CALIFORNIA
AMERICAN WATER

2023 Standard Specifications

Northern Division

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SECTION 01 14 00

WORK RESTRICTIONS

PART 1: GENERAL

1.01 WORK HOURS

A. Work hours shall conform to all applicable Federal, State, County, and local laws, ordinances, and codes applicable to the work. Where any of these laws are in conflict, the more stringent requirements shall be followed.

B. All work performed by Contractors shall be during the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday, unless otherwise specified by the Engineer, Owner, Local Governing Agency or permits. This restriction includes deliveries of materials and equipment and servicing of construction equipment on the project site. Any work outside this time frame shall be allowed only with prior written permission from the Owner.

C. Each and every day the Contractor is not going to perform any work, the Contractor shall leave a message with the Owner and Engineer, by 9:00 a.m., that the site has been reviewed and the site is secure. Should any mitigation be necessary, the Contractor should also advise the Owner's third-party inspectors, if applicable.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 33 00 Submittal Procedure

B. Section 01 32 16 Construction Progress Schedule

1.03 BEGINNING OF WORK

A. General:

1. No work shall commence prior to delivery of the executed Contract, review and approval of required bonds and insurance, if required.
2. After the Owner reviews and approves the Contract, bonds and insurance, the Owner shall authorize the Contractor to begin the work. For Contractors under the direct employ of the Owner, the Owner shall issue a written Notice to Proceed (NTP).

B. Additional Requirements for Developers and their sub contractors:

1. No work shall commence prior to approval of the Developer's Contractor and acceptance of the Developer's application, project plans, submittals, permits, variances, and payment.

1.04 PRECONSTRUCTION CONFERENCE

A. Prior to the start of work, a preconstruction conference will be held to review

the work. The Contractor must attend this meeting and must include subcontractors and others necessary to ensure all topics are adequately covered.

B. Preconstruction conference must be held at least five days prior to the start of construction.

C. At minimum, the following topics shall be covered:

1. Project Schedule
2. Temporary Facilities
3. Utility Coordination
4. Subcontractors
5. Safety Procedures
6. Lines of Communication
7. Storm Water Pollution Prevention Plans
8. Service Interruptions and Tie-in Plans
9. Discharge of Test/Flush Water
10. Quality Control and Quality Assurance Procedures
11. Progress Payments

1.05 STOP WORK AUTHORITY

A. All Owner's personnel have Stop Work Authority. The Contractor must halt all work if any of the Owner's personnel enact their Stop Work Authority. The Contractor/Developer and all their employees and subcontractors must comply with the direction if enacted. Stop Work Authority is reserved to prevent dangerous acts, deviation from the contract documents or violation of laws, regulations or permits.

1.06 PHASING OF CONSTRUCTION

A. The Contractor shall be required to produce and submit a phasing plan that is acceptable to the Engineer prior to starting any work. This plan shall illustrate, by use of a map and bar chart per section 01 32 16, the streets and properties impacted during each phase of construction, as well as the sequence of phases. All changes to the implementation of the phasing plan must be approved in writing by the Engineer.

B. Contractor shall define work "phases" that comprise a portion of the Project work area that the Contractor will initiate work on and not initiate another phase until all work within the phase area is complete and operable. Work on multiple phases concurrently shall only be allowed if the Contractor demonstrates it has complete duplication of crews and does not adversely

affect the neighborhood. Crews shall not be allowed to work on multiple phase areas concurrently without prior approval from the Owner. It shall be at the Owner's discretion to permit work within multiple phases and may be affected by Inspector availability.

C. The Contractor shall perform Project work in the phased manner identified in the phasing plan. All changes to the implementation of the phasing plan must be approved in writing by the engineer.

D. Following are guidelines for developing the phasing plan:

1. Phase size limited to 2,000 feet of main or less unless otherwise approved by the Owner.
2. Connection with Owner's distribution system shall not occur until after curb and gutter is in place for new development and all new water system improvements are installed completely.
3. Each phase generally of equal size with regard to quantity of new services and/or linear footage of new distribution main placed.

E. The Contractor shall not abandon existing mains, hydrants, or valves until all of the new mains and services have been brought into service.

1.07 WEATHER DELAYS

A. Owner reserves the right to stop all work for the next calendar day if there is a 50 percent or greater chance of rain.

1.08 WATER SERVICE INTERUPTIONS

A. Contractors and Developers must request water service interruptions at least one-week prior to scheduling the work.

B. Individual water service interruptions shall not be longer than 4 hours unless otherwise approved in writing by the Owner.

C. There will be no service interruptions on Fridays or Holidays.

1.09 WORK WITHIN PRIVATE PROPERTY

A. If the project will encroach onto private property, the Contractor shall make all necessary arrangements with the owner of the property for such encroachments.

B. Repairs to Existing Services:

1. As a condition of receiving or continuing to receive water service, private property owners are required to provide access to the premises for the purpose maintaining, repairing, or replacing water utilities.
2. Should the Owner of a property within the project limits refuse to allow

such access, the Contractor shall notify the Owner. The Owner will then coordinate authorized access to the property. The Contractor shall skip these parcels and continue work elsewhere at no additional cost to the Owner, until access is obtained by the Owner.

1.010 STAGING ON PRIVATE PROPERTY

A. The Contractor may elect to provide, at the Contractor's own expense, additional land and access for temporary construction facilities or storage of materials. The Contractor must obtain all required permissions for use of private property prior to taking possession or use. The permission must be obtained in writing and a copy forwarded to the Owner at least 14 Calendar Days prior to the Contractor taking possession of said property.

1.011 DAMAGE TO EXISTING PROPERTY

A. In all cases, the Contractor is responsible for repairing damage or replacing improvements to the satisfaction of the Engineer and property owner where damage occurs due to Contractor activities.

1.012 EXISTING UTILITIES

A. The Contractor/Developer shall maintain efforts to protect health, safety, and welfare of persons and property. The Contractor/Developer shall fully comply with the Underground Service Alert laws and regulations.

B. Additional Requirements for Contractors:

1. Any location, alignment, and depth of existing underground utilities as shown on the Plans are taken from public records and no responsibility is assumed for the accuracy thereof. Contractor shall assume all properties have gas, electric, cable, phone, water, and sewer services and the contractor shall call for markings and pothole ahead of new construction.
2. The Contractor is expected to identify the exact location and depth of existing underground utilities a minimum of ten (10) days in advance at any location where an existing utility may conflict with the proposed work. Contractor shall submit by e-mail a copy of each Underground Service Alert ticket and renewals to the Engineer. Following field marking of existing utilities, the Contractor shall expose (pothole) all marked utilities crossing proposed water service laterals and mains.
3. The Contractor is responsible for the protection of and for damage to existing overhead and underground utility lines and services encountered during construction. The Contractor shall notify the respective utility owner prior to any interruption of service. The Contractor shall notify the Engineer immediately, should any existing utilities be damaged, including breaks, leaks, nicks, dents, gouges, grooves, or other damage to subsurface installation lines, conduits, coatings, or cathodic protection during construction.

1.013 BACKYARD ACCESS

A. Contractor shall notify Owner one week in advance of work requiring backyard access.

B. Contractor shall not enter backyards or private property without homeowner's permission.

1.014 OPERATION OF VALVES

A. Without exception, all opening and closing of the valves on existing water mains will be performed by Owner.

1.015 CUT-OFF AND RING SAW SAFETY OPERATIONS

A. Contractors shall comply with Owner's Cut-Off and Ring Saw Safety Operations Practice when working on Owner's existing infrastructure.

PART 2: PRODUCTS – NOT USED

PART 3: EXECUTION – NOT USED

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Definitions.

B. Submittal procedures.

C. Construction progress schedules.

D. Product data.

E. Shop Drawings.

F. Samples.

G. Test reports.

H. Certificates.

I. Manufacturer's instructions.

1.02 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.

B. Informational Submittals: Written and graphic information and physical Samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.03 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer-accepted form.

B. Assign each submittal a unique number. Clearly note the submittal numbers on the transmittal. Number each submittal with the identifying Specification Section, followed by a sequential number that represents the Contractor's assigned number of 01, 02, et cetera. Resubmittals shall be numbered by adding a dot (.) and 01, 02, 03, et cetera to the original submittal number, depending on the number of times the submittal has been resubmitted. For example: if Submittal 033100-01 requires a resubmittal, the first resubmittal will bear the designation "033100-01.01" and the second resubmittal will bear the designation "033100-01.02" and so on.

C. Contractor shall identify Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

D. Apply Contractor's stamp, signed or initialed, certifying that review, approval,

verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.

E. Schedule submittals to expedite Project and submit electronic submittals via email as PDF electronic files. Coordinate submission of related items.

F. For each submittal for review, allow 15 days.

G. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

H. Allow space on submittals for Contractor and Engineer review stamps.

I. When revised for submission, identify (circle/flag) changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

K. Submittals not requested will not be recognized nor processed.

L. Incomplete Submittals: Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Engineer.

1.04 PRODUCT DATA

A. Action Submittal: Submit Contractor shall submit to Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents and Owner's Standard Specifications.

B. Submit electronic submittals via email as PDF electronic files.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project. Un-marked/Unannotated cut sheets will be rejected.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute according to 01 33 00 Submittal Procedures and for record documents described in Section 01 77 00 Closeout Procedures.

1.05 SHOP DRAWINGS

A. Action Submittal: Submit Contractor shall submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment

and appliances.

C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.

1. Include signed and sealed calculations to support design.
2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. Submit electronic submittals via email as PDF electronic files.

E. After review, produce copies and distribute according to Section 01 33 00 Submittal Procedures and for record documents described in Section 01 77 00 Closeout Procedures.

1.06 SAMPLES

A. Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Samples for Selection as specified in Product Sections:

1. Submit to Engineer for aesthetic, color, and finish selection.
2. Submit Samples of finishes, textures, and patterns for Engineer selection.

C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing Work.

D. Include identification on each Sample, with full Project information.

E. Submit number of Samples specified in individual Specification Sections; Engineer will retain one Sample.

F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.

G. Samples will not be used for testing purposes unless specifically stated in Specification Section.

H. After review, produce copies and distribute according to Section 01 33 00 Submittal Procedures and for record documents described in Section 01 77 00 Closeout Procedures.

1.07 OTHER SUBMITTALS

A. Closeout Submittals: Comply with Section 01 77 00 Closeout Procedures.

B. Informational Submittal: Submit data for Engineer's knowledge as Contract administrator or for Owner.

C. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

1.08 TEST REPORTS

A. Informational Submittal: Submit reports for Engineer's knowledge as Contractor administrator or for Owner.

B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.09 CERTIFICATES

A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product but must be acceptable to Engineer.

1.010 MANUFACTURER'S INSTRUCTIONS

A. Informational Submittal: Submit manufacturer's installation instructions with product data submittal.

B. Submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, to Engineer in quantities specified for Product Data.

C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.011 CONTRACTOR REVIEW

A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer.

B. Contractor is responsible for:

1. Determination and verification of materials including manufacturer's catalog numbers.
2. Determination and verification of field measurements and field construction criteria.
3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
4. Determination of accuracy and completeness of dimensions and quantities.
5. Confirmation and coordination of dimensions and field conditions at Site.
6. Construction means, techniques, sequences, and procedures.
7. Safety precautions.
8. Coordination and performance of Work of all trades.

C. Stamp, sign, or initial, and date each submittal to certify compliance with requirements of Contract Documents.

D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Engineer.

1.012 ENGINEER REVIEW

A. Informational submittals and other similar data are for Engineer's information, do not require Engineer's responsive action, and will not be reviewed or returned with comment.

B. Submittals made by Contractor that are not required by Contract Documents may be returned without action.

C. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order, Field Order, or Work Change Directive.

PART 2: MATERIALS – NOT USED

PART 3: EXECUTION – NOT USED

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section includes quality control, tolerances, references, labeling, testing, and inspection services.

1.02 QA/QC PLAN

A. When required by Owner, the Contractor shall prepare and submit a Quality Assurance/Quality Control (QA/QC) Plan that provides specific details as to how the Contractor will monitor and evaluate the project to ensure compliance with the project plans and specifications. The QA/QC plan shall be project specific and shall include, but not be limited to, the following key elements:

1. Quality Management and Responsibilities.
2. Qualified Employees.
3. Project Quality Plan.
4. Inspections and Testing.
5. Control and Prevention of Nonconformance.
6. Training.
7. Project Documentation.
8. Project Closeout.

1.03 QUALITY CONTROL

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

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

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Engineer and Owner at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.04 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.05 REFERENCES

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

B. Conform to reference standard by date of issue current as of date for receiving Bids except where specific date is established by code.

C. Obtain copies of standards and maintain on Site when required by product Specification Sections.

D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.06 LABELING

A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:

1. Model number.

2. Serial number.

3. Performance characteristics.

C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

D. All products in contact with drinking water shall be shipped with their NSF 61 certification.

E. All waste containers must contain a hazardous/non-hazardous waste label.

1.07 TESTING AND INSPECTION SERVICES

A. Regulatory Inspections:

1. Contractor is responsible for calling for and coordinating any City/County building inspections or specialty inspections not performed by the Engineer or Inspector.

2. Owner shall contract directly with specialty inspection firms and Contractor shall notify engineer 48 hours in advance of on-site specialty inspection scheduling.

3. The cost of reinspection of failing work shall be paid for by the Contractor.

B. Owner Inspections:

1. Owner's Field Representative (Inspector) will be responsible for inspection.

2. Owner reserves the right to test any of the Contractor's work.

3. Owner will employ and pay for specified services through Owner's staff or an independent firm to perform specialty testing and inspection as required.

PART 2: PRODUCTS – NOT USED

PART 3: EXECUTION – NOT USED

END OF SECTION

SECTION 01 55 26

TRAFFIC CONTROL

PART 1: GENERAL

1.01 SUMMARY

A. Contractor is responsible for all traffic control and shall comply with all state and local (City or County) regulations unless otherwise specified.

B. Contractor shall furnish and install all traffic barricades, markers, signs, controls and provide flaggers, traffic police and other facilities required by the jurisdictional agency's Encroachment Permit.

C. All construction personnel shall wear appropriate personal protective equipment (PPE) while in the project area.

D. The Contractor shall notify the local police, and Highway Patrol (if appropriate (State Highway)), ambulance services, school district, and fire departments of daily construction activity and traffic diversions.

E. Special attention shall be given to the protection of pedestrians and, in particular, children going to and coming from school. Ingress and egress shall be maintained for all properties abutting the construction area.

F. When accessing existing utilities, any open manholes, utility vaults, valve boxes and other underground structures shall be clearly marked by cones, drums, or barricades and attended by construction personnel until closed.

G. The Owner or Engineer make no warranty or representation that the Contractor will be permitted to divert or barricade traffic and the Contractor shall be fully responsible to complete all obligations of the Contract regardless of any restrictions which may be imposed by Federal, State or local authorities.

H. Where discrepancy between this specification and local jurisdiction ordinance as outlined and referenced in the project's encroachment permit exists, the more restrictive requirement shall control.

1.02 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals.

B. Submittals shall include the following:

1. Traffic Control Plan.

PART 2: MATERIALS – NOT USED

PART 3: EXECUTION

3.01 TRAFFIC CONTROL PLAN

A. The Contractor shall prepare and submit a traffic control plan to the Engineer. The preparation and execution of the traffic control plan is a condition of work within the public right-of-way. The Contractor will not be authorized to work within the right-of-way until the traffic control plan has been approved and the has provided the Contractor with a copy of the signed encroachment permit from City or County jurisdiction.

B. The Contractor shall submit the draft traffic control plan to the Engineer within 10 days of the Owner's Notice to Proceed. The Contractor shall allow up to three weeks for the jurisdictional agency's review of the Traffic Control Plan.

C. The Traffic Control Plan shall comply with the latest edition of the jurisdictional agency's Standard Construction Specifications, agency standards, applicable Caltrans Standards, the California Manual of Uniform Traffic Control Devices (MUTCD) and other applicable provisions.

D. The Contractor's traffic control plan shall provide for the following:

1. Safe and passable pedestrian, bicyclist, and vehicular access must be provided and maintained to fire hydrants, homes, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, hospitals, and all similar facilities and establishments. Access must be navigable, continuous, and unobstructed unless otherwise approved.

2. Driveways may be closed only during normal working hours and only after giving property owners a minimum of twenty-four (24) hours advance notice of the closure.

3. Rear access to building and existing parking areas behind buildings shall be maintained. Contractor may close such access for a limited time only if arrangements have been made with property owners. Contractor shall give property owners one week's notice in advance of the closure.

4. Vehicle and pedestrian access to driveways, houses, and commercial businesses along the streets, alleys, and easements within the limits of the project shall be maintained. Access for emergency vehicles shall be available along all streets within the construction area at all times.

5. The entire roadway width of all streets within the limits of the project shall be kept open for traffic at night, during weekends, on holidays, and during other time periods when work is not in progress. Steel plates or other approved methods shall be used to cover all open excavations in roadways during non-working hours.

3.02 WORK HOURS

A. See Section 01 14 00 Work Restrictions.

3.03 MAINTAINING TRAFFIC

A. Traffic Diversion

1. Whenever it is necessary to divert traffic from its normal channel into another channel, such diversion shall be clearly marked by appropriate signage, cones, drums, barricades or temporary guard rail. If the markers are left in place at night, suitable lights shall be provided and maintained.

B. One-Way Traffic

1. Whenever one-way traffic is established, at least two (2) competent flaggers shall be employed continuously for the full time of the lane closure. Appropriate communication devices shall be used for continuous contact between flaggers. Temporary traffic control signal lights may be used if approved by local authorities with jurisdiction over traffic control.

C. Construction Site Access

1. Competent flaggers shall be employed at every location where the Contractor's equipment is working immediately adjacent to, or is entering, leaving or crossing, active traffic lanes. The flaggers shall be employed continuously for the full time such conditions exist.

