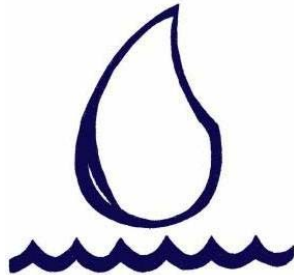


**PURISSIMA HILLS WATER DISTRICT
LOS ALTOS HILLS, CALIFORNIA**



**STANDARD SPECIFICATIONS
AND
STANDARD DRAWINGS**

July 2013



Pakpour Consulting Group, Inc.

STANDARD SPECIFICATIONS

PURISSIMA HILLS WATER DISTRICT
STANDARD SPECIFICATIONS AND DRAWINGS
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SECTION 01300 SUBMITTALS

PART 1 GENERAL

1.01 SCOPE OF WORK

Work included in this section consists of furnishing various submittal items as listed herein, as required for the work included in each specific project:

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01520	Traffic Control Plan
01530	Water Pollution Prevention Plan
01700	Project Closeout
02221	Trench Excavation, Bedding and Backfill
02600	Paving, Restoration and Resurfacing Work
03301	Cast-in-Place Concrete Structures
15060	Piping
15100	Valves and Appurtenances

1.03 SUBMITTAL PROCEDURE

The Contractor shall deliver all applicable submittal material listed in the schedule included in this section a minimum of 20 days before the anticipated start of construction. This time limit shall not apply to those items to be furnished during the course of the work or near or at the conclusion of the work such as test reports and record drawings. Five (5) copies of all submittal materials shall be furnished. Prior to installation of materials, the Contractor shall submit five (5) copies of corrected final submittal material. Installation shall not commence until submittal material has been reviewed by the District.

The following procedure shall be used by the Contractor in submitting and processing submittals for review by the District:

Each submittal item shall be forwarded to the District with an individual transmittal letter or form. The letter or form shall include the following items:

1. Project name and schedule.
2. Submittal number.
3. Description of submittal item.

4. District Standard Specification section and drawing references.
5. Certification by the Contractor's representative that the submittal is complete and correct.

The submittal numbering procedure shall be as follows:

Each submittal item must have a separate number, prefixed by the schedule designation (i.e, such as "A.2.").

Numbers must be assigned chronologically (i.e., in the order submitted).

A letter suffix shall be added to each submittal number to indicate how many submittals/resubmittals have been made on the same item (i.e., "A" for the first time, "B" for the second time, etc.).

When required in a specific specification section, a "Letter of Compliance" shall be furnished stating that material and/or equipment furnished complies with the specifications.

The District reserves the right to require submittals in addition to those called for herein. Enclosed is a sample of transmittal letter or form on the following page.

(Contractor's Letterhead)

(Date)

Pakpour Consulting Group, Inc.
5776 Stoneridge Mall Road
Suite 320
Pleasanton, CA 94588

Attention: (Project Manager or Other Designated Representative)

Project:

Submittal No. (_____)

(Allow space for Submittal Review Stamp)

The following item is submitted for review:

Item: _____

Specification Ref: _____

Section

Drawing Ref: _____

Sheet

No(s)

I hereby certify that all material submitted has been checked for number of copies as required by the specifications, for adequate identification, for completeness, for correctness, and for compliance with the drawings and specifications and that exceptions, if any, are clearly noted.

(Authorized Signature)

1.04 SHOP DRAWINGS

The term "shop drawings" includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, furnished by Contractor to explain in detail specific portions of the work required by the contract.

The Contractor shall coordinate all such drawings, and review them for legibility, accuracy, completeness and compliance with contract requirements and shall so indicate that such coordination and review has been done by signing the transmittal letters required by Paragraph 1.03 herein. Shop drawings submitted to the District without evidence of Contractor's review will be returned for resubmission.

Review by the District shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with requirements of this contract. If shop drawings show variations from contract requirements, Contractor shall describe such variations in writing, separate from the drawings, at time of submission. All such variations must be approved by the District.

In the District Standard Specifications, whenever the trade name of a product, or the name of a manufacturer appears, it shall be understood to specify the product so identified or its equivalent. Data may be submitted by the Contractor for a period of fifteen (15) days from receipt of the Notice to Proceed to substantiate a request for substitution as an equivalent item.

Wherever in the District Standard Specifications, or in any orders that may be given by the District pursuant to or supplementing the specifications, it is provided that the Contractor shall furnish materials for which no detailed specifications are set forth, the materials shall conform to accepted quality standards for materials of the kind required, with due consideration for the use to which they are to be put.

1.05 SAMPLES AND TESTS

The source of supply of each material furnished shall be approved by the District, unless the District advises the Contractor to the contrary at least ten (10) calendar days prior to the time when delivery is started, of any of the material used in the work. Representative preliminary samples of the character and quality prescribed and the manufacturer's test certificates pertaining thereto shall be submitted by the Contractor for all materials to be used in the work, as required by the District Standard Specifications or as requested by the District.

All tests of materials will be made in accordance with commonly recognized standards of national organizations, and such special methods and tests as are prescribed in these project specifications. The approval of any material on the basis of sample tests and/or certificates will be considered as general approval only, and will not constitute a waiver of the District's right to demand full compliance with the Contract requirements. After delivery of materials to the job, the District will make such check tests as deemed necessary in each instance, and may reject materials, equipment, or accessories which fail to meet the check tests, even though such materials have previously been given general approval.

Laboratory test reports shall cite the contract requirements, the test of analysis procedures used, the actual test results, and include a statement that the item tested or analyzed conforms or fails to

conform to specification requirements. All test reports shall be signed by a representative of the testing laboratory authorized to sign certified test reports.

The cost of all testing will be borne by the Contractor, except for the following situations: (1) The Contractor shall assume all costs of retesting materials which fails to meet Contract requirements; (2) The Contractor shall assume all costs of testing materials offered in substitution of those found to be deficient; (3) The Contractor shall assume all costs of testing materials offered in lieu of specified materials, to prove their quality equivalence.

1.06 CERTIFICATES

For those items called for in individual sections of the District Standard Specifications or shown on project drawings, furnish certificates from manufacturers, suppliers, or other certifying that materials or equipment being furnished under the contract comply with the requirements of the District Standard Specifications.

1.07 PROGRESS SCHEDULES

Within five (5) days after Award, the Contractor shall submit a schedule for the project showing the estimated startup and completion date for each element of the work, in conformance with the requirements of the Special Provisions.

1.08 TRAFFIC CONTROL PLAN

Traffic Control Plan submittal shall be per Section 01520 of these Standard Specifications.

The Contractor shall notify the Town of Los Altos Hills, the Santa Clara County Central Fire Protection District, the Santa Clara County Sheriff's Department, and the County of Santa Clara Road and Airport (if applicable) at least 72 hours in advance whenever lane closures are planned. Such notification shall include the details and location of such closure, its anticipated duration and traffic control and signing to be used during such closure.

1.09 WATER POLLUTION CONTROL PLAN

The Contractor shall submit detail plan on how he intends to comply with Section 01530 of these Standard Specifications prior to the beginning of work.

1.10 RECORD DRAWINGS

Using colored ink, each Contractor shall make changes on a set of clean prints. Indicate all changes and revisions to the original design that affect the permanent structures and will exist in the completed work. Reference underground utilities to semi-permanent or permanent physical objects. Reference water, sewer, telephone, storm drain, gas, and electric lines to corners of buildings and survey markers.

The record drawings shall be kept current. Project record drawings are the property of the District and shall be delivered to the District before project closeout.

SUBMITTAL SCHEDULE

<u>Section No.</u>	Item
	Safety Plan per the General Provisions
01520	Traffic Control Plan
01530	Water Pollution Prevention Plan
01700	Tests
	Certificates and Guarantees
	Record Drawings
	Performance Bond
02221	Subgrade Material
	Bedding Material
	Aggregate Base
	Written Shoring Safety Plan prepared by a registered Civil or Structural Engineer
02600	Aggregate Base
	Aggregate Surfacing
	Asphaltic Concrete
	Bonding Coat and Crack Seal
	Temporary Paving
	2-Sack Slurry
	Slurry Seal
05500	Iron and steel
15060	Ductile Iron Pipe
	Thrust-resistant Retainers for Ductile Iron Pipe
	Thrust Blocks
	Pipe Connectors
	Hardware
	Polyethylene Tubing and Fittings
	Polyethylene Encasement
	Marker Tape for Buried Piping
15100	Gate Valves – Resilient Wedge and O.S.&Y. Type
	Pressure Reducing Valves
	Wye Strainers
	Pressure Gauges
	Flow Meter
	Air Combination Valve
	Valve and Meter Boxes
	Hydrants
	Pressure Reducing Station Shop Drawing

*****END OF SECTION*****

SECTION 01400 QUALITY CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

Work included under this section consists of performing or conforming to quality control procedures and requirements as listed herein and in the various technical specification sections that comprise these project specifications

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01010	Summary of Work
01150	Definition of Bid Items
01500	Temporary Facilities and Controls
01700	Project Closeout

1.03 GENERAL QUALITY

All material shall be new and of a quality equivalent to that specified.

The work shall be executed in conformity with the best accepted standard practice of the trade so as to contribute to maximum efficiency of operation, accessibility and appearance, and minimum cost of maintenance and construction of future alterations and additions.

1.04 QUALITY IN ABSENCE OF DETAILED SPECIFICATIONS

Whenever the Contractor shall furnish materials or manufactured articles or shall do work for which no detailed specifications are set forth, the materials or manufactured articles shall be of the normal commercial grade in quality and workmanship obtained from firms normally furnishing such materials or equipment or, if not ordinarily carried in stock, shall conform to the usual standards for first-class materials or articles of the kind required with due consideration of the use to which they are to be put. In general, the work performed shall be in conformity with the intent to secure the normal commercial standard of construction and equipment of the work as a whole or in part.

1.05 DEFECTIVE MATERIALS

All materials not conforming to these project specifications shall be considered defective; and all such materials, whether in place or not will be rejected, and shall be immediately removed from the site of the work, unless otherwise permitted to remain by the District. Rejected materials, the defects of which have been subsequently corrected, shall not be used until approval in writing has been obtained from the District. Upon failure of the Contractor to comply with any order of the District made under the provisions of this article, the District shall have the authority to remove and replace defective materials and to deduct the cost of same from any monies due or to become due the Contractor.

1.06 GUARANTEE

All materials, and workmanship furnished under this Contract shall be guaranteed by the Contractor for a period of two (2) years from the date of initial operation or the date of acceptance thereof, whichever is later, against all defects that might render the work unsatisfactory for the intended purpose. Defective materials and workmanship occurring during the guarantee period shall be replaced by the Contractor at his expense, together with the repair or replacement of any adjacent work which may be damaged or displaced in the process.

In addition to the above guarantee, the Contractor shall assign to the District all material guarantees issued by manufacturers or subcontractors which guarantees extend beyond the two (2) year period stipulated.

*****END OF SECTION*****

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SCOPE OF WORK

Work required under this section consists of providing temporary facilities or performing or conforming to control procedures and requirements as listed herein and in the various technical specifications sections that comprise these project specifications.

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01010	Summary of Work
01150	Definition of Bid Items
01400	Quality Control
01700	Project Closeout

1.03 TEMPORARY FACILITIES

1. Construction Utilities

- a. Water - The District can furnish water required for construction purposes, subject to availability. It shall be the Contractor's responsibility to provide hoses and/or piping to convey water to the construction site. Quantities and delivery schedules shall be subject to availability from the local system, as approved by the District. The District will not be responsible for transporting water to either jobsite for use by the Contractor.
- b. Electricity and Telephone - The Contractor shall provide these utilities as required for the work.
- c. Sanitary Facilities - The Contractor shall provide adequate toilet facilities for all workmen and representatives of the District employed on the work. Each facility shall be subject to the approval of the District as to location and type. The Contractor shall maintain them in sanitary conditions from the beginning of the work until completion and shall then remove the facilities and disinfect the premises. All portions of the work shall be maintained at all times in a sanitary condition. Waste disposal shall be as directed by the District.

2. Storage Facilities

It is the Contractor's responsibility to find a storage area for equipment and material during the duration of the project. All materials and equipment shall be stored at the jobsite or at the Contractor's yard. Storage areas shall be fenced. Fencing materials and boundaries of storage areas shall be subject to approval of the District.

3. Field Office

If the Contractor elects to establish an office for his own use on the project, the size, location and construction shall be subject to the approval of the District.

1.04 TEMPORARY CONTROLS

1. Housekeeping

Keep the project neat, orderly, and in a safe condition at all times. Immediately remove all hazardous rubbish. Do not allow rubbish to accumulate. Provide on-site containers for collection of rubbish or dispose of it at frequent intervals during progress of work. Wet down dry materials and rubbish to prevent blowing dust. Keep volatile wastes in covered containers.

The Contractor shall properly dispose of all litter, trash, garbage which may accumulate on the project site.

2. Environmental Protection Requirements

Provide environmental protective measures as required to control pollution that develops during normal construction practice, and as required to correct conditions that develop during the construction of permanent or temporary features associated with the project. Comply with all federal, state, and local regulations pertaining to water, air, and noise pollution. Prior to the commencement of the work, meet with the District to develop a mutual understanding relative to details of environmental protection, including measures for protecting natural resources and measures to be taken should the Contractor fail to provide adequate protection in an adequate and timely manner.

Water containment barriers must be on site for accidental discharge of chlorinated water.

3. Protection of Trees and Other Vegetation

Except in areas indicated to be cleared, do not remove, cut, deface, injure, or destroy trees, shrubs or other vegetation without special permission from the District. Do not fasten or attach ropes, cables, or guys to any existing nearby trees for anchorages unless specifically authorized. Where such special emergency use is authorized, the Contractor shall be responsible for any resultant damage. Protect existing trees which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations.

Repair or restore to their original condition all trees or other landscape features scarred or damaged by the equipment or operations. Obtain approval of the repair or restoration from the District prior to its initiation.

4. Air, Soil, and Water Pollution Control Measures

Take all necessary reasonable measures to reduce air, soil, and water pollution by any material or equipment used during construction.

No burning will be permitted.

Do not dispose of volatile wastes or oils or allow waste materials to be wash into storm or sanitary drains, nor allow such materials to reach watercourses.

5. Handling and Disposal of Waste Materials

Dispose of all waste materials legally.

Store chemical waste in corrosion resistant containers labeled to identify type of waste and date filled. Remove containers from the project site, and dispose of chemical waste in accordance with federal, state, and local regulations. For oil and hazardous material spills which may be large enough to violate federal, state, and local regulations, notify the District immediately.

