



CITY OF COEUR *d'*ALENE

WATER DEPARTMENT

CONSTRUCTION STANDARDS

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INTRODUCTION

The City of Coeur d'Alene Water Department recognizes the Idaho Standards for Public Works Construction and the City of Coeur d'Alene Standard Drawings as the primary construction standards and specifications for all work regarding infrastructure installation, repairs, and maintenance. The following information is intended as the Water Department's additional standard construction practices. If there is a conflict of construction methods or standards, the Idaho Standards for Public Works Construction and the City of Coeur d'Alene Standard Drawings shall be the prevailing rule.

These construction standards also provide references to other construction standards recognized by the State of Idaho and as referenced in the ISPWC such as IDAPA, ANSI and AWWA as well as manufacturer's specifications where certain brand name items and materials are specified.

The following construction standards are intended as an additional informational tool for engineering firms, contractors, and suppliers of construction materials within the City of Coeur d'Alene. The following information and updated construction drawings describe detailed standards in regard to the types of soil conditions inherent to the Coeur d'Alene area, approved installation methods and practices, and approved materials and appurtenances. The information provided is intended to save both the contractors and the City time and costs by reducing mistakes commonly made in the industry by not meeting our specific requirements for methods and materials.

The Contractor shall not bury any work to be inspected without such inspections taking place. The Contractor shall notify the Water Department forty-eight (48) hours in advance and shall use every number available to contact the Field Representative. If work is covered without the appropriate inspection, the Contractor will dig and expose any appurtenance which requires inspection at his/her own expense.

LIST OF CONTACTS

<u>Name, Department</u>	<u>Cell Numbers</u>	<u>Contact Numbers</u>
<u>City Engineer's Office</u>		(208)769-2216
<u>Water Department Office</u>		(208)769-2210
<u>Kyle Marine Director</u>	cell: (208)449-4021	(208)769-2211
<u>Glen Poelstra Assistant Director</u>	cell: (208)755-9727	(208)415-0418
<u>Mark Broglio, Utility Supervisor</u>	cell: (208)755-9728	(208)769-2210
<u>Rob Stark, Utility Supervisor</u>	cell: (208)661-6535	(208)769-2210
<u>Ryan Webster, Utility Supervisor</u>	cell: (208)755-9725	(208)769-2210
<u>Cory Royce, Const. Oversight</u>	cell: (208)277-7547	(208)676-7408
<u>Gary Nolan, Cross Connection Control, Field Representative</u>		(208)769-2298
		Ext. 298
<u>Streets & Engineering Department Office</u>		(208)769-2235
<u>Kim Harrington, Storm Water Management</u>		(208)769-2235
<u>Wastewater Department Office</u>		(208)769-2246
<u>City Hall Main Desk</u>		(208)769-2300
<u>Police Department Office</u>		(208)769-2320
<u>Fire Department Office</u>		(208)769-2340
<u>Bobby Gonder, Deputy Fire Marshall</u>	cell: (208)659-8986	(208)769-2245
<u>Craig Etherton Deputy Fire Marshall</u>	cell: (208)659-8986	(208)769-2245

CALL BEFORE YOU DIG!!!
DIAL "811" ANYTIME AND YOU WILL BE
AUTOMATICALLY DIRECTED TO YOUR LOCAL
UTILITY LOCATE SERVICE



BEFORE ANY DIGGING OCCURS, THE CONTRACTOR SHALL NOTIFY THE WATER DEPARTMENT 48 HRS IN ADVANCE AT: 208-769-2210

IF NEAR A TRAFFIC SIGNAL, NOTIFY THE STREETS & ENGINEERING DEPARTMENT AT: 208-769-2235

LOCATE ALL VALVES FOR AREA PRIOR TO DIGGING AS THIS WILL ENSURE THE CONTRACTOR'S ABILITY TO SHUT DOWN THE WATER MAIN IN CASE OF AN EMERGENCY.

IF THE CONTRACTOR FAILS TO CALL 811 FOR LOCATES PRIOR TO DIGGING, OR STARTS DIGGING BEFORE LOCATES ARE PERFORMED, THE CONTRACTOR ASSUMES ALL LIABILITY FOR DAMAGE TO ALL UTILITIES.

LOCATES ARE: *GOOD FOR 28 DAYS MAXIMUM. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING THE MARKS VISIBLE WITH THE APPLICABLE COLORS DURING THAT PERIOD.*

IF DAMAGE OCCURS TO ANY UTILITY, THE CONTRACTOR SHALL CALL THE RESPECTIVE UTILITY OWNER IMMEDIATELY TO DISCLOSE THE DAMAGE AND RECEIVE INSTRUCTIONS FOR REPAIRS, IF APPLICABLE.

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- W-9 Thrust Blocking
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- W-12 Cast Iron Valve Box – Two Piece
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- W-20 RPBA Premise Isolation, Std.
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CHAPTER 1

CONSTRUCTION INFORMATION, DEFINITIONS AND REQUIREMENTS

SECTION 1.1 OVERVIEW, DEFINITIONS AND ABBREVIATIONS

Subsection 1.1.01 OVERVIEW

- A. These construction standards are intended to provide a contractor's and supplier's guide for the correct provision of materials and proper installation of transmission/distribution mains, fire hydrants, fire service laterals, domestic and irrigation services in the City of Coeur d'Alene public water system, hereinafter referred to as the City.

Subsection 1.1.02 DEFINITIONS

- A. Whenever the words defined in this section, or pronouns used in their stead, occur in these specifications or other related documents, they shall have the meanings here given.
1. **Approval** - Shall be used to certify that all plans, specifications and other contract documents have been properly reviewed, signed and approved for public water facility construction by the City Engineer and/or Director or his/her duly authorized agent.
 2. **Appurtenance** - Shall mean any item attached to water facilities enabling it to function as designed, but not necessarily considered an integral component to be identified on plans or construction drawings.
 3. **Backflow** - Water that flows back to the distribution system. It is sometimes caused by a loss of pressure in the water system
 4. **Backpressure** - A form of cross connection caused by higher pressure on the customer side of the service meter, usually from a boosted pressure, elevation or thermal expansion
 5. **Casing** - Lengths of pipe welded or coupled together to form a continuous horizontal length of pipe to provide protection for a water main or vertically in a well from the surface to the aquifer.

6. **Chlorination** - A method of water disinfection where gaseous, liquid, or dissolved chlorine is added to a water supply system to inactivate pathogens and viruses.
7. **Chlorine Demand** - The amount of chlorine needed to react with potential contaminants in a public water system; used as a monitoring measurement by system operators.
8. **City** - Shall mean the City of Coeur d'Alene.
9. **City Engineer** - Shall mean the City of Coeur d'Alene employee having that title, or his/her duly authorized agent.
10. **Column** - The vertical pillar of water formed by water being pumped out of a well.
11. **Compound or Combination Meter** – A water meter used in places with high fluctuations in water usage; includes a positive displacement meter and a turbine meter.
12. **Contractor** - Shall mean the person, firm, or corporation that is installing public water facilities for the purpose of replacement or extension into and construction of new public water facilities.
13. **DCVA** - Shall mean a Double Check Valve Assembly utilized to protect potable water systems from low hazard used water. This unit uses two check valves in series to protect against backflow or backpressure.
14. **Design Engineer** - Shall indicate the individual, company, firm or corporation responsible for proposed design plans, easement description, written specifications and other contract documents for the proposed and/or constructed public water facilities.
15. **Developed Area** - Shall describe established subdivisions and other developed property along private or public right-of-way with paved streets and sidewalks where other utility facilities are present and do cross the path of a City proposed route causing major concern and where traffic maintenance is of major concern.
16. **Developer** - Shall indicate any person(s), corporation, partnership, or firm which desires installation of public water facilities for the purpose of developing property for construction and/or sale adjacent to or within the ACI boundaries of the City of Coeur d'Alene.
17. **Distribution System** - Shall mean the network of public water lines generally less than twenty (20") inches in diameter and to provide direct customer municipal water

service and which comprise the basic grid of the water system to promote adequate flow.

18. **Dry-barrel Fire Hydrant** - A freeze resistant fire hydrant with the operating valve located at the bottom of the barrel that keeps the water below the frost line.
19. **Ductile Iron Pipe**- A type of iron pipe used for water mains that generally has the properties of high flexural strength, ductility, and resistance to impact and permeation.
20. **Field Representative** - Shall infer a designated representative of either the construction engineering entity or a City representative duly authorized to provide construction oversight and approve or disapprove the work being done. The individual under this title shall have authorization to stop work and request corrections or further information to be provided by the Project Engineer, City Engineer and/or Director.
21. **Fire Hydrant** - A hydrant used to access water directly from the water main, equipped with fire hose connections for use in the event of a fire.
22. **Fire Line** - Shall mean an unmetered private line leading to and located on private property which shall be utilized for the sole purpose of providing water to interior commercial, industrial, and possible residential fire suppression systems only and not for other consumptive purposes.
23. **Flushing Hydrant** - A hydrant used to flush the water main, usually installed at the end of a water main. Also called blow-off hydrants.
24. **Gallons Per Minute** - GPM, A unit of measurement used to express the flow of water in a pipe.
25. **IDAPA** – As referenced in this manual shall mean the Idaho Administrative Procedures Act providing guidance for design, construction and operation of public water infrastructure as well as specific water quality regulations.
26. **IDEQ** – As referenced in this manual, shall mean the Idaho Department of Environmental Quality. This is the state agency responsible for oversight of the Safe Drinking Water program which governs primary regulations for the public and private water purveyors in the state of Idaho.
27. **Laterals** - The pipes that carry water from transmissions mains through smaller water mains to the customers, may also include customer services.

28. **Main Valves** - Valves installed at tees or crosses where two or more water mains intersect, so that the mains can be isolated for emergency repair or maintenance.
29. **Materials** - Shall mean all necessary parts, fittings, pipe, bedding and backfill, and any other miscellaneous materials necessary for the complete installation of public water facilities.
30. **Municipal Water Service – Or Water Service** - shall mean water service to an industrial, commercial, or residential lot for the purpose of domestic, commercial, recreational or irrigation purposes.
31. **MXU** - Shall mean an approved brand meter transceiver unit utilized to remotely read water meters. The MXU receives and transmits a signal to a remote reading unit giving the current water usage reading.
32. **Plans** - Shall mean approved engineering prints complete with inserted standard drawings, written specifications and other pertinent materials that constitute the Contract Documents for the specific project.
33. **Private Water Line** - Shall mean any water line that is not owned and/or maintained by the City. Private water lines shall not include water service for multiple lots or buildings where ownership of the mains could be disputed. The City will not allow private mains to be constructed without master metering or by other arrangements as specified by the Director or his/her duly authorized agent.
34. **Public Water Facilities** - Shall mean any and all components such as wells, reservoirs, mains, distribution stations, fire hydrants, water services and other appurtenances that comprise the entire public water system.
35. **Public Water Main or Line** - Shall mean a water line owned and maintained by the City.
36. **PVC** - Shall mean Poly Vinyl Chloride pipe, typically referred to as plastic pipe. The polyvinylchloride denotes the materials the pipe is constructed of. PVC pipe is constructed for various uses in the construction industry. It is generally utilized for utilities to convey potable and irrigation water, waste water, storm water, liquid petroleum products, and natural gas.
37. **Remote-read** - A type of water meter that generates a signal, which is read by radio, telephone, or by use of a handheld computer.
38. **Residual** - The amount of chlorine remaining after the initial reaction in a water purification system; used as a monitoring measurement by system operators.

39. **RPBA** - Shall stand for a Reduced Pressure Backflow Assembly also known as a RP or RPZ. This assembly incorporates two check valves with an atmospheric relief valve between check valves to provide an air gap between potable water and used water or other undesirable liquids to prevent cross contamination. RP's are required for high hazard potential situations.
40. **Salvage** - Shall mean all cast iron, steel, ductile iron, brass and other miscellaneous water system components removed during repairs or replacement. This will not include PVC or AC pipe.
41. **Select Material** - shall mean compaction material required by the manufacturer of the material being used, consisting of fine dirt, free of rocks larger than 5" in diameter, frozen lumps or other objectionable materials. City shall approve all select materials.
42. **Service Line** - Shall mean any pipe carrying potable water from a public water main to a water meter, the edge of public right of way, edge of the water main easement, or other distribution point, may also be known as laterals.
43. **Service Valves** - Valves used to isolate a single building from the water main; installed on the service line between the water main and the building, usually near the street curb; also called curb stop valves.
44. **Shop Drawings** - Shall mean submitted engineering preliminary prints, manufacturer supplied working drawings, work order drawings, and supplemental sketches submitted to the ENGINEER which show the location, character, dimensions and details of the work and/or materials to be provided either by a subcontractor or vendor.
45. **Site** - Shall indicate the developed or undeveloped area proposed for new construction of public water facilities.
46. **Specifications** - Shall reference a published contract document accompanying the plan drawings for direction of, provisions to, special conditions and/or requirements of the work to be performed.
47. **Director** - Shall mean the Director of the respective City of Coeur d'Alene utility or utilities to be developed, acting either directly or through his/her duly authorized agents, such agents acting severally within the scope of the particular duties entrusted to them. On all questions concerning the acceptance of materials, machinery, the classifications of material, the execution of work, conflicting interests of the contractors performing related work and the determination of costs, the decision of the Director shall be binding and final upon both parties.

48. **Transmission Main** - Shall indicate a public water main, usually twenty (20") inches and larger, which typically will not have any domestic, fire or irrigation services along its length, for the provision of large amounts of water to the respective distribution mains and/or grid.
49. **Turbine Meter** - A water meter used in higher-flow conditions.
50. **Undeveloped Areas** - Shall mean new proposed subdivisions, private or public right of-way or other areas where other utility facilities and traffic maintenance is not of major concern.
51. **Vacuum** - A condition created in a well or water main when air is not allowed to be displaced between the casing and the pump column or water main when water is evacuated.
52. **Valve** - A mechanical device by which the flow of liquid may be started, stopped, or regulated by a movable part that opens, shuts, or partially obstructs one or more ports or passageways.
53. **Vent** - A pipe installed in the well casing to allow for the displacement of air between the casing and the pump column.
54. **Water Flow** - The amount of water available in a water supply system.
55. **Water Hammer** - An occurrence caused when flowing water in a system is immediately stopped due to a valve or hydrant being closed too quickly, which sends a sudden pressure wave down the water line, dramatically increasing pressure at dead ends, elbows and tees.
56. **Water Main** - A primary pipe used to carry water from the source to storage facilities and to points along the distribution system.
57. **Water Meter** - A device used to measure the volumetric flow of water.
58. **Water Pressure** - The force of the water available in a water supply system, measured in pounds per square inch (psi).
59. **Well** - Any opening into the ground used to obtain water, where the depth of the opening is greater than the largest surface dimension.
60. **Well Abandonment** - A process to permanently close a well, which has certain criteria and requirements that must be followed.

- B. It is understood that the contractor will hire qualified help, provide the necessary and proper equipment and pursue the work with a good manner of workmanship, using the latest approved construction methods.

Subsection 1.2.02 PRE-CONSTRUCTION CONFERENCE

- A. Prior to work commencing on any project, the Contractor shall schedule a preconstruction conference with the City Water Department to inform the Director of the work to be performed. Any necessary contract documentation shall be provided to the City Water Department prior to the pre-construction conference. The Contractor shall attempt to have a representative from all of the Contractor's subs at the meeting or shall be authorized to speak for them. The Contractor shall provide at the meeting:
 - 1. A complete listing of the Contractor's subcontractors for the project.
 - 2. An approved set of plans with the applicable Utility Director's and City Engineer's signatures. Any changes, additions or deletions shall be reviewed and signed by the Director and City Engineer prior to construction as well. The Contractor shall have a set of signed plans available at the work site all times which shall be shown to the Field Representative.
 - 3. A project schedule which shall be regularly updated and any changes shall be submitted to the City during the project.
 - 4. Proof of insurance, license and bonding if not provided to the City at an earlier date.
- B. If construction stops, is delayed longer than thirty (30) days, or there are significant changes with the construction drawings/project, the Contractor shall set an additional preconstruction conference to review the work to be done and any possible changes. Minor drawing detail changes may be accomplished through the normal review process by the Utility and City Engineer.

Subsection 1.2.03 DAYS OF WORK

- A. Work may only be performed Monday through Friday from 7:00 AM until 5:00 PM. No work may be done on Saturday, Sunday or any City holiday without prior approval. All overtime costs will be incurred by the contractor for having an inspector present outside of normal business hours, routine inspections, weekends, and holidays. Any work deviating from these specifications must have prior approval from the City Engineer and /or Director. If any work is carried out without the Director's knowledge, the City shall require any portion of the work to be uncovered in order for a thorough inspection may be accomplished. Any portion of the work directly relating to streets, sidewalks, curbs, and any other street/traffic element shall be made available for inspection and approval as directed by the City Engineer. The Contractor shall leave all work performed uncovered

until the City Field Representative can confirm adequate installation, unless said work is in the street or presents a hazard to the general public. Any work performed on a weekend or City observed holiday shall be pre-approved by Director. A Field Representative from the Engineering firm shall be on site during work and shall submit proof of inspections to the Director the following scheduled work day. In this case, all work in the street requiring cover shall have as-builts, including applicable gps coordinates and pictures of all mechanical joints and thrust blocks, immediately available to the Field-Representative for the next regularly scheduled workday.

Subsection 1.2.04 REPORTING DISCREPANCIES

- A. If, during the performance of the work, the Contractor discovers any error, conflict, or discrepancy between the construction drawings and project specifications and any applicable construction standards or regulations, the Contractor shall report it to the Director and/or City Engineer immediately. Work affected by the discrepancy shall not proceed until the discrepancy has been corrected or both parties agree that there is no other viable method to resolve the discrepancy and shall agree on a course of action to remedy the situation.

Subsection 1.2.05 PLANS

- A. The City Engineer and/or Director shall approve all plans, drawings, or sketches showing locations of new facilities to be connected to the City public water system. No work may begin until written approval from the Director and the City Engineer has been received. All plans, drawings and specifications for new facilities and infrastructure shall be submitted for QLPE approval for IDEQ acceptance or by direct submission to IDEQ for final review and approval per IDAPA Rule prior to any construction taking place.

Subsection 1.2.06 PRESERVATION OF MONUMENTS

- A. The Contractor shall preserve all monuments, bench marks, survey marks and stakes. In case of their removal or destruction by the Contractor or his/her employees or others, the Contractor shall be liable for the cost of their replacement.

Subsection 1.2.07 DATUM PLANE AND MEASUREMENTS

- A. All distances and elevations shown on the plans, profiles, or other drawings are in feet; elevations being given above the datum of the U.S. Geological survey unless otherwise noted. All measurements on the plans are horizontal measurements, unless otherwise shown.

SECTION 1.3 PROJECT CONTRACTOR'S RESPONSIBILITIES

Subsection 1.3.01 SAFETY PRECAUTIONS

- A. Precautions shall be exercised at all times for the protection of persons and property. The safety provisions and regulations of applicable laws currently adopted building and construction codes concerning the area of construction shall be observed.
- B. The Contractor shall comply with all regulations as specified under the Occupational Safety and Health Act (OSHA) and its amendments.

Subsection 1.3.02 PERSONAL ATTENTION

- A. The Contractor shall give his/her personal attention to the performance of the work and shall be present, either in person or by a duly authorized representative, on the site of the work continually during its progress, to coordinate the work and to receive directions and instructions from the Director.

Subsection 1.3.03 CARE AND CUSTODY OF WORK

- A. The Contractor shall have full responsibility and custody of the work until acceptance, meaning until the end of the project and all water related punch list items and any other related work have been completed. The Contractor will be responsible for all damage to existing infrastructure and facilities while the work is in his/her charge. The Contractor shall take necessary steps to protect the work from damage and/or trespassers. All damage done to existing infrastructure and facilities, personal property, and/or utility structures shall be repaired by the Contractor at his/her own expense. This shall include all clean-up of the affected area.
- B. The Contractor shall not bury any work to be inspected without such inspections taking place. The Contractor shall notify forty-eight (48) hours in advance and shall use every number available to contact the Field Representative. If work is covered without the appropriate inspection, the Contractor will dig and expose any appurtenance which requires inspection at his/her own expense. No claims for project delays shall be made due to this inspection.

Subsection 1.3.04 MATERIALS

- A. All materials furnished shall be new and unused, of the quality defined in these specifications and approved by the Director. The Contractor shall furnish to the Director for test, whenever requested and free of charge, samples of all materials proposed to be used in the work. He/she shall also submit any required detailed drawings of articles or equipment for City approval. Rejected materials must be immediately removed from the site of the work and marked by the Contractor and shall not be brought again upon the work site.

Subsection 1.3.05 RESPONSIBILITY FOR MATERIAL FURNISHED BY THE CITY

- A. Material to be furnished by the City shall be examined by the Contractor at the place of delivery. Material which is found to be defective or damaged at the time of delivery shall be rejected by the Contractor and replaced by the City.
- B. Material furnished by the City which is found to be defective in manufacture shall be replaced by the City. Material which is accepted by the Contractor and is later found to be damaged shall be replaced by the Contractor. All defective and/or damaged material found after installation shall be removed and replaced by the Contractor at his/her own expense.
- C. Any material furnished by the City shall be secured by the contractor at City of Coeur d Alene Water Dept. facility or as specified by the Director.

Subsection 1.3.06 HANDLING OF PIPE AND ACCESSORIES

- A. Tools and equipment satisfactory to the Director shall be provided and used by the Contractor for the safe and efficient execution of the work. All pipe, fittings, valves and accessories shall be handled in such a manner as to prevent damage. The pipe shall not be dropped or thrown into the trench or onto the street surface. Any pipe which has been dropped shall be thoroughly inspected and rejected at the Contractor's expense if any damage is found. The damaged pipe shall be marked and removed from the work site.
- B. ***MATERIAL INSPECTIONS*** - All work and materials furnished under these specifications shall be subject to rigid inspection. All parts and materials shall be inspected by the City and/or Project Engineer prior to allowing the Contractor to begin excavation work. It shall be the Contractor's responsibility to notify the City Water Department when materials arrive on the job site to allow adequate time for inspection.

Subsection 1.3.07 COMPLIANCE WITH LAWS

- A. It shall be mandatory upon the Contractor herein and upon all Subcontractors under him/her, to comply with all provisions of the Idaho Standards for Public Works Construction, City Construction Specifications and Labor Code of the State of Idaho.

Subsection 1.3.08 STATE REGULATIONS

- A. In any situation where Federal, State or other jurisdiction's regulations are more restrictive than those listed in this document, the more restrictive regulation shall apply unless they are deemed unnecessary or contrary to City approved standards by the City Engineer and/or Director.

Subsection 1.3.09 USE OF PREMISES

- A. The Contractor shall confine his/her operations, including plant and the storage of materials, to the rights-of-way or roadways, as shown on the plans. Special care shall be taken to create a minimum of inconvenience and damage to private owners and their improvements.

Subsection 1.3.10 SHUT DOWN POLICY

- A. All shutdowns shall conform to the policy as adopted by the City Council. All affected customers shall be notified with a written notice at least forty-eight (48) hours prior to the shutdown. Notices shall also be provided to City Hall, the Water Department Office, and the Fire Department forty-eight (48) hours prior to shut down. If the shutdown is to occur on a Monday, the affected services shall be notified in writing the preceding Friday. If requested by the Contractor, the City may provide the Contractor with a form letter containing the correct contact numbers to use as an official notice. The Contractor shall provide verification to the City that he/she has made every attempt to contact everyone affected.
- B. If an emergency shut down is required, the Contractor shall immediately notify City Water Department personnel at (208-769-2210). Once notice has been given to City, every effort shall be given to notify all affected customers in the shutdown area.