D. Minimum Traffic Lane Widths

1. The minimum traffic lane widths shall be as follows:

   a. 10-feet where no fixed lateral obstructions exists

   b. 11-feet where fixed lateral obstruction (k-rail) exists on one side of lane

   c. 12-feet where fixed lateral obstruction exists on both sides of lane

E. Driveway Access

1. Driveway access shall conform with 3.0-D.1 of this Section.

F. Street Closing

1. When permitted by Federal, State or local authorities having jurisdiction, the Contractor may close streets to through traffic for minimum periods of time. Contractor shall notify and secure the permission of the local police and fire departments and such other public authorities and, if required by any law, ordinance or regulation, the occupants of all premises bordering the streets. Contractor must give all occupants reasonable notice with respect to the closing of any street, in whole or in part, even when not required by any law, ordinance, or regulation. Contractor shall so schedule his work that the time the street is closed is kept to a minimum and shall, whenever possible, make suitable preparations for access by local residents, school buses, and mail delivery vehicles. Contractor shall provide access for police, fire, ambulance and emergency vehicles at all times. Fire hydrants and other public utility valves shall be kept accessible at all times by the Contractor.

2. On roadways where parking is allowed, temporary "No Parking" signage

may be placed where roadway widths are inadequate.

3.04 TRAFFIC CONTROL DEVICES

A. The installation and operation of all traffic signals and traffic control devices shall conform to the requirements of the jurisdictional agency, the California Manual of Uniform Traffic Control Devices (CAMUTCD) and Federal, State and local government highway departments. Traffic control devices shall be installed in accordance with traffic control plans.

B. To protect persons from injury and to avoid property damage, adequate barricades including flasher and reflectorized construction signs and guards as required shall be placed and maintained during the progress of the construction work and until it is safe for traffic and pedestrians to use the construction zone.

C. When the Contractor is permitted to close a street or road to traffic, the Contractor shall furnish, erect, maintain and remove barricades, suitable and sufficient red lights, and other lights or reflecting material at the limits of the project, where side streets intersect, and at other points of public access to the project. The Contractor shall furnish, erect, and maintain advance warning signs and barricades on side streets at the first street intersection beyond the one closed by construction indicating "Street Closed, One Block Ahead". The Contractor shall furnish, erect, maintain and remove detour marking signs on temporary routes.

D. Traffic control devices shall be installed such that the sign or device farthest from the work area shall be placed first and shall be placed progressively towards the work area.

E. Existing signs that may conflict with temporary traffic control devices shall be covered.

F. Buffer and taper areas shall remain clear of vehicles and equipment (except for appropriate TCP devices) at all times.

3.05 TRENCH AND STORED MATERIAL MARKINGS

A. Before completion of each day's work, in traveled areas, the excavations shall be completely backfilled and tamped, and the necessary temporary paving installed. 3/4-inch stone will be used in sidewalk and walkway areas and blacktop in driveways. These areas are not to be left open, impassable or unsafe through the night. If the excavation cannot be completely backfilled and compacted, temporary bridges and crossings shall be used to accommodate through traffic and the general public. The job site will be left in a neat and satisfactory condition at the end of each day. The requirements of this Section are in addition to any requirements of Federal, State or local laws, rules, regulations or ordinances or any requirements found elsewhere in the Contract Documents.

B. Equipment and material shall not be stored on the streets.

3.06 WORK IN SCHOOL ZONES

A. Contractor shall contact schools affected by construction to determine if school

is in session. If school is in session, no traffic affecting construction activities shall take place 30 minutes before and 30 minutes after the arrival (AM) or departure (PM) bells.

3.07 STREET AND ALLEY CLOSURE NOTIFICATIONS

A. The Contractor shall notify the following local agencies/authorities prior to closing a street/alley to through traffic, if relevant: police, fire department, regional transit, and California Highway Patrol, if adjacent to highway. Notifications shall include:

1. Name of the project.
2. Project number.
3. Contractor name and phone number.
4. California American Water representative name and phone number.
5. Name and limits of street(s) affected by construction.
6. Duration of closure, if applicable.

B. Notifications made by the Contractor shall include the California American Water representative.

3.08 REMOVAL OF STREET PARKING

A. The Contractor's operations may require the prohibition of on-street parking of vehicles along all or a portion of the length of the project for a limited period of time. A "No Parking" notice shall be posted seventy-two (72) hours in advance. The notice shall include the dates and times when parking will not be allowed.

3.09 OTHER REQUIREMENTS

A. If the regulation of traffic and controls are not being provided in accordance with this Section and the public is inconvenienced or its safety is being endangered, in the judgment of the Engineer, Owner, or other authorities having jurisdiction, stop work directives can be issued which will remain in place until corrective action is taken. The Owner or others may provide such temporary traffic control services until the Contractor takes corrective action. All costs in providing such services will be deducted from any payment which may be due or may thereafter become due the Contractor.

B. Engineer may direct the Contractor to discontinue operations at any time if the Engineer or jurisdictional agency's inspector determines that the work creates an undue safety risk or severe traffic congestion.

C. The Contractor is responsible for paying all fees associate with violating the conditions of the jurisdictional agency's Encroachment Permit. Penalties are detailed in local jurisdictional codes.

D. Traffic Control Plans shall be on site at all times in which traffic controls are in place and available for review by the jurisdictional agency's inspector.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Construction waste management.

B. Asbestos demolition procedures.

C. Temporary discharge permit.

1.02 PURPOSE

A. Develop and implement construction waste management plan with the following intent:

1. Divert construction, demolition, and land-clearing debris from landfill disposal.

2. Redirect recyclable material back to manufacturing process.

3. Generate cost savings or increase minimal additional cost to Project for waste disposal.

1.03 SUBMITTALS

A. Conform to Section 01 33 00 Submittal Procedures for requirements for submittals.

B. Construction Waste Management Plan: Submit construction waste management plan describing methods and procedures for implementation and monitoring compliance including the following:

1. Transportation company hauling construction waste to waste processing facilities.

2. Recycling and adaptive reuse processing facilities and waste type each facility will accept.

3. Construction waste materials anticipated for recycling and adaptive reuse.

4. On-Site sorting and Site storage methods.

C. Weight tickets for waste material acceptance from disposal facilities.

D. Temporary discharge permit, as needed for construction.

1.04 CONSTRUCTION WASTE MANAGEMENT PLAN

A. Contractor shall implement construction waste management plan at start of construction.

B. Contractor shall review construction waste management plan at preconstruction meeting and progress meetings specified in Section 01 30 00 Administrative Requirements.

C. Contractor shall distribute approved construction waste management plan to Subcontractors and others affected by plan requirements.

D. Contractor shall oversee plan implementation, instruct construction personnel for plan compliance, and document plan results.

1.05 ASBESTOS CEMENT PIPE DEMOLITION PROCEDURES

A. No Asbestos Cement Pipe (ACP) is to be disturbed unless first authorized by the Owner.

B. All work must be performed in compliance with current federal and state regulations, including U.S. EPA and, Cal/OSHA, Title 8, Sections §1529 and §5208, “Asbestos,” the Special Provisions, Section 10-7.01 “Contaminated or Hazardous Materials,” of these Specifications, and the requirements contained herein. In addition, the following applies:

1. The Contractor is responsible to employ the means, methods, and techniques required to ensure that all ACP is removed in a manner such that it remains intact (indurated). When it is unfeasible to remove ACP without making the material friable, the Contractor must submit an Asbestos Abatement Plan (AAP) for review and approval by the Owner.

2. Any disturbance of greater than 260 linear feet of ACP requires the Contractor to be registered for asbestos-related work. Exception: Contractors with employees and supervisors who have received the prescribed 4-hour ACP training by a Cal-OSHA certified training provider may non-destructively remove greater than 260 linear feet of ACP without the asbestos-related work registration. Employees must have a current certificate of training from an accredited training provider.

3. Wet-cutting, snap-cutting, or a “clean break” of the pipe by an excavator is considered non-destructive. Abrasive (dry) sawing of ACP is a specifically "prohibited activity.”

4. Any operation that crushes or otherwise renders ACP friable requires that the work be done by a registered contractor.

5. If more than 260 linear feet of ACP is to be removed, and upon removal will become friable, a National Emission Standards for Hazardous Air Pollutants (NESHAPS) notification must be filed.

6. Non-friable ACP waste must be packaged (6-mil waste bags or wrapped in 6-mil poly sheeting and taped to be leak proof) and disposed of at a classified landfill that accepts asbestos waste. The Contractor must submit to the Agency a certificate of disposal to verify that the waste was legally disposed of. If underground sections of ACP are to be abandoned in place, they must be left intact and non-friable (indurated).

C. Asbestos concrete (or transite) pipe is not regulated asbestos containing material (RACM) if less than 260 linear feet is removed and classified as non-

friable.

D. When the work involves more than 260 linear feet of RACM or the potential for exposure to RACM as defined by Cal/OSHA, Title 8, Section §1529(a), the Contractor must provide a detailed Asbestos Abatement Plan (AAP).

1.06 ASBESTOS ABATEMENT PLAN

A. The plan must include the location and layout of decontamination areas, the sequencing of asbestos work and methods to be used to assure the safety of building occupants, workers, and visitors to the site, methods for controlling emissions in the work area and the containerization and disposal of asbestos debris, and the following:

1. Current medical examination reports for each employee of the Contractor who will be on site;

2. Documentation stating that the Contractor is currently licensed by the State of California to perform asbestos abatement work;

3. Current certificates of asbestos training for each employee of the Contractor who will be on site;

4. Current documentation of respirator training and fit testing for each employee of the contractor who will be on the site;

5. A letter from the EPA indicating an approved disposal site for ACM;

6. A list of authorized personnel to be granted access to the work area;

7. All required permits, licenses, and insurance;

8. Documentation of the Contractor's notifications to businesses and residents regarding the abatement project schedule;

9. The names and numbers of person(s) to be contacted on behalf of the Contractor in cases of an emergency.

B. Contractor shall submit an Asbestos Waste Manifests documenting the transport, disposal facility, and volume of asbestos disposed if RACM is disposed of off-site.

1.07 TEMPORARY DISCHARGE PERMIT

A. The Contractor is not permitted to discharge construction water to storm drains or sanitary sewers without acquiring a discharge permit. In lieu of obtaining a discharge permit, Contractor may elect to utilize a water truck or water buffalo and appurtenances to remove water from Work Site and discharge at an Owner-approved location.

B. The Contractor shall submit an application with local City, County, of Sewer CSD for the sanitary sewer discharge permit at least 20 days in advance of scheduled discharge.

C. The Contractor is responsible for compliance with all provisions of the discharge permit.

D. The Contractor shall report any violations to the Owner within 7 days of the discharge, notice, or order. The report shall include the following information:

1. The date, time, location, and nature of the operation, type of discharge and quantity, and the cause of the notice or order.

2. The water pollution control practices used before the discharge, or before receiving the notice or order.

3. The date of placement and type of additional or altered water pollution control practices placed after the discharge or after receiving the notice or order.

4. A maintenance schedule for affected water pollution control practices.

PART 2: MATERIALS – NOT USED

PART 3: EXECUTION

3.01 CONSTRUCTION WASTE COLLECTION

A. Collect construction waste materials in marked bins or containers and arrange for transportation to recycling centers or adaptive salvage and reuse processing facilities.

B. Maintain recycling and adaptive reuse storage and collection area in orderly arrangement with materials separated to eliminate co-mingling of materials required to be delivered separately to waste processing facility.

C. Store construction waste materials to prevent environmental pollution, fire hazards, hazards to persons and property, and contamination of stored materials.

3.02 CONSTRUCTION WASTE DISPOSAL

A. Deliver construction waste to waste processing facilities.

B. Dispose of construction waste not capable of being recycled or adaptively reused by delivery to landfill, incinerator, or other legal disposal facility.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section includes closeout procedures, project record documents, product warranties and bonds, examination, execution, final cleaning, and restoration.

1.02 TEST OF FACILITIES

A. All work shall be tested under operating conditions and pressures as required.

B. Any leaks or malfunctions shall be repaired to the satisfaction of the Owner.

1.03 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete the following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:

1. Submit maintenance manuals and project record documents in compliance with this Section.

2. Submit GIS database as required by Section 01 78 39 As-builts and GIS Documentation.

3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item.

4. Provide all submittals and inspection reports to Engineer that are required by governing or other authorities.

5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.

6. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.

7. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:

1. When Contractor considers Work to be substantially complete, submit to Engineer:

a. Written certificate of Work, or designated portion, is substantially complete.

b. List of items to be completed or corrected (initial punch list).

2. Within 7 days after receipt of request for Substantial Completion, Engineer will make inspection to determine whether Work or designated portion is substantially complete.

3. When Engineer finds that Work is substantially complete, Engineer will:

   a. Prepare Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).

4. After Work is substantially complete, Contractor shall:

   a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.

   b. Complete Work listed for completion or correction within time period stipulated.

C. Prerequisites for Final Completion:

1. When Contractor considers Work to be complete, submit written certification that:

   a. Contract Documents have been reviewed.

   b. Work has been examined for compliance with Contract Documents.

   c. Work has been completed according to Contract Documents.

   d. Work is completed and ready for final inspection.

2. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:

1. Within seven days after receipt of request for final inspection, Engineer will make inspection to determine whether Work or designated portion is complete.

2. Should Engineer consider Work to be incomplete or defective:

a. Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.

b. Contractor shall remedy stated deficiencies and send second written request to Engineer that Work is complete.

c. Engineer will reinspect Work.

d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

E. Submit marked-up paper copy documents to Engineer with claim for final Application for Payment. Requirements for Contractor markups are included in Section 01 73 00 Project Execution.

F. Submit PDF electronic files of marked-up documents to Engineer.

1.04 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Include table of contents and assemble in PDF electronic file.

E. Submit prior to final Application for Payment.

PART 2: MATERIALS – NOT USED

PART 3: EXECUTION

3. 01 FINAL CLEANING

A. Execute final cleaning prior to final Project assessment.

B. Clean Site, sweep paved areas, rake clean landscaped surfaces.

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

3. 02 RESTORATION

A. The Contractor shall restore and/or replace paving, curbing, sidewalks, gutters, shrubbery, fences, sod, or other disturbed surfaces and structures to a condition equal to that before the Work began and to the satisfaction of the Owner and shall furnish all labor and materials incidental thereto.

END OF SECTION

SECTION 01 78 39

AS-BUILTS AND GIS DOCUMENTATION

PART 1: GENERAL

1.01 AS-BUILTS

A. Where identified as a product of the Work, provide as-built drawings adhering to the criteria provided here and in the special conditions.

1. Recording the Information – Provide the Record As-Built information in both Electronic and Hardcopy mediums, with the exception of the Field Sketches. The Field Sketches are not required to be in the electronic format.

2. The Information Process - The Engineer will approve the submission and 'red line' any information needing to be corrected or added, and return it for resubmission. When the submittal is approved by the Engineer, the Contractor shall provide two CD-RW's each containing all approved Record As-Built information in a clear face hard plastic CD jacket and one hardcopy of all approved Record As-Built information (binder clipped together, not bound).

Initial submission must be provided within (14) calendar days of the 'Construction Completion' date, not including the restoration work. The Engineer will return the submission within (7) calendar days of receipt. The approved final submission must be provided within twenty-eight (28) calendar days from the 'Construction Completion' date, not including the restoration work.

PART 2: MATERIALS – NOT USED

2.01 TYPES OF AS-BUILT FORMATS

A. Construction Drawing Set

1. Number of hard copy drawing set(s) delivered to be determined at preconstruction meeting (minimum of 1)

2. All asset locations (including but not limited to mains, sewer lines, hydrants, valves, fittings and junctions) collected through traditional survey or GPS survey (mapping or survey grade). All GPS locations shall be collected with real-time correction or post processed with differential correction software, i.e. Trimble Pathfinder Office (most current version).

3. All assets taken out of service and abandoned or demolished shall be clearly denoted and labeled as such on the plans.

4. All assets (including but not limited to mains, sewer lines, hydrants, valves, fittings and junctions) shall be clearly represented on drawings with coordinates and top of surface and/or invert elevations (when applicable) labeled on drawing.

5. As-builts shall be provided with +/- 1’ horizontal accuracy and +/- 0.1’ for vertical accuracy unless otherwise specified during the preconstruction meeting.

B. GIS Mapping Format As-Builts

1. Deliverable comprised of GIS data in a file geodatabase format including .mxd map project (and associated map files, i.e. .lyr files) files for all maps in the construction set.

2. All GIS deliverables created and delivered in most current ArcGIS version, unless specified by Engineer.

3. All asset locations (including but not limited to mains, sewer lines, hydrants, valves, fittings and junctions) collected through traditional survey, mapping or survey grade GPS. All GPS locations shall be collected with real-time correction, and post processed with differential correction software, i.e. Trimble Pathfinder Office (most current version).

4. All assets taken out of service and abandoned or demolished shall be clearly denoted and labeled as such within the GIS mapping system as a separate layer.

5. As-builts shall be provided with +/- 1’ horizontal accuracy and +/- 0.1’ for vertical accuracy.

6. Projected Coordinate System:

WGS_1984_Web_Mercator_Auxiliary_Sphere

7. Geographic Coordinate System: GCS_WGS_1984

8. Delivery schedule of GIS data determined at pre-construction meeting.

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS

A. At a minimum, all As-Built record drawings shall contain the following information:

B. North Arrow with North at the top of the drawing.

C. Face of curb lines, easement lines, edge of pavement (EOP) or right-ofway lines.

D. All objects located shall be referenced to other objects with (3) perpendicular measurements. All such measurements shall be from permanent existing structures, such as catch basins, manholes, buildings, etc. (no utility poles).

E. The proposed pipeline ‘line’ designation shall be shown in bold or heavier line style per template and sample.

3.02 RECORD DRAWING REQUIREMENTS

A. Title Sheet (including American Water location, Project Name, Design Consultant Engineering Company name, Project date, County and Town.

B. Each drawing shall include only the work along one street block (transmission mains excluded), and the intersecting street corners with the distance to the center line of each intersection. Include Match Lines if multiple drawings are required.

C. If more than one drawing is required, include an overall site plan of the whole project with a drawing key.

D. Pipe diameter and material.

E. Bill of Materials with arrow identifying where installed.

F. Reference the Point of Connection where the new main pipeline connects to existing facilities and provide dimensions to nearest existing appurtenance.

