SECTION VI. WATERWORKS

A. INSPECTIONS & APPROVALS

1. DDW Regulations: All waterworks construction in Providence City shall follow Utah Division of Drinking Water (DDW) regulations. These regulations shall be a part of these specifications and shall take precedence should any conflict arise. All waterworks construction shall also follow the American Waterworks Association (AWWA) Standard for Disinfecting Water Mains.

2. Notification: On projects of sufficient size or complexity, as determined by the City, the developer shall submit plans to DDW for approval and shall notify them in writing of the actual construction starting date. The developer shall also provide DDW with the name and telephone number of the construction superintendent and a copy of the developer's construction schedule:

Utah Division of Drinking Water
150 North 1950 West, P.O. Box 144830
Salt Lake City, UT 84114-4830
voice: (801)536-4200 fax: (801)536-4211

3. City Inspections: All water main junctions, intersections, and connections to existing mains must be inspected by the City. All water main connections and thrust blocks shall be inspected and approved prior to backfilling. Connection of water mains to any live existing line shall be performed by the contractor under the direct supervision of an official from the Public Works Department. The developer shall give the Public Works Department forty-eight (hours) notice prior to any live connection. It is the developer's responsibility to contact the City prior to backfilling to see if any inspections are required.

4. As-Built Drawings: Two (2) copies, in addition to one reproducible copy of the as-built drawings, including all approved changes, shall be provided by the developer to the City prior to the minimum improvement inspection and before asphalt is laid.

5. Operating Permit: Prior to placing any new waterworks construction into operation that was approved by DDW, the City may require the developer to contact DDW and obtain written approval or an Operating Permit as outlined in State Regulations.

B. MATERIALS STORAGE & HANDLING

1. Handling Pipe And Accessories: Pipe, fittings, valves, hydrants and other accessories shall, at all times, be handled with care to avoid damage. In loading and unloading they shall be lifted by hoists or slid, or rolled on skidways in such manner as to avoid shock. Under no circumstances shall they be dropped. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground. All pipe, fittings, valves and hydrants shall be carefully lowered into the trench piece by piece by means of derrick, ropes or other suitable tools or equipment, in such manner as to prevent damage to pipe or pipe coating. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. If pipe is handled in such a manner that damage to the coating results, damaged coating shall be repaired or replaced in a satisfactory manner.

2. Responsibility For Safe Storage: The contractor shall be responsible for the safe storage of material furnished by or to him/her, and accepted by him/her, and intended for the work, until it has been incorporated in the complete project.

3. Replacement Of Damaged Material: Any material furnished by the owner that becomes damaged after acceptance by the contractor, shall be replaced by the contractor at his/her own expense.

C. WATER MAINS

1. Pipe Material: All water mains and fire hydrant laterals are to be centrifugal spun PRESSURE CLASS 350 ductile iron pipe. Pipe shall conform to ASA-A2.51.

a. Ductile iron pipe shall have a standard thickness cement liner and shall conform to all requirements for AWWA Standard C151-76 for centrifugal spun ductile iron pipe with “push on” or bell and spigot type joints.

b. Pipe shall be coated with bituminous coal-tar base, approximately one mil. thick. The nominal laying length of the pipe shall be eighteen feet (18').

2. Certification: Certification of all tests required by the American Water Works Association shall be provided by the manufacturer. The three (3) edge bearing test will be required.

3. Size: The standard minimum inside pipe diameter for water mains shall be eight inches (8"). Pipe diameters larger than eight inches (8") may be required by the City. Main lines smaller than eight inches (8”) may be allowed only in cul-de-sacs as per State Code.

4. Length: All pipe shall be standard lengths, except for making connections to valves, fittings and other such closures.

D. PIPE INSTALLATION

1. General Procedure: All pipe shall be laid and maintained to the required alignments and grades shown on the construction drawings, with fittings, valves and hydrants at the required locations, and with joints centered and spigots home, and with all valve and hydrant stems plumb. No deviation shall be made from the required alignment or grade without the approval of the City.

a. Protecting Existing Facilities: The developer shall have the entire construction area blue-staked before construction. Temporary support, protection and maintenance of all existing underground and surface utility structures, drains, sewers and other facilities encountered during construction shall be provided by the developer. Any damage to City or private facilities caused by construction shall be repaired or replaced at the developer's expense.

b. Unforseen Obstructions: The developer shall inform the City wherever existing utility lines, pipes or structures not shown on the construction drawings or the blue-staking obstruct the design grade or alignment of the new pipe. The City shall determine the proper solution to deal with the obstruction. This may include permanently supporting, removing, relocating or reconstructing the obstruction by the developer. In those instances where relocation or reconstruction is impracticable, the City may require a deviation from the alignment or grade. If the obstruction is created by a line or pipe owned by a public utility, irrigation company, or an entity other than the City, the developer shall contact that company for the proper resolution.

c. Water Shut-offs: Prior to construction, the developer shall locate the existing main and verify the final location and alignment of the new water main and hydrants with the City. Except when emergency shut-off is required, the developer shall give 24 hours verbal notice to the Public Works Director and 24 hours written notice placed on the front door of each homeowner prior to the interruption of water service. Water valves shall be turned off and on **BY CITY PERSONNEL ONLY**. The developer shall be present and work with the City during the process of turning water mains off and on.

i. In the event that water service is interrupted in excess of eight (8) hours. A backup water supply must be in place.

