

TECHNICAL PROVISIONS

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INTRODUCTION

These Technical Provisions cover the furnishing of materials, labor, workmanship, equipment and testing for the installation and construction of the **Ridge Road Water Main Replacement, Phase II.**

The following Technical Provisions shall be used in conjunction with the applicable sections of the *2010 Standard Specifications for Road, Bridge and Municipal Construction*, as prepared by the Washington State Department of Transportation and the Washington State Chapter of the American Public Works Association (hereinafter referred to as the “Standard Specifications”) except as may be amended, modified, or revised by the *King County Water District No. 19 Developer Standards and Standard Details, King County Standards* and herein.

Division I of the “Standard Specifications” relating to the General Requirements are hereby deleted and replaced with the General Conditions section and Division I section of the Supplemental Provisions contained in this project’s contract documents. All sections related to measurement and payment in the Standard Specifications are deleted and are replaced with Division II – Measurement and Payment in the Supplemental Provisions.

The Standard Specifications, except as they may be modified or superseded by these Technical Provisions and Supplemental Provisions, shall govern all phases of work under this contract, and they are by reference made an integral part of these specifications and contract as if herein fully set forth.

Reference Specifications

Certain referenced sections to the following publications are used in this specification and in the Standard Specifications and are from the latest edition of:

| | |
|------|--|
| AWWA | American Water Works Association |
| ANSI | American National Standards Institute |
| ASA | American Standards Association |
| ASTM | American Society for Testing and Materials |

Headings

Heading to parts, sections, forms, articles and sub-articles are inserted for convenience or reference only and shall not affect the interpretation of the contract documents.

ORGANIZATION OF TECHNICAL PROVISIONS

The technical provisions noted herein are in addition to, supplemental to, or as a replacement for, the Standard Specifications.

Where sections are marked “Replacement Section,” the specifications herein are intended to replace the Specifications section noted.

Where sections are marked as “Additional Section,” the specifications herein will be an addition to the Standard Specifications section noted.

Where sections are marked “Supplemental Section,” the specifications herein are to be a supplement to the Standard Specifications section noted.

Sections of the Standard Specifications that are not modified or replaced as addressed in these Technical Provisions shall remain as described in the Standard Specifications.

DIVISION 2 EARTHWORK

2-01 Clearing, Grubbing and Roadside Cleanup

2-01.1 Description

Section 2-01.1 is SUPPLEMENTED with the following:

(March 13, 1995, WSDOT GSP)

Clearing and grubbing on this project shall be performed within the following limits:

The Contractor shall perform clearing and grubbing within the limits of existing Right-of-Way, Temporary Construction Easements and Construction Limits and as shown on the plans.

The Contractor shall clear and grub as necessary to prepare the project area for utility installation, grading, curbs, gutters sidewalks, drainage, slopes, retaining walls, and all other items included for construction of the Work.

The limits of clearing and grubbing shall be staked and flagged by the Contractor for approval by the Engineer prior to construction.

2-01.2 Disposal of Usable Material and Debris

The third paragraph of Section 2-01.2 is revised as follows:

The Contractor shall dispose of all debris by Disposal Method Number 2. Contractor shall remove and haul off-site all vegetation and trees to be removed on the project. Tree removal includes the full removal of stumps.

Section 2-01.2 is SUPPLEMENTED with the following:

In instances where the Contractor is allowed to but is not required to clear areas to facilitate construction, any areas disturbed by construction shall be surface restored to existing or better condition, including matching surface restoration with hydroseed or plantings to match existing. Where the Contractor is allowed to clear areas to facilitate construction, surface restoration shall be completed at no additional cost to the Owner.

2-01.2(1) Disposal Method No. 1 – Open Burning

Section 2-01.2(1) is SUPPLEMENTED with the following:

Refuse and debris shall be disposed of in such a manner as to meet all requirements of state, county, and municipal regulations regarding health, safety, and public welfare.

2-02 Removal of Structures and Obstructions

2-02.3 Construction Requirements

(WSDOT GSP, February 17, 1998)

Section 2-02.1 is SUPPLEMENTED with the following:

Asbestos Handling and Disposal

Prior to and during the performance of any contract work, the Contractor shall verify that no asbestos-containing materials are involved or will be disturbed. When asbestos is encountered, the Contractor shall be responsible for obtaining all permits from, and provide notification to, the Washington State Department of Labor and Industries, the U.S. EPA, the local air pollution control agency, and other permitting and regulatory agencies with jurisdiction over the work involving asbestos as the law requires.