G. If project continues from an existing stub, a dimension from the center line of the nearest street intersection and existing line valve shall be included. Provide coordinates for the referenced existing valve.

H. If the project is a continuation of a previous project, reference the previous project reference number.

I. All valves, tees, manholes, vaults, hydrants, lift stations, horizontal/vertical bends, restraint locations, and the start and end of the new water main and sewer lines shall be located with coordinates in the specified format and identified and labeled on the Drawings.

J. All rim and invert elevations for manholes shall be labeled.

K. The invert in, invert out, and slope of all gravity sewers shall be labeled.

L. All connections, wet cuts and fittings not required to have coordinates shall be dimensionally located.

M. Indicate abandoned pipe with type of material and length (if applicable).

N. Indicate and locate buried valves (if applicable) with coordinates in the specified format.

O. Contractor shall provide a GPS or traditional survey line location every 100 LF, unless otherwise specified by Engineer.

P. At abrupt changes in pipe elevation, provide a referenced drawing showing the profile of the work and list the material used.

Q. Provide the depth from finish grade to top of pipe every 300 LF, and at the start and end of a new main.

R. Name of Contractor and Construction Inspector (full last name) on the project

(locate in title block).

S. For projects where buildings are constructed, as-built plans shall include detailed mechanical drawings of all interior appurtenances, including mechanical piping, pumps, valves, and electrical boxes.

T. Projects involving the construction of lift stations shall have as-builts that denote the quantity and location of valves, piping, and all other appurtenances. In addition, the wet well operating levels shall be included on the as-built plan.

END OF SECTION

SECTION 02 90 00

REMOVAL AND ABANDONMENT OF WATER FACILITIES

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section includes specifications for the removal and abandonment of water mains, hydrants, service lines, and valves.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 74 19: Construction Waste Management and Disposal

B. Section 31 23 16: Trenching, Backfilling, and Compacting

1.03 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals.

B. Submittals shall include the following:

1. An abandonment plan for review by the Engineer prior to start of the abandonment after field verification of pipe location, material, and size.

2. A removal plan for review by the Engineer prior to the start of removal after field verification of pipe location, material, and size.

3. Product data for materials.

PART 2: MATERIALS

2.01 GENERAL MATERIALS

A. Concrete for reaction blocks and plugs: Minimum 3,000 psi concrete conforming to Section 03 30 00 Cast-in-Place Concrete.

B. Pressure Grout: Low-strength concrete slurry backfill shall be a sand aggregate Portland Cement concrete of Type I or Type II Portland Cement per cubic yard of concrete sand and sufficient water added to provide a fluid, workable mix that will flow and can be pumped without separation of materials while being placed. Unless otherwise noted the maximum slump shall be 6 inches, maximum compressive strength 1000 psi and the minimum compressive strength 600 psi.

PART 3: EXECUTION

3.01 ABANDONMENT REQUIREMENTS

A. No existing pipeline facility shall be abandoned until all new facilities serving the same area are in operation and as authorized by California American Water. In the case of water pipeline that is to be removed due to conflicts with new work, the existing pipelines may be removed after the bypass system has been

installed and tested.

B. Where the existing pipe is to be abandoned, the Contractor shall cut back the abandoned pipe for five feet from any connecting structure. All holes at the existing structures shall be repaired. The abandoned pipe shall be capped or plugged with at least an 18-inch depth of concrete at both ends prior to backfill.

C. Abandoned mains shall be plugged and end capped or pressure grouted at intervals not less than 200' unless directed otherwise by Owner.

3.02 DEMOLITION OF FIRE HYDRANTS, VALVES, AND PIPELINE STRUCTURES PRIOR TO ABANDONMENT

A. Contractor shall remove all watermain appurtenances, such as hydrants, valves, and valve boxes. Appurtenances shall be returned to Owner for future use if directed so by the Owner.

B. Contractor shall demolish and remove precast concrete adjustment rings, concrete vaults and covers, or other pipeline structures.

C. Valves to be abandoned shall be closed before removing valve cans.

D. Excavate to expose valves to be abandoned. Remove the valve can and riser pipe to valve top. If the valve operating nut is less than 18-inches below grade, valve bonnet shall be removed to acquire necessary clearance for proper abandonment.

E. Backfill excavations per Section 31 23 16 Trenching, Backfilling, and Compacting.

F. Repair paved surfaces in accordance with local regulations.

G. Until a fire hydrant is physically removed, any hydrant that becomes non-usable during abandonment procedures shall have a heavy-duty cover placed over it and secured and marked "Abandoned" so that fire department personnel know its status.

3.03 CUTTING AND CAPPING OF MAINS

A. Do not begin cut, plug, and abandonment operations until replacement water main has been constructed and tested, all service connections have been installed, and replacement main is approved for use.

B. Clean inside surface of pipe at least 24-inches from ends, achieving firm bond and seal grout plug to pipe surface. Similarly, clean and prepare exterior surface if manufactured cap is to be used.

C. Place temporary plug or bulkhead approximately 18-inches inside pipe. Fill pipe end completely with dry-pack grout mixture.

D. Install concrete around cap and over pipe to ensure it is not penetrable by groundwater.

E. Backfill excavations per Section 31 23 16 Trenching, Backfilling, and Compacting.

F. Repair paved surfaces in accordance with local regulations.

G. Collect and dispose of excess grout material and debris.

3.04 CUTTING AND CAPPING OF WATER SERVICES

A. Do not begin cut, plug, and abandonment operations until replacement service, if necessary, has been constructed and tested, and all service connections have been installed.

B. Service lines shall be cut and capped at the water main and/or as directed on Project Drawings.

C. Before backfilling of a capped service line is started, the capping must be observed by California American Water.

D. After service to be abandoned has been cut and capped, check for any other sources feeding abandoned water service. When sources are found, notify California American Water immediately.

E. Install concrete around cap and over pipe to ensure it is not penetrable by groundwater.

F. Backfill excavations per Section 31 23 19 Trenching, Backfilling, and Compacting.

G. Repair paved surfaces in accordance with local regulations.

H. Collect and dispose of excess grout material and debris.

I. Mark location of abandoned water services on Drawings and provide to California American Water.

3.05 PIPE REMOVAL

A. Existing water pipes shall not be removed until the corresponding new water pipes are fully in service.

3.06 PROTECTION OF PERSONS AND PROPERTY

A. Provide safe working conditions for employees throughout demolition and removal operations. Observe safety requirements for work below grade.

B. Maintain safe access to adjacent property and buildings. Do not obstruct roadways, sidewalks, or passageways adjacent to the work.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1: GENERAL

1.01 SUMMARY

A. Provide concrete for structures such as thrust blocking, pipe encasement, curbs, sidewalks, driveways and pavement in accordance with this Specification Section. This Section is not applicable to flowable fill.

1.02 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals.

B. The Contractor shall submit a certification from the concrete producer, as well as supporting data, stating that the cement concrete conforms to the compressive strength needed for the proposed project.

PART 2: MATERIALS

2.01 PORTLAND CEMENT

A. Portland cement shall be Type I or Type II and conform to “Specification for Portland Cement” ASTM C150.

2.02 AIR-ENTRAINING AGENT

A. Air-entraining agent from approved manufacturer shall be added in accordance with manufacturer’s directions to the normal Portland cement to entrain 4½ percent air ± 1 percent with all other ingredients and strength as specified. Air-entraining admixtures shall conform to “Specifications for Air-Entraining Admixtures for Concrete” ASTM C260.

2.03 CONCRETE AGGREGATES

A. Concrete aggregates shall conform to “Specifications for Concrete Aggregates” ASTM C33. Coarse aggregates shall be a maximum of 1½ -inches in size in footings and plain concrete. Pea gravel shall be used for sections 3-inches or less in thickness.

2.04 WATER FOR CONCRETE

A. Water used in mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, organic materials, or other deleterious substances. In effect, the water used shall be potable water.

2.05 REINFORCING BARS

A. Reinforcing bars shall be billet steel grade (60,000 psi minimum yield) conforming to the requirements of ASTM A615, Grade 60. Reinforcing bars shall be new stock, free from rust, scale, or other coatings that tend to destroy or reduce bonding.

2.06 WELDED WIRE MESH

A. Welded wire mesh shall conform to “Specifications for Welded Steel Wire Fabric for Concrete Reinforcements” ASTM A185.

2.07 PREMOLDED EXPANSION JOINT MATERIAL

A. Premolded expansion joint material shall be provided where shown on the Project Drawings or directed by the Engineer. This non-extruding compressible joint material shall conform to the requirements of “Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction”, ASTM D1751.

2.08 CONCRETE MIXES

A. Concrete mixes apply to Owner facilities only. Sidewalks, driveways, curb, gutter and other facilities within the right-of-way owned by other agencies shall conform to the jurisdictional agency’s standards.

B. Ready-mixed concrete shall conform to “Specifications for Ready-Mixed Concrete” ASTM C94.

C. All concrete mixes shall produce a dense, durable concrete. The minimum 28-day compressive strength of the concrete shall be:

1. 2,500 psi – thrust blocking and pipe encasement.

2. 3,000 psi – driveways and sidewalks.

D. Water/cement ratio for the concrete shall not exceed a maximum as described in Chapter 4 of the ACI Standard 318 latest edition, Building Code Requirements for Reinforced Concrete, when strength data from field experience or trial mixtures are not available. A workable concrete with minimum slump of 3-inches and a maximum slump of 5-inches shall be produced without exceeding the water/cement ratio.

PART 3: EXECUTION

3.01 FORMWORK

A. Build all forms mortar tight and of sufficient rigidity to prevent distortion due to the pressure of the concrete and other loads incidental to the construction operations. Construct and maintain forms to prevent warping and the opening of joints.

B. The forms shall be substantial and unyielding. Design the forms so that the finished concrete conforms to the proper dimensions and contours. Design the forms to consider the effect of the vibration of concrete during placement.

3.02 PLACING REINFORCING STEEL

A. Place all steel reinforcement accurately in the positions shown on the Project Drawings. Secure the steel reinforcement firmly in place during the placing and setting of concrete. When placed in the work, it shall be free from dirt, detrimental rust, loose scale, paint, oil, or other foreign material. When spacing between crossing bars is greater than one foot, tie all bars at all intersections. When

spacing is less than one foot in each direction, tie alternate intersections of bars.

B. Maintain distances from the forms by means of stays, blocks, ties, hangers, or other approved supports. Continuous highchairs will not be permitted. Furnish all reinforcement in full lengths as indicated on the Project Drawings. Splicing of bars will not be permitted without the approval of the Engineer, except where shown on the Project Drawings. Stagger splices as far apart as possible. Unless otherwise shown on the Project Drawings, bars shall be lapped 36 diameters to make the splice.

C. Lap welded wire mesh at least 1½ meshes plus end extension of wires but not less than 12-inches in structural slabs. Lap welded wire mesh at least ½ mesh plus end extension of wires but not less than 6-inches in slabs on the ground.

3.03 CONVEYING AND PLACING CONCRETE

A. Concrete placement is not permitted when weather conditions prevent proper placement and consolidation unless approved by Owner.

B. When concrete is mixed and/or delivered by a truck mixer, the concrete shall be delivered to the project site for ultimate discharge within 90 minutes.

C. Convey concrete from the mixer to the forms as rapidly as practical by approved methods which will prevent segregation and loss of ingredients.

D. Clean formwork of dirt and construction debris, drain water, and remove snow and ice. After the forms have been inspected, deposit the concrete in approximately horizontal layers to avoid flowing along the forms. Place all concrete in the dry free from standing water. Deposit all concrete continuously or in layers of a thickness such that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the sections. Place the concrete to create a monolithic structure the component parts of which are securely bonded together. Compact the concrete during placement by suitable means. Work the concrete around the reinforcement and embedded fixtures and into corners and angles of forms, taking care to avoid overworking which may result in segregation.

E. Do not drop concrete into forms from a height greater than 5 feet. Use a spout to deposit concrete from a greater height; or, provide openings in the forms to limit the height of drop. Obtain the approval of Owner before using any method of placing concrete from a height greater than 5 feet.

F. Direct concrete through chutes to prevent it from striking reinforcement or sides of the form above the level of placement. Avoid segregation and coating of the surfaces with paste which may dry before concrete reaches its level.

G. Submit a concrete mix design to Engineer for approval prior to placing any concrete by pumping.

3.04 THRUST BLOCKING

A. See the thrust blocking details. Notify Engineer whenever field conditions are noted which are more restrictive than the thrust block design data included on details.

B. Construct blocking against the vertical face of undisturbed earth or sheeting left in place. Prevent the concrete from enclosing more than half the circumference of the pipe unless it is a straddle block. Keep the concrete away from joints or bolts in the piping.

C. If thrust blocks are employed, place thrust blocking for hydrants to allow the hydrant to drain.

3.05 PLACING CONCRETE IN COLD WEATHER

A. Follow the provisions of ACI 306R-10, ACI 308, and Paragraph 8-5 of USACE, Standard Practice for Concrete for Civil Works Structures, when the ambient temperature is less than 40°F at time of placement or expected to be less than 40°F during the curing period.

B. Control concrete setting time with the use of accelerating admixtures as required to facilitate placing and finishing operations. Do not use calcium chloride in excess of 2% by weight in the concrete free of steel reinforcement. Where steel reinforcement is employed and concrete with calcium chloride is permitted, Contractor must use galvanized or coated steel satisfactory to the Engineer.

C. Exposed subgrade, formwork, and reinforcing shall be warmer than 33°F prior to placement of concrete.

END OF SECTION

SECTION 03 48 20

VALVE BOXES, METER BOXES, AND VAULTS

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section consists of furnishing and installing valve boxes, meter boxes, and vaults.

1.02 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals.

B. Submittals shall include manufacturers' product data for the following:

1. Each type of valve box and lid.
2. Each type of meter box and cover.
3. Each type of vault frame and cover.

C. Submit design calculations and shop drawings for precast vault elements, sealed by a Professional Engineer licensed to practice in the State of California.

D. Submit shop drawings for cast-in-place meter vaults for approval if proposed construction varies from Project Drawings.

PART 2: MATERIALS

2.01 VALVE BOXES

A. Valve boxes shall be precast concrete with cast iron lid.

B. Valve box and lid shall be traffic rated.

C. Cast letter 'W' into lid for valves serving potable water lines, 1/2-inch in height and raised 3/32-inch.

D. Unless otherwise specified, uncoated cast iron.

E. Riser Pipe.

1. Provide 8-inch PVC, SDR 35, riser pipes in accordance with Section 33 05 31 Polyvinyl Chloride Pipe.
2. Provide a single section of pipe.

F. Concrete for valve box placement:

1. For locations in new concrete pavement, provide concrete in accordance with Section 03 30 00 Cast-in-Place Concrete.

2.02 METER BOXES

A. Provide meter boxes and lids:

1. Non-traffic bearing locations: H10 load rating.

2. Traffic bearing locations (street, driveway, alley, parking lot): H20 load rating.

B. Interior Dimensions: 13” x 24” x 12” deep minimum.

C. Lids: Shall be labelled “WATER”, 1/2-inch in height and raised 3/32-inch.

D. Cast-Iron Boxes: Clean and free from sand blowholes or other defects conforming to requirements of ASTM A48, Class 30B. Bearing surfaces shall be machined so that covers seat evenly in frames.

1. Boxes and lids shall have dipped, coal-tar-pitch, varnish finish.

2. Lids shall be cast-iron.

E. Concrete Meter Boxes: Made of Class A concrete, with minimum 4,000 psi compressive strength.

1. Castings: Free from fractures, large or deep cracks, blisters or surface roughness or any other defects that may affect serviceability.

2. Lids shall be cast-iron and shall have dipped, coal-tar-pitch, varnish finish. Concrete meter lids are not permitted.

F. Meter boxes shall conform to California American Water Standard Details.

2.03 VAULTS

A. Vaults shall be constructed of precast concrete unless otherwise approved by Owner.

B. Vaults shall be H20 rated.

C. Meter vaults shall be designed to include anti-flotation provisions.

D. Grates and Covers: Use castings for frames, grates, rings, and covers conforming to ASTM A48, Class 35B. Provide locking covers if indicated on Project Drawings.

1. Use clean castings capable of withstanding application of AASHTO M306 – 40,000-pound proof loading without detrimental permanent deformation.

2. Fabricate castings to conform to shapes, dimensions, and with wording or logos shown on Project Drawings. Standard dimension for manhole cover opening 32-inches in diameter.

3. Use clean castings, free from blowholes and other surface imperfections. Use clean and symmetrical cast holes in covers, free of plugs.

E. Provide safety grate option and keyed locks for all access hatches. Provide master access keys in accordance with Owner’s requirements. Two of each key

shall be provided and keys shall be tagged for lock location.

PART 3: EXECUTION

3.01 EXAMINATION

A. Obtain approval from Engineer for location of meter vault and meter boxes.

B. Verify lines and grades are correct.

C. Verify compacted subgrade will support loads imposed by vaults.

1. Require 12” compacted soil, OR;

2. Require 6” compacted soil and 6” of <1” clean stone.

3.02 VALVE BOXES

A. Install riser pipe with suitable length for depth of cover indicated on Project Drawings or to accommodate actual finish grade.

1. Install valve box and riser piping plumbed in a vertical position

B. Provide 6-inches telescoping freeboard space between riser pipe top butt end and interior contact flange of valve box for vertical movement damping. The end of pipe resting on valve shall be notched out sufficiently to provide a snug fit around the valve bonnet and to center valve inside of pipe.

C. Set, align, and adjust valve box so that lid is level with final grade.

3.03 METER BOXES

A. Install cast iron meter boxes in accordance with manufacturer’s instructions.

B. Adjust top of meter boxes to conform to cover elevations specified in Paragraph 3.5 Frame and Cover for Meter Vaults below.

C. Do not locate under paved areas unless approved by California American Water Project Manager. Use approved traffic type box with cast iron lid when meter must be in paved areas.

3.04 METER VAULTS

A. Do not cast in the presence of water. Make the bottom uniform. Verify lines and grades are correct and compacted subgrade will support loads imposed by vaults.