Subsection 1.3.11 WORK TO BE DONE

- A. The work to be done consists of furnishing all materials, equipment, labor and all other items of expense necessary for the installation of the completed facility as shown on the plans and in accordance with the specifications. In some instances, the City may furnish certain materials and services which will be expressly called out on the plans and/or specifications.
- B. The City's approval of plans prepared by a private engineer denotes agreement with the plan as prepared and is not an acceptance of responsibility as to accuracy. The private engineer shall be responsible for any errors, coordination with other facilities, and interpretation of the plans. Any changes to the original plans, whether in the field or during design, shall be submitted to the City Engineer and/or Director prior to the changes being made, installed, and placed on as-builts for approval. The intent is that the complete facility shall be in general conformance with the approved plan and in accordance with the requirements of these specifications. All revisions and changes in the plan must be approved by the City Engineer and/or Director.

Subsection 1.3.12 ABANDONMENTS

- A. Where gate valves, blow offs, service boxes, or meter pits are to be abandoned, they shall be removed per City specifications and requirements and the street, lot or lawn repaired by the Contractor to original conditions and/or the Director's satisfaction. The Director shall specify any other requirement concerning a particular job as the need arises.

Subsection 1.3.13 GUARANTEE

- A. The Contractor's guarantee shall be as stipulated under a public works contract with the City or as a specified condition of the development or jobsite work permit.

SECTION 1.4 OWNER'S RESPONSIBILITIES

Subsection 1.4.01 NOTICE OF DEFECTIVE WORK

- A. The Contractor shall be notified in writing whenever defective material or workmanship is discovered. The Contractor shall make all repairs at his/her own expense, within thirty (30) days after receipt of the written notice. Should the Contractor fail to repair the damage within the thirty (30) days, the City may make the necessary repairs and charge the Contractor with actual cost of the repairs. Where immediate attention is required, the City shall have the right to repair the defect or damage and to charge the Contractor with the actual cost of repairs.

Subsection 1.4.02 FINAL INSPECTION

- A. The City shall perform a final inspection with the project engineer or representative on the construction project in order to assist with provision of any punch list items which must be completed prior to final completion and acceptance of the project. The Water Dept. Field Representative shall also be required to sign off on water related projects prior to issuance of the Certificate of Occupancy.
- B. The Contractor shall not bury any work to be inspected without such inspections taking place. The Contractor shall notify forty-eight (48) hours in advance and shall use every number available to contact the Field Representative. If work is covered without the appropriate inspection, the Contractor will dig and expose any appurtenance which requires inspection at his/her own expense. No claims for project delays shall be made due to this inspection.

Subsection 1.4.03 MATERIAL AND EQUIPMENT SALVAGE

- A. The City shall make it clear and understood that when the Contractor is required to remove portions of old mains or appurtenances from the ground, this shall be considered salvage. All salvage is the property of the City. The City reserves the right to request the Contractor to collect and stockpile all salvage in a location safe and free of nuisance to the public and/or deliver it to the Water Department facility within thirty (30) days, or

dispose of it as directed by the Director. Backfill, compaction, and surface repair of all excavations for salvage shall be made in accordance with these specifications.

- B. Asbestos Cement (AC) pipe shall not be considered salvage, but must be disposed of in an approved manner, if removed from the trench, acceptable to the regulating agency.

SECTION 1.5 CONSTRUCTION SITE CONDITIONS

Subsection 1.5.01 RIGHTS-OF-WAY AND EASEMENTS

- A. Water mains shall be installed in dedicated rights-of-way at all times unless it is absolutely imperative that a main be installed across private property. When a main is installed across private property, a public utility easement shall be established for water main maintenance and repairs and legal documentation of said easement shall be furnished to the City prior to acceptance of water mains. The standard right-of-way / easement for water mains shall be twenty (20') feet centered on the completed pipeline. All utility easements where active mains may cross private property shall be kept accessible to the City maintenance crews at all times for maintenance, locating and repairs. The City will reserve final approval of all proposed water line easements in regard to accessibility and grades.
 - 1. No irrigation lines or fire lines shall cross the City's right of way or easement. Per existing City Water Department policy, no temporary or permanent buildings and/or structures shall be built within a water main utility easement or right-of-way. No structural wall shall be built within 10' of a water main or water services including concrete footings and retaining walls. Trees, shrubs, or bushes shall not be planted within 10' of water meter services, meter boxes, and other appurtenances to allow for future maintenance. The City Water Department will not be responsible for any landscaping repairs within 10 feet of its infrastructure. Any cover materials other than grass or asphalt shall be the responsibility of the property owner to replace should excavation for repairs and maintenance become necessary.

Subsection 1.5.02 OBSERVE MINIMUM UTILITY SEPARATIONS

- A. A minimum of five (5') feet horizontal separation shall be maintained from other utilities such as gas, power, phone and TV cable. Public utilities wishing to install lines within a public utility easement shall require written permission from the City for access. The City shall retain the right to require the other utility to vacate the easement should any conflicts exist.
- B. The standard minimum of ten (10') feet from any non-potable line shall be maintained. No other utilities shall be laid in or over the same trench as the water main and shall observe the minimum five (5') foot horizontal separation requirements.

Subsection 1.5.03 PUBLIC CONVENIENCE

- A. ***PUBLIC TRAFFIC*** - The Contractor shall at all times conduct his/her operations in a manner affecting the minimum obstruction and inconvenience to public traffic. Any planned interruptions in normal traffic flow shall have prior approval in the form of an approved encroachment permit received from the City of Coeur d'Alene Engineering Services Department. A permit to work within the right-of-way must be obtained from the Streets & Engineering Department prior to beginning any work in the public right-of-way. The Contractor shall provide a traffic control plan for approval by the City Engineer and/or Director when such work will impede or require any diversion of local traffic. The Contractor shall have under construction only that amount of work he/she can execute properly within the limits of all safety regulations and the rights and convenience of the public. Utility work in the public street or right of way shall not be left open overnight. The Contractor must fill in the work to finished grade or supply traffic rated plating if the Contractor has prior approval from the City Engineer and/or Director. All public and private driveways impacted by the work shall be accessible by the end of the work shift.

- B. ***WORK CONDITIONS*** - The work shall be carried on with special regard for the rights and convenience of the traveling public, the property owners, and residents along the line of work. All necessary precautions, as approved by the City Engineer, shall be taken wherever necessary to provide for two-way traffic along all traveled streets, unless otherwise approved and/or required by the City Engineer.

- C. ***ACCESS TO PRIVATE PROPERTY*** - The Contractor shall provide necessary access to adjoining private property. Residents shall be notified if driveways are to be blocked, allowing removal of cars if desired. Driveways shall not be closed or obstructed longer than is absolutely necessary in the Director's opinion and means of crossing shall be provided during all stages of work. Work which impairs access to service stations, stores and other business establishments shall be carried on to completion as rapidly as possible and where necessary, steel plates or continuous bridges shall be provided to facilitate travel across the trench. Temporary access shall be made for the full width of affected driveways to facilitate access from either travel direction, including weekends and holidays.

- D. ***PUBLIC SAFETY*** - The Contractor shall furnish, erect, and maintain in good order all warning signs, lights, barriers, and other measures designed to protect the traveling public as directed by the City and applicable laws and regulations. This provision shall include weekends and holidays.

- E. ***TRAFFIC CONTROL DEVICES*** - All barricades, cones and warning devices shall comply with all MUTCD regulations and shall be plainly marked with the Contractor's name and contact number. Traffic control plans shall be pre-approved by the Streets and Engineering Department.

- F. **OTHER HAZARDS** - The Contractor shall take immediate steps to correct any hazard affecting public safety. Where the Contractor does not take immediate action, the City Engineer or Director may require temporary corrective steps be taken and the Contractor shall be charged for all costs involved. Where the City Engineer or Director has taken temporary corrective steps, the Contractor shall not be relieved of his/her responsibility for public safety or damages to persons or property. The Contractor shall correct the hazardous condition at the earliest possible time and shall notify the City Engineer that he/she has done so.

Subsection 1.5.04 DUST ABATEMENT

- A. The Contractor shall furnish all labor and equipment to carry out effective measures where necessary to prevent his/her operations from producing dust as directed by the City Engineer. This includes weekends and holidays. The Contractor shall only use fire hydrants with appropriate portable fill stations attached and authorized by the Director. The Contractor shall not use a fire hydrant as a water supply unless authorized by the Director. If authorized, the Contractor shall obtain any necessary equipment to record the water used and will be subject to any applicable fees and charges.

Subsection 1.5.05 SANITATION

- A. The Contractor shall comply with all applicable rules and regulations established by the Idaho Department of Environmental Quality and the City of Coeur d'Alene in regard to keeping the construction site clean and preservation of the material sanitary conditions. All excess construction materials and supplies not intended for use shall be neatly piled or removed from the site on a regular basis. The site shall be thoroughly cleaned and restored to near original condition prior to final completion of the project and shall be inspected prior to acceptance.

SECTION 1.6 REQUIRED TESTS AND INSPECTIONS

Subsection 1.6.01 PRESSURE TESTS

- A. The Contractor shall perform all required pressure tests for all mains, fire hydrants, fire service laterals and service laterals as defined in Chapter 11 in the presence of the Water Department Field Representative and/or related RPR or Field Engineer. The pressure test shall consist of pumping the installation to 160 psi and maintaining said pressure for a minimum of two (2) hours while a pressure recording device is attached. A maximum allowable leak loss shall be calculated per the ISPWC, Section 401 and if the main exceeds the allowable leak loss or loses excessive pressure prior to the time limit, repairs shall be made, and the test repeated until the installation passes and has been recorded as such. (Please see Water Standard Drawing W-35 Approved Pressure Testing Method and Water Standard Drawing W-36 Allowable Leak Loss Table)

Subsection 1.6.02 DISINFECTION AND BACTERIA SAMPLING

- A. The Contractor shall perform water main disinfection as described per Chapter 10 of these construction standards. Procedures for acceptable disinfection methods are outlined and shall be followed. The Contractor shall consult the Water Department Field Representative as to the amount of flushing to perform and for a determination of the number of required bacteria samples to be extracted after flushing. All test results shall be forwarded to the Water Department for project records.
- B. When newly constructed water main is connected to the potable distribution system, the proper bacteria testing procedures shall be as follows:
 - 1. Bacteria tests shall be submitted to Water Department prior to pressure testing newly installed piping.
 - 2. After completion of a successful pressure test, an additional bacteria test shall be submitted to ensure the pressure test did not introduce bacteria into the system.

Subsection 1.6.03 COMPACTION AND OTHER REQUIRED TESTING

- A. The Contractor shall have all compaction and other required tests performed as specified by these construction standards and/or the project contract documents. All test results shall be presented to the City for project records.

Subsection 1.6.04 REGULAR PROJECT INSPECTION

- A. The Contractor shall notify the Registered Project Representative (RPR) or Project Engineer forty-eight (48) hours in advance of any work to be done which will require inspections, in order that such regular inspections may be provided with a minimum of inconvenience or delay. All fittings, taps, fire hydrants, services, thrust blocks and miscellaneous appurtenances shall be inspected and recorded for project record and as built purposes. The Contractor shall also notify the Water Department Field Representative for the same applications. For any work done with any area open to public traffic, the Contractor shall also notify the City Engineer.
- B. The Director or his/her designated representative shall at all times have access to the work during its construction and shall be furnished with every reasonable facility for ascertaining that materials and workmanship are in accordance with the requirements of these specifications. In the event that any work which requires routine inspection as specified is prematurely covered by the Contractor, the Director may require the Contractor to uncover the affected area at his/her expense for proper inspection such as fittings, thrust blocks, service lateral connections, or any other areas or appurtenances

which may require as-built measurements and visual confirmation of compliance with these regulations.

SECTION 1.7 PROJECT COMPLETION

***Subsection 1.7.01* COMPLETION OF WORK**

- A. The work shall be considered complete and acceptable when the Contractor has fulfilled all requirements of the project contract requirements, any additional requirements under field change orders or corrections and any specific requirements in accordance with these standards for installation of public facilities, has removed all excess materials and equipment, has swept all paved areas and has restored the site to as good or better condition than it was when he/she found it. The City will dispatch Field Representative to ensure all clean up and disposal has been taken care of prior to final acceptance.

***Subsection 1.7.02* FINAL INSPECTION**

- A. The Contractor shall notify the Director or his/her representative in writing forty-eight (48) hours in advance to schedule. The final inspection may generate a punch list which will be given to the Contractor within a mutually agreed upon date after inspection.
- B. Any punch list items identified by the Field Representative shall be the responsibility of the Contractor to repair in a timely manner prior to receipt of final payment.

***Subsection 1.7.03* AS-BUILTS**

- A. The Contractor and/or Project Engineer shall supply as-builts on the plans provided, indicating the exact locations of all facilities installed before the City will accept the project as completed. The Contractor shall supply the Director with all construction notes which may or may not have been included on the as-builts. As-builts are due to the City no more than thirty (30) days after substantial completion of the project. If no as-builts are received, the City shall withhold any building permits for the project and/or Certificates of Occupancy. Any and all plan/construction changes shall be included with the final as-builts. The as-builts shall contain information regarding planned and actual installations, footage measurements for all fittings, tees and valves, detailed information and measurements for any appurtenances removed or replaced during construction, and any information regarding service stubs and their locations.

CHAPTER 2

TRENCHING AND EXCAVATIONS

SECTION 2.1 INFORMATION AND DOCUMENTATION

Subsection 2.1.01 GENERAL INFORMATION

- A. The City of Coeur d'Alene Water Department Construction Standards will provide a general description of the correct procedures for utility trenching and excavation work to be performed in City Right-Of-Way and/or easements which may or may not contain existing City, and other utility infrastructure. Contractor's working in and for the City of Coeur d'Alene shall be responsible for reading and understanding these standards in their entirety.

Subsection 2.1.02 REFERENCES

- A. IDAPA 58.01.08
- B. AWWA/ANSI – C600-99, C602-00, C603-05, C605-94

Subsection 2.1.03 DOCUMENTATION

- A. **CONTRACT DOCUMENTS** – Shall contain plans and specifications identifying all work to be done on the utility construction project. The Field Engineer and/or Field Representative shall be responsible for knowing and understanding the scope of work to be performed. They shall also be responsible for measuring and recording pertinent project information regarding location of valves, tees, elbows, fire hydrants, and crossings with other utilities, etc., for transfer to as-builts and provision to the City Field Representative. Measurements for the City's benefit shall be in feet and inches from an identifiable location such as valve box or fire hydrant and not from engineering stations or movable objects such as power poles, trees or buildings.
- B. **SUBMITTALS** - The Director or his/her designated agents shall approve all plans, drawings, or sketches showing locations of new facilities to be connected to the City water system. No work may begin until written approval from the Director and the City Engineer has been received.

Subsection 2.1.04 DEPARTMENT CONTACT NUMBERS

A. **City Contact Numbers** - The following numbers and information should be included in the Contract Documents for immediate availability to the Contractor:

Table 2.1

1. Water Dept. (208)796-2210
2. Streets & Engineering Dept. (208)769-2235
3. Wastewater Dept. (208)769-2246

SECTION 2.2 TRENCHING

Subsection 2.2.01 PRE-CONSTRUCTION CONFERENCE

A. Prior to work commencing on any project, the Contractor shall schedule a preconstruction conference with the City Water Department to inform the Director of the work to be performed. Any necessary contract documentation shall be provided to the City Water Department prior to the pre-construction conference. The Contractor shall attempt to have a representative from all of the Contractor’s subs at the meeting, or shall be authorized to speak for them. The Contractor shall provide at the meeting:

1. A complete listing of the Contractor’s subcontractors for the project.
2. An approved set of plans with the City Engineer’s signature. Any changes, additions or deletions shall be reviewed and signed by the City Engineer prior to construction as well. The Contractor shall have a set of signed plans available at the work site at all times which shall be shown to the Field Representative.
3. A project schedule which shall be regularly updated and any changes shall be submitted to the City during the project.
4. Proof of insurance, license and bonding if not provided to the City at an earlier date.

B. If construction stops or is delayed longer than thirty (30) days, or there are significant changes with the construction drawings/project, the Contractor shall set an additional pre-construction conference to review the work to be done and any possible changes. . Minor drawing detail changes may be accomplished through the normal review process by the City Engineer.

Subsection 2.2.02 TRENCHES

- A. The Contractor shall excavate all trenches to the required grade and alignment as shown on the Contract Documents and/or called for in these standards. The allowable length of open trenches shall be determined by the City Engineer and/or Director when work is started. The trench shall be excavated only so far in advance of pipe installation as the City Engineer will permit. The trench work shall conform to OSHA recognized standard Trench Safety Practices in regard to sloping and/or shoring requirements. Work may be terminated by City Field Representatives if they determine that the Contractor has not provided adequate safety for his/her employees or the public.

- B. Utility trenches for water mains and services shall be excavated to a depth sufficient to provide a minimum six (6") inch bedding if so required and a minimum four and one half (4 ½') foot of pipe cover. All excavation work shall be consistent with OSHA approved safe trenching practices or as provided by the CDA Water Department Safety Manual. No City employee will be expected to enter any trenches they deem to be unsafe by City standards.

Subsection 2.2.03 TRENCH WIDTHS

- A. The Contractor shall provide a minimum trench width for the various sizes of pipe as indicated in **Table 2.3**. This trench width will allow for safe movement of employees and equipment around the pipe laid in the trench.

Table 2.3

Inside Diameter	Width of Trench
4" and 6"	20"
8" and 10"	24"
12" to and including 36"	Outside diameter of pipe plus 12"

Subsection 2.2.04 DEPTH OF PIPE

- A. All water mains shall have a minimum cover of four foot six inches (4' 6") and maximum cover of six feet (6') between the top of the pipe and the finished grade, unless otherwise approved or directed by the Director. (Please see Water Standard Drawing W-11 Pipe Bedding and Backfill)

Subsection 2.2.05 EXCESS EXCAVATION

- A. In the event the trench is over excavated without the permission or recommendation of the Engineer, the trench shall be backfilled at the Contractor's expense to six (6") inches below the bottom of the pipe for PVC plastic pipe and ductile iron pipe with approved select backfill material level across the trench. The approved backfill materials shall be

properly compacted prior to installation of approved pipe bedding materials. When excavating in soft and unstable soils, the contractor shall undercut the trench to a depth to be approved by the Engineer that will properly support the pipe and related fittings and backfill with a select backfill material approved by the Engineer. The backfill material shall be moistened and placed in uniform layers in accordance with the backfill requirements of these standards. The Contractor shall furnish and install said backfill material per unit payment as specified in the contract documents unless the contractor has created the problem, which then would be at his/her own expense as determined by the Engineer. (Please see Water Standard Drawing W-11 Pipe Bedding and Backfill)

Subsection 2.2.06 DEWATERING THE TRENCH

- A. All water encountered must be pumped out of the trench and the trench kept dry until the pipe has been installed and the joints closed. Any ground water entering an open pipe shall immediately be removed and the pipe shall be flushed clean of any debris or mud prior to continuing installation. If the contaminated pipe cannot be readily cleaned by flushing or other acceptable means, the contaminated pipe shall be removed, properly cleaned or replaced as necessary to ensure a clean, uncontaminated installation.

Subsection 2.2.07 PROTECTION OF EXISTING FACILITIES

- A. The Contractor shall be responsible for the care and protection of all existing sewer lines, water lines, gas mains, culverts, or other facilities or structures that may be encountered in the area of his work. Prior to construction, the Contractor shall notify each agency of jurisdiction and make arrangements for the locating of their facilities. This shall include, but not be limited to contacting the Kootenai County Utility Council utility locating system by dialing “811” from any phone. When an existing facility is damaged or requires special protection due to his/her operation, the contractor shall notify the agency of jurisdiction and the Contractor shall be liable for the cost of repairs or protection. The Contractor shall not bury any damaged and repaired utilities until inspected and approved by the agency of jurisdiction.

Subsection 2.2.08 CHANGES IN LINE OR GRADE

- A. The City Engineer and/or Director shall have the authority to order revisions in the line or grade when obstructions are encountered which will require alterations to the plans. The Contractor shall be responsible for determining the fittings required, both horizontal and vertical, to conform with the new alignment and grade necessary to avoid conflict with existing facilities.

Subsection 2.2.09 TRENCH READY FOR INSTALLATION

- A. When the trench is properly prepped and ready for pipe installation, the Contractor shall follow the applicable chapter related to the type of installation to be completed. Once all

facets of the installation are completed, including all necessary inspections, the Contractor shall follow the final bedding and backfill procedures as outlined in Chapter 8.

***Subsection 2.2.10* INSPECTIONS**

- A. The bedding and initial installation of the main shall be inspected prior to backfilling of the trench. The Contractor shall notify the Field Engineer and Field Representative a minimum of forty-eight (48) hours prior to work being completed to allow sufficient time to have the inspections completed without delaying the work being done. The final backfill shall be inspected prior to placing of asphalt or concrete.
- B. The Contractor shall not bury any work to be inspected without such inspections taking place. The Contractor shall notify forty-eight (48) hours in advance and shall use every number available to contact the Field Representative. If work is covered without the appropriate inspection, the Contractor will dig and expose any appurtenance which requires inspection at his/her own expense. No claims for project delays can be made due to this.

SECTION 2.3 EXCAVATIONS

***Subsection 2.3.01* GENERAL**

- A. Excavations and utility trenching are commonly confused as one and the same, However, for the purposes of these standards, excavation shall indicate digging on an area wider than a standard two (2') foot plus wide trench whereas the danger of cave ins is significantly reduced to the employee within the excavated area due to the additional space.
- B. When utilized for a water related appurtenance, the same provisions as described above for utility trenches will be implied.
- C. Patching of all trenches shall consist of a minimum of three (3") inches of Class 3 asphalt unless otherwise directed on the plans or by the City Engineer. All joints between existing asphalt and new asphalt shall be coated with an approved emulsion tack coating.

CHAPTER 3

WATER PIPE AND RELATED FITTINGS

SECTION 3.1 MATERIAL INFORMATION

Subsection 3.1.01 GENERAL

- A. All materials supplied by the Contractor, or the City shall be new, clean and shall meet or exceed all City and AWWA guidelines. The material shall be handled in a manner which will protect its integrity and any coatings or special surface preparations it may have.
- B. All PVC pipe for water main use shall be Class 150 DR-18 meeting the AWWA standard C-900 for four (4") inch through twelve (12") inch, or C-905 for pipe larger than twelve (12") inch.
- C. Ductile iron pipe for water mains shall be cement lined and shall conform to the specifications of ANSI/AWWA C151/A21.51-81 for Class 50 Pressure Pipe, ANSI/AWWA C111/A21.11-85 for rubber gasket joints for ductile iron pressure pipe and fittings, unless otherwise specified on the plans or approved by the Engineer
- D. Long term storage of PVC out of doors shall be accomplished with use of tarps to cover and protect the pipe exterior and especially the sealing ends from ultraviolet degradation caused by direct exposure to sunlight in excess of 6 months. Pipe stored for longer than this period shall be thoroughly inspected upon delivery and may be rejected by the City. The supplier shall replace any rejected pipe at no expense to the contractor or the City.

Subsection 3.1.02 REFERENCES

- A. IDAPA 58.01.08
- B. AWWA/ANSI C900-97 (4" – 12") & C905-97 (14" – 48")
- C. AWWA/ANSI C500-02 through C605-94

Subsection 3.1.03 CERTIFICATE OF MANUFACTURE

- A. Every shipment of pipe shall be accompanied by a statement from the manufacturer certifying that each length of pipe has been found to meet the requirements thereof. This certificate shall be filed with the Director prior to the unloading of said material at the job site. All pipe shall be so tagged or marked by the manufacturer as to clearly indicate it has been subject to and meets the City's requirements. Said tags or marks shall be preserved by the Contractor until inspection and approval by the Director has been obtained.