Conduct fueling and lubricating of equipment and motor vehicles in a manner that affords the maximum protection against spills and evaporation. Dispose of lubricants to be discarded and excess oil in accordance with approved procedures meeting federal, state, and local regulations.

Take special measures to prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water. Surround all temporary fuel oil, petroleum, or liquid chemical storage tanks with a temporary earth berm of sufficient size and strength to contain the contents of the tanks in the event of content leakage or spillage. For oil and hazardous material spills which may be large enough to violate federal, state, and local regulations, notify the District immediately.

6. Erosion Protection

All earthwork brought to final grade shall be immediately finished as indicated or specified in the project specifications or on the drawings. Immediately protect side slopes and back slopes upon completion of rough grading. Plan and conduct all earthwork in such a manner as to minimize the duration of exposure of unprotected soils.

7. Dust Control

Keep dust down at all times, including non-working hours, weekends, and holidays. Sprinkle or treat, with dust suppressors, the soil at the site, and other areas disturbed by operations. No dry power brooming shall be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing shall be permitted only for cleaning nonparticulate debris, such as steel reinforcing bars. No sandblasting shall be permitted unless the dust from there is confined. Only wet cutting of concrete and asphalt shall be permitted. No unnecessary shaking of bags shall be permitted where bagged cement, concrete mortar, and plaster is used.

8. Sound Control Requirements

The noise level from the Contractor's operations, between the hours of 8:00 a.m. and 5:00 p.m. shall not exceed 86 dbA at a distance of 50 feet. This requirement in no way relieves the Contractor from responsibility for complying with local ordinances relating to noise.

Said noise level requirement shall apply to all equipment on the job or related to the job, including but not limited to trucks, or transient equipment that may or may not be owned by

the Contractor. The use of load sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.

9. Preservation and Cleaning

The Contractor shall keep roads free from mud and other debris. If mud or debris is tracked onto the road, it shall be immediately cleared from the road. The Contractor shall completely clean roadways at the end of each day.

10. Cleanup and Removal of Temporary Facilities

Obliterate all signs of temporary construction facilities including work areas, structures, stockpiles of excess or waste materials, and all other vestiges of construction. Temporary parking areas and similar temporary use areas shall be graded in conformance with surrounding areas.

Sweep paved surfaces; rake other surfaces or grounds. Remove all tools, equipment, surplus materials, trash, garbage, and rubbish. At the time of final inspection, the project shall be thoroughly clean and ready for use. .

11. Mechanical/Vacuum Roadway Sweeper

During the course of construction, the Contractor will be required to sweep the project site at a minimum of once per week using a regenerated air type street sweeper.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.

*****END OF SECTION*****

SECTION 01520 – TRAFFIC CONTROL PLAN

PART 1 GENERAL

1.01 SCOPE OF WORK

Work required under this section consists of furnishing all labor, materials, tools, and equipment incidentals to comply and provide traffic control plan. Traffic control is the sole responsibility of the Contractor.

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01300	Submittals
01530	Water Pollution Control Plan
02111	Abandonment of Existing Facilities
02221	Trench Excavation, Bedding, and Backfill
02500	Drainage
02600	Paving, Restoration and Resurfacing Work
03301	Cast-in-Place Concrete Structures
15060	Piping
15100	Valves and Appurtenances

1.03 SUBMITTALS

The contractor shall submit details on how he intends to comply with the requirements of this section.

PART 2 MATERIALS

All materials used as part of the traffic control plan shall conform to the latest requirements of Caltrans Standard Specifications and the requirements of the encroachment permit.

PART 3 PERFORMANCE

3.01 TRAFFIC CONTROL PLAN

The first order of work shall be for the Contractor to submit a traffic control plan prepared by a licensed traffic engineer. This plan shall be submitted at the pre-construction meeting. Delay in submittal of traffic control plan shall not be a basis for any time extensions. Work shall not begin until the District has reviewed the traffic control plan.

The traffic control plan shall be in full compliance with the California Department of Transportation, the Town of Los Altos Hills and County of Santa Clara (if applicable) encroachment permits requirements.

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or paved shoulder area, including any section closed to public traffic.

The Contractor shall notify local authorities of the Contractor's intent to begin work at least 5 days before work is begun. The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make all arrangements relative to keeping the working area clear of parked vehicles.

A minimum of one paved traffic lane, not less than 10 feet wide, shall be open for use by public traffic in each direction of travel at all time. The full width of roadway used during construction shall be open for use by public traffic on Saturdays, Sundays and designated legal holidays, after 3:00 p.m. on Fridays and the day preceding designated legal holidays, and when construction operations are not actively in progress.

Ingress and egress for residents during construction must be provided during construction at all times.

Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the Contractor if, in the opinion of the District, public traffic will be better served and the work expedited. These deviations shall not be adopted by the Contractor until the District has approved them in writing.

3.02 CONSTRUCTION AREA SIGNS AND SYSTEM

Construction area signs shall be furnished, installed, maintained, and removed when no longer required in conformance with the provisions in Section 12. "Construction Area Traffic Control Devices," of the Standard Specifications and these provisions.

The Contractor shall notify in writing residence, District, the Town of Los Altos Hills, County of Santa Clara (if applicable) and any other pertinent local agencies at least two (2) working days prior to commencing excavation for construction area signs posts.

Excavation required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it determined there are no utility facilities in the area of the proposed post holes.

Sign substrates for stationary mounted construction signs may be fabricated from fiberglass reinforced plastic as specified under "Pre-qualified and Tested Signing and Delineation Materials" of the Standard Specifications.

The Contractor may be required to cover certain signs during the progress of the work. Signs that are no longer required or that convey inaccurate information to the public shall be immediately covered or removed or the information shall be corrected. Covers for construction signs shall be of sufficient size and density to completely block out the complete face of the signs. The retro-reflective face of the covered signs shall not be visible either during the day or at night. Covers shall be fastened securely so that the signs remain covered during inclement weather. Covers shall be replaced when they no longer cover the signs properly.

The contractor shall furnish and maintain two construction funding signs, 4'x4' in dimension, per Section 12 of the California Department of Transportation's Standard Specifications. The contractor shall place signs in conjunction with the construction area signs at locations designated by the inspector. The exact language of the signs will be furnished to the contractor by the District during the pre-construction meeting. At a minimum these signs shall contain the logo and address of the District and Contractor, project duration and funding information. These signs shall be maintained by the contractor throughout the project constructions. Damaged construction funding signs shall be replaced by the contractor at his/her expense.

When using trench plates at the end of the day, the Contractor shall place customized "Trench Plates Ahead" and "Uneven Pavement" signs on a working, lighted, barricade at each direction of traffic. Contractor shall also place "Trench Plates Ahead" signs at areas where trench plates are temporarily placed in the right-of-way. Sand bags shall be used at each barricade to provide stability. The existing wind conditions and weather will determine the number of sand bags to be used.

Letters of customized signs shall be black in color, 4-inch high, on orange background on non-running paint or color. Signs shall be maintained through the course of the project and shall be weather resistant. No paper signs are allowed.

Payment of customized signs shall be paid for under various bid items requiring the signs.

3.03 MAINTAINING TRAFFIC

Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

At least five (5) working days in advance is required prior the beginning of any operation which will impact properties, limit resident or business access to their driveways or potentially impact utility and sewer services, the Contractor must provide written notification to all the impacted residents. This Notice to Residents must clearly state the time, date, and duration of the contractor's planned operation, the impacts to the residents, the purpose of the project and the prohibition of on-street parking. The Contractor shall submit the notice for review.

All Notices to Residents shall include the District's phone number and the Contractor's day and emergency phone numbers. The Contractor shall obtain the District's approval of the Notice to Residents prior to distribution and the beginning of any operations. Each notice shall be hand delivered or securely attached to the door in the event that no one is home. A Friday that occurs prior to a Holiday (three day) weekend shall not be considered as a working day for the purpose of this section.

If needed, two (2) days prior to the day which will require the Contractor to remove parked cars, the Contractor shall furnish and erect "No Parking" signs. These shall be attached to portable barricades and shall state the dates and time that parking will be restricted. The exact date and time signs are posted shall also be noted on the signs.

Emergency vehicles shall be permitted to pass through the work area without delay at all times.

Noncompliance with the requirements of this section shall be cause for the Engineer to stop the work. Delays caused by failure to meet these requirements shall not be considered a valid basis for an extension of time for the purpose of calculating liquidating damages.

Lane closures shall conform to the provisions in the section of these special provisions entitled "Traffic Control System for Lane Closures" of these special provisions.

3.04 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

A traffic control system shall consist of closing traffic lanes in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, and "Construction Area Signs and System" and "Maintaining Traffic" of these provisions.

The provisions in this section will not relieve the Contractor of responsibility for providing additional devices or taking measures as may be necessary to comply with the Standard Specifications and these provisions.

*****END OF SECTION*****

SECTION 01530 WATER POLLUTION CONTROL PLAN / EROSION CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

Work required under this section consists of furnishing all labor, materials, tools, and equipment incidentals to provide and comply with a water pollution control plan.

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01300	Submittals
01520	Traffic Control Plan
02111	Abandonment of Existing Facilities
02221	Trench Excavation, Bedding, and Backfill
02500	Drainage
03301	Cast-in-Place Concrete Structures
15060	Piping
15100	Valves and Appurtenances

1.03 GENERAL BACKGROUND

The National Pollution Discharge Elimination System (NPDES) General Permit for Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities (Construction General Permit) issued and regulated by the State Water Resources Control Board (SWRCB) has been in effect for construction sites for many years now. The latest Construction General Permit requires owners or operators of construction sites, regardless of project size, to implement Best Management Practice (BMP) measures to prevent contamination of storm water runoff from leaving the construction site. In addition to this general requirement, owners and operators of construction sites, including underground and aboveground pipeline installation projects, that result in land disturbance of one acre or more shall obtain coverage under the Construction General Permit prior to starting construction. Coverage under the Construction General Permit requires:

- Electronically file all Permit Registration Documents (PRDs) to the State Water Board's Storm water Multi-Application and Report Tracking System (SMARTS) website, which includes a Notice of Intent (NOI) notifying the SWRCB of the project, Risk Assessment, Site Map, signed Certification Statement, Storm Water Pollution Prevention Plan (SWPPP), changes of information, annual reporting and other compliance documents, and Notice of Termination (NOT).

- Preparation of site-specific Storm Water Pollution Prevention Plan (SWPPP) identifying the potential sources of storm water runoff contamination and BMP measures that will be implemented and maintained on the project site to minimize storm water pollution.
- Mailing Annual Permit Fee to SWRCB.
- Obtaining Waste Discharger Identification (WDID) number.

1. For All Traditional and/or Linear Underground/Overhead Project Sites Greater Than One Acre

The District in accordance with the Town of Los Altos Hills Grading Ordinance will require all project applicants obtain coverage under and comply with the Construction General Permit regulations. Since installing new services or mains on development sites typically involves land surface disturbance, the District will not provide work or inspection services on construction sites without current PRDs, an approved and current SWPPP document prepared by a Qualified SWPPP Developer (QSD), site-specific BMP measures in place and functioning and monitored by a Qualified SWPPP Practitioner (QSP) throughout the duration of the project.

2. For Traditional and/or Linear Underground/Overhead Project Sites less than One Acre and Part of a Larger Common Plan of Development or Sale of One or more Acres of Disturbed Land Surface

The District in accordance with the Town of Los Altos Hills Grading Ordinance will require all project applicants obtain coverage under and comply with the Construction General Permit regulations, where these regulations specifically state that construction activities that results in land surface disturbance of less than one acre is subject to the regulations if the construction activity is part of a larger common plan of development or sale of one or more acres of disturbed land surface.

Since installing new services or mains on development sites typically involves land surface disturbance, the District will not provide work or inspection services on sites without current PRDs, an approved and current SWPPP document prepared by a Qualified SWPPP Developer (QSD), site-specific BMP measures in place and functioning and monitored by a Qualified SWPPP Practitioner (QSP) throughout the duration of the project.

3. For Traditional and/or Linear Underground/Overhead Project Sites less than One Acre

The District in accordance with the Town of Los Altos Hills Grading Ordinance will require all project applicants obtain approval of all improvement plans, including a project site-specific water pollution control plan, from all lead agencies (Town of Los Altos Hills, County of Santa Clara, etc.), where projects disturb less than one acre of land surface and is not part of a larger common plan of development or sale of one or more acres of disturbed land surface. Per the current Construction General Permit these construction activities do not require filing of PRDs to obtain coverage under the permit. However, the District reserves the right to require a project site-specific Water Pollution Control Plan prepared in accordance with the California Storm Water Quality Association (CASQA) Storm Water Program requirements and approved by the lead agency on a case by case basis. The project site-specific Water Pollution Control Plan shall identify BMP measures necessary to protect the project site throughout all phases of construction during both the rainy-season (October 15th through April 15th) and dry-season. All project construction site BMP measures shall be in place, maintained and functioning before the wet-season (before September 15th).

Since installing new services or mains on development sites typically involves land surface disturbance, the District will not provide work or inspection services on sites without an approved

and current site-specific Water Pollution Control Plan and BMP measures in place, functioning and monitored by the project applicant and/or project applicants contractor in accordance with industry standards.

1.04 REFERENCES AND RESOURCES

- SWRCB General Permit for Storm Water Discharges Associated With Construction Activity.
http://www.waterboards.ca.gov/water_issues/programs/storm_water/
- SWRCB General Permit for Storm Water Discharges Associated with Construction Activities from Small Linear Underground/Overhead Projects (State).
http://www.waterboards.ca.gov/water_issues/programs/storm_water/
- California Storm Water Quality Association (CASQA) Storm Water Program.
<https://www.casqa.org/>
- California Department of Transportation (CalTRANS) Storm water Quality Program.
http://www.dot.ca.gov/hq/construc/storm_water/

1.05 SUBMITTALS

The applicant's Contractor shall submit details on how he intends to comply with the requirements of this section.

PART 2 MATERIALS

All materials used as part of the water pollution control plan shall conform to the requirements of the SWRCB Construction General Permit and latest edition of the California "Storm water Best Management Practice Handbook: Construction" prepared by CASQA.

PART 3 PERFORMANCE

Water pollution control work shall conform to the requirements in Section III "Discharge Prohibitions," Section IV "Special Provisions," Section V "Effluent Standards," Section VI "Receiving Water Limitations," and Attachment A "Linear Underground/Overhead Requirements" of the Construction General Permit, and these specifications.

Water pollution control work shall conform to the requirements in the SWRCB Construction General Permit and the "Storm water Best Management Practice Handbook: Construction" prepared by CASQA, and addenda thereto issued up to and including the date of advertisement of the project, hereafter referred to as the "Handbooks."