B. Precast Meter Vaults:

1. Install precast vaults in accordance with manufacturer’s recommendations. Set level on a minimum 3-inch-thick bed of sand conforming to requirements of Section 31 23 16 Trenching, Backfilling, and Compacting.

2. Seal lifting holes with cement-sand mortar or non-shrink grout.

3.05 FRAME AND COVER FOR METER VAULTS

A. Set cast iron frame in a mortar bed and adjust elevation of cover as follows:

1. In unpaved areas, set top of meter box or meter vault cover 4 to 6-inches above natural grade.

2. In paved areas, set top of meter box or meter vault cover flush with adjacent concrete.

3.06 BACKFILL

A. Provide backfill in accordance with Section 31 23 16 Trenching, Backfilling, and Compacting.

B. Compacted soil and stone shall extend minimum of 6” beyond meter vaults and 3” beyond valve boxes.

C. Valve boxes shall be supported by bricks all around, where needed.

END OF SECTION

SECTION 31 11 00

CLEARING, GRUBBING, AND STRIPPING

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section consists of clearing, grubbing, and stripping required for this work, including, but not limited to:

1. Felling and removal of trees, stumps, roots, and tree debris.

2. Removal of surface rock and all debris.

3. Removal of surface organic topsoil layer.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 23 16: Trenching, Backfilling, and Compacting

1.03 QUALITY ASSURANCE

A. Qualifications of Workmen: Provide at least one person who shall be always present during tree clearing and grubbing operations and who shall be thoroughly familiar with the types of trees involved and who shall direct the trimming of roots and limbs where required.

B. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with the requirements of those insurance carriers providing coverage for this work.

1.04 TREE REMOVAL PERMIT

A. When working in Sacramento County, Contractor shall submit tree removal permits for removal of any landscaping trees, native oaks, public trees, or landmark trees as defined by Sacramento Zoning Code Regulations.

B. When working outside of Sacramento County, Contractor shall comply with local regulations related to tree removal.

1.05 DISPOSAL FEES

A. The Contractor shall bear all expenses to obtain a suitable disposal area, haul to the disposal area, pay disposal fees, and dump at the disposal area. The Contractor shall coordinate with California American Water for use of base landfill or compost area, where available.

PART 2: MATERIALS

2.01 TEMPORARY BARRICADES

A. Unless otherwise specifically approved by the Engineer, use only new and solid lumber of utility grade or better to construct temporary barricades around the

objects designated to remain.

2.02 PRUNING PAINT

A. Use only a pruning paint specially formulated for horticultural application on cut or damaged plant tissue and approved by the Engineer for use on this work.

2.03 OTHER MATERIALS

A. All other material not specifically described but required for proper completion of the work of this Section shall be as selected by the Contractor subject to approval of the Engineer.

PART 3: EXECUTION

3.01 LIMITS OF WORK

A. All excavation areas associated with new pipelines, structures, slabs, and delineated preparation areas shown on Plans shall be cleared, grubbed, and stripped.

3.02 CLEARING

A. When clearing, Contractor shall remove and dispose of shrubs, brush, limbs, and other vegetative growth. Contractor shall remove all evidence of their presence from the surface, including sticks and branches greater than 2 inches in diameter of thickness. Contractor shall remove and dispose of trash piles, rubbish, and fencing. Contractor shall protect trees, shrubs, vegetative growth, and fencing not designated for removal.

3.03 GRUBBING

A. Contractor shall remove and dispose of wood or root matter below the ground surface remaining after clearing, including stumps, trunks, roots, or root systems greater than 2-inches in diameter or thickness, to a depth of 12 inches.

3.04 STRIPPING

A. Contractor shall remove and dispose of all organic sod, topsoil, ash, grass and grass roots, and other structurally unsound material remaining after clearing and grubbing from the areas designated to be stripped.

3.05 DISPOSAL OF MATERIAL

A. Contractor shall not burn combustible materials.

B. Contractor shall remove all cleared, grubbed, and stripped material from the work site and dispose of it in accordance with all local laws, codes, and ordinances.

END OF SECTION

SECTION 31 23 16

TRENCHING, BACKFILLING, AND COMPACTING

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section consists of trenching, backfilling, and compacting for the construction and installation of open-cut trenches for pipelines.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 32 12 00: Flexible Paving

B. Section 31 41 00: Sheeting, Shoring, and Bracing

1.03 DEFINITIONS

A. Street Zone: The street zone includes the asphalt concrete and aggregate base pavement section placed over the trench backfill. Pavement and structural section of roadway as defined by local jurisdiction standards and encroachment permit.

B. Trench Zone: The trench zone includes the portion of the trench from the top of the pipe zone to the bottom of the street zone in paved areas or to the existing surface in unpaved areas also described as intermediate backfill zone.

C. Pipe Zone: The pipe zone includes the portion of the trench from the bottom of the trench zone to the bottom of the trench. Where multiple pipes or conduits are placed in the same trench, the pipe zone shall extend from the bottom of the lowest pipes to a horizontal level above the top of the highest or topmost pipe.

1.04 SUBMITTALS

A. In accordance with Section 01 33 00 Submittal Procedures.

B. Submittals shall include the following:

1. One electronic copy of a report from a testing laboratory verifying that backfill material conforms to the specified gradations of characteristics for granular material, imported sand, rock refill for foundation stabilization, and water.
2. Provide written description of barricading, shoring, cribbing, bracing, and sloping precautions per CAL/OSHA standards and in accordance with Section 31 41 00 – Sheeting, Shoring, and Bracing.

PART 2: MATERIALS

2.01 GRANULAR MATERIAL FOR STRUCTURAL BACKFILL – STREET ZONE

A. Granular material or granular soil for backfill used above the pipe zone shall be ¾-inch – Class 2 Aggregate Base conforming to Caltrans Standard Specification 26-1.02 unless otherwise defined by local jurisdiction standard details and specifications.

2.02 INTERMEDIATE BACKFILL – TRENCH ZONE

A. Pipe zone material shall be ¾-inch Class 2 Aggregate Base conforming to Caltrans Standard Specifications 26-1.02.

2.03 IMPORTED SAND – PIPE BASE AND PIPE ZONE

A. Imported sand used for the pipe base and pipe zone shall be free of clay or organic material and have the following gradation:

Sieve Size	Percent Passing By Weight
No. 4	100
No. 200	0 – 5

Imported sand shall have a sand equivalent not less than 50 per Caltrans California Test Method 217-G. All gradations to be approved by California American Water prior to construction.

2.04 INTERMEDIATE BACKFILL AND BEDDING ALTERNATIVE - TWO-SACK SAND CEMENT SLURRY BACKFILL

A. Two-sack sand cement slurry may only be used as an alternative if approved in writing by the Owner.

B. Low-strength concrete slurry backfill shall be a sand aggregate Portland Cement concrete of Type I or Type II Portland Cement per cubic yard of concrete sand and sufficient water added to provide a fluid, workable mix that will flow and can be pumped without separation of materials while being placed. Unless otherwise noted, the maximum slump shall be 6 inches, maximum compressive strength of 300 psi, and the minimum compressive strength of 100 psi.

2.05 REFILL FOR FOUNDATION STABILIZATION

A. ¾ - inch crushed rock shall be used in areas where pipelines extend into loose medium dense sands below the water table.

2.06 CONCRETE FOR PIPE ENCASEMENT AND THRUST BLOCKS

A. Section 03 30 00 Cast-In-Place-Concrete

B. Provide thrust blocks at fittings in pipe having rubber gasket bell and spigot or unrestrained mechanical joints as directed by the Engineer. Provide thrust

blocks at all tees and elbows 11.25° and greater, or as noted on contract plans and in the general or specific pipe specifications.

C. Size thrust blocks in accordance with California American Water Standard Detail W-106.

PART 3: EXECUTION

3.01 PROJECT CONDITIONS

A. Obtain all required permits and licenses before installing utilities under existing roads and follow the rules and requirements of the authority having jurisdiction.

B. Arrange construction sequences to provide the shortest practical time that the trenches will be open to avoid hazard to agency staff, subcontractors, and public, and to minimize the possibility of trench collapse.

3.02 TESTING FOR COMPACTION

A. The Contractor shall test for compaction at specific locations as determined by the Engineer.

B. Relative compaction is defined as the ratio, in percent, of the as-compacted dry density to the laboratory maximum dry density. The laboratory maximum dry density is defined in accordance with ASTM D1557, latest edition.

C. Where compaction tests indicate a failure to meet the specified compaction, the Contractor will take additional tests every 50 feet in each direction until the extent of the failing area is identified. Rework the entire failed area until the specified compaction has been achieved.

3.03 COMPACTION REQUIREMENTS

Unless otherwise shown in the drawings or otherwise described in the specifications for the pipe installed, relative compaction in pipe trenches shall be as follows:

A. Pipe Zone: 90% relative compaction.

B. Trench Zone: 95% relative compaction.

3.04 MATERIAL REPLACEMENT

A. Remove and replace any trenching and backfilling material which does not meet the specifications, at the Contractor's expense.

3.05 SLOPING, SHEETING, SHORING, AND BRACING OF TRENCHES

A. Trenches shall have sloping, sheeting, shoring, and bracing conforming with 29 CFR 1926, Subpart P – Excavations, CAL/OSHA requirements, and Section 31 41 00 - Sheeting, Shoring, and Bracing.

3.06 SIDEWALK, PAVEMENT, AND CURB REMOVAL

A. Cut bituminous and concrete pavements regardless of the thickness and curbs and sidewalks prior to excavation of the trenches with a pavement saw or

pavement cutter. Width of the pavement cut shall be at least equal to the required width of the trench at ground surface. Haul pavement and concrete materials from the site. Do not use for trench backfill.

3.07 TRENCH WIDTHS

A. Trench widths in the pipe zone shall be as shown in the drawings CAW-ND-W102. Trench width at the top of the trench will defer to the local jurisdiction and approved encroachment permit.

3.08 TRENCH EXCAVATION

A. Excavation for pipe shall be open cut where shown on the Plans. The trench shall be as wide as necessary for sheeting and bracing, if used, and the proper performance of the work up to the maximum width permitted by the typical cross-sections shown on the Drawings. The sides of the trenches shall be vertical in existing streets. The bottom of the trench shall be constructed to the grades and shapes indicated on the Drawings. Should the Contractor desire to use other equivalent methods, Contractor shall submit their method of construction to the Engineer for favorable review prior to its use.

B. Take care not to over excavate. Accurately grade the bottom of the trenches to provide uniform bearing and support for each section of the pipe at every point along its entire length, except for the portions of the pipe sections where it is necessary to excavate for bell holes and for the proper sealing of pipe joints, and as hereinafter specified. Dig bell holes and depressions for joints after the trench bottom has been graded, and, in order that the pipe rest on the bedding for as nearly its full length as practicable, bell holes and depressions shall be only of such length, depth and width as required for properly making the joint. Remove stones as necessary to avoid point bearing.

C. Backfill and compact over-excavations to 90% relative compaction with bedding material. There shall be no additional payment to the Contractor for over-excavations not directed by the Engineer. Remove unsatisfactory material encountered below the grades shown as directed by the Engineer and replace with bedding material. Payment for removal and replacement of such unsatisfactory material directed by the Engineer shall be made in accordance with the provisions of the General Conditions.

D. Grade trenches so that they are uniformly sloped between the pipe elevations shown on the Drawings. Comply with the minimum and maximum trench widths shown on the Drawings. Notify the Engineer if the trench width exceeds the maximum allowable width for any reason.

E. Provide ladders for access to the trench by construction and inspection personnel.

F. Hard rock excavation shall be all excavation necessary that requires a hydraulic hoe-ram or jack hammer to reach adequate trench size for placement of pipe and fill. Contractor shall coordinate with the Engineer to confirm hard rock excavation volume daily.

3.09 DEWATERING

A. Provide and maintain means and devices to remove and dispose of all water entering the trench excavation during the time the trench is being prepared for the pipelaying, during the laying of the pipe, and until the backfill at the pipe zone has been completed. These provisions shall apply during the noon hour as well as overnight. Dispose of the water in a manner to prevent damage to adjacent property and in accordance with regulatory agency requirements. Do not drain trench water through the pipeline under construction. Do not allow groundwater to rise around the pipe until jointing compound has been set hard.

B. Refer to Geotechnical Report for defined groundwater conditions. Contractor shall provide a dewatering plan with signed and stamped dewatering plan by Professional Engineer if required in Geotechnical Report.

3.010 LOCATION OF EXCAVATED MATERIAL

A. During trench excavation, place the excavated material only within the working area. Do not obstruct any roadways or streets. Conform the federal, state, and local codes governing the safe loading of trenches with excavated material. All trenches shall be backfilled at the end of each day's operation unless trench plates and shoring has been approved as an alternative by Owner and road-controlling entity. Trench patching with asphalt concrete shall be completed within 24 hours of trench backfill.

3.011 LENGTH OF OPEN TRENCH

A. Limit the length of open trench to 50 feet in advance of pipelaying or amount of pipe installed in one working day, whichever is less, and not more than 50 feet in the rear of pipelaying, except as modified by encroachment permit requirements of local jurisdiction where project occurs. Lay length of open trench may be increased beyond 50 feet if site is secure with security fencing at Owner's discretion.

B. Shoring shall remain in place until intermediate backfill compaction has caught up to pipe laying.

C. Trench-plating shall be kept to a minimum for excavations left overnight and weekends and in accordance with local jurisdiction encroachment permit.

D. Cold-patch temporary paving of street zone shall be allowed per local encroachment permit guidelines until final road structural section is placed and paved per the Plans.

3.012 TRENCH EXCAVATION IN BACKFILL OR EMBANKMENT AREAS

A. Construct trench excavation for pipe, pipes, or conduit in backfill or embankment areas in accordance with the following procedures:

1. Construct and compact the embankment to an elevation of 1-foot minimum over the top of the layer of the largest pipe or conduit to be installed.
2. Excavate trench in the compacted backfill or embankment. Place imported sand in the pipe base and pipe zone. Compact backfill above the pipe zone to the relative compaction required for trench zone backfill.

3.013 BACKFILL COMPACTION

Compact per the detailed piping specification for the pipe and per the following:

A. Compact trench backfill to the specified relative compaction. Compact by using mechanical compaction. Do not use high impact hammer-type equipment or sheep's-foot roller except where the pipe manufacturer warrants in writing that such use will not damage the pipe. Jetting is not allowed. Compact material placed within 12-inches of the outer surface of the pipe by mechanical vibrator plate.

B. Do not use any axle-driven or tractor-drawn compaction equipment within 5 feet of building walls, foundations, or other structures.

3.014 TWO-SACK SAND CEMENT SLURRY BACKFILL

A. When two-sack sand cement slurry backfill is directed, pipe shall be supported by mounding imported backfill material or sandbags filled with imported backfill material. Pipe shall not be supported on wooden or concrete blocks.

END OF SECTION

SECTION 31 41 00

SHEETING, SHORING, BRACING

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section covers protective installations consisting of shores, wales, braces, posts, piling, sheeting, anchorages, and fastenings required for the work of this project.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 23 16: Trenching, Backfilling, and Compacting

1.03 QUALITY ASSURANCE

A. Design Criteria. Contractor's Engineer shall design and Contractor shall construct temporary sheeting, shoring, and bracing, which are to be used as an aid in construction. Design shall be prepared in conformance with applicable requirements of Article 6, "Excavations, Trenches, Earthwork" of Construction Safety Orders of California State Division of Occupational Health and Safety. In addition, sheet piling design shall be based on the material requirements specified herein. Sloping of excavations shall not be employed below the groundwater water elevation. Designs shall be prepared and signed by a Civil Engineer registered in the State of California and shall be based on the stresses for various materials of construction contained in the California Building Code 2019 Edition and latest supplement. The allowable stresses permitted by the California Building Code may be increased 15 percent for temporary shoring used as an aid to construction.

1.04 SUBMITTALS

A. Submit to the Engineer for record purposes copies of the drawings and calculations used to determine the strength, size, and stability of the protective installations. All designs submitted under this section shall be signed by a Structural or Civil Engineer duly registered in the State of California.

B. Prior to the start of any work involving sheeting and bracing, the Contractor shall obtain a valid excavation permit from the Cal OSHA District office as required. A copy of the permit and all accompanying drawings, data, and calculations shall be submitted to the Engineer for record purposes only and not for review or approval.

1.05 ALTERNATIVES

The use or application of alternative methods and materials, and the employment of propriety systems under lease or franchise in lieu of that specified herein, may be allowed. Demonstration of suitability and compliance with these specifications and approval of the Owner shall be required.

PART 2: PRODUCTS

2.01 MATERIALS

A. Sheet Piling

1. Sheeting shall be continuous interlock type. Steel sheeting shall be made in accordance with ASTM A857 from steel meeting the requirements of ASTM A570, Grade 30. Sheeting shall be hot-dipped galvanized per ASTM A123 at a rate of two ounces per square foot total both sides. The sides of each piece of sheeting shall be furnished with an interlock that is continuous for the full length of the sheeting. The interlock shall have an opening of sufficient width to allow free slippage of the adjoining sheet. Sheeting shall be "Metric Sheeting" as manufactured by Contech Construction Products, Inc, or approved equal.

2. Dimensions and Section Properties. Steel sheet piling used for cofferdams or shall be standard rolled metric sections. The sheeting shall be galvanized after fabrication and have the minimum physical and sectional properties; Physical Properties: 5 gauge (0.209 inches), Sectional Properties: Modulus – 6.28 in^3, Moment of Inertia – 11.04 in^4.

A. Trench Boxes and Speed Shores

1. Pulling Trench Boxes and using speed shores is not a positive means of support, therefore such methods will not be allowed.

PART 3 – EXECUTION

3.01 INSTALLATION

A. General. Install sheeting and bracing for trench and structure excavation as the work requires. Butt planks to and/or interlock sheets to exclude groundwater and fines, preventing the erosion of voids outside sheeting. In soft, wet ground drive sheeting to a lower level as excavation progresses so that sheeting is embedded in undisturbed earth. Bracing of sheet piling may be permitted to penetrate the structural concrete only as approved by the Engineer. Install wales and struts at close intervals to prevent displacement of the surrounding earth and to maintain safe conditions in the work area. Any damage proven to result from improper installation shall be the responsibility of the Contractor.

