

**DIVISION 2 – SITE WORK****SECTION 02712 - WATER SYSTEM - MINIMUM DESIGN STANDARDS****1. MATERIALS**

Pipe, fittings, valves and fire hydrants shall conform to the latest standards issued by the AWWA, Colorado Department of Public Health and Environment (CDPHE), and shall comply with Town's detailed standard specifications. In the absence of such standards, materials meeting applicable Product Standards may be submitted to the Town for review and possible approval. Jointing material used in joining pipe shall meet pipe manufacturer's specifications and AWWA Standards, Ridgway Municipal Code (RMC) 9.1, as well as these Town's standards. All materials that could come in contact with potable water must meet NSF 61 and be so marked. Specific details for water materials are included in the Products section of the Water Distribution Standards.

**2. MINIMUM FLOW**

**2.01.** Design shall be based on an average peak flow of 4 gallons per minute (gpm) per tap and 8 gpm per dead end for lines servicing 5 or more taps. Instantaneous residential flow shall be assumed to be 15 gpm. Fire flow in residential areas shall be at least 1000 gpm unless structures are more than 20 feet apart in which case required flows can be reduced to 750 gpm. The required flow may be from more than one hydrant, provided the additional hydrants are accessible (within 300 ft) to all possible fire locations.

**2.02.** Commercial and industrial flows shall be designed based on the nature of the business using such references as CDPHE and Insurance Services Office (ISO) guidelines for sizing lines. The Town will have final review authority on all such lines. Fire flow in commercial and industrial areas shall be at least 1500 gpm and if the business has an above average hazard, the fire flow will be determined by the Town with assistance from the State Fire Marshall's office to insure no detrimental impact on the fire rating of the Town.

**2.03.** All areas shall be designed to have a maximum static head of 231 feet (100 psi) with Town mains designed to have 90 psi or less except for short distances. A minimum static head of 103 feet (45 psi). Distribution systems shall be designed to maintain a 35 psi residual pressure during required fire flow and peak residential flows. Pressure zones shall conform to existing Town zones as approved by the Town.

**3. LINE SIZE**

**3.01.** Size and location of all water lines shall be designed by a competent, licensed engineer and must be approved by the Town. The Town may at its option waive the requirement for an engineered design when the line is less than 100 feet and will serve 3 or less residential taps. The minimum line size shall be 6 inches except that four-inch mains may be installed on permanent deadends (see looping requirements below) less than 150 feet long which serve three or less houses and when a permanent flushing hydrant is provided. Any lines that temporarily deadend and that will be tapped for service before being extended shall be provided with a temporary flushing hydrant.

**3.02.** If the Town anticipates future expansion and or extension from the area being developed by the Responsible Party, the Responsible Party will be required to design, properly size, and construct the

system to permit future extensions to be made at the limits of the subdivision or development in question.

#### **4. WATER LINE DEPTHS**

In most cases water lines and services should be designed with 5' of cover. Depths of cover of more than 6' should be avoided. If there is a conflict at the 5' depth, the water line can be gradually reduced to 4 foot of cover with extruded polystyrene structural insulation rated at 400 pounds and an R value of 13 or more installed from where the depth reduces to where it returns to 5 ft of cover. If the conflict cannot be addressed by reducing the depth to 4', the depth shall be increased but only the minimum needed to make the crossing.

#### **5. WATER LINE LOOPING**

Water mains shall be designed through a subdivision and other type multi-unit development so that a continuous loop is provided for an alternate route of water, better circulation, and more even pressure. A variance of the looping requirement will be considered when the amount of pipe required to complete the loop will exceed 70% of the line required to serve the subdivision in accordance with Town specifications and the total cost of the water system extension will exceed \$6,000 per tap plus inflation (based on Ordinance 4-2016)

#### **6. VALVE SPACING**

**6.01.** A sufficient number of valves shall be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. The water system for residential areas shall be designed so that only one block need be closed off in the event of a water line break. When development has a geometry other than lot and block, valves shall be placed at intervals less than 400 ft. Gate valves shall be placed at all pipe line intersections so that each segment of line can be isolated while minimizing the number of customers out of water. Where the line runs as a single segment for long distances (over 750 feet), valves should be placed at least at 800 foot intervals when taps are more than 150 feet apart with more frequent intervals being required on larger lines and in densely populated areas.

**6.02.** Valves shall be placed on each leg of the tee for a fire hydrant and on each branch of a tee or cross and at a minimum on the branch of a tee for permanent flush hydrants. Air vacuum valves shall be installed at high points on primary feeders and where venting high points through a fire hydrant is not feasible on other mains.