The project applicant's Contractor and QSP shall become fully informed of, and comply with applicable provisions of the Handbook and Federal, State and local regulations that govern the Contractor's operations and storm water discharges from both the project site and areas of disturbance outside the project limits during construction.

The project applicant's Contractor shall incorporate appropriate Best Management Practices (BMPs) measures at all locations such as gutters, drainage inlets, etc., that may be affected by any operation,

including saw cutting, grinding and paving, that may deposit pollutants in those facilities. Monitoring of the BMPs shall be done throughout the project and any upgrades or adjustments shall be made as directed by the project applicant's QSP. Any spillage into gutters or drainage inlets shall be cleaned immediately.

Conformance with the requirements of this section "Water Pollution Control," shall not relieve the applicant and their Contractor from the responsibilities, as provided in Sections 7-1.11, "Preservation of Property," 7-1.121, "Indemnification," and 7-1.122, "Insurance," of the Standard Specifications.

The District or Town may order the suspension of construction operations which create water pollution if the applicant's Contractor and/or QSP fail to conform to the requirements of this section "Water Pollution Control" as determined by the District or Town. No extension of time and no delay charges shall result from such suspension by the District or Town.

If the project applicant's QSP and/or Contractor, the District and/or the Town identifies a deficiency in the deployment or functioning of an identified control measure, the deficiency shall be corrected by the Contractor immediately, or by a later date and time if requested by the applicant's Contractor and approved by the applicant's QSP in writing, but not later than the onset of subsequent precipitation events. The correction of deficiencies shall be at no additional cost to the District.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.

Nothing in the terms of the Contract nor in the provisions in this Section shall relieve the applicant's Contractor of the responsibility for compliance with Section 5650 and 12015 of the Fish and Game Code, or other applicable statutes relating to prevention or abatement of water pollution.

*****END OF SECTION*****

SECTION 01700 PROJECT CLOSEOUT

PART 1 GENERAL

1.01 SCOPE OF WORK

Work included under this section consists of conforming to the job completion-related requirements of other technical specification sections and of furnishing various materials needed to complete the project.

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01010	Summary of Work
01150	Definition of Bid Items
01300	Submittals
01400	Quality Control
01500	Temporary Facilities and Controls

1.03 SUBMITTALS

1. Tests

Submit any test results done during the course of the work and not previously submitted in accordance with Section 01300.

2. Certificates and Guarantees

Furnish all certificates and/or guarantees as required by individual technical specification sections and in accordance with Section 01300 and Section 01400.

3. Record Drawings

Furnish record drawings in accordance with Section 01300.

4. Performance Bond

Furnish bond in accordance with the General Conditions of the District.

1.04 FINAL INSPECTION

Submit written certification that project, or designated portion of project, is substantially complete, and request, in writing, a final inspection. The District will make an inspection within ten (10) days of receipt of the request.

Should the District determine that the work is substantially complete, the District will prepare a punch list of deficiencies that do not preclude operation and use of the facility; however, final payment will be withheld until all deficiencies are corrected and all close-out requirements of the encroachment permits are met.

Prior to the District accepting the project, the Contractor shall perform a final sweep using a regenerating air type street sweeper along the project limits 14 days after the paving and striping operations. Work shall be coordinated with the District inspector.

Until receipt of a letter of final acceptance, the Contractor shall be responsible for the work.

1.05 POST-CONSTRUCTION INSPECTION

Prior to expiration of the performance bond, and approximately 11 months from date of final acceptance, the District will inspect project to determine whether corrective work is needed. The Contractor will be notified in writing of any deficiencies. The Contractor must begin corrective work on the noted deficiencies within 10 days after receipt of notification.

PART 2 MATERIALS - NONE

PART 3 PERFORMANCE

3.01 CLEANING

Cleanup and cleaning shall be done in accordance with Section 01500 and 01530 and the various technical specification sections.

*****END OF SECTION*****

SECTION 02111 ABANDONMENT OF EXISTING WATER MAIN & FACILITIES

PART 1 GENERAL

1.01 SCOPE OF WORK

Work included under this section consists of furnishing all necessary labor, materials, tools, equipment, and services necessary to abandon existing facilities as specified herein.

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01520	Traffic Control Plan
01530	Water pollution Control Plan
02221	Trench Excavation, Bedding and Backfill
02600	Paving, Restoration and Resurfacing Work
15060	Piping
15100	Valves and Appurtenances

PART 2 MATERIALS

2.01 AGGREGATE BASE

Aggregate base shall be as specified in Section 02221, "Trench Excavation, Bedding and Backfill."

2.02 PAVEMENT REPLACEMENT

Paving replacement materials and methods shall be as specified in Section 02600, "Paving, Restoration and Resurfacing Work."

PART 3 PERFORMANCE

3.01 ABANDONMENT OF EXISTING WATER MAIN & FACILITIES

The procedure described herein shall apply, as applicable, to all water mains and appurtenances designated for abandonment on the drawings.

The procedure to be followed by the Contractor when abandoning mains shall be as follows:

1. This work shall not be done until the new water main has been successfully tested and is in operation. All work shall be coordinated with the District.
2. Remove existing fire hydrants by cutting 18-inches below grade and concrete cap the pipe as shown on the plans after new hydrant assemblies have been installed and tested. Deliver the

removed hydrants to the District's corporation yard. Stand pipes shall become the property of the Contractor. Remove any hydrant marker posts for abandoned hydrants.

3. Remove valve boxes (i.e., but not extensions of those boxes) and covers on valves located on mains, and fire hydrant runs, to be abandoned. Remove any valve marker posts for abandoned valves.
4. Remove existing meters and their respective boxes. Meters are to be delivered to the District's corporation yard.

The abandonment and removal of the existing meter box shall include removal of the angle meter stop and crimping the copper line within 2-feet of the meter box.

The new meter box for the service and PRV shall be installed after the abandonment and removal of the existing copper line and angle meter stop.

At the discretion of the District, the existing meter boxes, angle meter stops, and copper segments shall be salvaged and delivered to the District's yard.

All other appurtenances within the box such as the angle meter stop and copper piping after abandonment shall be delivered to the District's yard at the same time as the salvaged meter boxes.

5. Remove the existing pressure reducing station to be abandoned. All appurtenances within the vault shall be delivered to the District's corporation yard. The vault box and lid shall be removed from the ground and become the property of the Contractor. Existing mains left shall be plugged or capped with fittings approved by the District.
6. Cut, drain, and plug both ends of all existing mains and tees that are to be abandoned. The existing water main shall be drained until no water is visible within the pipe. Mains shall be plugged or capped with fittings approved by District.
7. Backfill shall be in accordance with Section 02221.
8. Restore paved surface as specified in Section 02600, "Paving, Restoration and Resurfacing Work."
9. All abandoned facilities shall be water-tight.
10. Services on live water mains shall be abandoned at the water main with a plug or a Smith-Blair stainless steel clamp as directed by District.
11. Contractor shall use due care when working with asbestos cement pipe and shall comply with all applicable laws and regulations regarding such work. When cutting asbestos cement pipe, Contractor shall ensure that adequate means are used to protect its workers and the environment against asbestos exposure. Asbestos cement pipe shall not be cut with a saw or comparable dust-generating tool, unless adequate encapsulation is provided. Asbestos cement pipe removed by the Contractor's operations shall become his property and be properly bagged and disposed of in an approved manner as required by federal, state, and local regulations.

*****END OF SECTION*****

SECTION 02221 TRENCH EXCAVATION, BEDDING, AND BACKFILL

PART 1 GENERAL

1.01 SCOPE OF WORK

Work included under this section consists of furnishing all necessary labor, materials, tools, equipment, and services in connection with and reasonably incidental to clearing, excavating, constructing pipe bedding, backfilling, and disposing of excess excavated materials required for the construction of water mains. Work required shall include the furnishing of all materials and equipment necessary for the construction and installation of all sheeting and bracing and other facilities which may be necessary to perform the excavations and to place and compact the backfill, and the subsequent removal of such sheeting, bracing and other facilities.

Excavation and backfill shall be in accordance with these specifications, the District's Standard Details and applicable provisions of Section 19 of the Caltrans standard specifications.

1.02 RELATED WORK IN OTHER SECTIONS

Section Title

01300	Submittals
01520	Traffic Control Plan
01530	Water Pollution Control Plan
02111	Abandonment of Existing Facilities
02500	Drainage
02600	Paving, Restoration and Resurfacing Work
03301	Cast-in-Place Concrete Structures
15060	Piping
15100	Valves and Appurtenances

PART 2 MATERIALS

2.01 SUBGRADE MATERIAL

Subgrade material shall be free from organic matter and dirt, and shall be graded with sufficient fines to prevent movement of the foundation into bedding material. All such material shall be compacted in place to provide a stable foundation for construction of the pipe bedding. Subgrade material shall conform to the following gradation requirements:

Sieve Size	Percent Passing
1 ½ - inch	100
¾ - inch	45-90
No. 30	10-25

2.02 BEDDING MATERIAL

Bedding material shall be either “Quarry Fines,”, or clean sand, free of organic material and clay, conforming to the following requirements:

Sieve Size	Percent Passing
No. 4	80-90
No. 200	18-23
Sand Equivalent	20-25

2.03 AGGREGATE BASE

Aggregate base shall conform to the requirements of Section 26 of the Caltrans standard specifications excluding the minimum value requirements for durability index. Grading requirements shall be for 3/4", Class 2 material, lime treated.

PART 3 PERFORMANCE

3.01 CONSTRUCTION ACROSS IMPROVED AREAS

Asphalt concrete pavement or driveways removed or damaged in connection with construction shall be rebuilt to current construction standards and have the same quality as the structure removed. Where pavement or driveways must be removed, they shall be saw cut prior to excavation.

The Contractor may, when approved by the District, tunnel under driveways. Where existing driveways are removed or damaged by the Contractor, the Contractor shall replace the same after completion of the installation of the pipeline or service connection with the same type and quality of material as that which was removed or damaged.

3.02 UNDERGROUND OBSTRUCTIONS

The Contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages by the Contractor's failure to exactly locate and preserve any and all underground utilities.

Excavation and other work under or adjacent to existing pipelines, conduits, or structures of any kind, shall be executed in such a manner as not to interfere with the safe operation and use of such installations. Should any damage occur to these facilities during the operations of the Contractor, they shall immediately notify the District and the proper owner(s) or authorities, and shall arrange for the immediate repair of the facilities at his own expense. If any conflicts are encountered during construction, the District shall be notified immediately.

The Contractor shall notify Underground Service Alert (USA) at (800) 642-2444 a minimum of 48 hours before proceeding with the work.

3.03 TRENCH EXCAVATION

1. Trench Width

In all cases, trenches must be of sufficient width to permit the proper jointing of the pipe. However, trenches wider than the maximums specified herein will result in a greater earth load on the pipe than it was designed for; consequently, if the maximum trench widths specified below are exceeded by the Contractor without the written permission of the District, the Contractor will be required, at his own expense for both labor and material, to provide a higher class of pipe or to embed the pipe in a concrete cradle as directed by the District.

Permissible trench widths are as follows: For all pipes up to and including 18" in diameter, and in all types of soil, a maximum trench width of 24" greater than the outside diameter of the pipe will be permitted. This shall be interpreted to permit a maximum of no more than 12" on each side of the pipe. This clearance shall be measured from the outside of the barrel of the pipe to the sides of the trench and shall include any sheeting, which may be used. The minimum width of un-shored trenches shall be 12" plus the outside diameter of the pipe, with a minimum of 6" on each side of the pipe. Where shoring is required the Contractor shall allow sufficient width to comply with codes and regulatory safety requirements.

2. "T" Cut

A second saw-cut operation is required prior to final paving to achieve the "T"-cut section as shown on the standard plans. Saw-cutting a wider trench line during initial trench excavation to achieve a "T" cut section will not be allowed.

3. Shoring

The Contractor shall furnish, place and maintain such shoring and bracing as may be required to support the sides of excavations for the protection of workers, to facilitate the work; to prevent damage to manholes, structures, and pipelines being constructed; to protect adjacent embankments, structures or facilities from damage; and as required by applicable local, State and Federal safety codes.

Shoring shall be removed by the Contractor unless field conditions are such as to make the removal of sheeting impractical. In such case, the District may permit portions of the sheeting to be cut off to a specified depth and to remain in the trench. Backfill shall be brought to one foot above the top of the pipe before sheeting may be removed.

When trenching or excavation over five (5) feet in depth, under the Labor Code Section 6705, Contractor shall provide the following:

- a. Written and detailed plan covering trench and excavation safety procedures that meets CalOSHA requirements under the Construction Safety Orders Sections 1539-1543.
- b. Submit a written safety plan reviewed and approved by a registered civil or structure engineer for review and approval prior to the start at work.

- c. Assign a competent person to supervised trenching and excavation operations when work is being performed.
- d. Notify Underground Service Alert (USA) a least 48 hours prior to the beginning any trench or excavation operations
- e. The Contractor shall obtain and provide the District a copy of a CalOSHA permit for all trench and excavation operations.

The Contractor must provided ladders or a safe access within 25 feet of a work area in trenches 4 feet or deeper.

4. Dewatering

During pipeline excavation and backfill operations, the Contractor shall provide temporary drains, diversion ditches, pumps, cofferdams, or other devices as may be necessary to remove surface water or groundwater from the area of work. Unless otherwise specifically permitted by the District, water, either of surface or subsurface origin, will not be permitted in the trenches or in new or existing water mains at any time during construction and until backfilling over the top of the pipe has been completed; nor will the groundwater level in the trench be permitted to rise above an elevation 6" below the invert of the pipe. If trench has been flooded prior to placement of bedding material, the bottom of the native trench shall be compacted to the satisfaction of the District. Special care shall be taken during dewatering to insure compliance with Section 01530 "Water Pollution Control Plan."

All excavations shall be kept free from water during the time when concrete is being placed and until such time as water will not be detrimental to the finished work. Dewatering trenches, when required, may be accomplished in any manner the Contractor desires, provided the method is acceptable to the District. Any damage resulting from the failure of the chosen method to operate properly shall be the responsibility of the Contractor and shall be repaired in a manner satisfactory to the District, at the Contractor's expense.

5. Structural Clearances

Excavation for appurtenant structures shall be sufficient to leave at least 12" between the outer surfaces of the structure and the sides of the excavation.

6. Care of Excavated Material and Sampling

All material excavated from trenches and piled adjacent to the trench, or in a roadway or public thoroughfare, must be piled and maintained in such a manner that the toe of the slope of the excavated material is at least 2 feet from the edge of the trench. It shall also be piled so that as little inconvenience as possible is caused to public travel. Free access shall be provided to all fire hydrants, water valves, and meters, and all other conduits shall be kept clean to allow free flow of storm water.