Temporary sheeting for trench and structure excavation may be removed and re-used. Withdraw individual planks alternatively as the backfill is raised, maintaining sufficient sheeting and bracing to protect the work and workmen. Remove bracing completely. Where unstable conditions occur in the underlying strata from any cause, and withdrawal of sheeting will endanger the work, a portion of the sheeting, including bracing, may be left in place with approval of the Owner. Remove all wood within a zone extending to four (4) feet below finished grade. Leaving such material in place shall not be cause for an increase in Contract in price.

B. Sheet Piling. The Contractor has the option of using steel sheet piling for temporary protective installations. All piling installations shall be continuous.

1. Installation of Sheet Piling. Depth of piling shall be sufficient to prevent heave when the trench is dewatered. Piles shall be driven with a hammer with an adequate capacity to complete pile driving without changing hammers. The use of air or water jets to assist in driving the sheet piling will be permitted, providing that the last 5 feet of advance is by driving. Piles shall be driven

accurately to the lines and grades shown or required, with each section interlocked with the sheet piles driven previously. To ensure proper alignment of the sheet piles, a driving template or jig shall be used. If any pile is damaged during driving, it shall be removed and replaced. If piles are driven out of interlock or are not properly plumbed or aligned, the piles shall be pulled and re-driven.

2. Prevention of Damage. In installing, cutting off, or removing sheet piles, every precaution shall be taken to ensure that damage to the structure or pipeline does not occur. If damage does occur, the Contractor shall perform the necessary repairs at his own expense.

3.02 PROTECTION OF EXISTING FACILITIES

A. It is the Contractor's responsibility to protect existing facilities from the consequences of his work. Where any sloped excavation infringes on or potentially endangers any existing facilities or structures, provide shoring, sheeting, and bracing according to shop drawings and calculations signed and stamped by a structural or civil engineer registered in the State of California.

a. END OF SECTION

SECTION 32 12 00

FLEXIBLE PAVING

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section includes materials, testing, and installation of asphalt concrete pavement, aggregate base course, herbicide, prime coat, tack coat, and seal coat.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 23 16: Trenching, Backfilling, and Compaction

1.03 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals.

B. Submittals shall include the following:

1. An electronic copy of a report from a testing laboratory verifying that aggregate material conforms to the specified gradations or characteristics.

PART 2: MATERIALS

2.01 MATERIALS USE IN THE RIGHT-OF-WAY

A. Furnish materials of construction for traffic control loops, pavement striping, paving, curbing, and surfacing in accordance with applicable Federal, State, and local standards. If there are no applicable standards, use materials which will produce a result that is at least equal to the type which existed before the work began and that is to the satisfaction of the Engineer.

2.02 ASPHALT CONCRETE PAVING

A. Asphalt concrete paving shall conform with Section 39 of the State Specifications and shall be Type A hot mix asphalt (Asphalt Concrete) using asphalt binder that conforms to Section 92 of the State Specifications unless otherwise specified by the road-controlling entity.

B. Asphalt concrete shall be placed in accordance with Section 23-8 of the Sacramento County construction specifications.

2.03 ASPHALT CONCRETE PAVING

A. Aggregate base shall be Class 2 aggregate base, ¾-inch-maximum size per Section 26 of the Caltrans Specifications. Aggregate shall contain no detectable asbestos.

2.04 PRIME COAT

A. All areas to be paved shall receive prime coat. Prime coat shall be asphalt grade MC-70 and applied at a rate of 0.15-0.25 gal/sq. yd.

2.05 TACK COAT

A. Tack coat shall be asphalt grade SS-1 and applied at a rate of 0.02-0.1 gal/sq. yd. Tack coat shall be required between asphalt concrete lifts when traffic has utilized the paving surface.

2.06 ASPHALT

A. Asphalt shall be viscosity grade AR 4000. Asphalt content in the pavement shall be 5.5% to 6.0%.

2.07 AGGREGATE FOR ASPHALT CONCRETE

A. Aggregate shall be Type B per Section 39-2.02 in the Caltrans Specifications. Aggregate shall contain no detectable asbestos.

2.08 FOG SEAL COAT

A. Fog seal coat shall be per Section 37-4.02 of the Caltrans Specifications. Contractor shall protect all structures, reflectors, and other markings in the roadway prior to commencing application.

2.09 SLURRY SEAL

A. 3/8” Type II slurry seal per Section 37-.3.02B(5) of the Caltrans Specifications.

2.010 REDWOOD HEADER

A. Size of redwood headers shall be 2-inches by the depth of the asphalt concrete paving; minimum size shall be 2-inches by 4-inches. Redwood shall be Construction Heart Grade stamped by the California Lumber Inspection Service.

2.011 HERBICIDE OR WEED KILLER

A. Use oxy-monobar chlorate, Occidental; Pramitol 3OWP, CIBA-Geigy; or equal.

2.012 PAINT FOR TRAFFIC AND PARKING LOT STRIPING AND MARKINGS

A. Provide white thermoplastic paint per Section 84 of the Caltrans Specifications.

PART 3: EXECUTION

3.01 PAVEMENT REMOVAL

A. Initially cut asphalt concrete pavement with pneumatic pavement cutter or other equipment at the limits of the excavation and remove the pavement. After backfilling the excavation, saw cut asphalt concrete pavement to the full depth of pavement at a point not less than 12 inches outside the limits of the excavation or the previous pavement cut, whichever is greater, and remove the additional pavement. See plans for local requirements.

B. Saw cut concrete pavement, including cross gutters, curbs and gutters, sidewalks, and driveways, to the full depth of pavement to the nearest score line or joint beyond the edge of the excavation and remove the pavement. The concrete pavement may initially be cut at the limits of the excavation by other methods prior to removal and the saw cut made after backfilling the excavation.

C. Cut-off and ring saws may be used for pavement cutting if the saw is properly mounted in a cart approved by the manufacturer and designed specifically for the saw model in use. Cut-off saws used for pavement cutting must be equipped with abrasive blades. No free hand use of cut-off saws or ring saws for pavement cutting applications is allowed. All manufacturer's recommendations, warnings, and safeguards must be followed. The use of diamond tipped blades is prohibited in any cut-off saw application. Only abrasive blades shall be used with cut-off saws.

D. Make arrangements for disposal of the removed pavement.

E. Final pavement saw cuts shall be straight along both sides of trenches, parallel to the pipeline alignment, and provide clean, solid, vertical faces free from loose material. Saw cut and remove damaged or disturbed adjoining pavement. Saw cuts shall be parallel to the pipeline alignment or the roadway centerline or perpendicular to same.

3.02 PAVEMENT REPLACEMENT

A. The pavement replacement shall conform to local jurisdiction standards (City or County).

3.03 INSTALLATION

A. Producing, hauling, placing, compacting, and finishing of asphalt concrete shall conform to Section 39 of the Caltrans Specifications. Apply seal coat to all paving except open asphalt concrete.

3.04 CONNECTIONS WITH EXISTING PAVEMENT

A. Where new paving joins existing paving, saw cut the existing surfaces 12 inches back from the joint line full depth. Dispose of waste material offsite. Tack prior to placing the asphalt concrete. Meet lines shall be straight and the edges vertical. Paint the edges of meet line cuts with liquid asphalt or emulsified asphalt prior to placing asphalt concrete. After placing the asphalt concrete, seal the meet line by painting with a liquid asphalt or emulsified asphalt and then immediately cover with clean, dry sand.

3.05 PREPARATION OF SUBGRADE

A. Scarify subgrade to a depth of 12-inches below finished subgrade elevation and compact to 95% minimum relative compaction. Shape subgrade to line, grade, and cross section shown in the drawings. The subgrade shall be considered to extend over the full width of the base course.

B. The finished subgrade shall be within a tolerance of 0.05 of a foot of the grade and cross section shown and shall be smooth and free from irregularities and at the specified relative compaction.

3.06 PLACING AGGREGATE BASE COURSE

A. Place aggregate base course to a minimum thickness as specified for the roadway. Compact to 95% relative compaction. Install in accordance with Section 26 of the Caltrans Specifications.

3.07 COMPACTION OF AGGREGATE BASE AND LEVELING COURSES

A. Compaction and rolling shall begin at the outer edges of the surfacing and continue toward the center. Apply water uniformly throughout the material to provide moisture for obtaining the specified compaction. Compact each layer to the specified relative compaction before placing the next layer.

3.08 PLACING PRIME COAT

A. Apply prime coat to the surface of the leveling course of aggregate base at the rate of 0.25 gallon per square yard per Section 39-4.02 in the Caltrans Specifications.

3.09 PLACING TACK COAT

A. Apply tack coat on surfaces to receive finish pavement per Section 39-4.02 in the Caltrans Specifications. Apply tack coat to metal or concrete surfaces that will be in contact with the asphalt concrete paving.

3.010 PLACING ASPHALT PAVING

A. Install in accordance with Section 39-6 in the Caltrans Specifications.

3.011 COMPACTION OF ASPHALT CONCRETE PAVING

A. Compact until roller marks are eliminated and a density of 92% minimum to 98% maximum has been attained per ASTM D2041. Compacting equipment shall conform to the provisions of Section 39-5.02, “Compacting Equipment”.

3.012 APPLYING SEAL COAT

A. Apply slurry seal coat at the rate of 10 to 18 pounds of dry aggregate per square yard.

3.013 SURFACE TOLERANCE

A. Finished grade shall not deviate more than 0.02 foot in elevation from the grade indicated in the drawings. Slopes shall not vary more than 1/4 inch in 10 feet from the slopes shown in the drawings.

B. After paving has been installed and compacted, spray water over the entire paved area. Correct any areas where water collects and does not drain away.

3.014 APPLYING PAINT FOR TRAFFIC AND PARKING LOT STRIPING AND MARKINGS

A. Apply in accordance with Section 84 of the Caltrans Specifications.

END OF SECTION

SECTION 33 01 10

DISINFECTION OF WATER UTILITY PIPING SYSTEMS

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section includes water utility piping disinfection.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 33 01 15: Hydrostatic Testing

1.03 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals.

B. Submittals shall include the following:

1. Testing Schedule and Notification of Disinfection: Submit advance written notice a minimum of 72 hours prior to conducting pipe disinfection.

2. Testing Plan: Submit a written plan that identifies the methods for water disinfection. Comply with AWWA C651.

PART 2: MATERIALS – NOT USED

PART 3: EXECUTION

3.01 TESTING REQUIREMENTS

A. Furnish personnel, materials, blowoffs, test plugs, restraints, anchors, temporary connections, pumps, pressure gauges, and other equipment needed to perform disinfection.

B. Water for Disinfection:

1. Use potable water for disinfection of pipelines.

2. Coordinate with Engineer for specific points to draw water from.

3. Water for testing may be taken from the nearest blow-off, fire hydrant or other approved source, and the source shall be metered at all times. Meter assembly must include an approved backflow device.

4. Supply and install all pipe, fittings, valves, couplings, and other materials needed to fill the test lines with water.

5. Care shall be taken not to contaminate the existing system.

6. Supply pipe connection and all necessary apparatus and equipment needed for the test.

C. Disinfect all portions of the pipe that have been installed as part of this Contract and installed by others to be included within the finished pipeline.

D. Disinfect all new pipe sections prior to making final connection to existing active operating piping.

3.02 GENERAL

A. Following chlorination, thoroughly flush all treated water from the mains until the replacement water, upon both chemical and biological tests, is proved equal to the water quality at the point of supply.

B. 24- and 48-hour passing bacteriological tests are required in accordance with AWWA C651. Bacteriological tests shall be coordinated with Owner at least 72-hours ahead of scheduled sampling. Sampling shall be performed by Owner.

C. Disposal of chlorinated water is not allowed. Dechlorinate all water prior to disposal as reviewed by the Owner.

3.03 DISINFECTION

A. Disinfection inspections shall begin only after passing the pressure test.

B. Disinfect the newly installed potable water pipelines using the continuous feed method in accordance with AWWA C651. Slug method and tablet method are not permitted.

C. Position valves so that the strong chlorine solution in the treated main will not flow into water mains in active service. Open and close valves and hydrants while the system is being disinfected. California American Water shall verify that a minimum chlorine residual of 50 parts per million (ppm) has been achieved. Chlorine residual shall not exceed 75 ppm. Retain treated water at least 24 hours after which time it shall be tested for residual chlorine. If less than 25 parts per million is indicated, additional chlorine in solution shall be added until disinfection satisfactory to the Owner is obtained.

D. Flush and fill the system with clear water when disinfection has been completed and approved by the Engineer. Chlorinated water shall be neutralized to 1 ppm chlorine residual or less prior to discharge.

E. Discharge location and neutralization methods shall be coordinated with and approved by California American Water. 72-hour notification to California American Water is required prior to any discharge of chlorinated water.

F. Chlorinated water resulting from flushing newly installed water lines may be discharged to the sewer system only if permit is obtained from the local sewer district.

G. The Owner shall have the testing lab test the water after refilling the line and, if not found to be of safe bacteriological quality, Contractor will re-chlorinate the line until the quality of the water is proven to be satisfactory.

H. Where connections are to be made to an existing potable water system, the interior surfaces of all pipe and fittings used in making the connections shall be

swabbed or sprayed with a one percent hypochlorite solution before they are installed. Start thorough flushing as soon as the connection is completed and continue until all discolored water is eliminated.

END OF SECTION

SECTION 33 01 15

HYDROSTATIC TESTING

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section consists of leak testing all pipelines and related valves and fittings. Rejected work shall be retested, and if still rejected shall be repaired or replaced to the satisfaction of the Owner at no additional cost to the Owner.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 33 01 10: Disinfection of Water Utility Piping Systems

1.03 QUALITY ASSURANCE

A. Water test pressure gauges shall be ANSI B40.1, Grade 2A (plus or minus 0.5 percent of full-scale accuracy), with a dial range approximately twice the required test pressure.

1.04 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals.

B. Accuracy certification by approved independent testing laboratories for flow meters and test gauges. Certifications shall be dated no more than 90 days prior to actual system testing.

C. Provide records of each piping installation during the testing. These records shall include:

1. Date of test.
2. Identification of pipeline, or pipeline section, tested or retested.
3. Identification of pipeline material.
4. Identification of pipe specification.
5. Test fluid. Only water shall be used for hydrostatic pressure testing.
6. Test pressure.
7. Remarks: Leaks identified (type and location), types of repairs, or corrections made.
8. Certification by Contractor that the leakage rate measured conformed to the specifications.

PART 2: MATERIALS

2.01 MANUAL AIR-RELEASE VALVES FOR BURIED PIPING

A. Provide temporary manual air-release valves for pipeline test. Construct the pipe outlet in the same manner as for a permanent air valve and after use, seal with a blind flange, pipe cap, or plug and coat the same as adjacent pipe.

PART 3: EXECUTION

3.01 PROJECT CONDITIONS

A. Testing shall not be performed until each system has been flushed or thoroughly cleaned in accordance with procedures in the section that describes pipeline installation.

B. Water for flushing and testing is available upon coordination with California American Water for a hydrant meter.

3.02 GENERAL

A. Perform testing in the Owner's presence after backfill and proper compaction of trenches. Where lines are installed under roadways and parking areas, perform tests before and after completion of final subgrade preparation and prior to application of surface courses. Notify Owner in writing at least 72 hours prior to testing. Notification shall be by the Contractor submitting a test form which shall indicate test date, pipeline to be tested, test requirements and requirements of the Owner.

B. Prepare each section for testing, using adequate bracing; protect system equipment susceptible to damage by test pressures; make provision for installation of Owner's pressure gauge in parallel with Contractor's gauge, if so requested; and maintain services where required.

C. Testing requirements are stipulated in Laws and Regulations; are specified in the specifications covering the various types of piping; and are specified herein. Requirements in Laws and Regulations supersede other requirements of Contract Documents, except where requirements of Contract Documents are more stringent, including higher test pressures, longer test times, and lower leakage allowances.

3.03 TEST PROCEDURE

A. After completion of the installations, Contractor shall test all piping and pipework as herein specified. The Contractor shall furnish all material, equipment, and labor for testing the piping systems.

B. Each phase must be tested in less than 2,000 foot sections. Each complete phase shall successfully meet the requirements specified herein before acceptance by the Owner.

C. Clean piping before pressure or leak tests.

D. For water testing, the test shall be made by closing new valves or providing blowoffs or plugs and filling the pipelines with water, with provisions made for the release of all air in the lines. Contractor may not test against Owner’s existing valves.

E. The test pressure shall be 150 psi or 150 percent of static, whichever is greater.

F. The duration of the test shall be no less than 2 hours.

G. No allowable leakage or pressure drop during hydrostatic pressure test. Leakage shall be considered as any loss of water pressure during the duration of the test.

H. The test pressure shall be measured at the lowest point of the pipeline section being tested, unless otherwise directed by Owner.

I. The Contractor shall take all necessary precautions to prevent any joints from drawing while the pipelines and their appurtenances are being tested and he shall, at his own expense, repair any damage to the pipes and their appurtenances, or to any other structures, resulting from or caused by these tests.

J. Where any section of the piping contains concrete thrust blocks or encasement, wait at least 24 hours after the pour to begin testing.

K. After a satisfactory test, remove the testing fluid and other test facilities, and restore the pipe coatings.

END OF SECTION

SECTION 33 05 00

PIPING AND ACCESSORIES – GENERAL PROVISIONS

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section consists of furnishing and installing piping and accessories. Specific pipe materials are defined in other specifications.

B. Drawings: Dimensions shown on Drawings are approximate only. Verify all piping geometry in the field and ensure proper alignment and fit of all piping consistent with the intent of the Drawings. Submit field layout drawings as required for approval.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 33 00: Submittals

B. Section 33 05 19 Ductile Iron Pipe

C. Section 33 05 31 Polyvinyl Chloride Pipe

D. Section 33 05 33 High Density Polyethylene Water Mains

1.03 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals.