Subsection 3.1.04 DOCUMENTATION

- A. Per the Contract Document requirements, the Field Engineer and/or Field Representative shall confirm that all materials utilized on the project meet all recognized standards and materials and installation. They shall also be responsible for measuring and recording pertinent project information regarding location of valves, tees, elbows, fire hydrants, and crossings with other utilities, etc., for transfer to as-builts and provision to the City Field Representative. Measurements for the City's benefit shall be in feet and inches from an identifiable location such as valve box or fire hydrant and not from engineering stations or movable objects such as power poles, or buildings.
- B. The Contractor and/or Project Engineer shall supply as-builts on the plans provided, indicating the exact locations of all facilities installed before the City accepts the project as completed. The Contractor shall supply the Director with all construction notes which may or may not have been included on the as-builts. As-builts are due to the City no more than thirty (30) days after substantial completion of the project. If no as-builts are received, the City shall withhold any building permits for the project and/or Certificates of Occupancy. Any and all plan/construction changes shall be included with the final as-builts. The as-builts shall contain information regarding planned and actual installations, footage measurements for all fittings, tees and valves, detailed information and measurements for any appurtenances removed or replaced during construction, and any information regarding service stubs and their locations.

Subsection 3.1.05 PRE-CONSTRUCTION CONFERENCE

- A. Prior to work commencing on any project, the Contractor shall schedule a preconstruction conference with the City Water Department to inform the Director of the work to be performed. Any necessary contract documentation shall be provided to the City Water Department prior to the pre-construction conference. The Contractor shall attempt to have a representative from all of the Contractor's subs at the meeting or shall be authorized to speak for them. The Contractor shall provide at the meeting:
 - 1. A complete listing of the Contractor's subcontractors for the project.
 - 2. An approved set of plans with the City Engineer's signature. Any changes, additions or deletions shall be reviewed and signed by the City Engineer prior to construction

as well. The Contractor shall have a set of signed plans available at the work site at all times which shall be shown to the Field Representative.

3. A project schedule shall be regularly updated and any changes shall be submitted to the City during the project.
 4. Proof of insurance, license and bonding if not provided to the City at an earlier date.
- B. If construction stops or is delayed longer than thirty (30) days, or there are significant changes with the construction drawings/project, the Contractor shall set an additional preconstruction conference to review the work to be done and any possible changes. Minor drawing detail changes may be accomplished through the normal review process by the City Engineer.

SECTION 3.2 PVC PIPE REQUIREMENTS

Subsection 3.2.01 HANDLING OF PVC PIPE AND ACCESSORIES

- A. Tools and equipment designed for use with PVC pipe and satisfactory to the Director shall be provided and used by the Contractor for the safe and efficient execution of the work. All PVC pipe, fittings, valves and accessories shall be handled in such a manner as to prevent damage. The PVC pipe shall not be dropped or thrown into the trench or onto the street surface. Any PVC pipe which has been dropped shall be thoroughly inspected and rejected at the Contractor's expense if any damage is found. The damaged PVC pipe shall be marked and removed from the work site.

Subsection 3.2.02 BEARING FOR PVC PIPE

- A. Bearing for PVC pipe shall be obtained by placing mounds of Type III bedding material or approved native material in the middle and near the ends of the pipe. The mounds shall extend across the trench, shall be six (6") inches wide, and shall be high enough to insure a clearance of at least six (6") inches beneath the bottom of the pipe along its entire length. Mounds shall bring the pipe to true line and grade as shown on the plan and profile. The entire length of the pipe shall be bedded with Type III bedding or approved native material to the centerline of the pipe, tamped well under and around the pipe, as indicated in the backfill section. Once the initial backfill has been tamped, the pipe shall be covered to a minimum of twelve (12") inches, minimum twenty-four (24") inches in rocky soils, above the highest portion of the pipe level across the trench. The bedding material shall then be tamped around the pipe prior to additional lifts of backfill being placed in the trench. If the trench is in a rock base, the trench shall be over excavated at least six (6") inches below the bottom of the pipe and shall have Type III bedding or approved native material placed and evenly distributed prior to pipe installation. (Please see Water Standard Drawing W-11 Pipe Bedding and Backfill)

Subsection 3.2.03 CUTTING OF PVC PIPE

- A. PVC water main may be cut with a powered chop saw, a PVC hand saw, an approved rotary pipe cutter or a chain style pipe cutter. Cut edges shall be buffed smooth as required. A beveling tool shall be utilized to cut or restore pipe assembly bevels at the spigot end as needed.
- B. Cut sections of piping may be utilized to continue the main provided that the cuts are clean and squared with no additional grooves, cracks or divots which may affect pipe integrity.

Subsection 3.2.04 PIPE DEFLECTION

- A. The PVC water pipe shall not be deflected along its length or at each bell joint greater than the manufacturer’s recommendation. The Contractor shall block or brace the pipe joints to ensure that bending of the C900 PVC pipe does not result in axial deflection in the gasketed or mechanical joint that exceeds the manufacturer’s published limits. Excessive axial-joint deflection may result in damage or leaks caused by excessive stress on the joints. Any necessary deflection beyond this point shall be accomplished with the aid of mechanical joint fittings and shall be shown on the construction drawings as necessary. At no time shall the pipe be deflected by the use of any mechanical device greater than a shovel or small pry bar. Please see **Table 3.1** for AWWA recommended PVC pipe deflection radius.

Table 3.1

Allowable Radius for C900 PVC Pipe

Nominal Size (m)	Minimum Bending Radius in. (mm)	ft. (30.5)
6 (150)	144	(43.9)
8 (200)	189	(57.6)
10 (250)	231	(70.4)
12 (300)	275	(83.8)

ANSI/AWWA C900 PVC pipe with cast iron (CI) outside diameters.

Subsection 3.2.05 PERMEATION

- A. Where there may be the likelihood that piping used for mains or services may be exposed to a significant concentration of pollutants including but not limited to low-molecular weight petroleum products and organic solvents or their vapors, the Project Engineer shall review the material selections or consider protection via casing materials of a

permeation resistive nature. Use of polyethylene, polybutylene, or polyvinyl chloride (PVC) have been documented as having been affected by permeation of low-molecular weight organic solvents and petroleum products.

SECTION 3.3 DUCTILE IRON PIPE

Subsection 3.3.01 HANDLING OF DUCTILE IRON PIPE AND ACCESSORIES

- A. Specific tools and equipment designed for use with ductile iron pipe and satisfactory to the Director shall be provided and used by the Contractor for the safe and efficient execution of the work. All ductile iron pipe, fittings, valves and accessories shall be handled in such a manner as to prevent damage. Ductile iron pipe shall not be dropped or thrown into the trench or onto the street surface. Any ductile iron pipe which has been dropped shall be thoroughly inspected and rejected at the Contractor's expense if any damage is found, including cracked cement mortar linings. The damaged ductile iron pipe shall be marked and removed from the work site.

Subsection 3.3.02 BEARING FOR DUCTILE IRON PIPE

- A. Bearing for ductile iron pipe, if so required, will be in the preformed in the same application as with PVC pipe. Type III bedding material or approved native material in the middle and near the ends of the pipe shall be utilized as approved by the Field Engineer or Field Representative. The entire length of the pipe shall be bedded with Type III bedding or approved native material to the centerline of the pipe, tamped well under and around the pipe, as indicated in the backfill section. (Please see Water Standard Drawing W-11 Pipe Bedding and Backfill)

Subsection 3.3.03 CUTTING OF DUCTILE IRON PIPE

- A. Ductile iron water main may be cut with a powered chop saw or a hydraulic compression type pipe cutter. Cut edges shall be ground smooth as required and the lining shall be checked for cracked or missing pieces.
- B. Cut sections of piping may be utilized in conjunction with other fittings to continue the main provided that the cuts are clean and squared with no additional grooves, cracks or divots which may affect pipe integrity. They cannot be used in a bell and spigot joint.

Subsection 3.3.04 PIPE DEFLECTION

- A. The ductile iron water pipe shall not be deflected along its length. Deflection shall take place at each bell joint or mechanical joint no greater than the manufacturer's recommendation. Any necessary deflection beyond this point shall be accomplished with the aid of mechanical joint fittings and shall be shown on the construction drawings as necessary. At no time shall the pipe be deflected by the use of any mechanical device

greater than a shovel or small pry bar. Please see **Table 3.2** for AWWA recommended ductile iron pipe deflection radius for bell and spigot joints.

Table 3.2

Maximum Joint Deflection – Bell and Spigot Joints

Nominal Pipe Size <i>in.</i>	Nominal Pipe Size <i>(mm)</i>	Deflection Angle- θ Offset - $S\ddagger$ <i>deg.</i>	Maximum Succession of Joints <i>in. (m) – ft. (m)</i>		Approx. Radius of Curve - $R\ddagger$	
			<i>Inches per 20 ft.</i>	<i>(5.5m)</i>	<i>Total Radius w/ 20' stick</i>	<i>Total Radius w/5m stick</i>
4	(102)	5	21	(0.53)	230	(70)
6	(152)	5	21	(0.53)	230	(70)
8	(203)	5	21	(0.53)	230	(70)
10	(254)	5	21	(0.53)	230	(70)
12	(305)	5	21	(0.53)	230	(70)
16	(406)	3	12	(0.30)	380	(116)
18	(457)	3	12	(0.30)	380	(116)
20	(508)	3	12	(0.30)	380	(116)
24	(610)	3	12	(0.30)	380	(116)

For 14-in. and larger push-on joints, maximum deflection angle may be larger than shown above. Consult manufacturer.

C. Joint deflection shall not exceed the previous table unless demonstrated in writing from the material manufacturer and approved by the City Engineer and/or Director.

D. Please see **Table 3.3** for AWWA recommended DI pipe deflection radius for mechanical joints on the following page.

Table 3.3

Maximum Joint Deflection – Mechanical Joint Pipe

Nominal Pipe Size <i>in.</i>	Nominal Pipe Size <i>(mm)</i>	Deflection Angle- θ Offset - $S\ddagger$ <i>deg.</i>	Maximum Succession of Joints <i>in. (m) – ft. (m)</i>		Approx. Radius of Curve - $R\ddagger$	
			<i>Inches per 20 ft.</i>	<i>(5.5m)</i>	<i>Total Radius w/ 20' stick</i>	<i>Total Radius w/5m stick</i>
4	(102)	8-18	35	(0.53)	140	(70)
6	(152)	7-07	30	(0.53)	160	(70)
8	(203)	5-21	22	(0.53)	220	(70)
10	(254)	5-21	22	(0.53)	220	(70)
12	(305)	5-21	22	(0.53)	220	(70)
16	(406)	3-35	15	(0.30)	320	(116)

18	(457)	3-00	12	(0.30)	380	(116)
20	(508)	3-00	12	(0.30)	380	(116)
24	(610)	2-23	10	(0.30)	500	(116)

SECTION 3.4 ASBESTOS CEMENT (AC) PIPE

Subsection 3.4.01 CUTTING AND TAPPING AC PIPE

- A. Cutting of AC pipe shall be performed using a hand saw or manual hydraulic snapping tool only due to the known hazards of airborne asbestos particles contained in the dust created by powered cut off saws.
1. Care shall be taken to prevent the inhalation hazards whenever working with AC pipe. Proper respiratory protection equipment shall be worn at all times during cutting and cleaning of the pipe. Airborne asbestos particles are a known carcinogen and all employees with potential exposure must be protected per OSHA guidelines.
 2. The portion of pipe cut out shall not be removed from the trench if at all possible. Once removed from the trench, the pipe is then considered hazardous waste and must be disposed per hazardous waste guidelines by double bagging in approved asbestos bags and sending to an approved disposal site. If left in the trench, the pipe can be mechanically crushed during backfill and compaction and will pose no further threat.
- B. Tapping of AC pipe may be done in the normal fashion utilizing a tapping tee or sleeve, gate valve and hydraulic tapping machine. Where two or more domestic taps, two (2") inches or less are to be made, saddles and corp stops will be utilized and shall be placed a minimum of twenty-four (24") inches apart on center to prevent cracking of the AC main. Where more than one tap four (4") inch and larger is made, the taps shall be a minimum of five (5') feet apart on center to preserve the structural integrity of the pipe. Any loosened soil under the pipe near a tapping tee or sleeve shall be removed and concrete shall be placed in the void to provide adequate and stable bearing surface. All coupons from AC pipe Tapping shall be saved in and offered to the Field Representative for pipe evaluation. Care should be taken to avoid undercutting of soil below pipe.
- C. Rough barrel AC pipe has varying wall thickness comparable with other types of pipe. Six (6") inch AC pipe has a three-quarter (3/4") inch wall thickness. Eight (8") inch AC pipe has a wall thickness of one and one-eighth (1 1/8") inches. And twelve (12") inch AC pipe has a one and three-eighths (1 3/8") inch wall thickness.

SECTION 3.5 FITTINGS AND RELATED MATERIALS

Subsection 3.5.01 FITTINGS AND VALVES

- A. Fittings shall conform to the latest editions of AWWA Specifications – either C111/A21.11 or C-104. Either of the following types of fittings may be used:
 - 1. Mechanical Joint – The Contractor may use mechanical joint fittings approved for use with ductile iron pipe. Joint restraints shall include meg-a-lug glands and thrust blocks. Where gate or butterfly valves connect to the fitting, the fitting shall have a flanged connection, unless otherwise approved by the City.
 - 2. Flanged type for outlet on tees and crosses or as required by the plans.
- B. Gate and butterfly valves shall be AWWA approved resilient seated valves and shall meet all requirements as specified in Chapter 4 of these construction standards.

Subsection 3.5.02 DEFECTIVE OR DAMAGED MATERIAL

- A. The pipe and couplings shall be carefully inspected for defects. Material found to be defective or damaged shall be rejected, marked and removed from the work site. In the event a portion of a length of pipe is damaged, the damaged portion shall be cut off in an approved manner, discarded and the remaining sound portions may be used. The Contractor shall be responsible for any and all damage to material and he/she shall stand the expense of repairing or replacing same. Rubber gaskets shall be stored out of the sun, inspected and protected from deterioration.

Section 3.5.03 PLUGS

- A. All openings in the pipeline shall be closed with watertight expandable type plugs, a push in plug (or pipe section with cap), or cast iron test plugs at the end of each day's operation. The use of fabric, plastic, a bucket, wood or other similar temporary plugs will not be permitted.

SECTION 3.6 INSTALLATION

Subsection 3.6.01 ASSEMBLY AND INSTALLATION

- A. PIPE AND FITTINGS -All connecting parts of pipe, gaskets, couplings and fittings shall be thoroughly cleaned before assembly and shall be assembled in a workmanlike manner in accordance with the manufacturer's recommendations or as provided in these specifications. Lubricant shall be as provided or approved by the pipe manufacturer. Excessive use of lubricant will not be permitted.

Subsection 3.6.02 JOINING PVC, DUCTILE IRON AND AC PIPE AND FITTINGS

- A. In joining with a rubber gasket type fitting, the length of pipe shall be a maximum of twenty (20') feet and a minimum of two (2) feet. All PVC, AC and ductile iron pipe, four (4") inch and larger shall be joined at tees, valves and other fittings by the use of a mechanical joint. Additional joint restraint, such as EBAA Iron 2000 PV series or a Meg-A-Lug 1100 series shall be installed as part of these construction standards if deemed applicable by the City Engineer and/or Director. The use of joint restraints does not eliminate the need for thrust blocks.
- B. Where rubber ring fittings are used, the pipe must have a machined end in accordance with the manufacturer's recommendations. Joining AC pipe to PVC pipe will require the use of Romac or equivalent couplings when a tee or elbow will not be installed. All valves shall be bolted to tees and crosses where applicable. Valves may occasionally be used with ninety (90°) degree elbows but shall be bolted to one side of the fitting.
- C. Please see **Table 3.4** for applicable bolt torque for all mechanical joint fittings unless otherwise specified by the respective manufacturer.

Table 3.4
Mechanical Joint Bolt Torque

Joint Size		Bolt size		Range of Torque	
		<i>in. (mm)</i>	<i>in. (mm)</i>	<i>ft.lb</i>	<i>(N.m)</i>
4-24	(102-610)	¾"	(19)	75-90	(102-122)
30-36	(762-914)	1"	(25)	100-120	(136-163)
42-48	(1067-1219)	1 ¼"	(32)	120-150	(163-203)

Subsection 3.6.03 JOINT RESTRAINT

- A. All mechanical joint deflection greater than eleven and one-quarter (11.25) degrees shall be physically restrained with a minimum of a poured concrete thrust block. The poured blocks shall be poured the full depth of the fitting with minimum 4 mil plastic sheeting double wrapped around the fitting. The concrete shall be poured to a perpendicular undisturbed embankment. (Please see Water Standard Drawing W-9 Thrust Blocking)

Subsection 3.6.04 BLOW OFF ASSEMBLY

- A. Blow off assemblies shall only be installed on dead mains in areas where water main will be extended at a later date. All other dead end main scenarios shall have a fire hydrant installed at the end of the main or an automatic flushing station to be determined by the Water Dept. Director.

Subsection 3.6.05 LOCATING WIRE

- A. All PVC and ductile iron water mains, fire services and fire hydrant laterals shall have a locating wire of not less than 12 ga. single or multi-strand copper with a direct bury rated insulated coating. The locating wire shall extend from just under the valve box lid down the inside of the valve box top section and outside of the valve box bottom section to the distribution main and shall be aligned at and taped to the center top of the pipe. Any connections shall be made with an approved direct bury connection. Locate wire is required to be fashioned into a knot prior to the direct bury connection. (Please see Water Standard Drawings W-11 Pipe Bedding and Backfill and W-12 Cast Iron Valve Box – Two Piece)

Subsection 3.6.06 MARKER TAPE

- A. All water mains shall have an approved marking tape to be placed approximately twenty-four (24”) inches from top of pipe and level in the trench with all lettering facing up. The tape shall be magnetically detectable and shall indicate “Buried Water Line Below”. (Please see Water Standard Drawing W-11 Pipe Bedding and Backfill)

Subsection 3.6.07 INSPECTION

- A. The bedding and initial installation of the main shall be inspected prior to backfilling of the trench. The Contractor shall notify the Field Engineer and Field Representative a minimum of forty-eight (48) hours prior to work being completed to allow sufficient time to have the inspections completed without delaying the work being done. The final backfill shall be inspected prior to placing of asphalt or concrete.
- B. The Contractor shall not bury any work to be inspected without such inspections taking place. The Contractor shall notify forty-eight (48) hours in advance and shall use every number available to contact the Field Representative. If work is covered without the appropriate inspection, the Contractor will dig and expose any appurtenance which requires inspection at his/her own expense. No claims for project delays can be made due to this.

SECTION 3.7 CASING FOR RIGHT-OF-WAY CROSSINGS

Subsection 3.7.01 CASING FOR PVC AND DUCTILE IRON PIPE

- A. Where it is necessary to install pipe in a casing, such as right-of-way or utility crossings, railroad and interstate crossings as well as waterway crossings, the casing sizes are indicated in **Table 3.5** and shall be utilized with approved wall thickness and the appropriate casing insulators. The casing insulators are available for various pipe sizes in certain casing sizes. The Contractor shall only install approved insulators as specified in the Contract Documents.

1. Casing wall thickness shall be determined dependent on the application it is being installed for. Wall thickness may be greater for unconfined soil placements or extreme traffic loading. The Project Engineer shall review all applicable regulations and construction standards prior to specifying the type and wall thickness of the casing to be used on the project.

Table 3.5 Casing
Inside Diameter

<u>Pipe Size</u>	<u>Casing Size</u>
6"	12"
8"	16"
10"	18"
12"	20"
14"	24"
16"	26"
18"	32"
24"	36"

- C. If steel casing is used, it shall have a minimum thickness of ¼ inch.
- D. **SEALS AND INSULATORS FOR STEEL CASING PIPE** - Casing insulators shall be used to electrically isolate the casing pipe from the water main. The insulators shall be equipped with heavy duty fusion bonded epoxy coated stainless steel spacers, with a minimum twelve (12") inch width, two (2") inch wide glass reinforced runners, with a minimum of two (2") bottom runners and two (2") top runners for pipe four (4") inches through twelve (12") inches, and a minimum of four (4") runners at the bottom and two (2") runners at the top for fourteen (14") inch through thirty-six (36") inch pipe.
- E. **CLOSURE OF CASING AFTER PIPE HAS BEEN INSTALLED** - Under no circumstances should the ends of the casing be closed, or any material installed inside the casing until after the pressure test has been completed and approved by the Field Representative_in charge. After the test, the ends of the casing should be sealed off. Closure shall be by manufactured boot, grouting, or insulating foam as approved by the City.
- F. The bedding and initial installation of the main shall be inspected prior to backfilling of the trench. The Contractor shall notify the Field Engineer and Field Representative_a minimum of forty-eight (48) hours prior to work being completed to allow sufficient time to have the inspections completed without delaying the work being done. The final backfill shall be inspected prior to placing of asphalt or concrete.

G. Patching of all trenches shall consist of a minimum of three (3") inches of Class 3 asphalt unless otherwise directed on the plans or by the City Engineer. All joints between existing asphalt and new asphalt shall be coated with an approved emulsion tack coating.

CHAPTER 4

MAIN LINE AND ISOLATION VALVES

SECTION 4.1 INFORMATION AND DOCUMENTATION

Subsection 4.1.01 GENERAL INFORMATION

- A. Main line and lateral isolation valves shall be the same size as the mains in which they are to be installed unless otherwise indicated on the plans. Gate valves shall be used to isolate all stubs and mains two (2") inch through eight (8") inch, and shall be bolted to all tees, crosses, and other fittings as established by the engineered drawings, Contract Documents and these Construction Standards or as determined by the City Engineer and/or Director. Any valves designed near elbows shall be bolted to the elbow by use of flanged fittings or a foster gland pack adapter. Butterfly valves will be used for mains ten (10") inches and larger unless the specific application calls for use of a gate valve such as a tapping sleeve. No hot taps greater than ten (10") shall be allowed unless approved by Water Dept. Director.

Subsection 4.1.02 REFERENCES

- A. IDAPA 58.01.08
- B. AWWA/ANSI C509-01
- C. AWWA/ANSI C504-00
- D. AWWA/ANSI C 512-04

Subsection 4.1.03 SUBMITTALS

- A. The City Engineer and/or Director shall approve all plans, drawings, or sketches showing locations of new facilities to be connected to the City water system. No work may begin until written approval from the Director and the City Engineer has been received.

Subsection 4.1.04 DOCUMENTATION

- A. The Field Engineer and/or Field Representative shall have reviewed and understand the scope of the work to be performed according to the Contract Documents prior to work commencing. They shall also be responsible for measuring and recording pertinent project information regarding location of valves, tees, elbows, fire hydrants, and crossings with other utilities, etc., for transfer to as-builts and provision to the City Field

Representative. Measurements for the City's benefit shall be in feet and inches from an identifiable location such as valve box or fire hydrant and not from engineering stations or movable objects such as power poles, trees or buildings.

- B. The Contractor and/or Project Engineer shall supply as-builts on the plans provided, indicating the exact locations of all facilities installed before the City accepts the project as completed. The Contractor shall supply the Director with all construction notes which may or may not have been included on the as-builts. As-builts are due to the City no more than thirty (30) days after substantial completion of the project. If no as-builts are received, the City shall withhold any building permits for the project and/or Certificates of Occupancy. Any and all plan/construction changes shall be included with the final as-builts. The as-builts shall contain information regarding planned and actual installations, footage measurements for all fittings, tees and valves, detailed information and measurements for any appurtenances removed or replaced during construction, and any information regarding service stubs and their locations.

Subsection 4.1.05 VALVE LOCATION

- A. Straight line runs must have in-line valves at least every two (2) standard city blocks or 600 feet, as determined by the City Engineer and/or Director. All lateral connections will have a valve bolted to the tee or cross. Where tees are installed, a main line valve shall be required a minimum of every two standard city blocks for possible future control. Valve locations will be closely studied for locations to best suit the future operation of the system and create as little service interruption as possible. Where designed, valves shall be bolted to elbows by means of flanged fittings or a foster pack gland adapter.
- B. Butterfly valve operating nuts, when standing on the nearest fitting (tee or cross) and looking away from the fitting, shall be on the left side of the pipe. For in-line valves, they shall conform to the standard as determined by the nearest fitting.