Contractor shall take a soil sample 6-inches above the bottom of the trench line and test for resistivity and pH. Sample shall be taken at every 500 linear or as requested by the District. Contractor shall coordinate with the District prior to start of the job.

7. Open Trench

Unless otherwise directed by the District or stated otherwise on the project drawings, no trench shall be excavated more than 200 feet, nor left unfilled past construction working hours or non-working hours.

All trenches in roads, lanes, or drives, whether located on the project roads or in easement, shall either be backfilled or plated during non-working hours.

8. Excavation Below Grade

Except where unsatisfactory native subgrade material exists, no excavation below the bottom of the pipeline bedding or the structure bedding will be permitted. If, for any reason other than unsatisfactory subgrade, excess material is excavated beyond the limits specified for bedding, such excavation below grade shall be replaced beneath the pipe zone with thoroughly compacted subgrade material at the expense of the Contractor. Unsatisfactory subgrade material shall be removed and replaced as directed by the District.

9. Tree Roots

Tree roots two inches or more in diameter shall not be cut without prior approval of a licensed arborist or the District. Material shall be removed from around root system so as to avoid damage thereto. Roots shall be protected with burlap wrapping while exposed.

10. Excavation

All excavation is unclassified. The work shall consist of performing all excavation operations regardless of the character of subsurface conditions. The Contractor shall make his own evaluation of the type of materials which may be encountered in the work.

11. Wasting of Material Excavated from Trenches

Any excess material resulting from trench excavation shall be disposed of by the Contractor at his own expense in a manner satisfactory to the District. Such excess material may be deposited on private property if so requested by the property owner and proper permits have been obtained for the pertinent local agencies by the property owner and the Contractor. It is recommended that disposed of materials be recycled wherever possible.

12. Trench Plates

When backfilling operations of an excavation in the traveled way, whether transverse or longitudinal, cannot be properly completed within a work day, steel plate bridging with a non-skid surface and shoring shall be required to preserve unobstructed traffic flow. Smooth surface plates are not allowed. A two (2) trench plate limit will be enforced unless directed by the District.

Tack weld plates together when using multiple plates.

Trench plate signage shall be per Section 01520 Traffic Control Plan.

The contractor shall respond to and correct shifting trench plates regardless of the time of day. If the contractor fails to correct sinking backfill material or shifting trench plates in a timely manner, the District reserves the right to correct the problem at the expense of the contractor.

In the event that pending inclement weather or other conditions as determined by the District may adversely affect the use of the plates, said plates shall be removed, and the excavation shall be backfilled, and the surface secured with temporary asphalt.

3.04 PIPE BEDDING AND BACKFILL WITH QUARRY FINES

1. Quarry Fine Bedding and Backfill Definition

Quarry Fine Bedding shall be defined as the area between the bottom of the pipe and 4" below the bottom of the pipe. Pipe Bedding shall consist of leveling the bottom of the trench and furnishing, placing, and compacting quarry fines or other specified material as shown on the project drawings and as specified herein.

Quarry Fine Backfill shall be defined as the area between the pipe, the sides of the trench, and 18" above the pipe. Pipe Backfill shall consist of furnishing, placing and compacting quarry fines above the pipe or other specified material as shown on the project drawings and as specified herein.

Bedding and backfill material shall be compacted to 90% relative compaction and placed in four lifts. Quarry fines shall be placed in no more than 12" lifts or as specified here in. Vibratory plate will not be allowed to compact the pipe backfill.

Lift One – The first lift shall consist of placing 4" of compacted quarry fines to the satisfaction of the District prior to the placement of the pipe. The pipe shall be placed prior to the second lift.

Lift Two – The second lift shall consist of placing quarry fines around the pipe to the top of the pipe to the satisfaction of the District. The top of the pipe shall be visible prior to the start of compaction for the second lift. Compaction of the backfill around the pipe shall be performed by a pneumatic means such as a "Powder Puff." No other means of compaction tool shall be allowed without prior approval by the District. Contractor shall use extreme care to avoid hitting the pipe and polyethylene wrapping while compacting.

Lift Three – The third lift shall consist of placing and compacting 12" of quarry fines.

Lift Four - The fourth lift shall consist of placing and compacting the backfill material to the required compacted depth of 18" above the pipe.

2. Subgrade Material

If the earth in the bottom of the trench contains stones or other hard objects which would interfere with the proper placement of bedding material or is unsatisfactory for supporting the pipe, it shall be removed to a depth to be determined by the District.

3.05 TRENCH BACKFILL

1. General

No backfilling shall commence until the pipeline has been inspected and approved by the District, until concrete in masonry structures or encasement has attained a proper strength, and until required fittings are installed and inspected.

In backfilling the trench, the Contractor shall take all necessary precautions to prevent damage or shifting of the pipe. Backfilling from the sides of the trench will be permitted after sufficient material has first been carefully placed over the pipe to such a depth as is acceptable to the District.

Any backfill which becomes displaced or depressed during construction or during the warranty period, shall be refilled, shaped, and restored to proper grade as frequently as is necessary until the surface is unyielding, at the Contractor's expense.

Placement and compaction operation shall be done in 12" maximum lifts unless otherwise specified by the District. Lifts shall be compacted by the use of mechanical means approved by the District. Compaction equipment or methods that produce horizontal or vertical earth pressures, which may cause excessive displacement or may damage the pipeline or structure, shall not be used. Ponding or jetting of backfill materials will not be permitted. The trench excavation and adjacent areas shall be backfilled to the grades existing prior to construction.

2. Classification of Backfill

"Type A" Trench (Paved Surfaces)

Shall be defined as filling the trench with lime treated aggregate base and compacting it in uniform layers to a relative density of 95%. Temporary pavement of 2" minimum thickness shall be placed and maintained to the satisfaction of the District. Compact temporary pavement per Section 02600 – Paving, Restoration, and Resurfacing. The existing paved surface shall then be replaced with a minimum 6" thickness of asphalt concrete within 30 days of placing temporary pavement.

"Type B" Trench (Graveled Areas and Road Shoulders)

Shall be defined as filling the trench with lime treated aggregate base and compacting it in uniform layers to a relative compaction of 95% to the surface.

"Type C" Trench (Unimproved Areas)

Shall be defined as compacting native material removed from the trench in uniform layers to a relative density of 90%. Material removed from the trench shall be deposited at a suitable site acquired by the Contractor or on abutting property if requested by the property owner, in writing.

"Type D" Trench (Pedestrian/Equestrian Pathways)

Shall be defined as filling the trench with lime treated aggregate base and compacting it in uniform layers to a relative density of 95% to within 6" of the surface. The top 6" shall be backfilled with gravel pathway material, as defined herein, compacted to a relative density of 95%.

"Type E" (2-Sack Slurry)

Shall be defined as filling the trench with 2-sack slurry as defined in Section 03301 – Cast in Place Concrete Structures to within 6" minimum of the surface.

3. Compaction Tests

It is the responsibility of the contractor to achieve the compaction requirements of these specifications. At its discretion the District may perform compaction tests to determine the adequacy of the trench bedding and backfill (quarry fines and aggregate base). Retesting for compaction required by a failing test shall be paid for by the Contractor.

3.06 WATER SERVICE CONNECTIONS AND AIR COMBINATION VALVE CONNECTIONS

Trench excavation, bedding and backfill for water service and air combination valve connections shall be as specified herein and as shown on District's Standard Drawings.

*****END OF SECTION*****

SECTION 02224 - PIPE JACKING

PART 1 GENERAL

1.01 SCOPE OF WORK

Work included under this section consists of furnishing all necessary labor, materials, tools, equipment and services required to jack welded steel casing as shown in the drawings and as specified herein. Installation of water mains within casing is specified in Section 15060, "Piping".

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01520	Traffic Control Plan
02221	Trench Excavation, Bedding and Backfill
15060	Piping

PART 2 MATERIALS

2.01 CASING

Welded steel casing shall be as specified in Section 15060, "Piping".

PART 3 PERFORMANCE

3.01 GENERAL

The installation of welded steel casing shall be in accordance with the line and grade requirements shown on the drawings. Traffic control requirements shall be in accordance with Section 01520.

Unless otherwise specified, the methods and equipment used in jacking casing shall be optional with the Contractor, provided that the proposed method is reviewed by the District and found to be in compliance with this specification. Such approval, however, shall in no way relieve the Contractor of the responsibility for making a satisfactory installation meeting the criteria set forth herein. No wet bores shall be permitted. Only workers experienced in jacking operations shall be used in performing the work.

Variations from the alignment shown on the drawings at the time of completion of jacking shall not exceed one percent of the distance from the jacking point.

3.02 JACKING PROCEDURE

The leading section of casing shall be equipped with a jacking head securely anchored thereto to prevent any wobble or variation in alignment during the jacking operation.

The driving ends of the casing shall be properly protected against damage. Any section of casing showing signs of failure shall be removed and replaced with a new section in which is adequate to carry the loads imposed upon it.

Excavation shall not be made in excess of the outer dimensions of the casing being jacked unless approved by the District. Every effort shall be made to avoid any loss of earth outside the jacking head. Excavated material shall be removed from the casing as excavation progresses, and no accumulation of such material within the casing will be permitted.

Once the jacking operation has commenced, it shall be continued uninterrupted around the clock until the casing has been jacked between the limits shown on the drawings. This requirement may be modified if the Contractor submits to the District for prior approval methods and details that shall prevent the "freezing" of the casing and ensure that the heading is stable at all times.

Should appreciable loss of ground occur during the jacking operation, the voids shall be backpacked promptly to the extent practicable with soil cement consisting of a slightly moistened mixture of 1 part cement to 5 parts granular material. Where the soil is not suitable for this purpose, the Contractor shall import suitable material at its expense. The soil cement shall be thoroughly mixed and rammed into place as soon as possible after the loss of ground.

The joints of sections of casing to be jacked shall be welded with a continuous circumferential weld. It shall be the Contractor's responsibility to provide stress transfer across the joints which is capable of resisting the jacking forces involved without damage to the casing.

*****END OF SECTION*****

SECTION 02500 – DRAINAGE

PART 1 GENERAL

1.01 SCOPE OF WORK

Work required under this section consists of furnishing all necessary labor, materials, tools, equipment and services in connection with and incidental to constructing any replacement drainage facilities damaged by the Contractor.

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01520	Traffic Control Plan
02221	Trench Excavation, Bedding and Backfill
02224	Pipe Jacking
02600	Paving, Restoration and Resurfacing Work

PART 2 MATERIALS

2.01 DRAINAGE PIPE AND CATCH BASINS

Materials shall be furnished and installed in accordance with Section 15060, "Piping", and with the Caltrans standard specifications and plans. Pipe material shall match existing or damage drainage facility. Special care shall be taken to insure adequate connection between existing and new facilities.

PART 3 PERFORMANCE

3.01 TRENCHING

Trench excavation and backfilling for drainage pipe shall be performed in accordance with Section 02221, "Trench Excavation, Bedding and Backfill."

3.02 LAYING DRAINAGE PIPE AND INSTALLING CATCH BASINS

Each structure shall be placed so that the cover (distance from finished grade to top of pipe) is as shown on the drawings or as established by the District. In no case shall the cover be less than one (1) foot. During construction, adequate cover must be maintained to protect the structure from damage. Pipe and catch basins shall be installed in accordance with the Caltrans standard specifications and standard plans.

*****END OF SECTION*****

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SECTION 02600 PAVING, RESTORATION, AND RESURFACING WORK

PART 1 GENERAL

1.01 SCOPE OF WORK

Work required under this section consists of furnishing all labor, materials, tools, and equipment incidental to replacing pavement and gravel surfacing removed or damaged during construction and that required for asphalt concrete paving and gravel road surfacing. Paving shall include asphalt concrete surfacing, untreated aggregate base course and aggregate sub-base materials. Paving and gravel roads include excavation, filling, spreading, and compaction of the filled areas to conform to the lines, grades, and slopes as shown on the drawings. The work also includes furnishing, installing and maintaining temporary paving and trench plates.

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01300	Submittals
01520	Traffic Control Plan
02111	Abandonment of Existing Facilities
02221	Trench Excavation, Bedding and Backfill
02500	Drainage

1.03 SUBMITTALS

The Contractor shall submit manufacturers' data including catalog cuts, drawings and samples, as appropriate, and letter(s) of compliance as required by Section 01300, "Submittals."

PART 2 MATERIALS

2.01 AGGREGATE BASE

Aggregate shall conform to the requirements of Section 26 of the Caltrans standard specifications. Grading requirements will be for ¾" (19 mm Maximum), Class 2 base aggregate, lime treated.

2.02 AGGREGATE SURFACING

Aggregate shall conform to the aggregate base requirements of Section 26 of the Caltrans standard specifications. Grading requirements shall be ¾" (19 mm Maximum), Class 2 base aggregate, lime treated.

2.03 ASPHALT CONCRETE

Asphalt concrete for pavement replacement shall be hot plant mix Type "B" (½-inch Maximum, Medium grading) and conform to the requirements of Section 39 of the Caltrans standard specifications. The asphalt cement shall be PG64-10 penetration grade asphalt.

2.04 BONDING COAT

Material for covering all (vertical and horizontal) surfaces of old pavement shall be asphalt emulsion Types RS-1 or SS-1 conforming to the requirements of Section 94 of the Caltrans standard specifications.

2.05 TEMPORARY PAVING

Temporary surfacing shall consist of Class 2 aggregate base as specified in Section 26 of Caltrans standard specifications. The aggregate base shall be equal in depth to the existing pavement structural section, but in any case not less than 18-inches in depth. The aggregate base shall be brought within two (2") inches of the top of the existing pavement and covered with temporary "cold mix" asphalt paving using an SC-250, SC-800 or approved equal. All temporary surfacing shall be installed the same day as backfilling and shall be level with existing paving.

2.06 SLURRY SEAL

Slurry seal shall be Type II conforming Section 37 of Caltrans standard specifications. Materials shall be a quick-setting asphalt emulsion type, rock dust and plaster sand aggregate, and water.

2.07 TRENCH PLATES

Trench plates shall be A-36 grade steel, non-skid, a minimum of 1-inch thick, and rated for HD-20 loading or greater. See Section 02221, Part 3.03, Sub-Part 12, for trench plate requirements.

2.08 STRIPING AND PAVEMENT MARKINGS

Striping and pavement markings shall be thermoplastic per Caltrans Standard Specifications.

Striping shall be placed in a continuous operation. The Contractor shall ensure there is enough material to prevent any stopping during placement. No overlapping of striping material or markings is permitted.