2. Keeping Pipes Clean: All foreign matter or dirt shall be removed from the inside of the pipe before it is lowered into its position in the trench, and it shall be kept clean by approved means during and after laying. According to Utah State Regulation, "the open

ends of all pipeline under construction shall be covered and effectively sealed at the end of the day's work" to prevent water contamination.

a. Flushing Existing Pipes: The developer shall flush all air and foreign materials from existing mains and service laterals that are shut down for repair or replacement. Water mains will not be completely shut off until the developer has excavated a sump of sufficient depth below the exposed pipe to prevent contamination of the existing line in the event of a leak or break.

b. Preventing Trench Water From Entering Pipe: At times when pipe laying is not in progress, the open ends of pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe.

c. Water-sewer Crossings: All water/sewer crossings must follow the minimum separation requirements outlined in the Utah Administrative Code.

3. Cutting Pipe: Cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe.

4. Jointing: Jointing of all pipe shall be as recommended by the manufacturer. All pipes shall be handled in such a way so as to prevent damage to the coating and lining. Refer to backfilling specifications for proper bedding and compaction. Thrust blocking shall be applied at all tees, plugs, caps and at bends deflecting twenty two and one-half degrees (22½°) or more. All pipes and fittings that are to be cemented shall be covered with plastic to prevent contact with the concrete and in no case shall bolts be covered with concrete.

5. Deflection of the pipe along an alignment shall be no greater than three degrees (3°), horizontally or vertically, per joint with a recommended deflection of two degrees (2°) or less per joint. Pipe deflection shall be limited to two degrees (2°) at crosses, valves, couplings and fire hydrants. Except where specifically noted on the plans, ductile iron pipe shall have bell and spigot ends. Joints shall comply with AWWA Standard C111-72.

6. Pipe Cover: All water mains and fire hydrant laterals shall have no less than five feet (60 inches) of cover from the top surface of the pipe up to the finish grade surface. Cover greater than five feet six inches (5' 6") must have the approval of the City.

7. Abandoning Existing Pipes: All existing water lines that are to be abandoned and left in place shall be plugged and the top section of the valve box will be removed. Plugs may be plastic bags (or an equivalent material) placed over the ends of the old pipe and secured in place with concrete.

8. Dead-End Lines: All water mains shall be "looped" with at least two connections to the existing City water system. Dead-end lines are only permitted within cul-de-sacs and/or temporary dead-end streets where the developer's drawings or the City master plan shows

a future connection to the existing system beyond the dead-end street.

a. Capping: Temporary dead-end water lines shall continue to and be capped at the property line of the development with the proper easement to allow for the future connection to adjacent developments.

b. Blow-off Hydrants: Blow-off hydrants, as shown in the Standard Construction Drawings shall be installed by the contractor at the end of each cul-de-sac and at temporary dead-end streets. In the case of the latter, the hydrant shall be removed and given to the City when the dead-end line is eventually looped and the hydrant is no longer needed.

E. FIRE HYDRANTS

1. Specification: All fire hydrants shall be supplied and installed by the contractor as shown on the City standard detail. The quantity and location of fire hydrants shall meet the Utah State fire code regulations. All fire hydrants shall meet the requirements of AWWA-Standard Specification C502 64 for ordinary waterworks service, with the following supplementary specifications:

2. Installation: Hydrants shall be located in a manner to provide complete accessibility, and in such a manner that the possibility of damage from vehicles or injury to pedestrians will be minimized. The distance between hydrants shall be in accordance with the International Fire Code, appendix C, “Fire Hydrant Locations and Distributions”. Hydrants are generally located in the parking strip between the back of the curb and the front of the sidewalk. Hydrants shall be set to the proper finish grade. Unless otherwise directed, the setting of any hydrant shall conform to the following:

a. Hydrant Bury: All fire hydrants shall have the correct bury as shown in the Standard Construction Drawings.

b. Position Of Nozzles: All hydrants shall stand plumb, and shall have their nozzles parallel with or at right angles to the curb, with the pumper nozzle pointing normal to the curb, except that hydrants having hose nozzles at an angle of forty five degrees (45°) shall be set normal to the curb. They shall conform to the established grade.

