controls, instrumentation, and other Equipment functions. The testing will generate signals with test Equipment to simulate operating conditions in each control mode.

- C. Complete Items C.1. to C.13. per Special Provisions Article 22.04.01. Testing and Start-Up Overview.
- D. Certificate of Proper Installation
 - 1. At completion of operational readiness testing (ORT) and prior to functional testing (FT): Contractor shall furnish a written report prepared and signed by the manufacturer's authorized representative certifying that Equipment:
 - a. has been properly installed, adjusted, aligned, and lubricated;
 - b. is free of any stresses imposed by connecting piping or anchor bolts;
 - c. is suitable for satisfactory, full-time operation under full load conditions;
 - d. operates within the allowable limits for vibration; and
 - e. controls, protective devices, instrumentation, and control panels furnished as part of the Equipment package are properly installed, calibrated, and functioning.
 - 2. Written report shall document data recorded and include specific equipment by serial number.
 - 3. Written report shall include the following statement: "The equipment has been inspected for proper installation and is certified to be suitable for satisfactory, full-time operation."
 - 4. Contractor shall furnish preliminary field written report prior to functional testing (FT) and shall submit comprehensive report in final record of testing.
- E. Prior to commencing functional testing (FT) the Contractor shall provide a certificate of completion of ORT certifying that equipment and systems are ready for functional testing.

22.04.04. Functional Testing

- A. No Special Requirements

22.04.05. System Commissioning Testing

- A. District staff will perform the system commissioning testing (SCT) of the sump pump systems for 7 consecutive Days following satisfactory completion of the FT.
 - 1. The District will monitor Equipment or systems for performance within the normal modes of operation and parameters. The District will log and notify the Contractor of any abnormalities that could be related to the electrical work and sump pump installation.
 - 2. The District will monitor pipes and conduits for any leakage installed by the Contractor. The District will log and notify the Contractor of any leakage detected.
 - 3. For each malfunction or failure or multiple malfunction(s) or multiple failure(s) occurring during a 24-hour period that requires a system or the plant to be taken out of service, the District will restart the entire SCT period.
 - a. If any installed Equipment fails to operate properly during the testing period, the test may be stopped. The Contractor shall assist the District in determining the cause of the problem. If the cause of the problem is Contractor-supplied installation work and materials, then the Contractor shall fix the problem at no additional cost to the District. After the problem has been fixed by the Contractor, the Engineer will determine if the entire test will be repeated from the beginning or if the test period can resume from the point at which it was stopped.

22.04.06. Submittals

- A. No Special Requirements

22.05. Submission of Closeout Items

- A. At completion of construction and prior to issuance of the Project Completion letter by the Engineer, the Contractor shall deliver to the Engineer the closeout Documents described in Standards Provisions Section 11 Contract Closeout.

22.06. Final Cleaning

- A. No Special Requirements

22.07. Payment

- A. Unless noted otherwise, full compensation for Work involved in complying with all requirements under Special Provisions Section 22 Contract Closeout shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time or payment shall be allowed.

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TECHNICAL PROVISIONS

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PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Section Includes: Concrete manholes, curb inlets, drop inlets, trench drains, grates, frames and covers, and appurtenances in drainage infrastructure components where shown on the Drawings.
- B. Precast utility structures shall be constructed from precast concrete units and appurtenances provided by experienced manufacturers. Custom precast concrete units are required where dimensions and arrangements shown on the Drawings so dictate. All associated cast-in-place concrete shall conform to the requirements of Division 3 Concrete.
- C. See Related Sections for additional requirements applicable to this Section (typical).

1.02 RELATED SECTIONS

- A. Section 02300 – Earthwork.
- B. Section 02315 – Fill and Backfill Materials
- C. Section 02632 – Storm Drainage Piping
- D. Section 02722 – Aggregate Base Course
- E. Section 03200 – Concrete Reinforcement
- F. Section 03300 – Cast-in-Place Concrete
- G. Section 03600 – Grouts
- H. Section 07100 – Dampproofing

1.03 SUBMITTALS

- A. Submittals shall be in accordance with the Standard and Special Provisions.
- B. Product data and drawings shall be submitted covering precast and cast-in-place concrete utility structures and as a minimum shall include dimensions, certification that it is designed to the required loads, concrete compressive strength, reinforcing steel, unit weights, joint gaskets, joint sealants, coatings, covers, metal fabrications and components, and appurtenances.

1.04 REFERENCE STANDARDS

- A. American Society of Testing and Materials (ASTM):
 - 1. C361 – Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.
 - 2. C478 – Specification for Precast Reinforced Concrete Manhole Sections.

3. C857 – Recommended Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
 4. C858 – Specification for Underground Precast Concrete Utility Structures.
 5. C913 – Precast Concrete Water and Wastewater Structures
 6. D1557 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb Rammer and 18-in Drop.
- B. 2018 California Department of Transportation Standard Plans and Standard Specifications.

1.05 QUALITY ASSURANCE

- A. Unless otherwise noted to the contrary, all precast utility structures, manholes, handholes, grates, covers, frames, and appurtenances shall be designed for a HS20-44 (sometimes abbreviated as HS20 or H-20 on the Drawings) wheel load plus the weight of the soil above (using 120 pounds per cubic foot for the soil weight), impact loads, and hydrostatic loads in accordance with ASTM C857. Wall and element thicknesses specified herein and shown on the Drawings shall be minimum sizes; greater sizes shall be provided if required to meet loadings at no additional cost to the District.
- B. Utility structures specified herein shall be watertight and hence free of infiltration or exfiltration.

1.06 MEASUREMENT AND PAYMENT

- A. Measurement and Payment for “**Storm Drain Manhole**” bid item shall be per lump sum and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the storm drain manhole, including, but not limited to, excavation, reinforcing steel, miscellaneous iron and steel, metal frame and grate, de-watering, concrete, backfill and compaction, adjustment to grade, connection to drainage pipes, grouting, dampproofing, cleaning, and leak testing and no additional compensation will be allowed therefor.
- B. Measurement and Payment for “**Curb Inlets and Catch Basins**” bid item shall be per lump sum and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the curb inlet or drop inlet, including, but not limited to, excavation, reinforcing steel, miscellaneous iron and steel, metal frame and grate, de-watering, concrete, curb, gutter, backfill and compaction, adjustment to grade, connection to drainage pipes, grouting, dampproofing, cleaning, and leak testing and no additional compensation will be allowed therefor.
- C. Measurement and Payment for “**Trench Drain**” bid item shall be per lump sum and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the trench drain, including, but not limited to, excavation, reinforcing steel,

miscellaneous iron and steel, metal frame and grate, de-watering, concrete, curb, gutter, backfill and compaction, adjustment to grade, connection to drainage pipes, grouting, dampproofing, cleaning, and leak testing and no additional compensation will be allowed therefor.

- D. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 PRECAST REINFORCED CONCRETE MANHOLES

- A. Precast reinforced concrete manhole sections including reducer and transition slabs, risers, grade rings, eccentric and concentric cones, slab tops, covers, transition slabs, and base sections shall conform to ASTM C478. Copolymer polypropylene coated steel manhole steps shall be provided except for sanitary sewer manholes. No manhole steps are required in sanitary sewer manholes unless specifically shown or noted on the Drawings. Minimum inside dimension for manholes shall be 48-inches and eccentric cone top sections shall be provided unless otherwise shown on the Drawings. Wall thickness shall not be less than 5 inches for 48-inch diameter risers and cones.
- B. Bases may be supplier-designed precast or cast-in-place concrete. Cast-in-place concrete shall conform to Section 03300 and reinforcement shall conform to Section 03200. Minimum concrete base cast-in-place thickness shall be 9 inches unless greater thickness is shown on the Drawings. Minimum (or greater if shown on the Drawings) steel reinforcement shall be #4 bars at 12-inches on center each way, top and bottom mats. The joint between the bottom-most riser section and the base shall include a minimum 4-inch mortar fillet or 4 inches of concrete embedment all around.
- C. Concrete manholes, slabs, covers, and appurtenances shall be by Jensen Precast Concrete, Central Precast Concrete, Hanson Pipe and Precast, Utility Vault, Co., Old Castle Precast, Inc., or equal.

2.02 MANHOLE COVERS AND FRAMES

- A. Manhole covers and frames shall be cast iron, 24-inches in diameter unless otherwise shown on the Drawings and be non-rocking. A minimum of one pick or hook hole shall be provided in the cover. Covers shall read "Storm Sewer" or "Storm Drain" for storm drain pipelines, "Sanitary Sewer" for sanitary sewers, and shall be blank for manholes on valve vaults. Joining cover and frame surfaces shall be machined. Covers and frames shall be asphalt varnish dipped. Check Drawings for locations where special manhole covers are grated. Large manhole covers (greater than 40-inch) shall include a 22-inch removable center or offset center vented lid.
- B. Manhole covers and frames shall be Neenah, Phoenix Iron Works, South Bay Foundry, D&L Foundry, or equal.

2.03 GASKETS

- A. Gaskets between riser sections, cones, and grade rings shall be mastic or rubber. Mastic gaskets shall be K.T. Snyder Ram-Nek, Hamilton-Kent Kent-Seal, Sheller-Globe Tac-Tite, or equal. Rubber gaskets shall be to ASTM C361 except natural rubber will not be acceptable. Cross sectional gasket area shall be as recommended by the precast manhole manufacturer for a watertight joint.

2.04 NON-SHRINK GROUT

- A. Grout for use in utility structures shall be non-shrink cementitious grout shall be in accordance with Section 03600.

2.05 CURB AND DROP INLETS

- A. Curb and drop inlets shall be precast concrete in accordance with ASTM C858 or C913 unless otherwise shown on the Drawings. The inside dimensions of these inlets shall be as shown on the Drawings. These units shall be reinforced concrete designed for the actual depth and installation conditions by the manufacturer. Minimum wall thickness is 4-inches unless a greater thickness is shown on the Drawings. Cast iron or steel grates, frames, and hoods shall be provided as shown on the Drawings. All steel frames and grates shall be hot dipped galvanized. Steel grates shall be banded at the ends of the bearing bars. Pipe openings or knock-out webs shall be provided for the number and diameter of pipes entering the unit as shown on the Drawings.
- B. Curb and drop inlets shall be by Jensen Precast Concrete, Central Precast Concrete, Hanson Pipe and Products, Old Castle Precast, Inc., or equal.

2.06 TRENCH DRAINS

- A. All trench drains and accessories shall be the product of one manufacturer, ACO, ABT, or equal. Trench drains shall be manufactured channel units of polymer concrete. Nominal channel inside width shall be 8 inches and shall have a cast-in slope of 0.6 to 1%. Channel units shall have interlocking tongue and groove joints and smooth inverts. The channel and grating combination shall be designed to withstand loadings of at least H-20 and 56,000 pounds. Neutral slope units shall be provided if necessary for installation. Channel units shall be provided with end caps and appurtenances to provide a complete trench drainage system.
- B. All trench drains shall be provided with removable and lockable gratings. Gratings shall be adequate to withstand loadings of at least H-20 and 56,000 pounds. Gratings shall be ductile iron with cross-trench slots.

2.07 DAMPPROOFING

- A. Dampproofing shall be applied to the exterior of all precast concrete walls from the top of the footings up to 6-in below finished grade per Section 07100.

PART 3 EXECUTION**3.01 HANDLING**

- A. Precast concrete units shall be handled carefully and shall not be dropped or bumped. Damaged sections shall be immediately marked as damaged and removed from the site.

3.02 MANHOLE BASE CONSTRUCTION

- A. Cast-in-place concrete or precast concrete manholes shall be placed over a minimum depth of 12 inches of aggregate base course compacted to 95% relative compaction per D1557, unless greater depths are shown on the Drawings. Aggregate base course shall be placed upon undisturbed earth or structural fill. The surface of the aggregate base rock and native soil shall be accurately graded, and the base section accurately set or cast so that intersecting pipelines will be at the proper line and grade. No blocking or wedging of precast concrete bases is permitted.
- B. In no case shall the invert of the inlet pipe(s) be lower than that of the outlet pipe(s). All bases and concrete fill shall be sloped to drain. Unless otherwise shown on the Drawings, the outlet pipeline(s) shall have an invert at least 0.1 foot lower than the lowest inlet invert pipeline. Concrete infill shall be provided and the invert of the concrete channels through the manhole shall be troweled smooth to create a flow path matching the connecting pipe diameters unless specifically shown otherwise on the Drawings.

3.03 MANHOLE RISER AND CONE, VAULT WALL INSTALLATION

- A. All concrete joints shall be cleaned prior to setting sections. Precast risers, cone sections, vault sections, and grade rings shall be provided with mastic or rubber gaskets to seal joints between sections. Mastic gaskets shall be used only within the temperature range and atmospheric conditions recommended by the gasket manufacturer. Lifting holes in precast units shall be completely packed with non-shrink grout after the unit is installed.
- B. All surfaces to receive grout shall be cleaned and wetted before placing grout.
- C. All void spaces between the piping and the manhole shall be completely packed with non-shrink grout.
- D. The maximum height of grade rings shall be limited to 18 inches. Grade rings shall be secured by cast-in-place concrete.

3.04 MANHOLE FRAME AND COVER INSTALLATION

- A. Frames and covers shall be adjusted to match the grade and cross-slope of the finished surface. Frames shall be embedded in concrete which shall extend outwards a minimum of 12 inches from the frame outside perimeter. In asphalt paved areas, the asphalt paving shall extend over the concrete to the perimeter

of the cover. In unpaved areas, the embedment concrete shall be flush with the top rim of the frame and slope away from the cover at 0.25-inches per foot.

3.05 CURB AND DROP INLET INSTALLATION

- A. Curb and drop inlets shall be placed upon a minimum of 12 inches of aggregate base course compacted to 95 percent relative compaction per D1557. The aggregate base course shall be placed upon undisturbed earth or structural fill. Backfill shall be carefully and evenly placed to avoid damage to the inlet and to maintain vertical alignment. Each inlet floor elevation will be accurately placed to match the grade of the lowest pipe invert. Concrete infill shall be provided in each inlet to form a smooth flow path from upstream pipe(s) to the outlet pipe. All lifting holes shall be filled with mortar.

3.06 PIPE PENETRATIONS

- A. Unless other means are shown on the Drawings or specified, all pipe penetrations into manholes, drop inlets, curb inlets, boxes, and similar structures shall have the gap between pipe and concrete fully sealed with non-shrink concrete grout per Section 03600.

3.07 TRENCH DRAIN INSTALLATION

- A. Trench drain installation shall be in accordance with the manufacturer's written instructions except where specifically modified herein. Ensure that channels are laid in consecutive sequence and with the flow direction arrows properly oriented. Provide an expansion/contraction joint in the trench drain wherever such joints are crossed in the surrounding surfaces. Use the manufacturer's clips, hangers, or other devices to ensure that the trench drain channels do not float while the surrounding concrete is placed. Provide block-outs in mating drop inlets or similar structures so that the full trench drain open cross section area is maintained for flow into such inlets.

3.08 DAMPPROOFING

- A. Dampproofing of structures shall take place prior to the performing of any leakage tests.
- B. Outer surfaces of precast and cast-in-place structures shall be dampproofed at the rate of 30 to 35 sq ft per gallon as directed by the Engineer and in accordance with manufacturer's instructions. Only the sides of the structure shall be dampproofed. Dampproofing will not be required on the structure bottom.

3.09 LEAKAGE TESTS

- A. Test each storm drain manhole, curb inlet, drop inlet, trench drains, and other similar structures for leakage. Engineer shall observe each test. Submit exfiltration field testing procedure for review by Engineer before performing test. Perform exfiltration test as described below.

- B. Assemble unit (e.g. manhole, curb inlet, etc.) in place; fill and point all lifting holes and exterior joints. Test prior to backfilling wherever feasible. Lower surrounding ground water table below bottom of the manhole for the duration of the test as required. Plug all pipes and other openings into the unit and brace to prevent blow out. Test units before electrical, instrumentation, and equipment components are installed where applicable.
- C. Fill unit with water to the top of the cone or cover section. If the excavation has not been backfilled and no water is observed moving down the surface of the unit, the unit is satisfactorily water-tight. If the test, as described above is unsatisfactory as determined by the Engineer, or if the unit excavation has been backfilled, continue the test. A period of time up to 48 hours may be permitted to allow for water absorption. Following this period, refill unit to the top of the cone, if necessary and allow at least 8 hours to pass. At the end of the test period, refill the unit to the top of the cone or cover again, measuring the volume of water added. Extrapolate the refill amount to a 24-hour leakage rate. The leakage for each unit shall not exceed one gallon per vertical foot of structure height above the base for a 24-hour period. If the unit fails this requirement, but the leakage does not exceed three gallons per vertical foot per day, repairs by approved methods may be made as directed by the Engineer. If leakage due to a defective section of joint exceeds three gallons per vertical foot per day, the unit shall be rejected and replaced at no additional cost to the District. Uncover the rejected unit as necessary and to disassemble, reconstruct or replace. Retest the unit and, if satisfactory, drain and prepare for service.
- D. No adjustment in the leakage allowance will be made for unknown causes such as leaking plugs, absorptions, etc. It will be assumed that all loss of water during the test is a result of leaks through the joints or through the concrete.

3.10 CLEANING

- A. On a daily basis, thoroughly clean all manholes, curb inlets, drop inlets, trench drains, gratings, and frames of test water, plugs, construction debris, dirt, and trash.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. All work required to demolish, modify, salvage, relocate, dispose, and convert existing structures, pipelines, pavements, curbs and gutters, castings, concrete vaults, retaining walls, trees, and miscellaneous items as required for the construction of the improvements as shown on the Drawings and as specified.
2. Demolition of piezometers (groundwater measurement wells) in accordance with Santa Clara County and District requirements in the areas of new improvements.
3. Protect all on-site personnel and the public at all areas of demolition and transportation of demolition materials and equipment.
4. Complete erosion and dust control measures as specified in the Standard and Special Provisions.
5. Protect, support, and maintain adjoining structures, buried and above grade utilities, sitework facilities, roadways and pavements, water channels and conduits, equipment spaces, vaults, and miscellaneous structures and items surrounding the demolition work from damage or harmful effects.
6. Protect all vegetation and landscaping except in areas designated for removal or within the footprints of new construction.
7. In accordance with the Standard and Special Provisions, and all applicable state and local laws, properly dispose of all hazardous materials as required, obtain EPA generator number from the District, and prepare safety plans for all aspects of the work.
8. All demolished items are the property of the Contractor for proper disposal except those items specifically listed to remain the property of the District herein or on the Drawings.

1.02 RELATED SECTIONS

See Related Sections for additional requirements applicable to this Section (typical).

- A. Section 02260 – Excavation Support and Protection.
- B. Section 02300 – Earthwork.
- C. Section 02742 – Asphaltic Concrete Paving

1.03 SELECTIVE SITE DEMOLITION WORK

- A. Demolition work includes, but is not limited to:
 - 1. General Sitework: Asphalt and concrete paving and slabs-on-grade, pipelines, storm drainage structures, sidewalks, curbs, gutters, V-gutters, concrete walls and slabs, above and below grade utilities, vaults, handholes, ductbanks, individual conduits, irrigation systems, and designated vegetation, trees and landscaping. Demolition as required to modify and raise existing handholes, vaults, manholes, valve boxes, and appurtenances to grade for new pavements.
 - 2. Piping associated with the Liquid Alum and Powdered Activated Carbon metering pumps to allow for replacement new piping, hose, fittings, and appurtenances as shown on Drawings.

1.04 PROTECTION

- A. Maintain free and safe passage for all on-site personnel at all times.
- B. Prevent movement or settlement of structures or surrounding areas to demolition work. Provide bracing, shoring, and debris barriers as required and assume responsibility for the safety and support of affected structures. See Section 02260.
- C. Protect water in Flocculation and Sedimentation Basins, Washwater Recovery Basins, Lower Sludge Drying Basins, East and West Clearwells, pipelines, and all other process water from contamination. Such water is being treated for drinking water or is typically recycled into drinking water.
- D. Protect from damage existing finishes, equipment, and adjacent work which remain. Cut finish surfaces such as masonry, gypsum wallboard, concrete, or metals by methods which will terminate or join work in a straight line at an appropriate point of division.
- E. Protect existing landscaping and irrigation systems to remain.
- F. Cease operations and notify the Engineer immediately if the safety of any structure or utility appears to be endangered. Take additional precautions to properly support such structure(s) and do not resume demolition operations until safety is restored.
- G. Utility locations shown on the Drawings are approximate and may vary from where they are shown.
- H. Dry concrete saw-cutting shall not be permitted. Wet concrete saw-cutting shall be permitted with proper management of slurry and prevention of slurry reaching plant underdrain and drain systems.
- I. Promptly repair any damage caused to facilities or landscaping by demolition operations as directed by the Engineer and at no additional cost to the District.

The minimum quality of repair shall be equal to that which existed prior to the start of the Contractor's work.

1.05 CONDITION OF STRUCTURES

- A. Conditions existing at the structures and areas to be demolished at the time of the bid period shall be maintained by the District insofar as practical. Minor variations in small piping, electrical equipment, and miscellaneous materials shall be expected by the Contractor and this entire work shall be completed at no additional cost to the District.

1.06 DISPOSAL OF MATERIAL REMOVED BY DEMOLITION WORK

- A. All materials removed by demolition work shall become the property of the Contractor as soon as actual demolition is initiated unless specifically identified to be salvaged for the District. The Contractor shall remove demolition materials as soon as possible but in no case shall Contractor store materials removed by demolition on the project site longer than 10 working days. Demolition materials other than concrete and soil shall be properly contained in covered waste disposal bins. Concrete and soil shall be tightly stockpiled and covered until removal.

1.07 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit a Waste Management Plan detailing proposed methods of waste storage on site, transportation from site, and final recycling or disposal locations.

1.08 ITEMS TO BE SALVAGED AND DELIVERED TO THE DISTRICT

- A. Three sump pumps and appurtenances as identified on the Drawings shall be salvaged, cleaned, packaged for storage (in cardboard boxes, pallets, packing materials, etc.) and delivered to the District at the location on the Rinconada Water Treatment Plant property designated by the Engineer. These items shall remain District property.
- B. Existing steel trench plates identified in the Drawings for removal shall be delivered to the District at the location on the Rinconada Water Treatment Plant property designated by the Engineer. These items shall remain District property.

1.09 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Schedule of Bid Items.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION**3.01 REMOVAL OF STRUCTURES AND PAVEMENTS**

- A. Contractor shall remove all components of structures shown or required to be removed both permanently and temporarily.
- B. All new pavements that interface with existing pavements to remain shall be sawn in straight lines.
- C. Where portions of structures are to remain and/or meet new work, the interface shall be sawn unless otherwise shown to be a roughened surface.
- D. Where shown or required for new construction, the underlying base rock and subgrade soils at pavement and concrete slab-on-grade areas shall be removed.
- E. Where shown or required for new construction, the underlying base rock, drain rock, geotextile fabrics and grids, underdrain piping, and subgrade soils under structures shall be removed.
- F. Where shown or required for replacement paving, the underlying base rock and subgrade soils at pavement and concrete slab-on-grade areas shall be removed.

3.02 CLEAN-UP

- A. The Contractor shall remove from the site all debris resulting from the demolition operations as it accumulates. Upon completion of the immediate demolition work, the Contractor shall thoroughly clean each area, including dusting, vacuuming, sweeping, wash down, and window cleaning.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Perform all dewatering necessary or required for the construction of the Work as required by these Specifications and indicated on the Drawings. Dewatering work shall include the control of water, sediment removal, and disposal of water. Also complete dewatering due to water-filled basins next to work, leaking existing structures, and for piping tie-ins. Existing process basins may contain water that is chlorinated or chloraminated and may contain other chemicals. All potable water at the plant is chloraminated.
- B. The Contractor's attention is directed to Article 18.02, for permissible discharges of construction-related water into District's basins, and Section 01140, Work Restrictions.

1.02 RELATED SECTIONS

- A. Section 01756 – Testing and Facility Startup.
- B. Section 02084 – Utility Structures.
- C. Section 02300 – Earthwork.
- D. Section 02632 – Storm Drainage Piping.

1.03 REFERENCES

- A. Caltrans Construction Site Best Management Practices Manual.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit a dewatering plan prior to beginning the work, including:
 - 1. Arrangement and location of wells or well points.
 - 2. Location of headers, discharge lines, and points of discharge.
 - 3. Number of pumps and pumping capacity.
 - 4. Sediment removal process and equipment.
 - 5. Discharge location.
 - 6. Water quality testing, monitoring and reporting plan.

7. Test data, including but not limited to, specific yield and groundwater extraction rate, demonstrating that the system is capable of complying with the requirements specified in Part 3, below.
8. Monitoring report showing water quality testing data.

1.05 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 GENERAL

- A. Contractor's attention is directed to the Special Provisions, Article 18.01.E, regarding certain allowable non-storm water discharges. Allowable non-storm-water discharges are subject to the same water quality requirements as stipulated for the Risk Level 2 Requirements in Article 18.01.04. District retains right not to reintroduce wasted waters from the Contractor's operations back into the treatment process due to upsetting the overall treatment process or capacity constraints for storage. Contractor must comply with all federal, state and local laws for disposal of waters not recycled back into the District's treatment process, and not suitable for discharge into the storm drain system under the NPDES permit.
- B. Other non-storm discharges not cited in Article 18.01.E are prohibited under the General NPDES Permit to be discharged into Smith Creek or other off-site storm drainage systems. Other non-storm discharges not already authorized in the General NPDES Permit shall be hauled off and disposed of in accordance with local, state and federal laws. Otherwise, Contractor shall be required to obtain and pay for necessary discharge permits from the Regulatory Agency(ies) having jurisdiction. Contractor shall provide all copies of applications for permit(s), permits acquired, and fill out and provide the District with a "Notice of Temporary Discharge (Notice)." A hard copy of the Notice is attached for use in Appendix H. An electronic version of the form may be transmitted to the Contractor upon request. The form must be filled out and sent via email to the Engineer for review. The Notice must be submitted 5 working days prior to discharge. Failure to submit the Notice of Temporary Discharge shall be grounds for temporary suspension of all or a portion of the work in accordance with Article 7.05.B. Suspension of work for noncompliance will not be grounds for additional time or compensation. A Notice of Discharge shall be submitted similarly for each occurrence, unless specifically approved otherwise by the Engineer.

3.02 CONTROL OF WATER

- A. All excavations and trenches shall be kept free from water and all construction shall be in the dry.
1. The presence of groundwater or seepage from groundwater or basins requires dewatering operations. Furnish, install, maintain, and operate all necessary pumping and other equipment for dewatering all excavations and trenches. Provide sufficient pumping equipment for immediate use, including standby pumps and standby power supply for use in case other pumps become inoperable or there is loss of power.
 2. Provide a sufficient number of pumps and dewatering points so as to hold the groundwater level at an elevation of not less than 3 feet below the lowest elevation of the subgrade preparation, concrete, pipe, duct or other material to be placed.
 3. If pumping is required on a 24-hour basis, as requiring engine drives or engine-generators, then engines shall be equipped and shielded in a manner to keep noise below 55 decibels as measured at the closest plant property line.
 4. Provide continuous dewatering operations to maintain the groundwater or seepage level at least 3 feet below the prevailing excavation level or subgrade.
 - a. During excavation.
 - b. While concrete is setting and achieves full strength.
 - c. Until backfill has been placed to a sufficient height to anchor the work against possible flotation.
 - d. During other construction operations.
 5. Continue dewatering during backfilling operations such that the groundwater or seepage is at least 3 feet below the level of the compaction effort at all times. No compaction of saturated materials will be allowed.
 6. Contractor shall be responsible for any damage to the foundations or any other parts of existing structures or of the new work caused by failure of any part of the Contractor's dewatering operations or protective works. After temporary protective works are no longer needed for dewatering purposes, they shall be removed by the Contractor.
 7. Arrange discharge piping for ease of sample collection.
- B. Any leakage shown to be originating from District's existing valves or other District facilities shall be immediately reported to the Engineer.

3.03 DISCHARGES TO SMITH CREEK

- A. Contractor must implement the dewatering operation in adherence of these Specifications and under the conditions set forth by permit(s) obtained and paid for by the Contractor from the agency(ies) having jurisdiction for "Other Discharges" as defined in Article 18.01 and, meet the discharge requirements stipulated in Article 18.01.
- B. Contractor must implement the dewatering operations in adherence of the Contractor's BMP Action Plan, if applicable, for discharges covered under the NPDES General Permit as defined in Article 18.01.
- C. If chlorinated or chloraminated water is to be discharged into Smith Creek or any storm drain systems, Contractor shall pump water to be discharged into a holding tank which is equipped with an outlet valve for flow control and pipes and/or hose necessary to discharge the tank content. The Contractor shall add de-chlorination agents (such as Sodium Bisulfite) to the tank using a metering pump or other device approved by the Engineer. The holding tank shall be mixed to allow for adequate mixing and reaction of de-chlorination agents with water. The Contractor shall take water samples from the holding tank and test them for chlorine content, turbidity, and pH. One sample shall be collected at 6 inches, 1 foot 6 inches, and 2 feet 6 inches from the bottom of the holding tank, respectively. If the test results of all samples in each tank meet the specified requirements, the content of the tank can then be discharged. Contractor shall provide initial monitoring results of the dechlorination / chloramination process to the Engineer before any discharges are made to Smith Creek or the storm drain systems. A log of the monitoring and sampling results shall be provided to the Engineer on a daily basis and discharges must be monitored in accordance with Article 18.01.04 for Risk Level 2 Requirements.
- D. Contractor's discharges to the on-site storm drain and/or Smith Creek are subject to water quality monitoring, testing and reporting requirements set forth in Article 18.01.04 for Risk Level 2 Requirements.
 - 1. The Contractor shall measure the water for turbidity at the point where the discharge water exits the Contractor's water control system or as required by Article 18.01. Measurements shall be made with a portable turbidimeter, Model No. DRT-15CE, by HF Scientific, Fort Meyers, Florida, or equivalent method approved by the Engineer. Turbidity measurements shall be performed on a sample immediately after the sample is collected per instrument manufacturer's specifications. The procedure used for performing turbidity measurements shall be documented in accordance with Article 18.01.
 - 2. Chlorine shall be measured using a Hach Company portable chlorimeter or equivalent instrument approved by the Engineer by the Contractor. Instruments shall have a detection limit of 0.08 mg/L or less.
 - 3. Discharge sampling shall be performed in accordance with Article 18.01 for chlorine residual, turbidity, temperature, and pH at 1-hour intervals for 4 hours for the first day of discharge and twice daily thereafter for potable

water. If groundwater is discharged, sampling shall be performed for turbidity, temperature, and pH at 1-hour intervals for 4 hours for the first day of discharge and twice daily thereafter. If samples taken indicate the discharge exceeds one of the criteria, the discharge will be suspended immediately, until the water can meet all of the discharge criteria. More testing and sampling may be required as required under requirements of Article 18.01.

4. Contractor shall conduct visual monitoring at the creek outfall through which water is discharged in accordance with Article 18.01 to ensure erosion is not occurring. If erosion of the stream channel banks or bottom is evident, the Contractor shall adjust the discharge flow rate or modify the discharge system to eliminate the effects of erosion.
5. Contractor shall conduct any required baseline testing and monitoring in accordance with Article 18.01 prior to and during the discharge operation of stream conditions, i.e., turbidity, temperature, pH and chlorine levels where discharges from construction would be routed.

3.04 DEWATERING SYSTEM REMOVAL

- A. Abandon well points and pipe underdrains and sumps using a lean concrete and bentonite slurry mix in accordance with County requirements for well abandonment. Remove all equipment and temporary measures when safe to do so.

3.05 SEDIMENT AND CHLORINE REMOVAL

- A. Water Quality Requirements: As required in Article 18.01.04 for Risk Level 2 Requirements.
- B. Best Management Practices: Provide dewatering devices and/or processes to adequately filter and/or remove fines from the extracted groundwater to meet legal water quality discharge requirements.
- C. Coordinate space requirements for sediment removal devices or processes within the Project boundaries shown on the Drawings.
- D. Discharge filtered water meeting water quality requirements. Discharge water in accordance with the dewatering plan. Prevent disposal of water and sediment to other adjacent lands or waterways.
- E. De-chlorinate chlorinated and chloraminated water prior to discharge per California SWRCB requirements.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Excavation support and protection; shoring and sheeting required to protect existing structures, buildings, roads, and accessways to remain in service next to new construction, pipeline construction, manhole, vault, and wetwell construction, and to complete all other project Work.
- B. This Section requires the Contractor to employ California registered professional engineers for specific tasks.

1.02 RELATED SECTIONS

See Related Sections for additional requirements applicable to this Section (typical).

- A. Section 02240 – Dewatering.
- B. Section 02300 – Earthwork.

1.03 REFERENCES

- A. American Institute of Steel Construction, Inc. (AISC):
 - 1. Manual of Steel Construction Allowable Stress Design.
- B. American Society of Civil Engineers (ASCE):
 - 1. Guidelines of Engineering Practice for Braced and Tied-Back Excavations.
- C. California Code of Regulations (CCR):
 - 1. Title 8 – Construction Safety Orders.
- D. California Labor Code Sections 6705 to 6707 (CLC).
- E. International Conference of Building Officials (ICBO) and State of California:
 - 1. California Building Code (CBC).
- F. State of California Department of Transportation (CALTRANS):
 - 1. CALTRANS California Trenching and Shoring Manual.
- G. United States Steel Corporation (USS):
 - 1. USS Steel Sheet Piling Design Manual.

1.04 DEFINITIONS

- A. Shoring: A temporary or permanent structural system designed to support vertical faces, or slopes which require shoring for safety as required by California Occupational Safety and Health Administration (CalOSHA), of soil or rock for purposes of excavation. Shoring includes cantilevered sheet piling, internally braced sheet piling, soldier piles and lagging, shotcreting, and other similar shoring systems. Sloping of the soil is not shoring.

1.05 SYSTEM DESCRIPTION

- A. Design and Qualifications Requirements:

1. General:

- a. Design the means for safe and stable excavations and the protection of adjacent structures in accordance with local, State, and Federal law and for any more conservative practices specified herein.
- b. Excavation support and protection design for bidding purposes and construction shall be completed by an engineering firm employed by the Contractor with a minimum of 7 years continuous experience prior to this Project's bid date in designing shoring systems for construction excavation in California. The responsible engineer for completing this design shall have a minimum of 10 years of experience in designing shoring systems for construction excavation. The responsible design engineer shall have a minimum of 15 shoring design projects similar to that required of this Work on her/his resume. Perform this design in accordance with information provided to the shoring design engineer by a geotechnical engineer employed by the Contractor. This geotechnical engineer shall be registered in California. Note that the Project geotechnical report was completed for the design of the permanent structures, not shoring design. The Engineer will not provide consultation on the shoring design or geotechnical criteria.
- c. Design steel members in accordance with the California Building Code and the AISC Manual of Steel Design.
- d. Design shoring involving materials other than steel in accordance with California Building Code.
- e. When electing to design with material stresses for temporary construction higher than allowable stresses prescribed in the Manual of Steel Construction and the California Building Code, increase in such stresses shall not exceed 10 percent of value of prescribed stresses.

- f. Generally acceptable references for the design of shoring and excavations are listed under the References paragraph above.
 - g. Contractor shall design and install excavation protection outside the foundation lines of new structures unless otherwise noted.
 - 2. Soldier Piles and Lagging:
 - a. Provide lagging over the full face of the excavation. Joints between pieces of lagging shall be tight to prevent loss of soil.
 - b. Provide full face lagging all around penetrations through the lagging.
 - c. Fill voids behind lagging with free-draining gravel or other material that will satisfy the design load assumptions for the excavation support and other requirements.
 - d. Impact Pile Driving is prohibited.
 - 3. Soil Anchors, Rock Anchors, and Deadmen Anchors:
 - a. Anchors may only be used where they will not extend within less than 5 feet of existing buried utilities and structures. Design tie back anchors for a safety factor of not less than 2 times the calculated load from the shoring.
 - 4. Site Visits and Inspection:
 - a. The responsible excavation support and protection design (i.e., "shoring") engineer shall visit and examine the site of the Work before preparing the excavation support and protection design. The shoring engineer shall inspect the shoring as often as necessary to ensure compliance with its design, with a minimum of 1 visit every 4 months while shoring is in use during the Work.
 - b. The shoring engineer shall attend a meeting at the site of the Work (in addition to the site visits specified above) if so requested by the Engineer at no additional cost to the District.
- B. Excavation Support and Protection Performance Requirements:
 - 1. General:
 - a. Support faces of excavations and protect new and existing structures and improvements in vicinity of excavations from damage and loss of function due to settlement or movement of soils, alterations in groundwater level caused by such excavations, and related operations.

- b. Additional Requirements:
 - (1) Nothing herein shall substitute or diminish the obligations of Contractor for the furnishing of a safe place of work pursuant to provisions of the Occupational Safety and Health Act of 1970 and its subsequent amendments and regulations, the requirements of California law, and for protection of the Work, structures, and other improvements.
- 2. Provide safe, dry, and stable excavations by means of sheeting, shoring, bracing, sloping, waterproofing, and other means and procedures, such as disposing of seepage and surface runoff, required to maintain the stability of soils and new construction.
- 3. Provide support for trench excavations for protection of workers and others from the hazard of caving ground.
- 4. Provide shoring whenever any of the following conditions exist:
 - a. Where, as a result of excavation work and analysis performed pursuant to general engineering design practice:
 - (1) Excavated face or surrounding soil mass may be subject to slides, caving, or other types of failures.
 - (2) Stability and integrity of existing and new structures and other improvements may be compromised by settlement or movement of soils, or changes in soil load on structures and other improvements.
 - b. For trenches 5 feet and deeper.
 - c. For trenches less than 5 feet in depth, when there is a potential for soil cave-in.
 - d. Where required to meet Project constraints on available space and to keep process basins and other District facilities in service.
 - e. Where required to keep all access roads and access to structures continuously open. All access roads and access to structures shall be maintained open except as noted in the Standard and Special Provisions.
 - f. Where otherwise required by local, state, or federal law.

5. For safe, dry, and stable excavations, use appropriate design and procedures for construction and maintenance to minimize settlement of supported ground and to prevent damage to structures and other improvements, including:
 - a. Using stiff support systems.
 - b. Following the appropriate construction sequence.
 - c. Preventing soil loss through or under support system.
 - d. Providing surface runoff and seepage collection, routing, and discharge away from excavations.
 - e. Where sheet piling is used, use interlocking type sheets. The sheet piles shall be continuous and driven in interlock. If the bottom of the excavation is located below the water table, use "thumb and finger" type interlock.
 - f. Not applying shoring loads to existing structures and other improvements.
 - g. Not changing existing soil loading on existing structures and other improvements.

1.06 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit statement of qualifications for engineering firm proposed for design of construction excavation support. Provide resumes of engineer(s) from the local design office who will complete this excavation support design. Provide address, telephone, and email addresses of local design office. Confirm that engineer(s) who are proposed to complete the work of this Section have reviewed the Drawings and Specifications.
- C. Submit name, address, telephone number, and resume of the engineer providing geotechnical information for shoring design if required by the excavation support engineer or Contractor.
- D. Submit name, address, telephone number, and resume of the surveyor that will perform monitoring of shoring survey points. The survey monitoring shall be performed by a Registered Land Surveyor, registered in the State of California.
- E. Submit copies of letter(s) to Contractor from the professional design engineers stating that the excavation support design has been completed in accordance with general engineering practice. Provide separate letters if required for different structures and sets of calculations.
- F. Submit shoring design calculations and drawings for record purposes only when required by the California Labor Code or other applicable law.

1.07 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION**3.01 TRENCHING AND EXCAVATION SAFETY PLANS**

- A. Develop, provide, and implement trench excavation and excavation safety plans as required by the California Labor Code, Construction Safety Orders, and other relevant law. Contractor shall submit all safety plans (per Special Provisions Section 16) to the Engineer for review, however, the Engineer will not be approving these plans.

3.02 INSTALLATION AND REMOVAL

- A. Install the means for providing safe and stable excavations and to protect District facilities.
- B. All shoring shall be removed by completion of the Work unless otherwise noted. Exceptions include rock anchors and soil nails that are at least 5 feet below existing and proposed underground infrastructure. Select shoring system and method of removal which will minimize the creation of voids and the creation of settlement. To prevent settlement caused by pulling shoring, fill voids with sand, pea gravel, or pressure injected grout. The methods used shall prevent settlement.

3.03 MAINTENANCE

- A. Where loss of soil occurs, plug gap in shoring and replace lost soil with compacted structural fill, Class 2 aggregate base, or controlled low-strength material. Provide dewatering or whatever means are necessary to keep surface water and groundwater out of excavations per Section 02240.
- B. Shoring shall be inspected no less frequently than weekly and needed repairs shall be completed as soon as required due to safety and the potential for damage.

3.04 MONITORING

- A. The Contractor shall require its engineer to provide sufficient shoring design calculations to specify the maximum allowable ground movement near the top facing and ground surface behind the temporary excavation support.

- B. Survey points shall be established at points on the shoring system, either at the top of shoring or at grade, with no more than 15-foot separation. Contractor shall monitor and survey the vertical and horizontal positions of shoring systems for new structures at least every 2 weeks to monitor stability, with the initial reading taken within 2 days of completion of initial shoring installation or after a change in shoring configuration. Contractor shall establish control points on existing structures; six control points on the Control Building, one control point on each clearwell, and four control points on the existing chemical storage areas. The results of all survey readings shall be reported to the Engineer and shall be attached to the daily inspection reports provided to the Engineer. At a minimum, reported data shall include the measured Northing, Easting, and elevation of each point. Deflection of any of the monitoring points exceeding a total of 0.50 inches in a resultant direction from their initial reading shall be flagged. In the event of excessive deflection, the Contractor may be ordered to stop excavation by the Engineer or the District.
- C. Where measurements and observations indicate the possibility of failure or excessive movement of excavation support, or damage to existing structures and utilities, the Contractor shall take appropriate action immediately.
- D. Appropriate action by the Contractor shall include, but not be limited to, placement of additional excavation supports, additional shoring design calculations, exploratory excavations, expediting work to complete and backfill excavations, repair of damage to existing structures and utilities, soil stabilization, greater ground and surface water control, and associated work.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Excavation, backfill, fill and grading including, but not necessarily limited to: excavation for structures, manholes, conduits, pipes, and paving; demolition, backfilling and fill; embankments and grading; slope protection; import of fill; disposal and stockpiling of waste and surplus soils and materials; and all related work.
2. Exploratory excavations (potholes) to locate existing pipelines, electrical ducts, concrete encasement, extent of foundations, and other utilities prior to relevant submittal preparation, demolition, trenching and general excavations.
3. Laboratory compaction curves, field compaction and moisture testing by the Contractor using an independent Testing Agency.

B. See the Reference Drawings from past projects for additional information on buried utilities and improvements in the area of the work.

C. Refer to Section 02924 for hydroseeding of disturbed landscaped areas.

1.02 RELATED SECTIONS

See Related Sections for additional requirements applicable to this Section (typical).

- A. Section 02084 – Utility Structures.
- B. Section 02240 – Dewatering.
- C. Section 02260 – Excavation Support and Protection.
- D. Section 02315 – Fill and Backfill Materials.
- E. Section 02632 – Storm Drainage Piping.
- F. Section 02722 – Aggregate Base Course.
- G. Section 02742 – Asphaltic Concrete Paving
- H. Section 02924 – Hydroseeding and Soil Preparation.
- I. Section 02952 – Erosion Control – Post Construction BMPs.
- J. Section 03300 – Cast-in-Place Concrete.

1.03 REFERENCES

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

1. C131 Test Method for Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

2. C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 3. D422 Test Method for Particle-Size Analysis of Soils.
 4. D1556 Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method.
 5. D1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54 kilogram) Rammer and 18-inch (457 millimeter) Drop.
 6. D2419 Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
 7. D2922 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods.
 8. D3017 Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 9. D4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- B. Standard Specifications for Public Works Construction (2012 Edition).
- C. State of California - Department of Transportation, Standard Specifications, 2018.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit the source and soils data for off-site sources of import fill materials. See Section 02315 for required test information.
- C. Submit product data for filter fabric and bioretention area plants.
- D. Provide representative 20-pound soil samples for testing by the Engineer when requested.
- E. Exploratory excavation data as it is collected.
- F. Laboratory fill and backfill materials, aggregate base, class 2 permeable, pipe bedding, and sand compaction curves. Field compaction and moisture test data verbally as it is taken and in writing within 5 days of each tests' completion.

1.05 SOIL TESTING/QUALITY ASSURANCE

- A. Where referred to in the Specifications or Drawings, "compaction" or "relative compaction" shall refer to in-place dry density of soil expressed as a percentage of the maximum dry density of the same material as determined by ASTM D1557.

- B. The Contractor shall employ an independent Testing Agency for testing of subgrades and the compaction of all fill and backfill materials, aggregate base, class 2 permeable, pipe bedding, soil, and sand for the work. Laboratory testing shall determine the relative compaction and moisture contents possible for each favorably reviewed material for use in field testing. Prior to the placement of any materials the Contractor's Testing Agency shall test that the subgrade is properly prepared and compacted by testing at intervals of no less than once every 400 square feet or a minimum of twice for each structure's or fill area's foundation. All fill and backfill materials, aggregate base, class 2 permeable, pipe bedding, soil, and sand shall be compaction tested at the first lift and at lift intervals no greater than every 16 inches vertically. Such testing shall be tested at intervals of no less than once every 400 square feet or a minimum of twice per lift for each structure or fill area. Trench backfill (any material) shall be tested at no greater intervals than every 50 linear feet of trench for the first lift and every second lift thereafter. All surfaces prior to the placement of concrete or asphalt concrete shall be tested at intervals no greater than once every 400 square feet. If any test result is unsatisfactory, the Engineer will direct additional testing to confirm contract compliance at no additional cost to the District
- C. If test results are unsatisfactory, all costs involved in correcting the deficiencies in compacted materials shall be borne by the Contractor without additional cost to the District.

1.06 GROUNDWATER ELEVATION

- A. Based upon soils investigations at this site, the design groundwater elevation is anticipated to be at elevation 356 feet or lower. Locally, groundwater or seepage may be present from seepage from water containing basins, channels, conduits, and pipelines. Water in excavations may also occur from rainfall, perched groundwater, and stormwater runoff.

1.07 EXPLORATORY EXCAVATIONS (POTHOLING)

- A. The Contractor shall perform exploratory excavations to locate existing pipelines, electrical ducts, concrete encasement, foundations, and other utilities prior to relevant demolition, trenching and general excavation. On the Drawings, and in these Specifications, "potholing", "exploratory excavations," and similar terms have the same meaning. See below for the requirement for exploratory excavation for pipe tie-ins. Reliable and accurate information on buried utilities is lacking in most areas. The objective of the exploratory excavations is to reduce the number of field changes due to unforeseen alignment conflicts, allow design adjustments prior to submittal preparation and submission to the Engineer, record data on existing utilities, and aid the Contractor in completing new improvements.
- B. Exploratory excavations shall be completed at least 15 days prior to the submission of submittals where such information is needed for these submittals in the sole opinion of the Engineer.
- C. Excavations in paved areas shall be repaired with a minimum of 2-inches of cold asphalt in asphalt concrete pavement areas and 3-inches of concrete in concrete

pavement areas. Provide greater repairs if required by the outside authorities having jurisdiction. The Contractor shall survey underground utilities as part of the exploratory excavation and report apparent size and type, top of utility elevation, bottom of utility elevation, and surveyed horizontal location (with northing and easting coordinates to the project coordinate system). In paved areas the thickness of asphalt pavement or concrete, and the underlying aggregate base rock shall be reported. Exploratory excavation data shall be submitted to the Engineer in accordance with the Standard Provisions within 5 working days of completion of individual exploratory excavations and also shall be repeated with other relevant fabrication and product submittals. Exploratory excavation data shall be submitted on separate forms using the Attachment 02300-A form. The Contractor shall notify the Engineer with the exploratory excavation data if any conflict with the Contract Documents is noted within 10 days.

- D. All field markings of buried utilities made by the District or other agencies responding to USA-type requests shall be permanently recorded by the Contractor onto draft record drawings. Contractor shall use this information and re-establish destroyed or obscured field markings prior to excavation and new USA-type requests.

1.08 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

- A. See Sections 02313 and 02315 for fill, backfill, bedding, drain, and embedment materials.
- B. Concrete fill used for embedment, a working mat, over-excavation repair, or seal slab shall be Class A concrete meeting the requirements of Section 03300.

2.02 FILTER FABRIC

- A. Filter fabric shall conform to Caltrans Standard Specifications Section 88 for edge drains and underdrains, except that references to measurement and payment shall not apply. Filter fabric shall be Mirafi 140N, DeWitt 6-ounce Filter Fabric, or equal.

2.03 DRAINAGE BOARD

- A. Drainage board (drainage composite) shall be a pre-formed sheet product designed to drain buried walls, resist compression from soil loads and surfaces and shall include an attached filter fabric to preclude soils. Drainage board shall

be Mirafi G100N, G100W, or G200N, Grace Hydroduct 200, 225 or 600 series, or equal.

2.04 EROSION CONTROL FABRIC

- A. Erosion control material shall provide permanent turf reinforcement for hillside, slope, and miscellaneous area protection from erosion. Erosion control material shall be suitable for application on hillsides with slope equal to 1 vertical to 1.5 horizontal or steeper. Color shall be tan or green.
- B. Erosion control material shall be designed to promote growth of vegetation and retain soil.
- C. Erosion control material shall be American Excelsior Company Recyclex TRM, Erosion Control Blanket PC42 or equal.

PART 3 EXECUTION

3.01 GENERAL EXCAVATION AND CONSTRUCTION REQUIREMENTS

- A. Excavation shall be made to such widths as will give safe room for construction of structures and utilities including bracing, supporting, pumping, and draining. The bottom of the excavations shall be rendered firm and dry.
- B. Existing soils at the Project site are unsuitable for reuse as structural fill or backfill, pipe bedding, and pipe or ductbank trench backfill. They are also unsuitable for blending due to their large fines content. Existing soil is suitable for "general fill". Areas receiving general fill shall be limited to general grading, landscaping, and for areas that are not supporting structures.
- C. All concrete slabs-on-grade that are driven upon and all asphalt concrete pavements shall be provided with an underlying minimum depth of 12-inches of class 2 aggregate base unless specific depths are designated on the Drawings.
- D. The Contractor shall coordinate crossings of new and existing utilities, including work among different trades. Piping and duct banks shall be deeper than the minimum depths indicated on the Drawings where required at crossings.
- E. The Contractor, as a minimum, shall have a "spotter" individual at all times at each excavation when excavating within 10 feet of any known utility (either shown on the Drawings, reference drawings, or marked in the field as a USA marking). The purpose of the spotter is to observe the progress of the excavation, communicate with the excavation equipment operators, and look for signs of buried utilities and structures so that damage to such utilities and structures is avoided.
- F. The Contractor shall construct temporary ditches, embankments, barriers, pumping systems, and other means to keep surface water runoff and subsurface water percolation out of excavations.

- G. Should any question arise concerning earthwork that is not described in these Specifications, the Engineer will enforce applicable requirements written in the Standard Specifications for Public Works Construction and State of California - Department of Transportation, Standard Specifications at the sole discretion of the Engineer.
- H. No structure may be backfilled until the entire lateral load system (e.g., roof system, floor system, chords, beams, buttresses, etc.) is in place and able to prevent wall deflection and before testing and inspection is complete and work found to be acceptable to the Engineer.

3.02 PREPARATION OF SUBGRADE – ALL TYPES

- A. Loose materials shall be removed from all cut surfaces. Unsuitable soils for foundations of structures, embankments, trenches (including beneath the pipe bedding zone of a pipe trench), and fills shall be removed and replaced with structural fill. Unsuitable soils include topsoil, soft clays or silts, soils containing organic material, debris, or other deleterious materials. Excavations required to demolish pipelines and structures shall be replaced with structural fill.
- B. Subgrades to receive spread footings, slabs, or mat foundations for structures shall be prepared to provide a flat, relatively dry, and firm working surface.
- C. Native soils and existing site fill exposed in excavations that will support new foundations shall have the upper 12 inches at a minimum of 90% relative compaction based upon field testing. If exposed soils do not meet this compaction criterion, they shall be re-worked, moisture conditioned, and re-compacted to achieve a minimum of 90% relative compaction.
- D. Traffic shall be minimized on excavated subgrades prior to placement of the structural fill, aggregate base, or concrete foundations. Sandy subgrades shall be proof rolled to achieve a competent subgrade prior to the placement of structural fill, aggregate base, or concrete foundations. Clay or clayey subgrades shall be excavated within the final 6 inches using a smooth edge bucket or blade, or hand excavation.
- E. Any visible cracks in the bottom of the footing excavations shall be closed by wetting prior to construction of the foundation.

3.03 COMPACTION - GENERAL

- A. Compaction of structural fills and backfills, subgrade soils, aggregate base, class 2 permeable material, and other soil materials shall be accomplished to the following density criteria in horizontal lifts of thicknesses noted, or if not noted, as compatible with the compaction equipment used.