PART 3 PERFORMANCE

3.01 AGGREGATE BASE COURSE

The aggregate base course shall be spread and compacted on the prepared subgrade. The base course material shall be placed in 6-inch layers and shall be compacted to a minimum relative density of 95%, or for pipeline restoration work be spread and compacted as described under Section 02221, "Trench Excavation, Bedding, and Backfill".

3.02 AGGREGATE SURFACING COURSE

Gravel road surfacing shall be an aggregate course applied to the base course after compaction in the same manner as specified for the aggregate base course. The surface course shall be placed in one layer. Special care shall be taken to maintain crown or slope for drainage.

3.03 TEMPORARY PAVING

Temporary paving shall be installed over all trenches to a thickness of 2-inches. Temporary paving shall be installed on the same day as acceptable trench compaction is obtained and base material installed and shall be smoothed out using a vibratory plate or other means approved by the District. No tire/wheel rolling compaction will be allowed. Temporary paving shall be maintained on a daily basis until permanent paving is installed. The final paving operation shall occur within 30 days of placing temporary paving.

3.04 ASPHALT CONCRETE

Asphalt concrete shall be placed in accordance with Section 39 of the Caltrans standard specifications.

3.05 TRENCH SEAL

The trench edges shall be sealed with an asphalt emulsion. Coverage shall be 1 foot wide centered along the trench edge on each side.

3.06 SLURRY SEAL

Slurry seal shall be placed in accordance with Section 37 of the Caltrans standard specifications.

3.07 TRAFFIC STRIPING

Traffic striping shall be placed per the Town of Los Altos Hills and/or County of Santa Clara requirements and shall comply with Section 84 of the Caltrans Standard Specifications. All damaged striping and reflectors shall be replaced in kind to duplicate, insofar as possible, pre-construction striping.

3.08 ROADWAY SWEEPING

Prior to the District accepting the project, Contractor shall perform a final sweep using a regenerated air type street sweeper through the project limits 14 days after the completion paving, striping, slurry seal, or sand seal. Work must be coordinated with the District for inspection.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.

*****END OF SECTION*****

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SECTION 03301 CAST-IN-PLACE CONCRETE STRUCTURES

PART 1 GENERAL

1.01 SCOPE OF WORK

Work included under this section consists of furnishing and installing all materials, equipment, and services required to construct the pressure reducing station vault, thrust blocks, and other minor concrete structures, as shown on the drawings.

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01300	Submittals
01520	Traffic Control Plan
01530	Water Pollution Control Plan
02221	Trench Excavation, Bedding and Backfill

1.03 DEFECTIVE WORK

Work considered to be defective may be ordered by the District to be replaced in which case the Contractor shall remove and replace the defective work at his expense.

1.04 APPLICABLE STANDARDS

All concrete shall be mixed, delivered, placed, finished, and cured in accordance with Sections 51 and 90 of the Caltrans Standard Specifications, dated 2010, and with ACI 301-05, "Standard Specifications for Structural Concrete."

1.05 SUBMITTALS

The Contractor shall submit manufacturers' data including catalog cuts, drawings and samples, as appropriate, and letter(s) of compliance as required by Section 01300, "Submittals."

1.06 APPROVAL OF TESTING AGENCIES AND REPORTS

Any laboratory where testing of materials is to be performed shall receive prior approval from the District. Documentary evidence, satisfactory to the Owner, that the material has passed the required inspection and testing must be furnished prior to the incorporation of such materials in the work, and rejected materials must be promptly removed from the premises.

PART 2 MATERIALS

2.01 FORMWORK

All formwork shall be 3/4 inch plywood, Exterior Type, DFPA Grade "Concrete Form Exterior", or better.

2.02 PORTLAND CEMENT

Portland cement shall conform to ASTM C150 for Type II cement, or Type V, low alkali, containing less than 0.6 percent alkalis. Use one standard brand throughout all work.

2.03 ADDITIVES

Water reducing additive shall conform to ASTM C-494 Type A.

2.04 CONCRETE AGGREGATES

Concrete aggregates shall conform to Section 90 of the Caltrans Standard Specifications, dated 2010, for hard rock concrete aggregates.

2.05 WATER

Water shall be clean and free from deleterious amounts of acids, alkalis, or organic materials.

2.06 CONCRETE

All structures, minor structures, foundations, and slabs shall be constructed of Class 1 concrete as specified in Section 90 of the latest Caltrans Standard Specifications, and shall develop a minimum compressive strength of 3,000 psi at 28 days. Thrust blocks and incidental concrete used for underground piping applications shall be Class 2 concrete.

The maximum water-cement ration shall be 0.45. If a pozzolan is used in the concrete, the maximum water-cement plus pozzolan ratio shall be 0.45.

The slump shall be 1-inch minimum and 3-inches maximum for footing slabs and walls. The slump shall be 1-inch minimum and 4-inches maximum for other slabs, beams, and columns.

2.07 2-SACK SLURRY

2-Sack Slurry shall consist of a fluid, workable mixture of aggregate, cement, and water. The aggregate cement and water shall be proportioned by weight. 188 pounds of cement (2-sack) shall be used for each cubic yard of material. The water content shall be sufficient to produce a fluid, workable mix that will flow and can be pumped without segregation of the aggregate while being placed.

The 2-sack mix should have a 28-day compressive strength of no more than 300 psi. The aggregate (sand) should conform to ASTM C33 (for gradation), and should have a Sand Equivalent of no less than 75.

2.08 BARS

Bars for reinforcing shall be deformed, domestic steel bars conforming to ASTM A615, Grade 60.

2.09 WIRE

Wire for tying reinforcement in place shall be No. 18 or heavier, AWG black annealed.

PART 3 PERFORMANCE

3.01 FORMWORK

Forms shall be designed and constructed in accordance with the requirements of Section 51 of the latest Caltrans Standard Specifications, and ACI 301-05.

The forms shall be smooth, mortar-tight, true to the required lines and grades, and of sufficient strength to resist springing out of shape during the placing and vibrating of concrete. All dirt, chips, sawdust, and other foreign matter shall be completely removed before concrete is deposited therein. Forms previously used shall be thoroughly cleaned of all dirt, mortar, and foreign matter before being reused. Before concrete is placed in forms, all inside surfaces of the forms shall be thoroughly coated with a form sealer. The form sealer shall be of high penetrating quality leaving no film on the surface of the forms that can be absorbed by the concrete or be incompatible with concrete paint.

All exposed sharp edges shall be rounded or chamfered with triangular fillets, 1/2 -inch, unless shown otherwise on the drawings.

Forms shall be removed in such a manner and at such time so as to insure the complete safety of the structure and proper curing of the concrete.

3.02 INSTALLATION OF REINFORCING STEEL

Reinforcing steel shall be cleaned, fabricated, placed, tied, and supported in accordance with the ACI detailing manual, SP-66(04), and Section 52 of the Caltrans Standard Specifications, dated July 2001.

Steel reinforcement shall be accurately placed and shall be supported and secured against displacement by the use of adequate and proper supporting and spacing devices, tie wires, etc., so that it will remain in its correct location in the finished work. No supporting devices shall be used that will impede the placement of concrete.

The clear spacing between parallel bars shall be not less than 1-1/2 times the normal diameter of the maximum size aggregate, and in no case less than 1-1/2-inches except at splices which shall be wired together. Concrete cover, and other reinforcing spacing requirements, shall conform to the latest requirements of the International Building Code.

Reinforcing steel shall extend to the far face of the concrete and terminate in a 90 degree hook.

Lap splice lengths shall be as follows:

No. 4	22-inches
No. 5	27-inches
No. 6	32 inches

3.03 PLACEMENT OF CONCRETE

Place concrete so that a uniform appearance of surfaces will be obtained and the concrete will be free of all rock pockets, honeycombs, and voids.

3.04 CURING

Freshly deposited concrete shall be protected from premature drying and excessively hot or cold temperatures, and shall be maintained with minimal moisture loss at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete.

3.05 CONSTRUCTION JOINTS

Joints not shown on the Drawings shall be so made and located as to least impair strength of the structure. A pour schedule for each structure showing all construction joints shall be submitted to the District for review.

The surfaces of all concrete joints shall be thoroughly cleaned and all laitance removed by sandblasting. In preparation for the next pour, the joints shall be dampened, then, thoroughly covered with a coat of neat cement mortar of similar proportions to the mortar in the concrete. The mortar shall be as thick as possible on vertical surfaces and at least 1/2-inch (13 mm) thick on horizontal surfaces. The fresh concrete shall be placed before the mortar has attained its initial set.

3.06 EXPANSION JOINTS

Pre-molded expansion joint material shall be installed where concrete walks abut buildings, walls, and curbs, where shown on the Drawings and at 20'-0" on centers maximum, where not specifically shown.

3.07 EMBEDDED ITEMS

All sleeves, inserts, anchors, ladders, and other embedded items required for adjoining work or for its support shall be placed prior to concreting. Embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts, and anchor bolt slots shall be filled temporarily with a readily removable material to prevent entry of concrete into the voids.

3.08 REPAIR OF SURFACE DEFECTS

All tie holes and all repairable defective areas shall be patched immediately after form removal in accordance with the applicable provisions of Section 51 of the Caltrans Standard Specifications, dated 2010.

FINISHES

1. Schedule of Finishes

<u>Element</u>	<u>Finish</u>
Walls not exposed	Rough or board form finish
Exposed slabs	Broom finish

2. Rough or Board Form Finish

Rough or board form finish surfaces shall be true to line and plane with no specific requirements for selected facing materials. Tie holes and defects shall be patched and fins shall be rubbed down with wooded blocks. Otherwise, surfaces shall be left with the texture imparted by the forms.

3. Broom Finish

Concrete shall first be finished with power floats, then with power trowels, and final by hand trowels before it is given a coarse, scored texture by drawing a broom, or burlap belt, across the slab surface.

3.09 CONCRETE COMPRESSIVE STRENGTH TESTS

Concrete will be tested and inspected as work progresses. One compressive strength test shall be made for each pour. One complete test shall consist of making three (3) cylinders in accordance with ASTM C31, storing the cylinders for 24 hours at the pour site, delivering the cylinders to the testing laboratory, testing one cylinder at 7 days and the other two cylinders at 28 days in accordance with ASTM C39. Four copies of certified test results shall be forwarded to the District upon completion of the testing.

3.10 CONCRETE SLUMP TESTS

Each pour shall be tested for slump at the beginning of the pour, at the time the sample for the strength test is taken, and whenever the consistency of the concrete appears to vary. The test shall conform to ASTM C143.

*****END OF SECTION*****

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SECTION 05500 MISCELLANEOUS METALWORK

PART 1 GENERAL

1.01 SCOPE OF WORK

This section defines quality requirements for any miscellaneous metalwork shown on the drawings and specified herein.

1.02 RELATED WORK IN OTHER SECTIONS

Section Title

01300	Submittals
01520	Traffic Control Plan
03301	Cast-In-Place Concrete Structures
15060	Piping
15100	Valves and Appurtenances

1.03 APPLICABLE CODES

All work specified herein shall comply with the latest edition of the California Building Code.

PART 2 MATERIALS

2.01 IRON AND STEEL

Conform to the current edition of ASTM A36, "Standard Specifications for Structural Steel for Bridges and Buildings."

2.02 STEEL PIPE

As specified under Section 15060, "Piping".

2.03 STAINLESS STEEL

Stainless steel shall be Type 316, unless shown otherwise on the Drawings.

2.04 GALVANIZING

Conform to the current edition of ASTM A-153, "Standard Specifications for Zinc (hot galvanized) Coatings on Structural Steel Shapes, Plates, Bars, and their Products. Galvanized finish shall not be broken, marred or scratched.

2.05 MISCELLANEOUS IRON

Shall be any commercial grade mild steel, unless shown otherwise on the drawings.

PART 3 PERFORMANCE

3.01 WORKMANSHIP

Fabrication of all miscellaneous metal items shall be done in the shop. Fabrication, assembling, welding, cutting, mitering, and fitting shall be perfect. Welds shall be ground smooth, drilling and tapping shall be accurate, with perfect alignment and free of stripped threads. All surfaces shall be free of file marks, dents, hammer marks, wire edges or other unsightly surface defects. When finally installed, all metal work shall be finished, unwarped, plumb, and level and well anchored to the structure.

*****END OF SECTION*****

SECTION 15060 - PIPING

PART 1 GENERAL

1.01 SCOPE OF WORK

Work included under this section consists of furnishing and installing all water main piping, fittings and appurtenances shown on the project drawings and as specified herein.

All water mains, including hydrant runs and tie-ins, shall be constructed entirely of Class 350 Ductile Iron fittings and pipe; wrapped in 8-mil linear low density polyethylene film. All fittings shall be restrained.

1.02 RELATED WORK IN OTHER SECTIONS

Section Title

01300	Submittals
01520	Traffic Control Plan
01530	Water Pollution Control Plan
02224	Pipe Jacking
02221	Trench Excavation, Bedding and Backfill
15100	Valves and Appurtenances

1.03 SUBMITTALS

The Contractor shall submit manufacturers' data including catalog cuts, drawings and samples, as appropriate, and letter(s) of compliance as required by Section 01300, "Submittals."

PART 2 MATERIALS

2.01 DUCTILE IRON (DI) PIPE

1. General

Ductile iron pipe shall conform to ANSI A21.50 and A21.51 (AWWA C150 and C151) and shall be Pressure Class 350.

2. Joints

Buried pipe and pipe fittings shall all have restraint push-on joints ("Field Lok," mega-lugs, flanged-in), unless shown otherwise on the drawings or specified otherwise. At fittings and tie-ins, pipe shall have push-on joints or mechanical joints. Mechanical joints may be used for closures, subject to meeting thrust restraint requirements. Flanged ends, or plain ends with restrained couplings, shall be used for piping above ground.

For mechanical joints, dimensional and material requirements for pipe ends, glands, bolts, nuts and gaskets shall conform to ANSI A21.11 (AWWA C111).

For flanged joints, ends of pipe and fittings shall be provided with ductile iron flanges conforming to ANSI A21.10 and A21.15 (AWWA C110 and C115), as applicable. Bolts, nuts, and gaskets for flanged connections shall conform to ANSI B16.1 and as specified in Section 2.08 Hardware. All flanged connections shall use "Ring Flange-Type" gaskets as manufactured by U.S. Pipe capable of withstanding pressures up to 350 psi.

3. Fittings

Fittings shall be of ductile iron conforming to ANSI A21.53 (AWWA C153) with push-on joint bell design to fit the particular make of the pipe furnished or to fit a pipe-to-fitting adapter unless specified on the plans. Fittings shall have a pressure rating at least equivalent to that of the pipe used.