1.04 GENERAL

A. Materials, storage, and installation must comply with the strictest requirements of these Specifications, the Contract Documents, the American Water Works Association (AWWA) Standards, and the manufacturers' recommendations.

PART 2: MATERIALS

2.01 CONTRACTOR'S RESPONSIBILITY FOR MATERIAL

A. Examine all material carefully for defects. Do not install material which is known, or thought to be, defective.

B. Owner reserves the right to inspect all material and to reject all defective material shipped to the job site or stored on the site. Failure of Owner to detect damaged material shall not relieve the Contractor from their total responsibility for the completed work if it leaks or breaks after installation.

C. Lay all defective material aside for final inspection by Owner or Owner's Representative. Owner or Owner's Representative will determine if corrective repairs may be made, or if the material is rejected. Owner shall determine the extent of the repairs.

D. Discolored pipe will be rejected in all cases.

E. The Contractor shall be responsible for all material, equipment, fixtures, and devices furnished. These materials, equipment, fixtures and devices shall comply with the requirements and standards of all Federal, State, and local laws, ordinances, codes, rules, and regulations governing safety and health.

F. The Contractor shall take full responsibility for the storage and handling of all material furnished until the material is incorporated in the completed project and accepted by Owner. Contractor shall be solely responsible for the safe storage of all material furnished to or by them until incorporated in the completed project and accepted by Owner.

G. Load and unload pipe, fittings, valves, hydrants and accessories by lifting with hoists or skidding to avoid shock or damage. Do not drop these materials. Pipe handled on skidways shall not be skidded or rolled against other pipe. Handle this material in accordance with AWWA C600, C605 or C906 whichever is applicable.

H. Drain and store fittings and valves prior to installation in such a manner as to protect them from damage due to freezing of trapped water.

2.02 REDUCTION OF LEAD IN DRINKING WATER ACT COMPLIANCE

A. The Contractor shall comply with the requirements and standards of the Reduction of Lead in Drinking Water Act.

B. Any pipe, fitting or fixture (e.g. corp stops, curb valves, gate valves less than 2 inches in diameter, backflow prevention devices, water meters, hose bibs, etc.), solder and flux installed or requiring replacement as of January 4, 2014 must be "lead free". The Contractor shall be responsible to comply with the State, local laws, ordinances, codes, rules, and regulations governing the Reduction of Lead in Drinking Water Act that may have additional limitations or requirements."

C. The definition of 'lead free' is as follows:

1. Not containing more than 0.2 percent lead when used with respect to solder and flux; and

2. Not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.

2.03 POLYETHYLENE ENCASEMENT

A. All buried metal must be encased with 8 mil polyethylene so that no soil is contact with metal. Polyethylene encasement materials and installation must comply with AWWA C105. Pipe must be encased using Method A of Section 4.4 of AWWA C105.

B. Adhesive tape must be used to secure and seal encasement. Tape must be 10 mil PVC tape. Tears, punctures, and damage must be repaired and sealed with tape, or with an 8 mil sheet wrapped around the pipe to cover the damaged area and secured and sealed with tape.

C. Excessive damage to encasement, as determined solely by the Owner or Owner's Representative, is cause for rejection of the entire section of encasement.

D. Polyethylene encasement for potable water pipes must be BLACK or CLEAR.

2.04 BACKFILL

A. Backfill must be performed according to Section 31 23 16 – Trenching, Backfilling and Compacting.

2.05 TRACER WIRE

A. 10-AWG, Type THNN insulated copper.

2.06 CAUTION TAPE

A. Twelve-inch-wide, blue, waterline warning tape with the phrase, "CAUTION: WATER" printed in permanent, 4-inch-high letters.

PART 3: EXECUTION

3.01 INSTALLATION - GENERAL REQUIREMENTS

A. Lay and maintain all pipe to the required lines and depths. Install fittings, valves and hydrants in strict accordance with the Specifications, standard details, and at the required locations with joints centered, spigots, and all valve and hydrant stems plumb. Do not deviate from the required alignment, depth or grade without the written consent of the Owner.

B. Cover any and all buried steel lugs, rods, brackets, and flanged joint nuts and bolts with approved coal-tar protective coating in accordance with AWWA Standard C203 prior to backfilling.

C. All steel lugs, rods, brackets, and flanged joint nuts and bolts must be torqued to manufacturer specifications and wrapped with 10 mil polyethylene and 10 mil tape.

D. Lay all pipe to the depth specified. Measure the depth from the final surface grade to the top of the pipe barrel. The minimum pipe cover shall be as shown on the Drawings and in accordance with Owner's Standard Detail (CAW-ND-W102). Minimum pipe cover shall not be less than 36" unless specified by the Owner and approved by Owner.

E. Pipe installation shall not begin until Contractor has installed or staked curb and gutter in new developments.

F. Do not lay pipe in a wet trench, on subgrade containing frost, or when trench conditions are unsuitable for such work. If all efforts fail to obtain a stable dry trench bottom and Owner determines that the trench bottom is unsuitable for such work, Owner will order the kind of stabilization to be constructed, in writing. In all cases, water levels must be at least 6" below the bottom of the pipe.

G. Thoroughly clean the pipes and fittings before they are installed. Keep these materials clean until the acceptance of the completed Work. Lay pipe with the bell ends facing in the direction of laying, unless otherwise shown on the Drawings, or directed by the Owner. Exercise care to ensure that each length abuts the next in such a manner that no shoulder or unevenness of any kind occurs in the pipeline.

H. Do not wedge or block the pipe during laying unless by written order of the Owner.

I. Before joints are made, bed each section of pipe the full length of the barrel, at the required grade, and at the invert matching the previously laid pipe. Dig bell holes sufficiently large to permit proper joint making. Do not bring succeeding pipe into position until the preceding length is embedded and secure in place.

J. Take up and relay pipe that is out of alignment or grade, or pipe having disturbed joints after laying. Take up such in-place pipe sections found to be defective and replace them with new pipe. Take up, relaying, and replacement will be at the Contractor's expense.

K. Place enough backfill over the center sections of the pipe to prevent floating. Take all other necessary precautions to prevent the floating of the pipeline by the accumulation of water in the trench, or the collapse of the pipeline from any cause. Should floating or collapse occur, restoration will be at the Contractor's expense.

L. Contractor shall install tracer wire along all pipelines. Tracer wire shall be placed, centered and taped on the top of pipe in 5 foot intervals.

M. Bedding materials and concrete work for the pipe bedding and thrust restraint shall be as specified.

N. Prevent foreign material from entering the pipe while it is being placed. Do not place debris, tools, clothing, or other materials in the pipe during laying operations. Close all openings in the pipeline with watertight plugs when pipe laying is stopped at the close of the day's work, or for other reasons such as rest breaks or meal periods.

O. Only cut pipe with an approved California American Water saw. Grind cut ends and rough edges smooth. Bevel the cut end slightly for push-on connections as per manufacturer recommendations.

P. In distributing material at the site of the Work, unload each piece opposite or near the place where it is to be laid in the trench. If the pipe is to be strung out, do so in a straight line or in a line conforming to the curvature of the street. Block each length of pipe adequately to prevent movement. Block stockpiled pipe adequately to prevent movement. All stockpiled pipe must be covered at all times with a UV protected covering. Do not place pipe, material, or any other object on private property, obstructing walkways or driveways, or in any manner that interferes with the normal flow of traffic.

Q. Exercise special care to avoid damage to the bells, spigots or flanged ends of pipe during handling, temporary storage, and construction. Replace damaged pipe that cannot be repaired to Owner’s satisfaction, at the Contractor's expense.

R. Remove all existing pipe, fittings, valves, pipe supports, blocking, and all other items necessary to provide space for making connections to existing pipe and installing all piping required under this Contract.

S. Maintain the minimum required distance between water and sewer lines and other utility lines in strict accordance with California DDW, and local requirements, and all right-of-way limitations unless specifically directed by Owner with approved DDW waiver.

T. Use short lengths of pipe (minimum length 3 feet, no more than three short sections), when approved by the Owner, to make connections that cannot be made with full length sections of pipe.

U. Furnish air relief valve assemblies in accordance with Owner’s Detail (CAW-ND-303) Any deviation from the standard detail, proposed by Contractor must be approved in advance.

V. Exercise particular care so that no high points are established where air can accumulate. Install an air release valve when the Owner determines that unforeseen field conditions necessitate a change in the pipe profile that requires the installation of an air release valve.

W. All water mains 14” and greater in diameter shall be constructed using DIP only. Other construction materials, such as PVC and HDPE, are limited to water mains 12” and under in diameter. Alternate materials for larger water mains may be approved by Owner on a case-by-case basis.

3.02 CONSTRUCTION METHODS TO AVOID CONTAMINATION

A. Heavy particulates generally contain bacteria and prevent even very high chlorine concentrations from contacting and killing such organisms. It is essential that the procedures of this Section be observed to assure that a water main and its appurtenances are thoroughly clean for the final disinfection by chlorination.

B. Take precautions to protect the interior of pipes, fittings, and valves against contamination. String pipe delivered for construction to keep foreign material out of the pipe. Close all openings in the pipeline with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods.

C. Delay in placement of delivered pipe invites contamination. The more closely the rate of delivery is correlated to the rate of pipe laying, the lower the likelihood of contamination. Complete the joints of all pipe in the trench before stopping work. If water accumulates in the trench, keep the plugs in place until the trench is dry.

D. Do not use contaminated material or any material capable of supporting prolific growth of microorganisms for sealing joints. Handle sealing material or gaskets in a manner that avoids contamination. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. Deliver the lubricant to the job in closed containers and keep it clean.

E. If dirt enters the pipe, and in the opinion of the Owner the dirt will not be removed by the flushing operation, clean the interior of the pipe by mechanical means, then swab with a 1% hypochlorite disinfecting solution. Clean using a pig, swab,

or "go-devil" only when the Owner has specified such and has determined that such operation will not force mud or debris into pipe joint spaces.

F. If the main is flooded during construction, the flooded section must be isolated from the remainder of the installation as soon as practical. Submit a plan to the Owner on correcting the condition and do not proceed until authorized by the Owner.

3.03 VALVE INSTALLATION

A. Prior to installation, inspect valves for direction of opening, freedom of operation, tightness of pressure containing bolting, cleanliness of valve ports and especially of seating surfaces, handling damage, and cracks.

B. Set and join to the pipe in the manner specified in Paragraph 3.01. Provide valves with adequate support, such as crushed stone and concrete pads, so that the pipe will not be required to support the weight of the valve. Set truly vertical. If polyethylene is applied to the pipe, the entire valve shall be encased in polyethylene encasement prior to backfill. The polyethylene encasement shall be installed up to the operating nut leaving the operating nut exposed and free to be operated.

C. Provide a valve box for each valve. Set the top of the valve box neatly to existing grade, unless directed otherwise by Owner. Do not install in a way that allows the transfer of shock or stress to the valve. Center and plumb the box over the wrench nut of the valve. Do not use valves to bring misaligned pipe into alignment during installation. Support pipe in such manner as to prevent stress on the valve.

D. Provide extension stem for each valve, with a standard 2-inch AWWA nut. Pin the extension stem to the operating nut on the valves. Extension must be installed before pressure testing. Valve extensions will be required on any buried valve where the distance from the finished grade to the top of the operating nut exceeds 4 foot. Extension shall be of a locking type to prevent it from coming off the valve. Top of extension shall be at least 18 inches below finish grade.

E. Provide valve marking posts, when authorized by Owner, at locations designated by Owner and in accordance with detail drawings.

3.04 THRUST RESTRAINT

A. Provide all plugs, caps, tees, and bends (both horizontal and vertical) with concrete thrust blocking and restrained joint pipe as represented on the Drawings or specified in the Specification Special Conditions.

B. Place concrete thrust blocking between undisturbed solid ground and the fitting to be anchored. Install the concrete thrust blocking in accordance with Owner's Standard Detail (CAW-ND-W106A and CAW-ND-W106B). Locate the thrust blocking to contain the resultant thrust force while keeping the pipe and fitting joints accessible for repair, unless otherwise shown or directed.

C. Use restrained joints for fittings and valves for a minimum distance on either side as calculated using CAW-ND-W107A and CAW-ND-W107B.

D. Provide temporary thrust restraint at temporary caps and plugs. Submit details of temporary restraint to Owner for approval.

E. At connections with existing water mains where there is a limit on the time the water main may be removed from service, use metal harnesses of anchor clamps, tie rods and straps; mechanical joints utilizing set-screw retainer glands; or restrained push-on joints as permitted by Owner. No restraining system can be installed without the approval of Owner. Submit details of the proposed installation to Owner for approval. For pipe up to 12-inches in size, use a minimum of two 3/4-inch tie rods. If approved for use, install retainer glands in accordance with the manufacturer's instructions. Material for metal harnessing and tie-rods shall be ASTM A36 or A307, as a minimum requirement.

F. Protection of Metal Harnessing: Protect ties rods, clamps, and other metal components against corrosion and by encasement of the entire assembly with 8-mil thick (12 mil thick in corrosive soils) loose polyethylene film in accordance with AWWA C105. Apply tape on all exposed tie rods prior to installing polyethylene.

END OF SECTION

SECTION 33 05 19

DUCTILE IRON PIPE AND FITTINGS

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section consists of furnishing and installing ductile iron pipe and fittings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 23 16: Trenching, Backfilling, and Compacting

B. Section 33 01 10: Disinfection of Water Utility Piping Systems

C. Section 33 12 16: Valves

1.03 QUALITY ASSURANCE

A. References, American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), Federal Specifications (FS), and the manufacturer's printed recommendations.

1.04 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals.

B. Submittals shall include the following:

1. Materials list and catalog data sheets naming each product to be used identified by manufacturer and type number.

2. The Contractor shall submit a pipe lay diagram for all ductile iron pipe and fittings installed in this project.

PART 2: MATERIALS

2.01 DUCTILE IRON PIPE

A. Pipe shall conform to ANSI A21.50 (AWWA C150), ANSI A21.51 (AWWA C151), and A21.4 (AWWA C104) as appropriate.

B. Flanged and mechanical pipe shall be per ANSI A21.15 (AWWA C150) pressure class:

4 – 12	inches	Class 52
> 12	inches	Class 51

C. Pipe wall thickness for grooved couplings shall be Class 52.

D. All ductile iron pipe shall by cement mortar lined in accordance with AWWA C104.

E. All pipe shall be made in the USA.

2.02 FITTINGS AND SPECIALS (EXCEPT GROOVED)

A. Main pipeline fittings (including end caps, ells, tees, and crosses) shall be ductile iron, conform to the requirements of AWWA C110 or C153, have flanged or mechanical joints, and be compatible with AWWA C900 (PVCP).

B. All fittings and specials shall be coated with an 8-mil nominal thickness fusion bonded epoxy conforming to the requirements of AWWA C550 and C116. Nuts and bolts shall be stainless steel conforming to ASTM F593 for bolts and ASTM F594 for nuts.

C. Bolts shall be threaded to conform to ANSI B 18.2.1, page C-1 for finished hex bolts. Nuts shall conform to ANSI B 18.2.2, page D-1. Nuts shall be finished with TRIPAC 2000 or an approved equal fluoropolymer coating system to minimize galling and ensure proper torque. Anti-seize compound shall not be used with blue nuts. Identifications on the head of the bolt shall be T-316, 316, F593G or F593H.

D. All fittings shall be made in the USA.

2.03 FLANGES

A. ANSI B16.1, Class 125 unless otherwise indicated, or required for the installation.

B. Flanges for spool pieces shall be factory installed threaded flanges. Flanges for fittings shall be cast integrally with the fitting.

2.04 RESTRAINED MECHANICAL JOINTS

A. Where specified, called for on the Drawings, or otherwise required for thrust restraint, mechanical joints shall be made using retainer glands with set screws or clamping lugs. Restraints shall be “wedge style” only. See Approved Materials List for manufacturers. All restraints shall be made in the USA.

B. Coatings

1. Wedge and Wedge Assemblies

   a. Process through an iron-phosphate spray, rinse and drying in preparation for coating application.

   b. The coating itself shall consist of two coats of liquid Xylan, with heat cure to follow each coat.

2. Casting (rings) shall be surface pre-treated with an iron-phosphate spray, rinse, sealer before drying. The coating shall be electrostatically applied and heat cured. Coating shall be a polyester-based powder to provide corrosion, impact and UV resistance.

3. The casting coating system shall be compliant with manufacturer

recommendations.

2.05 RUBBER GASKET FOR MECHANICAL OR PUSH ON JOINT

A. ANSI A21.11 (AWWA C111) vulcanized natural or vulcanized synthetic rubber. Per manufacturer's recommendations and California American Water approval.

2.06 FLANGED GASKETS

A. Neoprene rubber, red rubber, or approved equal.

2.07 BOLTS AND NUTS FOR FLANGES

A. ANSI B18.2.1 and B18.2.2, stainless steel conforming to ASTM F593 for bolts and ASTM F594 for nuts. Coatings shall be in accordance with Section 2.04.B of this Specification.

2.08 GROOVED FITTINGS

A. Cast iron, ASTM A 48, Class 30 A, epoxy coated and lined.

2.09 POLYETHYLENE ENCASEMENT

A. Buried piping, specials, and fittings shall be polyethylene encased, single wrapped 10 mils thickness using 10 mil tape, sized to pipe diameter, AWWA C105/ANSI A21.5.

PART 3: EXECUTION

3.01 PRODUCT HANDLING

A. Handle pipe and fittings in a manner to ensure delivery in a sound undamaged condition.

3.02 INSTALLATION

A. Bell and Spigot Ductile Iron Pipe. Where bell and spigot joints are used for joining ductile iron pipe, the joints shall be made using rubber rings. Gasket seat, gasket, and spigot shall be thoroughly cleaned before assembly of joint. The entire procedure shall be in strict accordance with manufacturer's recommendations.

B. Mechanical Joint Ductile Iron Pipe. Mechanical joints in ductile iron pipe shall be installed per manufacturer's specifications. Final tightness shall be torqued to manufacturer's specifications.