Prior to commencing asbestos related work, the Contractor shall provide the Engineer with written verification of approvals and notification that have been given and/or obtained from the required jurisdictional agencies, and the Contractor's schedule for all work involving asbestos removal. The schedule shall include the sequencing and scheduling of asbestos-related work, and coordination with subcontractors. The Contractor shall notify the Engineer when all approvals have been received and notifications have been made, as required by the agencies involved.

The Contractor shall ensure the safety of all workers, visitors to the site, and the general public in accordance with all applicable laws, rules, and regulations.

The Contractor shall designate a Washington State Certified Asbestos Supervisor (CAS) to personally supervise the asbestos removal and to ensure that the handling and removal of asbestos is accomplished by certified asbestos workers, pursuant to Washington State Department of Labor and Industries standards. The Contractor shall ensure that the removal and disposal of asbestos meets the requirements of EPA regulations 40 CFR Part 61, local health department regulations, and all other applicable regulations.

2-02.3(3) Removal of Pavement, Sidewalks, Curbs, and Gutters

Item 1 of Section 2-02.3(3) is REPLACED with the following:

The Contractor shall dispose of waste at no expense to the Contracting Agency. Any such disposal shall meet the requirement of section 2-03.3(7)C of the Standard Specifications.

2-02.3(3) Removal of Pavement, Sidewalks, Curbs and Gutters

(WSDOT GSP, September 8, 1997)

Section 2-02.3(3) is SUPPLEMENTED with the following:

Roots may be encountered during the process of replacing the existing pavement, drainage structures, or existing curb. Roots encountered during this process shall be treated by the Contractor as follows:

Roots shall be severed by cutting down and away from the tree trunk. The purpose is to minimize movement and disturbance to the remaining root system between the tree and the point of cutting. The Engineer shall determine whether, due to this additional root cutting, any additional tree top pruning or tree mechanical bracing or cabling is necessary. If deemed necessary, the top pruning/mechanical bracing shall be done by Owner prior to root cutting.

Within two hours of exposure, all roots 1/4-inch in diameter and larger are to be dressed using a sharp knife, covered, and kept moist using water and burlap bags staked in place.

Roots are to be cut clean on a 45-degree angle leaving no split or torn exterior root surfacing.

Roots are to be continually maintained in moistened conditions and protected from the wind until they are fully covered by final backfill.

All trees undergoing top pruning and root severing shall be fed using standard horticulture practices and using 6-10-8 Tree Fertilizer as per Section 8-02.3(8).

The approximate thickness of the pavement to be removed is 3 inches.

2-07 Watering

2-07.3 Construction Requirements

Section 2-07.3 is SUPPLEMENTED with the following:

The Contractor shall keep dust to a minimum at all times during all phases of construction by watering the Project area. At the end of each day the Contractor shall wash the street and completed trench sections. If necessary, the Contractor shall water the construction area during the weekend to control dust.

END DIVISION TWO

**DIVISION 3
PRODUCTION FROM QUARRY
AND PIT SITES AND STOCKPILING**

3-01 Production from Quarry and Pit Sites

3-01.4 Contractor Furnished Material Sources

Section 3-01.4 is SUPPLEMENTED with the following:

No source has been provided for any materials necessary for the construction of these improvements.

If the sources of material provided by the Contractor necessitate hauling over roads other than City streets, the Contractor shall, at his own cost and expense, make all arrangements for the use of the haul routes.

END DIVISION THREE

DIVISION 4

BASES

4-04 Ballast and Crushed Surfacing

4-04.3(2) Sub-grade (Supplemental Section)

This section is SUPPLEMENTED with the following:

Prior to placing HMA, the subgrade shall be proof-rolled with a fully-loaded dump truck or equivalent to identify any soft or unsuitable material. All soft or otherwise unsuitable material shall be removed to the satisfaction of the Owner and replaced with suitable material compacted as specified herein.

END DIVISION FOUR

DIVISION 5

SURFACE TREATMENTS AND PAVEMENTS

5-04 Hot Mix Asphalt

5-04.2 Materials

Section 5-04.2 is SUPPLEMENTED with the following:

Asphalt concrete used for pavement restoration shall be Hot Mix Asphalt (HMA).

Section 5-04.2 is SUPPLEMENTED with the following:

The grade of asphalt binder shall be PG 64-22.

All Commercial HMA shall be HMA Class ½ inch.

5-04.3 Construction Requirements

5-04.3(5) Conditioning of Existing Surface

5-04.3(5)A Preparation of Existing Surfaces (Supplemental Section)

This section is SUPPLEMENTED with the following:

Evidence of pavement damage such as surface cracking, ponding, or other variations in surface consistency shall be investigated by the Contractor and reported to the Owner. Pavement areas damaged by construction activities shall be removed and reconstructed at the Contractor's expense to existing thickness or Owner standards, whichever is the greater.