Subsection 4.1.06 PRE-CONSTRUCTION CONFERENCE

- A. Prior to work commencing on any project, the Contractor shall schedule a preconstruction conference with the City Water Department to inform the Director of the work to be performed. Any necessary contract documentation shall be provided to the City Water Department prior to the pre-construction conference. The Contractor shall attempt to have a representative from all of the Contractor's subs at the meeting or shall be authorized to speak for them. The Contractor shall provide at the meeting:
 - 1. A complete listing of the Contractor's subcontractors for the project.
 - 2. An approved set of plans with the City Engineer's signature. Any changes, additions or deletions shall be reviewed and signed by the City Engineer prior to construction

as well. The Contractor shall have a set of signed plans available at the work site at all times which shall be shown to the Field Representative.

3. A project schedule which shall be regularly updated, and any changes shall be submitted to the City during the project.
 4. Proof of insurance, license and bonding if not provided to the City at an earlier date.
- B. If construction stops or is delayed longer than thirty (30) days, or there are significant changes with the construction drawings/project, the Contractor shall set an additional pre-construction conference to review the work to be done and any possible changes. Minor drawing detail changes may be accomplished through the normal review process by the City Engineer.

SECTION 4.2 MATERIALS AND INSTALLATION

Subsection 4.2.01 MAIN LINE AND LATERAL GATE VALVES

- A. Gate valves shall be resilient seated, standard operating with approved exterior coatings, shall comply with AWWA standards C 509-01 (Resilient seat) and C 550 (Epoxy Exterior/Interior Coating) and shall be American made and assembled. Butterfly valves may be required for sizes twelve (10") inches and larger and shall conform to the latest revision of AWWA standards C-504-00 (Rubber Seat) and C 550, Resilient Seated Butterfly Valves, except as modified or approved by the Director in these specifications or on the plans. When using butterfly valves where the operating nut is near the center line of the valve, operating nut extensions will be required to bring the valve operating nut to within thirty-six (36") below finished grade.

Subsection 4.2.02 VALVE INSTALLATIONS

- A. Line and lateral isolation valves shall be the same size as the mains in which they are to be installed unless otherwise indicated on the plans. Valves shall be installed where mains and laterals connect, fire hydrant installations, or fire services are extended. Gate valves shall be used to isolate all stubs and mains two (2") inch through eight (8") inch and shall be bolted in a vertical position to all tees, crosses, and other fittings via flanged fittings as established by the engineered drawings and specifications or as determined by the City Engineer and/or Director. Butterfly valves shall be used for mains ten (10") inches and larger unless the specific application calls for use of a gate valve, such as a tapping sleeve. Prior approval must be obtained to install ten (10") and larger gate valves by Water Dept. Director. All flanges and gland packs shall be cleaned prior to installation and the proper size and pressure rated gaskets shall be used as specified by the contract documents, (plans and specifications). Where designed, valves shall be bolted to elbows by means of flanged fittings or a Foster pack gland adapter.

- B. Butterfly valve operating nuts, when standing on the nearest fitting (tee or cross) and looking away from the fitting, shall be on the left side of the pipe. For in-line valves, they shall conform to the standard as determined by the nearest fitting. Valves and fittings larger than sixteen (16") inch may require a concrete pad for proper support due to their extreme weight. Any pads required shall be engineered for diameter and thickness so as to provide adequate support.

Subsection 4.2.03 VALVE BOXES

- A. Valve boxes shall be cast-iron two-piece Tyler Series 6855-Heavy Duty (HD) or approved equal, and equipped with a "WATER" lid which fits properly inside the top of the valve box. All valve boxes shall be installed with a valve box alignment device and mud plug as approved by the Water Department. Valve boxes shall be adjusted to final grade and checked for proper alignment prior to paving over the mains. When replacing the valve box(s), the lower section shall not be broken or cracked and shall be cut square to the grade when adjusting the top section for elevation. The top section shall be in new condition with no cracks or broken. (Please see Water Standard Drawings W-12 Cast Iron Valve Box – Two Piece)
- B. When valve box extensions are required, use five (5") inch cast iron double hub soil pipe cut to the appropriate length. All valves shall be turned on and the valve boxes shall be cleared of all debris and raised to finished grade at completion of project. (Please see Water Standard Drawings W-12 Cast Iron Valve Box – Two Piece)
- C. Patching around valve boxes shall consist of a minimum of three (3") inches of Class 3 asphalt hot asphalt and all edges shall be tacked with an approved emulsion coating.

Subsection 4.2.04 OPERATING NUT DEPTH

- A. Where the actual operating nut of the valve is not approximately thirty-six (36") inches below finished grade using the AWWA standard six (6') foot valve key, an approved operating nut extension shall be installed so that the operating nut is at the thirty-six (36") inch depth. If after the completion of the installation, the valve operating nut cannot be easily operated, exceptions can be made by the Water Dept. Field Representative. It shall be the Contractor's responsibility to dig up and adjust the valve box so that the operating nut is centered in the valve box and the valve box is plumb and set to finished grade. (Please see Water Standard Drawing W-29 Valve Operating Nut Extension)

CHAPTER 5

FIRE HYDRANTS

SECTION 5.1 REFERENCES AND GENERAL INFORMATION

Subsection 5.1.01 GENERAL INFORMATION

- A. Fire hydrant assemblies shall be installed and located in accordance with these City Construction Standards. All fire hydrants installed shall be of the Waterous Pacer or Mueller Centurion models, dry-barrel type only, as specified in these standards. A fire hydrant flag and Storz adapter shall be installed on the fire hydrant. (Please see Water Standard Drawings W-3 Typical 6" Fire hydrant Setting and W-4 Fire Hydrant Locations)

Subsection 5.1.02 REFERENCES

- A. IDAPA 58.01.08
- B. ANSI/AWWA C 503-97

Subsection 5.1.03 DISTRIBUTION

- A. Standard fire hydrant spacing shall be at each street intersection with intermediate hydrants where distances between intersections exceed three hundred (300') feet, five hundred (500') feet maximum in exclusively one story, single family residential areas). In no case shall the number of hydrants in an area be less than previously described as above, or as required by the City Fire Chief or his designated agent. When any portion of a building or a hazard to be protected is in excess of one hundred fifty (150') feet access from a public street frontage, there shall be provided, when required by the Fire Chief, on-site fire hydrants and mains capable of supplying the required fire flow, or as required by the City Fire Chief or his designated agent.
- B. If additional fire flow is required than a single hydrant can supply, the Fire Department may utilize the flow test from the respective fire hydrant to determine the number of additional fire hydrants to be installed to meet the required fire flow.

Subsection 5.1.04 PLANS AND SPECIFICATIONS

- A. All plans and specifications for fire hydrants, laterals, and water main installations shall be submitted to the City Engineer, the City Fire Department and the City Water Department Director for review and approval prior to any construction. Fire hydrants shall not be placed in concrete spillways and shall be no less than five (5') from any driveway wing or approach apron. Fire hydrants must have a minimum of a three (3') foot radius of clear, flat and level spacing around them and shall not be obstructed from clear view of the street by plants, shrubs or other obstacles.

Subsection 5.1.05 PRIOR TO WOOD STRUCTURE CONSTRUCTION

- A. All applicable mains and fire hydrants required for on-site fire protection shall be installed by the developer and turned on by the City prior to any wood structure construction. Such facilities including all surface access roads shall be installed, made serviceable, and maintained unobstructed prior to and during the period of building construction.

Subsection 5.1.06 REQUIRED FLOW

- A. Water mains and fire hydrant laterals shall be of sufficient size and design to provide the minimum required fire flows as specified by the City Fire Chief or his/her designee. In no case shall any water main or lateral supplying a fire hydrant be of less than six (6") inch inside diameter.

Subsection 5.1.07 FLUSHING MAINS THROUGH FIRE HYDRANTS

- A. The only permitted use of fire hydrants by contractors shall be for flushing new main and hydrant installations. Contractors will not use fire hydrants for bulk water use such as street cleaning or compaction, even prior to the improvements being accepted, without the use of an approved fill station.
 - 1. The Contractors shall be required to use either permanent or portable fill stations from which they will be able to purchase bulk water for all uses other than flushing. The Contractor will apply at the Water Dept. Office at 3145 N Howard St. for use of either type of fill station.
- B. The fire hydrants are to be operated during flushing procedures with approved fire hydrant wrenches only. No other general-purpose wrench shall be used. The fire hydrants are designed to be fully open or fully closed. If throttling is required to reduce flow, the contractor shall use a port mounted gate valve to accomplish this. The use of ball valves on fire hydrants is expressly prohibited.

Subsection 5.1.08 PRE-CONSTRUCTION CONFERENCE

- A. Prior to work commencing on any project, the Contractor shall schedule a preconstruction conference with the City Water Department to inform the Director of the work to be performed. Any necessary contract documentation shall be provided to the City Water Department prior to the pre-construction conference. The Contractor shall attempt to have a representative from all of the Contractor's subs at the meeting, or shall be authorized to speak for them. The Contractor shall provide at the meeting:
 1. A complete listing of the Contractor's subcontractors for the project.
 2. An approved set of plans with the City Engineer's signature. Any changes, additions or deletions shall be reviewed and signed by the City Engineer prior to construction as well. The Contractor shall have a set of signed plans available at the work site at all times which shall be shown to the Field Representative.
 3. A project schedule which shall be regularly updated and any changes shall be submitted to the City during the project.
 4. Proof of insurance, license and bonding if not provided to the City at an earlier date.
- B. If construction stops or is delayed longer than thirty (30) days, or there are significant changes with the construction drawings/project, the Contractor shall set an additional preconstruction conference to review the work to be done and any possible changes. Minor drawing detail changes may be accomplished through the normal review process by the City Engineer.

Subsection 5.1.09 PERMEATION

- A. Where there may be the likelihood that a water main and/or a fire hydrant installation may be exposed to a significant concentration of pollutants including but not limited to low-molecular-weight petroleum products and organic solvents or their vapors, the Project Engineer shall review the material selections or consider protection or relocation of the fire hydrant(s) if possible. Use of polyethylene, polybutylene, or polyvinyl chloride (PVC) and rubber joint materials have been documented as having been affected by permeation of low-molecular-weight organic solvents and petroleum products.

SECTION 5.2 FIRE HYDRANT MATERIALS AND INSTALLATION

Subsection 5.2.01 FIRE HYDRANTS

- A. All new fire hydrants installed within the City of Coeur d'Alene water service area shall be Waterous Pacer or Mueller Centurion dry barrel minimum four and one half (4 ½') foot bury fire hydrants only. The upper barrel and bonnet of the fire hydrants shall be a safety yellow for high visibility. All port caps will be chained to the upper hydrant barrel. The large (steamer) port shall be equipped with a Storz Coupler for all new and

replacement installations. The port caps replaced by the Storz Coupler shall be given to the City. A 64 inch, spring -mounted resilient fiber-glass reflective hydrant marker will be installed to one of the rear bonnet bolts. All dirt and debris shall be removed from the exposed top section of the fire hydrant prior to inspection. (Please see Water Standard Drawing W-3 Typical 6" Fire Hydrant Setting)

- B. FITTINGS AND VALVES – A tapping sleeve, for single installations, or tees in new main installations shall be utilized to attach the fire hydrant to the mains. A gate valve shall be attached directly to the tee or tapping sleeve to control the fire hydrant lateral. Pipe from the valve to the hydrant may be either C900 PVC or Class 150 ductile iron.
- C. Mechanical restraint shall be accomplished with concrete thrust blocks regardless of whether meg-a-lug restraints are used. The fire hydrant shall be set on a twelve (12") inch square by four (4") inch thick patio block for stability. Precast blocks may be allowed per request in lieu of poured thrust blocks with the Engineer's approval. Poured blocks require a minimum 4 mil plastic wrapped around the fittings for protection.
- D. When a fire hydrant is located in a grassy swale, a minimum three (3') foot flat and level area shall be supplied around the hydrant and then gently sloped into the swale. If the swale is too narrow to allow gentle sloping, a culvert may be recommended to allow adequate flow behind the hydrant while maintaining an adequate flat area for fire fighters use.

Subsection 5.2.02 FIRE HYDRANT INSTALLATION

- A. The fire hydrants shall be installed in accordance with all City standards for main and lateral installations. The control valve for all fire hydrants shall be located on and bolted directly to the tee or tapping sleeve of the supply main and at no time shall ever be allowed to be bolted to the base of the fire hydrant. Any new installations shall have the proper bury depth fire hydrant assembly. Extensions shall not be permitted on any new installations unless expressly approved by the Water Director in those cases where the correct bury depth is not available. It shall be the contractor's responsibility to field verify the water main depth prior to ordering the fire hydrant(s).
- B. All fire hydrants shall be set on a precast twelve (12") inch by twelve (12") inch by four (4") inch base block to stabilize the fire hydrant elevation. All hydrants shall be plumb front to back and side to side upon completion of backfill and compaction. A tracer wire consisting of twelve (12) gauge single strand direct bury rated copper wire will be connected to the tracer wire at the main if applicable and extended the length of the fire hydrant lateral and shall extend up next to the hydrant barrel an minimum of twelve (12") inches above finished grade. (Please see Water Standard Drawings W-3 Typical 6" Fire Hydrant Setting and W-4 Fire Hydrant Location)
- C. All fire hydrants shall be connected to the service lateral with the use of mechanical joints only. Please see **Table 5.1** for proper bolt torque.

Table 5.1

Mechanical Joint Bolt Torque

Joint Size		Bolt size		Range of Torque	
<i>in.</i>	<i>(mm)</i>	<i>in.</i>	<i>(mm)</i>	<i>ft.lb</i>	<i>(N.m)</i>
4-24	(102-610)	¾"	(19)	75-90	(102-122)
30-36	(762-914)	1"	(25)	100-120	(136-163)
42-48	(1067-1219)	1 ¼"	(32)	120-150	(163-203)

- D. All fire hydrants shall be at the proper depth and grade to facilitate ease of repair utilizing a standard hydrant repair wrench. All fire hydrant installations shall be straight and perpendicular from the main tap or tee to the fire hydrant unless expressly approved by the Director. The fire hydrants shall be set square to the curb where possible and shall be plumb after backfill and compaction. The Contractor shall call for inspection prior to backfill, which shall include approval of the backfill materials which shall not contain any rock in excess of five (5") inches in diameter, and then after final grade is established. Individual fire hydrants and lateral installations shall be inspected upon installation, properly disinfected, pressure tested, flushed and bacteria sampled as per any other new installation.

- E. Patching of all trenches shall consist of a minimum of three (3") inches of Class 3 asphalt unless otherwise directed on the plans or by the City Engineer. All joints between existing asphalt and new asphalt shall be coated with an approved emulsion tack coating.

Subsection 5.2.03 THRUST BLOCKS

- A. Concrete poured in place thrust blocks shall be approved for new fire hydrant installations. All fire hydrants shall be set on a precast twelve (12") inch by twelve (12") inch by four (4") inch base block to stabilize the fire hydrant elevation. When pouring concrete blocks, the bearing surface shall be dug square and perpendicular to the direction of the anticipated thrust load. A minimum four (4) mil plastic wrap shall be supplied around all fittings prior to pouring concrete thrust blocks at the base of the fire hydrants and all related fittings. The Contractor shall ensure that no concrete is poured over the barrel drains. The contractor shall ensure that the drains have an adequate drainage area and are not inhibited in any way.

- B. Meg-a-lug joint restraints and tie rods may be used in place of thrust blocks in conditions where there may be inadequate bearing surface to pour or place thrust blocking. However this must be approved by the Engineer and/or Director.

Subsection 5.2.04 DRAIN ROCK

- A. Washed drain rock with a minimum one and one-half (1 ½”) inch minus, non-crushed, shall be installed around the base of the fire hydrant a minimum of eight (8”) inch depth and shall extend a minimum of four (4”) inches below and above the barrel drains.
- B. Drain rock shall be placed around the base of the fire hydrant to promote adequate drainage for freeze protection. The drain shall be one and one-half (1 ½”) diameter washed river rock. See subsection 5.2.05 regarding approved filter fabric to be placed over the drain rock.
- C. There shall be adequate drain rock placed to ensure complete barrel drainage. Where soils may be unsuitable for adequate drainage, additional drain rock may be added to promote proper drainage away from the fire hydrant base. (Please see Water Standard Drawing W3 Typical Fire hydrant Installation).

Subsection 5.2.05 FILTER FABRIC

- A. An approved Tyvar or equal filter fabric shall be placed over the drain rock and wrapped tight around the hydrant barrel to ensure that no fine materials can migrate into the drain rock and prevent barrel drainage.

Subsection 5.2.06 BOLLARDS

- A. Any bollards requested by the City Fire Chief or his/her designee shall be placed a minimum three (3’) feet from the fire hydrant and shall not obstruct access to any port of the hydrant.

Subsection 5.2.07 INSPECTION

- A. The Contractor shall have his/her Field Representative from the project engineering firm inspect all fire hydrant installations prior to backfill for proper installation. The contractor shall also immediately notify the City Water Department Field Representative to confirm that the assembly is installed per City Construction Standards. Any damage discovered by the Field Representative shall be noted and it shall be the Contractor’s responsibility to repair or replace the damaged items as per the Field Representative’s request.
- B. All fire hydrants will be plumb and level front to back and side to side. The traffic flanges shall be two (2”) inches above finished grade. New fire hydrants shall be ordered for the proper bury depth prior to installation. No extensions on new fire hydrants will be accepted unless prior approval is granted by the Director. The large port shall face and be parallel with the street fronting the fire hydrant. All port cap chains shall be in place and securely connected to the port caps. Any unpainted portions that are exposed above finished grade shall be painted to match by the Contractor prior to acceptance.

- C. The Contractor shall not bury any work to be inspected without such inspections taking place. The Contractor shall notify forty-eight (48) hours in advanced and shall use every number available to contact the Field Representative. If work is covered without the appropriate inspection, the Contractor will dig and expose any appurtenance which requires inspection at his/her own expense. No claims for project delays can be made due to this.

CHAPTER 6

DOMESTIC, IRRIGATION AND FIRE SERVICE LATERALS

SECTION 6.1 INFORMATION AND DOCUMENTATION

Subsection 6.1.01 GENERAL INFORMATION

- A. A minimum of one service lateral installation will be required for each individual building. If multiple individual inhabitable buildings shall exist for one lot, each building shall have an individual service unless otherwise approved by the City Engineer and/or Director. Multiple service laterals may be permitted for multifamily dwellings if approved by the City Engineer and/or Director. The service lateral will terminate with a standard copper meter setter (up to two (2") inch service size) of the proper grade height with the meter center set at eighteen (18") inches below finished grade, an approved meter box, and shall have a minimum five (5) foot stub of poly pipe of the same diameter, extending from the base of the copper setter on the customer side of the meter box. Four (4") inch and larger settings shall be installed in an approved 1914 series Wilbert, or approved equal, water meter vault of the appropriate size to accommodate the necessary appurtenances.

Subsection 6.1.02 REFERENCES

- A. IDAPA 58.01.08
- B. AWWA/ANSI C800-05

Subsection 6.1.03 LOCATION AND MARKING THE STUB ENDS

- A. The service lateral shall be located a minimum of two and one-half (2.5') feet left or right of the lot property line five (5') feet between service laterals minimum) where no power, gas or other utility is allowed to be placed on the property line between the service laterals, unless otherwise approved by the City Engineer and/or Director, and at right angles to the center of the right-of-way, with a minimum of ten (10') feet between the water and sewer laterals. Where the service laterals shall be separated by other utilities, the service lateral shall be a minimum of six (6') feet of separation from the property line to the service lateral. Service laterals will not be permitted in driveway areas or any other areas where a vehicle will routinely drive or park over the meter box. Water service laterals shall not be connected to existing water main or larger fire service laterals that

were originally intended for larger use, water main distribution stubs, or fire main/service stubs on the property to prevent the necessity of a street cut unless approved by the Director. The service for each lot shall be located within the property lines of the respective lot facing the street where the supply main is located.

- B. The customer end of lateral stubs of any kind which extend into private property for customer connection shall be marked with a minimum two by four (2" x 4") inch board extending a minimum of two (2') feet above finished grade. The exposed portion of the board shall be painted blue to indicate water service.

Subsection 6.1.04 SIZE

- A. The specific size of domestic, irrigation and fire service laterals shall be limited to the installation of various lengths of one (1") inch, two (2") inch, four (4") inch, six (6") inch, and eight (8") inch services. Where concrete or machine formed asphaltic concrete curbs exist or are to be constructed, the location of the meter box shall be a minimum six inches (6") back of the curb. Where there are no curbs, the location of the box shall be as approved by the City Engineer and/or Director in a location readily accessible to the City. The standard minimum lateral size for a residential lot is one inch (1"). Other size laterals shall be as approved by the City Engineer and/or Director, and as noted on the project drawings. All service laterals shall remain a consistent size from the main tap to and through the meter box or vault and extending with a minimum two foot (2') stub out of the customer side. Reductions in size shall only be allowed inside the meter vault at the water meter.
- B. A blow off assembly shall be installed in accordance with the City standards at locations noted on the plans and at such additional locations as required by the City Engineer and/or Director for the removal of water and/or sediment. All dead end mains and service stubs four (4") inch and larger that will not be continued in future development, shall have a fire hydrant or approved flushing station install to be determined by Water Dept. Director. When mains are planned to be extended in future development, an approved blow off assembly will be approved to be installed. (Please see Water Standard Drawing W-6 Typ. Frost-Free Blow Off Assembly) Any and all dead end mains designed for future phases of the subdivision will have a control valve equivalent to the size of the water main within 20 feet of the blow off so future installation will not affect existing customers. (Please see standard drawing W-6)

Subsection 6.1.05 MULTIPLE UNIT SERVICE LINE CONNECTIONS

- A. Service lines to large structures with multiple single family living units sharing the same base address, such as apartments or condominiums requesting individual metering per unit, and where the meters are desired in one location only, shall be set so as to correlate from left to right in a numbered sequence from 1, 2, 3, 4, 5, 6, etc. If this cannot be properly done, the structure shall be either metered with a single meter and an owners

association shall be established to manage the applicable fees, or the meters shall be installed directly in front of each unit, where applicable.

Subsection 6.1.06 SERVICE LINE REPLACEMENT/ADDITIONAL SERVICES

- A. Service line replacement to existing lots or where a customer has requested an additional service installation shall require that the customer choose the exact location of the meter box installation. The service line replacement shall be one (1") inch or two (2") in size. The laterals will be laid as straight as possible from the water main to the meter box for locating purposes and will include a minimum two-foot (2') stub on the customer side of the meter. All replacement and new service lateral installations shall be inspected from the water main to the meter box by the Water Department. The customer's connection and line from there to the structure will be inspected by the City plumbing inspector.

Subsection 6.1.07 DOCUMENTATION

- A. All service laterals shall be identified and recorded by the Field Engineer and/or Field Representative as pertinent project information regarding location for transfer to as-builts which will be provided to the City Water Dept. Field Representative. Measurements for the City's benefit shall be in feet and inches from an identifiable location such as valve box or fire hydrant and not from engineering stations or movable objects such as power poles, trees or buildings.
- B. The Contractor and/or Project Engineer shall supply as-builts on the plans provided, indicating the exact locations of all facilities installed before the City accepts the project as completed. The Contractor shall supply the Director with all construction notes which may or may not have been included on the as-builts. As-builts are due to the City no more than thirty (30) days after substantial completion of the project. If no as-builts are received, the City shall withhold any building permits for the project and/or Certificates of Occupancy. Any and all plan/construction changes shall be included with the final as-builts. The as-builts shall contain information regarding planned and actual installations, footage measurements for all fittings, tees and valves, detailed information and measurements for any appurtenances removed or replaced during construction, and any information regarding service stubs and their locations.