#### **7. HYDRANTS**

**7.01.** Fire hydrants shall be placed at the intervals recommended by the State Insurance Services Office, generally, at one per block and where lots are not in blocks or in longer blocks at least at 500 foot intervals and such that hydrants are within 250 ft of property lot lines and habitable structures are entirely within 300 ft of hydrant. Hydrants shall also be located to facilitate flushing and draining even if that necessitates reducing the spacing. Hydrant leads shall be a minimum of six inches in diameter and run in a straight line from the tee in the main to the hydrant location. Leads shall serve only the hydrant and the line from the water main to the hydrant may not be tapped or connected to for other purposes. Auxiliary valves shall be installed on all hydrant leads in conformance with typical drawings. Fire hydrant bottom valve size shall be

at least five inches. Nozzle size and threads shall be confirmed with the requirements of the Ridgway Fire District.

**7.02.** Hydrant weep hole and leach area shall not be connected to or located within 10 feet of sanitary sewers or storm drains. In cases where an existing sewer conflicts with a proposed hydrant leach area, the Town may allow encasement of the sewer, flowable fill encasing the sewer, or other solution on a case by case basis.

**7.03.** Use of antifreeze and hydrants that need antifreeze are prohibited.

## **8. SERVICE CONNECTIONS**

**8.01.** The installation of service lines and taps will be performed by the Town public works staff, or with Town approval, under Town supervision. Residential lots shall be served by a 3/4" ID tap. No direct taps will be allowed under any circumstances. Double strap stainless steel tapping saddles of non-rigid construction shall be used on PVC pipe. Materials and construction shall conform with the materials specified in the Water Line Construction Standard Specifications (Section 02713) and in accordance with relevant typical drawings.

**8.02.** Domestic water service lines and fire service lines shall be installed perpendicular to the main. Domestic water service lines shall typically be located 10 feet inside the uphill property line. When two service lines are not in separate trenches, the minimum separation between the two lines shall be 24" for lines up to 3/4", 30" for lines up to 2" and for all other lines the separation shall be at least 3 feet. All taps larger than 2" shall be installed using a tee in the main. Tapping sleeves are not allowed. Any variance of this layout will require justification and approval of the Town. Meter cans shall be set in the public right of way at property line, or if the sidewalk is at property line either just inside the front utility easement, or just to the street side of the sidewalk. Service lines shall be stubbed across the property line through the width of the utility easement with the end sealed with a watertight seal and marked in foot increments full depth with a 2 x 4 painted blue and brought to grade and marked with the depth to the service line. Place a steel T post behind the 2 x 4 post to protect it.

## **9. PROXIMITY STATEMENT**

**9.01.** There shall be no physical connection between a public or private potable water supply system and a sewer, other non-potable line or appurtenance thereto which would permit the passage of any sewage, non-potable, or polluted water into the potable supply directly or through contamination of the surrounding soils.

**9.02.** Buried potable water lines shall not be laid closer horizontally than 10 feet outside edge to outside edge from non-potable lines and the water lines shall typically be at a higher elevation than the non-potable. If this is not possible, separate trenches will be required and the water line shall be at least 18" above the non-potable and a pipe with a water tight welded joint such as HDPE shall be used. When water and non-potable lines cross each other, the water line shall be at least 18" above the non-potable. If this condition is not met, then where practical, the non-potable line shall be encased with a 20' PVC casing pipe centered on the water line crossing. If is not practical to case the non-potable line, the potable line shall be so cased. Should the non-potable line be above the water line, no matter what vertical separation the casing pipe shall be sealed to the carrier pipe with no-hub reducing couplings, Link-Seal or other approved method to provide a water tight seal.

**9.03.** Force main sewers require a separation from the water main of at least 10 feet measured horizontally unless both pipes are encased in and properly supported with pipe joints as far apart as possible with sealed end encasements. There shall be a 2' vertical separation at crossings or a watertight casing shall be provided around the force main.

**9.04.** There shall be a minimum clear distance vertically of 8" between the uppermost part of the lower utility and the lowermost part of the upper utility including casings to allow for proper bedding. In all cases, suitable backfill or other structural protection shall be provided to preclude settling and/or failure of any of the pipes.

**9.05.** No water pipe shall pass through or come within ten feet of a sewer manhole unless absolutely unavoidable, in which case adequate protection as determined by the Town Engineer must be provided.

Water lines shall have at least 5 foot horizontal separation from wire utilities. The Town shall have final review authority of all proposed designs which do not provide adequate separation. These requirements for protection of the water system against contamination from non-potable water conveyances shall apply equally to water mains and service connections.