All edges of existing asphalt concrete pavement shall be saw cut their full depth. The cut shall be a minimum of 12 inches beyond the edge of the trench. The thickness of the existing pavement is unknown.

5-04.3(9) Spreading and Finishing (Supplemental Section)

This section is SUPPLEMENTED with the following:

Spreading of the mixture shall be accomplished with mechanical spreading and finishing equipment specifically designed for these purposes and that will not contaminate the asphalt mixture with any other material. Where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the paving may be done with other equipment or by hand if approved, in writing, by the Engineer.

If hand-spreading of material is permitted by the Engineer, shoveling of the material shall be accomplished by loading the shovel, carrying it to the place to be deposited, lowering the shovel to grade and turning it over as the material is placed. Spreading material through casting or "broadcasting" will not be allowed as this can result in extensive segregation of the coarse and fine portions of the mix. Spreading and placing the material with tools or equipment that will contaminate the mix will not be allowed

5-04.3(22) Pavement Patching (New Section)

When constructing within existing paved areas the contractor shall patch the existing paved areas in accordance with the Construction Plans. Hot Mix Asphalt (HMA) shall be placed in a maximum of 2-inch compacted lifts.

The patches shall be rolled to a smooth riding surface, flush with the surface of the existing asphalt, and shall be maintained throughout the duration of project to prevent potholes or ruts. Potholes or ruts of 1 inch or more in depth shall be repaired.

At the end of each working day a temporary patch shall be placed over unfinished portions of work that affect traffic in any way. Material for these temporary patches shall be cold asphalt mix.

5-04.3(23) Pavement Overlay (New Section)

When constructing within existing paved areas, the Contractor shall provide a full width 0.12 ft thick overlay of the traveled road and paved shoulders in accordance with the construction plans. Material shall be HMA, and shall be rolled to a smooth riding surface.

The overlay shall provide a smooth transition at the beginning, end, and along the edge of existing gutters.

All utility and survey monument access covers shall be adjusted to the new grade. Storm catch basin grates shall be adjusted 0.1 foot below the new grade.

5-04.3(23) Utility Adjustment (New Section)

This section has been added to this Project.

Manhole covers, valve covers, survey markers, and other existing surface features shall be adjusted to match the finished grade of the overlaid or patched area, or the new pavement elevation. Adjustment of utility features to grade shall be in conformance with the *Water District No. 19 Developer Standards for the Construction of Water Systems*. Catch basin grates shall be set 0.1 feet below finished grade. All adjustments shall be in accordance with the requirements of each respective utility provider.

Final adjustment of all surface features shall be made following final paving by saw-cutting or neat-line jack-hammering of the pavement around the surface features. Opening should not be larger than 12 inches beyond the edge of the surface feature. Contractor shall then remove base material, surfacing course, and frame; add raising bricks; and replace surface feature to finish grade. Fill and mechanically compact around the feature with crushed surfacing material or ATB, or pour a 5-inch minimum thickness of concrete class 3000 to within 2 inches of the surface. Fill the remaining 2 inches with HMA, compacted and sealed to provide a dense, uniform surface. Final adjustment of all surface features shall be completed within 30 days of final paving.

END OF DIVISION FIVE

DIVISION 7

DRAINAGE STRUCTURES, STORM SEWERS, SANITARY SEWERS, WATER MAINS AND CONDUITS

7-08 General Pipe Installation Requirements

7-08.3 Construction Requirements

7-08.3(2)B Pipe Laying

Delete the third paragraph of Section 7-08.3(2)B and REPLACE it with the following:

Variance from established line and grade shall not be greater than 1/32-inch per inch of pipe diameter and not to exceed 1/2-inch, provided that such variation does not result in a level or reverse sloping invert; provided also, that variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed 1/64-inch per inch pipe diameter, or 1/2-inch maximum.

7-09 Pipe and Fittings for Water Mains

7-09.1 Description (Supplemental Section)

Water main pipe, fittings, valves, and appurtenances shall be constructed in accordance with the *Water District No. 19 Developer Standards for the Construction of Water Systems*, latest edition.

7-09.3(1) General (Supplemental Section)

The total length of pipe sections installed, prior to pressure testing and flushing, shall be limited to 1,500 feet. The Owner may require that the first section of pipe, not less than 1,000 feet in length, installed by each of the Contractor's crews, be pressure tested to qualify the crew and/or material.

7-09.3(4) Removal of Existing Street Improvements (Supplemental Section)

Driveways, curbs, gutters, landscaping, trees, sidewalks, and wheelchair ramps shall be removed as necessary to install the improvement as shown on the construction plans.