Subsection 6.1.08 PRE-CONSTRUCTION CONFERENCE

- A. Prior to work commencing on any project, the Contractor shall schedule a preconstruction conference with the City Water Department to inform the Director of the work to be performed. Any necessary contract documentation shall be provided to the City Water Department prior to the pre-construction conference. The Contractor shall attempt to have a representative from all of the Contractor's subs at the meeting or shall be authorized to speak for them. The Contractor shall provide at the meeting:

1. A complete listing of the Contractor's subcontractors for the project.
 2. An approved set of plans with the City Engineer's signature. Any changes, additions or deletions shall be reviewed and signed by the City Engineer prior to construction as well. The Contractor shall have a set of signed plans available at the work site at all times which shall be shown to the Field Representative.
 3. A project schedule which shall be regularly updated and any changes shall be submitted to the City during the project.
 4. Proof of insurance, license and bonding if not provided to the City at an earlier date.
- B. If construction stops or is delayed longer than thirty (30) days, or there are significant changes with the construction drawings/project, the Contractor shall set an additional pre-construction conference to review the work to be done and any possible changes. Minor drawing detail changes may be accomplished through the normal review process by the City Engineer.

Subsection 6.1.09 SERVICE SHUT-DOWN

- A. Whenever it is necessary to shut down any service(s), the Contractor shall reference the Shutoff Policy. All affected customers shall be notified with a written notice at least forty-eight (48) hours prior to the shutdown. Notices shall also be provided to City Hall, the Water Department Office, and the Fire Department forty-eight (48) hours prior to shut down. If the shutdown is to occur on a Monday, the affected services shall be notified in writing the preceding Friday. If requested by the Contractor, the City may provide the Contractor with a form letter to use as an official notice. The Contractor shall provide verification to the City that he/she has made every attempt to contact everyone affected.
- B. If an emergency shut down is required for any reason, the Contractor shall make every effort to immediately notify the Water Department at (208)769-2210 first and then the affected customers of the incident and expected duration of the shutdown.

SECTION 6.2 SERVICE LATERAL MATERIALS AND INSTALLATION

Subsection 6.2.01 ONE (1") INCH AND TWO (2") INCH SERVICES MATERIALS

- A. The Contractor or his/her agent shall furnish all service materials, as depicted on Standard Drawings, which are needed to complete a service installation. The above materials will be available for City approval and must have said approval prior to installation. The following shall apply:

1. **PIPE** - The Contractor shall use iron pipe size (IPS) polyethylene pipe which shall meet Ultra High Molecular Weight (250 psi) and both SIDR-7 & PE 4710 standards for one (1") inch and two (2") inch diameter services. Polyethylene pipe connections shall be made with approved pack joint compression style self-gripping brass fittings with stainless steel internal sleeves (inserts). Black iron or uncoated steel pipe shall not be used in any situation.
2. **SADDLE** - Saddles utilized for tapping all mains shall be Romac 202S or approved equivalent style epoxy coated body saddles with double stainless steel straps. Saddles may be used for service taps one (1") inch and two (2") inches in size. Taps four (4") inch and larger will require an approved tapping sleeve with a gate valve for installation with existing mains. Ductile iron tees with gate valves for main size eight (8") inch or less, or butterfly valves for main size twelve (10") or larger, may be used in new construction. All gate and butterfly valves shall have Tyler 6855-HD series valve boxes set to finished grade.
3. **CORPORATION STOP** - All brass body, ballcorp style, corporation stops (corps) shall have iron pipe size threads on the inlet side of the valve and shall have iron pipe size, self-gripping, pack joint for polyethylene pipe on the outlet side of the valve. Stainless steel inserts shall be used with the pack joints to ensure that the polyethylene pipe will not distort and pull away from the joint. The corporation stops will be used for one (1") inch and two (2") inch service taps.
4. **COPPERSETTER, ONE AND TWO INCH** - Coppersettors provided by the contractor shall comply with City standards for one (1") inch and two (2") inch coppersettors. The two (2") inch coppersettors shall have a bypass valve incorporated into the base of the coppersetter. A minimum four (4") inch by twelve (12") inch 3034 PVC sleeve shall be placed over the top of the bypass valve with a saddle cut for service key access. All setters shall have a minimum five (5') foot poly stub with a male poly pack and cap extending from the base of the coppersetter on the customer side of the setter. To provide stability, an appropriately size piece of schedule 40 PVC shall be installed on the through hole on the bottom of the coppersetter. The coppersetter shall be plumb and level. The service shall match the coppersetter size. (Please see Water Standard Drawings W-1 - 1" Coppersetter and W-14 - 2" Coppersetter)
5. **METERS** - The meters supplied by the Contractor shall be Badger models for all sizes. These meters shall include radio read registers pre-wired with no less than a twenty (5') foot lead supplied for connection with the transmitter. If the meters, meter registers, or transmitter cables are damaged, it shall be the Contractor's responsibility to replace the entire unit. Meters that are one and one half (1 1/2") and two (2") inch will be an approved disc style and shall meet standard lay lengths.
6. **METER BOXES** - Water meter boxes shall be Armorcast 13" x 24" RPM meter box or Hubbel 1130 polymer meter box for one (1") inch services, or Armorcast 17"x 30"

meter box or Hubbel 17" x 30" polymer meter box for two (2") inch services. The meter box shall consist of two (2) risers with a top section, three (3) total sections, and an approved lid with a cast iron access lid or a cast iron traffic rated lid with a precast hole for the transmitter.

- a.) The meter box shall be kept clean of dirt and debris to the bottom of the third section. Meter boxes will not be permitted in driveway areas or any other areas where a vehicle will routinely drive or park over the meter box unless specifically approved by the City Engineer and/or the Director.
7. The customer end of lateral stubs of any kind which extend into private property for customer connection shall be marked with a two by four (2" x 4") inch board extending a minimum of two (2') feet above finished grade. The exposed portion of the board shall be painted blue to indicate water service.

Subsection 6.2.02 FOUR (4") INCH AND LARGER SERVICE MATERIALS

- A. The Contractor or his/her agent shall furnish all service materials, as depicted on the applicable standard drawings, which are needed to complete a service installation. The following materials will be available for City approval and must have said approval prior to installation. The following shall apply:
 1. ***FOUR INCH OR LARGER SERVICE SETTINGS*** - For four (4") inch and larger service installations with three (3") inch and larger meters, a coppersetter is not available. Therefore, the Contractor shall install the meter in a vault with the provision of approved outside stem and yoke (OS & Y) gate valves on both sides of the meter and the appropriate companion flange connections. This setting shall be installed in an approved Wilbert 1914 series or approved equal, appropriately sized, concrete meter vault. The minimum tap size for a three (3") inch meter shall be four (4") inch and four (4") inch pipe shall be extended into and from the customer side of the meter vault. Any reductions shall be made inside the vault. (Please see Water Standard Drawing W-15 - 3" Typical Meter Vault)
 2. ***TAPPING SLEEVE*** - Tapping sleeves for four (4") inch and larger services shall be a minimum full wrap stainless steel or other approved material for the water main being tapped. The tapping sleeve shall have a flange of the appropriate tap size. The tapping sleeve shall fully support the body of the main tapped so as to eliminate any chance of leakage. The tapping sleeve shall be installed and torqued to the manufacturer's specifications and instructions and the Contractor shall ensure that the test plug is on the upper portion of the saddle for a possible test on the sleeve. The Field Representative shall determine at the time of installation as to whether a pressure test of the tapping sleeve and gate valve are necessary prior to the tap. The coupon retrieved from the tap shall be shown to the Water Department representative immediately after removal. The tapping saddle or sleeve and gate valve shall be swabbed with an appropriate strength solution of hypochlorite disinfectant.

3. **GATE VALVES** - Gate valves used for tapping sleeves shall be resilient seated per C509 standards, shall meet the “VALVES” standards of this document, and shall be suitable for tapping purposes as well as cleaned and disinfected. It is recommended to use the specific “tapping valves” with applicable alignment devices for the best result.
4. **METERS** - The meters supplied by the Contractor shall be the Badger models for all sizes. These meters shall include radio read registers pre-wired with no less than a twenty (5') foot lead supplied for connection with the transmitter. If the meters, meter registers, or transmitter cables are damaged, it shall be the Contractor's responsibility to replace the entire unit. Meters three (3") inch and larger will be a compound (combination for 8" and larger) with integrated debris strainer and an approved disc style bypass meter arrangement and shall meet standard meter lay lengths. Meters three (3") and larger shall be delivered to the Water Dept. a minimum of two weeks prior to installation for testing. If the meter test fails, the contractor shall work with the city and supplier to replace the meter and retest it. A passing test must be obtained before installation.
5. **METER VAULTS** - For services four (4") inch and larger, a Wilbert 1914 series, or approved equal, concrete meter vault of the appropriate size to accommodate all of the necessary appurtenances will be provided as per the Standard Drawing or the City Engineer's and /or Director's specifications. A water meter vault other than the above, must be approved by the City Engineer and/or Director if they are to be installed in the City system. (Please see Water Standard Drawing W-17 – 4" and Larger Service Vault)

Subsection 6.2.03 NEW SERVICE INSTALLATIONS

- A. Where the Contractor is installing new mains and/or services for new residential construction, the one (1") inch and two (2") inch service laterals shall be laid straight to the new coppersetter with a five (5ft) poly stub and male poly pack with cap to the lot it will serve. The customer shall connect to the stub with an approved pack joint fitting or threaded galvanized coupling. The Contractor may provide a longer poly extension from the coppersetter for the provision of other utilities directly behind the meter box. The customer connection at the end of the stub must be inspected by the plumbing inspector prior to burial. No meter boxes or service laterals are to be placed in driveways or approaches.
- B. The customer end of lateral stubs of any kind which extend into private property for customer connection shall be marked with a two by four (2" x 4") inch board extending a minimum of two (2ft) feet above finished grade. The exposed portion of the board shall be painted blue to indicate water service.

- C. Patching of all trenches shall consist of a minimum of three (3") inches of Class 3 asphalt unless otherwise directed on the plans or by the City Engineer. All joints between existing asphalt and new asphalt shall be coated with an approved emulsion tack coating.

Subsection 6.2.04 FIRE SERVICE

- A. Fire services shall be installed under the same conditions as standard supply services with the exception that they will not be metered. Standard fire services shall be a minimum of two (2") inches. An additional isolation valve (curb stop for two (2") inch residential, gate valve for two (2") and larger commercial) may be required at the property line for service control per the City engineer and/or Directors direction. All fire services four (4") inches and larger shall have a control gate valve at the main tap in the street/right-of-way/easement. All fire services shall be straight and perpendicular with the main until out of City's right of way. The proper backflow protection is also required on fire services dependent on a Fire Department Connection (FDC). Fire services shall be separate stubs from the domestic and irrigation supply lines as well as fire hydrant laterals. Complete fire service installations shall utilize approved backflow assemblies to isolate the fire service from the potable water supply to prevent contamination. All installed backflow assemblies shall be tested upon installation and annually thereafter with the results sent to the Water Department office.

Subsection 6.2.05 SERVICES FOR RECONSTRUCTION PROJECTS

- A. Reconnection of existing customer service laterals for water main replacement projects shall be installed from the new main to a minimum of two (2') feet behind the existing meter box if not already meeting current specifications. The service lateral replacement will include a new meter box and coppersetter to meet current standards. The new service shall be placed along side of the existing service prior to testing of the new main. The new service shall be connected to the customer side of the old meter setting after the new main and service lateral is tested and approved for operation. The old meter setting shall then be removed, the old meter shall be labeled or tagged with the original service address for later reference and the meter given to the City Water Department, and the existing service will be abandoned to the old main. All connections shall be inspected prior to backfilling. (Please see Water Standard Drawing W-33 1" and 2" Service Reconnection to New Mains)

Subsection 6.2.06 IRRIGATION METERS AND CONNECTIONS

- A. New commercial properties shall be required to stub an additional irrigation meter service per individual saleable lot for possible reduction of sewer fees. The irrigation service

shall be installed to domestic service standards complete with coppersetters. A stop and drain arrangement for 1" and 2" irrigation services shall be installed on the service not closer than two (2ft) from the discharge side of the meter setter and no further than five (5ft) from the meter setter. (Please see standard drawing W-1 and W-14). It is also required that irrigation services be installed per saleable lot in multifamily developments. Where a four (4") inch or larger irrigation service is required. (Please see Water Standard Drawing W-16 for 4" and Larger Meter Setting, Irr.)

- B. Where connections for a new irrigation system are made on residential domestic services, the Contractor/customer shall make all new irrigation connections with a stop and drain arrangement a minimum of two (2ft) feet past the bottom of the meter box on the customer service line going to the building. No connections of any kind shall be accepted inside, under or in front of the meter box. It shall be the Contractor's and/or customer's responsibility to read and understand all standards and specifications regarding irrigation system installation.

Subsection 6.2.07 MULTIPLE UNIT SERVICE LINE CONNECTIONS

- A. Service lines to large structures with multiple single family living units sharing the same base address, such as apartments or condominiums requesting individual metering per unit, and where the meters are desired in one location only, shall be set so as to correlate from left to right in a numbered sequence from 1, 2, 3, 4, 5, 6, etc. If this cannot be properly done, the structure shall be either metered with a single meter and an owners association shall be established to manage the applicable fees, or the meters shall be installed directly in front of each unit, where applicable.

Subsection 6.2.08 SERVICE LINE REPLACEMENT/ADDITIONAL SERVICES

- A. Service line replacement to existing lots or where a customer has requested an additional service installation shall require that the customer choose the exact location of the meter box installation. The service line replacement shall be one (1") inch or two (2") in size. The laterals will be laid as straight as possible from the water main to the meter box for locating purposes. All replacement and new service lateral installations shall be inspected from the water main to the stub on the customer's side of the meter box by the Water Department Field Representative.

Subsection 6.2.09 CUT SERVICES

- A. When existing services are accidentally or intentionally cut between the meter and the main, the City Engineer and/or the Director shall determine, regarding the type and condition of the existing service, as to whether the entire lateral must be replaced. Service line repairs of polyethylene pipe with pack joint compression couplings shall be allowed only upon the approval of the City Engineer and/or Director for existing services. Galvanized service lines shall be replaced from the corp stop to the coppersetter unless otherwise directed by the City Engineer and/or Director.

Subsection 6.2.10 LOCATING WIRE

- A. All service laterals shall have a locating wire of not less than 12 ga. single-strand copper with a direct bury rated insulated coating installed with the service. The locating wire shall extend from just under the meter box lid to the distribution main and shall be connected to the water main locating wire with an approved direct bury connection. The Contractor shall verify continuity from beginning to end of the project and shall be responsible for repairs to any damaged tracer wire.

Subsection 6.2.11 CUSTOMER CONNECTION

- A. The Contractor/customer shall be responsible for connecting to the end of the poly stub of the meter setter. All connections downstream of the coppersetter connection shall be the responsibility of the contractor/customers and shall be in accordance with local and state plumbing codes.

Subsection 6.2.12 METER INSTALLATION

- A. All meters shall be furnished by the Contractor and installed in accordance with Chapter 9 – Water Meters, of these construction standards. (Please see Water Standard Drawing W-1 1” Coppersetter Standard Pit Setting and W-14 2” Standard Pit Setting).

Subsection 6.2.13 UNUSED WATER SERVICES

- A. All unused water service connections shall be disconnected and abandoned per standard drawing W-39, W-40, or an approved repair band for taps .75” to 2”. Taps 3” and larger may require a section of main to be removed and a new piece be spliced in its place. This will be determined by Water Dept. field inspectors and approved by Water Dept. Director.

SECTION 6.3 PROJECT COMPLETION

Subsection 6.3.01 INSPECTIONS

- A. In the event that the service lateral is a stand-alone project and not included in a main line project, the Contractor shall contact the Water Department Field Representative 48 hours in advance to conduct an inspection and prepare as-builts of all installed laterals and confirm that the assembly is installed per City Construction Standards. Any damage discovered by the Field Representative shall be noted and it shall be the Contractor’s responsibility to repair or replace the damage items as per the Field Representative’s request

- B. The Contractor shall not bury any work to be inspected without such inspections taking place. The Contractor shall notify forty-eight (48) hours in advanced and shall use every number available to contact the Field Representative. If work is covered without the appropriate inspection, the Contractor will dig and expose any appurtenance which requires inspection at his/her own expense. No claims for project delays can be made due to this.

***Subsection 6.3.02* COMPLETION AND ACCEPTANCE**

- A. The installation shall not be considered complete and accepted by the City until accurate as-builts are provided by the engineering firm for the construction work including all appurtenances. The Contractor has thirty (30) days from substantial completion to submit complete and accurate as-builts to the City Engineer and/or Director.

CHAPTER 7

THRUST BLOCKS AND JOINT RESTRAINTS

SECTION 7.1 INFORMATION AND DOCUMENTATION

Subsection 7.1.01 GENERAL INFORMATION

- A. These standards and specifications shall detail the recommended installation of thrust blocks for joint restraint. Unusual situations may require a combination of or alternatives to these specifications. Any deviations from the prescribed standards must be approved by the City Engineer and/or Director.

Subsection 7.1.02 REFERENCES

- A. IDAPA 58.01.08
- B. AWWA/ANSI

Subsection 7.1.03 DOCUMENTATION

- A. A Field Engineer and/or Field Representative from the firm having designed the project, shall be responsible for measuring and recording pertinent project information regarding location of all fittings and related thrust blocks for transfer to as-builts and provision to the City Water Dept. Field Representative. All GIS coordinates shall be taken by the Engineering Representative from the firms GIS system. Measurements for the City's benefit shall be in feet and inches from an identifiable location such as valve box or fire hydrant and not from engineering stations or movable objects such as power poles, trees or buildings.
- B. The Contractor and/or Project Engineer shall supply as-builts on the plans provided, with any changes having prior signed approval, indicating the exact locations of all facilities installed before the City accepts the project as completed. The Contractor shall supply the Director with all construction notes which may or may not have been included on the as-builts. As-builts are due to the City no more than thirty (30) days after substantial completion of the project. If no as-builts are received, the City shall withhold any building permits for the project and/or Certificates of Occupancy. Any and all plan/construction changes shall be included with the final as-builts. The as-builts shall contain information regarding planned and actual installations, footage measurements for all fittings, tees and valves, detailed information and measurements for any appurtenances

removed or replaced during construction, and any information regarding service stubs and their locations.

SECTION 7.2 THRUST BLOCK MATERIALS AND INSTALLATION

Subsection 7.2.01 THRUST BLOCKS

- A. Thrust blocks shall be installed at all crosses, tees, valves, tapping sleeves, elbows and other main line fittings, not including service saddles two (2") and smaller. All mechanical joint deflection of twenty-two and one half (22 1/2) degrees or greater shall be physically restrained with a minimum of a poured concrete thrust block. (Please see Water Standard Drawing W-9 Thrust Blocking)
- B. Each thrust block shall be designed to have a sufficient thrust bearing area and shall be placed square and level so as to safely transmit maximum thrust to the surrounding undisturbed embankment.
- C. Where additional joint restraint is necessary such as four (4") and larger meter vaults, the City Engineer and/or Director may require the Contractor to provide alternative methods for restraint such as restrained bell joints and/or meg-a-lug gland pack restraints. (Please see Water Standard Drawing W-17 4" and Larger Dom. Service Vault)

Subsection 7.2.02 CAST IN PLACE THRUST BLOCKS

- A. The bearing faces of the block shall be poured against undisturbed, squared trench walls and shall be poured a minimum of six (6") inches below the pipe grade on the undisturbed trench bottom. All concrete shall be kept behind the bells and flanges of fittings and valves. Formwork shall be constructed wherever necessary to confine the concrete to the prescribed dimensions. All form lumber shall be removed after the block is poured and prior to pressure testing of the main. No surplus concrete shall be disposed of in the trench. All fittings shall be wrapped with four (4) mil plastic sheeting prior to pouring concrete against the fittings.
- B. All thrust blocks shall be allowed to cure for a sufficient time to have developed their initial strength so that there will be no movement of the main during testing.

Subsection 7.2.03 PRE-CAST THRUST BLOCKS

- A. Where the water main needs to be returned to service immediately, pre-cast thrust blocking may be allowed, but only as approved and/or directed by the City Engineer and/or Director. The ecology block, of sufficient size, shall be set square and level against the fitting, at a minimum six (6") inches below the bottom of the fitting, and the space between the embankment and the block shall be filled with a minimum three quarter (3/4")

inch minus aggregate and compacted to ninety percent (90%) density in maximum one (1') foot lifts.

Subsection 7.2.04 COVERING OF FITTINGS

- A. When thrust blocks are poured, all fittings shall be protected by being wrapped in 4 mil plastic. The poured blocks shall be poured the full depth of the fitting with a minimum of 4 mil plastic sheeting wrapped around the fitting. The concrete shall be poured to a perpendicular undisturbed, squared embankment and a minimum of six (6") below the fitting to the undisturbed trench bottom.

SECTION 7.3 JOINT RESTRAINT

Subsection 7.3.01 THRUST BLOCKING

- A. All mechanical joint deflection greater than and including twenty-two (22 ½) degrees shall be physically restrained with a minimum of a poured concrete thrust block as approved by the Engineer. The poured blocks shall be poured the full depth of the fitting with a minimum of 4 mil plastic sheeting double wrapped around the fitting. The concrete shall be poured to a perpendicular undisturbed, squared embankment. (Please see Water Standard Drawing W-9 Thrust Blocking)
- B. Please see **Table 7.1** for applicable bolt torque on mechanical joints. This table does not include torque settings for the pre-engineered break away contact bolts.

Table 7.1

Mechanical Joint Bolt Torque

Joint Size	Bolt size	Range of Torque			(N.m)
		<i>in. (mm)</i>	<i>in. (mm)</i>	<i>ft.lb</i>	
4-24	(102-610)	¾"	(19)	75-90	(102-122)
30-36	(762-914)	1"	(25)	100-120	(136-163)
42-48	(1067-1219)	1 ¼"	(32)	120-150	(163-203)

SECTION 7.4 PROJECT COMPLETION

Subsection 7.4.01 INSPECTION

- A. The Contractor shall have his/her Field Representative from the engineering firm inspect and prepare as-builts of all installed thrust blocks and joint restraint systems. The contractor shall also immediately notify the City Field Representative to confirm that the assembly is installed per city specifications. Any damage discovered by the Field

Representative shall be noted and it shall be the Contractor's responsibility to repair or replace the damaged items as per the Field Representative's request.

- B. The Contractor shall not bury any work to be inspected without such inspections taking place. The Contractor shall notify the Water Department forty-eight (48) hours in advance and shall use every number available to contact the Field Representative. If work is covered without the appropriate inspection, the Contractor will dig and expose any appurtenance which requires inspection at his/her own expense. No claims for project delays can be made due to this.

***Subsection 7.4.02* COMPLETION AND ACCEPTANCE**

- A. The installation shall not be considered complete and accepted by the City until accurate as-builts are provided by the engineering firm for the construction work including all appurtenances. The Contractor has thirty (30) days from substantial completion to submit complete and accurate as-builts to the City Engineer and/or Director.

CHAPTER 8

BEDDING AND BACKFILL

SECTION 8.1 INFORMATION AND DOCUMENTATION

Subsection 8.1.01 GENERAL INFORMATION

- A. These standards and specifications will cover the general requirements for proper bedding and back fill of trenches used for water infrastructure construction only. Approved types of bedding and backfill materials are specified as well as placement and compaction methods.

Subsection 8.1.02 REFERENCES

- A. IDAPA 58.01.08
- B. AWWA / ANSI – C600-99, C602-00, C603-05, C605-94

Subsection 8.1.03 SUBMITTALS

- A. The Director shall approve all plans, drawings, or sketches showing locations of new facilities to be connected to the City water system. No work may begin until written approval from the Director and the City Engineer has been received. The State Department of Environmental Quality (DEQ) has review authority on expansions to public water, sewer, and storm water systems, i.e. lift stations, booster stations, water storage facilities, and above ground treatment facilities. In this case no work shall begin until approval of these facilities from the Department of Environmental Quality has been received.

Subsection 8.1.04 DOCUMENTATION

- A. A Field Engineer and/or Field Representative shall be responsible for recording pertinent project information regarding proper compaction methods observed for transfer to as-builts and provision to the City Field Representative. Measurements for the City's benefit shall be in feet and inches from an identifiable location such as valve box or fire hydrant and not from engineering stations or movable objects such as power poles, trees or buildings.
- B. The Contractor and/or Project Engineer shall supply as-builts on the plans provided, indicating the exact locations of all facilities installed before the City accepts the project as completed. The Contractor shall supply the Director with all construction notes which may

or may not have been included on the as-builts. As-builts are due to the City no more than thirty (30) days after substantial completion of the project. If no as-builts are received, the City shall withhold any building permits for the project and/or Certificates of Occupancy. Any and all plan/construction changes shall be included with the final as-builts. The as-builts shall contain information regarding planned and actual installations, footage measurements for all fittings, tees and valves, detailed information and measurements for any appurtenances removed or replaced during construction, and any information regarding service stubs and their locations.