4. Coating and Lining

Buried ductile iron pipe and fittings shall be asphalt seal-coated and cement-mortar lined. The lining shall conform to the provisions of AWWA C104.

5. Polyethylene Encasement

All buried ductile iron pipe and fittings shall be wrapped in 8 mil. minimum weather resistant linear-low density polyethylene film in accordance with AWWA C105., Method A. The tape used to secure the polyethylene film shall be polyethylene adhesive.

6. Pipe End Caps During Transport / Storage

The interior of all pipe, fittings, and other accessories shall be kept clean and free from organic matter at all times. All pipes shall be delivered to the construction site with end-covers on both ends. End-cover components must adhere sufficiently to withstand the stresses caused by wind during shipment. Pipes delivered on-site with damage shall be immediately field cleaned to remove all undesirable material along the entire length of the interior of the pipe. New end covers shall be installed after cleaning.

Cut pipe lengths of 5.0 feet or less, fittings, and valves do not require end-covers but shall be field cleaned prior to installation.

2.02 WELDED STEEL PIPE AND APPURTANCES FOR CASING APPLICATIONS

1. Casing

Pipe casing used for jacked or tunneled road crossings shall be fabricated from steel, meeting the requirements of either ASTM A570 (36,000 psi yield) or ASTM A53B (35,000 psi yield) and shall conform to all applicable provisions of AWWA C200. Minimum wall thickness shall be 3/8 inch, unless shown otherwise on the drawings or in attached permits. If additional thickness of pipe is required to withstand jacking pressure, this additional thickness shall be provided by the Contractor at his expense.

2. Skids

All pipe installed within steel casings shall be supported on plastic insulators Calpico M Series, or equivalent. Stainless steel banding and hardware shall be used to attach the pipe to the skids.

3. Casing Seals

Seals between the casing and the carrier pipe shall be of the expanding mechanical type. They shall be "Link-Seal," as manufactured by Thunderline Corporation, or equivalent product as approved by the District Engineer. Seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the carrier pipe and the casing. Links shall be loosely assembled with bolts to conform a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut. After the seal assembly is positioned in the sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide a watertight seal between the carrier pipe and the casing.

2.03 CORRUGATED METAL PIPE

Corrugated metal culvert pipe and end sections shall be steel hot-dipped galvanized inside and outside and shall conform to Section 66 of the Caltrans standard specifications.

Unless shown otherwise on the project drawings, pipe smaller than 24-inches shall be 14 gauge and pipes 24-inches and larger shall be 12 gauge.

Connections shall be with 12-inch wide bolted band couplers, galvanized, with 7-inch wide neoprene gaskets, 3/8-inch thick.

2.04 THRUST-RESISTANT RETAINERS FOR DUCTILE IRON PIPE

1. Push-On Joint Locking Gasket Type

The locking gasket type restrained joint shall consist of stainless steel locking segments molded into the gasket that shall grip the spigot end of the pipe to prevent joint separation. This restrained joint system shall be "FIELD LOK," manufactured by U.S. Pipe or equivalent product approved by the Underwriters Laboratory and Factory Mutual.

2. Mechanical Joint Retainer Type

Mechanical joint fittings shall be EBAA Iron "Megalug". Bolts, nuts, and washers shall be low alloy (Corten).

Wedge gaskets shall be used with all mechanical joints. Standard mechanical joint gasket will not be allowed.

2.05 THRUST BLOCKS

Concrete thrust blocks are optional except where required on the drawings. Thrust blocks shall be constructed per Standard Details. Thrust blocks shall be constructed of Class 2 concrete, as defined in Section 90 of the Caltrans standard specifications.

2.06 PIPE CONNECTORS

1. Flexible Couplings

Flexible couplings shall be Smith-Blair Quantum Coupling No. 462, or equivalent cast coupling as approved by the District. Flex coupling must conform to AWWA C-219 and coated with a bonded epoxy. Flanges and sleeve shall be high strength ductile iron. Flexible couplings shall be rated at 250 psi.

Bolts, nuts and washers, and restraining tie rods and associated hardware, shall be high strength low alloy (Corten).

2. Flanged Coupling Adapters

Flanged coupling adapters shall be Tyler MJ x FE adapter or equivalent as approved by the District.

Bolts, nuts and washers, and associated hardware, shall be Type 316 stainless steel.

Flange gaskets shall conform to Section 2.01 – Ductile Iron Pipe, Sub-Section 2, Joints.

3. Tapping Sleeves

Tapping sleeves shall be Mueller No. H-615, mechanical joint, iron bodied, designed for ductile iron, cast iron or PVC pipe. Bolts, nuts, washers and associated hardware not part of a mechanical joint assembly shall be plated. No tapping sleeves shall be used for asbestos cement pipe.

2.07 HARDWARE

All bolts, nuts and washers, and restraining tie rods and associated hardware, used with flanged fittings, couplings and appurtenances shall be Type 316 Steel for all buried and exposed applications. All bolts shall be furnished with finished hexagonal nuts. The dimensions of all heads and nuts shall be not less than those required for the American Standard regular, and the height shall be sufficient to break the bolt in the body portion when tested. Threads shall be American Standard screw thread, coarse thread series.

Type 316 Steel bolts and nuts hardware shall be used one time per application. Reusing Type 316 Steel hardware will not be permitted.

Mechanical joint hardware EBAA shall be high strength, low alloy (Corten).

2.08 TUBING AND FITTINGS

Copper tubing and fittings used for service connections and reconnections shall be Type K, soft, and conform to ASTM 88.

2.09 MARKER TAPE FOR BURIED PIPING

Marker tape shall be metallic foil bonded to plastic film not less than 2-inches wide. The adhesive shall be colored and be compatible with the foil and film. Film shall be inert polyethylene plastic with thickness not less than 1 mil.

The buried utility line tape shall be identified with an appropriate imprint such as "Caution: Water Main Below" and the identification repeated at approximately 24-inch intervals. Letters shall be 3/4-inch high minimum. The tape shall have a blue imprint.

Marking and warning tape shall be as manufactured by Calpico, Inc., Lineguard, Inc., Allen Systems, Inc., Paul Potter Associates, all of Wheaton, Illinois, or Reef Industries, Houston, Texas, or equivalent.

PART 3 PERFORMANCE

3.01 TRENCH EXCAVATION, BEDDING AND BACKFILL

Trench excavation, bedding and backfill work shall be performed in accordance with Section 02221, "Trench Excavation, Bedding and Backfill" and with the Standard Plans.

3.02 EXISTING UTILITIES AND STRUCTURES

The locations of underground utilities and drainage facilities, where shown on the project drawings, are approximate only. It is the Contractor's responsibility to determine the exact locations of all existing utilities per Section 02221 paragraph 3.02. Where existing culverts, underground facilities, underground structures, power, telephone or guy poles or guy wires interfere with construction, the Contractor shall be responsible for coordinating with the appropriate utility companies before removing or relocating any interfering utilities providing that the interfering utilities are shown on the drawings or are visible above grade. The cost of removing and relocating all such existing facilities shall be included in the Contractor's bid and no additional allowance shall be made thereof unless specifically stated otherwise in these specifications.

3.03 HANDLING AND DISTRIBUTION OF MATERIALS

Pipe and appurtenances shall be stored in a manner to avoid damage to the materials and to linings and coatings.

The pipe shall be inspected before laying for cracked, broken, or defective pieces. Pipe sections shall be carefully lowered into the trench to prevent damage using padded blocking or cables. All dirt or other foreign matter shall be removed from inside the pipe before lowering into the trench and shall be kept clean during installation. The Contractor shall replace all damaged pipe.

3.04 INSTALLATION OF BURIED PRESSURE PIPING

1. General

Pipe, fittings, and appurtenances shall be installed in accordance with the manufacturer's instructions and in accordance with AWWA C600 and "A Guide for the Installation of Ductile Iron Pipe," published by the Ductile Iron Pipe Research Institute.

The Contractor shall furnish such parts and pieces as may be necessary to complete the fixtures and apparatus in accordance with the best practice of the trade and to the satisfaction of the Owner.

2. Handling

The pipe shall be protected to prevent entrance of foreign materials during installation.

All pipe and fittings shall be carefully examined for defects, and no piece shall be installed which is known to be defective. Special care shall be taken to avoid leaving bits of wood, dirt, or foreign particles in the pipe.

All pipe and fittings shall be carefully handled at all times and at no time while loading, unloading, moving, or installing any lined pipe and fittings shall be dropped. All pipe and fittings shall be handled by mechanical means. Wye belt sling shall be used for all coated pipe.

3. Alignment

Piping shall be installed as indicated on the project drawings. Where not detailed, exposed pipe shall be installed in straight horizontal and vertical runs parallel to the axis of the structures.

Parallel runs of pipe shall be grouped and kept uniformly parallel. Bends and fittings shall be properly located to maintain uniform spacing and elevation of pipe groups at changes of direction and at branch connections.

All pipe shall be carefully placed and supported and the proper lined and grade, and shall be sloped to permit drainage. Minor adjustment may be necessary to avoid architectural and structural features. Major relocations shall be approved by the District.

The project drawings shall be taken as diagrammatic for piping that is not shown in detail. Sizes of piping and their locations are indicated, but it is not limited to show every offset and fitting nor every structural difficulty that will be encountered during the installation for the work. The alignment of the pipes shall be varied from indicated on the projects drawings without extra expense to the District where necessary to complete the fixtures and apparatus in accordance with the best practice of the trade and to the satisfaction of the District.

The allowable angle of deflection at any joint shall not exceed the amount recommended by the pipe, or coupling, manufacturer for the particular pipe size used.

A minimum 3 foot homogeneous length of pipe shall be installed before and after any fitting, valve or other appurtenance. Any sections less than 3 feet will not be permitted.

Trench Dams shall be placed on new water main alignments where slopes exceed 10% or as directed by the District and shall be placed every 100' in accordance with the District's Standard Plans.

4. Valves

Valves shall be set with the stems upward and in vertical position, unless indicated otherwise on the drawings. The Contractor shall not operate existing District valves at any time.

5. Joints

Pipe shall be assembled and joined in accordance with the manufacturer's published instructions for the type of pipe and joint used. All portions of the joints shall be thoroughly cleaned before the sections of pipe are put together.

Where mechanical joints are used with ductile iron pipe, the pipe shall be marked in such a manner that it can be determined after installation that the pipe is properly seated.

Pipe work shall be suspended and supported in such manner as to prevent sagging or overstressing of pipe and connections and, furthermore, shall be supported so that no item of the piping system will transfer any load or strain to any equipment.

The ends of each pipe shall be assembled and joined in accordance with the manufacturer's instructions and shall abut against the next pipe section in such a manner that there will be no unevenness of any kind along the bottom half of the interior of the pipe.

Metallic pipe and supports, unless otherwise shown on the project drawings, shall be provided at the base of all risers, at intervals not to exceed 5' on all runs of the pipe 2" and smaller in diameter and at intervals not to exceed 10' on all runs.

6. Pipe Plugs

When pipe laying is not in progress, the open ends of the installed pipe shall be closed by a water tight plug. The plug shall be fitted with means for venting. When practical, the plug shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe flotation if the trench fills with water.

7. Thrust Resistance

Mechanical restrained joints ("retainers") shall be provided on all joints, at all bends, vertical bends, tee branches, and dead ends for ductile iron pipe.

Concrete thrust blocks shall be cast between undisturbed ground and the fitting to be anchored as shown on Standard Plans. Blocks shall be poured so that the pipe and the fitting will be accessible for repairs.

Retainers must be used throughout the full length of any ductile iron water main installed in a casing to the nearest fitting on each side of the casing (i.e., the casing installation does not provide effective thrust resistance

Where retainers are used, the manufacturer's written instruction for installation shall be followed.

8. Polyethylene Encasement for Ductile Iron Pipe and Fittings

Installation of 8-mil polyethylene encasement for ductile iron pipe shall be in accordance with ANSI/AWWA C105/A21.5-05 Method A.

Ductile iron pipe shall be encased with the polyethylene wrap prior to placement in the trench. Polyethylene wrap shall be cut approximately 2 ft. longer than the length of the pipe. The wrap shall be slipped around the pipe, centering it to provide a 1 ft. overlap on each adjacent pipe section and bunching it in an accordion-fashion lengthwise until it clears the pipe end.

After assembling the pipe joint, the overlap of the polyethylene from the proceeding wrap shall be pulled over to the new length of pipe and secured in place. Then, the overlap end of the polyethylene from the new pipe section shall be slip over to the preceding pipe and secured in place. Installation of the next section of pipe shall be in the same manner.

The excess wrap along the length of the pipe shall be folded back and secured at quarter points. The slack of the pipe shall be snug but not tight.

Cuts, tears, punctures, or other damage to the polyethylene shall be repaired with adhesive tape or with a short length of polyethylene sheet wrapped around the damaged area.

Bends, reducers, offsets, and other pipe shaped appurtenances shall be covered with polyethylene in the same manner as the pipe.

9. Installation of Marker Tape

Install tape in backfill directly over each pipeline, as shown on the drawings.

10. Disinfection

Disinfection of the water main shall be supervised by or performed by the District. The Contractor shall not disinfect the water main until they have coordinated with the District.

Disinfection of water main shall be in accordance with ANSI/AWWA C651-05. The Contractor shall use the Table Method. Any other disinfection method must be reviewed by the District before implementation.

Prior to construction, Contractor shall submit disinfection material information per Section 01300.

Calcium hypochlorite tablets must meet ANSI/AWWA B300 and are available in 5-g tablets and must contain 65% available chlorine by weight. Calcium hypochlorite intended for disinfecting swimming pools will not be allowed.

Tablets shall be stored in a cold, dry, and dark environment to minimize deterioration.

During new construction, 5-g calcium hypochlorite tablets shall be placed upstream in each section of pipe. The number of 5-g tablets required for each pipe section shall be as follows:

Length of Pipe Section ft			
Pipe Diameter In inches	12.9 or less	13.0-17.9	18
6	1	1	1
8	1	2	2
10	2	3	3
12	3	4	4
16	4	5	6

Attach all the tablets inside and at the top of the water main, with approximately equal numbers of tablets at each end of a given pipe length. Tablets shall be attached by approved US Drug Administration (USDA) food-grade adhesive. Examples of approved food-grade adhesive are Permatex Form-A-Gasket No. 2 and Permatex Clear RTV Silicone Adhesive Sealant. Un-approved food-grade adhesive by the USDA will not be accepted.

Also, one tablet shall be placed in each hydrant, hydrant branch, and other appurtenance.