7-09.3(5) Grade and Alignment (Supplemental Section)

The water main profile is shown on the plans. Adjustment in depth to avoid conflicting utilities shall be accomplished by either deflecting the pipe at the joints in conformance with manufacturer's recommendations or by the use of vertical bends and thrust blocking. The Contractor shall lay the pipe at grades which prevent localized high points.

7-09.3(6) Existing Utilities (Replacement Section)

The Contractor shall comply with the Construction Notes section of the construction plans and the General and Supplemental Provisions of these specifications.

7-09.3(7) Trench Excavation (Supplemental Section)

Prior to trenching through areas improved with lawn or through fences, rockeries, shrubs, plants, or other improvements, these improvements shall be removed, stored and protected. After the utility installation is complete, the improved area shall be returned to a condition equal to or better than the area before the utility installation. If any stored improvements are not suitable for reuse after construction, they shall be replaced with an improvement of equal or better quality.

The Contractor shall provide all materials, labor, and equipment necessary to adequately shore trenches to protect the work, existing property, utilities, pavement, and any other improvements, and to provide safe working conditions in the trench. The Contractor may use any method of shoring, provided that the method complies with all local, state, and federal safety codes. The Contractor alone shall be responsible for worker safety, and the Owner and its agents assume no responsibility. Damages resulting from improper shoring or failure to shore shall be the sole responsibility of the Contractor. Shoring below the pipe will not be removed if, in the opinion of the Engineer, such removal will disturb the pipe bed.

The length of the water main trench shall not exceed one hundred feet in advance of pipe laying. The maximum trench width shall be in accordance with the details shown on the construction plans.

7-09.3(7)A Dewatering of Trench (Supplemental Section)

Gravel required in the bottom of trench due to action of weather or workmen shall be furnished by Contractor without expense to the Owner.

7-09.3(8) Removal and Replacement of Unsuitable Materials (Supplemental Section)

All unsuitable material, as determined by the Owner, removed from the trench shall be hauled to a disposal site provided by the Contractor.

7-09.3(10) Backfilling Trenches (Supplemental Section)

The Contractor shall load excavated materials directly into a dump truck for haul and disposal at an approved off-site disposal location. No stockpiling of excavated materials will be allowed. All backfill shall be crushed surface base course meeting the requirements of Section 9-03.9(3).

In backfilling the trench, the Contractor shall take all necessary precautions to protect the pipe from damage, or shifting. In general, backfilling shall be performed by pushing the material from the end of the trench into, along, and directly over the pipe so that the material will be applied in the form of a rolling slope rather than by side filling, which may damage the pipe. All asphalt concrete pavement and all rocks larger than 4-inches as measured in any direction, shall be removed and disposed of legally by the Contractor.

A sand cushion must be placed between the new water main and any existing utilities within 12 inches of the new water main.

7-09.3(10)A Trench Restoration (New Section)

All trench excavations shall be paved daily with HMA per King County Road Standards and the Trench Restoration details in the plans. Trenches shall be compacted per specification prior to paving. Paved trench sections that are disturbed to repair sections of

water main that do not pass pressure testing shall be repaved at the Contractor's expense. Any sections of trench left unpaved must be sheeted at the end of the work day. Two-way traffic must be restored by the end of the workday.

7-09.3(11) *Compaction of Backfill (Supplemental Section)*

Backfill shall be compacted to 95 percent of maximum dry density using the modified proctor test in accordance with ASTM D1557. Backfill compaction will be tested periodically by the Owner. The Contractor shall provide access to accomplish compaction testing and collection of backfill samples. Should any compaction test fail, the Contractor shall take the necessary corrective measures to comply with this specification and all additional compaction testing costs shall be at the Contractor's expense.

7-09.3(13) *Handling of Pipe (Supplemental Section)*

The Contractor shall only lay out that length of pipe that will be installed during that day's work shift. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and pipe forced home and brought to correct line and grade. The pipe shall be secured in place with select backfill tamped under it. Precaution shall be taken to prevent dirt from entering the joint space. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug. If water is in the trench when work resumes, the seal shall remain in place until the trench is pumped completely dry. No pipe shall be laid in water or when trench conditions are unsuitable.

7-09.3(15) *Laying of Pipe on Curves (Supplemental Section)*

Pipe shall be laid with bell ends facing in the direction of the laying, unless otherwise approved by the Owner. Wherever it is necessary to deflect pipe from a straight line, the amount of deflection allowed shall not exceed pipe manufacturer's recommendations. Deflection of PVC pipe shall be performed in accordance with the manufacturer's recommendations and AWWA M23. No deflection shall be allowed at the pipe bell to spigot joint. Deflections equal to and greater than 11¼ degrees shall be made with a ductile iron fitting and shall conform to AWWA C110 or C153. Curved alignments shall be constructed by manually bending the pipe or providing a bell by bell PVC coupling or ductile iron fitting. The minimum pipeline radii for uniformly bending the pipe without couplings or fittings shall be per Section 7-09.3(15)B of the Standard Specifications. For connections of mechanical joints, the socket, plain end of each pipe and gasket shall be cleaned of dirt before jointing, and shall be jointed according to manufacturer's directions. Bolts shall be tightened alternately at top, bottom, and sides so pressure on gasket is even.