Subsection 8.1.05 PRE-CONSTRUCTION CONFERENCE

- A. Prior to work commencing on any project, the Contractor shall schedule a preconstruction conference with the City Water Department to inform the Director of the work to be performed. Any necessary contract documentation shall be provided to the City Water Department prior to the pre-construction conference. The Contractor shall attempt to have a representative from all of the Contractor's subs at the meeting or shall be authorized to speak for them. The Contractor shall provide at the meeting:
 - 1. A complete listing of the Contractor's subcontractors for the project.
 - 2. An approved set of plans with the City Engineer's signature. Any changes, additions or deletions shall be reviewed and signed by the City Engineer prior to construction as well. The Contractor shall have a set of signed plans available at the work site at all times which shall be shown to the Field Representative.
 - 3. A project schedule which shall be regularly updated, and any changes shall be submitted to the City during the project.
 - 4. Proof of insurance, license and bonding if not provided to the City at an earlier date.
- B. If construction stops or is delayed longer than thirty (30) days, or there are significant changes with the construction drawings/project, the Contractor shall set an additional pre-construction conference to review the work to be done and any possible changes. Minor drawing detail changes may be accomplished through the normal review process by the City Engineer.

SECTION 8.2 APPROVED MATERIALS AND INSTALLATION METHODS

Subsection 8.2.01 GENERAL REQUIREMENTS

- A. All bedding and backfill materials shall comply with the following specifications as set forth in City Water Dept. Construction Standards. The City Field Representative shall retain the right to reject any or all materials proposed for bedding and backfill if they do

not meet the approved conditions as described in this section or the site conditions warrant use of alternate materials to provide a stable trench base for placement of Type III bedding materials.

Subsection 8.2.02 APPROVED BEDDING MATERIALS

- A. Native soils must meet the following criteria in order to be considered for use as approved pipe bedding material:
 - 1. The native material must be clean and free of fresh or decomposing organic matter of any kind including but not limited to: roots, sod, branches, logs, stumps, thick layers of leaves, construction debris, trash, or demolition of any kind.
 - 2. The native material shall consist of fine to coarse sand with aggregate or cobbles no larger than three quarters of an ($\frac{3}{4}$ ") inch in diameter and shall have no sharp angular edges. The aggregate and cobbles cannot be any greater than approximately thirty-five (35%) percent by volume of the soil composition with a maximum three (3) to nine (9) percent passing the #200 sieve. Fine loam with no sand content will not be accepted as bedding material.
 - 3. The native soil cannot contain any more than approximately twenty (20%) percent optimum moisture content so that the material can be adequately compacted around the pipe.
 - 4. The native soil shall not contain any noticeable amounts of low-molecular-weight organic vapors or petroleum products.
 - 5. The native soil cannot contain any concrete, asphalt, brick, mortar or any similar demolition debris.
 - 6. The native soil can be suitably screened to comply with the requirements listed above.
- B. When the native soil on site is determined to be unsuitable for bedding per all previously specified requirements of these Construction Standards, the Contractor shall be required to use a Type III select bedding material consisting of clean, fine to coarse sand with no aggregate greater than three quarter ($\frac{3}{4}$ ") inch minus and which shall have no angular edges and consisting of at least sixty five (65%) percent sand by volume.
- C. In the event of significant water intrusion or flow through the trench profile, and whereas there may be the possibility of the fine bedding material washing away from the pipe, the Contractor may use a Type I select bedding material consisting of three quarter ($\frac{3}{4}$ ") inch crushed or fractured aggregate suitable for soil stabilization. This condition must be expressly approved by the City Engineer and/or the Director. In the event the native soil does not meet approval for bedding material, and the backfill material contains a

significant amount of rock, the Type III select bedding materials shall be used around all mains, laterals, services, fire hydrants, valve boxes, blow off assemblies and meter boxes to finished grade.

Subsection 8.2.03 TRENCH BACKFILL MATERIALS

- A. Sand and Sandy Loam: When the Contractor is installing water infrastructure in sandy soil conditions, the Contractor shall take all necessary safety precautions to ensure worker safety. The Contractor may request approval by the City Field Representative, City Engineer, or Director to utilize the existing sandy soils as proper bedding and backfill materials if it is properly screened prior to use to ensure no large cobbles are present. Once the bedding materials are placed and compacted per these Construction Standards, the native material, provided no rocks or cobbles equal to or larger than five (5") inches in diameter are found, may be used as backfill materials.
- B. Clay and Black Soils with little or no sand content shall not be utilized for trench backfill materials.
- C. Solid Rock and Rocky Soils: The installation of water infrastructure in these conditions shall always require the use of Type III bedding materials. The rock or rocky soil shall not be used for backfill material, unless screened to less than five (5") inches in size and incorporating a minimum sixty five percent (65%) fine grade material by volume for soil stabilization. Before placing any backfill in this situation, the Contractor shall be required to seek approval of the material by the City Engineer and/or Director.

Subsection 8.2.04 BEDDING UNDER THE PIPE TO SPRING LINE

- A. The area six (6") inches below, a minimum of six (6") inches on each side to the spring line of the pipe shall be hand-bedded with a shovel and T-handle tamper. In areas where a main is to be placed over solid rock, the City Engineer and/or Director may require an additional depth of Type III select bedding to be placed below the main. The Contractor shall be responsible to notify the City Engineer and/or Director of such conditions prior to main installation. If the City is not notified prior to such installation, the Contractor may be required to remove the water main and place the correct amount of bedding at his/her cost.

Subsection 8.2.05 BEDDING SPRING LINE TO ABOVE THE PIPE

- A. Bedding material in the bedding zone from the pipe spring line to the backfill level (twelve (12") inches to twenty-four (24") inches above the top of pipe) as specified by the City Field Engineer and as displayed in Water Standard Drawing W-11 – Pipe Bedding and Backfill, shall be placed in twelve (12") inch maximum lifts and compacted to at least ninety percent (90%) of the density of undisturbed surrounding materials to a point twenty four (24") inches above the top of the pipe. The remainder of the trench shall then

be backfilled in twelve-inch (12") lifts maximum to within twelve (12") of finished grade and adequately tamped utilizing a compaction method approved by the City Engineer and/or Director.

Subsection 8.2.06 BACKFILL IN APPROVED NATIVE MATERIALS

- A. Backfill material shall be approved by the City Engineer and/or Director. The approved backfill material shall be placed above the bedding material in twelve-inch (12") lifts and shall be mechanically compacted to a minimum ninety percent (90%) of the density of the surrounding materials. The backfill shall not contain any rock equal to or greater than five (5") inches in diameter and shall have at least sixty five percent (65%) consistent fines by volume for soil stabilization. If the Contractor backfills the trench with an unapproved backfill material, or the material has not been properly compacted, the City Engineer and/or Director may require the material to be removed and replaced. This shall be at the Contractor's expense.

Subsection 8.2.07 BACKFILL IN ROCK

- A. Where solid or large rock is encountered in an excavation, the Contractor shall remove rock to a minimum of nine (9") inches below grade and will furnish a minimum of nine (9") inches of tamped Type III bedding material below, on both sides to trench walls, and a minimum of twenty four (24") inches above the pipe. This will adequately protect the pipe from unintentional intrusion of rocks. The Contractor shall either replace the excavated rock with an approved backfill material or may crush the rock on-site. No rock equal to or larger than five (5") inches in diameter or any material without a minimum sixty five percent (65%) fines shall be utilized as approved backfill. The City Engineer and/or Director will require that any unapproved material be removed from the site and replaced at the contractor's expense.

Subsection 8.2.08 COMPACTION:

- A. Compaction shall be accomplished by mechanical means utilizing equipment such as hydraulic plate packers, machine mounted hydraulic vibratory compactors, sheep's foot wheel compactors, vibratory wheel compactors, or impact plate packers. Compaction shall be achieved at ninety (90%) percent for bedding materials, ninety (90%) percent for backfill materials to twelve (12") below finished grade. Top course materials within road rights of way shall achieve ninety-five (95%) percent compaction. Materials outside of roadways and parking lots may meet the ninety (90%) percent requirement. All compaction shall be done parallel with the trench with an approved method. (Please see Water Standard Drawing W-11 Pipe Bedding and Backfill)

Subsection 8.2.09 PAVED SURFACES

- A. Where paved surfaces are present, the Contractor shall be required to follow the City standards in regard to proper pavement removal, subsurface preparation and asphalt patching and repairs (see City Standards for Street Construction). All asphalt to be removed shall have a neat cut line exposed prior to patching and repairs. All old pavement, base coarse, rocks, unused soil, grass and other unsuitable materials shall be removed from the site prior to completion of the paving project. All edges shall be properly coated with an approved tack coat just prior to paving. This includes all materials inadvertently left on adjacent properties.
- B. Patching of all trenches shall consist of a minimum of three (3") inches of Class 3 asphalt unless otherwise directed on the plans or by the City Engineer. All joints between existing asphalt and new asphalt shall be coated with an approved emulsion tack coating.

Subsection 8.2.10 INSPECTIONS

- A. The bedding for the main installation shall be inspected prior to backfilling of the trench. The Contractor shall notify the Field Representative at least forty-eight (48) hours prior to the desired inspection to allow sufficient time to have this completed. The final backfill shall be inspected as well prior to placing of asphalt or concrete.
- B. **TESTING** - At the discretion of the City Engineer and/or Director, field tests for density will be performed in accordance with ASTM D-1556 at the sole cost of the Contractor
- C. The Contractor shall not bury any work to be inspected without such inspections taking place. The Contractor shall notify forty-eight (48) hours in advance and shall use every number available to contact the Field Representative. If work is covered without the appropriate inspection, the Contractor will dig and expose any appurtenance which requires inspection at his/her own expense. No claims for project delays can be made due to this.

CHAPTER 9

WATER METERS

SECTION 9.1 INFORMATION AND DOCUMENTATION

Subsection 9.1.01 GENERAL INFORMATION

- A. The following specifications will detail the specific brands, types and models of water meters that the City of Coeur d'Alene Water Department will accept for installation into the distribution system in regard to residential and commercial domestic and irrigation services. All meters shall read in U.S. gallons and be capable of billing in 1000-gallon increments.

Subsection 9.1.02 REFERENCES

- A. IDAPA 58.01.08
- B. AWWA / ANSI C700-02, C701-02, C702-01, C707
- C. NSF/ANSI 61
- D. Badger Meter, Inc. Product Technical Specifications

SECTION 9.2 BRANDS AND INSTALLATIONS

Subsection 9.2.01 METER CASE

- A. **LOW LEAD BRASS BODIED WATER METER** – All meters installed for the purpose of registration of water usage for domestic or irrigation purposes, whether commercial, industrial or residential, shall be either:
1. **BADGER** - New Badger brand, low lead bronze case meters shall comply with NSF/ANSI Standard 61. New Badger meters shall be positive displacement, nutating disc for meter sizes three quarter (3/4") inch, short laying length only, (seven and one-half (7 1/2") inches), through two (2") inch meters. The Badger disc meters consist of three basic components: the meter housing, measuring chamber, and a permanently sealed register. The new meter shall utilize magnetic drive registers and have the standard meter connection points relative to the meter port size. Models shall include: M35 3/4", M70 1", M120 1 1/2", M 170 2", Meters larger than two (2") inch may be compound meters and shall be specifically approved prior to installation. All meters

three quarter (3/4”) inch and one (1”) inch shall have a replaceable cast iron frost bottom in the event that the meter should freeze to prevent damage to the bronze body.

Subsection 9.2.02 MEASURING CHAMBERS AND DRIVES

- A. Measuring chambers for the Badger meters consist of a corrosion resistant thermo plastic extrusion rated for operating temperatures up to eighty (80) degrees Fahrenheit. The disc and chamber housing are constructed of the same materials with a stainless-steel shaft and permanently mounted ceramic magnet that transfers the disc motion to magnet follower within the sealed register.
- B. **PERFORMANCE CHART** - Normal operating flow rates for Badger meters from three quarter (¾”) inch through ten (10”) inch are listed in **Table 9.1**. These rates are for normal operating flows at 60 psi as set by AWWA meter performance standards. The meters listed do have an intermittent higher flow capacity but as there is increased head loss, only the standard flow chart shall be utilized in determining the proper meter though fixture count.

Table 9-1

Average GPM for Meter Sizes at 60 psi.

Badger Meters		
Type	Size	GPM
Disc	¾”	3/8-35
Disc	1”	½-55
Disc	1 ½”	1 ¼-120
Disc	2”	1 ½-170
Compound	3”	5-450
Compound	4”	10-1000
Compound	6”	20-2000
Combination	8”	30-3500
Combination	10”	50-5500

Subsection 9.2.03 METER REGISTERS

- A. The meter registers shall be a magnetic drive encoder style register. All registers used within the City of Coeur d’Alene water system shall read in one thousand (1000) gallon increments. The specifications are as follows:
 - 1. **BADGER** – The Badger meters utilized in the City of Coeur d’Alene uses the High-Resolution encoder (HR-E LCD) which is a fully electronic, solid-state

encoder with no moving parts. It is designed for use with all current Badger Meter Recordall® Disc, Turbo Series, Compound Series, Combo Series and Fire Service meters and assemblies. The HR-E LCD provides connectivity with Badger Meter ORION® and GALAXY® AMR/AMI endpoints and other AMR/AMI technology solutions approved by Badger Meter.

- a.) Construction: The housing of the HR-E LCD encoder shall be constructed of an engineered polymer enclosure and a polycarbonate lens. For long-term performance, the enclosure is fully encapsulated, weatherproof, and UV resistant to withstand harsh environments and to protect the electronics in flooded or submerged pit applications, an epoxy potting shall comprise the encoder bottom, The HR-E LCD shall meet all applicable requirements of AWWA Standard C706 and C707. The register shall have a temperature range of minus forty (40) degrees to one hundred forty (140) degrees Fahrenheit. The register housing shall have-a tamper-proof mounting system.
2. High Resolution LCD Encoder (HR-E® LCD), 9-digit LCD electronic encoder is fully electronic, solid-state and field programmable, utilizes industry standard ASCII communication protocol to provide high resolution encoded output, and has status indicators/alarms can also be sent as part of the encoded output to endpoints capable of receiving extended messages. The register shall be secured to the meter body by means of a tamper resistant locking screw so that non-utility personnel cannot remove the register. The register must be field replaceable by utility personnel with the use of a manufacturer-supplied field tool. The field tool must not be commercially available. Seal wiring or a frangible head seal screw is not acceptable. The meter register shall have a Twist Tight In-Line Connector Assembly. The connection between the meter register and the Orion Cellular Water Endpoint shall be accomplished with the use of Badger Meter's Twist Tight In-line Connector Assembly. The register shall transmit the register data directly to the Orion-cellular endpoint.-All vaults must have 1 7/8" minimum hole in manhole cover for the radio read MXU. (Please see Water Standard Drawing W-30 Manhole Cover)

Subsection 9.2.04 CAST IRON FROST BOTTOM

- A. The meter housings for the three quarter (3/4" inch and one (1") inch sizes shall include a manufacturer provided cast iron replaceable frost bottom equipped with embossed breakaway ears or an embossed breakaway bottom design to prevent damage to the main case in the event that the meter was to freeze.

Subsection 9.2.05 ORION TRANSMITTER

- A. Orion Cellular water endpoints communicate with the encoder and capture 15-minute interval read data and meter status information. The endpoints then automatically broadcast the information, including endpoint status information, via the cellular network to Beacon® Software as a Service (SaaS). The endpoints are designed to call in four times each workday and feature a configurable schedule that enables utility customers to select call-in times that best support their processes.
- B. Broadcast Mode: ORION Cellular water endpoints broadcast fixed network reading data through the secure cellular network within the service area.
- C. Configurations: ORION Cellular water endpoints are multi-purpose endpoints that can be deployed in indoor, outdoor and pit (non-metal pit lid) applications. The electronics and battery assembly are fully encapsulated in epoxy for environmental integrity. The endpoint is available with a connector assembly for ease of installation.
- D. Meter Compatibility: When attached to a Badger Meter High Resolution Encoder, the ORION Cellular water endpoint is compatible with all current Badger Meter Recordall® Disc, Turbo Series, Compound Series, Combo Series and Fire Service metes and assemblies, and with E-Series G2® Ultrasonic, E-Series® Ultrasonic, E-Series® Ultrasonic Plus, and ModMag® electromagnetic flow meters.

Subsection 9.2.06 INSTALLATION

WATER METER – All new water meter settings shall include an approved copper setter with the appropriate angle stop and customer side check valves. The one (1”) and smaller meters shall be attached in the proper orientation (arrow cast in body pointing toward the building) by use of the threaded female meter adapters provided with the coppersetter. Any existing meter settings that currently do not have an approved coppersetter, shall provide adequate meter adapters to accommodate the Badger meter. If meter adapters are not provided, the meter setting shall be either reconstructed with the appropriate coppersetter or have the proper meter spuds installed. All installations shall require approved meter gaskets for a drip tight seal. Meters one and one half (1 ½”) inch and larger shall be secured by the use of bolted flanges, zinc plated grade five or better steel bolts and nuts, either provided with the two (2”) inch coppersetter or by plumbed companion flanges when using three (3”) inch or larger meters. An approved flange gasket shall be included to provide a drip tight connection with the appropriately sized zinc plated steel bolts and nuts. Meters three (3”) and larger shall be delivered to the Water Dept. a minimum of two weeks prior to installation for testing. If the meter test fails, the contractor shall work with the supplier and the city to replace the meter and retest it. A passing test must be obtained before installation.

SECTION 9.3 PROJECT COMPLETION

Subsection 9.3.01 INSPECTION

- A. All new water meter coppersetter/meter box installations shall be inspected and approved by a Water Department Field Representative as to proper installation, depth and condition of setting. Any repairs to or replacement of existing meter settings and/or meter boxes and lids shall also require inspection and approval by a Water Department Field Representative. The water meter shall be pressurized upon installation and visually inspected to confirm that no leaks are present. Once inspections are complete, the meter shall be removed and drained to prevent possible freezing. Any deviations from City Standards will require immediate correction by the Contractor.

CHAPTER 10

DISINFECTION OF WATER MAINS

SECTION 10.1 INFORMATION AND DOCUMENTATION

Subsection 10.1.01 GENERAL REQUIREMENTS

- A. The Contractor shall furnish all necessary approved chemicals for complete disinfection of newly installed mains, laterals, fire hydrants and appurtenances as well as system repairs. All applicable portions of the mains and/or appurtenances to be tested shall be disinfected according to recognized standards for Disinfecting Water Mains recommended by AWWA standard C651-05.

Subsection 10.1.02 REFERENCES

- A. IDAPA 58.01.08
- B. ANSI/AWWA C651-05
- C. The Contractor shall be responsible for complying with and performing the following AWWA Standards.

Subsection 10.1.03 DOCUMENTATION

- A. The Contractor shall be responsible for reviewing, understanding and performing the following procedures step by step for proper disinfection of new construction, replacements and repairs. Disinfection and proof of satisfactory results are mandatory before a main, lateral, fire hydrant, fire service or domestic/irrigation water line is placed in service. The Contractor shall notify the Water Department Field Representative prior to filling, flushing and sampling a water line. The Field Representative shall determine the minimum flushing time necessary to clear all disinfectant from the water line and the resultant quantity of bacteria samples to be withdrawn. All test results will be presented to the City Water Dept. by the Project Engineer or Contractor in writing prior to the water line being placed in service.

Subsection 10.1.04 PRE-CONSTRUCTION CONFERENCE

- A. Prior to work commencing on any project greater than installation of a single water service, the Contractor shall schedule a pre-construction conference with the City Water Department to inform the Director of the work to be performed. Any necessary contract

documentation shall be provided to the City Water Department prior to the preconstruction conference. The Contractor shall attempt to have a representative from all of the Contractor's subs at the meeting or shall be authorized to speak for them. The Contractor shall provide at the meeting:

1. A complete listing of the Contractor's subcontractors for the project.
 2. An approved set of plans with the City Engineer's signature. Any changes, additions or deletions shall be reviewed and signed by the City Engineer prior to construction as well. The Contractor shall have a set of signed plans available at the work site at all times which shall be shown to the Field Representative.
 3. A project schedule which shall be regularly updated, and any changes shall be submitted to the City during the project.
 4. Proof of insurance, license and bonding if not provided to the City at an earlier date.
- B.** If construction stops or is delayed longer than thirty (30) days, or there are significant changes with the construction drawings/project, the Contractor shall set an additional pre-construction conference to review the work to be done and any possible changes. Minor drawing detail changes may be accomplished through the normal review process by the City Engineer.

SECTION 10.2 TYPE OF APPROVED DISINFECTING AGENTS

***Subsection 10.2.01* CALCIUM HYPOCHLORITE TABLETS**

- A. Calcium hypochlorite in five (5 g) gram tablet form with sixty five (65%) percent available chlorine shall be utilized for the initial disinfection of all new water mains, service laterals of adequate size, and fire hydrants installed in any portion of the water system whether it be an extension or a replacement main. The tablets shall be glued to the pipe with Permatex #1, not the fittings, in sufficient number as indicated in **Table 10.1** so that it will stay in place during the initial filling of the water line and generate a minimum concentration of fifty (50 mg/L) milligrams per Liter of total chlorine to achieve a proper disinfection rate. This shall be done for all new installations and replacements larger than ten (10') feet unless the replacement must immediately be placed back in service.

***Subsection 10.2.02* SODIUM HYPOCHLORITE LIQUID**

- A. Where mains or services have been cut for repairs or have been severed accidentally, the replacement pipe and fittings shall be swabbed with a liquid solution of sodium hypochlorite on the interior of all fittings and pipe. Prior to final assembly, additional liquid hypochlorite may be used to add to the disinfection effort. Slowly fill and allow the repair to sit for as long as possible prior to flushing and returning to service.

- B. Sodium hypochlorite may also be utilized for re-disinfection, if approved by the Field Representative, should the initial attempt fail to provide satisfactory samples. A minimum five (5%) percent solution shall be used in sufficient volume to achieve a minimum fifty (50 mg/L) milligrams per liter of total chlorine available. This solution shall then be injected into the line to be disinfected and allowed to sit for forty-eight (48) hours or as long as possible as the case may be.

SECTION 10.3 APPROVED DISINFECTION METHODS

***Subsection 10.3.01* AWWA STANDARD TABLET METHOD FOR DISINFECTING WATER MAINS AND SERVICE LATERALS A. BASIC TABLET PROCEDURE UTILIZED BY CITY OF COEUR D'ALENE -**

The basic procedure comprises three initial steps comprised of the following:

1. Preventing contaminating materials from entering the water mains during construction or repair and removal by flushing all materials that may have entered the water main, laterals and services by flushing at the meter and/or house as applicable. (Please see Subsection 10.3.02)
2. Disinfecting any residual contamination that may remain and flushing out at the meter settings or house faucets. (Please see Subsection 10.3.03)
3. Determining the bacteriologic quality of all mains, laterals and services by laboratory test after disinfection and flushing. (Please see Subsection 10.3.04)

***Subsection 10.3.02* PREVENTATIVE MEASURES DURING CONSTRUCTION**

A. Recommended methods for keeping the pipe, fittings and materials clean and dry.

1. **Protection** - Precautions shall be taken to protect pipe interiors, fittings and valves against contamination. Pipe delivered for construction shall be strung so as to minimize entrance of foreign material. When pipe installation is not in progress (i.e. at the close of the day's work), all openings in the pipeline in the trench shall be closed by watertight plugs. Joints of all pipe in the trench shall be completed before work is stopped. If any contaminants enter the pipe line in the trench, the Contractor shall effectively flush the pipe to clean out the contamination. If not done, the City Engineer and/or Director may require that the contaminated pipe be removed and replaced at the Contractors expense. If water accumulates in the trench, the plugs shall remain in place until the trench is clear of any groundwater and dry.