c. Drainage At Hydrant: A drainage pit two feet (2') in diameter and two feet (2') deep shall be excavated below each hydrant and filled completely with coarse gravel or broken stone, mixed with coarse sand, under and around the bowl of the hydrant and to a level of six inches (6") above the waste opening. No hydrant drainage pit shall be connected to a sewer.

d. Cleaning: Hydrants shall be thoroughly cleaned of dirt or foreign matter before setting.

e. Plugging Dead Ends: Standard plugs shall be inserted into the bells of all dead ends of pipe, toes or crosses and spigot ends shall be capped.

f. Temporary Covers: Each hydrant installed shall be covered temporarily with a black plastic bag tied at the base. The bag shall be removed by the contractor after that section of water main is placed in service and the hydrant is “on-line.”

g. Notification: Notification must be given to the City and the appropriate fire protection agency as soon as the hydrant is removed from or placed in service.

3. Replacement Hydrants: Existing fire hydrants that are to be replaced are to have the hydrant and valve assembly removed and given to the city. The existing hydrant lateral is to be cut and plugged with plastic bags (or equivalent material) placed over the ends of the old pipe and secured in place with concrete.

F. VALVES & FITTINGS

1. Materials:

a. Flanged Fittings: All flanged fittings shall be in accordance with AWWA C110-65 cast iron fittings.

b. Gate Valves: Gate valves shall be iron body, bronze mounted, double disc with non-rising stems with resilient seat, and modifications herein. Stem seals shall be double O-ring seals, valves shall open counterclockwise. Provide two inch (2") square wrench nut for key operation. Provide mechanical joint ends, except gate valves for use with fire hydrants. Valves shall be placed in the system so that sections of pipe no longer than two hundred fifty feet (250') in residential development and or five hundred feet (500’) in commercial development may be isolated and shut off from the rest of the system so repairs may be made with a minimal number of water connections being put out of service. When connecting to existing or new lines at tees, a minimum of two (2) valves shall be installed; where crosses are used, a minimum of three (3) valves shall be used. All new valves over 7 feet deep to the top of the valve are to have stem extensions that reach to 12" from the underside of the lid. All water valves that are to be abandoned must be turned off and left in the ground. The existing valve box and lid is to be removed and given to the city. New pressure release valve assemblies must meet State Drinking Water Standards and be inspected by the city.

c. Valve Boxes: Valve boxes shall be buffalo, sliding type with base as required for the valve size used and of sufficient length for the specified pipe bury. It shall have the “water” stamped thereon.

d. Dresser Couplings: Latest standard style with rubber gasket for water. For

diameters four inches (4") to fourteen inches (14"), middle ring to be a minimum of one-fourth inch (¼") thick and five inches (5") long with four and five-eighths inch (4 5/8") bolts for four inch (4") diameters; six and five-eighths inch (6 5/8") bolts for six inch (6") and eight inch (8") diameters and eight and five-eighths inch (8 5/8") bolts for ten inch (10"), twelve inch (12") and fourteen inch (14") diameters.

e. Check Valves: Standard iron body swing check valves for one hundred fifty (150) pound working pressure crane, Ludlow or equal.

2. Installation:

a. Location: Gate valves, hydrants and fittings shall be located as shown on the plans.

b. Valve Boxes And Valve Pits: Cast iron valve boxes shall be firmly supported, and maintained centered and plumb over the wrench nut of the gate valve, with box cover or barrel lid flush with the surface of the finished pavement or at such other approved level.

c. Thrust Blocking: Thrust blocking shall be applied on all pipelines eight inches (8") in diameter or larger at all toes, plugs, caps and at bends deflecting twenty two and one-half degrees (22½°) or more, or movement shall be prevented by attaching suitable metal rods or straps as directed. Blocking shall be placed between solid ground and the fitting to be anchored, the area of bearing on the pipe and on ground in each instance shall be that required (see Standard Construction Drawings). The blocking shall, unless otherwise directed, be so placed that the pipe and fitting joints will be accessible for repair. Thrust blocks must be formed.

G. HYDROSTATIC TESTS

1. Inspections: Each valve section of the water main shall be pressure-tested by the contractor in the presence of the City. The contractor shall notify the City forty-eight (48) hours before every test. Each section of pipe to be tested shall be properly thrust-blocked and secured from expansion or failure. The test shall be conducted at 200 pounds per square inch for a period of at least 2 hours with no loss of pressure. The charging of the water lines for either testing or to place in service shall be performed only by the City. The contractor shall give the Public Works Director forty-eight (48) hours notice prior to the charging of any water lines.

2. Procedure: Each valve section of pipe shall be slowly filled with water and the specified test pressure, measured at the point of highest elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connections and all necessary apparatus shall be furnished by the contractor. The contractor shall furnish gauges and measuring devices for the test and will make all taps into the pipe. The

contractor shall furnish all necessary assistance for conducting the tests.