C. Flanged Pipe. Flanged joints shall be made up square, with even pressure on the gaskets, and shall be watertight.

D. Grooved Coupling: Grooved couplings shall be prepared or painted as necessary to obtain a leak free seal.

E. Polyethylene Encasement for External Corrosion Protection for Buried Piping

1. General: Provide polyethylene encasement with 10 mil tape for all buried ductile iron pipe.

2. Installation of Pipe

   a. Pick up the pipe with a sling or pipe tongs. Slip a polyethylene tube which is approximately two feet longer than the pipe over the plain end and leave it bunched up accordion style.

   b. Lower the pipe into the trench and make up the joint with the preceding pipe. Shallow bell holes are required to allow overlap of the tube at the joints.

   c. Remove the sling or tong from the center of the pipe, raise the bell a few inches and slip the polyethylene tube along the pipe barrel, leaving approximately one foot of the tube bunched up at each end of the pipe for wrapping the joints.

   d. Overlap each joint by first pulling one bunched up tube over the bell, folding it around the adjacent plain end, and securing it in place with two or three wraps of the polyethylene adhesive tape. Complete the overlap by repeating the same procedure with the bunched up tube on the adjacent pipe.

   e. Take up the slack tube along the pipe barrel by folding it over the top of the pipe holding the fold in place with polyethylene adhesive tape.

   f. Repair any rips, punctures or other damage to the polyethylene with tape or by cutting open a short length of tube, wrapping it around the pipe and securing with tape.

3. Installation of Fittings, Valves, and Piping Specialties

   a. Fit bends, reducers and offsets with polyethylene tube in the same manner described above for pipe.

   b. Wrap valves, tees, crosses and specialty items with a flat sheet obtained by splitting open a length of polyethylene tube. Pass the sheet under the valve or fitting and bring it up around the body. Join the seams by bringing the edges together, folding over twice and securing in place with tape.

   c. Handle slack tube and overlapping at joints in the same manner described above for pipe.

   d. Prepare openings for service taps, air reliefs, etc., by making an X shaped cut in the polyethylene and temporarily folding back the edges. After installation is completed, replace the polyethylene and repair the cut with polyethylene adhesive tape.

4. Backfilling

   a. Care shall be taken not to damage the polyethylene.

   b. Initial backfill material shall be free of rocks and debris which could puncture the polyethylene. If suitable backfill material is not available, felt roofing or similar material can be laid over the top of the pipe to protect the polyethylene.

c. In general, backfilling shall be done in accordance with Section 31 23 00 and AWWA C600.

F. The Contractor shall submit a pipe-lay diagram for all ductile iron pipe and fittings installed in this project.

3.03 TESTING

A. Pressure Testing. Shall be in accordance with Section 33 05 05.

B. Disinfection. Shall be in accordance with Section 33 01 10.

END OF SECTION

SECTION 33 05 31

POLYVINYL CHLORIDE PIPE

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section consists of furnishing and installing polyvinyl chloride (PVC) pipe and fittings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 33 00: Submittals

B. Section 31 23 16: Trenching, Backfilling, and Compacting

C. Section 33 01 10: Disinfection of Water Utility Piping Systems

D. Section 33 05 05: Hydrostatic Testing

E. Section 33 05 19: Ductile Iron Pipe and Fittings

F. Section 40 05 61: Valves

1.03 QUALITY ASSURANCE

A. This section contains references to some or all the following documents, most recent edition. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
ASTM D1248	Polyethylene Plastics Extrusion Materials for Wire and Cable
ASTM D1784	Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D1785	Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D2241	Polyvinyl Chloride (PVC) Pressure Rated Pipe (SDR series)
ASTM D2464	Threaded Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2466	Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40
ASTM D2467	Poly Vinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2564	Solvent Cements for Polyvinyl Chloride (PVC) Plastic Piping Systems
ASTM D3034	Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM D4101	Polypropylene Injection and Extrusion Materials
ASTM F402	Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings

1.04 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals Procedures.

B. Submittals shall include the following:

1. Materials list and catalog data sheets naming each product to be used identified by manufacturer and type number.

2. The Contractor shall submit a pipe lay diagram for all PVC pipe and fittings 3 inches or greater installed in this project.

PART 2: MATERIALS

2.01 PIPE SCHEDULE

	Nominal Pipe Size (inches)	Material
Water Main	12 and Less	C900 PVC, Class 305, DR-14

2.02 PVC PRESSURE PIPE

A. C900 Water Pipe. Water mains shall be PVC pressure pipe conforming to AWWA C900, CLASS 305, DR14 unless otherwise noted. PVC shall be made of polyvinyl chloride compound 12454-B per ASTM D1784. PVC outside diameters shall be ductile iron pipe size. PVC shall be supplied in standard 20-foot lengths. Pipe joints shall be the bell-and-spigot type, self-centering, with O-ring elastomeric gaskets, conforming to ASTM D3139 and F477. The Contractor shall furnish certificates of compliance with the specified standards for the PVC pipe and elastomeric gaskets.

B. Ductile Iron Pipe Fittings. Ductile iron pipe fittings shall conform to Section 33 05 19 Ductile Iron Pipe and Fittings. All tees and crosses used with PVC shall have mechanical joint (MJ) connections.

C. Restrained PVC Pipe

1. Where specified, called for on the Drawings, or otherwise required for thrust restraint, restrained joints shall be made with a mechanical joint type or approved “Flex-lock” type, or approved “wedge” style bell restraint harness.

   a. The bell restraint harness shall be manufactured of ductile iron conforming to ASTM A536. A back up ring shall be utilized behind the PVC bell. A restraint ring, incorporating a plurality of individually actuating gripping surfaces, shall be used to connect the bell ring and gripping ring.

2. Restraint Coatings. Wedge and wedge assemblies, T-bolts, bolts, and nuts shall be processed through an iron-phosphate spray, then rinsed and dried in preparation for coating application. The coating itself shall consist of two coats of liquid Xylan with heat cure to follow each coat.

   a. Casting (rings) shall be surface pre-treated with an iron-phosphate spray, rinse, sealer before drying. The coating shall be electrostatically applied and heat cured. Coating shall be a polyester-based power to provide corrosion, impact, and UV

resistance.

b. The coating system shall be per manufacturers recommendations.

c. Where the coating systems of this section are utilized, no additional cathodic protection is required except for polyethylene encasement, which is required.

2.03 PVC CONDUIT

A. Where PVC conduit is specified on the project drawings, pipe shall be Schedule 80. Edges shall be chamfered for pulling.

B. Where PVC coated rigid pipe is specified on the project drawings for fiber optic, pipe shall be Schedule 80. Pipe shall have internal epoxy coating, 40 mil cover. Edges shall be chamfered for pulling.

PART 3: EXECUTION

3.01 INSTALLATION OF PIPE AND FITTINGS

A. General. In accordance with manufacturer's recommendations and ASTM D2321, whichever is more stringent.

B. Plastic piping exposed to sunlight shall be painted with two coats of latex paint. Color shall be white unless otherwise specified.

C. Pipe and fittings shall be of the sizes indicated. Clean pipe interior of all foreign

matter before installing. Pipe shall be square cut with fine tooth saw or other cutter or knife designed for use with plastic pipe. Remove burrs by smoothing edges with a knife, file, or sandpaper. Replace any section of pipe found to be defective or damaged with new acceptable pipe. Handle pipe carefully to prevent gouging or scratching. Any length of pipe having a gouge, scratch, or other permanent indentation more than 10 percent of the wall thickness in depth shall be rejected. Use of cut-off saws and ring saws for cutting pipe of any diameter is prohibited.

D. The pipe shall be placed firmly in the center of the trench and true to line and grade with no visible change in alignment at any joint, unless the alignment is shown to be curved in the Improvement Plans. On slopes greater than ten percent (10%) the pipe bells shall be pointed up-grade and laying shall proceed up-grade. The pipe joints shall be assembled according to the manufacturer's recommendations, these Specifications, and as directed by the Engineer or Inspector, but regardless of the method used the joins shall be watertight. Joint deflection shall not exceed 80% of the manufacturer's recommended values. If it is necessary that a pipe be moved or that the alignment be adjusted after it has been installed, it shall be removed and rejointed as was accomplished in the original installation. Except as required for backfilling, the Contractor shall prohibit walking or working upon the pipe until backfilling of the trench has been completed. The Contractor shall provide temporary bridging over pipe trenches where it is necessary to provide crossings for workmen and equipment, or access roads. The Contractor shall take all necessary precautions to prevent the pipe from floating due to water entering the trench from any source, shall assume full responsibility for any damage and shall, at his own expense, restore and replace the pipe to its specified condition and grade if it is displaced due to flotation.

E. The Contractor shall submit a pipe lay diagram for all plastic pipe and fittings installed in this project.

3.02 INSTALLATION OF PUSH-ON JOINT TYPE PIPE

A. Clean gaskets and seats of foreign materials prior to joint assembly. Apply lubricant as recommended by the pipe manufacturer. Carefully insert the spigot end into the bell to prevent entry of dirt and incorrect entry angle. With suitable fork tool, crowbar, or by hand, make the joint to the insertion depth recommended by the manufacturer. When the selected pipe uses joints not designed for full depth insertion, prevent further closure of previously completed joints by restraining movement of the installed line while making succeeding joints.

B. Field inspection for Plastic Pipe and Fittings. Installed pipe shall be inspected to ensure that vertical deflections for plastic pipe do not exceed the maximum allowable deflection

3.03 TESTING

A. Pressure Testing. Shall be in accordance with Section 33 05 05.

B. Disinfection. Shall be in accordance with Section 33 01 10.

END OF SECTION

SECTION 33 05 33

HIGH DENSITY POLYETHYLENE WATER MAINS

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section consists of furnishing and installing high density polyethylene (HDPE) water mains and fittings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 33 00: Submittals

B. Section 31 23 16: Trenching, Backfilling, and Compacting

C. Section 33 01 10: Disinfection of Water Utility Piping Systems

D. Section 33 05 05: Hydrostatic Testing

E. Section 40 05 61: Valves

1.03 QUALITY ASSURANCE

A. This section contains references to some or all the following documents, most recent edition. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
ASTM D638	Standard Test Method for Tensile Properties of Plastics
ASTM D1248	Polyethylene Plastics Extrusion Materials for Wire and Cable
ASTM D3035	Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
ASTM D3261	Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
ASTM D3350	Polyethylene Plastics Pipe and Fittings Materials
ASTM F714	Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter

1.04 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals.

B. Submittals shall include the following:

1. Materials list and catalog data sheets naming each product to be used identified by manufacturer and type number, including required certifications.

2. The Contractor shall submit a pipe lay diagram for all high-density PE pipe 3 inches or greater installed in this project.

PART 2: MATERIALS

2.01 HIGH DENSITY POLYETHYLENE (HDPE) DISTRIBUTION PIPE

A. HDPE Water Pipe. Water mains shall be HDPE pressure pipe conforming to AWWA C906 DR 9. HDPE shall be PPI TR-4 PE 4710 per ASTM D3350. HDPE outside diameters shall be ductile iron pipe size per AWWA C906. Pipe shall conform to ANSI/NSF Standard 61.

B. Pipe shall contain no recycled compound except for rework material generated in the manufacturer's own plant that has the same cell classification as the material to which it is being added. The pipe shall be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other defects that may affect the wall integrity.

C. Permanent identification of water piping service shall be provided by coextruding longitudinal blue stripes into the pipe outside surface. The striping material shall be the same material as the pipe material except for color. Stripes printed or painted on the outside surface shall not be acceptable.

D. The nominal pipe diameter and DR (dimension ratio) are provided on the Project Plans.

E. HDPE may be deflected subject to approval by the Engineer. Bending radius allowed by the manufacturer can vary. Contractor shall verify pipe bending radius with manufacturer and shall not exceed 125% of the manufacturer's recommendations.

2.02 FITTINGS

A. Plain end butt-fused fittings shall be used when joining polyethylene materials. Mechanical (compression) fittings shall be used only when joining polyethylene materials to different piping materials and approved by the Engineer.

B. The fittings shall contain no recycled compound except for rework material generated in the manufacturer's own plant that has the same cell classification as the material to which it is being added. The fittings shall be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other defects that may affect the wall integrity.

C. Butt fusion fittings shall comply with ASTM D3261.

D. Mechanical (compression) fittings used with polyethylene pipe shall be specifically designed for, or tested and found to be acceptable for, use with polyethylene pipe.

PART 3: EXECUTION

3.01 PACKAGING, HANDLING, AND STORAGE

A. The manufacturer shall ensure that the interior of all pipe is clean and install plastic cleanliness plugs in all pipes to keep the pipe interiors clean. The manufacturer shall package the pipe in a manner designed to ensure that it

arrives at the project neat, clean, intact, and without physical damage. The transportation carrier shall use appropriate methods and intermittent checks to assure that the pipe is properly supported, stacked, and restrained during transport such that the pipe is not nicked, gouged, or physically damaged.

B. Contractor shall inspect pipe and appurtenances for defects prior to installation in the trench. Set aside defective, damaged or unsound material and hold material for inspection by California American Water.

C. Contractor shall store pipe on clean, level ground to prevent undue scratching or gouging. If the pipe must be stacked for storage, such stacking shall be done in accordance with the pipe manufacturer's recommendations. The pipe shall be handled in such a manner that it is not pulled over sharp objects or cut by chokers or lifting equipment.

D. Sections of pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed. The undamaged portions of the pipe shall be rejoined by butt fusing or the use of electrofusion fittings.

3.02 PIPE INSTALLATION

A. Contractor shall remove all dirt and foreign matter from pipe before lowering into the trench. Do not place debris, hand tools, clothing or other materials in the pipe. Keep pipe clean during and after laying.

B. Maximum pipe bending radius shall be in conformance with the manufacturer's recommendation for the specific diameter and dimension ratio (DR) of the pipe – see Section 2.02-E of this Specification. Whenever possible, changes in direction shall be accomplished by bending the pipe in lieu of installing a fitting, except as approved by the Engineer or specified on the Project Plans.

C. Tracer wire shall be placed contiguous except at test stations, valve boxes, and where splicing is required. All splices shall be encased. Wire insulation shall be highly resistant to alkalis, acid and other destructive agents found in soil.

D. Prevent flotation of sealed pipe during work stoppages.

E. HDPE pipe will not be employed with directional drilling through rock and other abrasive conditions unless it is encased.

3.03 PIPE AND FITTING JOINING

A. Butt fusion procedures shall be in accordance with the manufacturer's recommendations. Surfaces must be clean and dry before joining. The fusion equipment operator shall be fully trained in the use of the respective equipment, and certified/qualified in accordance with the requirements of the manufacturer's recommendations. The wall thicknesses of the adjoining pipes shall have the same DR at the point of fusion.

B. Butt fusion equipment shall be equipped with a Data Logger to record and document key parameters of each fusion process including heater temperature, fusion pressure, melt time, hold time, etc. Information from the Data Logger shall be collected and filed daily. A record of each fused joint including a graph

of the fusion cycle shall be submitted to the Engineer.

C. The temperature of the heating tool surfaces shall be monitored daily with a temperature measuring device, such as, a thermometer or temperature indicating crayons, to assure the temperature measuring device on the equipment is in sound working condition and that the appropriate temperature range is maintained.

D. Each HDPE joint shall be traceable to the fusion operator and equipment. Also, the fusion joint number and fusion operator ID shall be stenciled on the pipe.

E. Mechanical (compression) joining of pipe and fittings is only permissible when joining polyethylene pipe to unlike materials. HDPE stiffeners shall be utilized with all mechanical (compression) fittings. Blocking must be provided at changes in direction for any mechanical fittings. Use of positive restrained joints fittings (non-friction type) is permissible when approved by the Engineer.

3.04 SERVICE CONNECTIONS

A. Sidewall fused polyethylene hot-tapping tees shall be used for 3 /4-inch and 1-inch service lines off mains 3-inches to 12-inches in diameter. For larger sized mains, polyethylene service saddles may be used, sidewall fused, and then tapped with a tapping tool or machine.

B. For large mains (>12-inch), mechanical clamps or tapping saddles may be used provided they are designed for HDPE pipe and acceptable to the manufacturer of the pipe.

3.05 INCLEMENT WEATHER

A. In inclement weather and especially in windy conditions, the fusion operation shall be shielded to avoid precipitation and excessive heat loss from wind chill.

B. Butt, saddle or socket, fusion is not recommended below -4°F without special provisions such as a portable shelter or trailer or other suitable protective measures with auxiliary heating. When making a butt fusion joint with the ambient temperature below 3°F, the pipe ends shall be preheated using a heating blanket or warm air device to elevate the pipe temperature to improve the heating cycle starting condition.

C. The heating tool shall also be stored in an insulated container to prevent excessive heat loss. Contractor shall remove all frost, snow or ice from the OD and ID of the pipe; all surfaces must be clean and dry prior to fusing.

D. The time required to obtain the proper melt may increase when fusing in cold weather. Contractor shall maintain the specified heating tool surface temperature during the fusion process.

E. The proper cycle time for any particular condition shall be determined by making a melt pattern on a piece of scrap HDPE pipe using the recommended standard heating time. If the melt pattern is incomplete, the Contractor shall increase the heating time by three (3) second intervals until a complete melt pattern is established. Each time the procedure is repeated, a new piece of scrap pipe shall be used.

3.06 VISUAL INSPECTION

A. The Contractor shall perform visual examination of HDPE piping installations to satisfy that they conform to the applicable assembly and erection requirements including: alignment, routing, elevation, cuts or gouges exceeding 10% of wall thickness, flanged joints, bolting torque, bolt length, gaskets, and supports (if applicable).

B. All fused joints shall be examined by in-process examination for cleanliness, joint preparation, alignment, plate temperature, melt, joining, holding pressure and time, bead size (uniformly rounded and consistent in size all around the joint), storage of joining materials, and appearance of the finished joint.

3.07 BEND BACK TEST

A. The Contractor shall perform a bend back test on a HDPE fusion joint to detect the presence of a 'cold fusion' on a weekly basis.

B. The Contractor shall cut out a section of pipe with the butt-fusion joint at the center. The cut out section shall be at least two feet long, one foot on each side of the fusion joint. The Contractor shall cut out four one-inch wide straps lengthwise across the fusion joint. These cut out straps shall be located 90 degrees apart around the circumference of the pipe. Each strap shall be held at or near the ends and bent so that the inside wall faces outwards to obtain a smooth bending radius.