2. Delay in placement of delivered pipe invites inadvertent contamination. The more closely the delivery date is correlated to the date of pipe installation, the less chance contamination will occur.
3. **Standards** - See C600-AWWA Standard for Installation of Cast Iron Water Mains, and C-900-905 AWWA Standard for Installation of (PVC) Pressure Pipe. If dirt not removed by the flushing operation enters the pipe, the interior of the pipe shall be cleaned and swabbed as necessary with a five percent (5%) hypochlorite disinfecting solution.
4. **Pipe Lubricants** - The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. It shall be delivered to the job in closed containers and shall be kept clean. The use of any other agent that does not meet the manufacturer's specifications is strictly prohibited.
5. **Cleaning and swabbing** - If dirt enters the pipe, it shall be removed, and the interior pipe surface swabbed with a 1 to 5 percent hypochlorite disinfecting solution. If, in the opinion of the purchaser, the dirt remaining in the pipe will not be removed using the flushing operation, then the interior of the pipe shall be cleaned using mechanical means, such as a hydraulically propelled foam pig (or other suitable device acceptable to the purchaser) in conjunction with the application of a 1 percent hypochlorite disinfecting solution. The cleaning method used shall not force mud or debris into the interior pipe-joint spaces and shall be acceptable to the purchaser.
6. **Flooding by storm or accident during construction** - If the main is flooded during construction, it shall be cleared of the floodwater by draining and flushing with potable water until the main is clean. The section exposed to the floodwater shall then be filled with chlorinated potable water that, at the end of a 24-hr holding period, will have a free chlorine residual of not less than 25 mg/L. The chlorinated water may then be drained or flushed from the main. After construction is completed, the main shall be disinfected using the continuous-feed or slug method.

Subsection 10.3.03 WATER MAIN FLUSHING ASSEMBLY

- A. A main flushing assembly shall be installed at a major low section of the main which may be subject to accumulating sediment and shall be sized to provide a minimum of two point five (2.5') feet per second scouring velocity in the main to remove any accumulation of sediment. A two (2") inch assembly will be installed to grade with a two (2") gate valve, threaded coupling and finger tight plug six (6") inches from finished grade in approved Tyler valve boxes. The flush point will only require the sixteen (16") Tyler top section and lid at finished grade. Locations shall be determined by the City Engineer and/or Director.

Subsection 10.3.04 APPROVED FORM OF CHLORINE DISINFECTION

A. Tablet Method - Tablet disinfection is the preferred method of water main disinfection for four (4”) inch through twenty four (24”) inch diameter mains. Because the preliminary flushing step must be significantly reduced, this method requires that scrupulous cleanliness has been exercised during main installation. If trench water or foreign material has entered the main or if the water temperature is below 5° C. (41° F.) and total chlorine levels of twenty-five (25 mg/L) milligrams per Liter cannot be achieved in forty-eight (48) hours, alternate methods shall be reviewed and approved by the City Water Department. Water mains larger than twenty-four (24”) inch may also require an alternate method of disinfection to be approved by the City Water Department.

1. **Placement of Tablets** - Tablets shall be placed in each twenty (20’) foot section of pipe and also in fire and flush hydrants, hydrant branches, and other appurtenances. The tablets shall be attached by an approved adhesive (Permatex No. 1), except for the tablets placed directly in hydrant bases and in the fittings between the pipe sections. All of the tablets glued within the pipe must be at the top of the main. If the tablets are fastened before the pipe section is placed in the trench, their position should be marked on each section of pipe to ensure that the tablets will end up at the top of the main. If any glued tablets disintegrate prior to pipe installation, the Contractor shall glue in new tablets or replace the pipe. **(Please see Table 10.1)**

Table 10.1

Number of Hypochlorite Tables of 5-G
 Required for Dose of 50 Mg/L
 (Based on a 3 ¾ g. available chlorine per tablet)

Diameter of Pipe / Inches	2”	4”	6”	8”	12”	16”	20”	24”	36”	48”
# of tablets/section of pipe (20’)	1	1	2	3	5	6	9	13	N/A	N/A

2. **Approved adhesive** - The adhesive may be Permatex No. 1 or any alternative approved by the City of Coeur d’Alene Water Department. There shall be no adhesive on the tablet except on the broad side next to the surface to which the tablet is attached.
3. **Filling and Contact Time** - When installation has been completed, the main shall be filled with water at a rate to ensure that the water within the main will flow at a velocity no greater than 1 ft/sec (0.3 m/sec). Precautions shall be taken to ensure that air pockets are eliminated. This water shall remain in the pipe for at least forty-eight

(48) hours to ensure an adequate contact time regardless of water temperature. A detectable free chlorine residual should be found at each sampling point after the forty-eight (48) hour period. The results must be reported to the City Water Dept. immediately.

4. **Valves** - Valves to the existing mains shall be closed drip tight so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water.
5. **Final Flushing** - After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than the residual generally prevailing in the distribution system, or less than 1 mg/1. An approved chlorine residual determination shall be made to ascertain that the heavily chlorinated water has satisfactorily been removed from the pipeline. Flushing must be done on all mains, laterals, flush hydrants and appurtenances for the appropriate amount of time to ensure that water in the main has been exchanged a minimum of three (3) times. This will require calculation of the entire main capacity and a metered and/or timed calculation to determine that the amount of flushing is sufficient accomplish this task. These calculations must be presented to the on-site Field Representative for approval prior to flushing. (Please see **Table 10.2**).

Table 10.2
REQUIRED OPENING TO FLUSH PIPELINES*
(40 psi Residual)

Pipe Size (in.)	Flow req. to produce 2.5 fps velocity		Hydrant Outlet Nozzles	
	Size (in.)	gpm	Size (in.)	Orifice Number
4"	100	15/16"	1	2.5"
6"	220	1 3/8"	1	2.5"
8"	390	1 7/8"	1	2.5"
10"	610	2 5/16"	1	2.5"
12"	880	2 13/16"	1	2.5"
14"	1,200	3 1/4"	2	2.5"
16"	1,565	3 5/8"	2	2.5"
18"	1,980	4 3/16"	2	2.5"

- a.) *With forty (40) psi residual pressure, a two and one half (2 ½") inch hydrant outlet nozzle will discharge approximately one thousand (1,000) gallons per

minute (gpm) and a four and one half (4 ½”) inch hydrant nozzle will discharge approximately two thousand, five hundred (2,500) gallons per minute.

6. **Disposal of Water** - Water from the flushing of the main shall be disposed of as directed by the City Engineer and/or Director in accordance with applicable regulations. The Contractor shall take steps up to and possibly including chemical dechlorination to prevent damage to any existing grasses, plants and shrubs during the flushing process. Where necessary, federal, state, local, or provincial regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

Subsection 10.3.05 BACTERIOLOGIC SAMPLING

A. **Bacteriologic Tests** - After final flushing, and before the water main is placed in service, a sample or samples shall be collected at designated points along the main(s) and from the end of the line and tested for bacteriologic absence and shall show the absence of coliform organisms. If the number and frequency of samples is not prescribed by the public health authority having jurisdiction, The City Water Dept. Field Representative may determine the number of samples required. Any project will require at least one (1) sample shall be collected from chlorinated supplies where a chlorine residual is maintained throughout the new main. From unchlorinated supplies at least two (2) samples shall be collected at least twenty-four (24) hours apart.

1. In the case of extremely long mains (over 1000’), it is desirable that samples be collected at designated points along the length of the line at a minimum of every one thousand two hundred (1200’) feet as well as at its end.
2. **Repetition of Procedure** - If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained. The tablet method cannot be used in these subsequent disinfections. The main may not be placed in service until satisfactory test results have been received by the City Water Department and approved by the City Engineer and/or Director.

Subsection 10.3.06 ALTERNATE METHODS OF DISINFECTION

A. When the tablet method cannot be utilized due to main size, water or foreign material intrusion, or repeated failures, the Contractor shall present alternative methods of disinfection for approval by the City Water Department This may include the injection method.

1. **Preliminary Flushing** - Prior to any alternate method of disinfection, all of the mains shall be flushed prior to disinfection. The sites and velocities of flushing shall be as specified by the City Engineer and/or Director. No flushing shall be done without prior notification sent to the Water Department Office.

2. **Flushing Velocity** - It is recommended that the flushing velocity be not less than 2.5 ft./sec. The rate of flow required to produce this velocity in various diameters is shown in **Table 1**. No site for flushing should be chosen unless it has been determined that drainage is adequate at that site. The Contractor shall be responsible for all damage that may occur during flushing or because of the flushing procedure.
3. **Recommended Cautions** - Flushing is no substitute for preventive measures taken before and during pipe installation. Certain contaminants, especially in caked deposits, resist flushing at any velocity. Furthermore, with pipe diameters of sixteen (16") inches or more, even the minimum recommended flushing velocity of 2.5 ft./sec. is sometimes difficult to achieve.

Subsection 10.3.07 PROCEDURE AFTER CUTTING OR REPAIR TO EXISTING MAINS

- A. The following procedures apply primarily when existing mains are wholly or partially dewatered. After the appropriate procedures have been completed, the existing main may be returned to service prior to the completion of bacteriological testing in order to minimize the time customers are without water. Leaks or breaks that are repaired with clamping devices while the mains remain full of pressurized water may present little danger of contamination and therefore may not require disinfection.
 1. **Swabbing with hypochlorite solution** - The interior of pipe and fittings (particularly couplings and sleeves) used in making the repair shall be swabbed or sprayed with a 1 percent hypochlorite solution before they are installed.
 2. **Flushing** - Thorough flushing is the most practical means of removing contamination introduced during repairs. If valve and hydrant locations permit, flushing toward the work location from both directions is recommended. Flushing shall be started as soon as the repairs are completed and shall be continued until discolored water is eliminated.
 3. **Bacteriological samples** - Bacteriological samples shall be taken after repairs are completed to provide a record for determining the procedure's effectiveness. If the direction of flow is unknown, then samples shall be taken on each side of the main break. If positive bacteriological samples are recorded, then the situation shall be evaluated by the potential owner who can determine corrective action. Daily sampling shall be continued until two consecutive negative samples are recorded.

SECTION 10.4 PROJECT COMPLETION

Subsection 10.4.01 INSPECTION

- A.** The Contractor shall have his/her Field Representative working in a cooperative effort with the Water Department Field Representative confirm that proper disinfection procedures were followed. The City shall be provided with copies of all acceptable bacteria test reports. Any damage discovered by the Field Representative shall be noted and it shall be the Contractor's responsibility to repair or replace the damaged items as per the Field Representative's request.
- B.** The Contractor shall not bury any work to be inspected without such inspections taking place. The Contractor shall notify forty-eight (48) hours in advance and shall use every number available to contact the Field Representative. If work is covered without the appropriate inspection, the Contractor will dig and expose any appurtenance which requires inspection at his/her own expense. No claims for project delays can be made due to this.
- C.** All bacteria test report copies shall be sent to the City Water Department for approval.

CHAPTER 11

HYDROSTATIC TESTING

SECTION 11.1 INFORMATION AND DOCUMENTATION

Subsection 11.1.01 GENERAL INFORMATION

- A. Pressure testing of all mains complete with all valves and fittings, fire hydrants, domestic services, fire service laterals, stubs and passing bacteria sample shall be done under the following Construction Standards as directed by the City Engineer and/or Director for any water facility installation. Any deviations from the prescribed methods must be approved by the City Engineer and/or Director prior to such tests being performed.

Subsection 11.1.02 REFERENCES

- A. IDAPA 58.01.08
- B. AWWA C 605-94
- C. AWWA C 600-99

Subsection 11.1.03 DOCUMENTATION

- A. The Contractor shall notify the City Field Representative when he/she is ready to supply the mandatory pressure test of the water line. The Contractor shall provide a standard hose bibb fitting on his/her test equipment for a field recorder or data logger to be attached to. The test shall last a minimum of two (2) hours at one hundred sixty (160) psi with the recording device in place for the entire time. (Please see Water Standard Drawing W-35 Approved Pressure Testing Methods)

Subsection 11.1.04 PRE-CONSTRUCTION CONFERENCE

- A. Prior to work commencing on any project, the Contractor shall schedule a preconstruction conference with the City Water Department to inform the Director of the work to be performed. Any necessary contract documentation shall be provided to the City Water Department prior to the pre-construction conference. The Contractor shall attempt to have a representative from all of the Contractor's subs at the meeting, or shall be authorized to speak for them. The Contractor shall provide at the meeting:
 1. A complete listing of the Contractor's subcontractors for the project.

2. An approved set of plans with the City Engineer's signature. Any changes, additions or deletions shall be reviewed and signed by the City Engineer prior to construction as well. The Contractor shall have a set of signed plans available at the work site at all times which shall be shown to the Field Representative.
 3. A project schedule which shall be regularly updated and any changes shall be submitted to the City during the project.
 4. Proof of insurance, license and bonding if not provided to the City at an earlier date.
- B. If construction stops or is delayed longer than thirty (30) days, or there are significant changes with the construction drawings/project, the Contractor shall set an additional pre-construction conference to review the work to be done and any possible changes. Minor drawing detail changes may be accomplished through the normal review process by the City Engineer.

SECTION 11.2 APPROVED PRESSURE TESTING PROCEDURES

Section 11.2.01 GENERAL REQUIREMENTS

- A. The Contractor shall be responsible for supplying all related materials and equipment for the pressure test with the exception of the City supplied recording instrument. The Contractor shall provide accurate footage of the pipe to be tested including any laterals and stubs. The Contractor shall provide a suitable connection for the test equipment, a calibrated pressure gauge and an isolation ball valve and a water meter for the leak loss calculations. (Please see Water Standard Drawing W-35 – Approved Pressure Testing Method)

Section 11.2.02 PRESSURE TEST PROCEDURE

- A. All mains complete with valves, fittings, fire hydrants, fire services and laterals, service laterals, stubs and other facilities and appurtenances shall be hydrostatically tested, meeting Section 19 of AWWA C603-64T Specifications at one hundred sixty (160) psi for a two (2) hour duration. All valves, with the exception of the existing supply main valve(s), shall be in the fully open position and all valve boxes shall be clean and accessible for the Field Representative prior to the test being performed.

1. **Thrust blocks** - All thrust-blocks shall have been in place for a sufficient time to have developed their initial strength so that there will be no movement of the main, as approved by the City Engineer and/or Director.
2. **Mains** - The main(s) shall be filled with water and all remaining air shall be purged from all mains, fire hydrants and fire services, domestic and irrigation services, laterals and stubs prior to being subjected to the hydrostatic test.
3. **Equipment** - The Contractor shall provide the complete means of conducting such tests including pumps and all related equipment and shall conduct the test using pressure recording equipment furnished by the City to provide a permanent record of each test. The Contractor shall provide a test manifold which will include an accurate glycerin filled pressure gauge capable of reading in two (2) psi increments with a sufficient rating for the applicable test pressure. An additional hose bibb style faucet shall be provided for the City furnished equipment connection. A teflon seated ball valve will be utilized to isolate the test pump from the manifold. An accurate water meter shall be connected to the low-pressure side of the test pump (prior to connection for test pumping) to record the amount of water lost when re-pressurizing the main. This meter shall read in one (1) gallon increments with a one tenth (1/10th) of a gallon dial. It is recommended that the Contractor pressurize the main at least once to ensure that all trapped air is relieved prior to the City's final test.
4. **Inspection** - All hydrostatic tests shall be conducted in the presence of the City Field Representative and scheduled to be conducted during regular City working hours inclusive of the two (2) hour test period. Any overtime required to complete the test on behalf of the City shall be billed to and paid by the Contractor.
5. **System Testing** - Hydrostatic tests shall be conducted with mains, service taps, fire hydrants, laterals, stubs and other appurtenances required to constitute a completed project as shown on approved plans excluding the tie-ins to existing mains. The Contractor shall not be permitted to make final tie-ins to existing mains except as a supply source for the new infrastructure before testing unless approved by the City Engineer and/or Director. If approved to do so, then the same testing practices shall govern as if the tie-ins were not made prior to testing and final acceptance of the project.
6. The leak loss chart provided in **Table 11-1** may be used to calculate the maximum allowable leak loss for the pipe size and length. It will be very important that the Contractor have or provide accurate footages of each size of pipe to be involved in the pressure test. It is recommended that the Contractor pressurize the pipe several times prior to beginning the actual pressure test to attempt to evacuate all air which will affect the outcome of the test. All required components of the test manifold must be in place and acceptable to the Field Representative and/or engineer or the test will not be allowed.

Table 11.1

ALLOWABLE LEAKAGE FOR AWWA PVC PIPE C-900

Average Test Pressure in Line: psi

Nominal Pipe	160	175	200
Size (in.)	Allowable Leakage per 1000' or 50 joints: gal/hr (L/hr)		
4"	0.33	0.36	0.38
6"	0.50	0.54	0.57
8"	0.66	0.72	0.76
10"	0.83	0.89	0.96
12"	0.99	1.07	1.15
16"	1.32	1.43	1.53
18"	1.49	1.61	1.72
20"	1.66	1.79	1.91
24"	1.99	2.15	2.29

7. **Test Pressure** - The test pressure is to be kept as nearly as possible to one hundred sixty (160) psi or greater as required. If pressure drops below the calculated allowable loss, the test will be terminated by the Field Representative and the contractor shall correct any problems prior to rescheduling the pressure test. (Please see Water Standard Drawing W-35 Approved Pressure Testing Methods)
- a.) Test pressure for all fire service laterals (not including City fire hydrants) shall be a minimum of two hundred (200) psi or greater at two hours as required by code. Prior to pressure testing, a passing bacteria sample must be obtained and 48 hrs advanced notice must be given to Water Dept. field inspectors. The pressure test must be performed by, or under the supervision of a licensed fire sprinkler contractor and be approved by the Fire Marshal.
8. **Leaks and Defects** - Any defective portions of work performed (materials and/or workmanship) discovered during hydrostatic tests shall be replaced or repaired by the Contractor before the Engineer and/or Field Representative will approve and accept the completed job. After repairs are made, the Contractor will be required to repeat the pressure testing until an acceptable test is completed.
- B. Prior to the City issuance of a Certificate of Occupancy or a Temporary Certificate of Occupancy, all required fire hydrants shall be tested and approved as to service, location, and available fire flow by the City Fire Department. The fire hydrant(s) shall be pressure tested, disinfected, and bacteria sampled in accordance with all applicable City standards for water main construction.

SECTION 11.3 PROJECT COMPLETION

Subsection 11.3.01 WITNESSING THE TEST

- A. The Contractor shall have his/her Field Representative from the engineering firm inspect and confirm that proper pressure testing procedures were followed. The City shall be provided with copies of an acceptable test. The Contractor shall also immediately notify the City Field Representative to confirm that proper procedures were followed per current City specifications. Any damage discovered by the Field Representative shall be noted and it shall be the Contractor's responsibility to repair or replace the damaged items as per the Field Representative's request.

Subsection 11.3.02 ACCEPTANCE

- A. This procedure shall not be considered complete and accepted by the City until an approved test has been completed and a copy received by the City.
- B. All water utilized for testing purposes will come from a potable supply such as an approved transport tank or container which shall be approved by the engineer and/or Field Representative.

CHAPTER 12

NON-POTABLE WATER LINE SEPARATION

SECTION 12.1 INFORMATION AND DOCUMENTATION

Subsection 12.1.01 GENERAL REQUIREMENTS

- A. When a water main crosses under an existing sewer main, the Contractor shall take all necessary precautions to insure the integrity and uninterrupted service of the sewer main. If a sanitary or storm sewer main is broken during construction, the Contractor shall immediately call the agency having jurisdiction and shall aid and assist or make the repair as directed by the Director or the agency having jurisdiction over the sewer main. All costs related to the repair shall be paid for by the Contractor. All repairs to sewer mains shall be subject to rigid inspection by the Director and the agency having jurisdiction over the sewers. Zone A select backfill material shall be extended to twelve (12) inches above the sewer main. (Please see Water Standard Drawing W-11 Pipe Bedding and Backfill)
- B. When a new sanitary or storm sewer main crosses under an existing AC water main, the water main at the discretion of the Director may need to be altered per city specifications. (Please see Water Standard Drawing W-8 Approved AC Main Replacement Crossing).

Subsection 12.1.02 REFERENCES

- A. IDAPA 58.01.08
- B. AWWA / ANSI

Subsection 12.1.03 HORIZONTAL SEPARATION OF WATER AND SEWER LINES

- A. Water and sewer line separation must meet the DEQ standard, or the following, whichever is more restrictive:
 - 1. When the potable water line and non-potable line have at least ten (10') feet horizontal separation, and the water main has at least eighteen (18") inches vertical separation above the non-potable line, then no other special conditions shall exist unless pointed out by the City Engineer or Director.
 - 2. If the ten (10') foot horizontal separation cannot be maintained, and the Contractor has prior approval from the City Engineer, DEQ, and Water Dept. Director, then the following conditions shall be met:

3. The water and non-potable line shall be at least six (6') feet apart and;
4. The non-potable line shall be constructed or reconstructed with pipe which conforms to water main standards and pressure tested for watertightness or;
5. One of the lines shall be encased with sleeving material acceptable to DEQ and the City Engineer and/or Director.

***Subsection 12.1.04* DOCUMENTATION**

- A.** A field engineer and/or Field Representative shall be responsible for measuring and recording pertinent project information regarding location of replaced water main and related valves, tees, elbows, fire hydrants, and crossings with other utilities, etc., for transfer to as-builts and provision to the City Field Representative. Measurements for the City's benefit shall be in feet and inches from an identifiable location such as valve box or fire hydrant and not from engineering stations or movable objects such as power poles, trees or buildings.
- B.** The Contractor and/or Project Engineer shall supply as-builts on the plans provided, indicating the exact locations of all facilities installed before the City accepts the project as completed. The Contractor shall supply the Director with all construction notes which may or may not have been included on the as-builts. As-builts are due to the City no more than thirty (30) days after substantial completion of the project. If no as-builts are received, the City shall withhold any building permits for the project and/or Certificates of Occupancy. Any and all plan/construction changes shall be included with the final as-builts. The as-builts shall contain information regarding planned and actual installations, footage measurements for all fittings, tees and valves, detailed information and measurements for any appurtenances removed or replaced during construction, and any information regarding service stubs and their locations.

SECTION 12.2 MATERIALS AND PRACTICES

***Subsection 12.2.01* VARIOUS MATERIALS USED**

- A.** There may be various types of materials that the potable and non-potable lines are constructed of. This may include but is not limited to:
 1. C900 PVC plastic pipe.
 2. Class 160 PVC plastic pipe
 3. 3034 PVC plastic pipe

4. DR 18 PVC plastic pipe
5. AC concrete pipe
6. Precast concrete pipe
7. Coated steel pipe
8. Galvanized steel pipe
9. HDPE Poly pipe

Subsection 12.2.02 APPROVED BEDDING MATERIALS:

- A. Contractor shall be required to use a Type III select bedding material consisting of clean, fine to coarse sand with no aggregate greater than three quarter ($\frac{3}{4}$ ") inch minus and which shall have no angular edges.
- B. In the event of significant water intrusion or flow through the trench profile, and whereas there may be the possibility of the fine bedding material washing away from the pipe, the Contractor may use a Type I select bedding material consisting of three quarter ($\frac{3}{4}$ ") inch crushed or fractured aggregate suitable for soil stabilization. This condition must be expressly approved by the City Engineer and/or the Director. The Type III select bedding materials shall be used around all fire hydrants, valve boxes, blow off assemblies and meter boxes to finished grade.
- C. All street cuts and/or open work areas shall be covered or backfilled during overnight exposure as per City code and construction standards, or as approved by the City Engineer.