#### **10. CROSS CONNECTIONS AND BACKFLOW PREVENTION**

There shall be no connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contaminated materials may be discharged or drawn into the Town potable water system. Any interconnections between potable water supplies shall have prior written approval of the Town. All water mains, service lines and connections and appurtenance shall be installed consistent with RMC 9-1-27 Cross Connection and Backflow Prevention and meet the requirements in the Water Distribution Section of these Standards.

#### **11. DISINFECTION AND FLUSHING**

Refer to Standard Specifications – Water Line Construction for disinfection and flushing requirements.

#### **12. TESTING**

Testing of water lines, services, and appurtenances, shall conform with the requirements of AWWA and the applicable Town Code and Standard Specifications of the Town.

**DIVISION 2 – SITE WORK****SECTION 02713 – WATER SYSTEM CONSTRUCTION****1. GENERAL**

The water lines and appurtenances shall be constructed according to standard accepted practices and as specified herein. Reference to standard specifications e.g. AWWA, ASTM, etc. made a portion of these specifications by reference shall be the latest edition and revision thereof. All water line improvements and additions must also comply with the Minimum Standards portion of the Town Standards, Section 9.1 of the Ridgway Municipal Code, and all applicable Colorado Department of Public Health and Environment (CDPHE) and EPA regulations.

**1.01. Description**

- A. This section covers the furnishing, installation and testing of water distribution lines and appurtenances. Contractor shall furnish all equipment necessary for said work and testing.
- B. Contractor shall follow manufacturer's recommended procedures in all handling and installation operations. All water line improvement must also comply with the Town's Minimum Standards and all applicable codes, laws, and regulations.
- C. Contractor shall engage the services of a licensed surveyor to layout the locations and depths of the new water infrastructure in accordance with the Town approved plans. If not done during design and incorporated into the approved construction drawings, the Contractor shall make such excavations as are necessary to determine the exact location of existing utilities which affect new construction. Where practical, new lines shall be routed to facilitate installation, allow for future maintenance, minimize existing utility conflicts and to minimize construction problems.

**1.02. Related Work Specified Elsewhere**

Section 02200 – Excavation, Backfill, and Compaction Specifications  
Section 02712 – Water System – Minimum Design Standards  
Section 02723 – Sewer System Construction

**1.03. Proximity Statement:** Refer to Section 02712 - Minimum Design Standards for Water Distribution System.

**2. PRODUCTS**

All materials shall be new, unused, and of the best standard quality available for the purpose intended. All materials in contact or potential contact with potable water shall be NSF 61 certified and meet all current EPA and CDPHE requirements including the lead-free requirements. All brass shall meet AWWA C-800. Where materials are specified by brand names, materials of equal quality may be substituted if the Contractor submits adequate technical and descriptive data and secures the approval of the Town unless the material is specifically noted to be the only material allowed. The Town or its designated representative shall be the sole judge of the suitability and acceptance of materials. The Town in some instances may insist on a particular brand or model (to match materials in use) to minimize the parts inventory and/or O and M requirements.

Certificate of Compliance shall be submitted to the Town stating all pipe and materials furnished under these specifications do in fact comply with all referenced specifications and meet the Safe Drinking Water Act, CDPHE, and NSF 61 requirements.

**2.01. Ductile Iron Pipe**

Conformance	AWWA C151
Thickness	Class 50
Pressure Rating	150 PSI
Joints	Neoprene Gasket AWWA C111/ with Conductivity Straps
Fittings	ANSI/AWWA C153 when available or C110. All fittings shall be epoxy lined.
Corrosion Protection	Wrap pipe in polyethylene tubes and sealed

**2.02. Plastic Pipe (PVC) - Water**

Conformance	AWWA C900
Thickness	Class 150
Pressure Rating	DR-18 to line pressures of 100 psi and DR-15 when typical line pressures are expected to exceed 100 psi
Joints	Rubber Gasket, bell and spigot
Fittings	Ductile Iron AWWA C153 when available or C110 Under 4", PVC with 200 PSI rating allowable. All fittings shall be epoxy lined.
Marking	10 ga color coded tracer wire taped to pipe (blue for potable water and purple for non-potable. Metallic 6" wide color-coded marking tape, located 12" above water line

**2.03. Copper Tubing**

Conformance	ASTM B88, lead free
Thickness	0.65" for ¾" and 1"
Service	Potable water service lines
Type	K soft copper