Filling and contact time shall be per AWWA C651-05. When installation has been completed, the water main shall be filled with water at a rate to ensure the water within the water main will flow at a velocity no greater than 1 ft/sec (0.3 m/sec). Precautions shall be taken to ensure that air pockets are eliminated. This water shall remain in the pipe for at least 24 hours. If the water temperature is less than 41 F (5 C), the water shall remain in the water main for at least 48 hours.

11. Bacteriological Test

a. Standard conditions:

After the final flushing and before the new water main is connected to the distribution system, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the new water main. At least one set of samples shall be collected from every 1,200 ft of the new water main, plus one set from the end of the line and at least one set from each branch. Samples shall be tested for bacteriological (chemical and physical) quality in accordance with *Standard Methods for the Examination of Water and Wastewater* (AWWA, 6666 W. Quincy Avenue, Denver, CO 80232, (303) 794-7711, APHA, 800 I Street, NW, Washington, DC 20001, (202) 777-2742, or WEF, 601 Wythe Street, Alexandria, VA 22314-1994, (800) 666-0203). Water shall show absence of coliform organisms, and the chlorine residual shall be within 0.4 mg/l of the chlorine residual of the water being used to fill the new water main. If the first sample test fails the District will require additional tests to find the turbidity, pH, and a standard heterotrophic plate count (HPC) level.

b. Special conditions:

If excessive quantities of dirt, debris, or trench water have entered the new water main, bacteriological samples shall be taken at intervals of approximately 200 ft or as directed

by the District. Additional samples shall be taken of water that stood in the new water main for at least 16 hours after final flushing has been completed.

c. Sampling Procedure:

Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate, as required by *Standard Methods of the Examination of Water and Wastewater* (AWWA, 6666 W. Quincy Avenue, Denver, CO 80232, (303) 794-7711, APHA, 800 I Street, NW, Washington, DC 20001, (202) 777-2742, or WEF, 601 Wythe Street, Alexandria, VA 22314-1994, (800) 666-0203). No hose or fire hydrant shall be used in the collection of samples without prior approval from the District. If no other sampling ports are available, well-flushed fire hydrant with a hose bib may be used with the understanding that they do not represent optimum sampling conditions. A corporation-stop with a copper standpipe assembly or a temporary combination blow-off assembly may be used for sampling the new water main. The sampling pipe must be dedicated and clean, disinfected and flushed prior to sampling. There should be no water in the trench up to the connection for sampling.

d. Sample Results.

If sample results from the lab indicate a measured coliform organism and/or HPC greater than 500 colony-forming units (cfu) per mL, flushing should be resumed and another coliform and HPC set of samples should be taken until no coliform are present and the HPC is less than 500 cfu/mL.

e. Record of Compliance.

The record of compliance shall be the bacteriological test results certifying that the water sampled from the new water main is free of coliform bacteria contamination.

f. Re-disinfection

If the initial disinfection fails to produce satisfactory bacteriological results, the new water main shall be re-flushed, re-chlorinated, and re-sampled at the expense of the Contractor. If check samples also fail to produce acceptable results, the water main shall be re-chlorinated by the continuous-feed or slug method until satisfactory results are obtained – that being two consecutive sets of acceptable samples taken 24 hours apart.

12. Tie-ins

Final connection to existing water main shall be in accordance with ANSI/AWWA C651-05.

Water main and all appurtenances must be completely installed, flushed, disinfected, and satisfactory bacteriological sample results received prior to permanent connections being made to the active distribution system. The new pipe, fitting, and valve(s) required for the connection shall be swabbed with a minimum 1-5% solution of chlorine just prior to installation.

Contractor shall use due care when working with asbestos cement pipe and shall comply with applicable laws and regulations regarding such work.

When cutting asbestos cement pipe, Contractor shall ensure that adequate means are used to protect its workers and the environment against asbestos exposure.

Asbestos cement pipe shall not be cut with a saw or comparable dust-generating tool.

Snap cutters shall be used to cut asbestos cement pipe. Asbestos cement pipe shall not be cut with a saw or cutting tool. Asbestos cement pipe removed by the Contractor's operations shall become his property and be properly bagged and disposed of in an approved manner as required by federal, state and local regulations.

District shall be notified at least 48 hours in advance of any scheduled tie-ins.

No tie-ins, or shutdowns, will be allowed on Fridays or the day preceding a holiday.

No shutdown shall exceed 6 hours in duration.

The Contractor shall designate a person to contact should trench maintenance or other problems arise during non-working hours or days. The District shall be given that person's name, phone number and/or pager number. **INSTALLATION OF ABOVE GROUND EXPOSED PRESSURE PIPING**

13. General

Pipe, fittings, and appurtenances shall be installed in accordance with the manufacturer's specifications and section 3.04 of these Standard Specifications or as directed by the District.

14. Exposed Pipe

Extreme care shall be taken to assure watertight joints. All pipe shall be free of all dirt and grease to secure a tight bond with concrete or waterproof material.

Metallic pipe shall be coated with a dielectric coating.

3.05 CASING

1. Fittings

Field locks shall not be used on the first fittings on the pipe coming out of the steel casing.

3.06 ACCEPTANCE TESTS FOR PRESSURE PIPING

All newly installed sections of pressure piping including but not limited to service connections shall be pressure and leakage tested as described herein. Testing procedures shall be in accordance with the requirements of AWWA C600, Section 4.1, for ductile iron pipe as modified herein. The tests may be run simultaneously at the Contractor's option.

For buried pressure pipelines, tests shall be made on sections not to exceed 2500 feet in length. All necessary equipment, material and labor required shall be furnished by the Contractor. The District will monitor all testing operations. Testing against new valves shall be permitted at the Contractor's risk. No testing shall be permitted against existing system valves.

Tests shall be made after the trench has been backfilled.

A test pressure equal to the design pressure of the pipe measured at the point of lowest elevation plus 50 psi, or 150 psi, whichever is higher, shall be applied. The test pressure in the line shall be maintained for a period of 2 hours. The water required to maintain the test pressure shall be measured by means of a graduated barrel, drum or similar device at the pump suction.

No leakage shall be permitted for exposed piping.

Allowable leakage for buried ductile iron pipe (i.e., 18-foot pipe lengths) shall be as follows:

Ductile Iron Pipe
Allowable Leakage (gal/1000 ft./2 hrs.)

<u>Test Pressure</u>	<u>6-inch</u>	<u>8-Inch</u>	<u>10-Inch</u>	<u>12-Inch</u>
100 psi	0.90	1.20	1.50	1.80
125 psi	1.00	1.35	1.70	2.00
150 psi	1.10	1.50	1.85	2.20
175 psi	1.20	1.60	2.00	2.40
200 psi	1.25	1.70	2.15	2.60

Should testing disclose leakage in excess of that required in the preceding table, defective joints or pipe shall be located, repaired and retested until satisfactory at no additional cost to the District.

3.07 FLUSHING AND DECHLORINATION

Flushing and dechlorination of the water main shall be supervised by or performed by the District. The Contractor shall not flush or dechlorinate the water main until they have coordinated with the District.

All foreign matter shall be flushed from the pipeline prior to disinfection. Hoses, temporary piping, or other devices shall be provided to dispose of flushing water without damage to adjacent properties in accordance with Section 01530. An approved backflow device shall be used when flushing and filling newly-constructed mains.

Following chlorination, all treated water shall be flushed from the piping until the replacement water shall, upon testing, both chemically and bacteriologically, be proven equal to the water quality at the point of supply. Chlorination shall be repeated, if necessary, by the Contractor if the replacement water does not prove equal to the water quality at the point of supply. Actual testing of the bacteriological water sample for chlorine residual shall be conducted by District personnel.

A disposal plan of chlorine-water mixture shall be submitted to the District 48 hours in advanced for review. Upon approval of the disposal plan by the District, the Contractor may proceed with disposal of the chlorine-water mixture per Section 01530 Water Prevention Pollution Plan.

The Contractor shall not allow the treated water to flow at all into a waterway without adequate dechlorination or other satisfactory method of reducing the chlorine concentration to zero.

3.08 CUTTING AND DISPOSAL OF EXISTING ASBESTOS CEMENT PIPE

Contractor shall use due care when working with asbestos cement pipe and shall comply with all applicable laws and regulations regarding such work. When cutting asbestos cement pipe, Contractor shall ensure that adequate means are used to protect its workers and the environment against asbestos exposure. Asbestos cement pipe shall not be cut with a saw or comparable dust-generating tool, unless adequate encapsulation is provided. Asbestos cement pipe removed by the Contractor's operations shall become his property and be properly bagged and disposed of in an approved manner as required by federal, state, and local regulations.

*****END OF SECTION*****

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SECTION 15100 VALVES AND APPURTENANCES

PART 1 GENERAL

1.01 SCOPE OF WORK

Work included under this section consists of furnishing and installing valves and appurtenances as shown on the drawings and as specified herein.

1.02 RELATED WORK IN OTHER SECTIONS

Section	Title
01520	Traffic Control Plan
01530	Water Pollution Control Plan
01300	Submittals
02221	Trench Excavation, Bedding and Backfill
15060	Piping

1.03 SUBMITTALS

The Contractor shall submit manufacturer's data including catalog cuts, drawings and letter(s) of compliance as required by Section 01300, "Submittals".

PART 2 MATERIALS

2.01 GENERAL

All Mueller parts specified within this section must be purchased from the local Mueller Distributor.

All main line valves shall be 8" or larger in diameter and shall have flanged or mechanical joint ends or push-on with fieldlok. Valves smaller than 8" shall require prior written approval by the District. Flanges shall be dimensioned, faced and drilled in accordance with ANSI B16.1 for Class 125 unless stated otherwise on the drawings or the specifications. All necessary caulking materials, gaskets, bolts, and nuts shall be provided. All valves shall be protected from damage before installation and until completion of work.

Valves shall be carefully installed in their respective positions, accessible for operation and repair, and free from all distortion and strain, with joints made as specified, and shall be left in satisfactory operating condition.

All valves shall be furnished with a 2-inch square operating nut.

All exterior and interior ferrous metal surfaces of valves specified in this section shall be factory epoxy coated in accordance with AWWA C550. No disassembly of valves shall be allowed after these items have been shipped from the factory.

All buried valves shall be furnished with Type 316 stainless steel valve stem packing and bonnet bolts. All external flanged bolts, nuts and washers for all valves shall be Type 316 stainless steel. Corten T-bolts are allowed on mechanical joints.

Brass goods furnished under this section shall be new and unused. All fittings shall conform to ANSI/AWWA Standard C800, latest revision.

All brass components in contact with potable water must be made from either CDA/UNS Brass Alloys C89520 or C89833 with a maximum lead content of .25% by weight. Brass alloys not listed in ANSI/AWWA C800 Paragraph 4.1.2 are not approved. Brass saddles shall be made from CDA/UNS C83600.

All service fittings shall be certified as suitable for contact with drinking water by an ANSI accredited organization in accordance with ANSI/NSF Standard 61, Drinking Water Systems Components – Health Effects.

All fittings shall be stamped or embossed with a mark or name indicating that the product is manufactured from the low-lead alloy as specified above.

2.02 GATE VALVES

Gate valves shall be Mueller A-2362 and have either flanged or mechanical joint ends as shown on the drawings. The valve shall be resilient seat and fully comply with the latest revision of AWWA C509, and also be UL listed and FM approved. The valves shall be tested and certified to ANSI/NSF 61.

The valve shall have a 250 psig working pressure. Each valve shall be factory seat tested to 250psig and shell tested to 500psig. Buried valves shall be NRS (non-rising stem), equipped with a 2-inch operating nut (open left), and have an arrow cast on the operating nut opening direction. The bolt that attaches the operating nut to the stem shall be recessed into the operating nut so as not to interfere with valve wrench operation.

The valves shall have Type 316 stainless steel bolts and nuts for the stuffing box and bonnet.

The valve stem shall be made of ASTM B98-C66100/H02 (Everdur) bar stock material. The stem shall have at least one “anti-friction” thrust washer above and below the stem collar to reduce operating torque. The design of the NRS valve stem shall be such that if excessive input torque is applied, stem failure shall occur above the stuffing box at such a point as to enable the operation of the valve with a pipe wrench or other readily available tool. The stem material shall provide a minimum 70,000psi tensile strength with 20% elongation and yield strength of 38,000psi. Valves with two-piece stem collars are unacceptable.

The NRS valves shall have a stuffing box (with dirt seal) that is o-ring sealed. Two o-rings shall be placed above and one o-ring below the stem thrust collar. The thrust collar shall be factory lubricated. The thrust collar and its lubrication shall be isolated by the o-rings from the waterway and from outside contamination providing permanent lubrication for long term ease of operation. Valves without a stuffing box are unacceptable. Valves without at least three stem o-rings are also unacceptable.

The valve body and bonnet shall be composed of ASTM A536 ductile iron. The body and bonnet size shall also adhere to the minimum wall thickness table as set forth in AWWA C509. Wall thickness less than those are not acceptable.

The valve disc and guide lugs must be fully (100%) encapsulated in EPDM. The peel strength shall not be less than 75 pounds per inch. Guide caps of an Acetal bearing material shall be placed over solid guide lugs to prevent abrasion and to reduce the operating torque. Guide lugs placed over bare metal are not acceptable.

The valves shall have all internal and external ferrous surfaces coated with a fusion bonded thermosetting powder epoxy coating of 10 mils nominal thickness. The coating shall conform to AWWA C550.

The valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of ten (10) years from the date of manufacture. The manufacturing facility for the valves must have current ISO certification.

2.03 HYDRANTS

Hydrants shall be Clow 960 (wet barrel) with Clow LBI400 break-off check valve assembly. No substitutions will be permitted. The break-off check valve assembly shall have Type 316 SS bolts and nuts between the body and extension/riser.

Hydrants shall have two 2½" outlets and one 4" pumper outlet. Hydrants shall have a 6" flanged inlet per the Standard Drawings.

The Contractor shall have various sizes of hydrant buries on hand to accommodate varying field conditions. The bury length selected shall be such that the bottom of the break-off flange is at least 1-inch but no more than 4-inches above the finished grade.

Hydrants and all metal above the concrete collar shall be factory painted "safety yellow" using a self priming semi-gloss high solids polyurethane 2114 Series and 249-44 Catalyst as manufactured by Pinnacle. Contractor shall submit a color sample for review.

All bolts, nuts and washers, and restraining tie rods and associated hardware, used with flanged fittings, couplings and appurtenances shall be Type 316 Steel for all buried and exposed applications. All bolts shall be furnished with finished hexagonal nuts. The dimensions of all heads and nuts shall be not less than those required for the American Standard regular, and the height shall be sufficient to break the bolt in the body portion when tested. Threads shall be American Standard screw thread, coarse thread series.