3. Expelling Air Before Test: Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation, and afterward tightly plugged.

H. DISINFECTION

1. General Requirements: Before being placed in service, all new water distribution systems, or extensions to existing systems, or any valved section of such extensions or any replacement in the existing water distribution system, shall be disinfected. All new water mains or appurtenances shall be disinfected in accordance with AWWA Standard.

2. Procedure for Cutting Into Existing Pipelines: Cuts made in existing pipelines for the insertion of valves, fittings, repairs or for any other purpose, shall be chlorinated by swabbing the pipe with a high concentration of chlorinated water (50 ppm) and then rinsed.

3. Sample Collection: The City Inspector will collect samples for each successfully pressure tested section, label, and submit them to the Bear River Health Department for testing. A satisfactory report must be received by the City prior to installing or re-connecting any service lateral or allowing any water to flow from the new main into the existing water system. This must be done twice, twenty-four (24) hours apart.

4. Repetition Of Procedure: Should the initial disinfection treatment prove ineffective, the same procedure, or an alternative procedure approved by the City, shall be repeated until test samples meet state requirements.

I. FLUSHING

All chlorinated water that is flushed from any line must be dechlorinated per State Standards.

1. Timing: Following chlorination, all tested water shall be thoroughly flushed from the newly laid pipeline at its extremities until the replacement water throughout its length shall, upon test, both chemically and bacteriologically, be proven equal to the water quality served the public from the existing water supply system, and approved by the Bear River Board of Public Health. All pipelines shall be flushed after satisfactory pressure testing and disinfection has been completed and approved.

2. Procedure: Flushing shall be accomplished through hydrants. If a hydrant does not exist at the end of the line, the contractor shall install a tap sufficient in size to provide for a 2.5 foot per second flushing velocity in the line. The mains are to be flushed until the chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the distribution system, or that is acceptable for domestic use

(0.2 parts per million). The following is the flow quantity required to provide a 2.5 foot per second flushing velocity:

FLUSHING CHART	
Pipe Size (Inches)	Flow (gpm
2	26
4	100
6	200
8	400
10	600
12	900
16	1600

J. SERVICE LINES & METER BARRELS

1. Materials: The developer shall supply and install all water meter materials as shown on the City standard construction drawings.

2. Installation: All water service materials shall be installed as shown on the City standard construction drawings.

a. Laterals: All service laterals off the main must tilt toward the home they serve. Lateral pipe may not cross over or under the main. Laterals shall be one continuous length of copper tubing. Spliced joints are not allowed between the corp stop at the main and the meter setter, unless only a new meter barrel and setter are being installed and the existing lateral is 1 inch copper that has been recently installed according to these specifications.

b. Meter Barrels: No water meter barrels shall be set until grade stakes have been properly placed by the developer's engineer for each water service. Each barrel shall be marked with a steel tee-post painted blue.

3. Pulling Replacement Laterals: With the approval of the City, replacement laterals may be installed by pulling the new lateral through the same hole as the existing lateral. The pulling method may be used only if the contractor can show to the City's satisfaction that

the existing lateral has at least 48 inches of cover throughout its entire length and that the pulling can be done without damaging the new lateral.

4. Trenched Laterals: Laterals on the short side to middle can be trenches. Trenched laterals that cross under existing curb and gutter should be tunneled with a probe; if undercut with the backhoe bucket, flowable fill shall be used to prevent the curb and gutter from settling. The contractor will replace at his expense any curb and gutter that settles after completion of the project.

5. Bored Laterals: Laterals on the long side must be bored.

6. Testing Back-flow Prevention Assemblies: All back-flow prevention assemblies shall be tested within ten (10) working days of initial installation.

7. Relocation of Existing Water Service: When a property owner determines that it is necessary to relocate an existing water service, the following steps/procedures and regulations shall apply:

a. Providence City Public Works Department shall be notified of the need to relocate the water service. A representative from the Public Works Department will meet with the contractor/property owner to discuss and determine if and where the existing service shall be relocated.

b. Upon approval of the relocation, the contractor shall notify the Providence City Public Works Department to schedule the inspection of the service relocation. The contractor/property owner shall be responsible for all arrangements to facilitate the relocation, including all costs incurred during the process, (including materials and labor). A representative of the Public Works Department shall be present to visually inspect the new connection to the existing service line and the new location of the service.

c. When an existing water service is relocated, the extent of the City vs. property owner responsibilities is altered. Once relocated, the property owner shall assume all responsibility for the service line from the connection point of the original service up to and including connections at/on the setter (excluding the meter and associated 2 connections). Should the service line develop a leak at or beyond the new connection point, Providence City assumes no responsibility.

All current existing standards and specifications shall be recognized and followed throughout the relocation.