**2.04. Water Service Materials**

- A. Corporation Valve: Corp valves shall be A.Y. McDonald #5182 brass, Mueller 300 ball corporation valve B25028N with AWWA IP thread inlet and Mueller 110 conductive compression outlet CTS OD tubing. Valves shall be AWWA C-800 and NSF 61 certified.
- B. Service Saddles: Service Saddles shall be MuellerBR2B for ductile and H-013000 for PVC pipe bronze saddle with brass straps and O Ring sealed outlet, sized for the pipe to which it will be connected with the correct tap size and thread. Saddles shall be AWWA C-800 and be NSF 61 certified. **Only these models will be allowed.**
- C. Meter Setters: Meter setters shall be A.Y. McDonald 731-412-WDQQ44 ONLY, with compression brass connections, with ball valve shutoff and dual check valve. Meter setters shall be AWWA C-800 and NSF 61 certified. Meter setters for 1-1/2" taps shall be Ford VBHH76-xxB-11-66-NL.
- D. Water Service Backflow Preventor: Mueller M-98 Angle Dual check valve or can be incorporated into meter setter.

- E. Meter Can: Meter cans shall be Bingham Taylor MMP 24” diameter Carson Oldcastle 24” diameter insulated can with white interior. The Town may also consider Sigma 20 x48” that tapers when acceptable 24” diameter cans are not available.
- F. Meter Can Lid: Castings – M 70 meter can cover with cast iron outer lid of sufficient diameter for the meter can with 2 in hole and M 70 aluminum inner frost lid. **Only this model will be allowed.**
- G. Water Service Pressure Regulator: Pressure regulators with strainers shall be installed on the mainline side of meters when the pressure through the meter will exceed 80 psi. Regulators will be diaphragm type, easily field adjustable for pressure, and shall be accessible for repair without removal from the pipe line. Unless otherwise approved regulators shall be pre-set at 50 psi. A "Y" type strainer with plug and screen removable without removing the strainer or regulator shall be installed at the inlet end of each regulator.
- H. Curb Stop and Box: Curb ball stops shall be McDonald brand brass with compression joints on both end and with cast brass pinned handle with box and cap lid.

**2.05. Gate Valves**

Conformance	AWWA C515
Material	Epoxy coated ductile
Body Type	Resilient seat, non-rising stem
Pressure Rating	150 PSI, minimum
Joints	Flange or Mechanical Joint end as required typically flanged to fitting, mechanical joint to pipe
Coating	Epoxy inside
Operating Nut	2" Square, open counterclockwise (buried) Handwheel (non-buried service)
Acceptable Models	Mueller is accepted (Only this product will be accepted by the Town unless developer can demonstrate very extenuating circumstances. In the event an extenuating circumstance is proven and accepted by the Town, a valve in the M&H / Kennedy family meeting or exceeding the quality and serviceability of the Mueller may be authorized by the Town.

**2.06. Valve Box**

Location	All buried valves not in vaults
Type	Slip type, two or three piece 5 1/4" as req'd, traffic rated
Base	Suitable for valve size, depth, and operating mechanism
Material	Cast Iron, 1/4" minimum wall thickness
Coating	Bituminous varnish, plastic wrapped
Cover	Cast Iron, traffic type, marked "WATER"
Location	All buried gate valves
Operator Extension	1" minimum diameter cold rolled steel rod (where depth greater than 5 feet)

**2.07. Butterfly 3-inch and Larger**

Conformance	AWWA C504
Material	Iron Body, bronze mounted
Type	Resilient seat
Pressure Rating	150 PSI
Coating	Epoxy inside

Seat	Rubber
Joints	Flange
Operator	Electric Actuator (see below for details)
Operation	Open by turning counterclockwise
Acceptable Models	Bray, Mueller

**2.08.** Butterfly Valve Electric Actuator: Actuator shall be UL listed, designed to be located in a wet environment, NEMA 4 rated. It shall include adjustable speed control for both opening and closing speeds such that operating the valve will not create water hammer in the line. Wiring shall go to a terminal strip. Actuator shall include a simple manual override handwheel system. Actuator shall be designed to function with the butterfly valve furnished. Actuator shall be Bray Series 70 or approved equal.