2.04 COMBINATION AIR VALVES

Combination air valves shall be capable of positive action in releasing air accumulations in pipelines under full line operating pressure and shall vent or exhaust air during filling and draining operations. Valves shall be of the size and pressure rating indicated on the project drawings or if not so indicated shall be 1-inch with a 5/64-inch orifice and simple type lever, rated for operation at 300 psi minimum. Combination air valve shall be Val-Matic 201C-X045, per the Standard Drawings.

All valve bodies and covers shall be cast iron (ASTM A126, Class B). Floats, lever mechanisms and all other internal parts shall be stainless steel. A resilient, Buna-N seat shall provide drop-tight closure. Valve coating and hardware requirements shall be as specified in Paragraph 2.01 of this section.

Air/vacuum valves shall not be used unless written approval is obtained for District Engineer.

Air/vacuum valves shall be capable of exhausting large quantities of air from pipelines when being filled and shall open to allow air to enter the pipelines to prevent a vacuum condition when being drained. Valves shall be of the size and pressure rating indicated on the project drawings or if not so indicated shall be 1-inch with a 1-inch orifice, rated for operation at 300 psi minimum. Air/vacuum valves shall be Val-Matic 101-X005 per the District's Standard Drawing.

All valve bodies and covers shall be cast iron (ASTM A126, Class B). Floats, lever mechanisms and all other internal parts shall be stainless steel. A resilient, Buna-N seat shall provide drop-tight closure.

Valve coating and hardware requirements shall be as specified in Paragraph 2.01 of this section.

2.05 VALVE AND METER BOXES

Valve boxes shall be furnished and installed on all buried valves in the locations shown on the drawings.

Valve boxes shall be concrete traffic-type boxes with cast iron traffic covers. Covers shall be marked "WATER". Concrete extension pieces shall be provided with each box as required. For deep bury conditions for valve boxes, 8" SDR 35 PVC pipe extensions shall be. Diameter shall be 10 ³/₈-inches minimum with 9-inch throat diameter. Valve boxes shall be Christy "Machined Faced" Model G05T with G505CT cover.

Meter boxes shall be concrete with reinforced concrete cover or as noted on the plans for H-20 rating. For ¾-inch or 1-inch meters, meter boxes shall be Christy Model B16 with B16G cover. For 1 ½-inch or 2-inch meters, meter box shall be Christy Model N36 with a B36G cover.

Water service PRV boxes shall be concrete reinforced concrete cover. For 1-inch PRV, boxes shall be a Christy BX09B with a BX09D reinforced concrete lid or as noted on the plans. For 2-inch PRV, boxes shall be a Christy B16B with a B16G reinforced concrete lid or as noted on the plans.

Boxes for air valve service shall be Christy Model N30 with B30-61D steel checker plate cover with extension(s), as required.

Boxes for the 2" blowoff assembly shall be Christy Model B1324 (H-20 loading) with B1324-61JH steel checker plate cover, and for the 4" blowoff assembly shall be Christy Model B1730 (H-20 loading) with B1730-51JH steel checker plate cover.

Boxes installed in driveways and other paved areas shall have traffic-rated covers.

2.06 CORPORATION STOPS

Corporation stops shall be Mueller N-35008-N (insulated), with inlet AWWA taper thread and outlet compression connection for 1" service. No substitutions will be permitted.

Corporation stops shall be Mueller B-25008-N on a 1" combination air valve. No substitutions will be permitted.

Corporation stops shall be Mueller B-25008-N on a 1½" to 2" service connection. No substitutions will be permitted.

Corporation stops shall be Mueller B-25008-N on a 2" combination air valve. No substitutions will be permitted.

2.07 METER VALVES AND COUPLINGS

Compression ball angle meter valves shall be angle pattern, with lock wing. Compression ball angle meter valves for 1" meter connections shall be Mueller B-24258-3-N with 360° turn. Compression ball angle meter valves for 1-1/2" and 2" meter connections shall be Mueller B-24276-3-N with 360° turn. No substitutions will be permitted.

When a ¾" meter is being installed, two (2) Ford A-34-NL meter adapters shall be installed on the inlet and outlet sides of the meter. When a ¾" X 1" meter is being installed, one (1) Ford A-44-NL meter adapter shall be installed on the outlet side of the meter.

Meter couplings shall be Mueller H-10871-N (insulated). No substitutions will be permitted.

Residential ball valve shall be Red White 5044AB

When the customer's water service is PVC, Mueller V-15442 (female) or V-15440 (male) Pack Joint connection shall be used.

2.08 SERVICE SADDLES

Service saddles shall be bronze with neoprene gaskets with double bronze straps. Saddles shall be Mueller No. BR2B "CC", sized for the exact outside diameters of the pipes on which they will be installed.

2.09 BLOWOFF ASSEMBLY

Blowoff assembly shall have a 2-inch vertical FIP inlet and 2-inch NIP for mains 6-inches and smaller, or 4-inch vertical FIP inlet and 4-inch MIP outlet for mains 8-inches and larger. Blowoff assembly shall be operated by turning a top-mounted square operating nut. All internal working parts and the inlet and outlet fittings shall be manufactured from low-lead brass. All working parts shall be serviceable from above without removing the valve box. Blowoff assembly shall be Truflo Model No. TF550 (2-inch) or Model No. TF800 (4-inch) as manufactured by the Kupferle Foundry Co., St. Louis, MO.

2.10 BACKFLOW PREVENTER

Backflow preventer shall operate on the reduced pressure principle and shall consist of two spring-loaded check valves and a spring-loaded, diaphragm actuated, differential pressure relief valve located between the two check valves, in accordance with the District's Standard Drawings. The backflow preventer assembly shall meet all applicable requirements of AWWA C511 and shall be included on the most current "List of Approved Backflow Prevention Assemblies" issued by the California Department of Public Health (CDPH).

Backflow preventer shall be provided on all service connections to properties having a supplemental source of water, wells, fire sprinkler system, irrigation system that has an automatic chemical feeding control, pumps or any other instances that has a potential to contaminate potable water supply or as directed by the District.

Residential reduced pressure backflow preventer assembly shall be Wilkins 975XL2TCU or 375XL for ¾" to 2" and Wilkins 375DA for 2 1/2" or greater.

2.11 RESIDENTIAL PRESSURE REDUCING VALVES

Pressure regulating valves located within the meter boxes shall be Wilkins NR3XL-DU-SC.

2.12 PRESSURE REDUCING VALVE AND VAULT

The pressure reducing valve shall be installed according to the project plans. Contractor shall submit for review and approval shop drawings for the pressure reducing valve and vault assembly.

Pressure reducing valve shall be a Cla Val, 90-01, Class 150, and installed per the plans and manufacturer's recommendation.

Pipe support shall be installed per detail drawings.

Pressure gage shall be liquid filled and accommodated pressure of 300 psi.

After the pressure reducing valve has been installed, the vault shall be cleaned from all construction debris.

All bolts, nuts and washers, and restraining tie rods and associated hardware, used with flanged fittings, couplings and appurtenances shall be Type 316 Steel for all buried and exposed applications. All bolts shall be furnished with finished hexagonal nuts. The dimensions of all heads and nuts shall be not less than those required for the American Standard regular, and the height shall be sufficient to break the bolt in the body portion when tested. Threads shall be American Standard screw thread, coarse thread series.

Contractor shall coordinate with District for a temporary shutdown.

PART 3 PERFORMANCE

3.01 INSTALLATION OF VALVES

Valves shall be carefully installed in their respective positions, free from all distortion and strain, with joints made as specified, and shall be left in satisfactory operating condition. Buried gate valves, and valve boxes, shall be installed in accordance with the District's Standard Drawings.

Before installation, all valves and appurtenances shall be thoroughly cleaned of all foreign material, and shall be inspected for proper operation, both opening and closing and to verify that the valves seat properly. Valves shall be installed so that the stems are vertical.

All valves shall be tested in place so far as practicable under the conditions specified and any defects revealed in valves or connections tested shall be corrected.

A marker post shall be installed adjacent to each gate valve, combination air valve, air/vacuum valve, and blow-off assembly. The location for each post will be selected by the District based on field conditions.

Valves located within 10' of a fitting shall be moved directly to the fitting and connected via a flanged joint or as directed by the District.

Gate valves marker sign will be supplied by the district, it is the responsibility of the contract to install the post, affix the sign on the post per District Standard Plans.

3.02 INSTALLATION OF VALVE AND METER BOXES

Valve boxes shall be centered and set plumb over the wrench nuts of the valves and shall not transmit shock or stress to the valves. Valve box covers shall be set flush with the surface of the finished grade or as directed by the District. Backfill shall be placed around the valve boxes and thoroughly compacted to a 95% relative in such a manner that will not damage or displace the valve box from proper alignment or grade. Misaligned valve boxes shall be excavated, plumbed, and backfilled at the Contractor's expense. No riser or extension rings are allowed. 8" SDR 35 PVC pipe extensions shall overlap the gate valve box a minimum of 6".

Water and PRV meter boxes shall be the last item set after the existing angle meter and copper piping is removed and in conformance with the standard and project drawings. Meter boxes shall be set parallel to the service line following the contour of existing ground. After the box is set and aligned with the meter, contractor may use native material, aggregate base, or fines to backfill around the box as directed by the District and as applicable. Soil within a 12-inch perimeter of the box shall be compacted to a relative density of 90% using a pneumatic device such as a "Powder Puff" or other mechanical means approved by the District.

The box shall be placed as to project 1-inch above grade when located in non-traffic areas and flush with pavement when located in traffic areas and pathways.

Contractor shall set the box "knockout" in-line with service. A 1-inch clearance between the box and service line shall be attained. Box shall not sit on top of the service line.

After the box has been set and compacted, any debris and dirt inside the box shall be disposed of to the satisfaction of the District.

Contractor shall use care when working around mailboxes and private properties. Contractor shall bear the responsibility of private property structures during construction.

3.03 INSTALLATION OF RESIDENTIAL (WATER SERVICE) PRESSURE REDUCING VALVES (PRV)

Contractor shall furnished all labor, equipment and material (PVC, galvanize, copper fittings and pipe of all dimensions) to connect the PRV to the resident's service line. Contractor is responsible to determine ahead of time the necessary material to connect the PRV with the resident's service line. Contractor shall coordinate with the District to determine the configuration and location of the PRV.

PRV meter box shall be aligned with the water meter box following the contour of the existing grade or as directed by the District.

Contractor shall furnish up to 10-ft of copper between the PRV and the resident's service line. Cooper line size will be the same as the meter line or the resident's service line, whichever is greater.

Cost of the copper and connections material line shall be included with the cost of installation of the PRV.

3.04 INSTALLATION OF SERVICES

All services shall be 1" or 2" in size and installed in conformance with the District's Standard Drawings. Applications for services larger than 1" require hydraulic calculations justification and prior approval from the District.

Contractor shall furnished all labor, equipment and material (PVC, galvanize, copper fittings and pipe of all dimensions) to connect the service to the resident's service line. When connecting copper to PVC, Mueller's V-15442 (female) or V-15440 (male) pack joint connections shall be used. Contractor is responsible to determine ahead of time the necessary material to connect the service with the resident's service line. Contractor shall coordinate with the District to determine the configuration and location of the service.

All services shall be the size as directed by the District and shall be installed in conformance with the District's Standard Drawings.

Direct tapping of ductile iron pipe shall be done using the "preferred method" described in AWWA C600, Section 8.1 to preserve the integrity of the polyethylene encasement. This method requires the application of two or three layers of polyethylene adhesive tape completely around the pipe to cover the area where the tapping machine and chain will be mounted. The corporation stop shall then be installed directly through the polyethylene tape and wrap. If damaged, the wrap and/or tape shall be repaired with tape.

Service relocations shall be done by "freezing" the service line with CO₂ or other approved method by the District to temporary discontinue the supply of water while relocating the service. Crimping will not be allowed to temporary block the supply of water.

3.05 INSTALLATION OF FIRE HYDRANTS

Fire hydrants shall be plumbed vertical and installed in accordance with the District's Standard Drawings. Fire hydrants shall be set so that the bottom of the break-off flange is at least 1-inch but not more than 4-inch above finish grade.

All hydrants shall be flushed and test operated after installation to assure a sound setting and smooth operation. All valves shall close drip tight.

Contractor shall install a two-way, reflective pavement marker at each fire hydrant location as directed by the Santa Clara County Fire District. If the marker does not adhere to existing ground, place it on top the gate valve cover located directly off the main. For fire hydrants located on fire roads, fire hydrant marker post shall be installed per the District's Standard Drawings. The markers shall be furnished and installed in accordance with applicable paragraphs of Section 85 of the Caltrans standard specifications. Fire hydrant valve lid and rim shall be painted yellow.

3.06 INSTALLATION OF BLOW-OFF ASSEMBLY

Blow-off assembly shall be installed in accordance with the District's Standard Drawings.

3.07 INSTALLATION OF COMBINATION AIR VALVES AND AIR/VACUUM VALVES

Combination air valves shall be plumbed vertical and installed in accordance with the District's Standard Drawings.

3.08 INSTALLATION OF BACKFLOW PREVENTERS

Backflow preventer shall be installed horizontal and level, with the minimum clearances for obstructions as shown on the Standard Drawings. A ball valve line size shall be installed on both sides of the backflow preventer assembly. Mueller's H-15531 compression x MIPT 90°s shall be used at both ends of the assembly to allow removal of the unit in the event of a malfunction. The backflow preventer assembly shall be tested for proper operation by applying backpressure on the pressure reducing relief valve 20 psi in excess of the upstream pressure. If the valve is operating properly, observation of a pressure gauge upstream of the valve will not indicate an increase in upstream pressure. Valves failing this test shall be rejected, replaced, and retested.

Contractor shall furnished all labor, equipment and material (PVC, galvanize, copper fittings and pipe of all dimensions) to connect the backflow preventer to the resident's service line. Contractor is responsible to determine ahead of time the necessary material to connect the backflow preventer with the resident's service line. Contractor shall coordinate with the District to determine the configuration and location of the backflow preventer.

3.09 INSTALLATION OF PRESSURE REDUCING VALVE AND VAULT

The pressure reducing station shall be installed as shown on the plans and as directed by the District. Contractor shall pot-hole the existing water main and utilities.

Vault and hatch shall be installed horizontal and level to the existing water main, with the minimum clearances for obstructions as shown on the Standard Drawings and per the manufacturer's

recommendation. The pressure reducing station shall be tested and disinfected at the same time as the new water main.

Pipe supports shall be installed per the plans and as directed by the District.

*****END OF SECTION*****