Subsection 12.2.03 WATER AND SANITARY/STORM SEWER LINE CROSSINGS

- A. Under normal conditions, water lines shall cross a minimum of eighteen (18") inches above any sanitary sewer or storm sewer. When an eighteen (18") inch vertical separation between the bottom of the water line and the top of the sewer cannot be maintained, the sewer lines shall be constructed, or reconstructed as the case may be, with pipe which conforms to water main standards, or sleeved with a suitable material for a distance of at least ten (10) feet horizontally on both sides of the water main, (twenty (20') feet total). The water pipe shall be centered at the crossing so that the joints will be an equal distance and as far as possible from the sewer. If the water main is located below a sanitary or storm sewer, the water main shall be sleeved at least ten (10') feet horizontally each side of the sewer main, twenty (20') feet total.

Subsection 12.2.04 SEPARATION FROM SEWAGE DISPOSAL SYSTEMS

- A. A minimum horizontal distance of twenty-five (25') feet shall be maintained between a subsurface sewage disposal system and water distribution pipes.

Subsection 12.2.05 UNAPPROVED AUXILIARY WATER SOURCES

- A. Unapproved auxiliary water supplies and/or sources shall be any source or private water system not supplied by the public water system and not approved by the water purveyor. These systems shall follow under the same separation criteria as non-potable water line separation of at least ten (10') foot minimum and shall at no time be constructed within public water systems rights-of-way or easements. All unapproved auxiliary supplies to be constructed during a construction project shall be constructed of either purple pipe or a pipe with approved markings a maximum of every five (5') feet denoting "non-potable water" and a non-potable water line marking tape buried a minimum of two (2') feet below finished grade. Any exposed appurtenance to an unapproved source shall have a purple color and markings denoting "non-potable water, do not drink".
- B. Plans to unapproved auxiliary water sources shall be kept on site at all times and shall be available to the water purveyor for review in the event utility locates are required. The water purveyor will not at any time be responsible for locating unapproved auxiliary water supplies and private water systems. It will be the sole responsibility of the private system owner for location purposes and repair of damages should the owner fail to locate the system.

SECTION 12.3 PROJECT COMPLETION

Subsection 12.3.01 INSPECTION

- A. The Contractor shall have his/her Field Representative from the engineering firm inspect and prepare as-builts of all installations. The contractor shall also immediately notify the City Field Representative to confirm that the assembly is installed per city specifications. Any damage discovered by the Field Representative shall be noted and it shall be the Contractor's responsibility to repair or replace the damage items as per the Field Representative's request.
- B. The Contractor shall not bury any work to be inspected without such inspections taking place. The Contractor shall notify forty eight (48) hours in advanced and shall use every number available to contact the Field Representative. If work is covered without the appropriate inspection, the Contractor will dig and expose any appurtenance which requires inspection at his/her own expense. No claims for project delays can be made due to this.

***Subsection 12.3.02* COMPLETION AND ACCEPTANCE**

- A. The installation shall not be considered complete and accepted by the City until accurate as-builts are provided by the engineering firm for the construction work including all appurtenances. The Contractor has thirty (30) days from substantial completion to submit complete and accurate as-builts to the City Engineer and/or Director.

CHAPTER 13

BACKFLOW ASSEMBLIES

SECTION 13.1 INFORMATION AND DOCUMENTATION

Subsection 13.1.01 GENERAL REQUIREMENTS

- A. This section will detail the approved installation of backflow assemblies within the City of Coeur d'Alene. The City currently has a Cross Connection Control Program which tracks and governs the specific requirements for backflow assemblies. This construction standard will specify the proper installation of the various assemblies in regard to new construction and reconstruction of existing systems.

Subsection 13.1.02 REFERENCES

- A. AWWA – C510-97, C512-04,
- B. USC-FCCC&HR - University of Southern California – Foundation for Cross Connection Control and Hydraulic Research.
- C. DEQ – Department of Environmental Quality
- D. CMC-13.24.000 – City Municipal Code #13.24.000
- E. IDAPA-58.01.08
- F. UPC, Ch. 6 – Uniform Plumbing Code, Chapter 6

Subsection 13.1.03 DOCUMENTATION

- A. A City Field Representative or backflow assembly tester shall be responsible for measuring and recording pertinent project information regarding location and types of backflow assemblies for transfer to the City Cross Connection Control Program software. Information for the City's benefit shall be:
 - 1. Type of assembly,
 - 2. Brand
 - 3. Model number,

4. Serial number,
5. Size,
6. Location,
7. Type of hazard protected,

SECTION 13.2 APPROVED ASSEMBLIES AND PROCEDURES

Subsection 13.2.01 ASSEMBLY APPROVAL

- A. All assemblies chosen for installation shall be listed on the most current USC-FCCC&HR list of approved assemblies and shall be commensurate with the degree of hazard to be protected. The Contractor installing the assembly shall check with the Water Department Operator in charge of the Cross Connection Control Program to verify that the assemblies are on the approved list and for proper installation technique(s). It shall be the Contractor's responsibility to replace any unapproved assembly installed on his/her project and to correct any improper installations at his/her own expense.

Subsection 13.2.02 TYPES OF ASSEMBLIES

- A. **AVB** – Atmospheric Vacuum Breaker – Cannot be pressurized for more than twelve (12) hours in a twenty-four (24) hour period and shall have no valves downstream of the assembly. Must be mounted above ground, minimum six (6”) inches above all points of downstream use. Not for use in backpressure situations.
- B. **PVBA** – Pressure Vacuum Breaker Assembly– Can be pressurized for more than twelve (12) hours and may have valves downstream of the assembly. Must be mounted above ground, minimum twelve (12”) inches above all points of downstream use. Not for use in back pressure situations.
- C. **SVBA** - Spill Resistant Pressure Vacuum Breaker Assembly - Relatively new type of pressure vacuum breaker assembly designed for use where water should not be spilled or dumped on a regular basis. May have valves downstream of the assembly. Must be mounted above ground level, minimum twelve (12”) inches above all points of downstream use. Not for use in backpressure situations.
- D. **DCVA** – Double Check Valve Assembly - An assembly with two check valves, utilized primarily in premise isolation, irrigation and fire sprinkler systems to protect the potable

water supply from low hazard backflow conditions and backpressure from high pressure supply systems. Can be mounted below ground.

- E. **RPBA** - Reduced Pressure Backflow Assembly - An assembly utilized in high hazard premise and device isolation. As this assembly has a relief valve designed into it, this assembly is approved for most high hazards with the provision that it is plumbed with adequate drainage as it can dump as much water as the service line can feed to it. Must be mounted above ground and kept from freezing or mounted inside structure with adequate drains.
- F. **AIR GAP** - A physical separation between the free-flowing discharge end of a potable water supply pipeline and an open or non-pressure receiving vessel. An approved air gap shall be at least double the diameter of the supply pipe measured vertically above the overflow rim of the vessel- in no case less than one (1”) inch. This is the most stringent method of backflow prevention and can be used in extreme high hazard situations where no other form of protection is acceptable.

Subsection 13.2.04 PROPER DRAIN SIZING

- A. **ADEQUATE DRAINAGE** – All drains utilized for the reduced pressure backflow assemblies (RPBA, also known as RPZ) shall be sized to accommodate the maximum dump capacity as calculated and approved by the Uniform Plumbing Code and the USC manual. The drains may be constructed from approved materials such as ABS plastic, generally used for interior drain plumbing, ductile iron or copper, generally used in exterior applications where UV resistance is required. The drains must follow all plumbing regulations in regard to minimum/maximum slope, required anchor points, inlet and outlet construction. In the rare situation where an RPBA is allowed to be used in a vault, the drain shall be open to daylight above any known flood plain and open at both ends by line-of-sight confirmation. A backwater valve may be utilized at the lower end of the drain to prevent cold air and/or animals and insects from entering the pipe and damaging the device. The following **Tables 13.1** and **13.2** indicate that possible maximum dump capacity of the different size of devices.

Table 13.1

Relief Discharge Design Backflow Preventer Size Maximum Discharge

Mm	Inches	L/s	GPM
6 – 15	¼ - ½	4.7	75
20 - 25	¾ - 1	12.6	200
30 - 50	1 ¼ - 2	18.9	300
64 – 75	2 ½ - 3	28.4	450
100 – 150	4 – 6	47.3	750
200 - 250	8 – 10	69.3	1100
300 – 400	12 – 16	170.0	2700

Table 13.2

Drain Size Required For RPBA Discharge

Backflow Pipe Size	GPM Discharge W/RPZ Dumping	Diameter Floor Drain Required
¾” - 1”	200 Gallons	4” – 6”
1 ¼” – 2”	300 Gallons	5” – 6”
2 ½” – 3”	450 Gallons	6” – 8”
4’ – 6”	750 Gallons	8” – 10”
8” – 10”	1100 Gallons	10” –or- 6” + 8”

SECTION 13.3 PROJECT COMPLETION AND REVIEW

***Subsection 13.3.01* INSPECTIONS AND TESTING**

- A. All new assembly installations must be inspected by the City upon completion and prior to operation.

***Subsection 13.3.02* ANNUAL TESTING**

- A. All assemblies shall be performance tested upon initial installation and performance tested thereafter.

CHAPTER 14

AUTOMATIC CONTROL VALVES

SECTION 14.1 INFORMATION AND DOCUMENTATION

Subsection 14.1.01 GENERAL REQUIREMENTS

- A. Automatic control valves may include but are not limited to pressure reducing valves, pressure sustaining valves, altitude valves, surge anticipator valves, pump relief valves, air / vacuum release valves, etc.

Subsection 14.2.02 AUTOMATIC CONTROL VALVES

- A. Automatic control valves such as pressure reducing valves or pressure relief valves shall meet all applicable ANSI/AWWA and ISPWC standards, Division 400, for construction and protective coatings. Automatic controls shall have isolation valves to facilitate service and replacement. Automatic or control valves shall have speed controls, required three (3") inch glycerin filled pressure gauges on the high- and low-pressure chambers, and a rising stem position indicator to allow for visible confirmation of valve position. The pressure gauges shall be mounted a minimum of 4" above the assembly so as to facilitate viewing from the vault lid. (Please see Water Standard Drawing W-18 Pressure Sustaining Valve Assy.)
- B. Automatic control valves shall be specifically designed per application and a detail drawing shall be supplied with the contract documents. Control valves shall be installed in approved vaults with all necessary appurtenances for access and maintenance as shown on the standard drawings. The control valves shall be installed with isolation valves located on each side of the control valve and proper joint restraint for maintenance and replacement purposes. (Please see Water Standard Drawing W-17 3" and Larger Dom. Meter Vault and W-18 Pressure Sustaining Valve Assembly)

Subsection 14.2.03 EQUIPMENT ISOLATION VALVES

- A. Valves used as equipment or device isolation valves in meter vaults, automatic control valve vaults, booster stations and pump stations for automatic control valve, pump, meter and/or backflow device control isolation shall be "outside stem and yoke" (OS&Y) resilient seated gate valves or an approved equal style valve which will have visible indication of the valve position.

Subsection 14.2.04 AIR RELEASE/VACUUM VALVE ASSEMBLIES

A. Air release assembly shall be installed with a saddle tap at the top of the highest point of the water main. The tap shall incorporate a Romac 202S double stainless strap epoxy coated saddle with an approved Mueller or Ford one (1") inch male iron pipe size (IPS) by pack joint compression corporation stop, or approved equal that meets NSF-61 approval. One (1") inch iron pipe size (IPS) polyethylene pipe shall be used to extend from the corporation stop to the air release assembly. The air release assembly shall consist of: two one (1) inch galvanized ninety degree elbows and three (3) one (1") inch by two (2") inch galvanized elbows with a bug screen, the air release valve, a one (1") inch by two (2") inch galvanized nipple, a one (1") inch ball valve, and a one (1") inch male iron pipe size (MIP) by pack joint compression Mueller or Ford adapter, or approved equal that meets NFS . The one (1") inch service line shall be laid with a maximum rise of one (1") inch in ten (10') feet and shall be laid straight and true. The air release assembly shall be set in the meter box so that the top of the air release valve is approximately eighteen (18") inches below finished grade. Support stakes shall be provided to support the assemble plumb and vertical in the meter box. The assembly shall be attached to the stakes with stainless steel straps or banding. The meter boxes shall be set and backfilled with sand or a maximum of three quarters (3/4") inch minus crushed aggregate to the finished grade. The interior of the meter boxes shall be kept clean and free of debris to the bottom of the fourth box. (Please see Water Standard Drawing W-7 1" Air Release Assembly)

1. **LOCATION** - The air release shall be located at the highest elevation or elevations if crossing extreme variations in elevations. The air release valve shall be located in a meter box, Armorcast or Hubbel meter box of the appropriate size, consisting of two (2) risers and a top section three (3) total sections) with a composite or cast-iron lid. The assembly shall be located at the edge of the right-of-way closest to the water main. The air release valve and vault shall not be located in a street or paved driveway unless approved by the City Engineer and/or Director with a traffic rated lid. (Please see Water Standard Drawing W-7 1" Air Release Assembly)

Subsection 14.2.05 WATER MAIN FLUSHING ASSEMBLY

A. A main flushing assembly shall be installed at a major low section of the main which may be subject to accumulating sediment and shall be sized to provide a minimum of two point five (2.5') feet per second scouring velocity in the main to remove any accumulation of sediment. A two (2") inch assembly will be installed to grade with a two (2") gate valve, threaded coupling and finger tight plug six (6") inches from finished grade in approved Tyler valve boxes. The flush point will only require the sixteen (16") Tyler top section and lid at finished grade. Locations shall be determined by the City Engineer and/or Director.

CHAPTER 15

MONITORING WELL SPECIFICATIONS

SECTION 15.1 INFORMATION AND DOCUMENTATION

Subsection 15.1.01 GENERAL

- A. It may at times be in the best interest of the City of Coeur d' Alene Water Department to accept an abandoned well on developed property as an aquifer monitoring well in lieu of total abandonment as required by IDAPA 37-03-09, Section 12. The Contractor shall be required to modify the existing well casing and install a below ground containment vault as specified in these construction standards.

Subsection 15.1.02 REFERENCES

- A. AWWA
- B. IDAPA 37-03-09 & 58.01.08
- C. IDEQ
- D. ASTM Manual (D-5092), "Design Practice and Installation of Groundwater Monitoring Wells in Aquifers"

Subsection 15.1.03 EXISTING DOMESTIC WELLS

- A. Any unused or unusable existing domestic wells with a minimum six (6") inch diameter casing, on public or private property to be developed, may be offered to the City in lieu of total abandonment by a licensed and certified well driller as required by IDAPA 3703-09, Section 12. The City may consider the location of the well in correlation with other known test well sites, the proposed use of the property and the general location of the well on the aquifer in determining whether it is conducive to prep the well for a monitoring station. Any and all costs for modifications shall be at the developer's expense in lieu of proper abandonment and decommissioning. Any known existing water rights for the well shall be transferred to the City prior to modification or abandonment.

Subsection 15.1.04 DOCUMENTATION

- A. A field engineer and/or Field Representative shall be responsible for measuring and recording pertinent project information regarding location of monitoring wells for transfer to as-builts and provision to the Field Representative. Measurements for the City's benefit shall be in feet and inches from an identifiable location such as valve box or fire hydrant and not from engineering stations or movable objects such as power poles, trees or buildings.
- B. The Contractor and/or Project Engineer shall supply as-builts on the plans provided, indicating the exact locations of all facilities installed before the City will accept the project as completed. The Contractor shall supply the Director with all construction notes which may or may not have been included on the as-builts. As-builts are due to the City no more than thirty (30) days after substantial completion of the project. If no as-builts are received, the City shall withhold any building permits for the project and/or Certificates of Occupancy. Any and all plan/construction changes shall be included with the final as-builts. The as-builts shall contain information regarding planned and actual installations, footage measurements for all fittings, tees and valves, detailed information and measurements for any appurtenances removed or replaced during construction, and any information regarding service stubs and their locations.

Subsection 15.1.05 PRE-CONSTRUCTION CONFERENCE

- A. Prior to work commencing on any project, the Contractor shall schedule a preconstruction conference with the City Water Department to inform the Director of the work to be performed. Any necessary contract documentation shall be provided to the City Water Department prior to the pre-construction conference. The Contractor shall attempt to have a representative from all of the Contractor's subs at the meeting or shall be authorized to speak for them. The Contractor shall provide at the meeting:
 - 1. A complete listing of the Contractor's subcontractors for the project.
 - 2. An approved set of plans with the City Engineer's signature. Any changes, additions or deletions shall be reviewed and signed by the City Engineer prior to construction as well. The Contractor shall have a set of signed plans available at the work site at all times which shall be shown to the Field Representative.
 - 3. A project schedule which shall be regularly updated and any changes shall be submitted to the City during the project.
 - 4. Proof of insurance, license and bonding if not provided to the City at an earlier date.
- B. If construction stops or is delayed longer than thirty (30) days, or there are significant changes with the construction drawings/project, the Contractor shall set an additional pre-construction conference to review the work to be done and any possible changes. Minor drawing detail changes may be accomplished through the normal review process by the City Engineer.

SECTION 15.2 MATERIALS AND INSTALLATION

Subsection 15.2.01 CONCRETE AND PIPING

- A. Concrete utilized for construction of the monitoring well vault shall be a minimum 5 sack mix or greater if traffic rating is required. The well casing shall be steel, and an approved cap shall be installed.
- B. All piping used for drains shall be 3034 PVC plastic pipe.

Subsection 15.2.02 CAST IRON LID

- A. An approved cast iron ring and lid shall be utilized for access to the well head. The ring and lid shall be a lockable, traffic rated design with the City of Coeur d'Alene logo stamped into the casting.

Subsection 15.2.03 CONVERSION TO MONITORING WELL

- A. The Contractor shall excavate around the well head to a depth of three (3') feet where a traffic rated concrete vault shall be placed or constructed around the well head. The vault floor shall be sealed around the well casing with the exception of a minimum two (2") inch piped drain leading to an approved drain field or injection well (drywell) if available to prevent the vault from flooding or accumulating standing water. The casing shall be cut off a maximum of one (1') foot below finished grade. An approved self-sealing well cap with a two (2") inch threaded test port and galvanized plug shall be installed. As an alternate design requiring prior approval, a welded cap installed by a certified welder with a two (2") inch threaded test port and plug. The vault shall be capped with a watertight, traffic rated, 36" manhole ring and lid at finished grade. The ring shall be grouted tight to the vault wall. The excavation shall be backfilled and compacted to roadbed standards. Paved or concrete surfacing shall be placed around the completed vault per the development requirements. (Please see standard drawing W-28 Monitoring Well Casing Modification)
 - 1. **ACCESS PORT** - Upon completion of conversion to a monitoring well, the well shall be equipped with an access port that will allow for measurement of the depth to water or an approved pressure gage fitting that will allow access for measurement of shut-in pressure of an artesian flowing well. All pressure gage fittings shall include control valves such that the pressure gage can be removed. Approved access ports are illustrated in standard drawing W-28 together with approved locations for pressure gage fittings. Air lines are not a satisfactory substitution for an access port. (Per IDAPA 37-03-09, 7-1-93)

2. ***DRAIN FIELD*** - An approved drain field shall be constructed to effectively provide vault drainage in the event there is any water intrusion and/or accumulation in the monitoring well vault. The drain field shall be constructed to DEQ and Panhandle Health District standards and shall be registered with the Panhandle Health District. The drain field shall be sized to handle ten (10) times the monitoring well vault capacity.
3. ***INJECTION WELL*** – In lieu of an approved drain field, an injection well (drywell) may be installed or used if an existing one is available. The injection well shall have a minimum of ten (10) times the volume of the monitoring well vault and shall be registered with the Panhandle Health District if not already done so. All current approved specifications will apply.

Subsection 15.2.04 CONSTRUCTION OF NEW MONITORING WELL

- A. All new monitoring wells shall be constructed and maintained in a manner reflective of regulated standards under IDWR, ASTM Manual D-5092, and applicable City standards that will prevent intrusion of waste and/or contamination into the aquifer and as otherwise required by these rules. The new monitoring well shall have a minimum 6” diameter casing with a neat grout sanitary seal around the upper casing area a minimum depth of 150’ from finished grade or as designed by the engineer. The water bearing area of the casing may be either slotted or screened as designed by the engineer. The well head shall be constructed in the same manner as specified under “Conversion of Existing wells” with all applicable watertight seals and floor drain, drain field or injection well.
 1. ***ACCESS PORT*** - Upon completion of a new monitoring well, and before removal of the well rig from the site, the well shall be equipped with an access port that will allow for measurement of the depth to water or an approved pressure gage fitting that will allow access for measurement of shut-in pressure of an artesian flowing well. All pressure gage fittings shall include control valves such that the pressure gage can be removed. Approved access ports are illustrated in standard drawing W-28. Air lines are not a satisfactory substitution for an access port. (Per IDAPA 37-03-09, 7-1-93)
 2. ***DRAIN FIELD*** - An approved drain field shall be constructed to effectively provide vault drainage in the event there is any water intrusion and/or accumulation in the monitoring well vault. The drain field shall be constructed to DEQ and Panhandle Health District standards and shall be registered with the Panhandle Health District. The drain field shall be sized to handle ten (10) times the monitoring well vault capacity.
 3. ***INJECTION WELL*** – In lieu of an approved drain field, an injection well (drywell) may be installed or used if an existing one is available. The injection well shall have a minimum of ten (10) times the volume of the monitoring well vault and shall be registered with the Panhandle Health District if not already done so.

Subsection 15.2.05 ABANDONING OF WELLS

- A. When a monitoring well is no longer useful or needed, the owner or operator of the well shall abandon the well in accordance with IDAPA Rule 37-03-09, Section 12, Subsection 025.12.
 - 1. The well owner is charged with maintaining and abandoning a well in a manner that will prevent waste and/or contamination of the ground water. Permanently abandoned wells may have the casing removed or left in place and shall be filled with bentonite grout, cement grout, concrete, or puddling clay or other material as required to stop the upward or downward movement of water. If the well is artesian, cement grout, concrete or a packer approved by the City Engineer and/or Director shall be placed across the confining stratum overlying the artesian zone so as to prevent subsurface leakage from the artesian zone. The remainder of the well shall be filled with cement grout, concrete, or other approved material. (Reference IDAPA 37-0309, dated 7-1-93)
 - 2. The City Engineer and/or Director may require the abandonment of a well in compliance with the provisions of IDAPA Rule 37-03-09, Section 12 Subsection 025.12.a. if the condition of the well does not meet minimum well construction standards or if there is no valid water right or other authorization acceptable to the City Engineer and/or Director for use of the well.
- B. Patching of all trenches shall consist of a minimum of three (3") inches of Class 3 asphalt unless otherwise directed on the plans or by the City Engineer. All joints between existing asphalt and new asphalt shall be coated with an approved emulsion tack coating.

Section 15.3 COMPLETION

Subsection 15.3.01 INSPECTION

- A. The Contractor shall have his/her Field Representative from the engineering firm inspect and prepare as-builts of all installed air release assemblies. The contractor shall also immediately notify the City Field Representative to confirm that the assembly is installed per city specifications. Any damage discovered by the Field Representative shall be noted and it shall be the Contractor's responsibility to repair or replace the damage items as per the Field Representative's request

Subsection 15.3.02 COMPLETION AND ACCEPTANCE

- A. The installation shall not be considered complete and accepted by the City until accurate as-builts are provided by the engineering firm for the construction work including all appurtenances. The Contractor has thirty (30) days from substantial completion to submit complete and accurate as-builts to the City Engineer and/or Director.

- B. The Contractor and/or Project Engineer shall supply as-builts on the plans provided, indicating the exact locations of all facilities installed before the City will accept the project as completed. The Contractor shall supply the Director with all construction notes which may or may not have been included on the as-builts. As-builts are due to the City no more than thirty (30) days after substantial completion of the project. If no as-builts are received, the City shall withhold any building permits for the project and/or Certificates of Occupancy. Any and all plan/construction changes shall be included with the final as-builts. The as-builts shall contain information regarding planned and actual installations, footage measurements for all fittings, tees and valves, detailed information and measurements for any appurtenances removed or replaced during construction, and any information regarding service stubs and their locations.