TABLE 02300-1

Material	Minimum Percent Relative Compaction (ASTM D1557)	Maximum Uncompacted Lift Thickness (Inches)
Structural fill and backfill below and adjoining roads, paved areas, sidewalks, foundations and slabs, within 3 feet of such improvements	95	8
Structural fill and backfill below and adjoining roads, paved areas, sidewalks, foundations and slabs, greater than 3 feet from such improvements	90	8
Aggregate base course below asphalt or concrete pavement	95	8
Trench Backfill Zone (beneath non-structural areas)	90	8
Utility (all types) bedding / Pipe Bedding Zone	90	6

- B. Fine-grained fill and backfill soils shall be aerated and placed at moisture contents of 2 to 3 percent over optimum. Coarse-grained fill including all structural and aggregate base fill shall be placed at a moisture content within 2 percent of their optimum. Flooding or ponding of any fill or backfill materials and jetting of materials is not permitted.
- C. No placement or compacting shall be done when either the previously placed or the new materials are too wet from rain or excess application of water to obtain the compaction specified. At such time, work shall be suspended until the previously placed and/or new materials have dried sufficiently to permit proper compacting.
- D. Uniform compaction of embankment slope faces may be developed either by: (1) overbuilding the embankments and then trimming to final slope configuration, or (2) by close attention to slope face rolling and compaction which should be accomplished after each 4 feet of vertical embankment has been built.

3.04 EXCAVATION BELOW GRADE

- A. Whenever unsuitable subgrade material is encountered at the bottom of the excavation, the unsuitable material shall be removed to the extent required by the Engineer and a layer of structural fill material, as specified in Section 02315, shall be placed to bring the bottom of the excavation to grade. The Contractor may use controlled low-strength material, as specified in Section 02313, in lieu of structural fill material for this purpose when approved by the Engineer. Structural fill shall be placed and compacted per Table 02300-1. All work specified in this paragraph shall be performed by the Contractor at no additional cost to the District when: (1) the over-excavation which is required by the Engineer is less than 18 inches below the limits shown; and (2) the total amount of such over-excavation (less than 18 inches below the limits shown) for the entire work is less than or equal to 250 cubic yards (calculated in-place volume before excavation). Additional compensation to the Contractor for over-excavation and

structural fill deeper than 18 inches and quantities of over-excavation and structural fill from work less than 18 inches and in excess of a total of 250 cubic yards will be made per the Standard Provisions. No payments for over-excavation and structural fill shall be made when the unsuitable material is created by failure of the Contractor to provide proper groundwater control, protection from rainfall, drainage, utility breakage, or other actions within the control of the Contractor.

- B. If the Contractor excavates below grade through error or for its own convenience, the Contractor may be directed by the Engineer to replace the over-excavated material with structural fill or Class A concrete as acceptable to the Engineer. The work of excavating below grade and furnishing and placing the acceptable material shall be performed at no additional cost to the District.

3.05 ENCASEMENT AND BACKFILLING FOR PIPELINES AND CONDUITS BENEATH STRUCTURES AND SHALLOW INSTALLATIONS

- A. Pipelines shall be concrete encased beneath structures where shown on the Drawings. All backfill around pipelines and conduits beneath structures shall be structural fill or aggregate base, unless otherwise required, compacted to a minimum of 95% relative compaction in maximum of 8-inch lifts.
- B. Pipelines 6-inches or less in diameter, with depth of cover less than two feet, shall be concrete encased. Pipelines greater than 6-inches in diameter, with depth of cover less than three feet, shall be concrete encased.

3.06 TRENCH EXCAVATION, BEDDING, AND BACKFILLING

- A. Saw cut for all trenches across pavements and concrete improvements. Excavation for all trenches required for the installation of pipes and conduits shall be made to the depths and widths indicated on the Drawings. Safe and suitable access shall be provided for all excavations in accordance with CAL-OSHA and other applicable government regulations. The Contractor shall render the bottom of the excavations firm and dry. It is the Contractor's responsibility to support or temporarily relocate and protect existing utilities across trenches and other narrow structural excavations. See Section 02200 and the Drawings for irrigation piping relocation and restoration work.
- B. Rock and/or boulders shall be removed to a minimum clearance of 6 inches around the bottom and sides of all the pipes and ducts being installed.
- C. Pipes and conduits are to be installed in bedding or encased in concrete. The trench may be excavated by machinery to or just below the designated subgrade, provided that the material remaining in the bottom of the trench is no more than slightly disturbed.
- D. Pipe Bedding and Backfill
 - 1. After completion of the trench excavation and proper preparation of the trench bottom, bedding material shall be placed and compacted on the trench bottom for support under the pipe. Bell holes and similar

excavations for appurtenances shall be hand excavated. All pipe shall be installed in such a manner as to ensure full support of the pipe barrel over its entire length and under appurtenances.

2. Material for bedding shall be pipe bedding as specified in Section 02315 unless otherwise shown on the Drawings. Place and/or shape material for bedding the pipe and fittings.
 3. Laying and joining of pipe shall be as specified for the individual type of pipe. After joining flexible pipe, it may be adjusted to line and grade as noted on the Drawings.
 4. As soon as practicable after pipe has been installed and joined, bedding material shall be placed around and over the pipe to the limits as noted on the Drawings. It shall be placed with equipment and by hand, and compacted by suitable hand-operated equipment, in lift thicknesses and compaction as defined above, paying particular attention to bell holes, sling holes, and elimination of voids and to ensure uniform support for the pipe.
 5. All pipes shall be bedded to a minimum height of 6 inches over the top of the pipe unless greater depths are shown on the Drawings. The pipe bedding material shall be brought up in hand-operated equipment in compacted lifts not exceeding the thickness specified in Table 02300-1, approximately equal on each side of the pipe. The compaction shall be done so as to not disturb or damage the pipe or fittings.
 6. Jetting or flooding shall not be permitted.
- E. The Contractor shall meet the following criteria when its installation method includes the use of a trench "box":
1. When installing rigid pipe (reinforced concrete pipe, concrete cylinder pipe, cast iron pipe, etc.), any portion of the box extending below mid-diameter shall be raised above this point prior to moving the box ahead to install the next pipe. This is to prevent the separation of installed pipe joints due to movement of the box.
 2. When installing flexible pipe (PVC, steel, ductile iron, corrugated metal pipe, etc.), the bottom of the box shall not extend below mid-diameter. This is to prevent loss of soil between the box and the pipe bedding which could result in excessive deflection of the installed pipe.
- F. Ductbank and direct burial conduit bedding and backfill:
1. After excavation of the trench and cleaning of the trench bottom, place and compact either aggregate base or sand in thicknesses per the typical electrical details. Compact bedding to the requirements of Table 02300-1.
 2. After placement of conduits, reinforced concrete encasement or sand bedding, place and compact structural fill or class 2 aggregate base up to

the subgrade of the overlying pavements or foundations. The balance of subgrade materials and pavement, slab, curbs, gutters, V-ditches, or foundation construction shall be as shown on the Drawings and as otherwise specified.

3. Trenches for ductbanks and individual conduits in existing improved areas shall have their existing surfaces (e.g., asphalt concrete, concrete slab-on-grade, asphalt dike, concrete sidewalks, concrete curbs and gutters, etc.) replaced per the appropriate civil typical details for the same types of improvements. All pavement markings (parking stripes, dividing lines, etc.) damaged or removed by construction shall be replaced in kind.
 4. Trenches for ductbanks and conduits in existing landscaped or unimproved (soil) areas shall have the top 12 inches of trench replaced with excavated topsoil from the site or imported topsoil. However, if new pavements or structures are to be constructed in these areas, topsoil shall not be used and only structural fill or aggregate base shall be used.
- G. Backfilling over pipes or ductbanks shall begin not less than 2 days after placing concrete encasement.
- H. Where pipe or ducts are to be installed in fill of any type, including structural fill, fill shall be placed and compacted to at least 2 feet above the top of pipe or duct and then re-excavated for pipe or duct installation.
- I. As soon as practicable after the pipe or duct has been installed and jointed, bedding, concrete encasement, and backfilling shall begin and be prosecuted expeditiously.
- J. Excess soils shall be removed from the site.
- K. No trench shall be left open during periods when the Contractor is not at the site of work without proper barricades, trench plates, or other protections as otherwise specified and as authorized by the Engineer.

3.07 MISCELLANEOUS EXCAVATION

- A. The Contractor shall perform all the remaining miscellaneous excavation. The Contractor shall make all excavations necessary to permit the placing of landscaping, for constructing roadways, walks, slabs, parking areas, or any other miscellaneous earth excavation required under this Contract.

3.08 BACKFILLING WITH FILL MATERIALS

- A. Place structural fill, aggregate base fill, pea gravel, and class 2 permeable fill in layers having a maximum thickness and compaction effort as specified in Table 02300-1.
- B. Compaction work within 8 feet of structures shall be completed using compaction equipment weighing less than 1,000 pounds. Equipment used to place fill and

backfill material within 8 feet of structures shall not have wheels or tracks closer than 8 feet from structures.

3.09 DISPOSAL OF MATERIALS

- A. Excavated material shall not be stacked on any excavation or over buried pipes or structures. Inconvenience to traffic and work by others shall be avoided as much as possible. Excavated material shall be segregated for off-site disposal.
- B. Surplus excavated material shall be disposed of off the work site at a waste disposal or landfill site conforming to all local, State, and Federal regulations.

3.10 FILTER FABRIC INSTALLATION

- A. Surfaces to receive filter fabric, immediately prior to placement, shall be free of loose or extraneous material and sharp objects that may damage the filter fabric during installation. Adjacent rolls of filter fabric shall be overlapped a minimum of 18 inches. The preceding roll shall overlap the following roll in the direction the drain material is being spread.
- B. Should the fabric be damaged during placement, the torn or punctured section shall be either completely replaced or shall be repaired by placing a piece of fabric that is large enough to cover the damaged area and to meet the overlap requirement above. Damage to the fabric resulting from the Contractor's vehicles, equipment, or operations shall be replaced or repaired by the Contractor at its expense.
- C. At the top surfaces of drains and underdrains encased in filter fabric, the fabric shall be extended completely over the top of the drain material and extended down one side a minimum of 18 inches.

3.11 FINISH GRADING

- A. Finish grading in preparation for placing of paving, walks, slabs, hydroseed, landscaping, and appurtenances shall be performed at all places that are indicated on the Drawings, to the lines, grades, and elevations shown and otherwise as acceptable to the Engineer. During the process of grading, the subgrade shall be maintained in a well-drained condition. Finish grading for areas underlying paving, walks, structures, and slabs on grade shall be to plus or minus 0.04 feet of the designated grade. Finish grading for areas to be hydroseeded, landscaped or left unimproved shall be completed to within plus or minus 0.16 feet of the designated grade.
- B. If at the time of grading it is not possible to place any material in its proper section of the permanent embankment, fill, or excavation, such material shall be stockpiled for later use in designated staging areas. No extra payment will be made for the stockpiling or double handling of excavated material.
- C. Stones or rock fragments larger than 3 inches in their greatest dimensions will not be permitted in the top 6 inches of the finished subgrade of fills or embankments.

- D. In cuts, all loose or protruding rocks or boulders on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings.
- E. Slope soil and paving grades uniformly between spot elevations unless vertical curves are defined.

3.12 EROSION CONTROL MATERIAL APPLICATION

- A. Install erosion control material as recommended in writing by the manufacturer. Staple material to all slopes for a permanent installation. Overlap rolls a minimum of 6 inches at each joint. Trim neatly to dikes, curbs, and around objects to remain.
- B. Erosion control shall be installed as soon as practical after work in the vicinity is completed. Complete localized finish grading prior to installing erosion control material.

3.13 REPORTING AND REPAIR OF DAMAGED UTILITIES

- A. The Contractor shall report all damage to existing or new utilities immediately to plant operations. Initial notification may be verbal, and written notification to the Engineer is required within 4 hours. After the Engineer is notified or otherwise aware of the damage to a utility, the Contractor shall attend a meeting with the Engineer, District, and others chosen by the Engineer or Contractor to discuss the method of temporary and permanent repair. Meeting topics may include, at the discretion of the Engineer, the repair procedure, firm or organization to complete the repair, water treatment plant operational impacts, and schedule for completion of repairs. If the damaged utility is District owned, the District at its sole discretion may elect to complete the repair with District employees or District-selected firm(s). In such case the actual cost of repairs shall be deducted from any money due, or which may become due, the Contractor.

**ATTACHMENT 02300-A
EXPLORATORY EXCAVATION REPORT FORM**

Firm Completing Excavation: _____

Date of Excavation: _____ Assigned Excavation Number: _____

Description of Utility: _____

Diameter or Dimensions of Utility: _____

Apparent Utility Material (example – mortar covered steel, PVC, concrete encased duct bank, ductile iron, galvanized steel, steel CMP, VCP):

Adjoining Ground Surface Elevation (feet): _____

Top of Utility or Structure Elevation (feet): _____

Bottom of Utility or Structure Elevation (feet): _____

Surveyed Horizontal Location of Utility Excavation:

Northing: _____

Easting: _____

Utility Horizontal or Vertical Location Found to be Significantly Different From Contract Documents? _____ YES _____ NO

NOTE: ATTACH ANNOTATED PORTION OF CONTRACT DRAWING SHOWING UTILITY AND EXCAVATION LOCATION TO THIS FORM

Comments on Excavation (examples - thickness of pavement and road base, groundwater found):

END OF SECTION

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PART 1 GENERAL

1.01 WORK INCLUDED

- A. This section includes controlled low-strength material (CLSM) used as structural backfill and foundation fill under structures where indicated on the Drawings or required by these Specifications.
- B. Perform all sampling and furnish all testing of materials and products by an independent testing laboratory acceptable to the Engineer but engaged by and at the expense of the Contractor

1.02 RELATED SECTIONS

- A. Section 02200 – Earthwork
- B. Section 03300 – Cast-in-Place Concrete

1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with the Standard and Special Provisions, submittals including the following:
 - 1. Proposed supplier and mix design with mix characteristics and compressive strength results.
 - 2. Air-entraining admixture – Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, and conformity to ASTM standards.
 - 3. Field quality control reports of cylinder breaks and measured slumps within 7 calendar days of each test.
- B. Certifications:
 - 1. Certify that the Contractor is not associated with the independent testing laboratory, nor does the Contractor or its officers have a beneficial interest in the laboratory.
 - 2. Certify that admixtures used in the mix design are compatible with each other and the aggregates.

1.04 REFERENCE STANDARDS

- A. American Concrete Institute (ACI)
 - 1. ACI 229 – Controlled Low-Strength Materials

- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM C33 – Standard Specification for Concrete Aggregates
 - 2. ASTM C150 – Standard Specification for Portland Cement
 - 3. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
 - 4. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete
 - 5. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
 - 6. ASTM D4832 - Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders
 - 7. ASTM D5971 - Standard Practice for Sampling Freshly Mixed Controlled Low-Strength Material
 - 8. ASTM D6023 - Standard Test Method for Density (Unit Weight), Yield, Cement Content, and Air Content (Gravimetric) of Controlled Low-Strength Material (CLSM)
- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 DEFINITIONS

- A. Controlled Low-Strength Material (CLSM) - A self-leveling and self-compacting, cementitious material, sometimes referred to as flowable fill, used as a backfill in place of compacted fill.

1.06 SYSTEM DESCRIPTION

- A. Performance Requirements
 - 1. CLSM shall have a 28-day compressive strength, when tested in accordance with ASTM D4832, from 50 pounds per square inch to a maximum of 150 pounds per square inch. The wet unit weight shall be no greater than 125 pounds per cubic foot.
 - 2. Consistency shall be flowable and self-leveling, with slump from 6 to 10 inches.
 - 3. Provide air-entraining admixture and comply with manufacturer's recommendations.
 - 4. CLSM shall be mixed at an off-site concrete plant with adequate equipment to prepare consistent CLSM.

1.07 QUALITY ASSURANCE

- A. Manufacturer - CLSM shall be manufactured by a ready-mix concrete producer with a minimum of 1-year experience in the production of similar products.
- B. Pre-Installation Conference - A pre-installation conference shall be held before the start of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Notify Engineer of the meeting at least 10 days before its scheduled date.
- C. Field Testing - The field-testing of CLSM shall be as specified for concrete in Section 03300.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and handle in strict compliance with manufacturer's recommendations. Protect from damage due to weather, excessive temperatures, and construction operations.

1.09 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS**2.01 GENERAL**

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- B. All like materials shall be the products of one manufacturer or supplier in order to provide standardization of appearance.

2.02 MATERIALS

- A. Materials shall comply with this Section and any applicable State or Local requirements.
- B. Cement shall be per Section 03300.
- C. Aggregate shall be per Section 03300, except no aggregate shall be larger than 3/8 inch.
- D. Water shall be per Section 03300.
- E. Air-Entraining Admixture: The admixture shall comply with ASTM C260. Proportioning and mixing shall be in accordance with the manufacturer's

recommendations. Total air content of the sample prepared in accordance with ASTM C231 shall not exceed 6 percent.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine conditions of substrates and other conditions under which work is to be performed and notify Engineer of circumstances detrimental to the proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PLACEMENT

- A. Place CLSM as a structural backfill or foundation fill material where indicated on the Drawings or required by these Specifications.
- B. Place CLSM in a manner so that minimal segregation of the material occurs during and after placement, and without voids. Spade and vibrate as required to consolidate. Monitor placement to prevent flotation of pipes, structures, and other items.
- C. When backfilling retaining walls, place CLSM in lifts to prevent lateral pressures from exceeding the load capacities of the wall.
- D. For each truckload, provide documentation to the Engineer with the following clearly noted: design mix, date, truck number, quantity, and the supplier's name and address.

3.03 PROTECTION

- A. Protect CLSM from traffic until sufficient strength has been achieved for further construction operations.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Structural fill and backfill, class 2 permeable material, drain rock, pipe bedding, controlled low-strength material, sand, topsoil, and pea gravel.

1.02 RELATED SECTIONS

See Related Sections for additional requirements applicable to this Section (typical).

- A. Section 02300 – Earthwork.
- B. Section 02313 – Controlled Low-Strength Material.
- C. Section 02722 – Aggregate Base Course.
- D. Section 03300 – Cast-in-Place Concrete.

1.03 REFERENCES

- A. American Society of Testing and Materials (ASTM):
 - 1. C33 – Standard Specification for Concrete Aggregates.
 - 2. C131 – Test Method for Resistance to Degradation of Small-Size coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - 3. C136 – Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 4. D422 – Test Methods for Particle Size Analysis of Soils.
 - 5. D1557 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 10-lb Rammer and 18-in Drop.
 - 6. D4318 – Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- B. State of California, Department of Transportation (Caltrans):
 - 1. 2018 Standard Specifications.
 - 2. California Test Methods (CTM).
- C. Santa Clara Valley Urban Runoff Pollution Prevention Program

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. The Contractor shall submit to the Engineer reports of tests of individual materials to indicate that the materials meet these Specifications, prior to the materials being used in the Work, and product information.
- C. Submittals for controlled low-strength material shall comply with the submittal requirements of Section 02313.
- D. As a minimum, 2 sets of representative tests shall be completed by the Contractor for every 500 cubic yards of structural fill or backfill materials used in the Work.
- E. Test results for structural fill and backfill shall include:
 - 1. Sieve analysis.
 - 2. Liquid limit, plastic limit, and plasticity index.
 - 3. Saturated resistivity.
 - 4. pH.
 - 5. Sand equivalent value.
 - 6. Chloride level.
 - 7. Sulfate level.
- F. Submit product source, gradation, composition, and compliance information for class 2 permeable material, topsoil, sand, and drain rock.
- G. The Contractor shall submit a representative sample of each type of proposed material, weighing approximately 25 pounds, at least thirty days prior to the first date of anticipated use of such material.
- H. All material tests shall be in accordance with applicable ASTM standard test specifications.

1.05 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS – GENERAL REQUIREMENTS

- A. All sieve sizes referenced to be U.S. Standard sieve size unless otherwise noted. All percentages for amount passing a certain sieve are shown as a percentage of the total sample's dry weight.

- B. All materials noted herein shall have a maximum of one percent (1%) expansion when performed on a sample remolded to 95 percent of maximum ASTM D698 dry density and 2 percent below optimum moisture under a 100 pounds per square foot (psf) surcharge.
- C. In all cases where Caltrans Standard Specifications are referenced, references contained therein to measurement and payments do not apply.
- D. Materials shall not be corrosive, contain hazardous materials, debris, or vegetation, or be by-products of mineral mining, glassmaking, or other manufacturing processes.

2.02 STRUCTURAL FILL AND BACKFILL

- A. Excavated soils from the Project site are not suitable for use as structural fill or backfill and are not well-suited for blending to create structural fill or structural backfill. On-site soils shall not be used for structural fill or backfill.
- B. This class of material shall: (1) be granular material free of organic material, topsoil, debris, and deleterious material; (2) be free of lumps or rocks greater than 3 inches in any dimension; (3) have no more than 25 percent of the material passing the No. 200 sieve; (4) have a minimum saturated resistivity of 1,000 ohm-cm, as measured by California Test Method 643; (5) have a plasticity index less than 15 and liquid limit less than 35; and (6) have a pH range from 5.5 to 8.5, as measured by California Test Method 643.
- C. Structural fill shall meet the requirements above and in addition: (1) shall have a sand equivalent value greater than or equal to 15; (2) a minimum saturated resistivity of 3,000 ohm-cm as measured by California Test Method 643; (3) shall have a maximum chloride level of 300 ppm per California Method 422-Modified; and (4) shall have a maximum water-soluble sulfate level of 1,000 ppm per California Test Method 417-Modified.

2.03 AGGREGATE BASE FILL AND SUBGRADE

- A. Aggregate base material shall meet the requirements of Section 02722.

2.04 CLASS 2 PERMEABLE MATERIAL (DRAINAGE MATERIAL)

- A. Class 2 permeable material shall be crushed, angular shape rock (not rounded or sub-rounded permeable rock), free of organic material, clay balls, or other deleterious substances. It shall conform to the percent composition by weight, durability index, and sand equivalent value specified in the latest edition of Caltrans Standard Specifications, Section 68, for Class 2 permeable material.

2.05 DRAIN ROCK

- A. Drain rock shall be crushed, graded, durable rock with 100 percent passing the 1.5-inch sieve and no more than 5 percent passing the No. 4 sieve.

2.06 CLASS 2 AGGREGATE BASE (PIPE BEDDING)

- A. Class 2 aggregate base, when used as bedding under and around piping, shall meet the requirements of Section 02722.

2.07 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled low-strength material may be used as bedding and backfill for pipe and in other utility trenches, up to the surface structural section, in lieu of structural backfill. Controlled low-strength material may not be used in-lieu of pea gravel backfill when the use of pea gravel is specifically required in the Drawings.
- B. Controlled low-strength material shall conform to the requirements of Section 02313.

2.08 SAND

- A. Sand shall conform to the requirements of fine aggregate in Section 03300.

2.09 PEA GRAVEL

- A. Pea Gravel shall be washed, rounded, graded, durable rock with 100 percent passing the 3/8-inch sieve, no more than 5 percent passing the No. 4 sieve, and none passing the No. 30 sieve.

PART 3 EXECUTION**3.01 GENERAL**

- A. Install soil, rock and aggregate products in accordance with Sections 02300 and 02722.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Section Includes: Storm drainage pipe and fittings.

1.02 RELATED SECTIONS

See Related Sections for additional requirements applicable to this Section (typical).

- A. Section 02240 – Dewatering.
- B. Section 02260 – Excavation Support and Protection.
- C. Section 02300 – Earthwork.
- D. Section 02315 – Fill and Backfill Materials.
- E. Section 02742 – Asphaltic Concrete Paving

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submittals shall include the pipe and fitting manufacturer's standard literature, details of joints, gasket material, and pipe length.
- C. Shop drawings shall not be submitted without the Field Verification Report described below.
- D. The contractor shall field verify all existing crossing utilities and connecting pipelines, and prepare a Field Verification Report. The report shall include the size, horizontal and vertical location and material for each crossing utility or connecting pipeline. Additionally for connecting pipelines, the location of the nearest joints either side of the point of connection shall be determined. The Field Verification Report shall be prepared by the contractor prior to preparing pipe shop drawings.

1.04 REFERENCE STANDARDS

- A. Except as modified or supplemented herein, all storm drainage pipe, couplings, and fittings shall conform to the requirements of the following respective standards:
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM D2321 – Standard Practice for Underground Installation of Thermostatic Pipe for Sewers and Other Gravity-Flow Applications.
 - 2. ASTM D3034 -- Standard Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.

3. ASTM F679 -- Standard Specification for Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. All items shall be bundled or packaged in such a manner as to provide adequate protection during transportation to the site. Any pipe damaged in shipment shall be replaced at no additional cost to the District.

1.06 MEASUREMENT AND PAYMENT

- A. Measurement and Payment for "**PVC Storm Drain Pipe (Size)**" bid items shall be per lump sum and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in the installation of PVC pipe, including, but not limited to, excavation, trench shoring, de-watering, bedding, pipe, backfill, and compaction, and no additional compensation will be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 STORM DRAIN PIPE AND FITTINGS

- A. PVC pipe and fittings shall be solid wall PVC with a minimum SDR of 35 and with full diameter dimensions conforming to ASTM D3034 for sizes 4-inch to 15-inch, and ASTM F679 for sizes 18-inch to 27-inch. Fittings and pipe shall be compatible dimensionally and materially. Pipe wall thickness shall be increased if required for the burial depths shown on the Drawings. Pipe and fittings shall be by Vinyltech, Diamond Plastics, Multi Fittings Corp, or equal.

2.02 PIPING JOINTS

- A. PVC piping joints shall be stab type, with elastomeric gaskets. Gaskets shall be synthetic rubber; natural rubber is not acceptable.

2.03 WARNING TAPE

- A. Warning tape shall be durable plastic and a minimum of 3-inches wide. Warning tape for services shall be appropriate for the installation, e.g., "Caution Buried Storm Drain", etc. Warning tape shall be by Calpico, or equal.

PART 3 EXECUTION

3.01 GENERAL

- A. Should the manufacturer's installation instructions indicate that the maximum long-term pipe deflection will be more than 5 percent for actual burial depths plus HS-20 wheel loading, increase the compaction of the pipe bedding or concrete encase to reduce deflection to below 5 percent.

- B. Pipe storage, handling, and installation shall be in accordance with the manufacturer's written instructions unless specifically modified by the Specifications or Drawings.
- C. Pipe and fittings shall be carefully examined for cracks, damaged linings, and other defects immediately prior to installation. Spigot and bell ends shall be particularly examined and cleaned with care. All defective pipe and fittings shall be clearly marked as such and removed from the site of the work.
- D. Piping shall be beveled at connections to curb inlets, drop inlets, manholes, etc., to be flush with the interior concrete wall. All connections to such structures shall be grouted or sealed to be water tight.
- E. Install warning tape above all pipes.

3.02 LAYING PIPE

- A. Pipe shall be protected from lateral displacement by pipe embedment material installed as specified in the excavation and trenching section. Under no circumstances shall pipe be laid in water and no pipe shall be laid under unsuitable weather or trench conditions. Foreign matter shall be prevented from entering the pipe during installation.
- B. Pipe shall be kept shaded and as cool as possible during installation and shall be covered with backfill immediately after installation.
- C. The interior of all pipe and fittings shall be thoroughly cleaned before installation and shall be kept clean until the work has been accepted.
- D. Alignment:
 - 1. Piping shall be laid to the lines and grade indicated on the Drawings. Pipelines or runs intended to be straight shall be laid straight. Deflections from a straight line or grade shall not exceed the maximum deflections specified by the manufacturer.
 - 2. Unless otherwise specified or indicated on the Drawings, and subject to the acceptance of the Engineer, either shorter pipe sections or fittings shall be installed as required to maintain the indicated alignment or grade.
 - 3. PVC pipe shall not be deflected at any joints. Curvature of the pipe shall not exceed the manufacturer's recommendations.
- E. Cutting shall comply with the pipe manufacturer's recommendations. Cuts shall be smooth, straight, and at right angles to the pipe axis. After cutting, the end of the pipe shall be dressed to remove all roughness and sharp corners and beveled in accordance with the manufacturer's instructions.

3.03 PIPE AND FITTING JOINTING

- A. Jointing operations shall conform to the instructions and recommendations of the pipe manufacturer. All joint surfaces for gasketed joints shall be lubricated immediately before the joint is completed. Gaskets and lubricants shall be as supplied by pipe manufacturer, shall be suitable for use in potable water, shall be compatible with the pipe materials, shall be stored in closed containers, and shall be kept clean. Each spigot shall be suitably beveled to facilitate assembly.

3.04 PIPING HYDROSTATIC LEAKAGE TESTS

- A. Hydrostatic exfiltration leakage tests shall be completed for all piping runs which are longer than 20 feet between inlets, manholes, sumps, or similar facilities. Test pressure shall be as indicated in the Section 15052. The test pressure shall be 20 feet of water head. Tests shall be completed after backfilling but prior to the placement of permanent paving or fine grading. All pipe openings shall be plugged with pneumatic bags or mechanical plugs in such a manner that the entrapped air can be released from the pipe while it is being filled with water. Equipment shall be provided to adequately pressurize the pipeline and accurately measure water leakage to the nearest 0.05 gallon. Each test period shall be 2 hours.

- B. For the 2-hour hydrostatic leak test to be successful, the actual leakage must be less than that calculated by the following equation:

$Q = DL (0.0008)$, where:

Q is the maximum allowable leakage in gallons; D is the diameter of the pipe in inches; L is the length of the pipe run in feet. The Contractor shall make all repairs as required until the pipeline successfully passes this test at no additional cost to the District.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Aggregate base course for use under roadways pavements, concrete slabs-on-grade; under drainage, utility, and electrical structures; aggregate base fill; as a surface cover, pipe bedding, and miscellaneous uses.

1.02 RELATED SECTIONS

See Related Sections for additional requirements applicable to this Section (typical).

- A. Section 02300 – Earthwork.
- B. Section 02315 – Fill and Backfill Materials.

1.03 REFERENCES

- A. State of California Department of Transportation (Caltrans):
 - 1. 2018 Standard Specifications.
- B. American Society of Testing and Materials (ASTM):
 - 1. C 117 – Test Method for Material Finer than 75 μ M (Number 200) Sieve in Mineral Aggregate by Washing.
 - 2. C 136 – Method for Sieve Analysis of fine and Coarse Aggregates.
 - 3. D 4318 – Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Product Data:
 - 1. Source, gradation, and testing data for aggregate base course. Test reports shall be completed within the previous 4 months of the Contractor's submittal date. Provide resistivity and pH values for the product.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection: Protect from segregation, contamination, and excessive moisture during delivery, storage, and handling.

1.06 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Aggregate Base Course (Aggregate Base, AB, ABC, Agg Base)
 - 1. Caltrans Standard Specification Section 26 Class 2, 3/4- inch maximum aggregate size, as modified herein, free from vegetable matter and other deleterious substances, and of such nature that aggregate can be compacted readily under watering and rolling to form a firm, stable base.
 - 2. Materials derived from processing demolished or removed asphalt concrete, concrete, or glass are not acceptable.
 - 3. Minimum resistivity of the aggregate base shall be 3,000 ohm-cm. The pH of the aggregate base shall be between 5.5 and 8.5.
 - 4. Coarse aggregate material retained in Number 4 sieve shall consist of material of which at least 25 percent by weight shall be crushed particles when tested in accordance with California Test 205.
 - 5. Aggregate shall not be treated with lime, cement, or other chemical material before the Durability Index test is performed.
 - 6. Aggregate grading and sand equivalent tests shall be performed to represent not more than 500 cubic yards or one day's production of material, whichever is smaller.
 - 7. Grade within the limits and conform to quality requirements as follows when tested in accordance with California Test 202:

Sieve Sizes (Square Openings)		Percent by Weight Passing Sieve	
1 inch		100	
3/4 inch		90-100	
Number 4		35-60	
Number 30		10-30	
Number 200		2-9	
Quality Requirements			
Description	California Test		Minimum Test Result
Resistance (R Value)	301		78
Sand Equivalent	217		22
Durability Index	229		35

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Verification of Conditions: Examine conditions upon which the work specified in this Section depends for defects that may influence installation and performance.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Subgrade Preparation: Prepare as specified in Section 02300.

3.03 INSTALLATION

- A. Furnish, spread, and compact aggregate base course material to the lines, grades, and dimensions indicated on the Drawings.
 - 1. Spreading: The aggregate base material shall be delivered to the project site as a uniform mixture. It shall be deposited in place and spread in a manner that will maintain the uniformity of the material. Each layer shall be free from pockets of coarse or fine material. Where the required compacted thickness is 0.50 feet or less, the aggregate base may be spread and compacted in one layer. Where the required compacted thickness is more than 0.50 feet, the aggregate base material shall be spread in 2 or more layers so that each uncompacted layer thickness does not exceed 0.50 feet.
 - 2. Compacting: Compact in accordance with the requirements of Section 02300.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Asphaltic concrete (AC) pavement for permanent and temporary roadways, dikes, re-surfacing, parking areas, ramps, grade adjustments, and walkways on prepared aggregate base course as shown on the Drawings.
2. Temporary AC pavement for repairing and patching of existing asphaltic concrete pavement roadways on prepared aggregate base course as shown on the Drawings.
3. Removal, preparation, and disposal of existing asphaltic concrete pavement as necessary to place new AC pavement.
4. Slurry seal application on new and existing AC pavement.

1.02 RELATED SECTIONS

See Related Sections for additional requirements applicable to this Section (typical).

- A. Section 02220 –Demolition
- B. Section 02300 – Earthwork.
- C. Section 02722 – Aggregate Base Course.
- D. Section 02762 – Painted Traffic Lines and Markings.

1.03 REFERENCES

A. State of California, Department of Transportation (Caltrans):

1. 2018 Standard Specifications.

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

1. D1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb Rammer and 18-in Drop.
2. D5581 Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit product information for aggregate materials, asphaltic concrete mix design, and prime and tack coats. Minimum information shall include source of aggregates and asphalt, asphalt content, proposed recycled asphalt products content, gradation, unit weight of mix design, gradation, air void content, stabilometer values, and other test results needed for comparison with Caltrans Standard Specifications.
- C. Submit copies of delivery tickets showing materials, quantities, source, date, mix design, and other relevant information.

1.05 MEASUREMENT AND PAYMENT

- A. Measurement and Payment for **“AC Pavement (4” AC on 8” Class 2 AB, 5” Aggregate Subbase)”** bid item shall be per lump sum and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work necessary to complete the work including, but not limited to, the sawcut, removal and offsite disposal of existing asphalt, aggregate base, and subgrade materials to the limits determined in the field by the Engineer to provide a smooth transition. This item includes constructing permanent AC pavement complete in place, including grading, subgrade preparation, placement, preparation, and compaction of aggregate base and aggregate subbase, hauling, tack coat, joint preparation, joint adhesive, AC pavement placement and compaction, evaluation of surface tolerances, and slurry seal application and no additional compensation will be allowed therefor.
- B. Measurement and Payment for **“Temporary AC Pavement (4” AC on 8” Class 2 AB, 5” Aggregate Subbase)”** bid item shall be per lump sum and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work necessary to complete the work including, but not limited to, the sawcut, removal and offsite disposal of existing asphalt, aggregate base, and subgrade materials to the limits determined in the field by the Engineer to provide a smooth transition. This item includes constructing temporary AC pavement roadways and patching of existing AC surfaces complete in place, including grading, subgrade preparation, placement, preparation, and compaction of aggregate base and subbase, hauling, tack coat, joint preparation, joint adhesive, AC pavement placement and compaction, and slurry seal application and no additional compensation will be allowed therefor.
- C. Measurement and Payment for **“AC Dike”** bid item shall be per lump sum and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work necessary to complete the work, including, but not limited to, cleaning of surface, tack coat, and pavement placement, and no additional compensation will be allowed therefor.
- D. Measurement and Payment for slurry seal shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- E. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS**2.01 MATERIALS**

- A. Prime (tack) coat shall be Type SC-70 liquid asphalt conforming to the requirements of the Caltrans Standard Specifications Section 93.
- B. Asphaltic concrete surfacing for roadways, parking areas, ramps, grade adjustments, and walkways shall conform to the requirements of Caltrans Standard Specifications Section 39. Mineral aggregate shall be 1/2-inch maximum size, Type B. That asphalt concrete material placed more than 2 inches below the finished asphaltic concrete surface may be 3/4-inch or 1/2-inch maximum size, Type B.
- C. Asphalt to be mixed with the aggregate shall meet the requirements of Caltrans Standard Specifications Section 92, PG-64-10 refined paving asphalt. Recycled asphalt products content shall be the lower of that allowed by Caltrans Standard Specifications and a maximum of 15 percent of the aggregate weight. Glass shall not be used.
- D. Slurry seal shall conform to Caltrans Standard Specification Section 37-3, Type I.
- E. Asphalt or asphaltic concrete component quantities not defined herein or specifically defined in the Caltrans Standard Specifications shall be those typically used for high quality pavement products.
- F. All finished asphalt concrete mixes shall be such so as to provide a smooth, solid surface, and shall be free of voids as determined solely by the Engineer.

PART 3 EXECUTION**3.01 CUTTING PAVEMENT**

- A. Existing asphaltic pavements to be removed shall be cut by a wheel cutter, clay spade, or other device capable of making a neat, reasonably straight and smooth cut without damaging adjacent pavement that is not to be removed. In public right-of-ways, comply with the requirements of the authority having jurisdiction.
- B. The existing pavement shall be saw cut and trimmed off a minimum of an additional 6 inches on each side of the trench or pavement joint after placement of required base course material and just prior to placement of asphaltic concrete for pavement replacement, and the trimmed edges shall be painted with a coating of prime coat immediately prior to constructing the new abutting asphaltic pavements.
- C. Existing asphaltic concrete pavement that has not been excavated or trenched and is shown on the Drawings to be replaced shall be removed to the full depth. Protect all vaults, valve boxes, handholes, manholes, and other structures in the pavement surface from damage. Damaged structures shall be replacement by the Contractor at no additional cost to the District.

- D. The cold grinding or planing machine shall be specifically designed and built for grinding flexible pavements and shall have the ability to plane Portland cement concrete patches when encountered in bituminous pavement. The grinding machine shall be self-propelled and shall have the means for removing materials without tearing or gouging the underlying surface. The machine shall be adjustable as to crown and depth. Those areas of pavement that cannot be ground shall be removed by other means. The ground surface shall be acceptable to traffic use in the event resurfacing is delayed. The grinding shall be squared off for the full width of the traveled way at the end of each work day. Clean the ground surfaces prior to application of tack coat or pavement replacement.
- E. All removed asphaltic pavement materials is the property and disposal responsibility of the Contractor.

3.02 PAVEMENT INSTALLATION

- A. The construction of AC pavement shall conform to the requirements of the Caltrans Standard Specifications and upon completion; the pavement shall be true to grade and cross sections.
- B. The Contractor shall not pass equipment over any pipe, drain, utility line, duct or structure before it is protected by ample fill material, properly compacted. Any damage to such facilities shall be promptly repaired by the Contractor at no additional cost to the District.
- C. The subgrade shall be brought to the required grades and cross sections by grinding, excavating, filling, blading, and compacting as specified.
- D. AC pavement shall be constructed only when the surface is dry, when the atmospheric temperature in the shade is 40 degrees F and rising or above 50 degrees F if falling. No AC pavement shall be placed when the weather is foggy or rainy or when the base on which the material is to be placed is in a wet or frozen condition.
- E. Base and subbase materials shall be bladed to a smooth surface and shall be compacted to 95 percent relative compaction as determined by ASTM D1557. Paving grades shall be sloped uniformly between spot elevations unless vertical curves are defined. Subgrade for pavement shall not vary more than 0.05 feet from the specified road grade. Subgrades may also be Portland cement concrete and existing asphalt as shown on the Drawings.
- F. AC pavement shall be plant mix having a minimum overall thickness of 3 inches for temporary roadways and patching and a minimum overall thickness of 4 inches for permanent surfaces unless greater thicknesses are required by authorities having jurisdiction or greater thicknesses are shown on the Drawings. Compact the asphaltic concrete to at least 95 percent of the relative compaction achieved by a specimen of the same mix design subjected to 75 blows per ASTM D5561.

- G. All existing asphaltic pavement and concrete surfaces to be paved over or against shall receive a tack coat at a minimum rate of 0.1 gallons per square yard.
- H. The total width of the accepted aggregate base material shall receive a bituminous prime coat at the minimum rate of 0.25 gallons per square yard. Application shall conform to Caltrans Standard Specifications. Adjacent ground, structures, gutters, V-ditches, curbing, and fencing shall be protected from spraying operations.
- I. When AC pavement is to be applied over existing pavement and local irregularities (with only very minor damage) in the existing surface would result in a course of more than specified thickness, the surface of the existing pavement shall be brought to uniform contour by patching with asphaltic concrete, thoroughly tamped or rolled until it conforms with the surrounding surface, and a prime coat applied.
- J. When AC pavement is to be applied over existing pavement, existing surfaces adjoining gutters and other permanent features shall be ground to create smooth transitions and to maintain surface water flow lines. Also grind existing asphaltic concrete as required where indicated or shown on the Drawings to maintain existing finish grades.
- K. Existing AC pavement adjacent to potholes, depressed areas, utility trenches, and unfinished surfaces where patching with new AC pavement is shown in the Drawings shall be saw cut and completely removed and subgrade and aggregate base course shall be prepared before the installation of new AC pavement.
- L. Spreading shall be as nearly continuous as possible. When AC pavement is laid against vertical surfaces such as gutters, the face of the vertical surface shall be roughened for proper bonding, cleaned, and then painted with a light coating of asphalt cement or emulsified asphalt.
- M. At terminations of new surface courses, the asphaltic concrete shall be feathered into the existing surface over such a distance as may be required to produce a smooth riding transition. Existing pavements to be over-laid shall be ground or removed as required to avoid feather edges less than 1-inch in depth.
- N. Grind all edges with concrete swales and gutters to provide minimum 1-inch depth at transition and to maintain original drainage flow lines between new and existing surfacing unless otherwise noted.
- O. The finished surface shall be of uniform texture. When tested with a 10-foot straightedge laid on the surface parallel with the centerline of the road, the variation of the surface from the testing edge of the straightedge shall not be more than 1/4 inch (0.63 cm) except at grade changes.
- P. All existing valve boxes, manholes, handholes, pull boxes, grounding boxes, vaults, and other flush utility features shall be raised or lowered to the new finish grade.

- Q. The top of pavement shall match utility surface features such as valve boxes, corrosion protection test station boxes, electrical and telephone pull boxes, utility vaults, etc. Wherever possible drainage should be directed away from such utility structures, except drainage structures such as curb inlets and drop inlets.

3.03 ROADWAY SURFACE REMOVAL

- A. All pavement cuts shall be neat and straight to provide an unfractured and level pavement joint for bonding existing surfacing with pavement replacement. Pavement cuts shall be parallel or at right angles to the road or area centerlines. All cut edges shall provide clean, solid, vertical faces free from all loose material.
- B. All existing crushed aggregate and asphaltic concrete removed, and any excess new material shall be hauled away from the project site and legally disposed of by the Contractor.

3.04 PAVEMENT MARKING REPAIR

- A. All existing traffic markings and signs painted on areas which are covered with new or repair pavement (e.g., parking lot lines) shall be replaced in kind. See Section 02762.

3.05 ASPHALT CONCRETE DIKES

- A. Asphalt concrete dikes shall be hot mix, machine-laid, extruded to the section shown on the Drawings. Dikes shall be constructed of asphalt concrete conforming to Caltrans Standard Specification Section 39. Grading of the mix shall meet the approval of the Engineer. Dikes shall be stable with low (5 to 10 percent) air void content.

3.06 SLURRY SEAL

- A. Slurry seal shall be applied to all asphalt concrete pavement surfaces (new and existing) within the plant site near the completion of all work and where indicated after all heavy construction traffic is finished.
- B. The slurry seal shall be an asphaltic emulsion slurry seal and shall be applied in accordance with Caltrans Standard Specification 37-3, Slurry Seals and Micro-Surfacings. Attention is especially directed to the requirements for prior pavement cleaning and protection of facilities.

3.07 CLEAN-UP

- A. After all installation, repair and restoration of paving have been completed, all excess asphalt, dirt, rock and other debris shall be removed from the roadways. Adjoining curbs, gutters, structures, and other surfaces over-sprayed or splattered shall be cleaned of all asphalt concrete products.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Traffic stripes and pavement marking in the types and arrangements shown on the Drawings and as specified herein. Replacement of existing markings obliterated or damaged by other Work.

1.02 RELATED SECTIONS

See Related Sections for additional requirements applicable to this Section (typical).

- A. Section 09910 – Paints.

1.03 REFERENCES

- A. State of California, Department of Transportation (Caltrans):
 - 1. 2018 Standard Specifications.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Photographs, scale drawings, or other data acceptable to the Engineer, showing types of graphics proposed to be used.
 - 4. Proposed work sequence and traffic control plan for work on or adjoining public rights-of-way.

1.05 QUALITY ASSURANCE

- A. Alignment, layout, tolerances, appearance, and protection shall comply with Caltrans Standard Specifications Sections 84-1, 84-2.
- B. Comply with product manufacturer's recommendations. Clean all surfaces thoroughly and remove all deleterious materials present.
- C. Mask and protect all surfaces not to receive thermoplastic material and protect vegetation from overspray.

- D. Provide traffic control devices and personnel to safely direct vehicle traffic and to protect surfaces receiving thermoplastic material.

1.06 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 THERMOPLASTIC PAVEMENT MARKINGS

- A. Provide thermoplastic material specifically formulated for use as pavement marking in automobile traffic areas in conformance with Caltrans Standard Specification Section 84-2.01, and in the colors selected by the Engineer from standard colors of the approved manufacturer. Thermoplastic material shall conform to requirements of State and local air quality control boards.

2.02 OTHER MATERIALS

- A. Provide other materials, such as stencils and masking, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- B. Surfaces which are to receive traffic stripes and pavement markings shall be wire brushed or abrasive blasted, cleaned of all dirt and loose material prior to thermoplastic material application or marking.

3.02 APPLICATION

- A. Secure the Engineer's approval of graphics design and layout prior to start of application. Provide temporary markings to indicate proposed application locations. Application methods shall conform to Caltrans Standard Specifications Section 84-2 unless otherwise stated herein. References to measurement and payment in the Standard Specifications are not applicable.
- B. Using proper masking, stencils, primer, and application equipment recommended for the purpose by the manufacturer of the approved thermoplastic material, apply the approved thermoplastic material in strict accordance with its manufacturer's recommendations.

- C. Striping pattern shall be as follows:
1. Single traffic stripe – Unless otherwise shown on the Drawings, a 4-inch wide broken yellow line.
 2. Edge stripe - Unless otherwise shown on the Drawings, a 3-inch wide solid white line.
 3. Stop bar (limit line) - Unless otherwise shown on the Drawings, a solid 12-inch wide white line.
 4. Handicap parking and unloading lines – solid 3-inch wide blue lines.
 5. Parking lines – solid 3-inch wide white lines.
 6. Other markings – as shown on the Drawings or as specified in Caltrans standards.

3.03 PROTECTION

- A. Provide traffic cones, barricades, and other devices needed to protect the thermoplastic material until it is sufficiently dry to withstand traffic.

3.04 CLEANUP

- A. When thermoplastic material is thoroughly dry, visually inspect the entire application, and perform the following:
1. Touchup as required to provide clean, straight lines and surfaces throughout.
 2. Remove all stencils, product containers, masking, and other materials from the Project site.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Concrete curbs, gutters, and V-gutters.

1.02 RELATED SECTIONS

See Related Sections for additional requirements applicable to this Section (typical).

- A. Section 02300 – Earthwork.
- B. Section 02315 – Fill and Backfill Materials.
- C. Section 02722 – Aggregate Base Course.
- D. Section 03150 – Concrete Joints and Accessories.
- E. Section 03200 – Concrete Reinforcement.
- F. Section 03300 – Cast-In-Place Concrete.
- G. Section 03350 – Concrete Finishing.

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Construct various types of concrete curbs and gutters to dimensions and details indicated on the Drawings. Where concrete restoration or repairs are being made due to other improvements, match existing grades and functions on all sides of new work.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Products are submitted under other appropriate Sections.

1.05 MEASUREMENT AND PAYMENT

- A. Measurement and Payment for “**Concrete Curb**”, “**Concrete Curb and Gutter**”, and “**Concrete V-Gutter**” bid items shall be per lump sum and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work necessary to complete the work, including, but not be limited to, the removal and offsite disposal of existing improvements including existing curb and gutter, aggregate base, asphalt concrete, and subgrade materials; sawcutting adjacent asphalt pavement and/or concrete, and removal of existing materials required to construct the new curb, gutter, and V-gutter. This item includes constructing concrete curb, gutter, and V-gutter complete in place, including protection of utilities, grading, subgrade preparation, aggregate base, compaction, concrete, finishing, curing, and backfill, and no additional compensation will be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS**2.01 MATERIALS**

- A. Concrete: minimum Class B (3,000 psi design compressive strength), conforming to the applicable requirements of Section 03300.
- B. Curb Finishing Mortar: 1 part Portland cement to 2 parts sand.
- C. Form Release Material: Light oil or other releasing agent of type which does not discolor concrete or interfere with the application of finishing mortar to curb tops and faces.
- D. Rebar: See Section 03200.
- E. Joint Materials:
 - 1. Premolded joint filler and compressible joint filler: Comply with requirements as specified in Section 03150.
 - 2. Construction: Steel dividers or plastic inserts.

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Verification of Conditions:
 - 1. Verify field conditions, including subgrade condition, lines and grades, and interferences, before beginning work described in this Section.

3.02 PREPARATION

- A. Surface Preparation:
 - 1. Subgrade:
 - a. Construct and compact true to grades and lines indicated on the Drawings and requirements as specified in Section 02300.
 - b. Remove soft or unsuitable material to depth of not less than 6 inches below subgrade elevation and replace with satisfactory aggregate base material as specified in Section 02300.
 - 2. Forms and Subgrade: Water immediately in advance of placing concrete if soils are not already moist.
 - 3. Place minimum 3/4-inch thick premolded joint filler between concrete or CMU vertical structures already constructed and new concrete slabs-on-grade, gutters, sidewalks, driveways, ramps, swales, V-ditches, valley gutters, and similar structures.

3.03 INSTALLATION

A. Special Techniques:

1. Contractor's Option:

- a. Construct concrete curbs and gutters by conventional use of forms, or by means of curb and gutter machine when acceptable to the Engineer.
- b. When use of machines designed specifically for work of this Section are accepted by the Engineer, results must be equal to or better than those produced by use of forms.
- c. Applicable requirements of construction that apply to use of forms also apply to use of machines.
- d. Discontinue use of machines when results are not satisfactory to the Engineer at no additional cost to the District.

B. Forms and Reinforcing:

1. Carefully set to line and grade and securely stake in position forms conforming to dimensions of items to be constructed.
2. Thoroughly clean prior to each use and coat with form releasing material.
3. Support reinforcing on concrete or plastic dobies for with additional reinforcing to obtain specified positions.

C. Compressible and Contraction Joints:

1. Compressible Joints:

- a. Construct vertically, and at right angles to centerline of street and match joints in adjacent pavement or sidewalks.
- b. Constructed at radius points, driveways, and at adjoining structures.
- c. Fill joints with compressible joint filler material.

2. Contraction Joints:

- a. Constructed not more than 15 feet apart.
- b. Tool or saw cut joints to a depth of approximately $\frac{3}{4}$ inches and match joints in adjacent pavement or sidewalks.

3. Score Joints:
 - a. Tool joints approximately 5 feet on center to a depth of approximately 1-inch. Match joints in adjacent pavement or sidewalks.

D. Concrete:

1. Placing:
 - a. Thoroughly spade concrete along forms so that no rock pockets exist next to forms and so that no coarse aggregate will show when forms are removed.
2. Compacting:
 - a. Compact by mechanical vibrators.
 - b. Continue tamping or vibrating until mortar flushes to surface and coarse aggregate is below concrete surface.
3. Form Removal:
 - a. Front Form Faces: Do not remove before concrete has taken initial set and has sufficient strength to carry its own weight.
 - b. Gutter and Rear Forms: Do not remove until concrete has hardened sufficiently to prevent damage to edges. Take special care to prevent damage.
4. Finishing and Curing: Comply with requirements as specified in Section 03350 except as modified here:
 - a. As soon as curb face forms are stripped, apply finishing mortar to the top and face of curb and trowel to a smooth, even finish. Finish with fine haired broom in direction of work.
 - b. Where curb is installed without integral gutter, extend finish 2 inches below grade.
 - c. Edge concrete at compressible joints to 1/4-inch radius.
 - d. Flow lines of gutters shall be troweled smooth 4 inches out from curb face for integral curb and gutter and 4 inches on both sides of flow line for gutters without curbs.

E. Backfilling:

1. Unless otherwise specified, backfill behind curbs, gutters, or sidewalks against landscaped areas with soil native to area and to lines and grades indicated on the Drawings. All other backfill materials shall be structural

fill/backfill per Section 02315 unless otherwise shown on the Drawings. Compaction requirements shall be as specified in Section 02300.

3.04 FIELD QUALITY CONTROL

A. Tests:

1. Curbs and Gutters:

- a. Test face, top, back, and flow line with 10-foot straightedge or curve template longitudinally along surface.
- b. Correct deviations in excess of 1/4-inch.