7-09.3(18) *Coupled Pipe 4-inches in Diameter and Greater (Supplemental Section)*

For connection of "Tyton" and PVC joints, the jointing shall be done according to manufacturer's recommendations, with special care used in cleaning gasket seat to prevent dirt or sand from getting between the gasket and pipe. Lubricant to be used on the gasket shall be as recommended by the pipe manufacturer, non-toxic and free from contamination. When a pipe length is cut, the outer edge of the cut shall be beveled with a file to prevent injury to the gasket during jointing.

7-09.3(19)A Connections to Existing Mains (Supplemental Section)

No permanent connections to the existing system shall be made until the new water main has been tested and approved by the Engineer. No temporary connections of the untested, unapproved new water main to the existing system shall be made without the installation of a double check valve assembly between the new water main and existing system. The Contractor shall verify the size, material, and location of the existing main at the connection point prior to installing the new connecting water main.

Each connection shall be made in compliance with the construction plans. Connections to existing mains shall comply with the requirements for maintaining service as described herein.

Existing water mains shall be cut by the Contractor. The Contractor shall remove the portions of pipe to provide for the installation of the required fittings at the points of connection as shown on the construction plans.

The Contractor shall notify the Owner minimum of five (5) working days prior to constructing connections to the existing system. No connections shall be made until all tests have been performed and accepted by the Owner. An Owner representative shall witness all the connection work. Where the water line is to be removed from service, the Contractor shall coordinate with the Owner in notifying those customers that will be without service. The Contractor shall expose the existing water main and review the connection procedure prior to removing the water main from service.

7-09.3(19)B Maintaining Service (Replacement Section)

Water service shall be maintained as described on the construction plans and as follows:

The Contractor will be required to notify the Owner five (5) working days prior to any planned, major connection to an existing water main. Water main shut-offs shall not be scheduled to take place on Fridays, Mondays, Owner Holiday's, or on the day before or after an Owner holiday. The Owner will be responsible for all tasks involved with shut-off and turn-on of the existing water mains. Unless directed otherwise by the Engineer, the Contractor will not operate existing water system valves. The Contractor will be supplied with "water shut-off notice" cards that shall be distributed 48 hours prior to a system shut-off. The Contractor shall write the date and time that the shut-off will be in effect and distribute them to all affected residents, businesses, property owners, etc. The Owner will determine the extent of the affected customers to be notified by the Contractor.

Prior to commencement of any work on a connection to an existing water main, the Contractor will assemble all materials, equipment, and labor necessary to properly complete the work. Once the water has been shut off, the Contractor shall diligently pursue the connection to completion so that the time required for the shut-off will be held to a minimum. All connections to existing water mains shall be completed the same day that they are started. The Contractor shall time his operations so that the water will not be shut off over weekends, or during holidays.

The existing water mains are intended to remain in service until testing and disinfecting have been approved by the Owner and until all water service connections have been transferred. If, due to the Contractor's actions, the existing water system fails to provide

service to adjacent residences, then the Contractor shall provide temporary service to the affected residences. Furthermore, the temporary services, if required, shall be approved by the Engineer prior to installation. All costs of providing and maintaining temporary service for the necessary time durations shall be completely borne by the Contractor. Should the Contractor neglect or needlessly delay in the pursuit of this work item, the Owner may at its discretion dispatch crews to remedy the situation and deduct all costs associated with the employment of their crews from monies owed the Contractor.

7-09.3(21) Concrete Thrust Blocking (Replacement Section)

Provide concrete blocking at all fittings, and horizontal or vertical angle points. Blocking shall conform to the Owner's standard details for general blocking and vertical blocks. All fittings to be blocked shall be wrapped with 8-mil polyethylene plastic. Concrete blocking shall be properly formed with plywood or other acceptable forming materials and shall not be poured around joints. The forms shall be stripped prior to backfilling. Blocking shall be commercial concrete and poured in place (hand mixed concrete is not allowed). Timber blocking will not be permitted. Thrust blocks shall be poured as soon as possible after setting the fittings in place to allow the concrete to "set" before applying the pressure test. The concrete thrust blocks shall be in place before beginning the pressure test. Anchor blocks shall be allowed to set sufficiently to develop the necessary bond strength between the reinforcing rods and the concrete anchor before beginning the pressure test.