**2.09.** Fire Hydrants

Conformance	AWWA C502
Material	Ductile iron body, fully bronze mounted
Pressure Rating	150 PSI, minimum
Type	Breakaway traffic w/easily replaced flange
Size	6" w/ 6" mechanical joint inlet, 5' minimum bury
Joints	Megalug, O.A.E. restraints on mechanical joints
Outlets	2 - 2 1/2" hose nozzles, 1 - 4 1/2" pumper nozzle all w/ National Standard Thread
Operating Nut	1 1/2" National Standard pentagon, open counter-clockwise
Main Shut off	Gate valve per spec. above
Acceptable Models	Mueller Super Centurion ( <b>Only this model will be accepted by Town</b> )

**2.10.** Flushing Hydrants

Conformance	NSF/ANSI 372
Service	Potable water, frost free, self-draining, with vacuum breaker
Size	Inlet 2" or same as existing line, outlet 2-1/2" NST Bury match existing water line typically 5-6'
Type	Breakaway traffic w/easily replaced flange
Joints	Megalug 2000 series restraints on mechanical joints
Outlets	1 - 2 1/2" hose nozzle w/ National Standard Thread
Interior Operating Parts	Brass, bronze, and shall be removable for service and replacement without excavating the hydrant.
Exterior Casing	Ductile Iron
Operating Nut	1 1/2" National Standard pentagon, open counter-clockwise
Main Shut off	Gate valve per spec. above
Model	Mueller 2-1/8" Post type Hydrant with one 2-1/2" nozzle or approved equal.

**2.11.** Yard Hydrants

Service	Potable water, frost free, with vacuum breaker
Size	3/4" NPT inlet, 3/4" hose bib lockable, 5' bury
Valve	Woodford Y34-4 or approved equal

**2.12.** Air Valves:

At high points in water mains where air can accumulate, provisions shall be made to remove air by means of air relief valves or other means approved by the Town. Air relief valves shall be placed in vaults which allow convenient service of the valve and provide for adequate drainage.



Pressure Rating	150 PSI
Size	3/4" minimum, sized by air flow requirements
Connection	3/4" tapping saddle, tap at high point in line
Main Shut off	Corporation stop
Support	Support weight so not transferred to water line
Vent	12" above ground, pointed downward, covered with #24 mesh
Acceptable Models	APCO or Valmatic automatic valves or approved equal

**2.13.** Cross Connection Control Valves: Where there is a potential of backflow, either backpressure or back siphonage, into the potable water supply, the service line shall be isolated from the potable supply by a backflow prevention device such as a double check valve, reduced pressure principal device (RP), pressure or atmospheric vacuum breaker depending on the location and nature of the hazard. The Town shall approve the type of device to be installed. All cross-connection control devices shall meet the standards of the Foundation for Cross Connection Control and Hydraulic Research (Foundation). The valves shall be used only as recommended by the Foundation and installation shall be in accordance with its recommendations. A list of currently approved devices and valves is available from the CDPHE. Valves shall be installed in vaults which allow for convenient testing and maintenance of the valves and they must be installed in a manner that allows for gravity drainage from the vault.

**2.14.** Miscellaneous Valves: Plans for all large valves, control valves, pressure reducing valves, and other specialized valves shall be submitted to the Town for review and approval. In all cases such valves shall be installed in vaults or pits that are sufficiently large to accommodate all operation and maintenance required. Bypass lines are required.

**2.15.** Bolts and Hardware: All bolts, nuts, and small miscellaneous hardware shall be Cor-Blue, or other durable corrosion resistant material approved by the Town unless otherwise specifically noted.

**2.16.** Compression Couplings: Compression couplings 2" or smaller shall be Mueller.

**2.17.** Tracer Wire and Marking Tape

A. Tracer wire shall be 10 gauge with blue insulation.

B. Marking tape at least 6" wide labeled "water" shall be placed 12" above pipes of all materials.

**2.18.** Insulation: Trench insulation shall be high compressive strength extruded polystyrene ridge foam insulation designed for use in engineered applications for high load bearing uses. Materials shall be a closed cell structure and meet ASTM C578 type VII. Minimum compressive strength (ASTM D1621) shall be 60 psi with an R value (ASTM C518) of 5 per inch. Insulation shall be Foamular XPS or each. Thickness and width shall be in accordance with the table below:

<u>Depth of Cover</u>	<u>Insulation Width and Thickness</u>
4.5' – 5'	2" thick, 3.5' wide
4.0' – 4.5'	3" thick, 3.5' wide
3.0' – 4.0'	4" thick, 4' wide
Pipe crossing above water line	3" thick, 3' each side of crossing

**2.19.** Manholes: Manholes shall meet the requirements for manholes in the Sewer Standards (Section 02722).

**2.20.** Casing Pipe: Casing pipe shall be at least 120 psi or SDR 41 PVC pipe. Note that concrete encasement is prohibited.

**3. EXECUTION**

**3.01. Field Locations:** The Contractor shall make such excavations as are necessary to determine the exact location of existing utilities which affect new construction. Where practical, new lines shall be routed to facilitate installation, allow for future maintenance, minimize existing utility conflicts and to minimize construction problems. Notify the Town if existing utilities present conflicts for the new infrastructure.