B. Gutters:

- a. Frequency of Testing: When required by the Engineer, where gutters have slope of 0.8 foot per hundred feet or less, or where unusual or special conditions cast doubt on capability of gutters to drain.
- b. Test Method: Establish flow in length of gutter to be tested by supplying water from hydrant, tank truck, or other source.
- c. Required Results:
 - (1) 1 hour after supply of water is shut off, inspect gutter for evidence of ponding or improper shape.
 - (2) In event water is found ponded in gutter to depth greater than 1/2 inch, or on adjacent asphalt pavement, correct defect or defects in manner acceptable to the Engineer without additional cost to the District.

3.05 ADJUSTING

- A. Repair portions of concrete damaged while stripping forms or, when damage is severe, replace such work at no additional cost to the District. Evidence of repairs shall not be noticeable in the finished product.
- B. Remove and replace sections of work deficient in depth or not conforming to requirements indicated on the Drawings and specified in the Specifications at no additional cost to the District. Removal and replacement shall be the complete section between 2 joints.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

- A. Furnish all labor, material, equipment and services necessary to provide all landscape work, complete and in place, as indicated on Drawings and specified herein.
- B. Work specified in this Section, but is not limited to the following:
 - 1. Soil preparation
 - 2. Weed Control
 - 3. Hydroseeding
 - 4. Clean-up

1.02 RELATED SECTIONS

- A. Section 02300 – Earthwork.
- B. Section 02970 – Extended Landscape Maintenance.

1.03 QUALITY ASSURANCE

- A. Source Quality Control:
 - 1. Hydroseeded native grasses shall exhibit a uniform growth, in good health, free of noxious or invasive weeds, with viable seed production (season permitting), competitiveness against non-native species at the time of final acceptance, and demonstrating at least 75% coverage (as measured by canopy coverage within a randomly selected one yard by one yard plot per 8,000 square feet of hydroseeded area). Hydroseeded native grasses shall demonstrate at least 50% coverage at the end of the guaranty period.
- B. Acceptance of seed:
 - 1. Seed shall be tested according to the Association of Official Seed Analysts, International Seed Testing Association, and the Federal Seed Act standards. Tested seed shall be accompanied by a certificate of analysis furnished by a certified testing laboratory. All seed shall be subject to inspection and concurrence by the Contractor and the Engineer before work is authorized to proceed with the seeding operation.
 - 2. Certify as tested the following individual seed types:
 - a. Purity and Germination: Before seed is used, retest for germination all seed stored over six months from the date of the original acceptance test, and resubmit the results for inspection.

- b. Prohibited Noxious Weed Seed: Seed shall contain no federal- or state-listed prohibited noxious weed seed (an amount within the tolerance of zero percent) as determined by a standard purity test.
 - c. Restricted Noxious Weed Seed: Seed shall contain no more than 40 seeds per pound of any. Single species or 150 seeds per pound of all species combined, of restricted noxious weed seed. Restricted noxious weed seed is considered to be component of other crop and weed seed with limitations specified.
 - d. Weed Seed: Seed shall contain no more than 1 percent by weight, of weed seed of other crops and plant species as determined by standard purity tests.
- 3. Information regarding the seed mixture shall be provided by the Contractor on each standard sealed container label. The labels shall include the following information:
 - a. Seed mixture name
 - b. Lot number
 - c. Total net weight and pure live seed (PLS) weight of each seed type
 - d. Percentages of purity and germination
 - e. Seed coverage, in acres, on a PLS basis
 - f. Percentage of maximum weed seed content clearly marked for each seed type.
- C. The Engineer shall be the sole judge as to the condition of material. Material to be replaced within the guaranty period shall be replaced by the Contractor within fifteen (15) days of written notification.

1.04 SUBMITTALS

- A. Submittals shall be in accordance with the Standard and Special Provisions.
- B. Contractor shall submit the proposed source, ecotype, and demonstrate availability of the proposed seed.
- C. Contractor shall submit a complete list of equipment, materials, or processes specified or proposed. Include product information sheets.
- D. Contractor shall submit a sample of all supplied materials accompanied by analytical data from an approved laboratory source illustrating compliance with these Specifications and bearing the manufacturer's guaranteed analysis.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. The Contractor shall provide receipts, delivery tickets, load tickets, etc. of all items delivered to the job site to verify products and total quantities.
- B. The fertilizer shall be delivered to the project site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name trademark, and conformance to State Law.

1.06 JOB CONDITIONS

- A. Protect work and materials from damage due to construction operations by other contractors and trades and by vandalism. Maintain protection during installation and maintenance period.
- B. Hydroseeding operations shall not take place if any of the following conditions are predicted in the next 24 hours:
 - 1. Temperatures above 95°F.
 - 2. Temperatures below 55°F.
 - 3. Wind speeds at or above 20 mph.
 - 4. Rainfall greater than one tenth of an inch.

1.07 SAMPLES AND TESTS

- A. The Engineer reserves the right to take and analyze samples of materials for conformity to these Specifications. The Contractor shall furnish samples upon request by the Engineer. Rejected materials shall be removed from the site at Contractor's expense. Cost of testing of materials not meeting Specifications shall be paid by Contractor.

1.08 GUARANTY AND REPLACEMENT

- A. Guaranty and replacement requirements are specified in Section 02970.

1.09 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS**2.01 GENERAL**

- A. Any commercially processed or packaged material shall be delivered to the site in the original unopened container bearing the manufacturer's guaranteed analysis.

2.02 MATERIALS

A. Hydroslurry Fertilizer

1. Organic, non-petroleum based NPK fertilizer which contains the following percentages by weight, or equivalent:
 - a. 7% nitrogen
 - b. 2% phosphoric acid
 - c. 3% potash

B. Wood Cellulose Fiber Mulch (Hydromulching)

1. Mulch shall be specially prepared wood cellulose fibers with no growth or germination inhibiting factors, and dyed green to facilitate visual metering during application. Wood cellulose fiber shall have additional characteristics of dispersing rapidly in water to form homogeneous slurry and remain in such state when agitated in the hydraulic mulching unit.
2. Wood cellulose fiber mulch shall be supplied, compressed in packages containing 50 pounds of material having an equilibrium air dry moisture content at time of manufacture of 12%, plus or minus 2.

C. Binders

1. Organic, natural polysaccharide derived from Guar gum.
2. Organic, natural tackifier derived from ground Psyllium. Verify application rates.

D. Fungicide: "Subdue" (Ciba-Geigy) or equal.

E. Weed Control: as allowable under state law (order does not indicate preference)

1. Enide (Upjohn),
2. Dymid (Elanco Products Co.),
3. Treflan,
4. Eptan,
5. Surflan
6. or equal.

F. Mycorrhizal Inoculant

1. Granular formulation of endomycorrhizal species suitable for incorporation with hydroslurry mix, minimum of 25,000 spores per pound.
 - a. MycoApply "Endo"
 - b. Bio Organics "Micronized Endomycorrhizal Inoculant (BEIM)"
 - c. or equal

2.03 PLANTS**A. Plant Mixes**

1. Hydroseed mix shall be as follows:
 - a. Hordeum brachyantherum – 10 lbs/acre
 - b. Stipa pulchra – 15 lbs/acre
 - c. Leymus triticoides – 4 lbs/acre
 - d. Melica californica – 3 lbs/acre
 - e. Elymus multisetus – 3 lbs/acre
 - f. Hydromulch Fiber Hydrostraw - 4000 lbs/acre
 - g. Fertilizer Biosol 7-2-3 – 1000 lbs/acre
 - h. Microrizobial Inoculum – 20 lbs/acre
 - i. Hydromulch Tackifier Guar – 100 lbs/acre
2. Seed shall be weed free, fresh, re-cleaned, Grade A, new crop consisting of the percentages of mix as specified. Seed shall be labeled in accordance with the U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act presently in effect.
3. Seed shall be provided from and mixed by a certified dealer. Seed mixture shall be labeled with manufacturer's guaranteed analysis, germination rate and purity rate.

2.04 EQUIPMENT**A. Hydro-Seeder**

1. Equipment used for application of slurry shall be a commercial-type Hydro-Seeder and have a built-in agitation system with an operation capacity sufficient to agitate, suspend and homogeneously mix slurry.
2. Tank capacity shall be a minimum of 1,500 gallons and shall be mounted on a truck to allow access to the site.
3. Distribution Lines: Large enough to prevent stoppage and allow for even distribution of slurry over the site.
4. The pump shall be able to generate 150 psi at the nozzle.

PART 3 EXECUTION**3.01 OBSERVATION**

- A. Contractor to review the conditions of site for planting. Verify that all preceding and ancillary work, including final grades, have been established prior to beginning planting operations. Contractor is responsible to inform the Engineer of conditions of the site that are not suitable for planting.

3.02 PREPARATION

A. Soil Preparation of Hydroseed Areas

1. Remove existing erosion control mat and straw rolls as needed.
2. Apply weed control and fungicide as needed according to manufacturer recommendations.
3. Clear and remove existing weeds by mowing and grubbing to at least 1/4 inch below the soil surface. Bag, collect, and legally dispose of all weeds off-site.
4. Finish grading: Conform to Section 02300 and grades and notes on the Drawings. Areas shall be smooth and continuous with firm planes that insure proper surface drainage. All rocks, soil lumps and deleterious materials larger than 1 inch shall be removed and the areas raked or harrowed to break up surface and provide irregular seeding bed for maximum soil contact. Establish final grades of 1 inch below adjacent paved areas, sidewalks, valve boxes, headers, clean outs, drains, manholes, etc.

3.03 INSTALLATION

A. Hydroseed:

1. If Psyllium-based tackifier is used, pre-moisten the application area.
2. Apply Hydromulch in two applications as follows:
 - a. Apply all seed, fertilizer, mycorrhizal inoculum, and 25% of hydrostraw fiber.
 - b. Apply 75% of hydrostraw fiber and 100% of hydromulch tackifier.
3. Maintain optimum moisture to sustain germination and plant growth, tapering water off to emulate natural conditions as soon as possible.
4. Re-apply hydroseed to all dead or unhealthy strands of grass with equal material as directed by the Engineer at the following times:
 - a. Final landscape inspection prior to the maintenance period
 - b. End of the maintenance period
 - c. End of the guaranty period

3.04 MAINTENANCE

- #### A. See Section 02970, Extended Landscape Maintenance.

END OF SECTION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. All post-construction Best Management Practices (BMPs) indicated herein shall be kept effective and maintained by the Contractor throughout execution of the Work until final acceptance of all work in the contract. Following final acceptance, the District will assume maintenance responsibilities of all post construction BMPs.
- B. All affected and disturbed ground surface identified on the Drawings shall be tract walked, receive hydroseed and covered with erosion mat as specified in this Section. In addition, straw rolls shall be installed on all slopes (steeper than 10%) in a longitudinal direction at every 10-foot vertical height. Mat and straw rolls have been previously installed and may be reused.
- C. Any soil stockpile(s) generated during the execution of the Work, shall be removed from the site and disposed of.
- D. Installation of culverts and storm drain system: Construction of the storm drain pipelines shall be in accordance with the applicable Sections of the pipe material specifications and as shown on the Drawings. All concrete work (i.e. headwalls, curb and gutter, etc.) shall be in accordance with Section 02772.
- E. Installation of catch basin filter inserts. All proposed catch basins shall be fitted with filter inserts. In addition, stencil signs shall be installed on all the catch basin inlets to read "STORM WATER DISCHARGE ONLY". The site is currently managed under a temporary SWPP Plan by the Owner. Existing catch basins have filter inserts that shall remain. Work to clean and CCTV the storm drainage system, the Contractor may temporarily remove the inserts and replace when finished. Any inserts that are damaged or full of sediment, the Contractor shall notify the Owner to clean and dispose of the sediment and/or provide a replacement insert.
- F. Riprap for the energy dissipating structures shall be in accordance with Section 02300.
- G. Installation of seeding shall in accordance with Section 02924.

1.02 RELATED SECTIONS

- A. Section 02300 – Earthwork.
- B. Section 02772 – Concrete Curbs, Gutters, and Sidewalks.
- C. Section 02924 – Hydroseeding and Soil Preparation.
- D. Section 02970 – Extended Landscape Maintenance.

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Prior to delivery to the site, the Contractor shall submit samples and manufacturers' literature for the following items:
 - 1. Seed mixes (see Section 02924).
 - 2. Erosion control mat and straw rolls.
 - 3. Catch Basin filter inserts and signs.
- C. The Contractor shall submit all laboratory test data for all materials to the Engineer for review.
- D. Test Reports and Certifications:
 - 1. Certificates of Compliance
 - a. The Contractor shall furnish a certificate of compliance with each delivery or bulk material delivery, stating the source, quantity, and type of material. Written certificates providing the manufacturer's analysis shall be submitted at the time of each delivery. Inspection by federal or state governments at place of growth does not preclude rejection at project site.

1.04 MEASUREMENT AND PAYMENT

- A. Measurement and Payment for "**Erosion Control – Post Construction BMPs**" bid item shall be per lump sum and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work necessary to complete the work including, but not limited to, removal of existing erosion control mat and straw rolls, earthwork, removal of weeds, soil preparation, hydroseeding, and installation and maintenance of all material described herein and no additional compensation will be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Seed Mix
 - 1. Seed mix mixture, treatment and placement shall be furnished in accordance with Section 02924.
- B. Straw Rolls
 - 1. Straw rolls, i.e. straw wattles, shall be at least 9 inches in diameter, and shall be manufactured from certified 100-percent weed rice straw and wrapped in a tubular plastic netting. Straw rolls shall be as manufactured by Earth Saver, or equal.

- C. Erosion Mat
 - 1. Erosion mat shall be 100 percent agricultural straw stitched with degradable thread between two degradable polypropylene nettings. The erosion mat shall be North American Green Product S150, or equal.
- D. Catch Basin Filter Inserts and Sign
 - 1. The catch basin filter inserts shall be installed to remove trash, sediments and hydrocarbons from storm water runoff that could enter the catch basins. Acceptable products shall be DawgCatcher Catch Basin Insert and accessories, or equal, and categorized as MP-52 based on the California Stormwater Quality Association. Stencil sign reading "STORM WATER DISCHARGE ONLY" shall be constructed per Caltrans A74-A Type N-1.

PART 3 EXECUTION

3.01 APPLICATION

- A. Seeding shall be installed on all previously disturbed areas in accordance with Section 02924.
- B. Application and installation of straw rolls shall be placed on top and toe of all disturbed slopes. Existing straw rolls located onsite may be considered suitable for reuse pending approval by the Engineer in the field.
- C. Application of erosion mat shall be placed on disturbed areas with slope inclination of steeper than 10 percent. Installation of the material shall be in accordance with the manufacturer's recommendations. Existing erosion mat located onsite may be considered suitable for reuse pending approval by the Engineer in the field.
- D. Tract walking shall be performed with low-pressure equipment (i.e., Caterpillar D4) in an up and down direction parallel to the slope on all existing bare surface and disturbed area of the project. In addition, tract walking shall be performed first prior to placement of hydroseeding and erosion mat.
- E. All existing and proposed catch basins shall be fitted with filter inserts and stencil signs if not already so equipped.

3.02 MAINTENANCE

- A. During the entire period of installation, and until final acceptance of all work by the Engineer, the Contractor shall maintain all seeded areas by proper weed control, clean up, general care, erosion control, and any other necessary operations.

END OF SECTION

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PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, material, equipment and services required to maintain landscape in a healthy growing condition and in a neat and attractive appearance throughout the maintenance period.

1.02 RELATED SECTIONS

- A. Section 02924 – Hydroseeding and Soil Preparation

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.

1.04 QUALITY ASSURANCE

- A. The Contractor shall be experienced in horticulture and landscape maintenance, practices and techniques, and shall provide sufficient number of workers with adequate equipment to perform the work during the maintenance period.

1.05 MAINTENANCE PERIOD

- A. The maintenance period shall start upon Project Completion and Acceptance.
- B. Maintain all hydroseed areas during the progress of work until Project Completion and Acceptance and during the 24-month maintenance period after Acceptance. Hydroseed areas shall be maintained during this period or until establishment of a full, healthy and competitive stand of grass is achieved, whichever is later.
- C. Any day of improper maintenance, as determined by the Engineer, shall not be credited as an acceptable maintenance period day. The maintenance period shall be extended on a daily basis if the work is not in accordance to the Drawings and Specifications. Project shall not be segmented into maintenance areas or phases unless authorization of the Engineer is obtained.
- D. Contractor shall provide protection to the project site during the maintenance period. Any damage caused by the lack of adequate site protection shall be repaired or replaced at no additional cost to the District.

1.06 GUARANTY AND REPLACEMENT

- A. All hydroseed areas installed under the Contract shall be guaranteed for 24 months from the start of maintenance against any and all poor, inadequate or inferior materials and/or workmanship, acts of God, animal or insect damage or

improper maintenance, as determined by the Engineer. Material shall be replaced by the Contractor at Contractor's expense.

- B. Any materials found to be dead, missing, or not in a satisfactory or healthy condition during the maintenance period shall be replaced immediately. The Engineer shall be the sole judge as to the condition of material. Material to be replaced within the guaranty period shall be replaced by the Contractor within five (5) days of written notification by the Engineer. All replacement materials and installations shall comply with the Drawings and Specifications.

1.07 FINAL ACCEPTANCE OF THE PROJECT

- A. Upon completion of the maintenance period, the Engineer will inspect the hydroseed areas to determine final project acceptability.
- B. Where observed work does not comply with the Drawings and Specifications, replace rejected work and continue specified maintenance period until re-inspected by the Engineer and determined to be acceptable. All replacement materials and installations shall be in accordance with the Drawings and Specifications. Remove rejected work and materials immediately from project. Prior to date of final inspection at the end of the maintenance period, the Contractor shall provide the Engineer with all Record Drawings.

1.08 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials used shall conform to these Specifications or shall otherwise be acceptable to the Engineer. The Engineer shall be given a monthly record of all herbicides, insecticides and disease control chemicals used.
- B. General fertility maintenance fertilizer: shall consist of the following percent by weight:
 - 1. 16% nitrogen
 - 2. 6% phosphoric acid
 - 3. 8% potash
- C. Slow release fertilizer shall consist of the following percent by weight:
 - 1. 21% nitrogen
 - 2. 3% phosphoric acid
 - 3. 5% potash

PART 3 EXECUTION**3.01 MAINTENANCE**

- A. Maintenance shall be according to the following standards. All areas shall be weeded and cultivated at intervals of not more than ten (10) days. Watering, trash and debris removal, mowing, rolling, edging, trimming, fertilization, spraying and pest control, as required, shall be included in the maintenance period. Street gutters and sidewalks shall be included. The Contractor shall be responsible for maintaining adequate protection of the area. Damaged areas shall be repaired at the Contractor's expense. The Contractor shall reseed all spots or areas where plants are found to be dead, missing, or not in a satisfactory or healthy condition.

3.02 GROUND COVER CARE

- A. Weed Control
 - 1. Control weeds, preferably with pre-emergent herbicides, but also with selective systemic herbicides. Hoe weeds as little as possible since this may result in plant damage.
- B. Watering
 - 1. Water enough that moisture penetrates throughout root zone and only as frequently as necessary to maintain healthy growth. Refer to irrigation schedule as noted on the Drawings.
- C. Trash
 - 1. Remove trash and debris weekly. Dispose in a legal manner.
- D. Edging and Trimming
 - 1. Edge ground cover to keep in bounds and trim growth as necessary to achieve an overall even appearance.
- E. Reseeding
 - 1. Reapply hydroseed in areas with dead and/or missing plants at Contractor's expense.

END OF SECTION

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PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required, and design, install, and remove formwork for cast-in-place concrete as shown on the Drawings and as specified herein.
- B. Secure to forms as required or set for embedment as required, all miscellaneous metal items, sleeves, reglets, anchor bolts, inserts, and other items furnished under other Sections and required to be cast into concrete.

1.02 RELATED SECTIONS

- A. Section 03200 - Concrete Reinforcement
- B. Section 03300 - Cast-in-Place Concrete
- C. Section 03600 - Grouts
- D. Section 03922 - Modifications and Repairs to Concrete

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit shop drawings and product data showing materials of construction and details of installation for the following:
 - 1. Form release agent
 - 2. Form ties
 - 3. Form liners
 - 4. Void forms
 - 5. Architectural concrete forming system
- C. Certify that form release agent is NSF International/American National Standards Institute (NSF/ANSI) Standard 61 compliant, with certification from an independent ANSI/Environmental Laboratory Accreditation Program (ANSI/ELAP)-accredited testing laboratory acceptable to the Engineer but engaged by and at the expense of the Contractor.
- D. Falsework and Drawings - The Contractor will adhere to the provisions of Section 1717 of the Division of Industrial Safety, Construction Safety Orders, which require that all falsework or vertical shoring installations where the height of the falsework or vertical shoring, as measured from the top of the sills to the soffit of the superstructure, exceeds 14 feet, or where individual horizontal span lengths exceed 16 feet, or provision for vehicular or railroad traffic through falsework or vertical shoring is made, shall be approved and signed by a Professional Civil Engineer, registered in the State of California. A copy of the falsework plan or shoring layout shall be available on the job site at all times.

- E. The Contractor shall, in accordance with the requirements in Standard Provisions, submit detailed plans of falsework proposed to be used. Such plans shall be in sufficient detail to indicate the general layout, sizes of members, anticipated stresses, grade of materials to be used in the falsework, and typical soil conditions.
- F. Location and sequence of the concrete placement - Indicate locations of form joints, form-tie layout, and panel sizes and patterns. Show location of form ties on architectural surfaces.
- G. Review of pour sequence, form system and panel layout shall be for appearance and conformance to design concept only. Engineer's review of the forming plans or procedures shall not relieve the Contractor of responsibility for the strength, safety, or correctness of methods used, the adequacy of equipment, or from carrying out the work in full compliance with the requirements of the Drawings and as specified herein.
- H. Samples
 - 1. The Contractor shall demonstrate to the Engineer on a designated area of the concrete substructure exterior surface that the form release agent will not adversely affect concrete surfaces to be painted, coated, or otherwise finished and will not affect the forming materials.
 - 2. The Contractor shall construct one sample concrete wall 10 feet high by 10 feet long with the architectural forms and the form liner, complete with the form tie pattern and finish as specified. The wall will be viewed by the Engineer in the presence of the Contractor noting specific defects and establishing the quality of the finished architectural concrete for the project. The wall as modified by the Engineer's comments shall serve as the standard against which the acceptability of the actual architectural concrete will be judged. The wall shall remain until all architectural concrete has been placed, finished, and accepted at which time the Contractor shall demolish the wall and remove the debris from the site.

1.04 REFERENCE STANDARDS

- A. American Concrete Institute (ACI)
 - 1. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials
 - 2. ACI 301 - Specifications for Structural Concrete
 - 3. ACI 318 - Building Code Requirements for Structural Concrete
 - 4. ACI 347 - Guide to Formwork for Concrete
- B. American Plywood Association (APA)
 - 1. APA - Material Grades and Designations as Specified

- C. NSF International (NSF)
 - 1. NSF/American National Standards Institute (ANSI) Standard 61 - Drinking Water System Components - Health Effects
- D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. The form liner manufacturer's representative shall be on-site during initial installation of the form liner to instruct the Contractor on the proper methods of application and use of the liner. S/He shall be available to answer any questions on the liner that the Engineer may have.

1.06 SYSTEM DESCRIPTION

- A. General – Architectural Concrete is wall, slab, beam, or column concrete that will have surfaces exposed to view in the finished work. It includes similar exposed surfaces in water containment structures from the top of the walls to 2 feet below the normal water surface in open tanks and basins.
- B. Structural Design Responsibility – All forms and shoring shall be designed at the Contractor's expense by a Professional Civil Engineer, registered in the State of California. Formwork shall be designed and erected in accordance with the requirements of ACI 301 and ACI 318 and as recommended in ACI 347 and shall comply with all applicable regulations and codes. The design shall consider any special requirements due to the use of plasticized and/or retarded set concrete.

1.07 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation to be allowed therefor.
- B. Refer to Article 21.01 Schedule of Bid Items.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configurations desired.

2.02 MATERIALS

- A. Forms for cast-in-place concrete shall be made of wood, metal, or other approved material. Wood forms for the project shall be new and unused. Construct wood forms of sound lumber or plywood of suitable dimensions and free from knotholes and loose knots. Where used for exposed surfaces, dress

and match boards. Sand plywood smooth and fit adjacent panels with tight joints. Metal forms may be used when approved by the Engineer and shall be of an appropriate type for the class of work involved. All forms shall be designed and constructed to provide a flat, uniform concrete surface requiring minimal finishing or repairs.

- B. Form Release Agent - Coat all forming surfaces in contact with concrete using an effective, nonstaining, non-residual, water-based, bond-breaking form coating, unless otherwise noted. Form release agents used in potable water containment structures shall be suitable for use in contact with potable water and shall be nontoxic and free of taste or odor.
- C. Concrete surfaces that are to be painted shall be formed with hard plastic finished plywood or a similar material that does not require a form release agent unless the Contractor can substantiate to the satisfaction of the Engineer that the form release agent will not remain on the formed surface after it is stripped.
- D. Forms for Architectural Concrete or Concrete Receiving Architectural Finish:
 - 1. Forms for architectural concrete shall be constructed of materials and in a manner that will result in rigid forms with sufficient strength to withstand, without noticeable deflection, movement, or leakage, the high hydraulic pressures resulting from rapid filling of the forms and heavy, high-frequency vibration of the concrete. Deflection in formwork shall be limited to $1/360$ of each component span. Form joints shall be laid out in a uniform pattern or as indicated on the Drawings.
- E. Form Liners:
 - 1. Variable depth wooden-plank texture indicated on the Drawings shall be Pattern 16938, 1.5-inch Wide Plank, Random Depth manufactured by Fitzgerald Formliners; Pattern 1221 Stepped Wood Planks, manufactured by Spec Formliners, Inc.; or equal.
- F. Form Ties:
 - 1. Form ties encased in concrete other than those specified in the following paragraphs shall be designed so that, after removal of the projecting part, no metal shall remain within 1-1/2 inches of the face of the concrete. The part of the tie to be removed shall be at least 1/2 inch in diameter or be provided with a wood or metal cone at least 1/2 inch in diameter and 1-1/2 inches long. Form ties in concrete exposed to view shall be the cone-washer type.
 - 2. Form ties for exposed exterior and interior walls shall be as specified in the preceding paragraph except that the cones shall be approved wood or plastic.
 - 3. Flat bar ties for panel forms shall have plastic or rubber inserts having a minimum depth of 1-1/2 inches and sufficient dimensions to permit proper patching of the tie-hole.

4. Ties for liquid containment structures shall have a neoprene washer at the center of the tie. Snap-Ties shall be Meadow Burke, Tampa, FL; Gates Inc., Denver, CO; or equal.
 5. Common wire shall not be used for form ties.
 6. Alternate form ties, consisting of tapered through-bolts at least 1 inch in diameter at the smallest end or through-bolts that utilize a removable tapered sleeve of the same minimum size, may be used at the Contractor's option. Obtain Engineer's acceptance of system and spacing of ties before ordering or purchasing of forming. Clean, fill, and seal form tie hole with nonshrink cement grout. The Contractor shall be responsible for watertightness of the form ties and any repairs needed.
- G. Void Forms Under Slabs or Grade Beams:
1. Void forms used directly below grade beams and structural slabs shall be preformed cardboard having sufficient strength to support the weight of the reinforcement and the wet concrete placed directly above or adjacent to it without deflecting the void form more than 1/2 inch. Manufacturers include Sure Void Under Slab Void, SureVoid, Denver, CO; VoidForm, VoidForm International, Englewood, CO; or equal.

PART 3 EXECUTION

3.01 GENERAL

- A. Forms for walls shall have removable panels at the bottom for cleaning, inspection, and joint surface preparation. Forms for wall heights in excess of 16 feet shall have closable intermediate inspection ports. Tremies and hoppers for placing concrete shall be used to allow concrete inspection, prevent segregation, and prevent the accumulation of hardened concrete on the forms above the fresh concrete.
- B. Molding, bevels, or other types of chamfer strips shall be placed to produce blockouts or chamfers as shown on the Drawings or as specified herein. Chamfer strips shall be provided at horizontal and vertical projecting corners to produce a 3/4-inch chamfer. Rectangular or trapezoidal moldings shall be placed in locations requiring sealants where specified or shown on the Drawings. Size of moldings shall conform to the sealant manufacturer's recommendations.
- C. Forms shall be sufficiently rigid to withstand construction loads and vibration and to prevent displacement or sagging between supports. Construct forms such that the concrete and/or exposed rebar (dowels) will not be damaged by their removal. The Contractor shall be entirely responsible for the adequacy of the forming system.
- D. Before form material is reused, all surfaces to be in contact with concrete shall be thoroughly cleaned, all damaged places repaired, all projecting nails withdrawn, and all protrusions smoothed. Reuse of wooden forms for other than rough finish will be permitted only if a "like-new" condition of the form is maintained.

- E. Metal items, such as rebar, wire, or plates used to support pipe penetrations and pipe embedment shall have a minimum clearance of 2 inches from reinforcing bars.
- F. Tolerances in concrete construction shall be in accordance with ACI 117, unless otherwise noted.

3.02 FORM TOLERANCE

- A. Forms shall be surfaced, designed, and constructed in accordance with the recommendations of ACI 347 and shall meet the following additional requirements for specified finishes.
- B. Formed Surfaces Exposed to View - Edges of all form panels in contact with concrete shall be flush within 1/32 inch and forms for plane surfaces shall be such that the concrete will be plane within 1/16 inch in 4 feet. Forms shall be tight to prevent the passage of mortar, water, and grout. The maximum deviation of the finish wall surface at any point shall not exceed 1/4 inch from the intended surface as shown on the Drawings. Form panels shall be arranged symmetrically and in an orderly manner to minimize the number of seams.
- C. Formed surfaces not exposed to view or buried shall meet the requirements of Class "C" Surface in ACI 347.
- D. Formed rough surfaces including mass concrete, pipe encasement, electrical duct encasement, and other similar installations shall have no minimum requirements for surface smoothness and surface deflections. The overall dimensions of the concrete shall be plus or minus 1 inch.
- E. Architectural Concrete - All smooth faces to be exposed to view shall have surface deflections limited to 1/32 inch at any point and the variation in wall deflection shall not exceed 1/16 inch per 4 feet. The maximum deviation of the finished wall surface at any point shall not exceed 1/4 inch from the intended surface as shown on the Drawings. All textured faces, form lines, or rustications to be exposed to view shall be straight, plumb and true with a variation of no more than 1/4 inch in 10 feet measured in any direction.

3.03 FORM PREPARATION

- A. Wood forms in contact with concrete shall be coated with an effective form release agent before form installation.
- B. Steel forms shall be thoroughly cleaned, and mill scale and other ferrous deposits shall be sandblasted or otherwise removed from the contact surface for all forms except those utilized for surfaces receiving a rough finish. All forms shall have the contact surfaces coated with a form release agent.
- C. Form liners to be installed for architectural concrete finish shall be in accordance with the manufacturer's recommendations.

3.04 REMOVAL OF FORMS

- A. The Contractor shall be responsible for all damage resulting from removal of forms. Form removal shall conform to the requirements specified in Section 03300.

3.05 INSPECTION

- A. The Engineer shall be notified when the forms are complete and ready for inspection at least 24 hours before the proposed concrete placement.
- B. Failure of the forms to comply with the requirements specified herein, or to produce concrete complying with the requirements of this Section, in the opinion of the Engineer, shall be grounds for rejection of that portion of the form/concrete work. Rejected work shall be repaired or replaced as directed by the Engineer at no additional cost to the District. Such repair or replacement shall be subject to the requirements of this Section and approval of the Engineer.

3.06 FALSEWORK

- A. The Contractor shall be responsible for the design, engineering, construction, maintenance, and safety of all falsework, including staging, walkways, forms, ladders, and similar appurtenances, which shall equal or exceed the applicable requirements of the provisions of the OSHA Safety and Health Standards for Construction, the requirements of the Construction Safety Orders of the California Division of Industrial Safety, and the requirements specified herein.
- B. All falsework shall be designed and constructed to provide the necessary rigidity and to support the loads. Falsework for the support of a superstructure shall be designed to support the loads that would be imposed if the entire superstructure were placed at one time.
- C. Falsework shall be placed upon a solid footing, safe against undermining, and protected from softening. When the falsework is supported on timber piles, the maximum calculated pile loading shall not exceed 20 tons. When falsework is supported on any portion of the structure that is already constructed, the loading imposed by the falsework shall be spread, distributed, and braced in such a way as to avoid any possibility of damage to the structure.

END OF SECTION

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PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install all concrete reinforcement complete as shown on the Drawings and as specified herein.

1.02 RELATED SECTIONS

- A. Section 03300 - Cast-in-Place Concrete
- B. Section 03600 - Grouts
- C. Section 03922 - Modifications and Repairs to Concrete

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Reinforcing Steel - Submit to the Engineer, in accordance with the Standard Provisions, placement drawings conforming to the recommendations of ACI 315. All reinforcement in a concrete placement shall be included in a single placement drawing or cross-referenced to the pertinent main placement drawing. The main drawing shall include the additional reinforcement (around openings, at corners, etc.) shown on the standard details sheets. Bars to have special coatings and/or to be of special steel or special yield strength are to be clearly identified.
- C. Bar Bending Details - The bars shall be referenced to the same identification marks shown on the placement drawings. Bars to have special coatings and/or to be of special steel or special yield strength shall be clearly identified.
- D. Mechanical Connectors - Submit two samples of each type of mechanical reinforcing steel connectors.
- E. Test Reports - Submit test reports for each of the following items:
 - 1. Mill Test - Submit a certified copy of mill test on each steel proposed for use showing the physical properties of the steel and the chemical analysis.
 - 2. Foreign Manufactured Steel - Submit a certified copy of test reports for each foreign manufactured steel proposed for use in the fabrication of reinforcement. The tests shall be specifically made for this project at the expense of the Contractor by a domestic independent testing laboratory certified to perform the tests. The testing shall be for conformity to the applicable ASTM standard(s).
 - 3. Welder - Welder certification shall be in accordance with AWS D1.4 when welding of reinforcement is required.

1.04 REFERENCE STANDARDS

- A. Federal Specifications
 - 1. QQ-W-461H - Wire, Steel, and Carbon (round, bare and coated)
- B. American Concrete Institute (ACI)
 - 1. ACI 301 - Specifications for Structural Concrete
 - 2. ACI 315 - Details and Detailing of Concrete Reinforcement
 - 3. ACI 318 - Building Code Requirements for Structural Concrete
 - 4. ACI SP-66 - ACI Detailing Manual
- C. ASTM International (ASTM)
 - 1. ASTM A615 - Standard Specification for Deformed and Plain Carbon Steel - Bars for Concrete Reinforcement
 - 2. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
 - 3. ASTM A1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
 - 4. ASTM C1116 - Standard Specification for Fiber Reinforced Concrete
- D. American Welding Society (AWS)
 - 1. AWS D1.4 - Structural Welding Code - Reinforcing Steel
- E. Concrete Reinforcing Steel Institute (CRSI)
 - 1. CRSI - Manual of Standard Practice
- F. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. In no case shall any reinforcing steel be covered with concrete until the installation of the reinforcement, including the size, spacing, and position of the reinforcement has been observed by the Engineer and the Engineer's release to proceed with concreting has been obtained. The Engineer shall be given ample prior notice of the readiness of placed reinforcement for observation. The forms shall be kept open until the Engineer has completed observations of the reinforcing steel.

1.06 DELIVERY, HANDLING, AND STORAGE

- A. Reinforcing steel shall be substantially free from mill scale, rust, dirt, grease, or other foreign matter.

- B. Reinforcing steel shall be shipped and stored with bars of the same size and shape, fastened in bundles with durable tags, marked in a legible manner with waterproof markings showing the same "mark" designations as those shown on the submitted placement drawings.
- C. Reinforcing steel shall be stored off the ground, protected from moisture, and kept free from dirt, oil, or other injurious contaminants.

1.07 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configurations desired.

2.02 MATERIALS

- A. Materials shall be new and shall comply with the following material specifications.
- B. Deformed Concrete Reinforcing Bars are to be ASTM A615, Grade 60 deformed bars.
- C. Concrete reinforcing bars required on the Drawings are to be field bent or welded ASTM A706, Grade 60 deformed bars.
- D. Spiral Reinforcement shall comply with the following:
 - 1. ASTM A615, Grade 60 for hot-rolled plain or deformed bars
 - 2. ASTM A82 for cold-drawn wire
- E. Welded Steel Wire Fabric shall comply with ASTM A185.
- F. The following alternative materials are allowed:
 - 1. ASTM A615, Grade 60 may be used for ASTM A706 provided the following requirements are satisfied:
 - a. The actual yield strength of the reinforcing steel based on mill tests shall not exceed the specified yield strength by more than 18,000 pounds per square inch (psi). Retests shall not exceed this value by more than an additional 3,000 psi.

- b. The ratio of the actual ultimate tensile strength to the actual tensile yield strength of the reinforcement shall not be less than 1.25.
 - c. The carbon equivalency (CE) of the bars shall be 0.55 or less.
- G. Reinforcing Steel Accessories:
 - 1. Plastic protected bar supports shall comply with CRSI Bar Support Specifications, Class 1 - Maximum Protection.
 - 2. Stainless steel protected bar supports shall comply with CRSI Bar Support Specifications, Class 2 - Moderate Protection.
 - 3. Precast concrete block bar supports (dobies) shall comply with CRSI Bar Support Specifications, Precast Block. Block shall have equal or greater compressive strength than the surrounding concrete.
- H. Tie Wire:
 - 1. Tie Wires for Reinforcement shall be 16-gauge or heavier, black annealed wire, conforming to Federal Specification QQ-W-461H.
- I. Mechanical reinforcing steel butt splices shall be positive connecting taper-threaded type employing a hexagonal coupler such as Lenton rebar splices as manufactured by Erico Products, Inc.; Grip-Twist as manufactured by BarSplice Products, Inc.; or equal. They shall meet all ACI 318 Building Code requirements. Bar ends must be taper-threaded with coupler manufacturer's bar threader to ensure proper taper and thread engagement. Bar couplers shall be torqued to manufacturer's recommended value.
 - 1. Unless otherwise noted on the Drawings, mechanical tension splices shall be designed to produce splice strength in tension or compression of not less than 125 percent of the ASTM-specified minimum yield strength of the rebar.
 - 2. Compression type mechanical splices shall provide concentric bearing from one bar to the other and shall be capable of developing the ultimate strength of the rebar in compression.
- J. Fibrous Reinforcement - The fibers shall be 100 percent virgin homopolymer polypropylene fibrillated fibers, containing no reprocessed olefin materials, manufactured in accordance with applicable building codes and ASTM C1116 Type III. Fibrous concrete reinforcement shall be Fibermesh 300, as manufactured by Propex Concrete Systems Corporation; Durafiber, as manufactured by Durafiber, Inc.; or equal.
 - 1. Acceptable polypropylene fibers shall possess the following characteristics:
 - a. Specific Gravity: 0.91 ± 1
 - b. Tensile Strength: 80–110 ksi (kips per square inch)
 - c. Fiber Length: Graded per manufacturer.

2.03 FABRICATION

- A. Fabrication of reinforcement shall be in compliance with the CRSI Manual of Standard Practice.
- B. Bars shall be cold bent. Bars shall not be straightened or re-bent.
- C. Bars shall be bent around a revolving collar having a diameter of not less than that recommended by ACI 318.
- D. Bar ends that are to be butt-spliced, placed through limited diameter holes in metal, or threaded shall have the applicable end(s) saw-cut. Such ends shall terminate in flat surfaces within 1.5 degrees of a right angle to the axis of the bar.
- E. Spirals:
 - 1. Provide a minimum of one and one-half finishing turns at top and bottom, unless otherwise noted.
 - 2. Splices shall be tension lap splices at least 48 bar diameters, but not less than 12 inches in length. Welded splices shall only be used where specifically approved by the Engineer.
 - 3. Provide spacers as recommended by CRSI.

PART 3 EXECUTION**3.01 INSTALLATION**

- A. Surface condition, bending, spacing, and tolerances of placement of reinforcement shall comply with CRSI Manual of Standard Practice. The Contractor shall be solely responsible for providing an adequate number of bars and maintaining the spacing and clearances shown on the Drawings.
- B. Except as otherwise noted on the Drawings, the minimum concrete cover for reinforcement shall be as follows:
 - 1. Concrete cast against and permanently exposed to earth: 3 inches
 - 2. Concrete exposed to soil, water, sludge, and/or weather (including bottom cover of slabs over water): 2 inches
 - 3. Concrete not exposed to soil, water, sludge, and/or weather:
 - a. Slabs (top and bottom cover), walls, joists, shells, and folded plate members: 1.5 inches
 - b. Beams and columns, primary reinforcement: 2 inches
 - c. Ties, spirals, and stirrups: 1.5 inches

- C. Reinforcement that will be exposed for a considerable length of time after being placed shall be coated with a heavy coat of neat cement slurry.
- D. No reinforcing steel bars shall be welded either during fabrication or erection unless specifically shown on the Drawings or specified herein, or unless prior written approval has been obtained from the Engineer. All bars that have been welded, including tack welds, without such approval shall be immediately removed from the work and replaced at the expense of the Contractor. If welding of reinforcement is approved or specifically called for, it shall comply with AWS D1.4.
- E. Reinforcing steel interfering with the location of other reinforcing steel, conduits, or embedded items may be moved within the specified tolerances or one bar diameter, whichever is greater. Greater displacements of bars to avoid interference shall only be made with the approval of the Engineer. Do not cut reinforcement to install inserts, conduits, mechanical openings, or other items without the prior approval of the Engineer.
- F. Securely support and tie reinforcing steel to prevent movement during concrete placement. Secure dowels in place before placing concrete.
- G. Reinforcing steel bars shall not be field bent except where shown on the Drawings or specifically authorized in writing by the Engineer. If authorized, bars shall be cold-bent around a standard diameter spool as specified within CRSI. Do not heat bars. Closely inspect the reinforcing steel for breaks. If the reinforcing steel is damaged, replace, Cadweld, or otherwise repair as directed by the Engineer. Do not bend reinforcement after it is embedded in concrete unless specifically permitted on the Drawings.

3.02 REINFORCEMENT AROUND OPENINGS

- A. Unless specific additional reinforcement around openings is shown on the Drawings, provide additional reinforcing steel on each side of the opening equivalent to one-half of the cross-sectional area of the reinforcing steel interrupted by the opening. The bars shall have sufficient length to develop bond at each end beyond the opening or penetration.

3.03 SPLICING OF REINFORCEMENT

- A. Splices designated as compression splices on the Drawings shall be 30 bar diameters, but not less than 12 inches, unless otherwise noted.
- B. Tension lap splices shall be provided at all laps in compliance with ACI 318. The length of splices shall conform to the Drawings. Unless otherwise noted on the Drawings, rebar splices shall be contact lap splices. Splices in adjacent bars shall be staggered. Class A splices may be used when 50 percent or less of the bars are spliced within the required lap length. Class B splices shall be used at all other locations.
- C. Except as otherwise indicated on the Drawings, splices in circumferential reinforcement in circular walls shall be Class B tension splices and shall be

staggered. Rebar splices shall be contact lap splices. Adjacent bars shall not be spliced within the required lap length.

- D. Install wire fabric in as long lengths as practicable. Splices in welded wire fabric shall be lapped in accordance with the requirements of ACI 318 but not less than 12 inches. The spliced fabrics shall be tied together with wire ties spaced not more than 24 inches on-center and laced with wire of the same diameter as the welded wire fabric. Do not position laps midway between supporting beams, or directly over beams of continuous structures. Offset splices in adjacent widths to prevent continuous splices.
- E. Mechanical reinforcing steel splicers shall be used only where shown on the Drawings. Splices in adjacent bars shall be offset by at least 30 bar diameters, but not less than 24 inches. Mechanical reinforcing splices are only to be used for special splice and dowel conditions approved by the Engineer.

3.04 ACCESSORIES

- A. Determine, provide, and install accessories such as chairs, chair-bars, and the like in sufficient quantities and strength to adequately support the reinforcement and prevent its displacement during the erection of the reinforcement and the placement of concrete.
- B. Use precast concrete blocks (dobies) where the reinforcing steel is to be supported over soil. In no case shall such supports be continuous.
- C. Stainless steel bar supports or steel chairs with stainless steel tips shall be used where the chairs are set on forms for a concrete surface that will be exposed to weather, high humidity, or liquid (including bottom of slabs over liquid-containing areas). Use of galvanized or plastic-tipped metal chairs is permissible in all other locations unless otherwise noted on the Drawings or specified herein.
- D. Alternate methods of supporting top steel in slabs, such as steel channels supported on the bottom steel or vertical reinforcing steel fasteners to the bottom and top mats may only be used if approved by the Engineer.

3.05 INSPECTION

- A. In no case shall any reinforcing steel be covered with concrete until the installation of the reinforcement, including the size, spacing, and position of the reinforcement, has been observed by the Engineer and the Engineer's release to proceed with the concreting has been obtained. The Engineer shall be given a minimum of 24 hours prior notice of the readiness of placed reinforcement for observation. The forms shall be kept open until the Engineer has completed observations of the reinforcing steel.

END OF SECTION

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PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor and materials required and install all cast-in-place concrete complete as shown on the Drawings and as specified herein.
- B. Furnish all sampling and testing of products and materials by an independent testing laboratory acceptable to the Engineer but engaged by and at the expense of the Contractor.

1.02 RELATED SECTIONS

- A. Section 03200 - Concrete Reinforcement
- B. Section 03350 - Concrete Finishing
- C. Section 03600 - Grouts
- D. Section 03922 - Modifications and Repairs to Concrete
- E. Section 07100 - Dampproofing

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit to the Engineer, in accordance with the Standard and Special Provisions, submittals including the following:
 - 1. Sources of cement and aggregates.
 - 2. Material Safety Data Sheets (MSDS) for all concrete components and admixtures.
 - 3. Air-entraining admixture - Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, and conformity to ASTM standards.
 - 4. Water-reducing admixture - Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, and conformity to ASTM standards.
 - 5. High-range, water-reducing admixture - Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, retarding effect, slump range and conformity to ASTM standards. Identify proposed locations for use.
 - 6. Concrete mix design for each formulation of concrete proposed for use including constituent quantities per cubic yard, water-cementitious materials ratio, type and manufacturer of cement, compressive strength,

concrete slump, shrinkage, and air content. Provide with (a) or (b) below for each mix proposed.

- a. Standard deviation data for each proposed concrete mix based on statistical records, OR,
 - b. The curve of water-cementitious materials ratio versus concrete cylinder strength for each formulation of concrete proposed based on laboratory tests. The cylinder strength shall be the average of the 28-day cylinder strength test results for each mix. Provide results of 7- and 14-day tests if available.
7. Sheet curing material. Product data including catalogue cut, technical data, and conformity to ASTM standards.
8. Liquid curing compound - Product data including catalogue cut, technical data, storage requirements, product life, application rate, and conformity to ASTM standards. Identify proposed locations of use.
9. Samples - Fine and coarse aggregates if requested by the Engineer.
10. Test Reports - Submit test reports for each of the following items:
 - a. Fine aggregates - Sieve analysis, physical properties, and deleterious substances.
 - b. Coarse aggregates - Sieve analysis, physical properties, and deleterious substances.
 - c. Cements - Chemical analysis and physical properties for each type.
11. Certifications:
 - a. Certify that concrete constituents (cement, fine aggregates and coarse aggregates) are NSF International/American National Standards Institute (NSF/ANSI) Standard 61 compliant, with certification from an independent ANSI/Environmental Laboratory Accreditation Program (ANSI/ELAP)-accredited testing laboratory acceptable to the Engineer but engaged by and at the expense of the Contractor.
 - b. Certify that admixtures are NSF/ANSI Standard 61 compliant.
 - c. Certify that curing compounds are NSF/ANSI Standard 61 compliant (nontoxic and free of taste or odor).
 - d. Certify that admixtures used in the same concrete mix are compatible with each other and the aggregates.

- e. Certify that the Contractor is not associated with the independent testing laboratory nor does the Contractor or its officers have a beneficial interest in the laboratory.
- 12. Shrinkage test reports
- 13. Work Plans:
 - a. Hot weather concreting.
 - b. Cold weather concreting.
- 14. Field test reports for concrete compressive strength, concrete slump, concrete air content, and concrete shrinkage. Report to the Engineer the on-site test results the same day they are measured. Provide all test reports within 7 days of each test's completion.

1.04 REFERENCE STANDARDS

A. American Concrete Institute (ACI)

- 1. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete
- 2. ACI 305R - Guide to Hot Weather Concreting
- 3. ACI 306R - Guide to Cold Weather Concreting
- 4. ACI 315 - Details and Detailing of Concrete Reinforcement
- 5. ACI 318 - Building Code Requirements for Structural Concrete

B. ASTM International (ASTM)

- 1. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field
- 2. ASTM C33 - Standard Specification for Concrete Aggregates
- 3. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- 4. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- 5. ASTM C94 - Standard Specification for Ready-Mixed Concrete
- 6. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete
- 7. ASTM C150 - Standard Specification for Portland Cement

8. ASTM C157 - Standard Test Method for Length Change of Hardened Hydraulic Cement Mortar and Concrete
 9. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete
 10. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
 11. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
 12. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete
 13. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
 14. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete
 15. ASTM C596 - Standard Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement
 16. ASTM C1017 - Standard Specification for Chemical Admixtures for use in Producing Flowing Concrete
- C. NSF International (NSF)
1. NSF/ANSI Standard 61 - Drinking Water System Components - Health Effects
- D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. Reinforced concrete shall comply with ACI 318, and other stated requirements, codes, and standards. The most stringent requirement of the codes, standards, and this Section shall apply when conflicts arise.
- B. Only one source of cement and aggregate shall be used on any one structure. Concrete shall be uniform in color and appearance.
- C. Well in advance of placing concrete, discuss with the Engineer the sources of individual materials and batched concrete proposed for use. Discuss placement methods, waterstops, and curing. Propose methods of hot and cold weather concreting as required.
- D. A meeting shall be held before the placement of plasticized concrete. The plasticizer (high-range water-reducer) manufacturer's representative and the Contractor shall be available to discuss the properties and techniques of batching

and placing plasticized concrete. Services of the manufacturer's representative shall be at no additional cost to the District.

- E. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the Engineer may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. All changes so ordered shall be made at the Contractor's expense.
- F. If, during the progress of work, the materials from the sources originally accepted change in characteristics, the Contractor shall, at their expense, make new acceptance tests of aggregates and establish new design mixes.
- G. Testing of the following materials by an independent testing laboratory, acceptable to the Engineer, shall be engaged by and at the expense of the Contractor to verify conformity with this Specification Section and the stated ASTM Standard(s).
 - 1. Fine aggregates for conformity to ASTM C33 - sieve analysis, physical properties, and deleterious substances.
 - 2. Coarse aggregates for conformity to ASTM C33 - sieve analysis, physical properties, and deleterious substances.
 - 3. Cements for conformity to ASTM C150 - chemical analysis and physical properties.
 - 4. Cements, fine aggregates, coarse aggregates and admixtures for conformity to NSF/ANSI Standard 61.
 - 5. Proposed concrete mix design(s) - compressive strength, slump, shrinkage, and air content (entrapped + entrained).
- H. The Contractor shall provide field testing services of the concrete by an independent testing agency, acceptable to the Engineer but employed by and at the expense of the Contractor. Testing of the following items shall be performed to verify conformity with this Specification Section.
 - 1. Concrete placement - compressive strength (cylinders), compressive strength (cores), slump, air content, and shrinkage (concrete bars).
 - 2. Other materials or products that may come under question.
- I. All materials incorporated in the work shall conform to accepted samples.

1.06 DELIVERY, HANDLING, AND STORAGE

- A. Cement - Store cement in weathertight buildings, bins, or silos to provide protection from dampness and contamination and to minimize warehouse set.

- B. Aggregate - Arrange and use stockpiles to avoid excessive segregation or contamination with other materials or with other sizes of like aggregates. Complete each layer before the next is started. Do not use frozen or partially frozen aggregate.
- C. Sand - Arrange and use stockpiles to avoid contamination. Allow sand to drain to uniform moisture content before using. Do not use frozen or partially frozen sands.
- D. Admixtures - Store in closed containers to avoid contamination, evaporation, or damage. Provide suitable agitating equipment to assure uniform dispersion of ingredients in admixture solutions that tend to separate. Protect liquid admixtures from freezing and other temperature changes that could adversely affect their characteristics.
- E. Sheet Curing Materials - Store in weathertight buildings or off the ground and under cover.
- F. Liquid curing compounds - Store in closed containers.

1.07 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- B. Like items of materials shall be the end products of one manufacturer in order to provide standardization for appearance, maintenance, and manufacturer's services.

2.02 MATERIALS

- A. Materials shall comply with this Section and any applicable state or local requirements.
- B. Cement - Domestic Portland cement shall comply with ASTM C150 Type II. Air-entraining cement shall not be used. The cement brand shall be subject to approval by the Engineer and one brand shall be used throughout the Work. Cement shall be certified NSF/ANSI Standard 61 compliant.