C. A fusion joint shall be considered good if none of the straps break. Further, if one out of the four straps breaks, a fifth strap shall be cut from an area of the pipe near to which the broken strap was cut. If this strap does not exhibit break then the strap is considered good. Records shall be kept regarding where strap was cut as failures occurring in a consistent location can be an indication of fusion equipment problem. A very smooth break will indicate that cold material was brought together during the fusion process.

D. The result of each bend back test shall be recorded and submitted to the Engineer for review.

E. As an alternative to the bend back test, the Contractor has the option of testing the tensile strength of the butt fused joint in accordance with ASTM D638. A specimen of pipe cut across the buff fused joint shall be used for this test.

3.08 TESTING

A. Pressure Testing. Shall be in accordance with Section 33 05 05.

B. Disinfection. Shall be in accordance with Section 33 01 10.

END OF SECTION

SECTION 33 12 16

VALVES

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section consists of sections for furnishing and installing valves:

1. Gate Valves
2. Butterfly Valves
3. Air/Vacuum Release Valves
4. Ball Valves

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 33 00: Submittals

B. Section 33 05 19 Ductile Iron Pipe

C. Section 33 05 31 Polyvinyl Chloride Pipe

D. Section 33 05 33 High Density Polyethylene Water Mains

1.03 SUBMITTALS

A. Submit product data in accordance with Section 01 33 00 Submittals.

1.04 GENERAL

A. Materials, storage, and installation must comply with the strictest requirements of these Specifications, the Contract Documents, the American Water Works Association (AWWA) Standards, and the manufacturers' recommendations.

PART 2: MATERIALS

2.01 GATE VALVES

A. All gate valves, shall be ductile iron body, resilient-seated, nut-operated, non-rising stem gate valves suitable for buried service. The valve interior and exterior shall be epoxy coated at the factory by the valve manufacturer in accordance with AWWA Standard C550 (6-8 mil average, 4 mil minimum). The valves shall be designed for minimum differential pressure of 250 psi and a minimum internal test pressure of 500 psi unless otherwise noted on the Drawings. Valves shall be designed to operate in the vertical position. All valves shall open left (CCW).

B. Valves shall comply fully with AWWA Standard 509. Valve ends shall be restrained mechanical joint or as shown on the plans or approved in writing in

accordance with AWWA Standard C111. Stems shall be made of bronze in accordance with AWWA C509. Stem seals shall be double O-ring stem seals. Square operating nuts conforming to AWWA Standard C509 shall be used. Valves shall open left in accordance with Owner standard. All valve materials shall meet the requirements of NSF 61.

C. For exposed piping, valves shall be flanged joint.

D. Valves shall have mechanical joint ends unless otherwise designated on the Drawings or approved by Owner.

E. Test valves (Operation Test and Hydrostatic Tests) at the manufacturer's plant in accordance with AWWA Standard C509. Provide AW with certified copies of all tests prior to shipment. Owner reserves the right to observe all tests.

2.02 BUTTERFLY VALVE

A. Furnish and install rubber-seated butterfly valves as shown on the Drawings. Butterfly valves shall conform to Class 150B of AWWA Standard C504 and this Specification. If working pressure is greater than 150 psi, the butterfly valve shall conform to Class 250B of AWWA Standard C504. All valves furnished shall open left (CCW) in accordance with AW's standard.

B. Valve bodies shall be ductile iron with mechanical joint ends for buried valves. Mechanical joint ends shall conform to AWWA Standard C111. All valve materials shall meet the requirements of NSF 61. For exposed or above ground valves, use flanged ends.

C. Valve shafts shall consist of one-piece units extending through the discs of 18 - 8 stainless steel Type 303 or 304. Shaft diameter shall be in accordance with Table 3 of AWWA Standard C504.

1. Valve discs shall be Ni-Resist, Type 1, or cast iron with stainless steel edges.

2. Valve seats shall be hycar or natural rubber mounted in the valve body.

3. Valve bearings shall be nylon or Teflon.

D. The valve interior and exterior shall be epoxy coated at the factory by the valve manufacturer in accordance with AWWA Standard C550 (6-8 mil average, 4 mil minimum).

2.03 AIR/VACUUM RELEASE VALVES

A. For pipelines 12 inches and smaller, use a 1-inch AVRV. For pipelines larger than 12 inches, the Applicant shall determine the AVRV size and submit supporting calculations showing the adequacy of the recommended size to prevent pipe failure. These calculations shall be stamped by a professional engineer registered in California and submitted to the Owner for approval.

2.04 BALL VALVES

A. Ball valves 2 inches and smaller for customer piping systems shall have a

bronze body and stem and Teflon coated ball and seating.

2.05 VALVE EXTENSIONS

A. Valve extensions will be required on any buried valve where the distance from the finished grade to the top of the operating nut exceeds 4 foot. Extension shall be of a locking type to prevent it from coming off the valve. Top of extension will be no deeper than 1 foot from finished grade.

2.06 REDUCTION OF LEAD IN DRINKING WATER ACT COMPLIANCE

A. The Contractor shall comply with the requirements and standards of the Reduction of Lead in Drinking Water Act.

B. Any pipe, fitting or fixture (e.g. corp stops, curb valves, gate valves less than 2 inches in diameter, backflow prevention devices, water meters, hose bibs, etc.), solder and flux installed or requiring replacement as of January 4, 2014 must be “lead free”. The Contractor shall be responsible to comply with the State, local laws, ordinances, codes, rules, and regulations governing the Reduction of Lead in Drinking Water Act that may have additional limitations or requirements."

C. The definition of 'lead free' is as follows:

1. Not containing more than 0.2 percent lead when used with respect to solder and flux; and

2. Not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install the valves in strict accordance with the requirements of Specification Section 33 11 00 and Contract Drawings.

B. All valves shall be restrained.

END OF SECTION

SECTION 33 14 19

FIRE HYDRANTS

PART 1: GENERAL

1.01 SUMMARY

A. The work of this section consists of furnishing and installing fire hydrants.

1.02 SUBMITTALS

A. In accordance with Section 01 33 00 Submittals.

B. The Contractor shall submit the name of the hydrant manufacturer, type of bonnet paint, and engineering control drawing number for hydrant proposed for use.

PART 2: MATERIALS

2.01 HYDRANTS

A. Provide hydrants in conformance with AWWA Standard C503, Wet Barrel Fire Hydrants, or C502, Dry Barrel Fire Hydrants (latest edition). Hydrants are approved by California American Water by issuance of a Certificate of Responsibility. Hydrants shall open left (counterclockwise).

B. The California American Water Project Manager may, at any time, prior to or during installation of hydrants, randomly select furnished hydrant for disassembly and laboratory inspection, at California American Water's expense, to verify compliance with Specifications. When hydrant is found to be non-compliant, replace at Contractor's expense non-compliant hydrants with hydrants that comply with Specifications.

C. Provide lower hydrant barrel fabricated from ductile iron pipe as single piece, connected to upper hydrant barrel by means of joint coupling that will provide three hundred sixty (360) degree rotation of upper barrel.

2.02 HYDRANT TEE

A. Fire hydrant installations shall require the use of a tee on the main line. Hydrant valves shall be bolted to the hydrant tee for all installations. Mechanical joint hydrant tee shall be ductile iron, Class 350, and shall be produced in accordance with ANSI/AWWA A21.53/C153 and ANSI/AWWA A21.11/C111 for joints and ANSI/AWWA A21.4/C104 for cement lining in sizes 3" through 24". Hydrant tee mechanical joint nuts and bolts shall be ductile iron, high strength, low alloy steel per ANSI/AWWA A21.11/C111. Break off check valve to be installed below fire hydrant.

2.03 LEADS

A. Branches (Leads): Conform to requirements of Section 33 05 19 Ductile Iron Pipe and Section 33 05 31 Polyvinyl Chloride Pipe.

2.04 HYDRANT PAINTING

A. New hydrants and refurbished hydrants shall be shop coated as specified herein.

B. Exterior Above Traffic Flange (Including Bolts and Nuts)

1. Surface preparation to be in accordance with SSPC-SP 10 (NACE 2) near white blast cleaned surface

2. Coat with three coat alkyd/silicone alkyd system with total dry film thickness (DFT) of 6-9 mils as follows:

a. Prime Coat – Oil modified alkyd primer, to be in general conformance with SSPC Paint Specification No. 25. Total DFT of 2-3 mils.

b. Intermediate Coat – Heavy Duty Industrial alkyd enamel to be in general conformance with SSPC Paint Specification No. 104, and Federal Standard A-A-2962A. Total DFT of 2-3 mils.

c. Finish Coat – Silicone Alkyd Resin Enamel to be in general conformance with SSPC Paint Specification No. 21. Total DFT of 2-3 mils. Exception – hydrant bonnet shall not be finished shop coated, only intermediate coated. Install color coded finish coating of bonnet in field.

d. Bonnet Paint – Field apply finish coat of Silicone Alkyd Resin Enamel to be in general conformance with SSPC Paint Specification No. 21. DFT of 2-3 mils. Bonnet colors are to be as specified in Paragraph 3.1 to designate the available fire flow at 20 psi residual.

3. Colors – Primer: Manufacturer's standard color. Finish coat of hydrant body and connection caps to be painted to match the color of existing in-service hydrants. Approval of the color paint to be used on the hydrants shall be approved by the California American Water Project Manager prior to the final application of paint to the newly installed hydrant.

C. Field Maintenance Painting (Exterior Above Traffic Flange)

1. Surface preparation to be in accordance with SSPC-SP2 Hand Tool Cleaning, or SSPC-SP3 Power Tool Cleaning, depending on condition of existing paint and extent of corrosion. It is not necessary to remove tightly adhered mill scale, rust, and paint. Mill scale, rust, and paint are considered tightly adherent when they cannot be removed with dull putty knife. In some severe cases where it is necessary to remove majority of existing paint, surface should be cleaned in accordance with SSPC-SP11 Power Tool Cleaning to Bare Metal.

2. When surface is cleaned to bare metal (SSPC-SP11), coat hydrant with three coat Alkyd/Silicone Alkyd system in accordance with Paragraph 2.4.B-2 as for new hydrants. When surface is cleaned to SSPC-SP2 or SSPC-SP3, coat hydrant with Silicone Alkyd Resin Enamel in general conformance with SSPC Paint Specification No. 21.

D. Exterior Below Traffic Flange

1. Surface preparation in accordance with SSPC-SP10 (NACE 2) Near White Blast Cleaned Surface.

2. Primer and intermediate coat: coal tar epoxy in general conformance with SSPC Paint Specification No. 16. Apply two (2) coats with DFT of 8-10 mils each for total DFT of 16-20 mils.

3. Finish coat: Water based vinyl acrylic mastic. Apply one coat with DFT of 6-8 mils. Color of finish coat to be same as finish coat for exterior above traffic flange.

E. Interior Surfaces Above and Below Water Line Valve

1. Material used for internal coating of hydrant interior ferrous surfaces below water line valve must meet the requirements of local or State standards.

2. Coating shall be liquid or powder epoxy system in accordance with AWWA Standard C550. Coating may be applied in two or three coats, according to manufacturer's recommendations, for total DFT of 12-18 mils.

PART 3: EXECUTION

3.01 INSTALLATION

A. Set fire hydrant plumb and brace at locations and grades as shown on Project Drawings. When barrel of hydrant passes through concrete slab, place 1-inch-thick piece of standard sidewalk expansion joint material around section of barrel passing through concrete.

B. Place 12-inch by 12-inch yellow indicators (plastic, sheet metal, plywood, or other material approved by California American Water Project Manager) or contractor bags on pumper nozzles of new or relocated fire hydrants installed on new water lines not in service. Remove indicators or contractor bags after new water line is tested and approved by Project Manager.

C. Thrust blocks are required on all hydrant tees. Contractor shall provide a thrust block behind hydrant shoe. Do not cover drain ports, bolts, or fittings when placing concrete thrust block.

D. Obtain Engineer's approval in writing prior to installation of hydrants which require changes in bury depth due to obstructions not shown on Project Drawings.

E. Coating Requirements:

1. Apply coatings in strict accordance with manufacturer's recommendations. No requirements of this Specification shall cancel or supersede written directions and recommendations of specific manufacturer so as to jeopardize integrity of applied system.

F. Furnish affidavit of compliance that coatings furnished comply with requirements of this Specification and referenced standards, as applicable.

G. Remove and dispose of unsuitable materials and debris in accordance with local or State requirements.

H. Fire hydrants shall be spaced no more than 500 feet apart unless otherwise approved by local fire district.

END OF SECTION

CALIFORNIA
AMERICAN WATER

Appendix A

Approved Materials List

California American Water
Approved Materials List

Purpose and General Notes

The purpose of the Approved Materials List is to streamline the materials submittal and review process during construction. Contractors are strongly encouraged to use materials from the Approved Materials List.

In the event of a conflict between approved/contract drawings and the Approved Materials List, the Approved Materials List shall take precedence, subject to California American Water approval. Refer to California American Water Specifications for detailed product requirements.

All materials used for potable water systems must meet California Health and Safety Code 116875 (previously AB1953). All materials that come into contact with potable water must be NSF certified or approved (http://www.nsf.org/). All potable water material submittals must include evidence of NSF certification.

1. BACKFLOW PREVENTION & DETECTOR ASSEMBLIES

Description	Manufacturers
R.P. – Reduced Pressure Assemblies (¾" thru 10") **R.P. – Reduced Pressure Detector Assemblies** (2 ½" thru 10")	Backflow prevention materials and detector assemblies shall be listed per latest edition of USC-Foundation for Cross-Connection Control and Hydraulic Research "List of Approved Backflow Prevention Assemblies" A web link to the USC list is located at: https://fccchr.usc.edu/list.html

2. FIRE HYDRANTS

Description	Manufacturers
Standard Hydrant w/ Break-Off Check Valve 6" x 1-4" x 12 ½", wet barrel, primer coat and factory white enamel finish coat	AVK JONES Model: J-4060

3. GASKETS & GROMMETS

Description	Manufacturers
Meter Gaskets Water meter installations	1 ½" & 2" Rubber-Cloth-Inserted Drop-In Meter Gasket
Ring and Full-Face Gaskets Gaskets for steel and cast-iron flanges, non-asbestos	GARLOCK TRIPAC

4. METER BOXES AND VALVE BOXES

Description	Manufacturers
Meter Boxes & Lids Polymer Concrete, Services 1" and less	ARMORCAST PRODUCTS 13" x 24" ASSOCIATED CONCRETE PRODUCTS 13" x 24" J & R CONCRETE 13" x 24"
Polymer Concrete, Services 1" thru 2"	BROOKS PRODUCTS 17" x 30"
Valve Boxes & Lids G5 Concrete, traffic rated, with 6" C.I. lid marked "Water" for Potable Water	BROOKS CONCRETE PRODUCTS EISEL ENTERPRISES J&R PRODUCTS

5. SERVICE SADDLES AND TAPPING SLEEVES

Description	Manufacturers
Service Saddles for A.C. Pipe 4" thru 12", double strap, bronze	JONES
Service Saddles for C-900 Pipe 4" thru 12", single strap, bronze	JONES MCDONALD MUELLER ROMAC IND.
Service Saddles for Ductile Iron Pipe 4" thru 12", double strap, bronze	ROMAC IND. SMITH-BLAIR
Tapping Sleeves for A.C., PVC, & D.I. 4" thru 12", stainless steel	JCM IND. POWERSEAL PRODUCTS ROMAC IND. SMITH BLAIR

6. UTILITY MARKING TAPE

Description	Manufacturers
SAFETY BLUE – Potable Water Underground utility marking tape shall be in accordance with the A.P.W.A. National Color Code, detectable, imprinted "Potable Water", 6" width, 4.0 mil overall thickness	REEF INDUSTRIES SHIELDTEC

7. WATER PIPE & SERVICES

Description	Manufacturers
Ductile Iron Pipe Thickness class 52	PACIFIC STATES U.S. PIPE
High Density Polyethylene Pipe 4" thru 12" DR 9	CHEVRON PHILLIPS CHEMICAL COMPANY J-M MANUFACTURING COMPANY, INC.
Polyvinyl Chloride (PVC) 4" thru 12" C900, DR-14	DIAMOND PLASTICS CORP JM EAGLE NORTH AMERICAN PIPE CORP. (NAPCO, formerly CERTAIN-TEED CORP) PW PIPE CO. VINYL-TECH – "White Knight"
Liner Insert Stainless Steel	FORD JONES MCDONALD MUELLER
Polyethylene 1" thru 2", DR 9	DRISCO WESTFLEX

8. FITTINGS

Description	Manufacturers
Angle Meter Stop Brass or bronze	JONES MUELLER
Corp Stop Brass or bronze	JONES MUELLER
Ductile Iron Fittings	STAR PIPE PRODUCTS TYLER UNION U.S. PIPE
Joint Restraints	EBAA IRON ROMAC INDUSTRIES SIP INDUSTRIES SMITH BLAIR STAR U.S. PIPE
Adapters, Couplers	ROMAC IND. SMITH-BLAIR TYLER UNION MCDONALD MUELLER

9. AIR VALVES

Description	Manufacturers
Combination Air Release & Vacuum Valves	APCO VALVE CO. CLA-VAL CO. VALVMATIC VALVE CO.
Enclosure Polymer Enclosure Enclosure color shall be selected such that facility blends in with the surroundings (existing terrain) or to ensure permit requirements/conditions of approval are satisfied.	PIPELINE PRODUCTS

10. VALVES

Description	Manufacturers
Ball Valves Meter Ball Valves (with Handles) Material must be bronze or brass. Brass or bronze	JONES MUELLER
Butterfly Valves Class 250 Fusion bonded epoxy coated	CRISPIN (Previously CMB Industries) DEZURIK PRATT
Gate Valves Resilient Wedge Gate Valves	AVK AMERICAN FLOW CONTROL CO. CLOW CO. KENNEDY MUELLER CO. TYLER U.S. PIPE