**3.02. Service Disruption:** Service disruption shall conform to the requirements in the General Requirements.

**3.03. Receiving, Handling, and Storage**

Upon receipt make overall inspection that pipe has been received in good condition. Pipe and appurtenances should be inspected for any damage or imperfections and problem materials should be so marked set aside until removed from the job site. Town reserves the right to inspect all materials received and reject any which does not meet the requirements of Town specifications and standards.

Pipe, valves, fitting, and other appurtenances should be unloaded, handled, and stored in accordance with manufacturer's recommendations. Pipe shall be handled during all phases of construction in a manner that will provide the maximum protection of the pipe and any coating or lining and will prevent the intrusion of dirt or other foreign materials into the pipe. All slings, hooks, and other lifting or handling equipment which comes in contact with pipe and appurtenances shall be padded. Dropping the pipe during unloading or placing in the trench is prohibited and will be cause for rejecting that material. Do not drag pipe spigot rings on the ground and do prevent damage to the ring from contact with abrasive or hard objects. Extreme care shall be used in the handling, storage, and installation of valves and other appurtenances to prevent damage or distortion to the equipment and to ensure proper performance and assure cleanliness. Valves shall not be lifted by operating stems. Dropping materials during unloading or placement in the trench is prohibited and will be cause for rejecting that material.

Only the amount of pipe and fittings necessary to ensure efficient installation progress shall be strung along the trenches. All other pipe and fittings shall be stored in the Contractor's yard. Piping strung or stored shall be protected at all times from damage by traffic, workmen, construction operations, and other hazards. PVC pipe stored for a prolonged period of time shall be protected from sunlight.

**3.04. Alignment and Grade**

Pipe shall be laid and maintained to the required line and/or grade shown on the approved plans with fittings, valves, and hydrants at the required locations with spigots centered in the bells. Pipes and appurtenances shall be installed within 0.5' horizontal and 0.1' vertical of design.

Changes in horizontal or vertical alignment of the pipe at a joint shall not exceed the manufacturer's recommended deflection for the type and size pipe being laid. When the change required is more than that recommended, a fitting or several short joints of pipe shall be used. All changes in direction in excess of eight (8) degrees or the maximum deflection recommended by the manufacturer, shall require a fitting unless otherwise approved by the Town.

When new pipe is to be connected to an existing pipe or when crossing existing pipe line, the Contractor shall excavate the existing lines well in advance of the laying of the new line to enable the Town's representative to verify their elevation and placement and to make any adjustments in grade and/or alignment of the new pipe line that may be required.

The Contractor shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures, both known and unknown, may be determined, and he/she shall be held responsible for the repair or replacement of such structures when broken or otherwise damaged. Temporary support, adequate protection, and maintenance of all underground and surface utility structures, drains, sewers, and other structures encountered in the progress of the Work shall be furnished by the Contractor at his expense.

Whenever obstructions are encountered during the progress of the Work and interfere to such an extent that an alteration in the approved plans is required, the Contractor shall notify the Town and the Town shall have the authority to change the plans and order a deviation from the line and/or grade or arrange with the owners of the structures for the removal, relocation, or reconstruction of the obstructions.

All pipe shall be laid to the depth shown on the approved plans or pipeline typical drawing. The depth of cover shall be measured from the top of the barrel of the pipe to the established finished grade of the street unless changes in street grade are proposed in which case the cover shall be measured to the proposed depth. Construction staking is required at minimum 50 ft intervals for line and grade control.

### **3.05. Excavation and Trench Preparation**

Excavation shall be in accordance with Trench Excavation, Compaction, and Backfilling Standard Specifications except as more stringent requirements are outlined herein.

Bedding for water lines shall be in accordance with Section 02200 Excavation, Compaction, and Backfilling Standards and manufacturer's recommendations including that select bedding for water taps and service lines shall be a low permeability material.