- C. Fine Aggregates - Fine aggregates shall be washed inert natural sand conforming to the requirements of ASTM C33. Fine aggregates shall be certified NSF/ANSI Standard 61 compliant.
- D. Coarse Aggregates - Coarse aggregates shall be well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33. Grading requirements shall be as listed in ASTM C33 Table 2 for the specified coarse aggregate size number. Limits of deleterious substances and physical property requirements shall be as listed in ASTM C33 Table 3 for severe weathering regions. Size numbers for concrete mixes shall be as shown in Table 1 herein. Coarse aggregates shall be certified NSF/ANSI Standard 61 compliant.
- E. Water - Water shall be potable and free from injurious amounts of oil, acids, alkalis, salts, organic matter, or other deleterious substances. Use of reclaimed water or recycled water is not permitted.
- F. Admixtures - Admixtures shall be free of chlorides and alkalis (except for those attributable to water). When it is required to use more than one admixture in a concrete mix, the admixtures shall be from the same manufacturer. Admixtures shall be compatible with the concrete mix including other admixtures. Admixtures shall be certified NSF/ANSI Standard 61 compliant.
 - 1. Air-Entraining Admixture - The admixture shall comply with ASTM C260. Proportioning and mixing shall be in accordance with manufacturer's recommendations.
 - 2. Admixtures causing retarded or accelerated setting of concrete shall not be used without written approval from the Engineer. When allowed, the admixtures shall be retarding or accelerating water-reducing or high-range water-reducing admixtures.
 - 3. Water-Reducing Admixture - The admixture shall comply with ASTM C494, Type A. Proportioning and mixing shall be in accordance with manufacturer's recommendations.
 - 4. High-Range Water-Reducer (Plasticizer) - The admixture shall comply with ASTM C494, Type F and shall result in non-segregating plasticized concrete with little bleeding and with the physical properties of low water/cementitious ratio concrete. The treated concrete shall be capable of maintaining its plastic state in excess of 2 hours. Proportioning and mixing shall be in accordance with manufacturer's recommendations.
- G. Pozzolan (Fly Ash) - Use of Pozzolans within the concrete mix is not permitted.
- H. Granulated Ground Blast Furnace Slag (GGBFS) - Use of granulated ground blast furnace slag within the concrete mix is not permitted.
- I. Sheet Curing Material - Sheet curing material shall be waterproof paper, polyethylene film, or white burlap-polyethylene sheeting, all of which must comply with ASTM C171.

- J. Liquid Curing Compound - Liquid membrane-forming curing compound shall comply with the requirements of ASTM C309, Type 1-D (clear or translucent with fugitive dye) and shall contain no wax, paraffin, or oil. Curing compound shall be certified NSF/ANSI Standard 61 compliant (nontoxic and free of taste or odor).

2.03 CONCRETE MIXES

- A. Development of mix designs and testing shall be by an independent testing laboratory acceptable to the Engineer but engaged by and at the expense of the Contractor.
- B. Select proportions of ingredients to meet the design strength and materials limits specified in Table 1 and to produce concrete having proper placability, durability, strength, appearance and other required properties. Proportion ingredients to produce a homogenous mixture that will readily work into corners and angles of forms and around reinforcement without permitting materials to segregate or allowing excessive free water to collect on the surface.
- C. The design mix shall be based on standard deviation data of prior mixes with essentially the same proportions of the same constituents or, if such data is not available, be developed by a testing laboratory, acceptable to the Engineer, employed by and at the expense of the Contractor. Acceptance of mixes based on standard deviation shall be based on the modification factors for standard deviation tests contained in ACI 318. The water content of the concrete mix, determined by laboratory testing, shall be based on a curve showing the relation between water cementitious ratio and 7- and 28-day compressive strengths of concrete made using the proposed materials. The curves shall be determined by four or more points, each representing an average value of at least three test specimens at each age. The curves shall have a range of values sufficient to yield the desired data, including the specified design strengths as modified below, without extrapolation. The water content of the concrete mixes to be used, as determined from the curve, shall correspond to strengths 16 percent greater than the specified design strengths. The resulting mix shall not conflict with the limiting values for maximum water-cementitious ratio and net minimum cementitious content as specified in Table 1.
- D. Compression Tests - Provide testing of the proposed concrete mix or mixes to demonstrate compliance with the specified design strength requirements in conformity with the above paragraph.
- E. Shrinkage Tests - Perform shrinkage tests for Class D concrete. The tests shall conform to ASTM C157 as modified by ASTM C596. Concrete and not mortar specimens shall be used.
 - 1. The average shrinkage at 25 days of air storage shall not exceed 0.036 percent.

- F. Entrained air content, as measured by ASTM C231, shall be as shown in Table 1.
1. If the air-entraining agent proposed for use in the mix requires testing methods other than ASTM C231 to accurately determine air content, make special note of this requirement in the admixture submittal.
- G. Slump of the concrete as measured by ASTM C143, shall be as shown in Table 1. If a high-range water-reducer (plasticizer) is used, the slump indicated shall be that measured before plasticizer is added. Plasticized concrete shall have a slump ranging from 7 to 10 inches.
- H. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

TABLE 1
Concrete Mix Requirements

Class	Design Strength (1)	Cement (2)	Fine Aggregate (2)	Coarse Aggregate (3)	Cementitious Content lbs./cu. yd. (min) (4)	
A	2500	C150 Type II	C33	57	440	
B	3000	C150 Type II	C33	57	480	
D	4500	C150 Type II	C33	57	560	
Class	W/C Ratio (Max.) (5)	Fly Ash (6)	AE Range (7)	WR (8)	HR WR (9)	Slump Range Inches
A	0.62	No	3.5 to 5	Yes	No	1-4
B	0.54	No	3.5 to 5	Yes	No	1-3
D	0.44	No	3.5 to 5	Yes	No	3-5

NOTES:

- (1) Minimum compressive strength in pounds per square inch (psi) at 28 days
- (2) ASTM designation
- (3) Size Number in ASTM C33
- (4) Cementitious content in pounds per cubic yard
- (5) W/C is water-cementitious ratio by weight
- (6) Use of Pozzolans and/or GGBFS is not permitted
- (7) AE is percent air entrainment
- (8) WR is water-reducer admixture
- (9) HRWR is high-range water-reducer admixture

PART 3 EXECUTION**3.01 INSTALLATION****3.02 MEASURING MATERIALS**

- A. Concrete shall be composed of Portland cement, fine aggregate, coarse aggregate, water, and admixtures as specified and shall be produced by a plant acceptable to the Engineer. All constituents, including admixtures, shall be batched at the plant except a high-range water-reducer may be added in the field.
- B. Measure materials for batching concrete by weighing in conformity with and within the tolerances given in ASTM C94 except as otherwise specified. Scales shall have been certified by the local Sealer of Weights and Measures within one year of use.
- C. Measure the amount of free water in fine aggregates within 0.3 percent with a moisture meter. Compensate for varying moisture contents of fine aggregates. Record the number of gallons of water as batched on printed batching tickets.
- D. Admixtures shall be dispensed either manually using calibrated containers or measuring tanks, or by means of an automatic dispenser approved by the manufacturer of the specific admixture.
 - 1. Charge air-entraining and chemical admixtures into the mixer as a solution using an automatic dispenser or similar metering device.
 - 2. Inject multiple admixtures separately during the batching sequence.

3.03 MIXING AND TRANSPORTATION

- A. Concrete shall be ready-mixed concrete. No hand mixing will be permitted. Clean each transit mix truck drum and reverse drum rotation before the truck proceeds under the batching plant. Equip each transit-mix truck with a continuous, nonreversible, revolution counter showing the number of revolutions at mixing speeds.
- B. Ready-mix concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of their rated capacities as stated on the nameplate.
- C. Keep the water tank valve on each transit truck locked at all times. Any addition of water must be approved by the Engineer. Added water shall be incorporated by additional mixing of at least 35 revolutions. All added water shall be metered, and the amount of water added shall be shown on each delivery ticket. Addition of additional water is not permitted if any of the following occur:
 - 1. The maximum slump value listed in Table 1 is exceeded.
 - 2. The maximum water-cementitious ratio listed in Table 1 is exceeded.

3. More than 1/4 cubic yard of concrete has been discharged from the mixer/truck.
- D. All central plant and rolling stock equipment and methods shall comply with ACI 318 and ASTM C94.
- E. Select equipment of size and design to ensure continuous flow of concrete at the delivery end. Metal or metal-lined non-aluminum discharge chutes shall be used and shall have slopes not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long and chutes not meeting slope requirements may be used if concrete is discharged into a hopper before distribution.
- F. Retempering (mixing with or without additional cement, aggregate, or water) of concrete or mortar that has reached initial set will not be permitted.
- G. Handle concrete from mixer to placement as quickly as practicable while providing concrete of required quality in the placement area. Dispatch trucks from the batching plant so they arrive at the work site just before the concrete is required, thus avoiding excessive mixing of concrete while waiting, or delays in placing successive layers of concrete in the forms.
- H. Furnish a delivery ticket for ready-mixed concrete to the Engineer as each truck arrives. Each ticket shall provide a printed record of the weight of cement and each aggregate as batched individually. Use the type of indicator that returns for zero punch or returns to zero after a batch is discharged. Clearly indicate the weight of fine and coarse aggregate, cement, and water in each batch, the quantity delivered, the time any water is added, and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck. Indicate the number of revolutions of the truck mixer.

3.04 TEMPERATURE AND MIXING TIME CONTROL

- A. In cold weather, do not allow the as-mixed temperature of the concrete and concrete temperatures at the time of placement in the forms to drop below 40 degrees Fahrenheit.
- B. If water or aggregate has been heated, combine water with aggregate in the mixer before cement is added. Do not add cement to mixtures of water and aggregate when the temperature of the mixture is greater than 90 degrees Fahrenheit.
- C. In hot weather, cool ingredients before mixing to maintain temperature of the concrete below the maximum placing temperature of 90 degrees Fahrenheit. If necessary, substitute well-crushed ice for all or part of the mixing water.
- D. The maximum time interval between the addition of mixing water and/or cement to the batch and the placing of concrete in the forms shall not exceed the values shown in Table 2.

- E. If an approved high-range water-reducer (plasticizer) is used to produce plasticized concrete, the maximum time interval shall not exceed 90 minutes.

TABLE 2
Maximum Time to Discharge of Concrete

Air or Concrete Temperature (Whichever is higher)	Maximum Time (Minutes)
70 to 90 Degrees F (21 to 32 Degrees C)	60
40 to 69 Degrees F (5 to 20 Degrees C)	90

F = Fahrenheit, C = Celsius

3.05 CONCRETE APPEARANCE

- A. Concrete mix showing either poor cohesion or poor coating of the coarse aggregate with paste shall be remixed. If this does not correct the condition, the concrete shall be rejected. If the slump is within the allowable limit, but excessive bleeding, poor workability, or poor finishability are observed, changes in the concrete mix shall be obtained only by adjusting one or more of the following:
1. The gradation of the aggregate
 2. The proportion of fine and coarse aggregate
 3. The percentage of entrained air, within the allowable limits
- B. Concrete for the work shall provide a homogeneous structure which, when hardened, will have the required strength, durability and appearance. Mixtures and workmanship shall be such that concrete surfaces, when exposed, will require no finishing. When concrete surfaces are stripped, the concrete, when viewed in good lighting from 10 feet away, shall be pleasing in appearance, and at 20 feet shall show no visible defects.

3.06 PLACING AND COMPACTING

- A. Placing:
1. Placing of all concrete shall be in accordance with the recommendations contained in ACI 304R.
 2. Verify that all formwork completely encloses concrete to be placed and is securely braced before concrete placement. Remove ice, excess water, dirt, and other foreign materials from forms. Confirm that reinforcement and other embedded items are securely in place. Have a competent worker at the location of the placement that can assure that reinforcing steel and embedded items remain in designated locations while concrete is being placed. Sprinkle semi-porous sub grades or forms to eliminate suction of water from the mix. Seal extremely porous sub grades in an approved manner.
 3. Deposit concrete as near to its final position as possible to avoid segregation due to rehandling or flowing. Place concrete continuously at

a rate that ensures the concrete is being integrated with fresh plastic concrete. Do not deposit concrete that has partially hardened or has been contaminated by foreign materials or on concrete that has hardened sufficiently to cause formation of seams or planes of weakness within the section. If the section cannot be placed continuously, place construction joints as specified or as approved.

4. Pumping of concrete will be permitted. Use a mix design and aggregate sizes suitable for pumping and submit for approval.

B. Slabs:

1. After suitable bulkheads, screeds, and jointing materials have been positioned, the concrete shall be placed continuously between construction joints beginning at a bulkhead, edge form, or corner. Each batch shall be placed into the edge of the previously placed concrete to avoid stone pockets and segregation.
2. Avoid delays in casting. If there is a delay in casting, the concrete placed after the delay shall be thoroughly spaded and consolidated at the edge of that previously placed to avoid cold joints. Concrete shall then be brought to correct level and struck off with a straightedge. Bullfloats or darbies shall be used to smooth the surface, leaving it free of humps or hollows.
3. "Jitterbugs" shall not be used on slab surfaces to aid in finishing.

C. Compacting:

1. Consolidate concrete by vibration, puddling, spading, rodding, or forking so that concrete is thoroughly worked around reinforcement, embedded items and openings and into corners of forms. Puddling, spading, etc. shall be continuously performed along with vibration of the placement to eliminate air or stone pockets that may cause honeycombing, pitting, or planes of weakness.
2. All concrete shall be placed and compacted with mechanical vibrators. The number, type, and size of the units shall be approved by the Engineer in advance of placing operations. No concrete shall be ordered until sufficient approved vibrators (including standby units in working order) are on the job site.
3. A minimum frequency of 7,000 revolutions per minute is required for mechanical vibrators. Insert and withdraw vibrators vertically at points from 18 to 30 inches apart. At each insertion, vibrate sufficiently to consolidate concrete, generally from 5 to 15 seconds. Do not over-vibrate so as to segregate. Keep a spare vibrator on the site during concrete placing operations.
4. Concrete Slabs - Concrete for slabs less than 8 inches thick shall be consolidated with vibrating screeds; slabs greater than or equal to

8 inches thick shall be compacted with internal vibrators and (optionally) with vibrating screeds. Vibrators shall always be placed into concrete vertically and shall not be laid horizontally or laid over.

5. Amount of Vibration: Vibrators are to be used to consolidate properly placed concrete but shall not be used to move or transport concrete in the forms. Vibration shall continue until the following conditions are met:
 - a. The frequency returns to normal.
 - b. The surface appears liquefied, flattened, and glistening.
 - c. Trapped air ceases to rise.
 - d. Coarse aggregate has blended into the surface, but has not disappeared.

3.07 CURING AND PROTECTION

- A. Protect all concrete work against injury from the elements and defacements of any nature during construction operations.
- B. Curing Methods:
 1. Curing Methods for Concrete Surfaces - Cure concrete to retain moisture and maintain specified temperature at the surface for a minimum of 7 days after placement. Curing methods to be used are as follows:
 - a. Water Curing - Keep entire concrete surface wet by ponding, continuous sprinkling or covered with saturated burlap. Begin wet cure as soon as concrete attains an initial set and maintain continuous wet cure 24 hours a day.
 - b. Sheet Material Curing - Cover entire surface with sheet material. Securely anchor sheeting to prevent wind and air from lifting the sheeting or entrapping air under the sheet. Place and secure sheet as soon as initial concrete set occurs.
 - c. Liquid Membrane Curing - Apply curing compound over the entire concrete surface except for surfaces to receive additional concrete. Curing compound shall NOT be placed on any concrete surface where additional concrete is to be placed, where concrete sealers or surface coatings are to be used, or where the concrete finish requires an integral floor product. Curing compound shall be applied as soon as the free water on the surface has disappeared and no water sheen is visible, but not after the concrete is dry or when the curing compound can be absorbed into the concrete. Application shall be in compliance with the manufacturer's recommendations.

- C. Specified Applications of Curing Methods:
1. Slabs for Water Containment Structures - Use water curing only.
 2. Slabs on Grade and Footings (not used to contain water) - Water curing, sheet material curing, or liquid membrane curing shall be used.
 3. Structural Slabs (other than water containment), not including Slabs on Grade - Water curing or liquid membrane curing shall be used.
 4. Horizontal Surfaces that will Receive Additional Concrete, Coatings, Grout or Other Material that Requires Bond to the substrate - Water curing shall be used.
 5. Formed Surfaces - No curing shall be used if nonabsorbent forms are left in place 7 days. Water curing shall be used if absorbent forms are used. Sheet curing or liquid membrane curing shall be used if forms are removed before 7 days. Exposed horizontal surfaces of formed walls or columns shall be water cured for 7 days or until next placement of concrete is made. Concrete for formed water containment structures shall only be cured by water and sheet material curing.
 6. Concrete Joints - Water curing or sheet material curing shall be used.
- D. Finished surfaces and slabs shall be protected from the direct rays of the sun to prevent checking and crazing.

3.08 REMOVAL OF FORMS

- A. Except as otherwise specifically approved by the Engineer, forms shall not be removed before the concrete has attained a strength of at least 30 percent of its specified design strength, nor before reaching 100 degree days of curing for walls and vertical surfaces, and 500 degree days of curing for beams and slabs, (whichever is the longer). Degree days are defined as the total number of 24-hour periods multiplied by the weighted average daily air temperature at the surface of the concrete (e.g., 5 days at an average 70 degrees Fahrenheit = 350 degree days).
- B. Shores shall not be removed until the concrete has attained at least 60 percent of its specified design strength and also sufficient strength to support safely its own weight and construction live loads.

3.09 INSPECTION AND FIELD TESTING

- A. The batching, mixing, transporting, placing, and curing of concrete shall be subject to the inspection of the Engineer at all times. The Contractor shall advise the Engineer of their readiness to proceed at least 24 hours before each concrete placement. The Engineer will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing steel and the alignment, and the cleanliness and tightness of formwork. No placement shall be made without the inspection and acceptance of the Engineer.

- B. Sets of field control concrete cylinder specimens in compliance with ASTM C31 and concrete bars for shrinkage testing shall be taken during the progress of the work by an independent testing agency, acceptable to the Engineer, employed by and at the expense of the Contractor. The number of sets of concrete test cylinders taken of each class of concrete placed each day shall not be less than one set per day, nor less than one set for each 150 cubic yards of concrete, nor less than one set for each 3,000 square feet of surface area for slabs or walls. If the total volume of concrete were such that the frequency of testing required for a given class of concrete would provide less than five strength tests, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are anticipated.
- C. A "set" of test cylinders consists of six cylinders: two to be tested at 7 days and two to be tested and their strengths averaged at 28 days. The final two may be used for a special test at 3 days or to verify strength after 28 days if 28-day test results are low. The Contractor shall provide a copy of all concrete test results to the District for their review.
- D. When the average 28-day compressive strength of the cylinders in any set falls below the specified design strength or below proportional minimum 7-day strengths (where proper relationships between 7- and 28-day strengths have been established by tests), proportions, water content, or temperature conditions shall be changed to achieve the required strengths.
- E. The Contractor shall cooperate in the making of tests by allowing free access to the work for the selection of samples; providing an insulated, closed curing box for specimens; affording protection to the specimens against injury or loss through the operations; and furnishing material and labor required for the purpose of taking concrete cylinder samples. All shipping of specimens will be paid for by the Contractor. Curing boxes shall be acceptable to the Engineer.
- F. Concrete Slump:
 - 1. Slump tests will be made in the field immediately before placing the concrete by an independent testing agency, acceptable to the Engineer, employed by and at the expense of the Contractor. Such tests shall be made in accordance with ASTM C143. If the slump is greater than the specified range, the concrete shall be rejected.
 - 2. At a minimum the first three trucks shall be tested to establish consistency. Additionally, testing will be performed with each field control concrete cylinder test and each air content test.
 - 3. The Engineer reserves the right to increase the frequency of testing when deemed necessary.
- G. Air Content:
 - 1. Testing for air content shall be performed on a fresh concrete sample by an independent testing agency, acceptable to the Engineer, employed by and at the expense of the Contractor. Air content testing for concrete

made of ordinary aggregates having low absorption shall be performed in compliance with either the pressure method complying with ASTM C231 or by the volumetric method complying with ASTM C173. If lightweight aggregates or aggregates with high absorptions are used, the latter test method shall be used. If air content is below the specified air-entrainment range, air-entraining admixture may be added on-site to bring the concrete within specifications. If measured air content is above the specified air-entrainment range (+1.5 percent or more) listed in Table 1, the concrete shall be rejected.

2. At a minimum, the first three trucks shall be tested to establish consistency, then every third truck thereafter. Additionally, an air content test shall be performed with each field control concrete cylinder test. Samples for the testing of air content shall be taken at the point of placement and not at the truck chute/hopper.
3. The Engineer reserves the right to increase the frequency of testing when deemed necessary.

H. Shrinkage:

1. Field test specimens shall be handled and tested by an independent testing agency, acceptable to the Engineer, employed by and at the expense of the Contractor as specified herein under "Concrete Mixes."
 2. One set of three test specimens shall be made and tested from each placement of concrete for water containment structures.
 3. The maximum concrete shrinkage for specimens cast in the field shall not exceed the trial batch maximum shrinkage requirement by more than 25 percent.
 4. If the required shrinkage limitation is not met during construction, the Contractor shall take any or all of the following actions, at no additional cost to the District, to achieve the specified shrinkage requirements. These actions may include changing the source of aggregates, cement, and/or admixtures; reducing water content; washing of aggregate to reduce fines; increasing the number of construction joints; modifying the curing requirements; or other actions designed to minimize shrinkage or the effects of shrinkage.
- I. The Engineer may have cores taken from any questionable area in the concrete work such as construction joints and other locations as required for determination of concrete quality. The results of tests on such cores shall be the basis for acceptance, rejection, or determining the continuation of concrete work.
- J. The Contractor shall cooperate in obtaining cores by allowing free access to the work and permitting the use of ladders, scaffolding and such incidental equipment as may be required. The Contractor shall be responsible for the repair all core holes. The work of cutting and testing the cores will be at the expense of the Contractor.

3.10 FAILURE TO MEET REQUIREMENTS

- A. Should the strengths shown by test specimens made and tested in compliance with the previous provisions fall below the values given in Table 1, the Engineer shall have the right to require changes in proportions outlined to apply to the remainder of the work. Furthermore, the Engineer shall have the right to require additional curing on those portions of the structure represented by the test specimens that failed. The cost of such additional curing shall be at the Contractor's expense. In the event that such additional curing does not give the strength required, as evidenced by core and/or load tests, the Engineer shall have the right to require strengthening or replacement of those portions of the structure that fail to develop the required strength. The cost of all such core borings and/or load tests, and any strengthening or concrete replacement required because strengths of test specimens are below that specified, shall be entirely at the expense of the Contractor. In such cases of failure to meet strength requirements, the Contractor and Engineer shall confer to determine what adjustment, if any, can be made in compliance with Sections titled "Strength" and "Failure to Meet Strength Requirements" of ASTM C94. The "purchaser" referred to in ASTM C94 is the Contractor in this Section.
- B. When the tests on field control specimens of concrete fall below the specified strength, the Engineer will permit check tests for strengths to be made by means of typical cores drilled from the structure in compliance with ASTM C42 and C39. In the case of cores not indicating adequate strength, the Engineer, in addition to other recourses, may require, at the Contractor's expense, load tests on any one of the elements in which such concrete was used. Tests need not be made until concrete has aged 60 days.
- C. Should the strength of test cylinders fall below 60 percent of the required minimum 28-day strength, the concrete shall be rejected and shall be removed and replaced.

3.11 PATCHING AND REPAIRING

- A. This Section requires quality work including adequate forming, proper mixture and placement of concrete, and curing, so completed concrete surfaces will require no patching.
- B. Defective concrete in the opinion of the Engineer, and honeycombed areas shall be repaired in an approved manner and to the satisfaction of the Engineer.
- C. As soon as forms have been removed and the concrete surfaces exposed, fins and other projections shall be removed. All exposed surfaces shall be carefully examined, and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall be made until after inspection by the Engineer. In no case will extensive patching of honeycombed concrete be permitted. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall be repaired as specified herein. Concrete containing extensive voids, holes, honeycombing, or similar depression defects shall be completely removed and

replaced. The Contractor, at their own expense, shall promptly execute all repairs and replacements herein specified.

- D. Defective surfaces to be repaired as specified in above shall be cut back from true line a minimum depth of 1/2 inch over the entire area. Feathered edges will not be permitted. Where chipping or cutting tools are not required in order to deepen the area properly, the surface shall be prepared for bonding by the removal of all laitance or soft material and not less than 1/32 inch depth of the surface film from all hard portions, by means of an efficient sandblast. After cutting and sandblasting, the surface shall be wetted sufficiently in advance of shooting with shotcrete or with cement mortar so that while the repair material is being applied, the surfaces under repair will remain moist, but not so wet as to overcome the suction upon which a good bond depends. The material used for the repair proposed shall contain such proportion of Atlas White Portland Cement as is required to make the color of the patch match the color of the surrounding concrete.
- E. Recesses left by the removal of form ties shall be filled. Immediately after removal of forms, remove plugs and break off metal ties as required by Section 03100. Promptly fill holes upon stripping as follows: moisten the hole with water, followed by a 1/16-inch brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug the hole with a 1 to 1.5 mixture of cement and concrete sand mixed slightly damp to the touch (just short of "balling"). Hammer the grout into the hole until dense and an excess of paste appears on the surface in the form of a spider web. Trowel smooth with heavy pressure. Avoid burnishing.
- F. Surface defects that do not impair structural strength, in the opinion of the Engineer, shall be repaired in an approved manner and to the satisfaction of the Engineer. When patching exposed surfaces, the same source of cement and sand as used in the parent concrete shall be employed. Adjust color if necessary by addition of proper amounts of Atlas White Portland Cement. Rub lightly with fine Carborundum stone at an age of 1 to 5 days if necessary to bring the surface down to flush with the parent concrete. Exercise care to avoid damaging or staining the virgin skin of the surrounding parent concrete. Wash thoroughly to remove all rubbed matter.
- G. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete.

3.12 SCHEDULE

- A. Table 3 lists the general applications for the various concrete classes and design strengths.

TABLE 3
Concrete Schedule

Class	Design Strength (psi)	Description
A	2,500	Concrete fill and pipe, conduit and duct encasements
B	3,000	Concrete overlay slabs, sidewalks and pavements
D	4,500	Walls, slabs on grade, suspended slab and beam systems, columns, grade beams, footings, drilled piers and all other structural concrete

END OF SECTION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required to finish cast-in-place concrete surfaces as shown on the Drawings and as specified herein.

1.02 RELATED SECTIONS

- A. Section 03300 - Cast-in-Place Concrete
- B. Section 03600 - Grouts
- C. Section 03922 - Modifications and Repairs to Concrete
- D. Section 07100 - Dampproofing
- E. Section 09910 - Paints

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit to the Engineer, in accordance with the Standard and Special Provisions, product data showing materials of construction and details of application for the following:
 - 1. Concrete Sealer - Submit product data including catalogue cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards, and Safety Data Sheet. Confirmation that the sealer is compatible with additionally applied coatings shall also be submitted.
 - 2. Concrete Hardener - Submit product data including catalogue cuts, technical data, storage requirements, product life, application requirements, conformity to required ASTM standards, and Safety Data Sheet.

1.04 REFERENCE STANDARDS

- A. ASTM International (ASTM)
 - 1. ASTM C33 - Standard Specification for Concrete Aggregates
 - 2. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
 - 3. ASTM C779 - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces

- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. Finish:
 - 1. For concrete that will receive additional applied finishes or materials, the surface finish specified is required for the proper application of the specified manufacturer's products. Where alternate products are approved for use, determine if changes in finish are required and provide the proper finish to receive these products.
 - 2. Changes in finish made to accommodate products different from those specified shall be performed at no additional cost to the District. Submit the proposed new finish and their construction methods to the Engineer for review and approval.
- B. Services of Manufacturer's Representative:
 - 1. The Contractor shall make available, upon 72 hours notification, the services of a qualified field representative of the manufacturer of the curing compound, sealer, or hardener to instruct the user on the proper application of the product under the prevailing job conditions. Services of manufacturer's representative shall be at no additional cost to the District.

1.06 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 GENERAL

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

2.02 MATERIALS

- A. Concrete sealer shall comply with ASTM C309, Type 1, Class A or B. Concrete sealer must also be compliant with State of California VOC regulations. Concrete sealer shall be Spartan Cote WB II by Edoco (Burke), Kure-N-Seal WB by BASF Building Systems (Sonneborn), or equal.
- B. Concrete Hardener must be compliant with State of California VOC regulations. Concrete hardener shall be Mastercron by BASF Building Systems, Burke Non-Metallic Hardener by Edoco (Burke), or equal.

PART 3 EXECUTION**3.01 FORMED SURFACES**

- A. Forms shall not be removed before the requirements of Section 03300 have been satisfied.
- B. Exercise care to prevent damaging edges or obliterating the lines of chamfers, rustications, or corners when removing the forms or performing any other work adjacent thereto.
- C. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete.
- D. Rough-Formed Surfaces:
 - 1. Immediately after stripping forms and before concrete has changed color, carefully remove all fins and projections.
 - 2. Promptly fill holes left by tie cones and defects as specified in Section 03300.
- E. Rubbed Finish:
 - 1. Immediately upon stripping forms and before concrete has changed color, carefully remove all fins. While the wall is still damp apply a thin coat of medium-consistency neat cement slurry by means of bristle brushes to provide a bonding coat within all pits, air holes, or blemishes in the parent concrete. Avoid coating large areas with slurry at one time.
 - 2. Before slurry has dried or changed color, apply a dry (almost crumbly) grout proportioned by volume and consisting of 1 part cement to 1.5 parts of clean masonry sand having a fineness modulus of approximately 2.3 and complying with the gradation requirements of ASTM C33 for such a material. Grout shall be uniformly applied by means of damp pads of coarse burlap approximately 6 inches square used as a float. Scrub grout into the pits and air holes to provide dense mortar in all imperfections.
 - 3. Allow the mortar to partially harden for 1 or 2 hours depending upon the weather and ambient temperature. If the air is hot and dry, keep the wall damp during this period using a fine fog spray. When the grout is hardened sufficiently so it can be scraped from the surface with the edge of a steel trowel without damaging the grout in the small pits or holes, cut off all that can be removed with a trowel. (Caution: Grout allowed to remain on the wall too long will harden and will be difficult to remove).
 - 4. Allow the surface to dry thoroughly and rub it vigorously with clean, dry burlap to completely remove any dried grout. No visible film of grout shall remain after this rubbing. The entire cleaning operation for any area must be completed the day it is started. Do not leave grout on surfaces

overnight. Allow sufficient time for grout to dry after it has been cut off with the trowel so it can be wiped off clean with the burlap.

5. On the day following the repair of pits, air holes, and blemishes, the walls shall again be wiped clean with dry, used pieces of burlap containing old, hardened mortar, which will act as a mild abrasive. After this treatment, there shall be no built-up film remaining in the parent surface. If, however, such a film is present, a fine abrasive stone shall be used to remove all such material without breaking through the surface film of the original concrete. Such scrubbing shall be light and sufficient only to remove excess material without changing the texture of the concrete.
6. A thorough wash-down with stiff bristle brushes shall follow the final bagging or stoning operations. No extraneous materials shall remain on the surface of the wall. The wall shall be sprayed with a fine fog spray periodically to maintain a continually damp condition for at least 3 days after application of the repair grout.

F. Abrasive Blast Finish:

1. Coordinate with Rubbed Finish application. Do not begin until Rubbed Finish operation is complete or before concrete has reached minimum 7-day strength. The Rubbed Finish application may be deleted by the Engineer if the unfinished concrete surface is of superior quality. Apply the abrasive blast finish only where indicated on Drawings.
2. Prepare a sample area of minimum 4 feet high by 16 feet wide and blast finish as directed by Engineer on a portion of new wall construction that will not be exposed in the final work. The sample area shall contain a variety of finishes obtained with different nozzles, nozzle pressures, grit materials, and blasting techniques for selection by Engineer. The final accepted sample shall remain exposed until completion of all blast finish operations.
3. The blast finish operation shall meet all regulatory agency requirements. The blast finish Contractor shall be responsible for obtaining all required permits and/or licenses.
4. Perform abrasive blast finishing in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish on each surface or area of work. Maintain patterns or variances in depths of blast as present on the accepted sample.
5. Use an abrasive grit of proper type and gradation as well as equipment and technique to expose aggregate and surrounding matrix surfaces as follows:
 - a. Medium: Generally expose coarse aggregate - 1/4-inch to 3/8-inch reveal.

6. Abrasive blast corners and edge of patterns carefully, using back-up boards, to maintain uniform corner or edge line. Determine type of nozzle, nozzle pressure, and blasting techniques required to match Architect's samples.
7. Upon completion of the blast finish operation, thoroughly flush finished surfaces with clean, clear water to remove residual dust and grit. Allow to air dry until curing of concrete is complete.

3.02 FLOORS AND SLABS

A. Machine Float:

1. Screed floors and slabs with straightedges to the established grades shown on the Drawings. Immediately after final screeding, a dry cement/sand shake in proportion of two sacks of Portland cement to 350 pounds of coarse natural concrete sand shall be broadcast evenly over the surface at a rate approximately equal to 500 pounds per 1,000 square feet of floor area. Do not sprinkle neat, dry, cement on the surface.
2. The application of the cement/sand shake may be eliminated at the discretion of the Engineer if the base slab concrete exhibits adequate fattiness and homogeneity and the need is not indicated.
3. When the concrete has hardened sufficiently to support the weight of a power float without it digging into or disrupting the level surface, thoroughly float the shake into the surface with a heavy revolving disc type power compacting machine capable of providing 200-pound compaction force distributed over a 24 inch-diameter-disc.
4. Start floating along the walls and around columns and then move systematically across the surface, leaving a matte finish.
5. The compacting machine shall be a "Kelley Power Float with Compaction Control" as manufactured by Kelly Industries, or equal. Troweling machines equipped with float (shoes) blades that are slipped over the trowel blades may be used for floating. Floating with a troweling machine equipped with normal trowel blades will not be permitted. The use of any floating or troweling machine that has water attachments for wetting the concrete surface during finishing will not be permitted.

B. Hand Float:

1. In lieu of power floating, small areas may be compacted by hand floating. The dry cement/sand shake previously specified shall be used unless specifically eliminated by the Engineer. Screed the floors and slabs with straightedge to the established grades shown on the Drawings. While the concrete is still green, but sufficiently hardened as to support a finisher and kneeboards with no more than 1/4-inch indentation, float to a true,

even plane with no coarse aggregate visible. Use sufficient pressure on the floats to bring moisture to the surface.

C. Finishing Tolerances:

1. Level floors and slabs to a tolerance of plus or minus 1/8 inch when checked with a 10-foot straightedge placed anywhere on the slab in any direction. Where drains occur, pitch floors to drains such that there are no low spots left undrained. Failure to meet either of the above requirements shall be cause for removal, grinding, or other corrective measure as directed by the Engineer.

D. Broomed Finish:

1. Machine float concrete as specified above. When the concrete has stiffened sufficiently to maintain small surface indentations, draw a bristle broom lightly across the surface in the direction of drainage, or in the case of walks and stairs, perpendicular to the direction of traffic to provide a nonslip surface.

E. Steel Trowel Finish:

1. Machine float concrete as specified above, then hand steel trowel to a perfectly smooth hard even finish free from high or low spots or other defects.
2. Where concrete is greater than 15 feet in each direction, the Contractor may use a power steel trowel provided a minimum of three troweling passes are made of the entire surface.

3.03 CONCRETE SEALER

A. Prepare and seal floor surfaces indicated on the Drawings as follows:

1. Finish the concrete as specified in the preceding paragraphs and in accordance with the Schedule of Finishing in Paragraph 3.06 below.

B. Newly Placed Concrete:

1. Surface must be sound and properly finished. Surface is application-ready when it is damp, but not wet and can no longer be marred by a walking worker.

C. Newly Cured Bare Concrete:

1. Level any spots gouged out by trades. Remove all dirt, dust, droppage, oil, grease, asphalt, and foreign matter. Cleanse with caustics and detergents as required. Rinse thoroughly and allow to dry so that surface is no more than damp, and not wet.

D. Aged Concrete:

1. Restore surface soundness by patching, grouting, filling cracks, and holes, etc. Surface must also be free of any dust, dirt, and other foreign matter. Use power tools and/or strippers to remove any incompatible sealers or coatings. Cleanse as required, following the procedure indicated under cured concrete.

E. Methods:

1. Comply with the manufacturer's recommendations to apply sealer so as to form a continuous, uniform film by spray, soft-bristle push broom, long-nap roller, or lamb's wool applicator.

F. Applications:

1. Two coats are required for curing concrete. Apply the first coat evenly and uniformly as soon as possible after final finishing at the rate of 200 to 400 square feet per gallon. Apply the second coat when all trades are completed and the structure is ready for occupancy, at the rate of 400 to 600 square feet per gallon.
2. For sealing new concrete, both coats shall be applied full strength.
3. For sealing aged concrete, when renovating, dust proofing, and sealing, the first coat should be thinned 10 to 15 percent with reducer per manufacturer's directions.

3.04 CONCRETE HARDENER

A. Prepare and apply hardener to floor surfaces indicated on the Drawings as follows:

1. Finish the concrete as specified in the preceding paragraphs and in accordance with the "Schedule of Finishing" defined below.
2. Concrete floor hardener shall be applied to green (newly placed) concrete surfaces only.

B. Methods:

1. Comply with the manufacturer's recommendations in the application of the product.
2. Do not apply dry shake into the bleed water.

C. Applications:

1. The product shall be applied using a two-pass process ("shakes"). Using a mechanical spreader, spread approximately 1/2 to 2/3 of the required floor hardener evenly over the concrete surface.

2. If the Contractor chooses to broadcast the floor hardener by hand, in lieu of a mechanical spreader, apply each pass perpendicular to the previous application to better ensure complete coverage.
3. Apply the product in quantities prescribed for "medium duty," but not less than 100 pounds per 100 square feet.

3.05 APPROVAL OF FINISHING

- A. All concrete surfaces, when finished, will be inspected by the Engineer.
- B. Surfaces that do not meet the requirements in this Specification in the opinion of the Engineer shall be refinished or reworked to the satisfaction of the Engineer.
- C. After finishing horizontal surfaces, regardless of the finishing procedure specified, the concrete shall be cured in compliance with Section 03300, unless otherwise directed by the Engineer.

3.06 SCHEDULE OF FINISHING

- A. Concrete shall be finished as specified either to remain as natural concrete or to receive an additional applied finish or material under another Section.
- B. Concrete for the following conditions shall be finished as noted on the Drawings and as further specified herein:
 1. Concrete to receive dampproofing and waterproofing: Rough-Formed Finish
 2. Concrete not exposed to view and not scheduled to receive an additional applied finish or material: Rough-Formed Finish
 3. Exterior vertical concrete above grade, exposed to view (except surfaces formed with a form liner): Rubbed Finish
 4. Interior vertical concrete exposed to view except in water containment areas: Rubbed Finish
 5. Vertical concrete in water containment areas: Rubbed Finish on exposed surfaces and extending to 2 feet below normal operating water level; Rough-Formed Finish on remainder of submerged areas
 6. Interior and exterior underside of concrete exposed to view: Rubbed Finish
 7. Exterior surfaces exposed to view and indicated to have an abrasive blast finish: Abrasive Blast Finish
 8. Interior or exterior horizontal concrete not requiring floor hardener or sealer: Floated Finish

9. Interior or exterior horizontal concrete requiring floor hardener or sealer: See paragraphs titled "Concrete Sealer" and "Concrete Hardener" above, and prepare floor in accordance with manufacturer's recommendations
10. Concrete for exterior walks, interior and exterior stairs: Broomed Finish perpendicular to direction of traffic
11. Concrete slabs on which process liquids flow or in contact with sludge: Steel Trowel Finish
12. Concrete tank, basin, and channel bottoms to be covered with grout: See Section 03600

END OF SECTION

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PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install grout complete as shown on the Drawings and as specified herein.
- B. Perform all sampling and furnish all testing of materials and products by an independent testing laboratory acceptable to the Engineer but engaged by and at the expense of the Contractor.

1.02 RELATED SECTIONS

- A. Section 03200 - Concrete Reinforcement
- B. Section 03300 - Cast-in-Place Concrete
- C. Section 03922 - Modifications and Repairs to Concrete
- D. Section 05500 - Miscellaneous Metals

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit to the Engineer, in accordance with the Standard and Special Provisions, submittals including the following:
 - 1. Commercially Manufactured Nonshrink Cementitious Grout - Submit product data including catalogue cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards, and Safety Data Sheet.
 - 2. Commercially Manufactured Nonshrink Epoxy Grout- Submit product data including catalogue cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards, and Safety Data Sheet.
 - 3. Cement Grout - The submittal shall include the type and brand of the cement, the gradation of the fine aggregate, product data on any proposed admixtures, and the proposed mix of the grout.
 - 4. Concrete Grout - The submittal shall include data as required for concrete as delineated in Section 03300 and for fiber reinforcement as delineated in Section 03200. This includes the mix design, constituent quantities per cubic yard, and the water/cementitious ratio.

- C. Samples:
 - 1. Submit samples of commercially manufactured grout products when requested by the Engineer.
 - 2. Submit aggregates for use in concrete grout when requested by the Engineer.
- D. Laboratory Test Reports:
 - 1. Submit laboratory test data as required under Section 03300 for concrete to be used as concrete grout.
- E. Certifications:
 - 1. Certify that grout constituents in contact with water are NSF International/American National Standards Institute (NSF/ANSI) Standard 61 compliant, with certification from an independent ANSI/Environmental Laboratory Accreditation Program (ANSI/ELAP)-accredited testing laboratory acceptable to the Engineer but engaged by and at the expense of the Contractor.
 - 2. Certify that the Contractor is not associated with the independent testing laboratory, nor does the Contractor or its officers have a beneficial interest in the laboratory.

1.04 REFERENCE STANDARDS

- A. ASTM International (ASTM)
 - 1. ASTM C531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
 - 2. ASTM C579 - Standard Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
 - 3. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures
 - 4. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
 - 5. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics
- B. NSF International (NSF)
 - 1. NSF/ANSI Standard 61 - Drinking Water System Components - Health Effects

- C. US Army Corps of Engineers (CRD)
 - 1. CRD-C 621 - Corps of Engineers Specification for Nonshrink Grout
- D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. Qualifications - Grout manufacturer shall have a minimum of 10 years experience in the production and use of the type of grout proposed for the work.
- B. Pre-Installation Conference - Well in advance of grouting, hold a pre-installation meeting to review the requirements for surface preparation, mixing, placing, and curing procedures for each product proposed for use. Notify the Engineer as well as all parties concerned with the grouting of the meeting at least 10 days before its scheduled date.
- C. Services of Manufacturer's Representative - A qualified field technician of the nonshrink grout manufacturer, specifically trained in the installation of the products, shall attend the pre-installation conference and shall be present for the initial installation of each type of nonshrink grout. Additional services shall also be provided, as required, to correct installation problems. Services of manufacturer's representative shall be provided at no additional cost to the District.
- D. Field Testing - The field testing of Concrete Grout shall be as specified for concrete in Section 03300.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the jobsite in original, unopened packages, clearly labeled with the manufacturer's name, product identification, batch numbers, and printed instructions.
- B. Store materials in full compliance with the manufacturer's recommendations. Total storage time from date of manufacture to date of installation shall be limited to 6 months or the manufacturer's recommended storage time, whichever is less.
- C. Material that becomes damp or otherwise unacceptable shall be immediately removed from the site and replaced with acceptable material at no additional expense to the District.
- D. Nonshrink, cement-based grouts shall be delivered as pre-blended, prepackaged mixes requiring only the addition of water.
- E. Nonshrink epoxy grouts shall be delivered as pre-measured, prepackaged, three-component systems requiring only blending as directed by the manufacturer.

1.07 DEFINITIONS

- A. Nonshrink Grout - A commercially manufactured product that does not shrink in either the plastic or hardened state, is dimensionally stable in the hardened state, and bonds to a clean baseplate.

1.08 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS**2.01 GENERAL**

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- B. All like materials shall be the products of one manufacturer or supplier in order to provide standardization of appearance.

2.02 MATERIALS

- A. Nonshrink Cementitious Grout:
 - 1. Nonshrink cementitious grouts shall meet or exceed the requirements of ASTM C1107, Grades B or C and CRD-C 621. Grouts shall be Portland cement-based, contain a pre-proportioned blend of selected aggregates and shrinkage-compensating agents and shall require only the addition of water. Nonshrink cementitious grouts shall not contain expansive cement or metallic particles. The grouts shall exhibit no shrinkage when tested in conformity with ASTM C827. The minimum 28-day compressive strength of 5,000 pounds per square inch (psi) is required for all nonshrink cementitious grout.
 - 2. General purpose nonshrink cementitious grout shall conform to the standards stated above and shall be SikaGrout 212 by Sika Corp.; NS Grout by The Euclid Chemical Co.; FSP Construction Grout by Five Star Products Inc.; or equal.
 - 3. Flowable (Precision) nonshrink cementitious grout shall conform to the standards stated above and shall be Masterflow 928 by BASF Building Systems; Hi-Flow Grout by the Euclid Chemical Co.; SikaGrout 212 by Sika Corp.; Five Star Grout, by Five Star Products Inc.; or equal.

B. Nonshrink Epoxy Grout:

1. Nonshrink epoxy-based grout shall be a pre-proportioned, three-component, 100 percent solids system consisting of epoxy resin, hardener, and blended aggregate. It shall have a minimum compressive strength of 10,000 psi in 7 days when tested in accordance with ASTM C579, Method B, and have a maximum thermal expansion of 30E6 when tested in accordance with ASTM C531. The grout shall be Masterflow 648 CP by BASF Building Systems; Five Star HP Epoxy Grout by Five Star Products, Inc.; Sikadur 42 Grout-Pak by Sika Corp.; E3-HP by the Euclid Chemical Co.; or equal.

C. Cement Grout:

1. Cement grouts shall be a mixture of one part Portland cement conforming to ASTM C150 Types I, II, or III and one to two parts concrete sand conforming to ASTM C33 with sufficient water to place the grout. The water content shall be sufficient to impart workability to the grout but not to the degree that it will allow the grout to flow.

D. Concrete Grout:

1. Concrete grout shall conform to the requirements of Section 03300 except as specified herein. It shall be proportioned with cement, coarse and fine aggregates, water, water reducer, high-range water-reducer (if required), and synthetic reinforcing fibers to produce a mix having an average strength of 2,900 psi at 28 days, or 2,500 psi nominal strength. Coarse aggregate size shall be 3/8 inch maximum. Slump shall not exceed 5 inches and shall be low as practical yet still retain sufficient workability.
2. Synthetic reinforcing fibers as specified in Section 03200 shall be added to the concrete grout mix at the rate of 1.5 pounds of fibers per cubic yard of grout. Fibers shall be added from the manufacturer's premeasured bags and according to the manufacturer's recommendations in a manner that will ensure complete dispersion of the fiber bundles as single monofilaments within the concrete grout.

E. Water:

1. Water shall be potable, free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances. Use of reclaimed or recycled water is not permitted.

PART 3 EXECUTION**3.01 PREPARATION**

- A. Grout shall be placed over cured concrete that has attained its full design strength unless otherwise approved by the Engineer.

- B. Concrete surfaces to receive grout shall be clean and sound; free of ice, frost, dirt, grease, oil, curing compounds, laitance, and paints; and free of all loose material or foreign matter that may affect the bond or performance of the grout.
- C. Roughen concrete surfaces by sandblasting or hydroblasting to ensure bond of the grout to the concrete. Remove loose or broken concrete. Irregular voids or projecting coarse aggregate need not be removed if they are sound, free of laitance, and firmly embedded into the parent concrete.
 - 1. Air compressors used to clean surfaces in contact with grout shall be the oilless type or equipped with an oil trap in the airline to prevent oil from being blown onto the surface.
 - 2. Use of mechanical means (scabbling, scarifying, chipping etc.) may only be used for concrete beneath baseplates and with prior approval of the Engineer. Roughening of concrete by mechanical means for large concrete areas to receive concrete grout is not permitted.
- D. Remove all loose rust, oil, or other deleterious substances from metal embedments or bottom of baseplates before the installation of the grout.
- E. Concrete surfaces shall be washed clean and then kept moist for at least 24 hours before the placement of cementitious or cement grout. Saturation may be achieved by covering the concrete with saturated burlap bags, use of a soaker hose, flooding the surface, or other method acceptable to the Engineer. Upon completion of the 24-hour period, visible water shall be removed from the surface before grouting. The use of an adhesive bonding agent in lieu of surface saturation shall only be used when approved by the Engineer for each specific location of grout installation.
- F. Epoxy-based grouts do not require the saturation of the concrete substrate. Surfaces in contact with epoxy grout shall be completely dry before grouting.
- G. Construct grout forms or other leak proof containment as required. Forms shall be lined or coated with release agents recommended by the grout manufacturer. Forms shall be of adequate strength, securely anchored in place and shored to resist the forces imposed by the grout and its placement.
 - 1. Forms for epoxy grout shall be designed to allow the formation of a hydraulic head and shall have chamfer strips built into forms.
- H. Level and align the structural elements and/or equipment bearing plates in accordance with the structural requirements and the recommendations of the equipment manufacturer.
- I. Equipment shall be supported during alignment and installation of grout by shims, wedges, blocks, or other approved means. The shims, wedges, and blocking devices shall be prevented from bonding to the grout by appropriate bond breaking coatings and removed after grouting unless otherwise approved by the Engineer.

3.02 INSTALLATION - GENERAL

- A. Mix, apply, and cure products in strict compliance with the manufacturer's recommendations and this Section.
- B. Have sufficient manpower and equipment available for rapid and continuous mixing and placing. Keep all necessary tools and materials ready and close at hand.
- C. Maintain temperatures of the foundation plate, supporting concrete, and grout between 40- and 90-degrees Fahrenheit during grouting and until grout compressive strength reaches 1,000 psi or as recommended by the grout manufacturer, whichever is longer. Take precautions to minimize differential heating or cooling of baseplates and grout during the curing period.
- D. Take special precautions for hot weather or cold weather grouting as recommended by the manufacturer when ambient temperatures and/or the temperature of the materials in contact with the grout are outside of the 60–90 degrees Fahrenheit range.
- E. Install grout in a manner that will preserve the isolation between the elements on either side of the joint where grout is placed in the vicinity of an expansion joint (EJ) or partial contraction joint (PCJ).
- F. Reflect all existing underlying expansion joints, partial contraction joints, and construction joints (CJ) through the grout.

3.03 INSTALLATION - CEMENT GROUTS AND NONSHRINK CEMENTITIOUS GROUTS

- A. Mix in accordance with manufacturer's recommendations. Do not add cement, sand, pea gravel, or admixtures without prior approval by the Engineer.
- B. Avoid mixing by hand. Mixing in a mortar mixer (with moving blades) is recommended. Pre-wet the mixer and empty excess water. Add pre-measured amount of water for mixing, followed by the grout. Begin with the minimum amount of water recommended by the manufacturer and then add the minimum additional water required to obtain workability. Do not exceed the manufacturer's maximum recommended water content.
- C. Placements greater than 3 inches in depth shall include the addition of clean washed pea gravel to the grout mix when approved by the manufacturer. Comply with the manufacturer's recommendations for the size and amount of aggregate to be added. Place grout into the designated areas in a manner that will avoid segregation or entrapment of air. Do not vibrate grout to release air or to consolidate the material. Placement should proceed in a manner that will ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.
- D. Place grout rapidly and continuously to avoid cold joints. Do not place cement grouts in layers. Do not add additional water to the mix (retemper) after initial stiffening.

- E. Just before the grout reaches its final set, cut back the grout to the substrate at a 45-degree angle from the lower edge of the bearing plate unless otherwise approved by the Engineer. Finish this surface with a wood float (brush) finish.
- F. Begin curing immediately after form removal, cutback, and finishing. Keep grout moist and within its recommended placement temperature range for at least 24 hours after placement or longer if recommended by the manufacturer. Saturate the grout surface by use of wet burlap, soaker hoses, ponding, or other approved means. Provide sunshades as necessary. If drying winds inhibit the ability of a given curing method to keep grout moist, erect wind breaks until wind is no longer a problem or curing is finished.

3.04 INSTALLATION - NONSHRINK EPOXY GROUTS

- A. Mix in accordance with the procedures recommended by the manufacturer. Do not vary the ratio of components or add solvent to change the consistency of the grout mix. Do not over mix. Mix full batches only to maintain proper proportions of resin, hardener, and aggregate.
- B. Monitor ambient weather conditions and contact the grout manufacturer for special placement procedures to be used for temperatures below 60 or above 90 degrees Fahrenheit.
- C. Place grout into the designated areas in a manner that will avoid entrapment of air. Placement methods shall ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.
- D. Minimize "shoulder" length (extension of grout horizontally beyond baseplate). In no case shall the shoulder length of the grout be greater than the grout thickness.
- E. Finish grout by puddling to cover all aggregate and provide a smooth finish. Break bubbles and smooth the top surface of the grout in conformity with the manufacturer's recommendations.
- F. Epoxy grouts are self-curing and do not require the application of water. Maintain the formed grout within its recommended placement temperature range for at least 24 hours after placing, or longer if recommended by the manufacturer.