Concrete shall have a compressive strength of at least 3,000 psi.

7-09.3(23) Hydrostatic Pressure Test (Replacement Section)

All water mains and appurtenances shall be tested under a hydrostatic pressure equal to 150 psi in excess of that under which they will operate. In no case shall the test pressure be less than 200 psi. All pumps, gauges, plugs, saddles, corporation stops, backflow prevention devices, miscellaneous hose and piping, and other equipment necessary for performing the test shall be furnished and operated by the Contractor. The pipeline trench shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and sufficiently cured to reach design strength before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking and remove it after testing.

A backflow prevention device will be used when drawing water from the Owner's system. (The Contractor will be charged for the water used.) Before applying the specified test pressure, air shall be expelled completely from the pipe, valves and hydrants. If permanent air vents are not located at all high points, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged.

The mains shall be filled with water and allowed to stand under pressure for a minimum of 24 hours to allow the escape of air and/or allow the lining of the pipe to absorb water. The Owner will furnish the water necessary to fill the pipelines for testing purposes at a time of day when excess quantities of water are available for normal system operation.

Gauges used in the test may be required to be certified for accuracy at a laboratory identified by the Owner.

Any visible leakage detected shall be corrected by the Contractor to the satisfaction of the Owner regardless of the allowable leakage specified. Should the test section fail to meet the pressure test successfully as specified, the Contractor shall, at his own expense, locate and repair the defects and then retest the pipeline.

All tests shall be made with the hydrant auxiliary valve open and pressure against the hydrant valve.

Prior to calling out the Engineer to witness the pressure test, the Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to assure that the pipe is in a satisfactory condition.

Before applying the specified test pressure, air shall be expelled completely from the pipe, valves and hydrants.

The test shall be accomplished by pumping the main up to the required pressure, stopping the pump for 2 hours and then pumping the main up to the test pressure again. During the test, the section being tested shall be observed to detect any visible leakage. A clean container shall be used for holding water for pumping pressure on the main being tested. This makeup water shall be sterilized by the addition of chlorine to a concentration of 1 mg/l.

The quantity of water required to restore the initial hydrostatic pressure shall be accurately determined by either; 1) pumping from an open container of suitable size such that accurate volume measurement can be made by the Owner or, 2) by pumping through a positive displacement water meter with a sweep unit hand registering one gallon per revolution. The meter shall be approved by the Owner.

Acceptability of the test will be determined by two factors, as follows:

- 1) The quantity of water lost from the main shall not exceed the number of gallons per hour as listed in the following table.

AND

- 2) The loss in pressure shall not exceed 5 psi during the test period, per AWWA standards.

Allowable Leakage Per 1,000 Ft. of Pipeline* - GPH

| PSI | <i>Nominal Pipe Diameter* -- Inches</i> | | | | | | |
|-----|---|------|------|------|------|------|------|
| | 6 | 8 | 10 | 12 | 16 | 20 | 24 |
| 450 | 0.95 | 1.27 | 1.59 | 1.91 | 2.55 | 3.18 | 3.82 |
| 400 | 0.90 | 1.20 | 1.50 | 1.80 | 2.40 | 3.00 | 3.60 |
| 350 | 0.84 | 1.12 | 1.40 | 1.69 | 2.25 | 2.81 | 3.37 |
| 290 | 0.77 | 1.02 | 1.28 | 1.53 | 2.04 | 2.55 | 3.07 |
| 275 | 0.75 | 1.00 | 1.24 | 1.49 | 1.99 | 2.49 | 2.99 |
| 250 | 0.71 | 0.95 | 1.19 | 1.42 | 1.90 | 2.37 | 2.85 |
| 225 | 0.68 | 0.90 | 1.13 | 1.35 | 1.80 | 2.25 | 2.70 |
| 200 | 0.64 | 0.85 | 1.06 | 1.28 | 1.70 | 2.12 | 2.55 |

* If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size, or for those

diameters of pressures not listed, by the formula stated in Section 7-11.3(11) of the Standard Specifications.

7-09.3(24) *Disinfection of Water Mains (Supplemental Section)*

Taps of the existing main required by the Contractor for flushing and chlorination purposes shall be provided by the Contractor and approved by the Owner.

The Contractor shall provide all equipment and materials to chlorinate the water main at a concentration of no less than 50 mg/l either by pumping in a premix from a container or by a metering pump into the water main until it appears at the opposite end of the pipes. The chlorinated water shall remain in the water main for 24 hours. After 24 hours the water main shall be dechlorinated and flushed from the main. The Contractor shall not discharge water to the sanitary sewer system. Alternatively, the Contractor may truck away the chlorinated water. Contractor shall supply a plan for flushing the water main.