### **3.06. Pipe Laying**

- A. Lowering Pipe into Trench: Proper implements, tools and facilities shall be provided and used by the Contractor for the safe and convenient performance of the Work. All pipe, fittings, valves, and hydrants shall be carefully lowered into the trench piece by piece by means of a derrick, ropes, or other suitable tools or equipment, in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall the pipe or accessories be dropped or dumped into the trench. Dropped or dumped materials will be cause for rejection of same.
- B. Inspection Before Installation: The pipe and accessories shall be carefully inspected for cracks and other damage before installation in the final position. Defective or unsound material shall be set aside for inspection by the Town who will determine if the material shall be repaired or rejected. Rejected materials shall be removed by the Contractor from the job.
- C. Keeping Pipe Clean: Every effort shall be made to keep the interior of pipe and fittings clean during all phases of construction. This is especially important if the tablet method of disinfection is to be allowed. The interior of the pipe shall be thoroughly cleaned of foreign material before being lowered into the trench and shall be kept clean during operations by plugging or other approved means. Fittings shall be thoroughly cleaned, with a wire brush if necessary, taking care to not damage the internal coating. If the pipe laying crew cannot keep pipe clean while placing the pipe in the trench, Town may require that the ends of the pipe be covered before placing it in the trench and that the covers only be removed as the joints are assembled. If cleanliness is in question, the Town may require the line be swabbed and/or hydrojetted and video inspected at contractor's expense to confirm that it is clean. Providing access to all sections which are required to be videoed, then cleaning and reassembling pipe, shall be the responsibility of the Contractor.

- D. Laying of Pipe: The full length of each section of pipe shall rest solidly upon the bed, with recesses excavated to accommodate bells and joints. Pipe shall be laid with bell ends facing the direction of laying unless directed otherwise by the Town. Pipe laid on slopes 10% and steeper shall be laid from the bottom and proceed upward and have restraints approved by the Town. Pipe shall not be laid in water or when trench or weather conditions are unsuitable for the Work unless expressly permitted by the Town.

The subgrade upon which the pipe is placed shall consist of materials suitable for supporting the pipe without excessive settlement or stress development. Fine earthen materials shall be carefully placed and compacted around the pipe and up to a depth of six inches over the top of the pipe. Care shall be taken in backfilling to see that the pipe is not displaced, crushed, cracked, or otherwise injured. In the event that rock or excessively spongy materials are encountered, they shall be removed to a depth of not less than 6" below the bottom of the proposed lines and replaced with an approved material and mechanically compacted to grade. If no suitable subgrade material is available from the upper portion of the excavation, approved material shall be imported to the job site.

The sealing surface of the pipe, the bell to be joined, and the elastomeric gaskets shall be cleaned immediately before assembly. Assembly shall be made as recommended by the manufacturer. Unless otherwise directed, the gasket and the bell or the plain end of the pipe to be jointed shall both be lubricated with a suitable soft vegetable soap compound meeting NSF 61. The spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. Pipe that is not furnished with a depth mark shall be marked before assembly to assure that the spigot end is inserted to the full marked depth of the joint. Care shall be taken to ensure that no damage is done to the pipe, collar, gasket, or bell when the pipe is being homed. Use of excessive force will not be permitted. Any pipe that has had the grade or joint disturbed during or after laying shall be taken out and relayed.

Any section of pipe, fittings, valves, or hydrants already laid and found to be defective shall be taken out and replaced without additional expense to the Town.

HDPE pipe shall be installed in strict accordance with manufacturer's recommendation. All workers welding HDPE pipe must be trained and approved by the manufacturer for welding pipe of the size and DR being used on this project. At the beginning of welding each day, each worker who will be welding pipe shall demonstrate his qualifications by successfully completing a bend back test prior to welding any pipe for use on the project. All welds shall be full depth and shall have a uniform bead around the joint.

Flange and mechanical joints shall be made with properly sized machine bolts and nuts. All nuts and bolts utilized in underground connections shall be Cor-blue, stainless steel, coated high strength cast iron, or coated high strength wrought iron depending on soil conditions. All nuts and bolts shall be Cor-blue unless approved by the Town. All components of these types of joints shall be cleaned before jointing. Only one (1) gasket will be permitted in a flange joint. In a mechanical joint the plain end pipe shall be fully seated before the gland and gasket is slipped up to the bell; care shall be taken to locate the gasket evenly around the entire joint. All nuts on both types of joints shall be tightened by hand first then by alternating nuts 180 degrees apart to the manufacturer required torque. Deflection at a mechanical joint shall not exceed either the manufacturer's recommendation or Table 1 in AWWA C600. Buried bolts and nuts on mechanical and flanged joints shall be wrapped in a 10 mil plastic and taped closed.

When work is not in progress, open ends of pipe and fittings shall be securely closed by a watertight plug to prevent entry of foreign materials and/or water. If there is water in the trench, the seal shall remain in place until the trench is pumped completely dry. Whenever water is in the trench, enough backfill shall be placed on the pipe to prevent floating. Should any foreign material be allowed to enter the line or to remain in the line after installation, the Contractor shall remove such accumulation with a pipeline scraper or other approved means. Should the Contractor repeatedly fail to prevent dirt or other material from entering the line, he/she will be required to clean each section of pipe with a pipeline scraper or swab as it is installed. If pipeline cleanliness is in question the tablet method of disinfection will not be permitted.