3.05 INSTALLATION - CONCRETE GROUT

- A. Screed underlying concrete to the grade shown on the Drawings. Provide the surface with a broomed finish, aligned to drain. Protect and keep the surface clean until placement of the concrete grout.
- B. Remove the debris and clean the surface by sweeping and vacuuming all dirt and other foreign materials. Wash the slab with water using equipment capable of delivering a minimum water pressure of 8,000 psi. Flushing of debris into tank drain lines will not be permitted.

- C. Saturate the concrete surface for at least 24 hours before placement of the concrete grout. Saturation may be maintained by ponding, by the use of soaker hoses, or by other methods acceptable to the Engineer. Remove excess water just before placement of the concrete grout. Place a cement slurry immediately ahead of the concrete grout so that the slurry is moist when the grout is placed. Work the slurry over the surface with a broom until it is coated with an approximately 1/16 to 1/8-inch-thick cement paste. (A bonding agent composed of one part Portland cement, 1.5 parts fine sand, an approved bonding admixture, and water, mixed to achieve the consistency of thick paint, may be substituted for the cement slurry.)
- D. Provide grout control joints as indicated on the Drawings.
- E. Finish and cure the concrete grout as specified for cast-in-place concrete.

3.06 SCHEDULE

- A. General Purpose Nonshrink Cementitious Grout - Use at all locations where nonshrink grout is called for on the Drawings except for baseplates greater in area than 3 feet wide by 3 feet long and except for the setting of anchor rods, anchor bolts, or reinforcing steel in concrete.
- B. Flowable Nonshrink Cementitious Grout - Use under all baseplates greater in area than 3 feet by 3 feet. Use at all locations indicated to receive flowable nonshrink grout on the Drawings. The Contractor, at his/her option and convenience, may substitute flowable nonshrink grout for general purpose nonshrink cementitious grout.
- C. Nonshrink Epoxy Grout - Use at all locations specifically indicated to receive epoxy grout.
- D. Cement Grout - Cement grout may be used for grouting of incidental baseplates for structural and miscellaneous steel such as post baseplates for platforms, baseplates for beams, etc. It shall not be used when nonshrink grout is specifically called for on the Drawings or for grouting of primary structural steel members such as columns and girders.
- E. Concrete Grout - Use for overlaying the base concrete under scraper mechanisms of clarifiers, under scraper mechanisms of sedimentation basins, in screw pump troughs, or to allow more control in placing the surface grade. Use at all locations indicated on the Drawings to receive concrete grout.

END OF SECTION

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PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required to cut, remove, repair, or otherwise modify parts of existing concrete structures as shown on the Drawings and as specified herein as necessary to complete the Work. Work under this Section shall also include bonding new concrete to existing concrete.
- B. Work on the project shall conform to all the requirements of ACI Specification 503.7, "Specification for Crack Repair by Epoxy Injection," published by the American Concrete Institute, except as modified by these Contract Documents.

1.02 RELATED SECTIONS

- A. Section 03200 - Concrete Reinforcement
- B. Section 03300 - Cast-in-Place Concrete
- C. Section 03600 - Grouts
- D. Section 05500 - Miscellaneous Metals

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit to the Engineer, in accordance with the Standard and Special Provisions, submittals including the following:
 - 1. Submit manufacturer's technical literature on all product brands proposed for use by the Contractor, to the Engineer for review. The submittal shall include the manufacturer's installation and/or application instructions.
 - 2. When substitutions for acceptable brands of materials specified herein are proposed by the Contractor, submit brochures and technical data of the proposed substitutions to the Engineer for review and approval before delivery to the jobsite.
 - 3. Certify that constituents in contact with water are NSF International/American National Standards Institute (NSF/ANSI) Standard 61 compliant, with certification from an independent ANSI/Environmental Laboratory Accreditation Program (ANSI/ELAP)-accredited testing laboratory acceptable to the Engineer but engaged by and at the expense of the Contractor.

1.04 REFERENCE STANDARDS

- A. American Concrete Institute (ACI)
 - 1. ACI 503.7 - Specification for Crack Repair by Epoxy Injection
- B. ASTM International (ASTM)
 - 1. ASTM C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
 - 2. ASTM C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear
 - 3. ASTM D570 - Standard Test Method for Water Absorption of Plastics
 - 4. ASTM D638 - Standard Test Method for Tensile Properties of Plastics
 - 5. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics
 - 6. ASTM D732 - Standard Test Method for Shear Strength of Plastics by Punch Tool.
 - 7. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic and Electrical Insulating Materials
- C. NSF International (NSF)
 - 1. NSF/ANSI Standard 61 - Drinking Water System Components, Health Effects
- D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. No existing structure or concrete shall be shifted, cut, removed, or otherwise altered until the Engineer gives authorization.
- B. When removing materials or portions of existing structures and when making openings in existing structures, all precautions shall be taken and all necessary barriers, shoring and bracing, and other protective devices shall be erected to prevent damage to the structures beyond the limits necessary for the new work; protect personnel; control dust; and prevent damage to the structures or contents by falling or flying debris. Unless otherwise permitted, shown or specified, line drilling will be required in cutting existing concrete.
- C. Manufacturer Qualifications: The manufacturer of the specified products shall have a minimum of 10 years' experience in the manufacture of such products and shall have an ongoing program of training, certifying, and technically supporting the Contractor's personnel.

- D. Contractor Qualifications: Contractors shall complete a program of instruction in the application of the approved manufacturer's material specified in this Section and provide certification from the manufacturer attesting to their training and status as an approved applicator.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the jobsite in original, unopened packages, clearly labeled with the manufacturer's name, product identification, batch numbers, and printed instructions.
- B. Store materials in full compliance with the manufacturer's recommendations.

1.07 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Items.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- B. Materials shall comply with this Section and any applicable federal, state and/or local requirements.

2.02 EQUIPMENT

- A. The following equipment is associated with demolition activities associated with minor modifications and repairs to concrete elements.
- B. Mechanical Scarifying Equipment
 - 1. The scarifying equipment shall be a power-operated, mechanical scarifier capable of uniformly scarifying or removing the existing overlay materials from the foundation slabs to the depths required. The equipment shall be self-propelled with sufficient power, traction, and stability to maintain accurate depth of cut and slope.
- C. Handheld Blast-Cleaning Equipment
 - 1. Handheld blast-cleaning equipment shall be either sand or water as necessary to expose fine and coarse aggregates, thoroughly clean all exposed reinforcing steel, and remove any unsound overlay material or laitance layers from the existing surface. If sandblasting is utilized, the equipment shall have oil traps. If water-blasting equipment is utilized, the

equipment must be capable of delivering a minimum water pressure of 8,000 pounds per square inch.

D. Power-Driven Hand Tools

1. Power driven hand tools and jackhammers will be permitted but shall not be heavier than the nominal 35-pound (lb) class. Chipping hammers shall not be heavier than the nominal 15-lb class. Only hand chipping tools shall be used when removing concrete within 1 inch of reinforcing steel. Mechanically driven tools shall be operated at a maximum angle of 45 degrees to the slab or wall surface.

2.03 MATERIALS

A. Epoxy Bonding Agent:

1. Epoxy bonding agent shall be a two-component, solvent-free, moisture-insensitive epoxy resin material used to bond plastic concrete to hardened concrete complying with the requirements of ASTM C881, Type II.
2. Color shall be concrete gray.
3. Product shall be Sikadur 32 Hi-Mod by Sika Corporation or equal.

B. Epoxy Paste:

1. Epoxy paste shall be a two-component, solvent-free, moisture insensitive epoxy-resin material used to bond dissimilar materials to concrete in situations such as setting railing posts into hardened concrete and shall comply with the requirements of ASTM C881, Type I, Grade 3. Epoxy paste may also be used to patch existing surfaces where the glue line is 1/8 inch or less.
2. Color shall be concrete gray.
3. Product shall be Sikadur 31 Hi-Mod Gel by Sika Corporation or equal.

C. Nonshrink Grout and Nonshrink Epoxy Grout shall be as specified in Section 03600.

D. Post-installed concrete adhesive for setting dowels and/or anchor rods into hardened concrete shall be as specified in Section 05500.

E. Crack Repair Epoxy Adhesive:

1. Crack Repair Epoxy Adhesive shall be a two-component, solvent-free moisture insensitive epoxy-resin material suitable for crack grouting by injection or gravity feed. Crack Repair Epoxy Adhesive shall be formulated for the specific size of opening or crack being injected.

2. For standard applications, product shall be Sikadur 35 Hi-Mod LV by Sika Corporation or equal.

PART 3 EXECUTION

3.01 GENERAL

- A. Cut, repair, reuse, demolish, excavate or otherwise modify parts of the existing structures, as indicated on the Drawings, specified, or necessary to permit completion of the Work. Finishes, joints, reinforcements, sealants, etc. are specified in other Sections of this Specification. All work shall comply with other requirements of this Section and as shown on the Drawings.
- B. All commercial products specified in this Section shall be stored, mixed, and applied in strict compliance with the manufacturer's recommendations.
- C. In all cases where concrete is repaired in the vicinity of an expansion joint (EJ) or partial contraction joint (PCJ), the repairs shall be made to preserve the isolation between components on either side of the joint.
- D. When drilling holes for dowels/bolts at new or existing concrete, drilling shall stop if rebar is encountered. As approved by the Engineer, the hole location shall be relocated to avoid rebar. The Contractor shall not cut rebar without prior approval of the Engineer. Where possible, rebar locations shall be identified before drilling using non-destructive methods, "rebar locators," so that drilled hole locations may be adjusted to avoid rebar interference.
- E. When coring new openings at new or existing concrete, the Contractor shall identify existing rebar locations using non-destructive methods, "rebar locators." Where possible and as approved by the Engineer, the Contractor shall locate the new hole to avoid and/or minimize rebar interference. The Contractor shall not cut existing rebar without prior approval from the Engineer.

3.02 CONCRETE REMOVAL

- A. Unless otherwise noted, concrete designated to be removed to specific limits as shown on the Drawings or directed by the Engineer shall be removed by line drilling at limits followed by chipping or jack-hammering as appropriate in areas where concrete is to be taken out. Remove concrete in such a manner that surrounding concrete or existing reinforcing to be left in place and existing in place equipment is not damaged. Sawcutting at limits of concrete to be removed shall only be done if indicated on the Drawings, or after obtaining written approval from the Engineer.
- B. Where the joint between new concrete or grout and existing concrete will be exposed in the finished work, the edge of concrete removal shall be a 1-inch-deep saw-cut on each exposed surface of the existing concrete.
- C. Where existing reinforcing is exposed due to saw-cutting/core-drilling and no new material is to be placed on the saw-cut surface, a coating or surface treatment of epoxy paste shall be applied to the entire cut surface to a thickness of 1/4 inch.

- D. Concrete specified to be left in place that is damaged by the Contractor, in the opinion of the Engineer, shall be repaired by approved means to the satisfaction of the Engineer at the Contractor's expense.
- E. The Engineer may from time to time direct the Contractor to make additional repairs to existing concrete. These repairs shall be made as specified or by such other methods as may be appropriate.

3.03 CONNECTION SURFACE PREPARATION

- A. Connection surfaces shall be prepared as specified below for concrete areas requiring patching, repairs, or modifications as shown on the Drawings, as specified, or as directed by the Engineer.
- B. Remove all deteriorated materials, dirt, oil, grease, and all other bond-inhibiting materials from the surface by hydro-blasting or sand/shot-blasting, as approved by the Engineer. Surfaces shall be roughened to a full amplitude of at least 1/2-inch depth. Irregular voids or surface stones need not be removed if they are sound, free of laitance, and firmly embedded into parent concrete, subject to the Engineer's final inspection. If impact removal techniques are employed (e.g., bush-hammering, scrabbling, jackhammering, etc.), subsequent removal of the micro-fractured surface by hydro-blasting, shot-blasting, or by wet or dry sandblasting shall be required.
- C. If reinforcing steel is exposed, it must be mechanically cleaned to remove all contaminants, rust, etc., as approved by the Engineer. If half of the diameter of the reinforcing steel is exposed, chip out behind the steel. The distance chipped behind the steel shall be a minimum of 1/2 inch. Reinforcing to be saved shall not be damaged during the demolition operation.
- D. Reinforcing from existing demolished concrete that is shown to be incorporated in new concrete shall be cleaned by mechanical means to remove all loose material and products of corrosion before proceeding with the repair. It shall be cut, bent, or lapped to new reinforcing as shown on the Drawings and provided with 1-inch minimum cover all around.
- E. The following are specific concrete surface preparation and connection "methods" to be used where called for on the Drawings, specified or as directed by the Engineer.
 - 1. Method A - After the existing concrete surface at the connection has been roughened and cleaned, thoroughly saturate and maintain saturation for a period of at least 12 hours. Remove excess water just before placement of the concrete. Place a cement paste immediately ahead of the concrete so that the paste is moist when the concrete is placed. Work the paste over the surface until it is coated with an approximately 1/16-inch layer of cement paste. Immediately after application of cement paste, place new concrete or grout mixture as detailed on the Drawings.
 - 2. Method B - After the existing concrete surface has been roughened and cleaned, apply epoxy bonding agent at connection surface. The field

preparation and application of the epoxy bonding agent shall comply strictly with the manufacturer's recommendations. Place new concrete or grout mixture to limits shown on the Drawings within time constraints recommended by the manufacturer to ensure bond.

3. Method C - Post-installed concrete adhesive dowels shall be set in existing concrete by drilling holes to the required depth to develop the full tensile and shear strengths of the dowel material being used. The post-installed concrete adhesive system shall be installed per the manufacturer's recommendation in holes sized as required. Unless otherwise shown on the Drawings, deformed dowels shall be drilled and set to a depth of 10 bar diameters and smooth dowels shall be drilled and set to a depth of 15 bar diameters. The dowel may be installed in horizontal or vertical positions as indicated on the Drawings.
4. Method D - This method is a combination of Methods B and C.

3.04 GROUTING

- A. Grouting shall be as specified in Section 03600.

3.05 CRACK REPAIR

- A. Cracks on horizontal surfaces shall be repaired by gravity feeding crack repair adhesive into cracks per manufacturer's recommendations. If cracks are less than 1/16 inch in thickness, they shall be pressure injected.
- B. Cracks on vertical surfaces shall be repaired by pressure injecting crack repair adhesive through valves sealed to the surface with crack repair epoxy adhesive per manufacturer's recommendations.

END OF SECTION

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PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install all miscellaneous metal complete as shown on the Drawings and as specified herein.

1.02 RELATED SECTIONS

- A. Section 03200 - Concrete Reinforcement
- B. Section 03300 - Cast-in-Place Concrete
- C. Section 03600 - Grouts
- D. Section 03922 - Modifications and Repairs to Concrete
- E. Section 05510.10 - Modification of Existing Aluminum Stairs
- F. Section 05520 - Handrails and Guardrails
- G. Section 09910 - Paints

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit to the Engineer, in accordance with the Standard and Special Provisions, product data showing materials of construction and details of installation.
- C. Welding Procedures - Contractor shall submit Welding Procedure Specification (WPS) and Procedure Qualification Records (PQR) for all welding joint types, as applicable.
- D. An ICC-ES report listing the capacity in tension and shear for each size and type of post-installed concrete anchor used shall be submitted to the Engineer for review.
- E. Contractor shall submit Manufacturer's Printed Installation Instructions (MPII) for all mechanical and adhesive anchors for Engineer's review. Upon favorable review by the Engineer, these instructions shall be followed explicitly.
- F. No substitution for the indicated post-installed mechanical or adhesive anchors will be considered by the Engineer unless accompanied with an ICC-ES report verifying strength and material equivalency.
- G. Certificates:
 - 1. Submit certification that welders are qualified in accordance with AWS on field welding procedures to be used.

2. Submit certification that adhesive anchor installers are qualified in accordance with the American Concrete Institute/Concrete Reinforcing Steel Institute (ACI/CRSI) Adhesive Anchor Installer Certification program.

1.04 REFERENCE STANDARDS

A. Federal Specifications:

1. DOD-P-21035 - Paint, High Zinc Dust Content, Galvanizing Repair
2. FF-B-575C - Bolts, Hexagonal and Square
3. MIL-G-18015 A (3) - (Ships) Aluminum Planks (6063-T6)
4. MIL-A-907E - Antiseize Thread Compound, High Temperature
5. MIL-P-26915 - Primer Coating, Zinc Dust Pigment

B. American Association of State Highway and Transportation Officials (AASHTO):

1. Standard Specifications for Highway Bridges - HL93 (HS20) Truck Loading

C. American Concrete Institute (ACI):

1. ACI 355.2 - Qualification of Post-Installed Mechanical Anchors in Concrete
2. ACI 355.4 - Qualification of Post-Installed Adhesive Anchors in Concrete

D. American Institute of Steel Construction (AISC):

1. Steel Construction Manual

E. ASTM International (ASTM):

1. ASTM A36 - Standard Specification for Carbon Structural Steel
2. ASTM A48 - Standard Specification for Gray Iron Castings
3. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
4. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
5. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
6. ASTM A125 - Standard Specification Steel Springs, Helical, Heat-Treated
7. ASTM A153 - Standard Specification Zinc Coating (Hot-Dip) on Iron and Steel Hardware

8. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
9. ASTM A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
10. ASTM A194 - Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
11. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes
12. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength
13. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 KSI Minimum Tensile Strength
14. ASTM A384 - Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
15. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
16. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
17. ASTM A536 - Standard Specification for Ductile Iron Castings
18. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts
19. ASTM A575 - Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades
20. ASTM A780 - Standard Practice for Repair of Damage and Uncoated Areas of Hot-Dip Galvanized Coatings
21. ASTM A786 - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy and Alloy Steel Floor Plates
22. ASTM A992 - Standard Specification for Structural Steel Shapes
23. ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
24. ASTM A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability and Ultra-High Strength
25. ASTM B98 - Standard Specification for Copper-Silicon Alloy Rod, Bar, and Shapes

26. ASTM B201 - Standard Practice for Testing Chromate Coatings on Zinc and Cadmium Surfaces
 27. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
 28. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes
 29. ASTM B429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
 30. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
 31. ASTM C633 - Standard Test Method for Adhesion or Cohesion Strength of Thermal Spray Coatings
 32. ASTM D6386 - Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
 33. ASTM E140 - Standard Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness
 34. ASTM E376 - Standard Practice for Measuring Coat Thicknesses by Magnetic-Field or Eddy-Current (Electromagnetic) Testing Methods
 35. ASTM E384 - Standard test method for Koop and Vickers Hardness of Materials
 36. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
 37. ASTM F594 - Standard Specification for Stainless Steel Nuts
 38. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
- F. American Welding Society (AWS)
1. ANSI/AWS D1.1 - Structural Welding Code - Steel
 2. ANSI/AWS D1.2 - Structural Welding Code - Aluminum
 3. ANSI/AWS QC1 - Qualification and Certification of Welding Inspectors
- G. International Code Council Evaluation Services (ICC-ES)
1. Manufacturer Evaluation Reports, as appropriate

- H. National Fire Protection Association (NFPA)
 - 1. NFPA 101 - Life Safety Code
- I. National Association of Corrosion Engineers (NACE)
 - 1. Coating Inspector Program (CIP)
- J. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. The work of this Section shall be completely coordinated with the work of other Sections. Verify, at the site, both the dimensions and work of other trades adjoining items of work in this Section before fabrication and installation of items herein specified.
- B. Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.
- C. All welding shall be performed by qualified welders and shall conform to the applicable AWS welding code. Welding of steel shall conform to AWS D1.1 and welding of aluminum shall conform to AWS D1.2.
- D. All welding procedures and welder qualification shall be available in the Contractor's field office for Engineer's review.
- E. All welding shall be inspected by a District-provided inspector qualified in accordance with AWS requirements and acceptable to the Engineer.
- F. Unless otherwise directed by the Engineer, the Contractor shall provide the services of an independent, NACE-certified coating inspector. The cost of such work, except as specifically stated otherwise, shall be paid by the Contractor. All shop-applied coatings shall be inspected by an inspector, qualified in accordance with NACE requirements and approved by the Engineer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver items to be incorporated into the work of other trades in sufficient time to be checked before installation.
- B. Items damaged during transit, inadequate storage, improper handling, or corroded, in the opinion of the Engineer, shall be repaired or replaced, at the Contractor's expense, to the satisfaction of the Engineer before incorporating them into the work.

1.07 PROJECT/SITE REQUIREMENTS

- A. Field measurements shall be taken at the site, before fabrication of items, to verify or supplement indicated dimensions and to ensure proper fitting of all items.

1.08 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS**2.01 GENERAL REQUIREMENTS**

- A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- B. Like items of materials shall be the end products of one manufacturer in order to provide standardization for appearance, maintenance, and manufacturer's service.
- C. Aluminum - Unless otherwise noted:
 - 1. Sheet and Plate ASTM B209, Alloy 6061-T6.
 - 2. Aluminum in contact with concrete, masonry, wood, porous materials, or dissimilar metals shall have contact surfaces coated in accordance with the Section 09910 - Paints.
- D. Bolts, Nuts, and Washers - Unless otherwise noted:
 - 1. Stainless Steel Bolts, Nuts, and Washers, ASTM F593 and ASTM F594, Type 316.
 - 2. High-Strength Steel Bolts, Nuts, and Washers, ASTM A325 (mechanically galvanized per ASTM B695, Class 50, where noted).
 - 3. General Applications - Exposure Type I or Type II.
- E. Galvanizing - ASTM A123, Zn with 0.5 percent minimum Ni.
- F. Galvanizing - Hardware ASTM A153, Zn with 0.5 percent minimum Ni.

2.02 MISCELLANEOUS ALUMINUM

- A. All miscellaneous aluminum metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item even if such pieces are not definitively shown or specified.
- B. Miscellaneous aluminum items shall include floor plates for the purpose of reducing trip hazards.

2.03 BOLTS AND ANCHORS

- A. Standard Service (Non-Corrosive Application): Unless otherwise indicated, bolts, anchor bolts, washers, and nuts shall be steel, galvanized after fabrication as indicated herein. Threads on galvanized bolts and nuts shall be formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing. Except as otherwise indicated, steel for bolts, anchor bolts, and cap screws shall be in accordance with the requirements of ASTM A307, Grade A.
- B. All bolted connections for aluminum members shall be stainless steel.
- C. Unless otherwise indicated, stainless steel bolts, anchor bolts, nuts, and washers shall be Type 316 stainless steel, class 2, conforming to ASTM A276. All threads on stainless steel bolts shall be protected with an antiseize lubricant suitable for submerged stainless steel bolts, to meet government specification MIL-A-907E. Buried bolts in poorly drained soil shall be coated the same as the buried pipe.
 - 1. Antiseize lubricant shall be classified as acceptable for potable water use by NSF.
 - 2. Antiseize lubricant shall be "PURE WHITE" by Anti-Seize Technology, or equal.
- D. Bolt Requirements:
 - 1. The bolt and nut material shall be free-cutting steel.
 - 2. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads. All bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series.
 - 3. All bolts and nuts shall be installed with washers fabricated of material matching the base material of bolts, except that hardened washers for high strength bolts shall conform to the requirements of the AISC Specification. Lock washers shall be installed with washers where indicated and shall be fabricated of material matching the bolts.
 - 4. The length of all bolts shall be such that after joints are made up, each bolt shall extend through the entire nut, but in no case more than 1/2 inch beyond the nut.
- E. Post-Installed Adhesive Anchors - Unless otherwise indicated, all post-installed adhesive anchors for installation in concrete shall have satisfied the requirements of the Simulated Seismic Tests of ACI 355.4. No substitutions will be considered unless accompanied with ICC-ES report verifying strength and material equivalency and compliance with ACI 355.4.
 - 1. The design and installation of adhesive anchors in concrete shall comply with ACI 318 Appendix D. The characteristic bond stresses, τ_{cr} and τ_{uncr} , shall be based on long term elevated temperatures of not less than 110 degrees Fahrenheit.

2. Post-installed adhesive anchors shall be Hilti HIT-HY 200 adhesive anchors, Powers Pure110+ adhesive anchors, or equal.
 3. Post-installed adhesive anchors shall not be used for overhead installations (i.e., installations at the underside of concrete slabs).
- F. Post-Installed Expansion (Torque-Controlled and Displacement-Controlled) and Undercut Anchors - Unless otherwise indicated, all post-installed expansion and/or undercut anchors for installation in concrete shall have satisfied the requirements of the Simulated Seismic Tests of ACI 355.2. Post-installed expansion anchors shall be zinc-plated carbon steel wedge-type anchors complete with nuts and washers. Type 316 stainless steel wedge type anchors shall be used where they will be submerged or exposed to the weather or where stainless steel wedge type anchors are required. When the length or embedment of the bolt is not noted on the Drawings, provide length sufficient to place the wedge and expansion sleeve portion of the bolt at least 1 inch behind the concrete reinforcing steel.
1. The design and installation of expansion anchors and undercut anchors in concrete shall comply with ACI 318 Appendix D.
 2. Post-installed expansion anchors shall be Hilti Kwik Bolt TZ anchors, Simpson Strong-Tie Strong-Bolt 2 Wedge Anchors, or equal.
- G. Shell and lead caulking anchors will not be permitted.

PART 3 EXECUTION

3.01 FABRICATION AND INSTALLATION REQUIREMENTS

- A. Fabrication and Erection: Except as otherwise indicated, the fabrication and erection of structural steel shall conform to the requirements of the AISC "Steel Construction Manual."
- B. All steel surfaces that come into contact with exposed concrete shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in accordance with the manufacturer's instructions before installation.
- C. Where aluminum contacts a dissimilar metal, apply a heavy brush coat of zinc-chromate primer followed by two coats of aluminum metal and masonry paint to the dissimilar metal.
- D. All aluminum surfaces in contact with concrete or masonry shall receive a coating in accordance with Section 09910 before the placement of concrete or masonry.
- E. Aluminum Components:
1. Electrolysis protection of materials shall be provided.
 2. Between aluminum grating, aluminum tread plate, aluminum stair treads, or aluminum handrail brackets and steel supports, insert 1/4-inch-thick neoprene isolator pads, 85 plus or minus 5 Shore-A-Durometer, sized for full width and length of bracket or support.

3.02 WELDING

- A. Method - All welding shall be by the metal-arc method or gas-shielded arc method as described in the AWS's "Welding Handbook" as supplemented by other pertinent standards of the AWS. Qualification of welders shall be in accordance with the AWS Standards governing same.
- B. Welding electrodes shall meet the minimum requirements of E70XX. Filler metal for welds in moment connections shall have a minimum CVN value of 20 foot-pounds at 0 degrees Fahrenheit.
- C. Quality - In assembly and during welding, the component parts shall be adequately clamped, supported and restrained to minimize distortion and for control of dimensions. Weld reinforcement shall be as indicated by the AWS Code. Upon completion of welding, all weld splatter, flux, slag, and burrs left by attachments shall be removed. Welds shall be repaired to produce a workmanlike appearance, with uniform weld contours and dimensions. All sharp corners of material to be painted or coated shall be ground to a minimum of 1/32 inch on the flat.

3.03 GALVANIZING

- A. Bolts, anchor bolts, nuts, and similar threaded fasteners, after being properly cleaned, shall be galvanized in accordance with the requirements of ASTM A153.

3.04 POST-INSTALLED CONCRETE ANCHORS

- A. Post-installed concrete anchors and reinforcing bars (dowels) shall be installed in strict accordance with the Manufacturer's Printed Installation Instructions (MPII).
- B. Holes shall be roughened with a brush on a power drill, cleaned, and dry.
- C. Expansion anchors shall not be installed until the concrete has reached the specified 28-day compressive strength.
- D. Adhesive anchors and dowels shall not be installed until the concrete has a minimum age of 21 days and has reached the specified 28-day compressive strength.
- E. Adhesive anchors and dowels installed in a horizontal or upwardly inclined position shall have the following additional requirements:
 - 1. Installation shall be performed by personnel certified in accordance with the ACI/CRSI Adhesive Anchor Certification program.
 - 2. Installation shall be inspected by a certified special inspector who is continuously present when the installation is performed.
- F. Post-installed adhesive anchors shall not be loaded until the adhesive has reached its indicated strength in accordance with the manufacturer's instructions.

- G. Post-installed mechanical anchors shall be checked for tightness a minimum of 24 hours after initial installation. Install anchors using the manufacturer's recommended drive units and adapters, in compliance with the manufacturer's recommendations.

END OF SECTION

DIVISION 5: METALS
MODIFICATION OF EXISTING ALUMINUM STAIRS

SECTION 05510.10

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals necessary and modify aluminum metal stairs and platforms complete with anchors and brackets, as shown on the Drawings and as specified herein.

1.02 RELATED SECTIONS

- A. Section 03300 - Cast-in-Place Concrete
- B. Section 05500 - Miscellaneous Metals
- C. Section 05520 - Handrails and Railing
- D. Section 09910 - Paints

1.03 REFERENCE STANDARDS

- A. Aluminum Association (AA)
 - 1. Aluminum Design Manual
 - 2. Specification for Aluminum Structures
 - 3. AA 6061-T6 - Aluminum Sheet and Plates
- B. American Institute for Steel Construction (AISC)
 - 1. ANSI/AISC 360 - Specification for Structural Steel Buildings
- C. American Society of Civil Engineers (ASCE)
 - 1. ASCE/SEI 7, Minimum Design Loads for Buildings and Other Structures
- D. American Welding Society (AWS)
 - 1. ANSI/AWS D1.1 - Structural Welding Code - Steel
 - 2. ANSI/AWS D1.2 - Structural Welding Code - Aluminum
 - 3. ANSI/AWS QC1 - Qualification and Certification of Welding Inspectors
- E. ASTM International (ASTM)
 - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 - 2. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings

- F. California Building Standards Commission (CBSC)
 - 1. California Building Code (CBC)
- G. National Association of Architectural Metal Manufacturers (NAAMM)
 - 1. NAAMM AMP 510 - Metal Stairs Manual
 - 2. NAAMM MBG 531 - Metal Bar Grating Manual
- H. Occupational Safety and Health Standards (OSHA)
 - 1. Code of Federal Regulations, 29 CFR, Part 1910
- I. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 QUALITY ASSURANCE

- A. Industry Standards - Comply with the provisions of the following standards and specifications:
 - 1. ANSI/AISC 360
 - 2. NAAMM - AMP-510
 - 3. NAAMM - MBG 531
 - 4. ANSI/AWS-D1.2

1.05 DELIVERY, STORAGE, AND HANDLING

- A. All materials shall be delivered promptly so as to cause no delay with other parts of the work. Stored materials shall be placed on skids and not on the ground and shall be piled and blocked up so that they will not become bent or otherwise damaged. Materials shall be stored inside a well-ventilated area, away from uncured concrete and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity. Materials shall be handled with cranes or derricks as far as practicable. Material shall not be dumped off cars or trucks nor handled in any other way likely to cause damage. Materials with excessive damage, in the opinion of the Engineer, shall not be incorporated in the work and shall be removed and replaced, at the Contractor's expense, with new undamaged materials, to the satisfaction of the Engineer.

1.06 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS**2.01 GENERAL REQUIREMENTS**

- A. Provide incidental materials required for modification of existing aluminum stairs in accordance with the relevant specification section, or seek approval from Engineer.

PART 3 EXECUTION**3.01 ERECTION**

- A. Erect stairs and platforms square, level, plumb, and free from distortion or defects detrimental to appearance and performance.
- B. Provide necessary anchors, plates, angles, hangers, and struts as required for connecting stairs and platforms to the structure.
- C. Ensure alignment with adjacent construction. Coordinate with related work to ensure no interruption in installation.
- D. Perform necessary cutting and altering for the installation of work of other Sections. Do not perform any other additional cutting without prior review and approval of the Engineer. If approved, cutting and/or altering of stair elements shall be done in an approved manner to the satisfaction of the Engineer.
- E. Field bolt and weld to match standard of shop bolting and welding. Hide bolts and screws whenever possible. Where not hidden, use flush countersunk fastenings, unless indicated otherwise. Make mechanically fastened joints flush hairline-butt. Grind welds smooth and flush.

3.02 PROTECTION

- A. Protect aluminum fabrications from damage due to work of adjacent trades.

3.03 CLEANING

- A. As work progresses, remove debris and leave installation sites broom clean.
- B. Before final acceptance, clean stairs of any paint, mud, or other adherents.

END OF SECTION

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PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section Includes:

1. Aluminum mechanically fastened tube railings, pickets, brackets, anchor plates, inserts, fasteners and accessories as indicated.

1.02 RELATED SECTIONS

- A. Section 05500 – Miscellaneous Metals.
- B. Section 05510.10 – Modification of Existing Aluminum Stairs.
- C. Section 09910 – Painting.

1.03 COORDINATION

- A. Coordinate installation of anchorages for railing. Furnish setting drawings, templates, and directions for installing anchorages, including backers, fillers, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or built into framed walls. Deliver such items to Project site in time for installation.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Product Data: Provide product data for fittings, railing brackets, piping, inserts and installation accessories.
- C. Shop Drawings: Provide plans, elevations, sections, details showing attachments to other work.
- D. Samples:
 1. Provide sample of railing at top rail and post intersection with typical mechanical connection in specified finish.
 2. Provide typical fittings and brackets.
- E. Deferred-Design Submittal: Submit structural calculations signed and sealed by the qualified California professional engineer responsible for their preparation.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.06 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.07 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers for aluminum pipes, pipe fittings, reinforcements, brackets, and related components:
 - 1. Hollaender Manufacturing Company, Interna-Rail Mechanical Handrail System
 - 2. The Wagner Company, Intern-Rail Non Welded Pipe Railing System.
 - 3. Or equal.
- B. Source Limitations: Obtain railing, fittings, fasteners and accessories from single source from single manufacturer.

2.02 PRODUCTS

- A. Pipe handrails railings and pickets shall be mechanically fastened, flush-fit, internal aluminum system. Fittings shall be externally connected to the pipe by means of an anodized aluminum, tubular rivet nut, and an austenitic 302 alloy stainless steel, socket head cap screw with a stainless steel lock washer. The fitting shall be internally connected to the pipe by means of an internal double tang, expanded by an austenitic 302 alloy stainless steel, internal / external, reverse knurl, cup point, hexagon socket set screw. Pop rivets, sheet metal screws, and adhesives shall not be an acceptable fastening method. The fittings shall be machined of solid aluminum bar stock of alloy 6063-T6 conforming to ASTM B221, or machined castings of high-tensile aluminum-magnesium alloy 535.0 manufactured in compliance with ASTM B26, cast from high-purity ingot 535.2 conforming to ASTM B179. Flanges (if required) shall be sand cast from high-tensile aluminum magnesium alloy 535.0, and fastened directly to the pipe by means of an internal / external, reverse knurl, cup point, hexagon socket set screw (flanges which include a bearing plate will not be accepted). Aluminum fittings with an anodized finish shall match aluminum railing system.

2.03 PERFORMANCE REQUIREMENTS

- A. Deferred Design: Contractor shall employ a qualified California professional engineer, to design railing, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Top rail:
 - a. Uniform load of 50 lbf / ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards.
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 - b. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

2.04 ALUMINUM RAILING

- A. Aluminum, General: Provide alloy and temper recommended by manufacturer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.
- B. Extruded Structural Pipe and Round Tubing: ASTM B 221, Alloy 6063-T6.
- C. Extruded Bars and Tubing: ASTM B 221, Alloy 6063-T5/T52, 6005-T5 Provide 1-1/2 in IPS, (1.90 in OD) Standard Weight (Schedule 40) pipe for rails, Schedule 80 for posts, Schedule 10 for pickets, unless otherwise indicated.
- D. Cast-In-Place Sleeves: As Indicated.

2.05 FASTENERS

- A. General: Provide the following:
 - 1. Aluminum Railing: Type 304 Stainless Steel.
- B. Fasteners for Anchoring Railings to Other Construction: Manufacturer's standard select fasteners of type, grade, and class required to produce connections

suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads. Fasteners shall be determined by deferred design engineer's calculations.

- C. Fasteners for Interconnecting Railing Components: Rails shall be attached to posts by means of tee fittings equipped with anodized aluminum, tubular rivet nut and stainless steel socket head cap screw. All structural fasteners such as tee fittings shall be machined from 6063-T6 aluminum alloy. The fitting shall be internally connected to the rail by means of an internal dual tang that is expanded with a stainless steel, internal /external, reverse knurl, cup point socket head set screw. This combination shall prevent any loosening of the system due to changes in temperature or vibration. Systems using pop rivets or adhesives will not be accepted.
- D. Fasteners for Connecting Pickets to Top and Bottom Rail: Use Hollaender anodized aluminum 156-85 component picket tees, machined from 6063-T6b aluminum alloy, to attach 3/4 in IPS, Sch. 10 picket to top and bottom rails. Picket tees to be attached using threaded self-tapping machine screws, size 1/4-20 x 1. Picket tees to have notch that allows water to escape from picket and prevent freezing.

2.06 PICKET INFILL FOR RAILINGS

- A. Panel:
 - 1. Picket infill shall be 3/4 in IPS, Schedule 10, 6063-T6 aluminum pickets, attached to top and bottom rails by 156-85 aluminum component tees.
 - 2. Spacing to be 4 in on center.
 - 3. Picket tees to be attached to top and bottom rails with threaded self-tapping machine screws, size 1/4 - 20 x 1. Picket tees to be attached to pickets by friction fit through the use of mechanical or hydraulic pressure.
 - 4. Top and bottom rail to be 1-1/2 in IPS, Schedule 40, 6063-T6 aluminum.
 - 5. Pickets to be installed such that no welding or tool marks will be needed or visible and pickets will be firmly fixed with no movement allowed.
 - 6. Individual picket tees to have notches allowing escape of any water build up in the pickets.

2.07 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling

limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas to exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with mechanical connections unless otherwise indicated.
- H. Mechanical Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
- I. Form changes in direction as detailed.
- J. Close exposed ends of railing members with prefabricated end fittings, unless otherwise shown.
- K. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns.
- L. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- M. Provide inserts and other anchorage devices for connecting railings to concrete. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- N. Toe Boards: Where indicated, provide toe boards at railings around opening and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.08 ALUMINUM FINISHES

- A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. All handrails, railings, pickets, and related components shall be AA-M12C2XA44, Class I, Dark Bronze Anodized Finish, 0.7 mils minimum thickness.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine all assemblies, where reinforced to receive anchors, to verify that locations concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.02 INSTALLATION, GENERAL

- A. Fit exposed connection together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of risk.
 - 1. Install railings to meet acceptable gaps and tolerances per California Code of Regulations, Title 8, Section 3209.
 - 2. Do cut or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 3. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 4. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 - 1. Coat concealed surfaces of aluminum that are in contact with concrete or dissimilar metals in accordance with Section 09910, Painting.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening in In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.03 RAILING CONNECTIONS

- A. Provide connections as indicated on the Drawings, if not indicated as designed by the manufacturer's engineer.

3.04 ANCHORING POSTS

- A. Anchor posts to substrates as indicated on the Drawings, if not indicated as designed by the manufacturer's engineer.

3.05 ATTACHING RAILINGS

- A. Secure wall brackets and railing end flanges to structure as indicated on the Drawings, if not indicated as designed by the manufacturer's engineer.

3.06 ADJUSTING AND CLEANING

- A. Clean aluminum stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

3.07 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings prior to completion.

END OF SECTION

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PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all materials, labor, supervision, equipment, and incidentals required to damp-proof concrete surfaces as required by the Drawings and as specified herein.

1.02 RELATED SECTIONS

- A. Section 03300 – Cast-in-Place Concrete.
- B. Section 03350 – Concrete Finishing.

1.03 APPLICATION SCHEDULE

- A. Damp-proofing shall be applied to the buried exterior surfaces of all exterior poured in place concrete walls from the top of the footings up to 6-in below finished grade except where membrane waterproofing, or geotextile drain fabric is used.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit representative samples of all proposed materials required for the work of this Section.
- C. Submit the certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

1.05 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials shall comply with local regulations controlling use of volatile organic compounds (VOCs).

B. Dampproofing

1. Dampproofing shall be an asphalt emulsion reinforced with fibers conforming to ASTM D1227, Type II, Class 1. The dampproofing shall be Sealmastic Type 2 by W.R. Meadows Inc., Elgin, IL; Hydrocide 700B by Sonneborn Building Products, Division of ChemRex Inc., Minneapolis, MN; Karnak 220 Asphalt Emulsion by Karnak Corporation, Clark, NJ or equal.

PART 3 EXECUTION**3.01 INSTALLATION****A. Installation or Dampproofing**

1. Surface to be treated shall be free from oil and dirt and shall comply with manufacturer's instruction for preparation of surfaces. The surface shall be dry and free from frost at the time of application.
2. Surfaces to be dampproofed shall receive two coats, the first coat being carefully applied so "holidays" or untreated air-bubble depressions in the surface shall be completely filled and the second coat will guarantee a 100% coating of the surface. Applying dampproofing shall comply with manufacturer's application requirements and restrictions.
3. Particular care shall be given to the application of dampproofing at all concrete joints which are encountered.
4. The number of coats specified is in addition to primer coats as recommended by the manufacturer.

3.02 CORRECTION OF DEFICIENCIES

- A. All deficiencies in work and/or items not meeting specified testing requirements shall be corrected in order to meet specification requirements at no additional cost to the District.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section Includes:

1. Provide gypsum board partitions, furred walls, and similar construction. Provide taping and finishing of gypsum board ready for paint or other finish coatings.

1.02 RELATED SECTIONS:

- A. Section 09653 – Resilient Wall Base and Accessories.
- B. Section 09910 – Paints.

1.03 REFERENCES

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

1. ASTM C36 – Standard Specification for Gypsum Wallboard.
2. ASTM C475 – Standard Specification for Joint compounds and Joint Tape for Finishing Gypsum Board.
3. ASTM C514 – Standard Specification for Nails for the Application of Gypsum Wallboard.
4. ASTM C557 – Standard Specification for Adhesives for Fastening Gypsum Wallboard in Wood Framing.
5. ASTM C630 – Standard Specification for Water-Resistant Gypsum Backing Board.
6. ASTM C840 – Standard Specification for Application and Finishing of Gypsum Board.
7. ASTM C919 – Standard Practice for Use of Sealants in Acoustical Applications.
8. ASTM C931 – Standard Specification for Exterior Gypsum Soffit Board.
9. ASTM C1002 – Steel Drill Screws for the Application of Gypsum Board.
10. ASTM C1396 – Standard Specification for Gypsum Board.

11. ASTM C1629 – Standard Classification for Abuse-Resistant Non-Decorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.
12. ASTM D3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
13. ASTM D3274 – Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation.
14. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.

B. Gypsum Association:

1. GA 216-07: Recommended Specifications for the Application and Finishing of Gypsum Board.

1.04 SUBMITTALS

- A. Submit product data giving manufacturer's technical data for all materials and systems proposed for use.
- B. For all assemblies required to be fire-rated for which a "Listed Design" is not provided in this Section, submit drawings and specifications of an appropriate design that has been tested and is "Listed" by a Nationally Recognized Fire Testing Agency such as Underwriters Laboratory; Warnock Hersey; or equal.

1.05 QUALITY CONTROL

- A. Comply with the more restrictive or conservative of the following.
- B. Comply with the following regulatory requirements:
 1. California Building Code (CBC), 2013 edition, and referenced standards.
 2. Where fire-rated assemblies are required comply with detail specifications stated in the "Assembly Listing."
- C. Comply with recommendations in "Gypsum Construction Handbook," 3rd edition by United States Gypsum Company, for installation of materials used and United States Gypsum "USG Cavity Shaft Wall Systems - Folder SA 926" and USG-Gypsum Products, Accessories and Systems SA 919."
- D. Where fire-rated assemblies are required comply with detail specifications for a specific assembly that has been tested in accordance with ASTM E119 or other applicable ASTM standards and has been given a fire rating and by a nationally recognized fire testing laboratory acceptable to the Engineer, Fire Marshal and other regulating agencies having jurisdiction such as the UL Fire Resistance

Directory, ICBO Evaluation Reports, or Gypsum Association "Fire Resistance and Sound Control Manual.

- E. Comply with Gypsum Association GA-216-07, "Recommended Specifications for the Application and Finishing of Gypsum Board".
- F. Comply with ANSI Standard Specifications A97.1 "Applications and Finishing of Wallboard."

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand and manufacturer's name.
- B. Store all materials in protected dry storage areas. Neatly stack in flat position on spacers to prevent sagging and contact with concrete slabs.

1.07 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 DRYWALL MATERIALS

- A. Verify and match existing wall thickness and type

2.02 TRIM ACCESSORIES

- A. Material: Galvanized-coated steel sheet. Provide as required by reference standards.
 - 1. Cornerbead.
 - 2. LC-Bead: J-shaped. Exposed long flange receives joint compound.
 - 3. L-Bead: L-shaped. Exposed long flange receives joint compound.
 - 4. U-Bead: J-shaped. Exposed short flange does not receive joint compound.
 - 5. Expansion (control) joint.

2.03 FASTENERS

- A. Gypsum Board to Metal Supports: ASTM C1002, self-tapping bugle head screws, 1-inch-long for single layer; 1-5/8 long for second layer.
 - 1. Use Type S screws to 25-gauge supports.
 - 2. Use Type S 12 screws to 20-gauge or heavier supports.
- B. Gypsum Board to Wood Supports. ASTM C514, cooler or wallboard nails.
 - 1. 6d wallboard nails 0.0915-inch shank diameter, 1-7/8-inch-long, 19/64-inch head diameter, concave head, phosphate etched diamond point.
 - 2. 6d cooler nails 0.092-inch shank diameter, 1-7/8 long, 1/4-inch-head-diameter, cement coated, flathead diamond point.
 - 3. Type W screws 1-1/4-inch long.

2.04 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475.
- B. Joint Tape: Paper unless otherwise noted. Provide moisture and mold-resistant tape as recommended by panel manufacturer at moisture and mold-resistant panels, and tile backing panels.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping or drying-type, all-purpose compound. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping or drying-type, all-purpose compound.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, all-purpose] compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound or drying-type, all-purpose compound, or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

PART 3 EXECUTION**3.01 GYPSUM BOARD INSTALLATION**

- A. Install gypsum board systems in accordance with ASTM C840 and GA 216.
- B. General: Where fire-rated partitions are required, install gypsum board in accordance with requirements for a fire-rated assembly that has been tested and "Listed" by a nationally recognized fire testing agency in accordance with ASTM E119.
- C. Where studs extend above the top edge of gypsum board, attach the top edge of the gypsum board to horizontal stud depth backing installed between studs.
- D. Edge and ends of gypsum board shall be in moderate contact. Attach gypsum boards to framing members with screws and to wood member. For non-rated assemblies, space screws at 8 inches on center on edges of gypsum board for vertical surfaces and at 7 inches on center for horizontal surfaces. Space screws at 12 inches on center at intermediate members. Stagger fasteners in adjacent edges at joints. Drive fasteners until their heads are slightly below the surface of the gypsum board, but without breaking the cover. After all fasteners have been installed hammer on walls to detect loose fasteners and push on gypsum board adjacent to fasteners to detect movements. Drive loose fasteners tight or replace them with other fasteners approximately 1-½ inches away and remove loose fasteners.
- E. Leave ¼" space between existing electrical equipment and finished gypsum board.
- F. Install control or expansion joints as required and/or recommended by manufacturer.
- G. Set bottom edge of gypsum board ¼-inch above the floor. Fill the gap between gypsum board and floor (or curb) acoustical sealant.

3.02 FINISHING AND JOINT TREATMENT

- A. Mix and size joint compound in accordance with manufacturer's instructions. Spread a thin layer of compound over joint and embed tape in compound leaving sufficient compound under tape to provide proper bond. Spot nail heads. Reinforce interior angles with perforated tape neatly folded to form straight, true corner. Reinforce exterior corners with specified corner bead. Backer board shall be taped and screwheads spotted prior to installing face layer.
- B. Allow compound to dry overnight. Sand lightly. Cover tape with topping cement spread evenly and slightly beyond tapered edge of wallboard. Apply second coat to screwheads. Feather all edges of topping compound.
- C. Allow compound to dry and then sand lightly. Apply a final skim coat of topping cement. Feather edges 8 inches to 10 inches each side of joint. Feather out final coat at screw heads to minimum of 10-inch-diameter.

- D. Sand to true even surface with very fine paper. Avoid heavy pressure that might scuff paper face of wallboard. Leave ready for painting or other wall finish.

3.03 LEVELS OF GYPSUM BOARD FINISH

- A. All joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges. Note: It is recommended that the prepared surface be coated with a primer/sealer prior the application of final finishes. See painting/wallcovering specification in this regard.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Section Includes:
 - 1. Resilient base.
 - 2. Resilient molding accessories.

1.02 RELATED SECTIONS

- A. Section 09250 – Gypsum Board.

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Product Data: For each type of product indicated. Submit cut sheets and schedule of proposed resilient molding accessories for approval by Engineer.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

1.04 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Mockups: Provide resilient products with mockups specified in other Sections.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.06 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.

- B. Until Project completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.07 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.08 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 RESILIENT BASE

- A. Resilient Base:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - b. Johnsonite.
 - c. Roppe Corporation, USA.
 - d. Or equal.
- B. Resilient Base Standard: ASTM F 1861.
 - 1. Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
 - 2. Manufacturing Method: Group I (solid, homogeneous).
 - 3. Style: Cove (base with toe).
- C. Minimum Thickness: 0.125 inch.
- D. Heights: 4 inches.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed or preformed.

- G. Inside Corners: Job formed or preformed.
- H. Finish and Color to match existing

2.02 INSTALLATION MATERIALS

- A. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated, and comply with "Low-Emitting Materials" requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- C. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.03 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. Preformed Corners: Install preformed corners before installing straight pieces.
- G. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible.

3.04 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes painting for new interior walls and exposed carbon steel piping.
 - 1. See Section 02762 for traffic lines and markings.

1.02 RELATED SECTIONS

- A. Section 02762 – Painted Traffic Lines and Markings
- B. Section 03350 – Concrete Finishing

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM D4417 - Standard Method for Field Measurement of Surface Profile of Blast Cleaned Steel.
 - 2. ASTM D4258 - Surface Cleaning Concrete for Coating.
 - 3. ASTM D4259 - Abrading Concrete.
 - 4. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
 - 5. ASTM D4285 - Indicating Oil or Water in Compressed Air.
 - 6. ASTM D6386 – Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.
- B. National Association of Corrosion Engineers (NACE):
 - 1. RP-0188-88 - Standard Recommended Practice for Discontinuity (Holiday) Testing of Protective Coatings.
- C. National Sanitation Foundation (NSF):
 - 1. NSF 61 – Drinking Water System Components – Health Effects.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Product Data:
 - 1. Submit complete technical data on all materials to be used on the project for review prior to ordering material. Include manufacturer's brand name and type of material for each coat of each system to be used.
 - 2. If products manufactured by makers other than the first named product by the first named maker listed in Part 2 of this Section are submitted, submit supporting performance test results prepared by an independent paint testing laboratory for comparison with the performance of the first named product by the first named maker.
- C. Manufacturer's Certification: That products furnished meet applicable regulations for the local Air Resources Board or Air Quality Management District having jurisdiction as to allowable VOC content for the place of application and use intended.
- D. Submit certification that materials specified in this Section to be NSF 61 certified are ANSI/NSF Standard 61 compliant for contact with drinking water.

1.05 QUALITY CONTROL

- A. Regulatory Requirements: All field work, material, procedures and practices under this Section shall conform to requirements of the Federal Standard 40 CFR on air quality control, and the requirements of the Bay Air Resources Board or Air Quality Management District. Shop applied coatings shall conform to requirements of the Federal Standard 40 CFR on air quality control, and the requirements of the Air Resources Board or Air Quality Management District having jurisdiction.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in unopened containers with manufacturer's label. Label shall state VOC content.
- B. Store in assigned area. Maintain storage area clean and fire safe. Dispose of used rags and clean buckets daily. Store solvents in closed approved storage containers.

1.07 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Provide ambient temperatures recommended by manufacturer of material to be applied.
 - 2. Provide adequate ventilation.

3. Provide 40- to 50-foot candles of illumination on all surfaces in areas to be painted including floors, walls, and ceiling even though they do not require painting.
4. Use temporary dust barriers to close off areas being painted from areas where other work is being performed.
5. Prevent paint fumes from being conveyed to occupied areas of buildings.

1.08 COLORS AND COLOR SAMPLES

- A. Match existing wall color.
- B. Colors are to be factory or machine mixed, using light-fast colorants proportioned by accurate measurement into a proper tinting base. The color formula for each color shall be submitted to facilitate future color matching.

1.09 TOUCH-UP PAINT

- A. The Contractor shall provide one quart of each finish color used on the Project as spare touch-up paint for future District use. Packaging shall be new quart containers, labeled with color mixing information.