Dry calcium hypochlorite will not be allowed for disinfection of the pipeline on this Project.

7-09.3(24)D *Dry Calcium Hyperchlorite (Deleted)*

Section 7-09.3(24)D of the Standard Specifications is DELETED.

7-09.3(24)P *Dechlorination (Additional Section)*

Water containing chlorine residuals shall not be disposed into the storm drainage system or any waterway. Should the Contractor wish to discharge chlorinated water into a storm system or waterway, dechlorination of this water per AWWA standards will be required.

7-09.3(25) *Existing Water Main Abandonment (Additional Section)*

The existing water mains shall be abandoned as shown on the construction plans. All exposed lines shall be capped or plugged with concrete. Branch valves shall be closed and in-line valves shall remain open. Valve boxes shall be removed and surfaces restored to match the adjacent surrounding.

7-09 Valves for Water Mains

7-12.3 *Construction Requirements (Supplemental Section)*

All valves with operating nuts located more than 42 inches below finished grade shall be equipped with extension stems per the *Water District No. 19 Developer Standards and Standard Details*.

7-12.3(1) *Installation of Valve Marker Post (Supplemental Section)*

Valve marker posts shall be installed per *Water District No. 19 Standard Details* where the valve box is located in an unimproved area.

7-09 Hydrants

7-14.1 *Description (Supplemental Section)*

Hydrants shall conform to *Water District No. 19 Developer Standards and Standard Details*.

7-14.3(1) *Setting Hydrants (Supplemental Section)*

Hydrants shall be installed in accordance with the *Water District No. 19 Developer Standards* and *Standard Details*.

7-14.3(2) *Hydrant Connections (Supplemental Section)*

Contractor shall provide vertical bends and blocking as necessary to avoid existing utilities and other obstructions and provide a hydrant connection that meets the Owner's Standard Detail and Specifications.

7-14.3(7) *Abandoning Hydrants (Additional Section)*

All existing hydrants connected to the abandoned water main shall be removed and abandoned as shown on the plans and as required in the construction details. Fire hydrants shall be cleaned and delivered to the Owner's shop. Also, the associated lane marker for each hydrant shall be removed.

7-15 Service Connections

7-15.2 *Materials (Supplemental Section)*

Service connections shall conform to *Water District No. 19 Developer Standards* and *Standard Details*.

7-15.3 *Construction Requirements (Supplemental Section)*

Construction of water services shall be in accordance with the details as shown on the construction plans and the requirements specified in the General Notes.

The services shall not be connected to the new main until it has been tested, approved, and put into service.

END OF DIVISION SEVEN

DIVISION 8 MISCELLANEOUS CONSTRUCTION

8-02 Roadside Restoration

8-02.1 Description (Supplemental Section)

This section is supplemented with the following:

Hydroseed shall be applied to all unimproved areas disturbed during construction in addition to areas shown on the Project Plans. Contractor shall submit Hydroseed mix information prior to its application.

8-02.2 Materials (Supplemental Section)

This section is supplemented with the following:

Where lawns maintained by property owners are disturbed by construction, they shall be re-sodded upon request of the property owner. Contractor shall meet with property owner to discuss the restoration and the type of grass in the sod

8-02.3(18) Property Restoration (Additional Section)

If property or improvements are disturbed or damaged by roadside work, the Contractor shall restore and repair the property or improvements to their original condition and as directed by the Engineer.

END OF DIVISION EIGHT

DIVISION 9

MATERIALS

9-30 Water Distribution Materials

9-30.1 Pipe and 9-30.2 Fittings

Sections 9-30.1 and 9-30.2 are SUPPLEMENTED with the following:

Water mains to be installed shall be ductile iron pipe or polyvinyl chloride (PVC) for pipe sizes 4-inch to 24-inch unless specifically noted otherwise. Water mains to be installed shall be ductile iron pipe for all sizes greater than 24-inch unless specifically noted otherwise.

Ductile iron pipe for water mains shall conform to AWWA C151 Standards, and current amendments thereto, except the ductile iron pipe shall be thickness Class 53 for 6-inch pipe, Class 52 for 8-inch, 10 -inch and 12 -inch and Class 50 for larger than 12 -inch pipe. Grade of iron shall be a minimum of 60-42-10. The pipe shall be cement lined to a minimum thickness of 1/16 -inch meeting NSF standards for potable water and the exterior shall be coated with asphaltic coating.