1.10 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Gypsum wall board shall be coated with Eggshell System: Eggshell Acrylic Latex Interior Enamel.
 1. Primer and Minimum of 2 Coats:
 - a. On gypsum board: PVA Sealer. ICI Dulux PVA Interior Primer-Sealer General Purpose Wall Primer, Ultra-Hide No. 1030. ICI Dulux Eggshell Interior Acrylic Wall and Trim Enamel, Dulux Ultra No. 1403.
- B. Carbon steel pipe shall be abrasive blasted SSPC-SP-6 Commercial Blast Cleaning. Brush apply a "striped coat" over all welded joints prior to the first coat.
 1. Tnemec:
 - a. 1 Coat: V69-1211 Hi-Build Epoxoline II (3.5-4.5 DFT)
 - b. 1 Coat: V69-Color Hi-Build Epoxoline II (4.0-5.0 DFT)
 - c. 1 Coat: 1075-Color Endura-Shield II (3.0-5.0 DFT)

2. Carboline:
 - a. 1 Coat: Carboguard 890 (3.5-4.5 DFT)
 - b. 1 Coat: Carboguard 890 (4.0-5.0 DFT)
 - c. 1 Coat: Carbothane 133VOC (3.0-5.0 DFT)
- C. Coatings used shall be premium grade and of the type recommended by the manufacturer for the intended use and substrate. Expected service life is a minimum of 15 years.
- D. Applicable Air Quality Management District regulations prohibit the manufacture, sale or application of coatings having greater than stipulated levels of volatile organic compounds.
- E. The Contractor shall base its bid on using the products specified. If the products specified are not available in formulations that meet applicable Air Quality Management District regulations on maximum VOC levels, the Contractor shall submit products of equivalent quality and function that comply with regulations in effect at that time.
- F. If the Contractor applies any coatings for which it has not submitted certificates indicating the VOC content and that the product complies with applicable Air Quality Management District regulations, or if it applies coatings that have been modified or thinned other than as recommended by the manufacturer, the Contractor shall be responsible for any fines, costs, remedies, or legal actions that may result.
- G. Compatibility: Primers and succeeding coats of all systems shall be compatible with each other and the substrate. Thinning or reducing the paint shall be completed in accordance with the coating manufacturer's recommendations. Shop priming shall be done with primers that are guaranteed by the manufacturer to be compatible with the finish paints to be used.

PART 3 EXECUTION

3.01 CONDITION OF SURFACES TO BE PAINTED

- A. Examine areas to receive work of this Section. Make certain that surfaces are even, smooth, sound, clean, dry, and free from defects or substances that might affect application.
- B. Arrange for repairs or major cleaning as required. Starting work indicates acceptance of surfaces as satisfactory to achieve required result.

3.02 PREPARATION OF SURFACES - GENERAL

- A. Check that hardware, trim, plates, lighting fixture covers and similar items have been removed before starting work; coordinate with work under sections installing such items. Check that equipment adjacent to walls shall be disconnected and moved to permit wall surfaces to be painted before starting work under this Section.
- B. Dust all surfaces and wipe clean with a tack cloth just prior to coating.

3.03 APPLICATION – GENERAL

- A. Apply all material in strict accordance with manufacturer's instructions. Apply first coat immediately after surface preparation.
- B. Do not apply coatings when temperature is below 55°F. Do not apply exterior coatings in damp or rainy weather. Do not apply exterior coatings on damp wood.
- C. Brush, spray, or roll out each coat to a uniform, even coating; lay material on in one direction and brush or roll out at right angles. Special application techniques may be required for new coatings with low VOC content. Apply such coatings in strict accordance with manufacturer's detailed instructions. Allow material to dry a minimum of 3 hours between coats unless a longer period is specified by the coating manufacturer.
- D. Sand between coats for enamel and varnish finishes.
- E. Do necessary puttying or filling of nail holes, cracks and other blemishes after first coat has been applied. Finish putty or fill flush with adjoining surface in neat, smooth, workmanlike manner. Putty or fill nail holes in wood to be stained, with colored putty to match finish.
- F. Back prime all interior and exterior wood trim before installation. Prime all exposed and concealed surfaces of sheet metal flashing prior to installation.
- G. Paint items and surfaces before installation that will be difficult or impossible to paint after installation.
- H. Coat all six surfaces of doors with the specified coats. Seal mortises and cutouts for locks, hinges and other hardware.
- I. Apply not less than the number of coats specified. Apply additional coats if required for uniform coverage and full hiding. Apply finishes in their factory original consistencies. Do not thin unless specifically recommended by the manufacturer.
- J. Finish work shall be uniform in color, full coverage, smooth and free of sags and brush marks. Varnish work shall be done so that an entire surface is coated while maintaining a wet edge so that there are no lap marks or areas of uneven color.
- K. Do all cutting in to a sharp, true line. Repaint if necessary to correct over runs.
- L. Do not paint over Underwriters' labels, fusible links, door hardware, nameplates, signage, fire alarm devices, or similar items.
- M. Paint access panels, electrical panels, air registers and similar items prior to installation to prevent edges from peeling or chipping when panels are removed.
- N. Repaint factory finished air registers, grills, inlets, outlets, and other items to match adjacent painted surfaces.

3.04 PROTECTION, CLEANING AND COMPLETION

- A. Protect finish work by suitable covering or other method as job progresses.
- B. Remove paint or varnish spots from floors, glass and other surfaces, upon completion of work. Remove rubbish, empty containers and other accumulated materials from premises. Leave work in clean, orderly, acceptable condition.
- C. Check work of this Section at completion of project. Touch-up or refinish marred or damaged surfaces. Replace glass damaged by operations under this Section. Leave entire area with finish free from imperfections.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes installation of on-hand chemical duct bank vault sump pumps and connection of pumps and level switches to the associated control panels to provide a complete and fully functional system.

1.02 RELATED SECTIONS

- A. Refer to supplemental information provided at end of this section and reference drawings.

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submittals shall include at least the following:
 - 1. Written test procedures shall be submitted to the Engineer for approval a minimum of 30 days prior to testing.

1.04 REFERENCE STANDARDS

- A. American National Standard Institute (ANSI)
 - 1. ANSI/NSF Standard 61 – Drinking Water System Components – Health Effects.
- B. Anti-Friction Bearing Manufacturers Association (AFBMA)
- C. National Electrical Manufacturers Association (NEMA)
- D. American Gear Manufacturers Association (AGMA)
- E. Occupational Safety and Health Administration (OSHA)
- F. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY CONTROL

- A. The pumps covered by these Specifications are intended to be standard pumping equipment, as modified by these Specifications. Owner supplied items as described in Paragraph 2.01 are assumed to be in good working order and shall be handled with care and installed in the condition in which they are received by the Contractor.

1.06 MEASUREMENT AND PAYMENT

- A. Measurement and Payment for “**Sump Pumps Installation**” bid item shall be lump sum and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in installation of sump pumps in existing leak detection vaults, including, but not limited to, installation of Owner-supplied sump pumps and level switches, connection to existing control panel, discharge piping, instrumentation system testing, plastic piping, pipe supports, miscellaneous steel including bolts, excavation, pipe laying, compaction and backfilling, concrete modifications, grouting, cleaning, and leak testing and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 GENERAL

- A. Sump pumps, pump lifting cable, level switches, and power and control wiring to connect the pumps to the existing control panels are provided by Owner.
 - 1. Sump pumps LDVSP300 and LDVSP400 are Barnes Model 2SEV542L
- B. These Specifications are intended to give a general description of what is required. Not all of the appurtenant items are specifically listed; however, the Contractor shall provide incidentals customary for each trade to produce a complete working system.
- C. The equipment shall be anchored into position, and all necessary bolts, plates, nuts and washers shall be furnished and installed by the Contractor. Anchor bolts shall be of Type 304 stainless steel unless otherwise specified.
- D. Provide reducers or increasers as required to match each pump discharge diameter with the diameter of the discharge pipe. Such reducers or increasers shall be of the same material as the pump discharge piping.

PART 3 EXECUTION

3.01 PREPARATION

- A. Pumps and accessories shall be installed in accordance with the manufacturer's written instructions and recommendations and as shown on the Drawings. All piping connections shall be made in a neat and leak-free manner.
- B. Coordinate with other trades, equipment and systems to the fullest extent possible.
- C. Take all necessary measurements in the field to determine the exact dimensions for all work and the required sizes of all equipment under this Contract. All

pertinent data and dimensions shall be verified in advance of submittal preparation and ordering.

- D. Verify existing power, control, and signal connections. Make all necessary connections to provide a working system as intended and described in this specification Section and Appendices and on the Drawings.
- E. The Contractor shall install the recommended lubrication for normal operation prior to final testing.

3.02 INSTALLATION

- A. Sump Pumps are on-hand and raceways are installed. Contract work to include installation of sump pumps in the vault. Extend raceways and wires to make the final connection to complete installation of the sump pumps. Sump Pump connections include power, signal, and control. Refer to Reference Drawings. Sump Pumps are monitored via SCADA. Contractor work shall also include input additions to PLC I/O cabinets, programming, and graphic screen updates. Sump pumps shall also be shown in the PLC, SCADA, LDV, and Blue Beacon screens. Screens shall be set-up to follow other existing graphic screens. Sump pump alarms shall also be included in WIN-911 pager system and the Historian. SCADA related work shall be performed by an integrator familiar with District SCADA Standards. Acceptable integrator includes TSI, or equal.
- B. Installation shall be in strict accordance with the manufacturer's instructions and recommendations in the locations shown in the Drawings. Anchor bolts shall be set in accordance with the pumps manufacturer's recommendations and setting plans.
- C. The Contractor shall be responsible for providing transition fittings, couplings, and other fittings as necessary to connect pumps and equipment furnished with the piping shown on the Drawings.
- D. Connection of piping to the pump shall be done in the presence of the Engineer. All piping connections to the pump shall be done without bending and/or twisting the piping to mate with the pump connections.
- E. A certificate from each equipment manufacturer shall be submitted stating that the installation of their equipment is satisfactory, that the equipment is ready for operation and that the District's operating personnel have been suitably instructed in the operation, lubrication and care of each unit.

3.03 FIELD TESTS

- A. Upon completion of installation, conduct tests, in the presence of the Engineer, to demonstrate that pump operation is in conformance with the Specifications and that the pumps operate without excessive noise, vibration, or overheating. Testing shall verify the specified head and capacity.
- B. If the pump performance does not meet the Specifications, corrective measures shall be taken, or the pumps shall be removed and replaced with pumps which

satisfy the conditions specified, at no additional cost to the District. The pumps shall then be retested. All test procedures shall be in accordance with factory test procedures specified above and certified results of tests shall be submitted. Provide, calibrate and install all temporary gauges and meters, make necessary tapped holes in the pipes, and install all temporary piping and wiring required for the field acceptance tests.

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION

- A. The Contractor shall test the connection of sump pumps installed under this project to ensure operation consistent with specifications Section 11217 Submersible Sump Pumps and its appendices.
- B. The Contractor shall support the District in performing Functional Acceptance Testing (FAT) and Operational Readiness Testing (ORT).

1.02 SCOPE OF WORK

- A. The testing and commissioning work shall include the following:
 - 1. Provide all materials, equipment, labor, and services required to perform the testing and commissioning as specified in Part 3 of this Specification.
 - 2. No testing shall be performed until the associated testing procedures have been favorably reviewed by the Engineer.
 - 3. Perform test to verify proper installation of power and communication cable(s) in existing systems as well as communication to the District's SCADA system.
- B. Related Work
 - 1. Section 11217: Submersible Sump Pumps

1.03 SUBMITTALS

- A. Test Documentation: Document testing by submitting a copy of the signed off test procedures. Testing shall not be considered complete until the signed-off test procedures have been submitted and favorably reviewed. Submittal of other test documentation, including "highlighted" I/O electrical schematic wiring diagrams with field technician notes are not acceptable substitutes for completion of the formal test documentation.

1.04 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefore.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION**3.01 TESTING****A. General**

1. As part of the requirement of this Specification Section, it is the responsibility of the Contractor to provide a complete connection of the installed sump pumps to the existing control panel. Confirmation of an operational control system is dependent upon results derived from test procedures as specified in this Section.
2. Copies of the completed test procedures, forms and checklists will constitute the required test documentation. The test result forms shall be submitted to Engineer for approval at the completion testing.
3. Provide all special testing materials and equipment. Wherever possible, perform tests using actual process variables, equipment, and data. Where it is not practical to test with real process variables, equipment and data, provide suitable means of simulation. Define these simulations techniques in the test procedures.
4. The Contractor shall coordinate all required testing with the affected Subcontractors, the Engineer, and the District.
5. The Contractor shall furnish the services of field service engineers, all special calibration and test equipment and labor to perform the field tests.
6. Engineer reserves the right to test or retest all specified functions, whether or not explicitly stated on the Test Procedures, as required to determine compliance with the functional requirements of the overall system. Such testing required to determine compliance with the Specified requirements shall be performed at no additional cost to the District. Engineer's decision shall be final regarding the acceptability and completeness of all testing.

- B. Contractor shall support the District in performing Operational Readiness Tests (ORT) and Functional Acceptance Test (FAT) on the existing panels, sump pumps, and HMI. Successful FAT control system field testing shall be completed prior to any control system operation of the process equipment. Testing shall include full confirmation of successful communication to and from the SCADA system on all communication channels and media as well as verification of all monitoring logic. Testing shall include verification by the Contractor of all SCADA HMI addressing. Testing shall be scheduled and coordinated by the District

- C. Field Testing - Following connection of the sump pumps to the process control system , support the District in performing the following:
1. Operational Readiness Test (ORT)
 - a. General: Prior to startup and the Functional Acceptance Test, the indicated system elements shall be certified (inspected, wired, calibrated, tested, and documented) that it is installed and ready for the ORT as defined below.
 - b. Loop/Component Inspections and Tests: System shall be checked for proper installation, calibrated and adjusted on a loop-by-loop and component-by-component basis to ensure that it is in conformance with related submittals and these Specifications. Related loops shall be tested as a system to verify interlocks, operations of functionally related loops, etc., all as specified in Section 11217.
 - c. The Loop/Component Inspections and Tests shall be implemented using Contractor developed, Engineer-approved forms and checklists. Each loop of functionally related group of loops (subsystem) shall have a Loop/Subsystem Status Report to organize and track inspection, adjustment and calibration. These reports shall include the following information and check off items with spaces for sign off by the system supplier:
 - (1) Project Name, Test Date, Contractor Name, and Lead Contractor Technician Name
 - (2) Loop Number or Loops Numbers of a Tested Subsystem
 - (3) Tag Number for each component.
 - (4) Check offs/signoffs for each component:
 - (5) Tag/identification (Loop or Subsystem name)
 - (6) Installation
 - (7) Termination – wiring and tubing
 - (8) Scale, Range, and Setpoint as applicable
 - (9) Calibration/adjustment (4 point for analog, set point for switches) rising and falling
 - (10) Check offs/signoffs for the loop
 - (11) Panel interface terminations
 - (12) I/O interface terminations

- (13) Inputs/Outputs operational: received/sent, processed, adjusted
 - (14) Total loop operation and operation of subsystem associated loops per Section 11217.
 - (15) Space for comments
 - d. The Contractor shall maintain the Loop Status Reports sheets at the job site and make them available to the Engineer at any time.
 - e. These inspections, calibrations, and tests do not require witnessing. However, Engineer shall review Loop Status Sheets and spot-check the Contractor test process periodically. Any deficiencies found shall be corrected by the Contractor prior to commencement of the Functional Acceptance Test.
 - f. Submit ORT results for review by Engineer.
2. Functional Acceptance Test (FAT).
- a. General: Prior to startup, the installed instrument and control system elements as described above shall be certified that it is ready for operation. A witnessed FAT shall be performed on the system to demonstrate that it is operating and in compliance with these Specifications. All preliminary testing, inspection, and calibration shall be complete as defined in the Operational Readiness Test.
 - b. Each specified function and process control shall be demonstrated on a paragraph-by-paragraph, loop-by-loop, panel-by-panel, and site-by-site basis. FAT shall be correlated to the functional verification of the process control descriptions of Section 11217 addressing specific elements of overall system and sub-system control.
 - c. Loop-specific and non-loop-specific tests shall be the same as specified under Factory Tests except that the system shall be tested, and all functions demonstrated using live field-based data to the greatest extent possible. In addition, related loops shall be tested as a system to verify interlocks, operations of functionally related loops, etc., all as specified in Section 11217.
 - d. Updated versions of the documentation specified to be provided for during the Factory Tests shall be made available to Engineer at the job site during the tests. In addition, one copy of all O & M Manuals shall be available for reference at the job site during testing.
 - e. Following initial startup, the control system shall operate for a continuous 100 hours without failure before this test will be

started. Network testing and performance testing shall be on-line and monitoring network operation throughout the 100-hour period.

- f. Punchlist items and resolutions noted during the test shall be documented on the Punchlist/Resolution form. In the event of rejection of any part or function test procedure, the Contractor shall perform repairs, replacement, and/or retest within 10 Days.
- g. Submit FAT results for review by the Engineer.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Provide supports, bracing, anchorage, and appurtenances for above ground piping. Supports shall be as specified herein.
- B. General: Unless otherwise noted, the word "piping" as used herein shall mean pipe, tubing, valves, fittings, and appurtenances. The word "support" as used herein shall mean all manner and type of piping supports as used in the mechanical trades including overhead and wall hangers, brackets, clamps, rods, concrete inserts, struts, miscellaneous metals and non-metallic fabrications, anchorages, and appurtenances for the permanent installation of piping. All piping supports and anchorages are typically not shown on the Drawings. Contractor is to provide calculations and provide supports, braces, anchors, and appurtenances for all piping of the sizes listed above in item 1.01.A, unless supports are shown and detailed on the Drawings.

1.02 RELATED SECTIONS

- A. Section 03600 – Grouts.
- B. Section 05500 – Miscellaneous Metals.

1.03 REFERENCES

- A. California Building Code.
- B. ASCE/SEI Standard 7-05 Minimum Design Loads for Buildings and Other Structures.
- C. NFPA 13 Standard for the Installation of Sprinkler Systems.
- D. ACI 318-08 Building Code Requirements for Structural Concrete.
- E. SMACNA Seismic Restraint Manual: Guidelines for Mechanical Systems.
- F. Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS)
 - 1. MSS SP-58 - Pipe Hangers and Supports - Materials, Design and Manufacture.
 - 2. MSS SP-69 - Pipe Hangers and Supports - Selection and Application.

- G. ASTM International
 - 1. ASTM A36 - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- H. American National Standards Institute (ANSI)
 - 1. ANSI B31.1 - Power Piping.
- I. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 GENERAL REQUIREMENTS

- A. Support, bracing, restraint, and anchorage locations are the responsibility of the Contractor; however, maximum spacing dimensions included herein or designated by codes shall be adhered to. Not all supports, braces, and anchors are shown on the Drawings nor were they intended to be shown. The absence of these supports, restraints, braces, and anchors from the Drawings shall not relieve the Contractor of the responsibility for providing them according to the Contractor's calculations, plans, and details.
- B. The locations of all hangers, braces, supports, anchors, and associated devices shall be coordinated by the Contractor with the Work and existing conditions to prevent conflicts between trades and shall be in accordance with the Contractor's calculations, plans, and details.
- C. The District is the authority having jurisdiction and no building department will review submittals or shop drawings for this Work. The Engineer will review submittals and shop drawings.

1.05 SUPPORT AND ANCHORAGE DESIGN CRITERIA

- A. As a minimum, piping supports shall comply with the requirements of the California Building Code, California Plumbing Code, and California Mechanical Code. Comply with Section 01612 and stricter criteria herein. As a minimum, steel piping shall be provided with braces that satisfy the SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems (latest edition), Seismic Hazard Level A, Connection Level 1.
- B. All piping shall be properly and adequately supported and anchored so as to maintain the supported loads in proper position under all operation conditions without unnecessary movement or strain on any piece of equipment.
- C. The working factor of safety for supports shall be a minimum of 5 times the ultimate pipe load, assuming water-filled pipe is being supported at the maximum spacing as specified.

- D. The minimum factor of safety for thrust anchorage design shall be 1.5. Thrust design shall utilize working pressure plus water hammer; or 1.5 times working pressure; or test pressure; whichever is highest or as noted on the Drawings, and as acceptable to the Engineer. If the test pressure is not noted on the Drawings, it shall be assumed to be 150 psig or 250% of working pressure of chemical piping, whichever is greater.

1.06 QUALITY CONTROL

- A. The supports specified under this Section shall be furnished by a manufacturer or fabricator who is fully experienced, reputable, qualified, and has been regularly engaged in the manufacture (or fabrication) of the items to be furnished, for at least 5 years.

1.07 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit to the Engineer for approval in accordance with the Standard Provisions details of fabrication and/or installation of all items specified herein and/or shown on the Drawings.

1.08 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 20.01 Schedule of Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT - GENERAL

- A. These Specifications call attention to certain features, but do not purport to cover all details of construction of the units.
- B. Plastic piping supported on metal supports shall be wrapped in a minimum 16 gauge sheet metal shield and cover at least 270 degrees of the pipe. Metal shields inside of mechanically ventilated structures shall be galvanized steel. Metal shields outside, in vaults, or areas over water containing structures shall be stainless steel. Minimum shield length shall be 6 inches unless adjoining fittings require a shorter length.
- C. All supports in contact with copper piping shall be coated before installation with a minimum of 1/16-inch thick plasticized coating where in contact with the copper. Alternately, copper plated supports may be used. Contact between dissimilar metals shall be eliminated.
- D. Supports, hangers, hanger rods, and structural attachments shall be the appropriate applicable models as manufactured or fabricated by: Anvil

International, Tolco, Carpenter & Paterson, Inc., Unistrut, Powerstrut, B-Line, Tripac, or equal. The following descriptions and catalog numbers herein refer to Anvil products, except as otherwise noted. Comparable products from listed support manufacturers may be provided.

- E. Where insulated, copper or plastic, fiberglass, or other non-metallic type piping is utilized, the supports shall be similar and suitable models, respectively, to the type called for and specifically suitable for the type of pipe material.

2.02 SUPPORTS FROM BELOW

- A. Manufactured pipe saddle supports for pipes 2-1/2 to 36 inches in diameter shall as a minimum be equal to Anvil Figure 264. Manufactured pipe saddle supports with stanchion (or yolk) for pipes 4 to 36 inches in diameter shall as a minimum be equal to Tolco Figure 319.
- B. All floor supports shall be supplied with support pipes, threaded collars and floor flange with bolts, or base plates as noted or as acceptable to the Engineer. They shall be capable of at least 1-inch of vertical adjustment with the pipe installed unless otherwise noted or acceptable to the Engineer.
- C. Fabricated pipe saddles or preformed channel framing systems shall be utilized for all pipes two inches in diameter and less.
- D. Under base fittings, the base fitting support shall be supplied as shown and required. The lower metal base fitting support shall be similar to the adjustable or fabricated pipe support specified with a companion flange and bolts in place of the pipe saddle.
- E. Pipe saddles for use with insulated piping shall be Anvil Figures 160 through 165 as required.

2.03 MISCELLANEOUS SUPPORTS

- A. Where support is from walls or columns, welded steel brackets Anvil Figure 195 (for pipes up to 12 inches in diameter) and Anvil Figure 199 (for pipes 14 to 30 inches in diameter) or fabricated framing brackets as a minimum and as acceptable to the Engineer shall be furnished along with a standard U-bolt and nuts, Anvil Figure 137. Additional wall bearing plates shall be provided. Horizontal runs of pipe, of 2-inch diameter and smaller, where installed with pipe center line within 4 inches of the face of the wall shall be supported from fiberglass reinforced channels with non-metallic pipe clamps and appurtenances.
- B. Pipe or riser clamps shall as a minimum be Anvil Figure 103 for pipes 3/4-inch to 8 inches in diameter.
- C. Tubing and other piping up to 1-inch in diameter when installed flush against the face of wall or ceiling may be fastened directly to the concrete or steel with Anvil Figure 262 and with two bolts.

- D. Continuous piping supports shall be of the type as acceptable to the Engineer and similar to steel channels as supplied by Powerstrut, Unistrut or equal. The pipe shall be connected to the support by U-bolts at spacing as noted in Paragraph 3.01.
- E. When pipes run along a wall below, or to a plumbing fixture, the supports for these pipes shall be cast brass pattern and when exposed, shall be the same finish as the pipes they support.
- F. Support for rubber hose shall be Electray Ladders as manufactured by Husky-Burndy, Globetray by the Metal Products Division of United States Gypsum, or equal. Ladders shall be supported by vertical cable supports with support hook equal to Husky-Burndy Catalogue No. SH-38 hung from galvanized inserts in concrete or galvanized bolts through steel framing.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All required piping, tubing, fittings, valves, and appurtenances shall be rigidly supported from the structures by acceptable supports, hangers, inserts, or clamps, with adequate provisions for expansion and contraction. A minimum of 3.25-inch clearance (greater as required) shall be provided between all valves, unions, and fittings and walls, piping, equipment, and other obstructions to allow removal and repair. Support shall be provided at, or near, changes in direction, hubs, joints, valves, appurtenances, branches and elsewhere within 3 feet of couplings in accordance with the manufacturer's recommendations, as shown on the Drawings, and as specified, along with the following support spacing:
- B. Horizontal Runs
 - 1. Please note that additional supports and anchors where required by criteria other than the type of pipe or by joints shown on the Drawings shall be the Contractor's responsibility and as acceptable to the Engineer.

Type of Pipe	Maximum Support Spacing (unless otherwise noted)
Waste, drain, and/or vent of any size and other gravity pipe below or in concrete. (Except concrete pipe).	5 feet
Copper pipe or any metal tubing of any size and any metal pipe 1 1/2 inches in diameter or smaller.	6 feet
Hose and plastic pipe	Continuous for hose or at 3.5 feet intervals for pipe, as acceptable to the Engineer
All other metal pipe	10 feet
All other types of pipes	5 feet or as acceptable to the Engineer

- C. Supports shall provide firm support but not so firm as to prevent longitudinal pipe movement due to thermal contraction and expansion. In addition, point loading

shall be avoided for soft or non-metallic piping. Plastic or fiberglass pressure pipe shall be securely anchored to continuous supports, if utilized, with U-bolts spaced at a maximum of 4 feet on center along the pipe.

- D. All pipe shall be anchored at locations and by methods as acceptable to the Engineer. Any continuous pipe supports shall be anchored to the structure at a maximum of every 5 feet.
- E. All pipe supports shall be free of sharp edges, burrs, and rough edges, especially at cut surfaces.

3.02 COATING

- A. After fabrication and before installation all metal surfaces of pipe supports, hangers, anchors, rods, support pipes, brackets, nuts, bolts, washers, and other metal used, shall be either galvanized conforming to ASTM A123, A153, and A385, as applicable (except cast or ductile iron and stainless steel).

3.03 FIELD INSPECTION, TESTING, AND CORRECTION OF DEFICIENCIES

- A. Hangers, supports, and anchors installed on the piping system shall operate satisfactorily as specified in Paragraph 1.02 during the testing of the respective systems. The hangers, supports and anchors shall maintain piping in position without evidence of bending, sagging, warping, vibration, or stress.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Removal and re-installation of insulation on piping, as required by modification of existing emergency shower and eyewashes and rerouting of copper sample pipelines.

1.02 RELATED SECTIONS

- A. Section 15400.10 – Emergency Shower and Eyewash Modification

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit the following, in accordance with the Standard Provisions, for each insulation system:
 - 1. Manufacturer's product data showing conformance with these specifications for required adhesives and appurtenances.

1.04 QUALITY ASSURANCE

- A. Insulation, jackets, and covers shall be securely fastened, neat in appearance, and free of open joints.
- B. Adhesives, coatings, and other products used with insulation shall have a minimum of 5 years of successful application history.
- C. No materials shall contain lead or asbestos.

1.05 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 GENERAL AND MANUFACTURERS

- A. The materials supplied shall conform to all governing codes, standards, and specifications including the requirements of the California Energy Commission. All materials shall be asbestos-free. If any departures from the specification are

deemed necessary, departures shall not be made without prior written approval of Engineer.

- B. Materials and integrated insulation assemblies furnished shall have flame spread ratings of not over 25 (fire resistive), smoke developed rating of not over 50, as established by tests conducted in accordance with ASTM E-84. The treatment of jackets or facings to impart flame and smoke safety must be permanent.
- C. The toxicity of the solvents used shall not exceed a maximum allowable concentration of 200 ppm or the latest value published by the American Conference of Governmental Industrial Hygienists and OSHA.
- D. Adhesives, coatings and vapor barrier materials shall be compatible with the insulation as recommended by the insulation manufacturer. Adhesives and coatings shall be manufactured by Foster Div., H.B. Fuller Co. or Childers Products Co. or equal. H.P. Fuller and Childers Products Numbers are listed below by adhesive/coating types.
 - 1. Lagging adhesive: 30-40, CP50.
 - 2. Vapor barrier coating: 30-35, CP30.
 - 3. Vapor seal adhesive: 85-75, CP82.
 - 4. Duct adhesive: 85-20, CP82.
 - 5. Sealing compound adhesive: 30-45, CP70.
 - 6. Weatherproof mastic: 35-01, CP10.

2.02 INSULATION FOR OUTDOOR PIPING

- A. Insulation Material – Melamine foam insulation with a factory laminated to a reinforced Polyester vinyl jacket (a one-piece insulation system). The insulation shall have an ASTM C 3574 density of 0.56 pound per cubic foot and a “K” factor of 0.26 at 75 degrees F mean temperature.
- B. The factory applied jacket shall be a durable polyester fabric reinforced PVC compound with ultraviolet and flame retardant additives. Jacket shall be 30-mil with a weight of 28-ounce per square yard. Polyester cloth shall be 0.030 inches. Jacket service temperature shall be -40 degrees F to 140 degrees F.
- C. Jacketing shall be chemically resistant.
- D. Each section shall be 4 feet in length and have 2 inch overlapping flaps longitudinally and 2 inch jacket overlap circumferentially on one end.
- E. Jacket shall be available in colors that will be selected to be aesthetically pleasing to the surrounding neighborhood. As such, metal shields shall not be used on the exterior to prevent crushing the insulation; an alternate method shall be provided to maintain continuous insulation while preventing the insulation from crushing.
- F. Manufacturer shall be TechLite 379 Series, or equal.

PART 3 EXECUTION**3.01 GENERAL**

- A. Do not apply insulation prior to testing and acceptance of piping, ductwork and/or equipment. Clean dust, dirt, grease, and moisture from surfaces of pipe and ducts before applying insulation or insulation adhesives. Nameplates and equipment certification and data tags affixed to any piece of apparatus shall not be covered. Where two layers of insulation are used, stagger all joints both ways. Secure each layer independently. Continue insulation and jacketing through walls, partitions, floors and pipe sleeves.
- B. Insulation, adhesives, coatings and vapor barrier materials shall be applied in accordance with manufacturer's recommendations. Do not apply these materials when ambient temperature is above or below the maximum and minimum ambient temperature respectively, specified as limits by the manufacturer.
- C. All penetrations through a vapor barrier for hangers, instruments, etc. shall be sealed to provide a complete vapor barrier. The use of staples or other fasteners that penetrate the vapor barrier is not permitted.

3.02 INSTALLATION OF PIPING INSULATION

- A. Remove and reinstall existing piping insulation on piping connected to the emergency shower eyewash as required to complete piping modifications.
- B. Vapor seal adhesive shall be used to seal seams and to butt sections on all cold piping if self-sealing laps are not provided. The use of staples or any other fastening method that would penetrate the vapor barrier will not be permitted on cold refrigerant systems. Staples may be used on hot piping systems where there is no potential for condensation.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: General requirements for valves, including features, accessories, materials, and installation. See Related Sections for additional requirements applicable to this Section (typical).

1.02 RELATED SECTIONS

- A. Section 09910 – Paints.
- B. Section 15111 – Ball Valves.
- C. Section 15112 – Butterfly Valves.
- D. Section 15113 – Plastic Valves.
- E. Section 15119 – Air and Vacuum Relief Valves.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM A48 - Standard Specification for Gray Iron Castings.
 - 2. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - 3. ASTM A159 - Standard Specification for Automotive Gray Iron Castings.
 - 4. ASTM A240 - Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels.
 - 5. ASTM A276 - Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
 - 6. ASTM A436 - Standard Specification for Austenitic Gray Iron Castings.
 - 7. ASTM A536 - Standard Specification for Ductile Iron Castings.
 - 8. ASTM B30 - Standard Specification for Copper-Base Alloys in Ingot Form.
 - 9. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
 - 10. ASTM B429 - Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

- B. American Water Works Association (AWWA):
 - 1. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - 2. AWWA C500 - Gate Valves for Water and Sewage Systems.
 - 3. AWWA C504 - Standard for Rubber-Sealed Butterfly Valves.
 - 4. AWWA C507 - Ball Valves 6-in Through 48-in.
 - 5. AWWA C508 - Standard for Swing-Check Valves for Waterworks Service, 2-in Through 24-in NPS.
 - 6. AWWA C509 - Resilient-Seated Gate Valves for Water and Sewage Systems.
 - 7. AWWA C511 - Reduced-Pressure Principle Backflow-Prevention Assembly.
 - 8. AWWA C540 - Power-Actuating Devices for Valves and Sluice Gates.
 - 9. AWWA C550 - Protective Epoxy Interior Coatings for Valves and Hydrants.
 - 10. AWWA C800 - Underground Service Line Valves and Fittings.
- C. American National Standards Institute (ANSI):
 - 1. ANSI B2.1 - Specifications, Dimensions, Gauging for Taper and Straight Pipe Threads (except dry seals).
 - 2. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
 - 3. ANSI B16.10 - Face-to-Face and End-to-End Dimensions of Valves.
- D. American Iron and Steel Institute (AISI).
- E. Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS):
 - 1. MSS-SP-60 - Connecting Flange Joint Between Tapping Sleeves and Tapping Valves.
 - 2. MSS-SP-61 - Pressure Testing of Steel Valves.
 - 3. MSS-SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
 - 4. MSS-SP-71 - Cast Iron Swing Check Valves, Flanges and Threaded Ends.
 - 5. MSS-SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Services.

6. MSS-SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends.
 7. MSS-SP-80 - Bronze Gate, Globe, Angle and Check Valves.
 8. MSS-SP-82 - Valve Pressure Testing Methods
 9. MSS-SP-98 - Protective Epoxy Coatings for the Interior of Valves and Hydrants.
- F. National Electrical Manufacturers Association (NEMA).
- G. Underwriters Laboratories (UL).
- H. Factory Mutual Insurance (FM).
- I. NSF International
1. NSF Standard 61 - Drinking Water System Components – Health Effects

1.04 SYSTEM DESCRIPTION

- A. All of the equipment and materials specified herein is intended to be standard for its respective use in controlling the flow of water as noted in the Contract Documents.
- B. Valves, appurtenances and miscellaneous items shall be installed as shown on the Drawings and as specified, so as to form complete workable systems. Some valves are specified in other Sections – see related Sections above.
- C. Unless otherwise noted, valve operators shall be factory mounted, adjusted and tested on the valve for which it is supplied by the valve supplier, the operator manufacturer or an authorized distributor and service facility for the operator as specified herein.

1.05 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Shop Drawings:
1. Submit complete product data and shop drawings required to establish compliance with these Specifications in accordance with the Standard Provisions.
 2. Submittals shall include as a minimum:
 - a. Certified drawings showing all important details of construction and dimensions.
 - b. Descriptive literature, bulletins and/or catalogs of the valve assemblies.

- c. The total weight of each item.
- d. A complete bill of materials.
- e. Recommendations on installation direction with respect to one and two-way flow.
- f. Additional submittal data, where noted with individual valve specifications or pieces of equipment.

C. Quality Assurance/Control

1. Certificates

- a. For each valve specified to be manufactured, tested and/or installed in accordance with AWWA and other standards, submit an affidavit of compliance with the appropriate standards, including certified results of required hydrostatic tests and certification of proper installation.
- b. For valves and other products specified to be NSF 61 certified, provide certificates of compliance with ANSI/NSF Standard 61 for contact with drinking water.

2. Manufacturer's Installation and Application Data

3. Operation and Maintenance Data

- a. Operation and maintenance instructions shall be furnished to the Engineer. The instructions shall be prepared specifically for this installation and shall include all required product data, drawings, equipment lists, descriptions and other information required to instruct operating and maintenance personnel unfamiliar with such equipment.

1.06 QUALITY ASSURANCE

A. Qualifications

- 1. Valves and appurtenances shall be products of well-established firms who have a minimum of 10 years continuous experience, are reputable and qualified in the manufacture of the particular products to be furnished.
- 2. Each product shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.
- 3. All units of the same type shall be the product of one manufacturer.
- 4. Valves shall not be field modified.

B. Certifications

1. The manufacturers shall furnish an affidavit of compliance with Standards referred to herein as specified in Paragraph 1.02. Refer to PART 3 for testing required for certain items in addition to that required by referenced standards.

C. Inspection of the units may be made by the Engineer or other representative of the District after delivery. The equipment shall be subject to rejection at any time due to failure to meet any of the Specification requirements, even though submittal data may have been accepted previously. Equipment rejected after delivery shall be marked for identification and shall be removed from the job site at once.

1.07 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping

1. Care shall be taken in loading, transporting and unloading to prevent injury to the valves, appurtenances, or coatings. Equipment shall not be dropped. All valves and appurtenances shall be examined before installation and no piece shall be installed which is found to be defective. Any damage to the coatings shall be repaired to a new condition.
2. Prior to installation, the ends of all valves shall be acceptably covered to prevent entry of foreign material. Covers shall remain in place until installation.
 - a. All valves 3-in and larger shall be shipped and stored on site until time of use with wood or plywood covers on each valve end.
 - b. Valves smaller than 3-in shall be shipped and stored as above except that heavy cardboard covers may be used on the openings.
 - c. Rising stems and exposed stem valves shall be coated with a protective oil film which shall be maintained until the valve is installed and put into use.
 - d. Any corrosion in evidence at the time of acceptance by the District shall be removed and repaired, or the valve shall be removed and replaced.

B. Storage and Protection

1. Special care shall be taken to prevent plastic and similar brittle items from being directly exposed to the sun, or exposed to extremes in temperature, to prevent deformation. See the individual piping specifications and manufacturer's information for further requirements.

1.08 MAINTENANCE

- A. Special tools and the manufacturer's standard spare parts, if required for normal operation and maintenance, shall be supplied with the equipment, as specified herein.
- B. Furnish all spare parts recommended by the manufacturer of each piece of equipment, including control panels, for the normal operation and maintenance of the equipment for a period of three years after the Notice of Completion and Acceptance of the entire Project. Minimum spare parts shall be as specified in the individual equipment sections.
- C. Provide all special tools required for normal maintenance. Tools shall be packaged in a steel case, clearly and indelibly marked on the exterior to indicate equipment for which tools are intended.
- D. Provide to the District a list of all spare and replacement parts with individual prices and location where they are available.

1.09 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS - GENERAL

- A. Reference is made to Section 15050 for additional requirements, including nameplates, provisions for temporary pressure gauges, protection against electrolysis and anchor bolts.
- B. The use of a manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- C. Valves and appurtenances shall be of the size shown on the Drawings or as noted and as far as possible equipment of the same type shall be identical and from one manufacturer.
- D. Valves and appurtenances shall have the name of the maker, nominal size, flow directional arrows, working pressure for which they are designed and standard referenced, cast in raised letters or indelibly marked upon some appropriate part of the body.
- E. Unless otherwise noted, items shall have a minimum working pressure of 150 psig or be of the same working pressure as the pipe they are connected to, whichever is higher and suitable for the pressures noted where they are installed.

- F. Joints, size and material - unless otherwise noted or required by the Engineer:
 - 1. Except where noted, all joints referred to herein shall be of the same type, nominal diameter, material and with a minimum rating equal to the pipe or fittings they are connected to.
 - 2. Unless otherwise noted on the Drawings, valves and appurtenances shall be of the same nominal diameter as the pipe or fittings they are connected to.
- G. Provide all special adapters as required to ensure compatibility between valves, appurtenances and adjacent pipe.
- H. Valves and actuators located outdoors, within 2 feet above a liquid surface, in vaults, or where otherwise noted shall be especially designed for submerged service where water may completely submerge the valve and operator. All other units shall be as a minimum weather tight.

2.02 EQUIPMENT

- A. See Paragraph 2.01 for submergence requirements.
- B. The valve manufacturer shall supply, and rigidly mount all actuators, including any type of manual or powered actuators, on valves at the factory. The valves and their individual actuators shall be shipped as a unit.
- C. Unless otherwise noted, valves shall be manually actuated; non-buried valves shall have an operating wheel, handle or lever mounted on the operator; buried valves and those with operating nuts shall have a non-rising stem with an AWWA 2-in nut.
- D. Except as otherwise shown on the Drawings or specified herein, all valves 3-in diameter or larger, with the valve center line located 7-ft or more above the operating floor, shall be provided with chain wheel operators complete with chain guides and hot dipped galvanized steel chain, which loop within 4-ft of the operating floor. A galvanized steel bracket shall be provided to hold the chain out of the traveled way.
- E. All actuators shall be capable of moving the valve from the full open to full close position and in reverse and holding the valve at any position part way between full open or closed.
- F. Each operating device shall have cast on it the word "OPEN" and an arrow indicating the direction of operation.
- G. Stem guides shall be of the adjustable wall bracket type, bronze bushed, with maximum spacing of 10-ft as manufactured by Clow, Rodney Hunt, or equal. Extended operating nuts and/or stems shall have universal joints and pin couplings, if longer than 10-ft and a rating of at least five times the maximum operating torque. Stem adapters shall be provided.

- H. Where required by the installation, or as specified, provide the following: extended stem; floor stand and handwheel; position indicator and etched or cast arrow to show direction of rotation to open the valve; resilient, moisture-resistant seal around stem penetration of slab.
- I. Additional valve actuator requirements are included with the individual valve types.
- J. All position indication and direction of opening arrows shall be embossed, stamped, engraved, etched or raised decals.

2.03 FABRICATION

- A. Assembly: All operator and valve assemblies shall be match marked during mounting with indelible markings to illustrate proper relative orientation and facilitate disassembly and reassembly in the field.
- B. Operators for valves shall be provided with support assemblies. Factory mounting of operator and valve shall include placement of 1/4" carbon steel operator support plate between operator and valve. Operator stem and coupling shall be of sufficient length to accommodate 1/4" plate.

2.04 FINISHES

- A. Notwithstanding any of these Specifications, all coatings and lubricants in contact with potable water shall be NSF 61 certified and shall be acceptable for use with that fluid. All coatings applied within the jurisdiction of the Bay Area Air Quality Management District shall be compliant with District Regulation 8.
- B. If not specified herein, coatings shall comply with the requirements of Section 09910. In case of a conflict, the requirements of this Section govern.
- C. If the manufacturer's requirement is not to require finished coating on any interior surfaces, then manufacturer shall demonstrate that interior coating is either impossible to apply or not required, and that all wetted surfaces are NSF 61 certified. All valves proposed to be furnished without interior coating shall be acceptable to the Engineer.
- D. The exterior surface of various parts of valves, operators, floor-stands and miscellaneous piping shall be thoroughly cleaned of all scale, dirt, grease or other foreign matter and thereafter one shop coat of an approved rust-inhibitive primer shall be applied in accordance with the instructions of the paint manufacturer or other primer compatible with the finish coat provided.
- E. Unless otherwise noted, interior ferrous surfaces of all valves shall be given a shop finish of an asphalt varnish conforming to AWWA C509, (except mounting faces/surfaces) or epoxy AWWA C550 with a minimum thickness of 4 mils.
- F. Ferrous surfaces obviously not to be painted shall be given a shop coat of grease or other suitable rust-resistant coating. Mounting surfaces shall be especially coated with a rust preventative.

- G. Special care shall be taken to protect uncoated items and plastic items, especially from environmental damage.

2.05 SOURCE QUALITY CONTROL

- A. Factory inspection, testing and correction of deficiencies shall be done in accordance with the referenced Standards and as noted herein.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. All valves and appurtenances shall be installed per the manufacturer's instructions in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to a new condition before they are installed.
- B. Install all brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings, or otherwise required. Before setting these items, check all Drawings and figures which have a direct bearing on their location. The Contractor shall be responsible for the proper location of valves and appurtenances during the construction of the Work.
- C. All materials shall be carefully inspected for defects in construction and materials. All debris and foreign material shall be cleaned out of openings, etc. All valve flange covers shall remain in place until connected piping is in place. All operating mechanisms shall be operated to check their proper functioning and all nuts and bolts checked for tightness. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced at no additional cost to the District.
- D. Where installation is covered by a Referenced Standard, installation shall be in accordance with that Standard, except as herein modified, and the Contractor shall certify such. Also note additional requirements in other parts of this Specification.
- E. Unless otherwise noted, joints for valves and appurtenances shall be made up utilizing the same procedures as specified under the applicable type connecting pipe joint and all valves and other items shall be installed in the proper position as recommended by the manufacturer. Contractor shall be responsible for verifying manufacturers' torquing requirements for all valves.

3.02 INSTALLATION OF MANUAL OPERATIONAL DEVICES

- A. Unless otherwise noted, all operational devices shall be installed with the units of the factory, as shown on the Drawings or as acceptable to the Engineer to allow accessibility to operate and maintain the item and to prevent interference with other piping, valves and appurtenances.
- B. For manually operated valves 3-in in diameter and smaller, valve operators and indicators shall be rotated to display toward normal operation locations. Manually

operated valves larger than 3-in in diameter shall be installed in accordance with the manufacturer's recommendations for ease of access to the valve operator.

- C. Floor boxes, valve boxes, extension stems and low floor stands shall be installed vertically centered over the operating nut, with couplings as required and the elevation of the box top shall be adjusted to conform with the elevation of the finished floor surface or grade at the completion of the Contract. Boxes and stem guides shall be adequately supported during concrete pouring to maintain vertical alignment.

3.03 FIELD QUALITY CONTROL

- A. Take care not to over pressurize valves or appurtenances during pipe testing. If any unit proves to be defective, it shall be replaced or repaired to the satisfaction of the Engineer.
- B. No testing shall be performed until the manufacturer's service representative has provided written certification that the following installed equipment has been examined and found to be in complete accordance with the manufacturer's requirements.
- C. Functional Test: Prior to plant startup, all items shall be inspected for proper alignment, quiet operation, proper connection and satisfactory performance. All units shall be operated continuously while connected to the attached piping, without vibration, jamming, leakage, or overheating and perform the specified function.
- D. The various pipe lines in which the valves and appurtenances are to be installed are specified to be field tested. During these tests, any defective valve or appurtenance shall be adjusted, removed and replaced, or otherwise made acceptable to the Engineer.
- E. Various regulating valves, strainers, or other appurtenances shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected or the device replaced or otherwise made acceptable to the Engineer.

3.04 CLEANING

- A. All items (including valve interiors) shall be cleaned prior to installation, testing and final acceptance.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Metallic ball valves for various types of service. See Related Sections for additional requirements applicable to this Section (typical).

1.02 RELATED SECTIONS

- A. Section 09910 – Paints.
- B. Section 15110 – Valves-General Requirements.
- C. Section 15113 – Plastic Valves.

1.03 REFERENCES

- A. See reference standards listed in Section 15110.

1.04 SYSTEM DESCRIPTION

- A. All of the valves and materials specified herein are intended to be products of proven ability for use in controlling the flow of fluids under pressure. All valve materials and components shall be recommended by the manufacturer for use in the system fluid (chemical, water, gas, etc.).
- B. Valves, appurtenances, and miscellaneous items shall be installed substantially as shown on the Drawings, so as to form complete, workable systems.

1.05 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit complete information on the valves and appurtenances to the Engineer. Information shall include an affidavit of compliance with the governing standard, manufacturer's data sheets, dimensions, material descriptions, design drawings, operating characteristics (including Cv values as a percentage of valve opening position), manual actuator dimensions, intended service, and all other data required to ensure compliance with these Specifications.
- C. See Section 15110 for other submittal requirements.
- D. For non-water valve applications, provide valve manufacturer certification that the valve materials to be provided are acceptable for each respective service (for example, the valves are acceptable for polymer service, etc.).

1.06 QUALITY ASSURANCE

- A. The valve manufacturer shall demonstrate and document with shop drawing submissions at least 10 years of experience in the manufacture of valves of the type, size, and class contemplated for provision herein.
- B. The Raw Water Flow Control ball valves (tags: RWBV160, RWBV260) shall be manufactured by Henry Pratt Company, APCO, or equal.

1.07 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS**2.01 MATERIALS - GENERAL**

- A. Reference is made to Section 15110 for additional valve requirements.
- B. The use of a manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- C. Valves and appurtenances shall be of the size shown on the Drawings or as noted and equipment of the same type shall be identical and from one manufacturer.
- D. Valves and appurtenances shall have the name of the maker, nominal size, flow directional arrows, working pressure for which they are designed and standard referenced, cast in raised letters or indelibly marked upon some appropriate part of the body.
- E. Unless otherwise noted, items shall have a minimum working pressure of 150 psig or be of the same working pressure as the pipe they are connected to, whichever is higher and suitable for the pressures noted where they are installed.
- F. Provide all special adaptors as required to ensure compatibility between valves, appurtenances and adjacent pipe.
- G. Refer to Section 15110 for NSF 61 certification requirements.

2.02 BALL VALVES

- A. Ball Valves - Water Service, smaller than 4-inch
 - 1. Ball valves smaller than 4-inch for water service (water service includes plant water, raw water, settled water, filtered water, filtered-to-waste water, treated water, washwater (backwash water), centrate, decant, connecting drains and vents to these services, and similar services) shall

be manual or manual and electric actuated as shown on the Contract Documents, resilient seated, regular port, threaded two piece body type valves. These valves shall be lead-free. The body and cap shall be of brass, ASTM B30, the ball and stem of Type 316 stainless steel and the seats and seals of TFE.

2. Valves shall have full port floating ball and shall be non-lubricated. Valve seats shall be easily accessible and replaceable. Valves located outdoors or in below grade vaults, handholes, or manholes shall have stainless steel handles. Valves shall be rated to a minimum of 150 psi and shall be as manufactured by Neles-Jamesbury; WKM; Worcester; or equal.

2.03 FABRICATION

- A. All operator and valve assemblies shall be match marked during mounting with indelible markings to illustrate proper relative orientation and facilitate disassembly and reassembly in the field.

2.04 FINISHES

- A. Notwithstanding any of these Specifications, all components, coatings, and lubricants used in ball valves in contact with potable water shall be NSF 61 certified and shall be acceptable for use with potable water.
- B. If not specified herein, coatings shall comply with the requirements of Section 09910. In case of a conflict, the requirements of this Section govern.
- C. The exterior surface of various parts of valves, operators, floor-stands and miscellaneous piping shall be thoroughly cleaned of all scale, dirt, grease or other foreign matter and thereafter one shop coat of an approved rust-inhibitive primer shall be applied in accordance with the instructions of the paint manufacturer or other primer compatible with the finish coat provided.
- D. Unless otherwise noted or required by NSF certification, interior ferrous surfaces of all valves in water service shall be given a shop finish of an asphalt varnish (except mounting faces/surfaces) or an epoxy complying with AWWA C550, with a minimum thickness of 4 mils.
- E. Ferrous surfaces obviously not to be painted shall be given a temporary shop coat of grease or other suitable rust-resistant coating. Mounting surfaces shall be specially coated with a rust preventative.
- F. Special care shall be taken to protect uncoated items and plastic items, especially from environmental damage.

2.05 SOURCE QUALITY CONTROL

- A. Factory inspection, testing and correction of deficiencies shall be done in accordance with the referenced Standards and as noted herein.

2.06 FACTORY MOUNTING OF OPERATORS AND VALVES

- A. All operator and valve assemblies shall be match marked during mounting with indelible markings to illustrate proper relative orientation and facilitate disassembly and reassembly in the field.

PART 3 EXECUTION**3.01 PREPARATION**

- A. Valves and appurtenances will have their exterior surfaces painted as required in Section 09910, except that stainless steel surfaces are not required to be painted.

3.02 INSTALLATION

- A. Inspection prior to installation and installation shall be in accordance with the manufacturer's written instructions unless otherwise specified. Adjust limit switches for proper operation on those valves so equipped.
- B. Valves shall be supported to avoid placing loads on connecting piping until pipe and valve supports are completed.
- C. Clean valve interiors and test for proper operation before piping testing.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Above-grade butterfly valves for all services. See Related Sections for additional requirements applicable to this Section (typical).

1.02 RELATED SECTIONS

- A. Section 09910 – Paints.
- B. Section 15110 – Valves -- General Requirements.

1.03 REFERENCES

- A. All reference standards are contained in Section 15110.

1.04 SYSTEM DESCRIPTION

- A. All of the valves and materials specified herein are intended to be products of proven ability for use in controlling the flow of fluids under pressure.
- B. Valves, appurtenances, and miscellaneous items shall be installed substantially as shown on the Drawings, so as to form complete, workable systems.
- C. All valves shall be NSF 61 certified or all wetted surfaces shall be NSF 61 certified products including linings, gaskets and other components in contact with water. Listed or substituted products that are not NSF Standard 61 certified or in the process of obtaining NSF Standard 61 certification at the time of first submittal shall be considered unacceptable for use in the above listed water contact applications. If the manufacturer is in the process of obtaining NSF Standard 61 certification, state the testing organization and the status of certification.

1.05 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Complete information on the valves and appurtenances to be supplied shall be furnished to the Engineer. Information shall include an affidavit of compliance with the governing standard, manufacturer's data sheets, dimensions, material descriptions, design drawings, operating characteristics (including Cv and head loss as a percent of valve position), intended service, and all other data required to ensure compliance with these Specifications.

- C. Submittal shall include the following documentation:
 - 1. Manufacturer's statement stating that all valve and actuator parts including coatings and linings that will be in contact with potable water are NSF Standard 61 compliant for conveyance of potable water.
 - 2. Provide coating and lining specifications used for shop and field coatings to be applied to valve with NSF Standard 61 certification for those surfaces of the valve that will be in contact with potable water.
- D. Submit for Engineer's favorable review, third party inspector(s) qualifications confirming the inspector has 3-year previous experience inspecting and testing valves. Provide a minimum of three references from other customers using this service.
- E. Approved third party inspector(s) shall witness all material fabrication, including foundry processes, material composition verification, coating inspections and factory leak and hydro tests. All third party inspection reports, including instrument calibrations and final results, are to be supplied to the District.
- F. Submit certified copies of test results as specified herein by Section 5 of ANSI/AWWA C504, with an affidavit of compliance as indicated in Section 1.7 of C504, before the valves are shipped. Certified copies of physical and chemical test results shall be submitted for the materials of construction of valve components. Manufacturer shall submit certification that each valve and all appurtenances furnished is in accordance with the reference standards. Submit pressure, vacuum and temperature ratings of valve.
- G. See Section 15110 for additional required submittals.
- H. For non-water valve applications, provide valve manufacturer certification that the valve materials to be provided are acceptable for each respective service (for example, the valves are acceptable for sludge service, etc.).

1.06 QUALITY ASSURANCE

- A. The valve manufacturer shall demonstrate and document with shop drawing submissions at least 10 years of experience in the manufacture of valves of the type, size, and class contemplated for provision herein.

1.07 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS**2.01 GENERAL REQUIREMENTS FOR BUTTERFLY VALVES**

- A. Butterfly valves shall be Class 150B where the valve is not listed in a schedule or where the class is not shown. All butterfly valves shall have flanged ends and be short body unless otherwise shown on the Drawings or otherwise specified.
- B. All valves shall be provided with manual actuators in addition to any other actuator (operator) specified. All manual actuators shall be provided with a 2-inch operating nut, handwheel, and position indicator. In-plant valves position more than 6 feet above the operating floor shall be equipped with chainwheels unless otherwise noted. Manual valve actuators shall be capable of holding the disc in any position without creeping or fluttering. Manual actuators shall be serviceable without removal from the valve. Valve disc stops and a shaft seal shall be incorporated between the manual actuator and the valve. Flow stops in the valve flow stream will not be allowed.
- C. Unless otherwise specified, all valves shall be left hand to open (counterclockwise). Each valve body or actuator shall have cast thereon the word "OPEN" and an arrow indicating the direction to open.
- D. All ferrous (but non-stainless steel) metal surfaces of valves and accessories, both interior and exterior, shall be shop painted for corrosion protection. All butterfly valves shall have an interior epoxy coating in compliance with AWWA C550.
- E. Handwheel diameters shall be at least 8 inches but not more than 24 inches. Pull to operate valves with handwheels shall not exceed 40 pounds.
- F. Valve seats shall be of synthetic Buna-N compound. As an alternate, corrosion resistant material (epoxy) shall be used to mechanically secure the seat.
- G. Valve shafts shall be turned, ground, and polished and shall be constructed of Type 304 or 316 or ASTM A564 stainless steel. On valves larger than 20-inch, and all Class 250 valves, the disc shall be secured to the shafts with pins. These pins shall be of the same material as the shaft and pass completely through the disc and shaft. Pins shall be tightly secured with lockwashers and nuts to ensure line vibrations cannot loosen the connection. On Class 150 butterfly valves smaller than 20-inch, stainless steel pressure fit pins may be used.
- H. Valve bearings shall be sleeve type, corrosion resistant, and self-lubricating. Bearing load shall not exceed 20 percent of the compressible strength of the bearing or shaft materials, and shall be secured in the trunnion by a machined ledge. Ferrous bearings in the flow stream shall not be allowed.
- I. Shaft seals shall be of the chevron or O-ring type.
- J. Cartridge retained seats in the valve body are not acceptable.

- K. Flange gaskets shall be one-piece, 1/8-inch thick, full face gaskets, constructed of materials that are suitable for the intended service. Gaskets that are in contact with water shall be NSF 61 certified and resistant to chloramines.
- L. After each valve is completely assembled, including the actuator, it shall be operated several times in the factory to ensure it is in working condition. Each valve shall be shop tested and certified for leakage with the disc in the horizontal plane, in accordance with AWWA C504.

2.02 BUTTERFLY VALVES FOR WATER SERVICE

- A. Butterfly Valves for Water Service
 - 1. Butterfly valves shall have cast iron bodies (ASTM A126 Class B or A48 Class 40). Discs shall be Ni-resist (ASTM A436 Type 1) or cast iron with Ni-chrome or Type 316 stainless steel seating edges.
 - 2. Butterfly valves shall be as currently manufactured by Henry Pratt Company, Clow-Kennedy-M&H Valve Company, DeZurik, or equal.

2.03 FACTORY TESTING

- A. The Contractor must include in its Bid and provide at no additional costs to the District a third party independent testing inspector that will be present for all factory testing.
- B. All factory work must be witnessed by an authorized third party inspector approved by the District and with at least 3-year previous experience inspecting and testing valves. Third party inspectors shall witness all material fabrication, including foundry processes, material composition verification, coating inspections and factory leak and hydro tests. All inspection reports, instrument calibrations and final results are to be supplied to the District. Costs for the inspection services are to be paid for by the Contractor. The use of manufacturer's or Supplier's factory QA personnel will not be considered compliance with this requirement.
- C. District has the option to witness any factory tests with its own personnel.
- D. Contractor must verify and ensure compliance with all Specification requirements irrespective of the extent, presence, or absence of inspection of the work during its progress.
- E. After the valves and actuators are completely assembled in the factory, the complete assemblies must be operated at least three times in the factory to ensure they are in working condition.
- F. Painting and Coating Inspection shall ensure the following:
 - 1. Painting shall be applied in accordance with the painting specification Section 09910.

2. The painting surface shall be well finished, free from bare spots, bubble, blistering, peeling, foreign matter and other harmful defects.
 3. All surfaces of the valve shall be clean, dry and free from grease before applying paint or coating.
 4. Painting and Coating shall be NSF Standard 61 certified for valve interior surfaces that will be in contact with potable water.
 5. The final dry film thickness of painting shall be tested with dry film thickness gauge and shall be recorded.
 6. Seating surfaces shall be provided with the manufacturers standard unless otherwise specified.
- G. Visual Inspection of Castings and Machined Surface. Surface of the castings shall be free from any harmful defects such as gas holes, and inclusions, shrinkage, adhering sand, scales, cracks and hot tears, etc. on both external and internal surfaces. The machined surface shall be free from harmful material defects, scratch, retained chip and burrs, etc.
- H. Valve Body Test (Shell Test)— Hydrostatic test shall be performed at 300 psi for class 150 valves. The disc shall be slightly open, and the test pressure shall be applied to the valve to pressurize the entire body and packing to the test pressure for a period of 10 minutes. No visible leakage shall occur as verified visually and by test pressure gauge.
- I. Closed stops (both body and actuator) shall be verified and set after successful completion of the seat leak test.
- J. Perform torque tests on actuators to ensure compliance with these Specifications.

PART 3 EXECUTION

3.01 PREPARATION

- A. Valves and appurtenances which will be installed in-plant shall have their exterior surfaces painted as required in Section 09910.
- B. Piping with linings that adjoin butterfly valves shall be tapered as required to all free rotation of the butterfly valve disc.

3.02 INSTALLATION OF BUTTERFLY VALVES

- A. Inspection prior to installation and installation shall be in accordance with AWWA C504, Appendix A, unless otherwise specified. Installation shall be in accordance with the manufacturer's written instructions.

- B. The valve and actuator manufacturer(s) may provide an experienced, competent, and authorized representative(s) of the manufacturer(s) of the valves and actuators who shall:
1. Visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation.
 2. Be present and verify proper disassembly of actuator from valve by the Contractor. Contractor shall provide match marks to the valve mounting pad in accordance with manufacturer requirements to properly find the zero position of the valve disc established at the factory for reassembly.
 3. Be present and verify proper reassembly of actuator onto valve by the Contractor. Upon reassembly, Contractor shall facilitate access for representative to view the valve disc so that it gets positioned to dead zero appropriately.
 4. Contractor shall not mix or match valves with actuators upon reassembly that were not tested together at the factory. Serial Numbers will be verified from the factory to assure this has not taken place in the field.
 5. Be present when the equipment is placed in operation.
 6. Revisit the job site as often as necessary until any problems are corrected and the equipment installation and operation are satisfactory in the opinion of Engineer.
- C. If a representative(s) of the manufacturer(s) cannot be present on the construction site as specified in Paragraph 3.02B, the manufacturer(s) shall provide the District with detailed written instructions on how to verify proper installation and how to perform comprehensive testing that is required to confirm conformance with these Specifications.
- D. Butterfly valves shall be supported to avoid placing loads on connecting piping until backfill or pipe supports are completed.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Valves of different plastic formulations for chemical systems, water, and other uses. See Related Sections for additional requirements applicable to this Section (typical).

1.02 RELATED SECTIONS

- A. Section 15110 – Valves – General Requirements.

1.03 REFERENCES

- A. All reference standards are contained in Section 15110.

1.04 SYSTEM DESCRIPTION

- A. All of the valves and materials specified herein are intended to be products of proven ability for use in controlling the flow of fluids under pressure.
- B. Valves, appurtenances, and miscellaneous items shall be installed substantially as shown on the Drawings, so as to form complete, workable systems.

1.05 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Complete information on the valves and appurtenances to be supplied shall be furnished to the Engineer. Information shall include a certification for use in the various chemicals, manufacturer's data sheets, dimensions, material descriptions, design drawings, operating characteristics (including Cv factors at various percentages of open), number of turns to open, intended service, and all other data required to ensure compliance with these Specifications.
- C. See Section 15110 for other submittal requirements.
- D. For non-water valve applications, provide valve manufacturer certification that the valve materials to be provided are acceptable for each respective service (for example, the valves are acceptable for polymer service, etc.).

1.06 QUALITY ASSURANCE

- A. The valve manufacturer shall demonstrate and document with shop drawing submissions at least 10 years of experience in the manufacture of valves of the type, size, and class specified for provision herein. Factory inspection, testing

and correction of deficiencies shall be done in accordance with the referenced standards, manufacturer's written instructions, and as noted herein.

1.07 SPECIAL TOOLS AND SPARE PARTS

- A. Special tools and the manufacturer's standard stock of spare parts, if required for normal operation and maintenance of the valve, shall be supplied with each distinct type or size of valve.

1.08 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hayward, Chemtrol, Asahi/America, or equal.

2.02 VALVES - GENERAL

- A. Reference is made to Section 15050 for additional requirements affecting valves. The valve manufacturer shall provide specific written recommendations for solvent and primer. Valves shall meet the requirements of this Section; valves not otherwise specified shall be suitable and recommended by the manufacturer for continuous use for the intended service, meet nationally recognized standards, and shall be selected to have a minimum service life of 20 years.
- B. Valves and appurtenances shall be of the same nominal diameter as the pipe or fittings they are connected to or as specifically shown on the Drawings.
- C. Valves and appurtenances shall have the name of the maker, nominal size, flow directional arrows, working pressure for which they are designed and standard referenced, cast in raised letters or indelibly marked upon some appropriate part of the body.
- D. Unless otherwise noted, valves shall have a minimum working pressure of 120 psig at 70 degrees F or be of the same working pressure as the pipe they are connected to, whichever is higher and suitable for the pressures noted where they are installed. All valves shall be given hydrostatic and pressure and leakage tests at the factory.
- E. Joints, size and material - unless otherwise noted or required by the Engineer:
 - 1. Except as otherwise noted valve ends for valves 3-inch and smaller shall be socket-type designed for solvent welding. Valve ends for valves 4-inch and larger shall be flanged. All joints referred to herein shall be of the

same type, nominal diameter, material and with a minimum rating equal to the pipe or fittings with which they are connected.

- F. Provide all special adaptors and stem extensions, manual gear operating mounting kits, chain operators, switch box adaptation kits, as required to ensure compatibility between valves, actuators, appurtenances and connecting piping.
- G. Valves and actuators located outdoors, within a building below grade, within 2-ft above liquid, in vaults, or where otherwise noted shall be especially designed for submerged service where water may completely submerge the valve and operator. All other units shall be as a minimum weather tight.
- H. All valve ends shall be provided by the valve manufacturer.
- I. All valves and wetted materials shall be certified for contact with potable water in accordance with ANSI/NSF Standard 61 – Drinking Water System Components – Health Effects.

2.03 VALVE MATERIALS – CHEMICAL COMPATIBILITY

- A. Each manufacturer shall provide confirmation that these materials as used in their products have excellent corrosion resistance to the listed chemicals with respect to precise material formulation, durometer, and actual installation experience. All valves shall be certified as completely compatible with the intended and specified service; compatibility shall apply to the material of the valve and internal components, including all seals, gaskets, O-rings and washers; solvents and primers used in valve joint make-up shall be specifically in conformance with the written instructions of the valve supplier. Teflon sealing gaskets or O-rings shall not be used if other elastomers are chemically compatible due to the tendency of Teflon gaskets to take a set with infrequent use.
- B. Liquid Alum service:
 - 1. Formula: $\text{Al}_2(\text{SO}_4)_3$
 - 2. Concentration: 48%
 - 3. Specific gravity: 1.3
 - 4. Viscosity: 24.7 cp
 - 5. pH: 3.5 (1% solution)
 - 6. Valve materials: PVC, Teflon (see paragraph 2.03A above), EPDM, Viton

- C. Water service:
 - 1. Potable and non-potable, chlorinated and chloraminated to 5 ppm or less
 - 2. Valve materials: PVC, CPVC, Teflon (see paragraph 2.03A above), EPDM, and Hypalon.
- D. Valve body materials shall generally be the same as the piping service and shall be those as listed above for the type of chemical service.
 - 1. Polyvinyl chloride (PVC) shall be Class 12454-B (Type I, Grade 1), per ASTM D1784 classification, made from unplasticized polymer, and generally suitable for service to 120 degrees F.
- E. Unless otherwise specified:
 - 1. O-rings, valve seats and stem seals shall be PTFE, or PTFE encapsulated elastomer. Alternative materials may not be substituted without complete documentation provided to the Engineer of service suitability.
 - 2. Gaskets shall be low torque, full face and have two concentric, convex, molded rings between the center hole and bolt hole circle. Gaskets shall be PTFE-bonded EPDM.
 - 3. Valve external hardware shall be Type 316 stainless steel. No internal metallic components shall be exposed to the service fluid.

2.04 BALL VALVES

- A. Ball valves shall be the double-union end type, unless otherwise specified, with full-port opening. Provide quarter-turn manual valve operator and valve seat adjustability. Provide electric actuators per Section 13446 or position switches where specified or shown on the Drawings.

PART 3 EXECUTION

3.01 PRE-INSTALLATION REFRESHER TRAINING

- A. Prior to any installation of plastic valves under this Section, Contractor shall schedule and conduct a minimum 1 hour long installation refresher training session between an authorized valve manufacturer technical representative and the Contractor's staff who will be installing these valves. The purpose of this refresher training is to review the correct installation practices, common problems, and provide the opportunity for Contractor's staff to ask questions. The manufacturer's technical representative shall address the causes of such problems as gluing together valve components, scoring of balls and O-rings, joint failure due to over-tightening of threaded joints or over-torquing of flange bolts, and practices to avoid damage from thread tape, debris, and dried glue.

3.02 INSTALLATION

- A. The Contractor shall provide the crew size recommended by the valve manufacturer for correct installation at all times. The manufacturer's written instructions on valve installation shall be followed at all times.
- B. After the first 3 valves of every type have been installed by Contractor's staff, the valve manufacturer's technical representative shall visit the site, disassemble these valves, and discuss the quality of the installation with the Contractor and Engineer.
- C. Valves shall be supported to avoid placing loads on connecting piping until pipe supports are completed.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

- A. Furnish all labor, materials, equipment, and incidentals necessary to furnish, test, and install air-vacuum relief valves as shown on the Drawings and as specified herein. See Related Sections for additional requirements applicable to this Section (typical).

1.02 RELATED SECTIONS

- A. Section 09910 – Paints.
- B. Section 15110 – Valves – General Requirements.

1.03 REFERENCES

- A. All reference standards are contained in Section 15110.

1.04 SYSTEM DESCRIPTION

- A. All of the valves and materials specified herein are intended to be products of proven ability for use releasing trapped air and preventing vacuum conditions for fluids in piping normally under pressure.
- B. Valves, appurtenances, and miscellaneous items shall be installed substantially as shown on the Drawings, so as to form complete, workable systems.

1.05 SUBMITTALS

- A. Submittals shall be in accordance with the Standard and Special Provisions.
- B. Complete information on the valves and appurtenances to be supplied shall be furnished to the Engineer. Information shall include manufacturer's data sheets, dimensions, material descriptions, weights, operating characteristics, intended service, troubleshooting guides, and all other data required to ensure compliance with these Specifications.
- C. See Section 15110 for other submittal requirements.

1.06 QUALITY ASSURANCE

- A. The valve manufacturer shall demonstrate and document with shop drawing submissions at least 10 years of experience in the manufacture of valves of the type, size, and class contemplated for provision herein.

1.07 MEASUREMENT AND PAYMENT

- A. Measurement and Payment for “**Air-Vacuum Relief Valve**” bid item shall be lump sum and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in installing the valve and tee on the existing pipeline, including, but not limited to, removal of existing pipe elbow, connection of pipe tee, steel pipe, butterfly valve, air-vacuum valve, stainless steel piping, miscellaneous steel, flanged coupling adapter, cleaning, and leak testing and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 VALVES – GENERAL REQUIREMENTS

- A. Reference is made to Section 15050 for additional requirements, including nameplates, provisions for temporary pressure gauges, protection against electrolysis and anchor bolts. All materials, including but not limited to, valve body, seats, gaskets, and internal components shall be constructed of materials recommended for the intended service. Coatings in contact with water shall be suitable for potable water service.
- B. The use of a manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- C. Valves and appurtenances shall be of the size shown on the Drawings or as noted and valves of the same type shall be identical and from one manufacturer.
- D. Valves and appurtenances shall have the name of the maker, nominal size, flow directional arrows, working pressure for which they are designed and standard referenced, cast in raised letters or indelibly marked upon some appropriate part of the body.
- E. Unless otherwise noted, air-vacuum relief valves shall have a minimum working pressure of 150 psig or be of the same working pressure as the pipe they are connected to, whichever is higher and suitable for the pressures noted where they are installed.
- F. Joints, size and material – unless otherwise noted or required by the Engineer:
 - 1. Except where noted, all joints referred to herein shall be of the same type, nominal diameter, materials and with a minimum rating equal to the pipe or fittings they are connected to.
 - 2. Unless otherwise noted on the Drawings, valves and appurtenances shall be of the same nominal diameter as the pipe or fittings they are connected to.
 - 3. Valve to have flanged ends.

- G. Provide all special adaptors as required to ensure compatibility between valves, appurtenances and adjacent pipe.
- H. Refer to Section 15110 for NSF 61 certification requirements.

2.02 VALVES

A. Air-Vacuum Valves

1. Manufacturers:
 - a. Crispin-Multiplex Mfg.
 - b. Val-Matic
 - c. APCO Valve & Primer Corporation
 - d. Or equal.
2. This Paragraph applies to all air-vacuum relief valves.
3. Valves shall be supplied with butterfly valves. Valves shall be properly vented and piped to drain.
4. The large orifice assembly air and vacuum valve shall automatically exhaust air from a pipeline during the initial filling of the pipeline. The large orifice assembly shall not blow shut while exhausting air, even while venting air at sonic velocity. When all air has been exhausted from the pipeline, the large orifice float ball shall be buoyed up to seat tightly against a resilient seat ring. The large orifice float ball shall remain tightly closed while the pipeline is under positive pressure. Should the pipeline pressure fall below atmospheric pressure (such as during draining or a line break), the large orifice float ball shall automatically fall away from the seat ring and permit air to enter the pipeline.
5. The large orifice assembly shall be furnished with cast iron body and cover (ASTM A126-B). A seat ring shall be affixed to the valve cover. The float ball shall be constructed of stainless steel with a minimum pressure rating of 1,000 psi.
6. For air-vacuum valves mounted directly on top of pipelines a butterfly valve shall be used for the isolation valve (between the air/vacuum valve assembly and the pipeline).
7. Valves shall be supplied with a secured fine mesh stainless steel insect screen and/or vent screen on the venting outlet of the valve.

2.03 FINISHES

- A. Not with standing any of these Specifications, all components, coatings, and lubricants in contact with potable water shall be NSF 61 certified and shall be acceptable for use with that fluid. All coatings applied within the jurisdiction of the Bay Area Air Quality Management District shall be compliant with District Regulation 8.

- B. If not specified herein, coatings shall comply with the requirements of Section 09910. In case of a conflict, the requirements of this Section govern.
- C. If the manufacturer's requirement is not to require finished coating on any interior surfaces, then manufacturer shall demonstrate that interior coating is either impossible to apply or not required, and that all wetted surfaces are NSF 61 certified, and shall be acceptable to the Engineer.
- D. The exterior surface of various parts of valves and miscellaneous components shall be thoroughly cleaned of all scale, dirt, grease or other foreign matter and thereafter one shop coat of an approved rust-inhibitive primer shall be applied in accordance with the instructions of the paint manufacturer or other primer compatible with the finish coat provided.
- E. Unless otherwise noted, interior ferrous surfaces of all valves shall be given a shop finish of an asphalt varnish (except mounting faces/surfaces) or epoxy with a minimum thickness of 4 mils.
- F. Ferrous surfaces obviously not to be painted shall be given a shop coat of grease or other suitable rust-resistant coating. Mounting surfaces shall be especially coated with a rust preventative.
- G. Special care shall be taken to protect uncoated items and plastic items, especially from environmental damage.

PART 3 EXECUTION

3.01 PREPARATION

- A. Valves and appurtenances which will be installed in-plant shall have their exterior surfaces painted as required in Section 09910.

3.02 INSTALLATION

- A. Inspection prior to installation and installation shall be in accordance with the manufacturer's written instructions. The rate of air release shall be adjusted as required to avoid water hammer conditions in piping it serves.
- B. The outlets of air and vacuum relief valves provided under this Section shall be piped to 3 inches above a floor or equipment drain unless other outlet piping is shown on the Drawings. If no floor or equipment drain is present within 6 feet horizontally of the valve, the outlet piping shall be piped to within 3 inches of the floor. Piping shall be Type L copper unless otherwise noted. Provide at least one union in the outlet piping to aid removal of the valve (this union may not be shown on the Drawings).
- C. Valves shall be supported to avoid placing loads on connecting piping until pipe supports are completed.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes flanged coupling adapters.
- B. This Section is provided if the Contractor wishes to use flanged coupling adapters for installing a new steel pipe tee on the existing wastewater return pump discharge pipeline.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM A36 - Standard Specification for Structural Steel.
 - 2. ASTM A183 - Carbon Steel Track Bolts and Nuts.
 - 3. ASTM A 278, Class 30 - Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650°F.
 - 4. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - 5. ASTM A325 - Standard Specification for High-Strength Bolts for Structural Steel Joints.
 - 6. ASTM A575 - Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grade.
 - 7. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
 - 8. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
- B. American National Standards Institute (ANSI)
 - 1. ANSI A13.1 - Scheme for the Identification of Piping Systems.
 - 2. ANSI B1.1 - Unified Inch Screw Threads (UN and UNR Thread Form).
 - 3. ANSI B2.1 - Specifications, Dimensions, Gauging for Taper and Straight Pipe Threads (except dry seals).
 - 4. ANSI B16.5 - Pipe Flanges and Flange Fittings.
 - 5. ANSI B18.2 - Square and Hex Bolts and Screws Inch Series Including Hex Cap Screws and Lag Screws.
 - 6. ANSI B31 - Code for Pressure Piping, B31 Interpretation.

- C. American Society of Mechanical Engineers (ASME)
- D. National Sanitation Foundation (NSF) Standard 61.
- E. American Welding Society (AWS)
 - 1. AWS B3.0 - Welding Procedure and Performance Qualifications
- F. American Water Works Association (AWWA)
 - 1. AWWA C-206 - Grooved and Shouldered Type Joints.
 - 2. AWWA C-219 – Bolted, Sleeve-Type Couplings for Plain End Pipe.
 - 3. AWWA C-800 – Underground Service Lines Valves and Fittings.
 - 4. AWWA Manual M11 - Steel Pipe - A Guide for Design and Installation.
- G. Compressed Gas Association, Inc. (CGA)
 - 1. V-6-Standard Cryogenic Liquid Transfer Connections.
 - 2. CGA Publication G-4-1, Cleaning Equipment for Oxygen Service.

1.03 GENERAL DESCRIPTION

- A. All of the assemblies and materials specified herein are intended to be products of proven ability for use in systems under pressure.
- B. Piping specialties shall be installed substantially as shown on the Drawings, so as to form complete, workable systems.
- C. All piping specialties shall be NSF 61 certified or all wetted surfaces shall be NSF 61 certified products including linings, gaskets and other components in contact with water unless otherwise noted.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit product data and manufacturer's installation and testing instructions for each item provided under this Section.
- C. Provide certificates of compliance with ANSI/NSF Standard 61 for contact with drinking water.

1.05 QUALITY ASSURANCE

- A. All products shall be produced by firms with a minimum of 10 years of experience in manufacturing these items. The use of a manufacturer's name and/or model number is for the purpose of establishing the standard of quality and general configuration desired.

1.06 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 FLANGED COUPLING ADAPTERS (FCA'S)

- A. Flanged coupling adapters shall be rated at the working pressure of the joining piping or 150 psig, whichever is greater. Couplings shall also be designed for the actual soil loads for each installation condition if buried. Anchor studs shall be supplied when indicated on the Drawings. All couplings shall be factory cleaned and given a fusion bonded epoxy coating in accordance with AWWA C213. Coatings shall be NSF 61 certified for those portions in contact with the fluid. Non-insulated flanged coupling adapters shall be Dresser 913, JCM 303, Romac FC400, or equal. Insulated flanged coupling adapters shall be Dresser 933, Smith-Blair 933, or equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. In general, install products in conformance with the manufacturer's written instructions.
- B. Install custom enclosures in sequence with piping assembly. Confirm field fit and modify as required for liquid-tight joints.

3.02 PREPARATION

- A. Install FCAs in accordance with the manufacturer's written instructions. All dirt, scale, weld splatter, water and other foreign matter shall be removed from the inside and outside of all pipe and sub-assemblies prior to installing.
- B. All pipe joints and connections to equipment shall be made in such a manner as to produce a minimum of strain at the joint.
- C. Installation of Pipeline Appurtenances:
 - 1. All pipeline appurtenances shall be installed as required and in accordance with the manufacturer's recommendations, as acceptable to the Engineer.
 - 2. Meters and similar in-line items shall be isolated from testing pressures in excess of the rated pressure of the assembly.
 - 3. Use Teflon tape and/or thread compound approved for the service on all screwed fittings.

4. Restrain piping and fittings as required for testing and permanent installation.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish and install all piping, including fittings, accessories, coatings and linings as shown on the Drawings, described in the Specifications and as required to completely interconnect all piping for a complete and operable system
- B. Where the words "pipe" or "piping" are used, it shall refer to pipe, fittings, and appurtenances.

1.02 RELATED SECTIONS

- A. Section 09910 – Paints.
- B. Section 15120.10 – Flanged Coupling Adapters.

1.03 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Prior to completing shop drawings for piping, the Contractor shall expose and verify the exact location of all points of tie-in and all obstacles. The tie-ins and obstacles shall be surveyed into the project coordinate system by the Contractor. Any deviations to the lines and grades shown on the Drawings shall be called out to the Engineer in the piping submittal. With the Contractor's survey information, the proper alignment and/or grade will be confirmed by the Engineer before shop drawings are favorably reviewed. Submit shop drawings for the Engineer's approval prior to fabrication. Shop drawings shall show the details of fabrication of fittings, and assembly of pipe and fittings for completed pipeline. Shop drawings shall show field location number of each fitting and piece of pipe.
- C. Submit welding process and procedure for approval prior to start of fabrication.
- D. Submit certification of welders prior to start of work.
- E. Furnish mill certificates, or certificates from approved testing laboratory or other source, for the steel used for pipe cylinders, showing conformance to appropriate ASTM Specifications including chemical and physical characteristics.
- F. Furnish certificate from approved testing laboratory or other source for cement conformance to appropriate ASTM Specifications.
- G. Furnish a list of field location numbers for each fitting and piece of pipe with the cylinder manufacturing number of all cylinders used in the fabrication of each fitting or piece of pipe prior to shipment.

- H. Furnish cylinder manufacturing test reports, hydrostatic test reports, non-destructive welding test reports, and all the other test reports as required herein and by the referenced standard specifications including optional documents and field test results along with the appropriate information to insure compliance with these specifications.
- I. Submit coating material for underside of manhole covers with manufacturer's application instructions.
- J. Layouts and Schematics: Submit detailed installation drawings of all piping and connected equipment. The drawings shall include all pipe sections, fittings, valves, and other appurtenances. Provide as a minimum:
 - 1. Pipe section number with stations and invert elevation of ends of each pipe section along with lay direction.
 - 2. Invert elevation and station of all changes in elevation or horizontal alignment.
 - 3. Working profile: Submit a working profile of the pipelines prior to start of construction. The working profile shall be on profile paper and drawn to scales approved by the Engineer. It shall show the pipeline grades, the found line, type and location of each pipeline joint, details and location of all specials including vertical and horizontal angles, intersecting utilities found from potholing, and the type and location of all appurtenances to the pipeline.
 - 4. Fabrication details for all pipe sections, specials, elbows, nozzles, bevels, and closure joints to include cylinder thickness, lining thickness, pipe and bell diameters.
- K. Design calculations for the conditions specified herein and shown on the Drawings. Calculations shall include as a minimum internal pressure, deflection, buckling, thrust restraint, fitting and opening reinforcement, lifting and installation loads. Calculations shall include all formulas used, values of constants in the formulas, internal pressure values, deflection, external loads, and unbalanced forces.
- L. Quality control information on pipe manufacturer and pipe fitting and special manufacturer.
- M. Results of all tests required by this specification section.
- N. Certification that pipe, fittings and linings are listed by ANSI/NSF Standard 61 for drinking water contact.

1.04 QUALITY ASSURANCE

- A. The manufacturer is responsible for the performance of all inspection requirements as specified in AWWA C200. In addition, all pipe and fittings to be installed under this Contract may be inspected at the plant for compliance with

these Contract Documents by the Engineer and/or an independent testing laboratory selected by the District.

- B. Inspection of the pipe and fittings may also be made by the Engineer or other representatives of the District after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be immediately removed from the job site.
- C. All pipe and fittings shall be hydrostatically tested at the factory to the greater of the test pressure indicated in the Pipe Schedule or 50% above the working pressure.

1.05 DESIGN CONDITIONS

- A. Working and test pressures as follows:
 - 1. Working Pressure Range (PSIG): 30-40
 - 2. Test Pressure (PSIG): 100
- B. The steel wall thickness shall be increased, as required, at all bends, fittings, and anchorage locations where thrust is transmitted by the pipe.
- C. Steel wall thickness design shall be based on a maximum coating thickness of 3/4-inch and a maximum lining thickness of 0.5-inch even though actual coating and lining thickness to be furnished may be greater.
- D. Pipe and fittings including lining shall be listed by ANSI/NSF Standard 61 for drinking water contact.

1.06 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 PIPE AND FITTINGS

- A. Welded steel pipe and fittings shall be manufactured of steel plate of the thickness as specified or as determined by manufacturer's design. Minimum steel wall thickness shall be 3/16-inch for pipe less than 24-inches in diameter. Pipe materials, fabrication, and shop testing of straight pipe shall conform to the requirements of the AWWA C200. All outlets, 4-inch diameter and larger, shall be provided with reinforcing designed for the water working pressure and test pressure specified, or shown. For pipe 14-inches in diameter and larger, the inside diameter after lining shall not be less than the nominal diameter specified

or shown. Pipe smaller than 14 inches in diameter may be furnished in standard outside diameters.

- B. The minimum yield strength of the steel shall not be less than 33,000 psi and the design stress shall not exceed 50% of yield point. For steel with minimum yield strength greater than 33,000 psi, the design stress shall not exceed 50% of the yield point or 21,000 psi. Steel plate $\frac{1}{4}$ " thick or greater shall be tested for notch toughness using the Charpy V-notch test. The steel shall withstand a minimum impact of 25 ft.-lb. at a temperature of 30-degrees F. 2-inch tensile test specimens shall show a minimum elongation of 22 percent
- C. Minimum pressure rating shall be 100 psi for these pipe and fittings. Working and test pressures shown in Paragraph 1.05.A.
- D. Fittings and specials shall be fabricated in accordance with AWWA C200, Section 4, including non-destructive testing by dye penetrant of welds not previously tested in the straight pipe. Fittings shall conform to the dimensions of AWWA C208 or may be fabricated into standard pipe lengths. Tees shall be reinforced in accordance with ASME Pressure Vessel Code, Section VIII Paragraph UG-37 or AWWA M11 Chapter 13. Fittings and specials not covered by the Drawings, AWWA C208, or AWWA M11 shall conform to the details furnished by the manufacturer and as acceptable to the Engineer.
- E. Pipe and fittings shall be clearly marked with: the manufacturer's name or trademark; nominal pipe size; schedule, class or wall thickness of item; standard specification designation; type of pipe; top of pipe when installed, and pressure rating.
- F. Manufactured pipe or fabricated pipe fittings shall be flanged or with couplings as noted on the Drawings. Flanges shall conform either to AWWA C207 Class D or ANSI B16.5 Class 150. Flanges shall have flat faces and shall be attached with bolt holes straddling the vertical axis of the pipe unless otherwise shown. Attachment of the flanges to the pipe shall conform to the applicable requirements of AWWA C207.

2.02 APPURTENANCES AND ADDITIONAL PIPE JOINTS

- A. Split ring type couplings shall conform to AWWA Standard C606, current revision, unless otherwise noted. Grooves shall be radius cut for manufactured pipe and built up for fabricated pipe. Pipe thickness shall be designed to account for the material lost in the grooves. Ends for use with buried split ring type couplings shall be of the flexible type, unless otherwise noted.
- B. Couplings shall be as specified in Section 15120.10 and as shown on the Drawings.
- C. Gaskets shall be full face type for flanged joints and of suitable type for other joints. Gasket material shall be rubber suitable for potable water and in accordance with AWWA C207 as applicable.

- D. All gaskets, bolts, nuts and other required hardware shall be provided for connection of piping and appurtenances. Bolts and nuts shall, except as otherwise specified or noted on the Drawings, be Grade B conforming to the ASTM, Standard Specifications for threaded Low-Carbon Steel, Externally and Internally Threaded Standard Fasteners, designation A307 bolt studs. Studs shall be of the same quality as machine bolts. All other hardware shall be of the size, type and number as required and recommended by the piping or fitting manufacturer and as specified herein.
- E. The manufacturer shall supply sufficient removable packaging and internal stulling to prevent deformation of all fabricated pipe.
- F. Non-shrink grout employed in the interior joints shall be per Section 03600.
- G. Provide dished heads or equivalent bulkheads to accommodate pressure and leak testing specified herein. Bulkheads shall be located so as to permit all joints to be tested, including joints on each side of valves.

PART 3 EXECUTION

3.01 SHOP FABRICATION, SURFACE PREPARATION, AND COATINGS

- A. All piping shall be shop fabricated, welded, lined and coated as much as possible and field work shall be kept to a minimum.
- B. Upon completion of the welding, but before lining, each steel plate special shall be bulk headed and tested under a hydrostatic pressure of not less than 1-1/2 times the pressure for which the pipe has been designed, provided, however, that if straight pipe used in fabricating the specials has been previously tested in accordance with AWWA C200, the circumferential welds may be tested by a dye penetrant process with no further hydrostatic test. Any pin holes or porous welds which may be revealed by the test shall be chipped out and rewelded and the pipe or fitting retested.

3.02 SHOP COATINGS AND LININGS FOR FABRICATED PIPE

- A. Interior surfaces of all steel pipe, fittings, and specials shall be cleaned and lined in the shop with cement mortar lining applied centrifugally in conformity with C205. Wire mesh reinforcement shall be used in mortar lining of fittings and specials. Cement shall be ASTM C150, Type II. Lining thickness and thickness tolerances shall be as specified in AWWA C205. Linings shall be suitable for water flow velocities up to 20 feet per second. Interior surfaces of thredolets, weldolets, couplings, half-couplings, nozzles, flanged nozzles, split-ring coupling connections, and other outlets shall be cleaned, primed, and finish-painted as specified in Section 09910. All coatings applied within the jurisdiction of the Bay Area Air Quality Management District shall be compliant with District Regulation 8.
- B. The exterior surfaces of welded steel pipe and fittings which are exposed to atmosphere inside structures, above ground, or as otherwise specifically indicated, shall be cleaned, primed, and finish-painted as specified in

Section 09910. All coatings applied within the jurisdiction of the Bay Area Air Quality Management District shall be compliant with District Regulation 8.

- C. Curing of the lining shall continue at least until the exterior coating is applied. Curing of the finished pipe shall continue until 48 hours prior to shipment of pipe to the project site. The ends of the pipe shall be sealed with heavy plastic during the periods between placement of the lining and coating, and between placement of the coating and the time the pipe is lowered into the trench. End covers shall remain in place throughout the entire transportation process. Pipes received with end covers torn or missing may be rejected by the Engineer.
- D. Linings shall be tapered next to butterfly valves and other appurtenances where required to allow the full range of movement and operation of such valves and appurtenances within the pipeline.

3.03 FIELD COATING AND LINING TOUCH UP

- A. Field coating and lining at welded joints and for repairs shall be in accordance with AWWA C205, except the repair mix shall be non-shrink grout. No bare metal will be permitted. Materials used for field touch up shall be furnished by the pipe manufacturer and applied by the pipe manufacturer or Contractor. The minimum thickness of field applied linings and coatings shall be equal to the thickness specified herein. Note that field application must be kept to an absolute minimum.
- B. Cracks in linings and coatings greater than 1/16-inch in width shall be repaired by the Contractor.

3.04 SHIPPING, DELIVERY, HANDLING AND STORAGE

- A. Care shall be taken during loading, transporting and unloading to prevent injury to the pipes, fittings, linings, or coatings. Pipe or fittings shall not be dropped.
- B. Pipe shall be transported from the coating plant to the job site on padded bunks with nylon tie-down straps or padded banding to adequately protect the pipe and coating.
- C. Pipe shall be handled, stored and shipped in a manner that will prevent damage to the coating and lining. Pipe shall be handled with wide belt slings or rubber padded forklifts. Chains, cables or other equipment likely to cause damage to the pipe, lining, or coating shall not be used.
- D. No metal tools or heavy objects shall be permitted to come into contact unnecessarily with the finished lining or coating. Workers will be permitted to walk upon the coating only when necessary, in which case they shall wear shoes with rubber or composition soles and heels. All pipe and fittings specials and couplings shall be examined before installation, and no piece shall be installed which is found to be defective. Any damage to the coatings or lining shall be repaired as acceptable to the Engineer as noted previously in this Part 3.
- E. Stored pipe shall at all times be supported on sawdust bags, sand bags, or other suitable support. Bags shall be of sufficient size to prevent contact of the pipe

coating with the ground or any other obstruction. Rolling the pipe on any surface will not be permitted. Pipe ends shall be closed with polyethylene covers. Cement mortar lined pipe shall have water introduced regularly in order to prevent the lining from drying out.

3.05 INSTALLATION

- A. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until they are used in the work, and when installed, shall conform to the lines and grades shown on the Drawings. Where only end point elevations are given on the Drawings, the Contractor shall install the pipe at a uniform grade between the two points.
- B. The Contractor shall regulate its equipment and construction operations such that the loading on the pipe does not exceed the loads for which the pipe is designed and manufactured.
- C. Except as otherwise provided herein, pipe and fittings shall be installed in accordance with the requirements of AWWA M11. Special care shall be taken in placing the pipe and making the field joints. Bumping of the pipe in the trench will not be permitted. Fabric slings shall be used for handling coated pipe, and sandbags or cradles shall be used to support the pipe when stockpiled.
- D. All pipe shall be sound and clean before installation. When installation is not in progress, the open ends of the pipe shall be closed by watertight plug or other approved means. Good alignment shall be preserved during installation. The deflections at joints shall not exceed that recommended by the manufacturers.
- E. All pipe shall be stored in such a manner that the lining and coating will not crack or otherwise be damaged due to the effects of freezing and thawing, sunlight, and dry weather conditions.
- F. It shall be the Contractor's responsibility to ensure compatibility of all piping connections.

3.06 JOINT INSTALLATION

- A. Flanged joints shall be made with gasket, bolts and nuts, bolt studs with a nut on each end, or studs with nuts where the flange is tapped. The number and size of bolts shall conform to the same Standard Specifications as the flanges.
- B. Harnessing and additional information on joints for split ring or sleeve type couplings are specified in Section 15120.10.

3.07 FIELD TESTING AND CORRECTION OF DEFICIENCIES

- A. Testing of the pipe as specified in the paragraphs below shall be carried out after all appurtenances have been installed. At least 7 days shall elapse after the last concrete anchorage and/or structure has been cast if normal cement is used. If high-early strength cement is used, elapsed time may be reduced to 3 days. An electrical continuity test shall be carried out prior to pressure and leakage tests.

- B. All pipe and fittings shall be pressure and leakage tested in accordance with AWWA Manual M11 and as follows:
1. Duration of each Test: 2 hours.
 2. Pressure for each Test: Fifty (50) percent above normal operating pressure, or as noted in the Pipe Schedule.
- (Note: Valves and appurtenances shall not be operated at higher than their rated pressure, temporary bulkhead methods may be required.)
- C. If leaks are discovered during any test, they shall be repaired by the Contractor as part of the work of installing this pipe and appurtenances as acceptable by the Engineer. The Contractor shall supply all labor, equipment, material, gages, pumps, electricity, etc., required to conduct the tests.
- D. Care shall be taken by the Contractor in providing and operating all safety materials, vents, drains, etc., and providing for other safety of all personnel during testing. The Contractor's schedule, test procedures and equipment shall be submitted to the Engineer for review at least 30 days prior to the start of testing. No visible leakage will be permitted.
- E. To prevent pipe breakage caused by water hammer during initial filling, the approximate filling time per 1,000 feet of pipeline is to be a minimum of 35 minutes.
- F. All equipment, pipe, and appurtenances shall be repaired or replaced and the tests repeated at the Contractor's expense until the pipe, appurtenances, and equipment are in satisfactory compliance with these Contract Documents.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Stainless steel pipe, and fittings.
- B. The work includes, but is not necessarily limited to:
 - 1. Furnishing and installing stainless steel pipe, fittings and specials with screwed, welded, flanged, grooved, ring, shoulder, and plain ends.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM A182 - Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
 - 2. ASTM A240 - Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheets and Strip for Pressure Vessels.
 - 3. ASTM A262, Practice A - Standard Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels.
 - 4. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - 5. ASTM A276 - Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
 - 6. ASTM A312 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipe.
 - 7. ASTM A530 - Standard Specification for General Requirements for Specialized Carbon and Alloy Steel Pipe.
 - 8. ASTM A774 - Standard Specification for As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures.
 - 9. ASTM A778 - Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products.

- B. American National Standards Institute (ANSI):
 - 1. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
 - 2. ANSI B16.9 - Factory-Made Wrought Steel Buttwelding Fittings.
 - 3. ANSI B31.1, Paragraph 127.5 - Power Piping.
 - 4. ANSI B36.19 - Stainless Steel Pipe.
 - 5. ANSI/NSF Standard 61 – Drinking Water System Components – Health Effects.
- C. American Water Works Association (AWWA):
 - 1. AWWA C207 - Steel Pipe Flanges.
 - 2. AWWA C606 - Grooved and Shouldered Joints.
- D. American Society of Mechanical Engineers (ASME):
 - 1. ASME B31.1 - Power Piping.
 - 2. Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators.
- E. American Welding Society (AWS).

1.03 SYSTEM DESCRIPTION

- A. Piping shall be installed in those locations as shown on the Drawings so as to form a complete, smooth flow path.
- B. The equipment and materials specified herein are intended to be standard types of stainless steel pipe and fittings for use in transporting gases

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Provide product data including manufacturer's information on pipe, fittings, joints, couplings, harnesses, expansion joints, gaskets, fasteners, and other accessories.
- C. Support and anchorage calculations in compliance with Sections 01612 and 15061 where applicable. Calculations shall be prepared by a California registered civil or structural engineer.
- D. Provide manufacturer's certification that materials meet or exceed minimum requirements as specified.
- E. Submit results from integrity and leakage testing.

1.05 QUALITY CONTROL

- A. Stainless steel pipe and fittings shall be furnished by a single manufacturer who is fully experienced, reputable, qualified and regularly engaged for the last five years in the manufacture of the materials to be furnished. The pipe and fittings shall be designed, constructed and installed in accordance with the best industry practices and methods for the intended service and shall comply with these Specifications.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe, tubing, and fittings. Pipe, tubing, and fittings shall not be dropped. Pipe and fittings shall be examined before installation and no piece shall be installed which is found to be defective. Openings shall be kept covered while pipe and fittings are stored.
- B. In handling the pipe, wide cushioned slings shall be used or other devices and methods compatible with the printed instructions of the pipe manufacturer. No uncushioned ropes, chairs, wedges or levers shall be used in handling the pipe, tubing, fittings and couplings.
- C. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe by the Contractor, at no additional cost to the District. All pipe and fittings shall be thoroughly cleaned before installation and shall be kept clean until they are put into service.

1.07 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS**2.01 MATERIALS**

- A. Pipe and Fittings
 - 1. All Type 316 stainless steel pipe and fittings shall be fabricated from stainless steel sheet and conform to ASTM A240 Type 316, ASTM A778, and ANSI B36.19.
 - 2. A threaded connection shall be provided where stainless steel pipe connects to the air-vacuum release valve.

2.02 FABRICATION

- A. Pipe shall be die-formed or rolled true to dimension and round. Tolerances for length, inside and outside diameter and straightness shall conform to ASTM A530. The two edges of sheet shall be brought to line so as not to leave a shoulder on the inside of the pipe. Ends of pipe and fittings shall be perpendicular to the longitudinal axis. Longitudinal seams on pipe and fittings shall be welded by either the tungsten gas or the metallic-gas method. The interior welds shall be smooth, even and shall not have an internal bead higher than 1/16-in. All pieces shall be marked with gauge and type of stainless steel and with the initials of the inspector marked on the inside of each piece, at each end.
- B. Fittings shall be butt weld type for sizes 2-inch and larger, manufactured in accordance with ASTM A774, A778, and ANSI B16.9 of the same raw material and in the same thicknesses as the pipe. Long radius elbows up to and including 18-in diameter shall be smooth flow; i.e., centerline to end of elbow radius shall equal 1.5 times the nominal pipe size. Reducers shall be straight tapered, cone type. Tees, crosses, laterals and wyes shall be shop fabricated from pipe, and in addition, stainless steel reinforcement pads shall be fully welded to the branch and run of the pipe to maintain the specified pressure rating of the system.

- C. Stainless steel pipe and fittings shall be supplied with the following wall thicknesses:

Diameter (Inches)	Wall Thickness Schedule per ANSI B36.19
4 inches and less	40S

- D. All stainless steel pipe and fittings shall be pickled at the point of manufacture, scrubbed and washed until all discoloration is removed. Pickling of piping with hydrochloric acid or other acid harmful to the base metal shall not be allowed. Pipe and fittings shall be sandblasted or cleaned with solvent or other means acceptable to the Engineer.
- E. Shop welding of fabrications shall be done according to the procedures and by welders certified per ASME Section IX. Welds shall be by an inert gas shielding process using only extra low carbon filler metals. Welds shall have a bead height of no more than 1/16-in. Butt welds shall have 100 percent penetration to the interior or backside of the weld joint. Cross-sectional thickness of welds shall be equal or greater than that of the parent metal.
- F. All gaskets, glands, bolts, nuts, and other required hardware shall be provided for connection of piping and appurtenances. Bolts and nuts shall, except as otherwise specified or noted on the Drawings, be Type 316L stainless steel. Studs shall be of the same quality as machine bolts. All other hardware shall be of the size, type, and number as required and recommended by the piping or fitting manufacturer and as specified herein.

PART 3 EXECUTION**3.01 INSTALLATION OF PIPING**

- A. All pipe and fittings shall be installed true to grade and alignment and pipe anchorage and/or restraint shall be provided where required. Manufacturer's instructions shall be strictly followed. All pipe shall be welded except where flanges, couplings, or flanged coupling adapters are shown on the Drawings.
- B. To assemble the joints in the field, the Contractor shall thoroughly clean all joint surfaces and gaskets, if any, with soapy water before assembly. Bolts shall be tightened alternately, evenly to the manufacturer's specified torques. Under no condition shall extension wrenches or pipe-over-handle ratchet wrenches be used to secure greater leverage. All electrical bonding or insulation shall be installed as joints are made up.
- C. Fittings, in addition to those shown on the Drawings, shall be provided if required. Due consideration shall be given to thermal expansion/contraction over a temperature range of 200 degrees F.
- D. When cutting of pipe is required, the cutting shall be done by machine neatly, without damage to the pipe. Cut ends shall be smooth and at right angles to the axis of the pipe.

3.02 FIELD WELDING

- A. Welding in the field of exposed pipe shall be kept to a minimum. Field welds shall be made by welders certified under ASME Section IX and be equal in all respects to shop welds. After field welding has been done, all joints shall be thoroughly cleaned and buffed using stainless steel deburring and finishing wheels.

3.03 FIELD CLEANING AND DISINFECTION

- A. After installation, stainless steel piping and tubing shall be washed to remove any foreign material picked up during transport, storage, and installation.

3.04 FIELD TESTING

- A. Test all piping for leakage and integrity as specified in the Piping Schedule. Furnish all labor, testing plugs, caps, blanks, and fittings, dry, clean air supply, blocking, gauges, and all other equipment required. No testing against valves is permitted. All testing shall be completed in the presence of the Engineer and test reports shall be prepared for each test.
- B. Replace all faulty joints, fittings, gaskets, and pipe as required to obtain a successful pressure test. Retest after repairs are made.

3.05 PROTECTION

- A. All pipe and fittings shall be protected from dirt, dust, oil, grease and other foreign matter during installation to prevent damage to pipe and to ensure no foreign matter is left in the piping.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Plastic pipe and fittings for Schedules 40 and 80 thermoplastic drainage piping, and plastic hose.

1.02 RELATED SECTIONS

- A. Section 09910 – Paints.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
 - 2. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.
 - 3. ASTM D2447 - Standard Specification for Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter.
 - 4. ASTM D2464 - Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
 - 5. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
 - 6. ASTM D2467 - Standard Specification for Socket - Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
 - 7. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
 - 8. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
 - 9. ASTM F437 - Standard Specification for Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
 - 10. ASTM F438 - Standard Specification for Socket - Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40.

11. ASTM F439 - Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
 12. ASTM F441 - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
 13. ASTM F493 - Standard Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
 14. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.
 15. ASTM F594 - Standard Specification for Stainless Steel Nuts.
 16. ASTM F1674 – Standard Test for Joint Restraint Products for Use with PVC Pipe.
- B. American National Standard Institute (ANSI):
1. ANSI B16.5 Pipe Flanges and Flanged Fittings.
- C. National Sanitation Foundation (NSF) Standard 61.
- D. American Water Works Association (AWWA):
1. C105 - Polyethylene Encasement for Ductile Iron Pipe Systems
 2. C110 ANSI Standard for Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48-in for Water.
 3. C900 Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In. through 12 In. for Water Distribution.
 4. C905 Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 14 In. through 48 In. for Water Transmission and Distribution.

1.04 SYSTEM DESCRIPTION

- A. Piping shall be installed in those locations as shown on the Drawings.
- B. The equipment and materials specified herein are intended to be standard types of plastic pipe, hose, and fittings for use in transporting potable water, wastewater, and miscellaneous drainage.
- C. Plastic piping, hoses, and fittings shall be designed for 150 psig at a minimum temperature of 80 degrees F unless otherwise noted.