PVC pipe shall conform to AWWA C900/905 Standards and current amendments thereto. The pipe shall be provided to meet the specified pressure rating requirements and shall have minimum dimension ratio (DR) of 18 (PC150). The pipe shall be manufactured to cast iron pipe outside diameters in accordance with AWWA C900. The pipe shall be blue or white in color. Pipe materials shall be suitable for use in potable water applications and shall meet the requirements of ANSI/NSF 61. Each length of ductile iron pipe shall be plainly marked with the manufacturer's identification, year case, thickness, class of pipe and weight. Each length of PVC pipe shall be plainly marked in accordance with AWWA C900/905 and including the manufacturer's identification, manufactured date, pressure rating and dimension ratio. The District shall be provided with the manufacturer's date coding for translation. Pipe shall be installed with the manufacturing label showing on top.

The pipe shall be furnished with mechanical joint or push-on type, employing a single gasket, such as "Tyton", except where otherwise calling for flanged ends. Bolts furnished for mechanical joint pipe and fittings shall be high strength ductile iron, with a minimum tensile strength of 50,000 psi. PVC push-on type pipe joints shall consist of an integral thickened wall section with an elastomeric seal. The wall thickness in the bell section shall conform to the requirements of Section 6.2 of ASTM D3139, "Standard Specification for Joint for Plastic Pressure Pipes Using Flexible Elastomeric Seals." The seal shall meet the requirement of ASTM F477 "Standard for Elastomeric Seals (Gaskets) for Joining Plastic Pipe."

Restrained joint ductile iron pipe shall be push-on type with "Field-Lok" gaskets as furnished by U.S. Pipe or equal for 24" diameter and smaller pipe and "TR Flex" as furnished by U.S. Pipe or equal for larger diameter pipes. The restrained joint pipe shall meet all other requirements of the non-restrained pipe.

All pipe shall be jointed by the manufacturer's standard coupling, be all of one manufacturer, and be carefully installed in complete compliance with the manufacturer's recommendations.

Joints shall be "made up" in accordance with the manufacturer's recommendations. Standard joint materials, including rubber ring gaskets, shall be furnished with the pipe. Material shall be suitable for the specified pipe size and pressures.

All fittings shall be short-bodied, ductile iron complying with applicable AWWA C110 or C153 Standards for 350 psi pressure rating for mechanical joint fittings and 250 psi pressure rating for flanged fittings. All fittings shall be cement lined and either mechanical joint or flanged.

Fittings in areas required restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., MEGALUG, or approved equal. PVC pipe restraint shall conform to ASTM F1674 and be a type accepted by the pipe manufacturer.

All couplings shall be ductile iron mechanical joints sleeves.

The pipe and fittings shall be inspected for defects before installation. All lumps, blisters and excess coal tar coating shall be removed from the bell and spigot end of each pipe, and the outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean and dry, and free from oil and grease before the pipe is laid. PVC pipe used on the project shall be new, having been manufactured within 18 months prior to the date of installation, and shall be kept clean and protected against sunlight and heat damage. Pipe that is older than 18 months at the time of installation, or that is damaged due to sunlight or heat, shall be removed from the project site and replaced by the Contractor at no cost to the District.

Tracer wire (locator wire) shall be #14 AWG, single conductor solid, bare annealed copper, 30-Volt construction, water-resistant insulation, in 2,500 foot coils. The coating shall be blue in color. Direct bury splice enclosures shall be the Spears brand DS-500 Splice Wire Connector, no exceptions.

Detectable marking tape shall consist of inert polyethylene plastic that is impervious to all known alkalis, acids, chemical reagents, and solvents likely to be encountered in the soil, with a metallic foil core to provide the most positive detection and pipeline locators. The tape shall be color coded and shall be imprinted continuously over its entire length in permanent black ink. The message shall convey the type of line buried below and shall also have the word "Caution" prominently shown. Color coding of the tape shall be blue. The width of the tape shall be as recommended by the manufacture for the depth of installation.

9-30.3 Valves

9-30.3(1) Gate Valves – 3-Inch to 16 inch (Supplemental Section)

Gate valves shall comply with *Water District No. 19 Developer Standards and Standard Details*.

9-30.3(4) Valve Boxes (Supplemental Section)

Valve boxes shall comply with *Water District No. 19 Developer Standards and Standard Details*.

9-30.3(7) Combination Air Release/Vacuum Valve and Assembly (Supplemental Section)

Combination Air Release/Vacuum Valve and Assemblies shall comply with *Water District No. 19 Developer Standards and Standard Details*.

9-30.3(8) Tapping Sleeve and Valve Assembly (Supplemental Section)

Tapping Sleeve and Valve Assemblies shall comply with *Water District No. 19 Developer Standards and Standard Details*.

9-30.5 Hydrants

Fire hydrants shall comply with *Water District No. 19 Developer Standards and Standard Details*.

END OF DIVISION NINE