1.05 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submittals shall include the following:
 - 1. Product data. Include details of double containment fittings.
 - 2. Manufacturer's storage, transportation, installation, and testing instructions.
 - 3. Manufacturer's qualifications and experience in producing the products specified herein.
 - 4. Five copies of each PVC solvent weld pipe and fittings manufacturer's recommended assembly instructions including preparation, gluing technique, and assembly steps. Three of these copies shall be returned to the Contractor for distribution and use by the people completing this type of work.
 - 5. Written confirmation of chemical compatibility for chemical services.
 - 6. Certification that pipe, fittings and joint materials are listed by ANSI/NSF Standard 61 for drinking water contact.
- C. Shop drawings for buried pipe shall not be submitted without the Field Verification Report described below. The shop drawings shall be adjusted so that vertical and horizontal alignments conform with field locations of existing crossing utilities and connecting pipelines as determined in the Field Verification Report.
- D. The contractor shall field verify all existing crossing utilities and connecting pipelines, and prepare a Field Verification Report. The report shall include the size, horizontal and vertical location and material for each crossing utility or connecting pipeline. Additionally for connecting pipelines, the location of the nearest joints either side of the point of connection shall be determined. The Field Verification Report shall be prepared by the contractor prior to preparing pipe shop drawings.

1.06 QUALITY ASSURANCE

- A. All plastic pipe and fittings of each material and type (e.g., Schedule 80 and 40, C900, C905) shall be furnished by a single manufacturer who is experienced in the manufacture of the items to be furnished. All hose for each distinct application shall be furnished by a single manufacturer who is experienced in the manufacture of the items to be furnished. The pipe, hose, and fittings shall be designed, constructed and installed in accordance with the best United States industry practices and methods and shall be suitable for the intended service.
- B. The hose manufacturer shall guarantee that the hose supplied is adequate and suitable for the intended service.

- C. The Contractor's attention is directed to the importance that all employees assembling PVC piping be trained by the pipe and solvent cement manufacturer's authorized representatives in correct assembly techniques to avoid damage to other components, ensure proper function, and to avoid guaranty period work to correct deficiencies caused by improper assembly techniques.
- D. All items furnished under this Section shall be suitable for extended and reliable use with the indicated chemicals as appropriate for the intended service. The supplier(s) of the items under this Section shall review and confirm that the materials listed are suitable for the intended service. If suppliers believe that other materials are more suitable and durable for the intended service, they shall be provided at no additional cost to the District after approval by the Engineer.

1.07 MEASUREMENT AND PAYMENT

- A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work and no additional time or compensation be allowed therefor.
- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS FOR SCHEDULE 80 AND SCHEDULE 40 PVC PIPING

- A. Poly (Vinyl Chloride) and Chlorinated Poly (Vinyl Chloride) Pipe and Fittings – PVC and CPVC
 - 1. See all reference standards above. Pipe shall be manufactured from PVC compounds meeting ASTM D1784, Class 12454-B in accordance with ASTM D1785, PVC 1120. The pipe shall have a minimum hydrostatic design stress of 2,000 psi at 73 degrees F and shall be suitable for field cutting and solvent welding.
 - 2. Fittings shall be the socket type for solvent welded joints conforming to ASTM D2467 or ASTM D2466 where Schedule 40 pipe is specified. Fittings shall be manufactured from PVC compound meeting ASTM D1784, Class 12454-B. Solvent cement shall be as specified in ASTM D2564. Primer shall be as recommended by the pipe and fitting manufacturer for the piping service (e.g., chemical type) and installation conditions.
 - 3. For drain service, drain and waste fittings (e.g., long radius ells, sanitary tees, wyes, cleanouts, etc.) shall be used.
 - 4. All unions and transition unions shall be by Chemtrol, Spears, Asahi, or equal.

5. Pipe, fittings and solvent shall be certified by NSF in accordance with NSF Standard Nos. 14 and 61. The NSF seal shall be included on the pipe.
- B. Threaded joints shall be as specified under the applicable ASTM standard for the pipe and fittings being used. Thread sealer shall be thread tape which shall be standard industrial quality Teflon, Type 1. **Threaded joints shall not be used with PVC pipe.**
- C. Flanged Joints
 1. Where flanged joints are shown on the Drawings, they shall be supplied with 1/8-in thick full-faced Viton, PTFE gaskets, or equal as required for product service. Backer flanges of Type 304 stainless steel shall be provided for all PVC flanges on chemical piping.
 2. Flange bolt spacing, number and dimensions shall conform to the requirements of ANSI B16.5. CPVC and PVC flanges shall be single piece, suitable for solvent cementing to the pipe and shall be suitable for a minimum pressure of 150 psi.
 3. Bolts, nuts and washers for flanged joints shall be for corrosive service conditions and shall be ASTM F593 and F594, Type 316 stainless steel. Anti-seize compound for stainless steel bolts and nuts shall be of a molybdenum disulfide base.
- D. Fittings, specials, unions and flanges shall be of the same schedule number and manufactured of the same materials as the pipe. Whenever unions are called out on the Drawings (except at pump piping installations), flanged connections may be substituted, provided that dimensional controls do not preclude use of flanges.
- E. Contractor shall use the primer and cement (glue) currently recommended by the pipe and fitting and cement manufacturers for specifically each application. Application information shall include pipe and fitting material (e.g., PVC, CPVC), and installation and temperature conditions.
 1. Contractor is to provide special primer and cement for use with Caustic Soda and Sodium Hypochlorite, along with a certificate from the primer/solvent manufacturer that the products being supplied is specifically for use with those chemicals.
- F. Expansion joints for PVC and CPVC sizes 1/2-in to 6-in shall be telescoping type, Schedule 80, as manufactured by Plastinetics, Inc.; ASAHI/America, or equal. Expansion in pipes smaller than 1/2-in shall be accommodated with expansion loops unless otherwise shown on the Drawings.

2.02 MATERIALS FOR PLASTIC HOSE

- A. Provide PVC hose if not otherwise listed or shown on the Drawings. All products and materials shall be NSF 61 approved.

- B. PVC Hose Manufacturers:
1. Kuriyama of America
 2. New Age Industries
 3. or approved equal
- C. Hose sizes refer to hose inside diameter.
- D. The length of hose shall be adequate for intended service and installation. Joints are not allowed inside containment piping except where shown in vaults and structures. Hose shall be furnished in custom reel lengths (hose reel lengths in excess of 100 feet) to meet the project installation requirements. Joints in buried piping between vaults and elsewhere will not be accepted. Camlock and threaded couplings shall be compatible with the chemical service.
- E. PVC Hose: Hose shall be standard wall PVC, reinforced, FDA or NSF 61 approved suitable for chemical carrier application and installation in containment piping. Hoses shall be suitable for pulling through long containment piping as shown on the Drawings. Hose shall, at minimum, be rated for the following minimum working pressures:
1. ½" hose: 250 psi at 70 deg. F
 2. ¾" hose: 225 psi at 70 deg. F
 3. 1" hose: 225 psi at 70 deg. F
 4. 1 ½" hose: 175 psi at 70 deg. F
 5. 2" hose: 150 psi at 70 deg. F
 6. 2 ½" hose: 50 psi at 70 deg. F
 7. 3" hose: 50 psi at 70 deg. F
- F. Unless shown otherwise on the Drawings, transitions from hose to rigid piping shall be made using manufacturer-fabricated threaded couplings or camlock-type couplings. Hose barb fittings may be used only where other types of couplings are unavailable or infeasible and as approved by the City Representative. Hose barb fittings material and type and the rigid piping fitting for connection to the hose barb fitting shall be as recommended by the hose manufacturer for the chemical service. The hose to barb fitting connection shall be made with a Type 316 stainless steel hose clamp except for Sodium Hypochlorite Service shall be Hastalloy C or Titanium). The type of hose clamps shall be as recommended by the hose manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION OF SCHEDULE 80 AND 40 PVC PIPING

- A. The installation of plastic pipe shall be strictly in accordance with the pipe and solvent cement (where applicable) manufacturer's technical data and printed instructions. Manufacturer's representatives shall visit the site of the work and review/instruct Contractor's personnel on the proper assembly, handling, and testing of plastic pipes and fittings. This instruction shall be for a minimum of 1 hour and the manufacturer's representative shall provide at least 3 copies of installation procedures to the Contractor. Instruction shall include cutting, fitting,

beveling, sanding, primer and glue practices, snaking of pipe, assembly to account for pipe expansion and contractions, and the avoidance of common problems.

- B. Joints for PVC and CPVC pipe shall be solvent cemented unless flanged or threaded are otherwise shown on the Drawings or are specified as other types herein. In making solvent cemented connections, clean dirt and moisture from pipe and fittings, bevel pipe ends slightly with emery cloth to remove any shoulder or burrs created by cutting of the pipe. Solvent cement joints shall be made in accordance with ASTM D2855 except that solvent cement formulated especially for and as specified above shall be used for joining CPVC pipe and fittings. Primer shall be used whenever recommended by the pipe, fitting, or cement manufacturer and in all cases for joints on pipe systems 4-in in diameter or larger. Solvent cement joints shall not be completed, and the work shall stop when the temperature, measured in the shade, is less than or equal to 40 degrees F and falling.
 - 1. See previous requirement for use of special primer & solvent for use on Caustic Soda and Sodium Hypochlorite piping systems
- C. Joints between PVC drain, waste and vent pipe and cast-iron soil pipe shall be made with approved mechanical compression joints or transition unions designed for such use.
- D. Installation of valves and fittings shall be in accordance with the valve, fitting, and solvent cement (where used) manufacturer's instructions. Particular care shall be taken not to overstress threaded connections. In making solvent cement connections, the solvent cement or primer shall not be spilled on valves. Any cement allowed to run from joints shall be cleaned from the pipe and fittings immediately. Generally, all plastic valve bodies shall be removed from their union ends before cementing to the adjoining piping to protect the valves.
- E. All piping shall have a sufficient number of unions to allow convenient removal of piping and shall be as approved by the Engineer. Above grade PVC and CPVC pipe shall be installed with at least one expansion joint near the center of each straight run of pipe for every 100 feet of pipe.
- F. Where plastic pipe passes through wall sleeves, the space between the pipe and sleeve shall be sealed with a mechanical sealing element as specified in Section 15120 unless otherwise shown on the Drawings.
- G. All plastic pipe to metal pipe connections shall be made using flanged connections. Metal piping shall not be threaded into plastic fittings, valves, or couplings.
- H. Concrete inserts for hangers and supports shall be furnished and installed in the concrete as it is placed. The inserts shall be set in accordance with the requirements of the piping layout and the Contractor shall verify these locations from approved piping layout drawings and the Drawings. Pipe hangers and supports are specified in Section 15061.

- I. All buried PVC and CPVC piping shall have a conductive tracer wire taped to its top centerline. Conductive tracer wires shall be brought into all valve boxes, vaults, pipe trenches, and structures where they would be accessible for future tracing of the piping. All buried piping shall also have a continuous warning tape laid 12 to 24 inches above the piping.
- J. All pipelines shall remain undisturbed for the minimum curing or cooling time specified for each type of pipe material but no less than 8 hours to develop full curing and complete strength at all joints. Prior to testing, the pipelines shall be supported in an approved manner to prevent movement during the tests. All pipe systems shall be flushed clean and then subjected to a hydrostatic pressure test for 12 hours at the test pressure indicated on the Pipe Schedule on the Drawings. For some systems, de-ionized water is required for flushing and testing and shall be provided as noted on the Pipe Schedule.
- K. Special devices or valves that cannot be tested at the specified pressure shall be removed for testing, with suitable blind flanges, caps, or plugs added for testing. Testing shall be performed by slowly filling the piping system, expelling entrapped air from all high points. The fill rate shall be controlled so that the fluid velocity within the pipe system is less than 2 fps. Once the system has been filled, the piping should be slowly brought up to the test pressure in such a manner so as to not create shock, surge or water hammer in the pipe system. The test duration time limit shall not begin until the full pressure specified above has been reached. Test duration shall be 4 hours. All exposed joints shall be checked for leaks with a leak detection system. Upon completion of the test, the pressure shall be slowly removed by opening a valve or other pressure relieving device at a location remote to the location of the pressure monitoring equipment.
- L. The pressure test shall be monitored by a recording type pressure gauge. The entire test process shall be recorded, including the initial pressurization of the piping system. The record shall be continuous through the system test and shall show the final de-pressurization of the pipe system.
- M. All visible leaks detected during the pressure test shall be repaired and the pressure test rerun. A successful test shall be a test in which no visible leaks are detected, and the pipe system pressure can be maintained within 1 psi of the specified value.

3.02 INSTALLATION OF PLASTIC HOSE

- A. The installation of plastic hose shall be strictly in accordance with the hose manufacturer's technical data and printed instructions. Manufacturer's representatives shall visit the site of the work and advise the Contractor on proper installation practices. Hose shall be installed slowly and without damage.
- B. Hose shall be furnished in such lengths as to extend from chemical equipment to feed point without splices. All plastic hose to rigid pipe connections shall be made using clamped hose barbed fittings as recommended by the hose manufacturer. Clamps shall be stainless steel.

- C. All chemical hose systems shall be flushed clean and then subjected to a hydrostatic pressure test at the test pressure indicated on the Pipe Schedule on the Drawings. No testing against valves is permitted. For some systems, de-ionized water is required for flushing and testing and shall be provided if noted on the Pipe Schedule.
- D. Special devices or valves that cannot be tested at the specified pressure shall be removed for testing, with suitable blind flanges, caps, or plugs added for testing. Testing shall be performed by slowly filling the hose system, expelling entrapped air from all high points. The fill rate shall be controlled so that the fluid velocity within the hose system is less than 2 fps. Once the system has been filled, the hose should be slowly brought up to the test pressure in such a manner so as to not create shock, surge or water hammer in the hose system. The test duration time limit shall not begin until the full pressure specified above has been reached. Test duration shall be 4 hours. All exposed joints shall be checked for leaks with visual observations and monitoring of the pressure gauge. Upon completion of the test, the pressure shall be slowly removed by opening a valve or other pressure relieving device at a location remote to the location of the pressure monitoring equipment.
- E. The pressure test shall be monitored by a recording type pressure gauge. The entire test process shall be recorded, including the initial pressurization of the piping system. The record shall be continuous through the system test and shall show the final depressurization of the hose system.
- F. All visible leaks detected during the pressure test shall be repaired and the pressure test rerun. A successful test shall be a test in which no visible leaks are detected, and the hose system pressure can be maintained within 1 psi of the specified value.

3.03 FIELD PAINTING

- A. Field painting is included in Section 09910. Use only industrial coatings for the appropriate installation conditions. All exposed piping except clear piping and hoses shall be painted. All coatings applied within the jurisdiction of the Bay Area Air Quality Management District shall be compliant with District Regulation 8.

END OF SECTION

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DIVISION 15: MECHANICAL
EMERGENCY SHOWER AND EYEWASH MODIFICATION

SECTION 15400.10

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes modifications to existing emergency shower eyewashes.
- B. Refer to supplemental information provided at the end of this Section for the existing emergency shower eyewashes, including shop drawings and manufacturer installation instructions.

1.02 RELATED SECTIONS.

- A. Section 15082 – Piping Insulation.

1.03 CODES AND STANDARDS

- A. Comply with all of the following:
- B. American National Standards Institute (ANSI):
 - 1. ANSI A112.6.1 Supports for Off-the-Floor Plumbing Fixtures for Public Use.
 - 2. ANSI A112.18.1 Finished and Rough Brass Plumbing Fixture Fittings.
 - 3. NSF/ANSI 61 Drinking Water System Components – Health Effects
- C. California Plumbing Code.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions.
- B. Submit product data for all items described herein. Include fixtures, sizes, rough-dimensions, utility sizes, trim, and finishes.
- C. Certification that products specified to be NSF 61 certified are listed by ANSI/NSF Standard 61 for drinking water contact.

1.05 QUALITY ASSURANCE

- A. Fixtures: By same manufacturer throughout for each product specified.
- B. Trim: By same manufacturer throughout for each product specified.

1.06 MEASUREMENT AND PAYMENT

- A. Measurement and Payment for “**Emergency Shower Eyewashes Modification**” bid item shall be lump sum and shall include full compensation for furnishing all

labor, materials, tools, equipment and incidentals, and for doing all the work involved in modifying the existing emergency shower eyewashes, including, but not limited to, steel pipe, pipe insulation, concrete, concrete modifications, miscellaneous steel and stainless steel including bolts and anchor bolts, cleaning, leak testing, and testing of the emergency shower eyewash and no additional time or compensation be allowed therefor.

- B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MISCELLANEOUS PRODUCTS

- A. Miscellaneous products such as drain elbows, small pipe supports, adapters, couplings, etc., shall be standard high-quality commercial grade products recommended by the manufacturer for each specific application.

PART 3 EXECUTION

3.01 PRELIMINARY WORK

- A. Confirm location and size of existing emergency shower and eyewash before rough-in and installation. Confirm finished grade shown on Drawings with other disciplines.
- B. Verify that adjacent construction is ready to receive rough-in work of this Section.
- C. Obtain and review all manufacturer's written instructions for installation and operation prior to rough-in. Adjust rough-in as required.

3.02 INSTALLATION

- A. Modify, drains, valves, fittings, pipe and appurtenances in accordance with the manufacturer's written instructions and the California Plumbing Code.
- B. Install components level and plumb. Height to meet Americans with Disabilities Act (ADA) requirements (where applicable) and as shown on the Drawings.
- C. Install and secure fixtures in place with wall carriers and bolts.
- D. Insulate all drains, water supply piping, and instant hot water heaters where exposed.

3.03 ADJUSTING AND CLEANING

- A. Flush and check units for proper operation. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise or overflow.
- B. At completion, clean all plumbing fixtures, piping, and equipment.

END OF SECTION

APPENDIX A

Agreement
Payment Bond
Performance Bond
Escrow Agreement for Security Deposits in Lieu of Retention

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The following is an agreement entered into as of _____ by and between the SANTA CLARA VALLEY WATER DISTRICT, State of California, hereinafter referred to as "District" and _____, hereinafter referred to as "Contractor."

For the considerations hereinafter specified, Contractor and District agree as follows:

ARTICLE I: Work to Be Done and Documents Forming the Contract

Contractor agrees to do all the work and furnish all materials necessary to construct and complete, in accordance with the Specifications the following work:

RINCONADA WATER TREATMENT PLANT INTERIM SITE RESTORATION PROJECT

Project No. 93294057, Contract No. C0670

Said work shall be performed to the satisfaction of the Engineer all in accordance with the Drawings, Specifications, Notice to Bidders, and the Proposal of the Contractor, all of which documents are hereby specially referred to and by such reference made a part of this Contract.

ARTICLE II: Contract Price

District hereby agrees and promises to pay to Contractor the sum of _____ Dollars (\$_____).

For the performance of said work; provided, however, that the above mentioned sum is one determined by the Proposal of Contractor as based upon the estimated amount of work to be done, and should there be any variance between the estimated amount of work to be done and the actual amount of work performed, then the final payment price shall be computed on the basis of the unit prices contained in the Proposal of Contractor.

ARTICLE III: Completion of Contract

It is hereby agreed that the work called for under this Contract, in all its parts and requirements, shall be completed before the expiration of **160** calendar days from the First Chargeable Day of the Contract as stated on the Notice to Begin Work unless the time for completion is extended, as allowed by the Specifications.

ARTICLE IV: Bonds Required

This Contract shall have no force or effect whatsoever unless and until Contractor delivers to District a Payment Bond in the sum of _____ Dollars (\$_____).

Nor shall such Contract be effective until Contractor also gives a good and sufficient bond in the sum of _____ Dollars (\$_____)

for the faithful performance of the work to be done under the terms of this Contract.



ARTICLE V: Certification by Contractor

Contractor hereby certifies as follows:

“I certify that I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for workers’ compensation or to undertake self insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the work of this Contract.”

ARTICLE VI: Gift Policy Observance

Contractor hereby acknowledges that District policy prohibits the acceptance by District personnel of gifts of any kind from vendors or contractors. Contractor shall honor this policy by not sending or bringing gifts to the District.

IN WITNESS WHEREOF, Contractor and District have caused this Agreement to be subscribed as of the day and year first hereinabove written.

Date Contractor signature affixed:

By _____

Title _____

_____ Federal I.D.

“Contractor”

SANTA CLARA VALLEY WATER DISTRICT

Date District signature affixed:

By _____

Chair/Board of Directors

BE IT KNOWN BY THESE PRESENTS:

WHEREAS, the Santa Clara Valley Water District (hereinafter called "the Public Entity"), and _____ (hereinafter designated as "Principal") have entered into an agreement for the **RINCONADA WATER TREATMENT PLANT INTERIM SITE RESTORATION PROJECT** which said agreement is dated as of _____, 20____; and

WHEREAS, said Principal is required by California Civil Code Sections 9550 and 9554 to furnish a bond in connection with said agreement;

NOW, THEREFORE, we, the Principal and _____, a corporation duly organized under the laws of the State of _____, having its principal place of business at _____ in the State of _____, and authorized to do business in the State of California, hereinafter "Surety," are held and firmly bound unto the Public Entity in the penal sum of _____ Dollars (\$_____) lawful money of the United States of America for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, Administrators, and successors and assigns, jointly and severally, firmly by these presents.

1. THE CONDITION OF THIS OBLIGATION IS SUCH that if the Principal or the Principal's subcontractor fails to pay any of the persons named in Section 9100, or amounts due under the California Unemployment Insurance Code with respect to work or labor performed under the agreement, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal and the Principal's subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, that the Surety or Sureties will pay for the same, in an amount not exceeding the sum hereinabove specified, and also, in case suit is brought upon the bond, a reasonable attorney's fee, to be fixed by the court. The Principal may require of the Principal's subcontractors a bond to indemnify the Principal for any loss sustained by the Principal because of any default by the Principal's subcontractors under Section 9554 of the California Civil Code.
2. This bond shall inure to the benefit of any of the persons named in Section 9100 of the California Civil Code, so as to give a right of action to such persons or their assigns in any suit brought upon this bond.
3. Surety, for value received, hereby agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or to the Contract Documents accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or to the other portions of the Contract Documents.
4. Should the condition of this bond be fully performed, then this obligation shall become null and void; otherwise, it shall be and remain in full force and effect.



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

PRINCIPAL:

SURETY:

Signature

Signature

Name

Name (Seal)

Title

Title

Address

Address

NOTE: Signature of those executing for Surety must be properly acknowledged.

BE IT KNOWN BY THESE PRESENTS: That

WHEREAS, the Santa Clara Valley Water District, State of California, has awarded to

(hereinafter designated as "Principal") a Contract for **the RINCONADA WATER TREATMENT PLANT INTERIM SITE RESTORATION PROJECT**, and

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

NOW, THEREFORE, we, the Principal and _____ as Surety, are held and firmly bound unto the Santa Clara Valley Water District (hereinafter called "District") in the sum of _____ Dollars (\$_____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the above bounden Principal, or heirs, executors, administrators, successors, or assigns shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the said Contract and any alteration thereof made as therein provided, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless District, its officers, agents, and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

And the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed thereunder or the Specifications accompanying the same shall in any wise affect its obligation on this bond, and does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract or to the work or to the Specifications.

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



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

PRINCIPAL:

SURETY:

Signature

Signature

Name

Name (Seal)

Title

Title

Address

Address

NOTE: Signature of those executing for Surety must be properly acknowledged.



CONTRACT DOCUMENTS
**Escrow Agreement for Security
Deposits in Lieu of Retention**

Page 1 of 3

Escrow Account No.: _____

This Escrow Agreement is made and entered into by and between:

SANTA CLARA VALLEY WATER DISTRICT whose address is 5750 Almaden Expressway,
San Jose, CA 95118 hereinafter called "**Owner**," and

_____ whose address is _____ hereinafter called
"**Contractor**," and

_____ whose address is _____ hereinafter called
"**Escrow Agent**," and

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

1. Pursuant to §22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for _____ in the amount of \$_____ dated _____ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the retention earnings directly to the Escrow Agent. When the Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within 10 days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the Owner and Contractor. Securities shall be held in the name of Santa Clara Valley Water District, and shall designate the Contractor as the beneficial owner.
2. The Owner shall make progress payments to the Contractor for those funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.
3. When the Owner makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until the time that the escrow created under this contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.
4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.

-
5. The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.
 6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from the Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.
 7. The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven days' written notice to the Escrow Agent from the owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.
 8. Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.
 9. Escrow Agent shall rely on the written notifications from the Owner and the Contractor pursuant to Sections (5) to (8), inclusive, of this Agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.
 10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:
 11. Throughout the term of this Escrow Agreement, the Escrow Agent herein agrees to provide monthly statements indicating the account balances and status of the account, directly to the Owner, the Santa Clara Valley Water District, at the address provided below, to the attention of the District's representative identified below. The Escrow Agent may submit a request to provide such statements in electronic format.
 12. The Escrow Agent must provide written notice to the Owner in advance of any action that will negatively impact the account.



CONTRACT DOCUMENTS
**Escrow Agreement for Security
Deposits in Lieu of Retention**

Page 3 of 3

On behalf of Owner:

Signature Date

Name
*Capital Program Deputy Operating Officer
Designated Engineer*

Title

*5750 Almaden Expressway
San Jose, CA 95118*

Address

On behalf of Contractor:

Signature Date

Name

Title

Address

On behalf of Escrow Agent:

Signature Date

Name

Title

Address

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

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

OWNER:

Signature Date

Name
*Capital Program Deputy Operating Officer
Designated Engineer*

Title

*5750 Almaden Expressway
San Jose, CA 95118*

Address

CONTRACTOR:

Signature Date

Name

Title

Address

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APPENDIX B

Guidelines for Contractor's As-Built Mark-Ups

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Guidelines for Contractor's As-Built Mark-Ups or Engineer's Record Drawings

Santa Clara Valley Water District
CADD Services Unit

Version: 1.1 Effective Date: December 2009	Document Number CADD G101

EXTERNAL USERS:

The version provided by the “District” represents the applicable version.

INTERNAL “DISTRICT” STAFF:

Printed or downloaded versions are for reference only. See the CADD Services Unit website for released version.

Guidelines for Contractor’s As-Built Mark-Ups or Engineer’s Record Drawings

CADD Services Unit

These guidelines were developed and written by Emmanuel Aryee (CADD Services unit) and the example figures were provided by Roberto Parmituan (Construction Inspection unit). They were then reviewed by the Plans and Specifications Standardization team.

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3.0	

1.0 REDLINE MARKING IN THE FIELD OR THE OFFICE

Redline mark ups should be neat, legible, clear, and orderly and should accurately record and reflect the actual as-built condition.

It should be done with the correct symbols, lines, lettering and text, details, dimensioning, etc. using red pencil or ink.

All construction changes are based on authorized change documents or Engineer's instructions. These documents are kept in the Project or Construction files.

Change documents include addendum, request for information (RFI), contract change order (CCO), engineers work order or extra work order (EWO), field memo, etc. See Figure 4 & 6. It is not acceptable to attach change documents to the drawings to avoid having to mark up changes on the drawings. Changes should be interpreted and then transferred by redline markings on to the drawing sheets; they should be referred to in the listing of the changes or revisions in the title block of the drawing sheet. See Figure 4 to 8.

Already drafted changes, sketches, diagrams of the changes (not the complete change document) may be attached on blank spaces on the drawing sheet or a separate blank sheet, (not to cover the original drawing information) to show or illustrate the extent of the changes, if that will be helpful.

Features, items, details that were changed should be clearly detailed, dimensioned, located (survey information, tying to control lines, other features or monuments, station offsets or reference lengths, distances, etc.) and described in detail with lines, lettering & text, etc. with redline mark up.

Redline mark ups should be done in a manner that enables any competent technician or drafter to draft the as-built mark-up or the record drawings with minimum difficulty.

Redline marking includes making changes, additions and/or deletions representing the actual construction changes for the as-built drawings or changes authorized by the engineer on the record drawings.

1.1 CHANGE

A change is made when an item(s) on the drawing sheet is modified or replaced with completely new item(s). It may involve the change of a simple line, dimension, note or re-sketch of a part or a component. Only those areas of a drawing that are affected should be marked up. Item(s) changed should be clouded.

Clouding—The use of a cloud to surround the area or item, text or symbol changed so as to make the changes stand out and be easily identified. The original content that is not affected by the change is left unclouded. See Figure 8.

1.2 ADDITIONS

Additions occur when new item(s) are introduced on to the drawing sheet to supplement or clarify information without modifying or replacing the original items. When additions are made to the drawings that affect only the drawing content, the additions should also be clouded since they are revisions to the original drawings.

1.3 DELETIONS

Deletions occur when features, details or items on the drawings are not constructed, are removed, are changed and/or replaced.

When preparing As-built drawings, all original drawing details, items are preserved. Deleted items should not be erased or removed from the marked up drawing. Deletions are shown by **crossing** out the deleted elements, details, lines, text, symbols, or any other items involved, with one of these methods;

- a slanted/horizontal line (strike-out line) across the element,
- a heavy X over the element,
- a bold, big X across a major element or across the entire drawing sheet.

The area or item affected should be clouded to indicate the limits of removal. See Figure 8.

2.0 ADDITIONAL SHEETS

When changes involve the incorporation of new additional sheet or sheets, it may or may not be necessary to do clouding on the original sheet. If there is a reference to a new sheet in the set, then the reference area should be clearly clouded and the call out to the additional sheet made. Otherwise the new drawing should be marked as normal but tracking notation should show that this is an additional sheet with the original sheet left intact.

In cases where the marking up of several changes on the same sheet leaves the drawing content unclear, crowded, or when features and items become unidentifiable or make the drawing unreadable, use of additional sheets should be considered.

3.0 TRACKING OF “AS-BUILT” CHANGES OR REVISIONS

All changes marked up must be tracked. They must be clearly identified with the triangle symbol with the revision number (used in the change document) or the letters AB embedded (if no revision numbers are used). The triangle symbol should be placed by the side of all changes, outside the cloud, on the affected drawing sheet.



Figure 1—As-Built (AB) Triangle Symbol

A subscript representing the number (#) assigned to track and identify the particular change or revision is placed by the triangle symbol as shown above in Figure 1.

4.0 LISTING OR RECORDING OF CHANGES OR REVISIONS

All changes that have been done since the final (construction) drawings were issued
As-
Engineer's record drawings.

Changes made during construction must be listed or recorded and identified under the revision section of the title block of the drawing sheet. Each listing should be identified with the corresponding number (subscript) of the triangle symbol. The listing consist of a short description of the change and an abbreviated name of the change document such as CCO #2 for contract change order number 2, placed in brackets, under the
ng.

It could also be per the Engineer for some of the changes done under the direct instructions of the Engineer. It must include a date and the initials of the person who authorized the change. See Figure 2.

REV	DESCRIPTION	DATE	APPR.
	1. REMOVE AND REPLACE EXISTING PIPE SYSTEM (LOC #1) 2. REVISE ANODE LEAD WIRE (CCO #2)	08/01 05/02	S.C. D.M.

Figure 2—Listing or Recording of Changes

5.0 SIGNING OF THE AS-BUILT OR THE RECORD DRAWINGS

Each sheet must be signed and dated by the contractor's representative for the contractor's as-built mark-ups. The representative must also include his/her printed name and his/her company's name. Similarly the Engineer must do the same for the record drawings. See sample below.

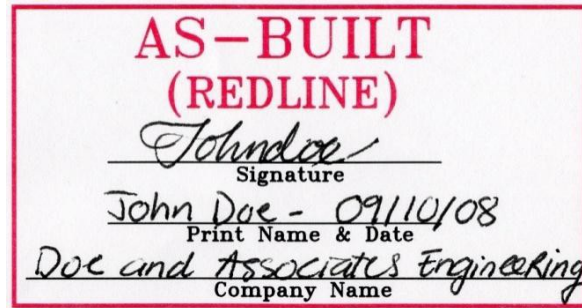


Figure 3—Sample of As-Built Signature Stamp





REQUEST FOR INFORMATION

FC 825 (04-10-86)

To: John Doe

Date: Feb. 6, 2008

To: John Doe
(Resident Inspector)

From: R. B. Construction Co., Inc.

Contractor File No.: 001

(Contractor, Utility, etc.)

Contract: PWTP Landscaping

RFI Consec. No.:

RFI Consec. No.: 4
Reply Needed By: Feb. 12, 2008

Contract No.: C0526

Item No.	INFORMATION ACTION NEEDED	Ref. Spec/Plan No.
1.	An existing buried concrete block was discovered during the trench excavation for the irrigation mainline. Location is shown in the attached drawing.	PLANSHEET I-4
	This buried concrete block will not allow for the installation of the proposed irrigation mainline in the location shown. Please provide direction on how to proceed.	

Figure 4—Request for Information

ENGINEER'S RESPONSE

Santa Clara Valley Water District 

REQUEST FOR INFORMATION
FC 825 (04-10-86)

To: John Doe (Resident Inspector) Date: Feb. 6, 2008

From: R. B. Construction Co., Inc. (Contractor, Utility, etc.) Contractor File No.: 001

Contract: PWTP Landscaping RFI Consec. No.: 4

Contract No.: C0526 Reply Needed By: Feb. 12, 2008

Item No.	INFORMATION ACTION NEEDED	Ref. Spec/Plan No.
1.	An existing buried concrete block was discovered during the trench excavation for the irrigation mainline. Location is shown in the attached drawing.	PLAN SBT I-4
	This buried concrete block will not allow for the installation of the proposed irrigation mainline in the location shown. Please provide direction on how to proceed.	

DISTRIBUTION: Pink = retained by Initiator 3 copies to Resident Inspector

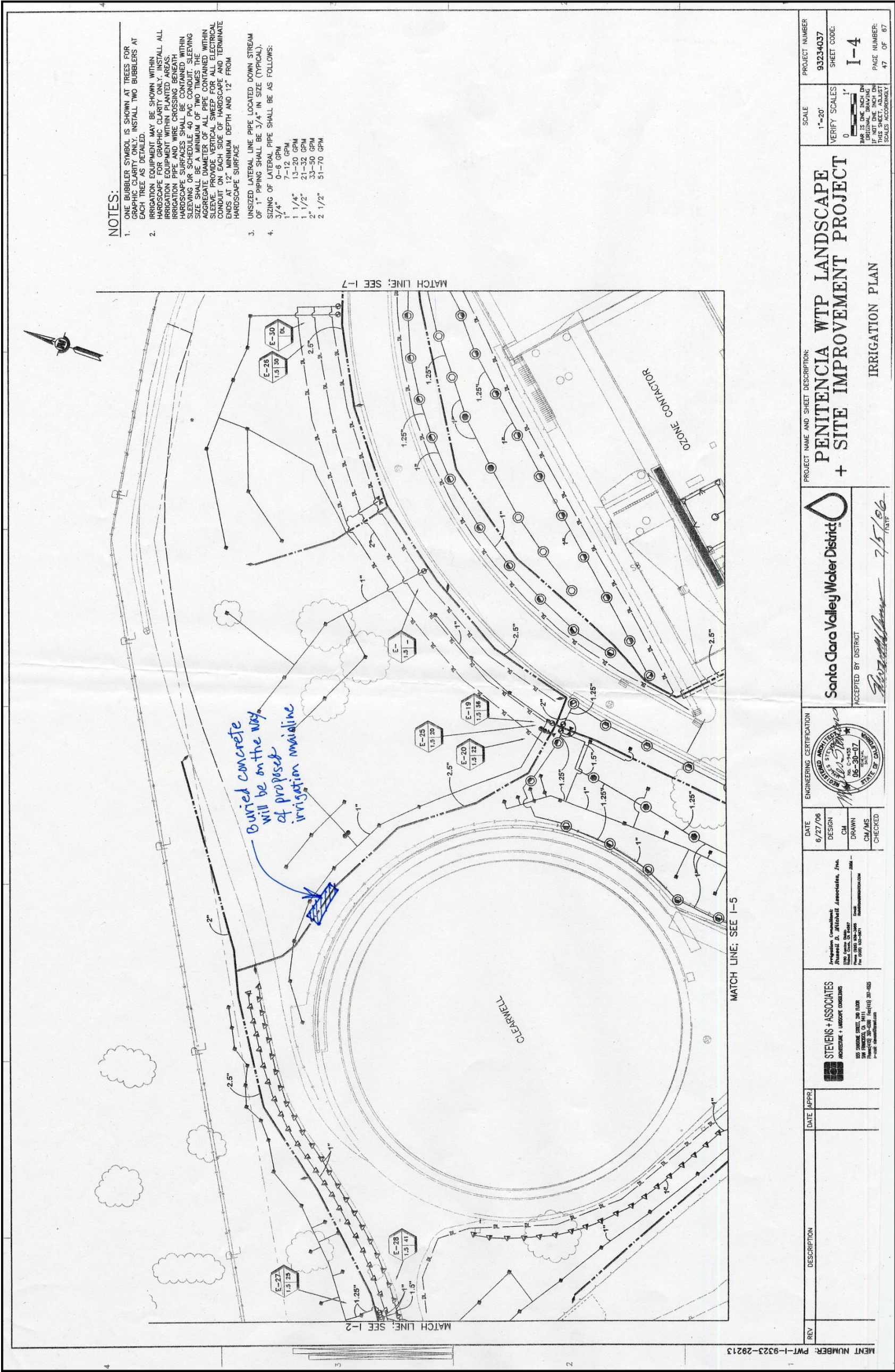
Item No.	REPLY	Extra WO Forthcoming (Yes/No)
1.	Please re-route/re-align the irrigation line installation as shown in the attached drawing.	TBD

Design Consultant:	Project Engineer <u>Mr. Smart</u>	Resident Inspector <u>John Doe</u>	
Date:	Date: <u>2/11/08</u>	Date: <u>2/11/08</u>	

NOTICE TO CONTRACTOR: This form has been designed to expedite responses to your inquiries. You may include more than one request on one form, but separate forms should be used for the different construction disciplines, e.g., architectural; civil; structural; mechanical; electrical.

Distribution: White = Retained by Resident Inspector
Pink = Initiator
Yellow = Project Engineer
Goldenrod = Returned to Initiator with reply

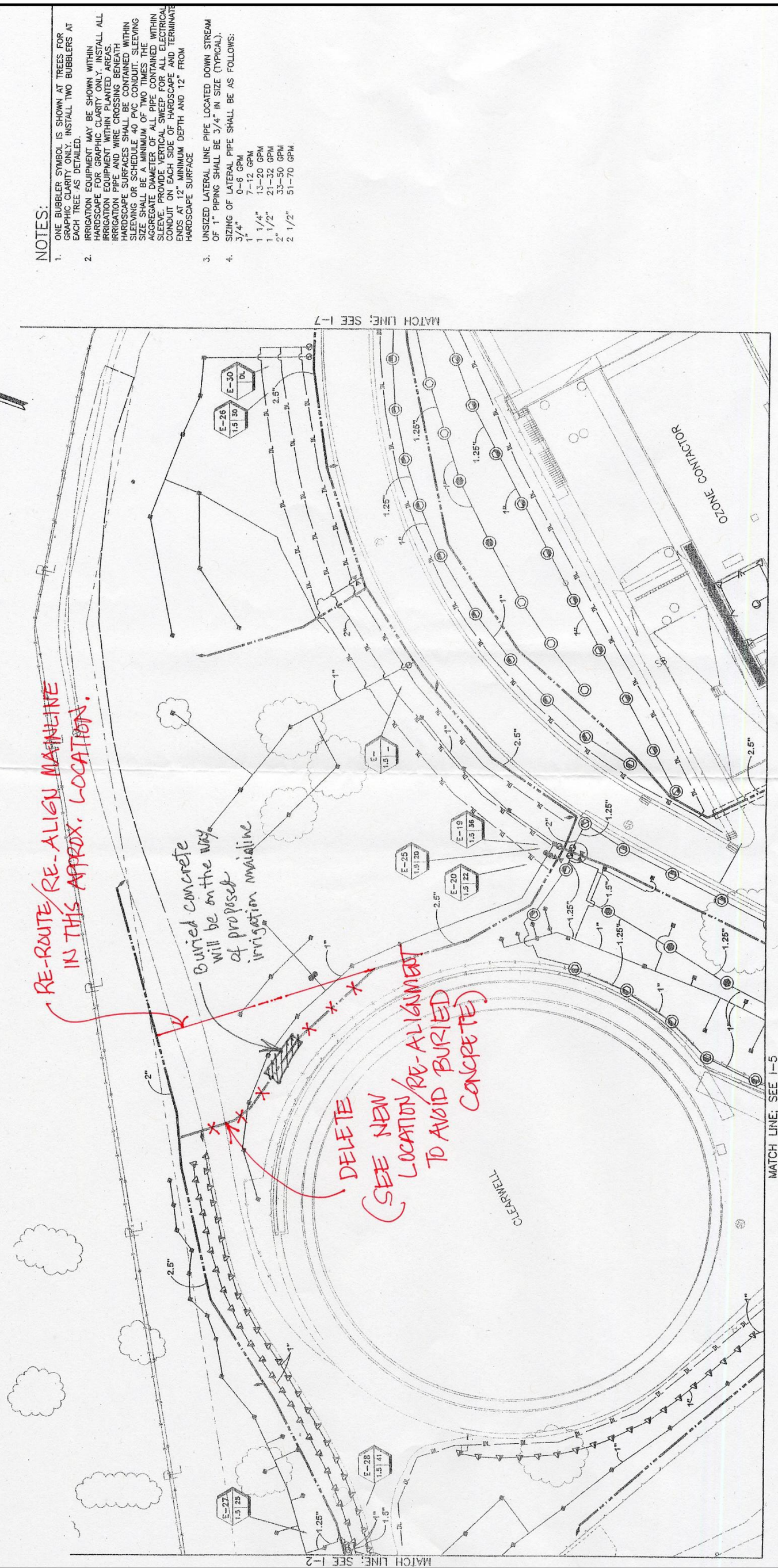
Figure 5—Engineer's Response to RFI



Mark-Up on Drawing Showing RFI

Figure 6—

attachment to: ENGINEER'S REPLY TO RFI #4

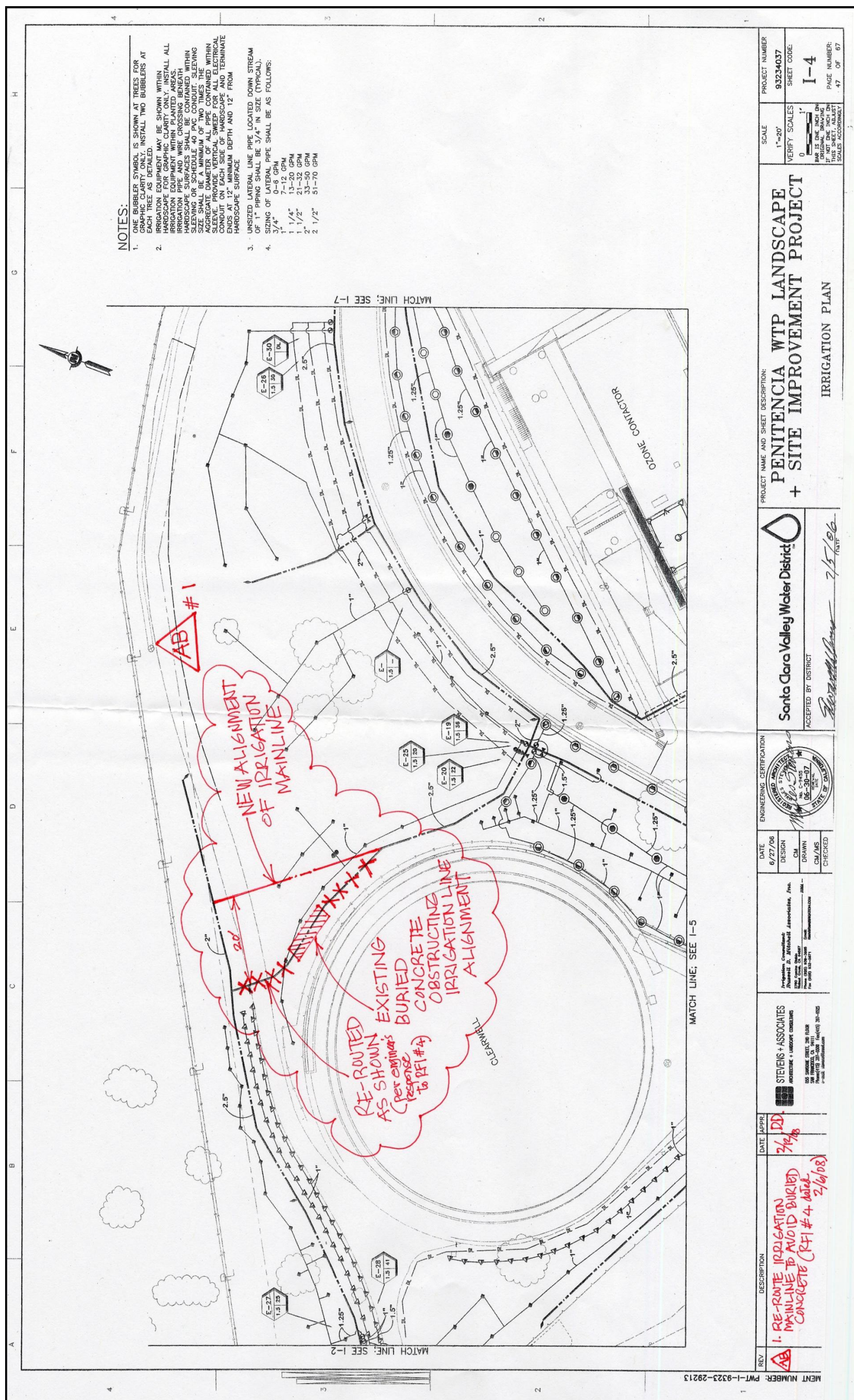


- NOTES:
- ONE BUBBLER SYMBOL IS SHOWN AT TREES FOR GRAPHIC CLARITY ONLY. INSTALL TWO BUBBLERS AT EACH TREE AS DETAILED.
 - IRRIGATION EQUIPMENT MAY BE SHOWN WITHIN HARDSCAPE FOR GRAPHIC CLARITY ONLY. INSTALL ALL IRRIGATION PIPE AND WIRE CROSSING BENEATH HARDSCAPE SURFACES SHALL BE CONTAINED WITHIN SLEEVING OR SCHEDULE 40 PVC CONDUIT. SLEEVING SIZE SHALL BE A MINIMUM OF TWO TIMES THE AGGREGATE DIAMETER OF ALL PIPE CONTAINED WITHIN SLEEVE. PROVIDE VERTICAL SWEEP FOR ALL ELECTRICAL CONDUIT ON EACH SIDE OF HARDSCAPE AND TERMINATE ENDS AT 12" MINIMUM DEPTH AND 12" FROM HARDSCAPE SURFACE.
 - UNSIRED LATERAL LINE PIPE LOCATED DOWN STREAM OF 1" PIPING SHALL BE 3/4" IN SIZE (TYPICAL).
 - SIZING OF LATERAL PIPE SHALL BE AS FOLLOWS:

1"	0-6 GPM
3/4"	7-12 GPM
1 1/4"	13-20 GPM
1 1/2"	21-32 GPM
2"	33-50 GPM
2 1/2"	51-70 GPM

7—Mark-Up on Drawing Showing Engineer's Response to RFI

Figure



APPENDIX C

CPM Scheduler Statement of Experience

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QUALIFIED CRITICAL PATH METHOD (CPM) SCHEDULER

STATEMENT of EXPERIENCE

THIS SCHEDULERS STATEMENT FORM IS SUBMITTED AS PART OF THE SUBMITTAL DOCUMENTS REQUIRED IN ARTICLE 11.06.02. CONFIRMING – SCHEDULERS QUALIFICATIONS IN PERFORMING CRITICAL PATH METHOD (CPM) SCHEDULING WORK.

If Contractor will be performing CPM scheduling work with its own forces, the Contractor shall complete the applicable portions of this form, specifically General items B and F and all of the project-specific items. If Contractor will be performing the CPM scheduling work with its own forces, references in this form to “CPM Scheduling, Subcontractor” or “Subcontractor” shall be understood to mean “Contractor.”

The Contractor authorizes the District to use the information provided on this form and/or obtained from the Owners listed below to evaluate the Contractor’s CPM Scheduling Subcontractor’s or the contractors named Scheduler, as applicable experience and qualifications.

The Contractor shall not add, delete or change CPM Scheduling Subcontractor or Contractor’s named Scheduler, as applicable, following the submittal of this information to the Engineer, without advance written authorization by the Engineer.

Engineer reserves the right to not consent to Contractor’s request to add, delete or change CPM Scheduling Subcontractor or Contractor’s submitted Scheduler, as applicable, for any reason including, but not limited to, the failure of the contractor’s proposed replacement to meet the minimum experience requirements specified in Article 11.06.02 of these Specifications.

I. General (Contractor: Provide Sub Contractor information if Subcontractor is used).

- A. Name of CPM Scheduling Subcontractor: _____
- B. Name of CPM Scheduling Subcontractor’s Scheduler: _____
- C. CPM Scheduling Subcontractor has been engaged in the CPM scheduling business, under its present businessname for _____ years.
- D. Other Scheduling Subcontractor’s experience in the type of scheduling work specified in Article 11.06.02, extends over a period of _____ years.
- E. CPM Scheduling Subcontractor’s Scheduler’s experience in the type of scheduling work specified in Article 11.06.02 extends over a period of _____ years.
- F. CPM Scheduling Subcontractor’s Scheduler’s experience in the type of scheduling work specified in Article 11.06.02 extends over a period of _____ years.
- G. CPM Scheduling Subcontractors has never been disqualified or otherwise prevented from providing CPM Scheduling services on a project funded by an agency of the Federal

QUALIFIED CRITICAL PATH METHOD (CPM) SCHEDULER STATEMENT of EXPERIENCE

government, any State, or any local agency, except as follows: _____

(List any exceptions and reason therefor. Use attachments, if necessary).

- H. CPM Scheduling Subcontractor has never failed to satisfactorily complete a CPM scheduling contract except as follows:

(List any exceptions and reason therefor. Use attachments, if necessary). If no exceptions state, none).

2. Project Specific Experience:

A. Type of work: WATER TREATMENT PLANT CONSTRUCTION

B. YEAR PROJECT COMPLETED: _____

C. TOTAL CONTRACT AMOUNT: \$ _____

D. PROJECT NAME AND LOCATION: _____

E. NAME OF PROJECT OWNER: _____

F. PERSON TO CONTACT: _____

G. NAME: _____

H. TELEPHONE: () _____

CPM Scheduling Subcontractor shall provide the following information for the contract listed above. Attach additional pages as required.

3. Project Specific Experience Performance Questions:

A. Did the contract documents for the project specify that the Owner would approve the CPM schedule? (Circle one) YES NO

B. Did the Owner, in fact, approve the Baseline CPM Schedule and subsequent CPM schedule updates? (Circle one) YES NO

QUALIFIED CRITICAL PATH METHOD (CPM) SCHEDULER STATEMENT of EXPERIENCE

- C. If the answer to question No. 2 is YES, how long did it take the Contractor and Owner to agree on the Baseline Schedule and subsequent CPM schedule updates?

_____.

- D. If the answer to question No. 2 is NO, how were the work activities planned and tracked if the Baseline schedule and CPM schedule updates were not approved by the Owner?

- E. Was the CPM schedule used to analyze time delays to the construction schedule?

(Circle one) YES NO

- F. Were the Contractor and Owner able to agree on time delays using the CPM scheduling method? (Circle one) YES NO

- G. If the answer to question No. 6 is NO, provide an explanation.

4. Project Specific Experience:

- A. Type of work: WATER TREATMENT PLANT CONSTRUCTION

- B. YEAR PROJECT COMPLETED: _____

- C. TOTAL CONTRACT AMOUNT: \$ _____

- D. PROJECT NAME AND LOCATION: _____

- E. NAME OF PROJECT OWNER: _____

- F. PERSON TO CONTACT: _____

- G. NAME: _____

- H. TELEPHONE: () _____

CPM Scheduling Subcontractor shall provide the following information for the contract listed above. Attach additional pages as required.

QUALIFIED CRITICAL PATH METHOD (CPM) SCHEDULER

STATEMENT of EXPERIENCE

5. Project Specific Experience Performance Questions:

- A. Did the contract documents for the project specify that the Owner would approve the CPM schedule? (Circle one) YES NO
- B. Did the Owner, in fact, approve the Baseline CPM Schedule and subsequent CPM schedule updates? (Circle one) YES NO
- C. If the answer to question No. 2 is YES, how long did it take the Contractor and Owner to agree on the Baseline Schedule and subsequent CPM schedule updates?
_____.
- D. If the answer to question No. 2 is NO, how were the work activities planned and tracked if the Baseline schedule and CPM schedule updates were not approved by the Owner?

- E. Was the CPM schedule used to analyze time delays to the construction schedule?
(Circle one) YES NO
- F. Were the Contractor and Owner able to agree on time delays using the CPM scheduling method? (Circle one) YES NO
- G. If the answer to question No. 6 is NO, provide an explanation.

6. Other Information

- A. If none of the referenced projects listed in items 2 and 4, did CPM Scheduling Subcontractor file claims against the Project Owner(s) which led to litigation, except as follows:

QUALIFIED CRITICAL PATH METHOD (CPM) SCHEDULER STATEMENT of EXPERIENCE

(Describe any such claims and the name of the case, the court in which it was filed, and the action or docket number of the lawsuit).

- B. The CPM Scheduling Subcontractor is not a defendant in any criminal legal action at present, except as follows:

(Provide name of case, court in which it is pending and action and docket number).

- C. The answers and information provided in this form are correct and complete to the best of my knowledge and belief.

Name of CPM Scheduling Subcontractor:

By: _____ Date: _____
Signature

Name: _____
Print

Title: _____

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