Tracer wire shall be fastened to all pipes at no less than 5' intervals and shall be fastened to and be looped up to the surface at all valves, hydrant, and other metallic structures along the line. Marking tape at least 6" wide labeled "water" shall be placed 12" above pipes of all materials. At the completion of segment of pipe installation and backfill, the electrical continuity shall be tested and confirmed. Continuity shall be demonstrated to the Town prior to acceptance of the work.

- E. Sequencing: Pipeline installation shall follow trench excavation within 100 lineal feet. Trench backfill shall follow pipe installation within 100 lineal feet. Approved cleanup shall follow trench excavation within 100 lineal feet. The Town may allow changes in these requirements if field conditions warrant.
- F. Cutting of Pipe: The pipe shall be cut in a neat and workmanlike manner in accordance with manufacturer recommendations. No damage shall be done to the pipe or any lining or coating and the cut shall leave a smooth end at right angles to the axis of the pipe. Flame cutting of iron pipe by means of an oxyacetylene torch shall not be allowed.
- G. Connection to and Crossing of Existing Lines: When new pipe is to be connected to or to cross an existing pipe, the Contractor shall excavate the existing lines well in advance of the laying of the new line to enable the Town's representative to verify elevation and placement and to make any changes in grade and/or alignment of the new pipe line that may be required. Connections to existing lines shall be made at the locations shown on the approved plans unless changes are approved by the Town. In most cases where there is significant elevation adjustment (more than 18"), the Contractor shall use 22.5 degree fittings to make the adjustment. For lesser changes a gradual adjustment of elevation should be made. Place insulation where cover is less than specified depths. Coordinate timing of the cut with Town, and provide required notice to affected customers. In cutting the existing pipe take great care to minimize contamination of existing line. Keep water level in the trench below the level of the pipes. Make connection using required fittings and restrain the joint. Disinfect the line as called for below for a repaired line. Cut off and seal abandoned section unless otherwise noted on the approved plans, remove abandoned sections of line.

### **3.07. Water Service Installation**

- A. Service Line Installation and Responsibility: All water services shall be stubbed out to through the utility easement. Generally, meters shall be set at property line. When sidewalks are set close to property line, meters shall be set in the green belt near the sidewalk. In all cases owner responsibility for the service line shall begin at the meter. Installation of service lines shall be by open cut with bedding, backfill, and compaction in conformance with the specifications herein and Standard Specifications for Excavation, Backfill, and Compaction. Depth of bury shall be 5' unless otherwise indicated on the Town approved plans. Care shall be taken in laying the service line to

prohibit kinks in the line. In placing backfill around pipe use only select materials which will bed and support the pipe and not cause injury to it.

- B. Meter Lid Elevation: The lid for the meter can boxes shall be flush to finished grade of the surrounding property and landscape. When a meter can must be set within a sidewalk the lid shall be set about 1/2" below grade to avoid catching on a plow.
- C. Curb Stop and Box: Install curb stop on service lines so that the box will be in the sidewalk or concrete. Boxes must be plumb and the box lid ¼" below the finished concrete.
- D. Fire Protection Service Line: Service lines for fire protection, unless smaller than 2", shall be made by installing a tee in the main with a gate valve flanged to the tee. All fire services shall be installed with a Town approved backflow preventions device. The property owner shall be responsible for maintenance of the fire service from the tee on the main to and through the property being served.

**3.08.** Crossings: Details for crossing roadways, canals, ditches, and arroyos (draws) are covered in a separate specification entitled "Crossings". All river crossings shall be submitted to the Town for specific review and approval.

**3.09.** Setting of Fittings, Valves, and Hydrants: All hydrants, valves, plugs, caps, and fittings shall be provided as shown on the approved plans and set and joined to the pipe in the manner specified herein for cleaning, laying, and joining pipe. Whenever practical, flanged fittings shall be used and gate valves bolted directly to crosses and tees as applicable. All valves, fittings, hydrants including the connections shall be wrapped in a 10 mil plastic and sealed.

- A. Valves and Valve Boxes: Gate valves shall be installed as shown on the Town typical drawing and in accordance with the Minimum Standards adopted by the Town at the locations shown on the approved plans. In general, a valve shall be provided on each branch of a tee or cross. Care shall be taken to assure that the valve and box are plumb and that the valve box is properly supported on a concrete base, and adjusted for the correct finished grade. A box shall be provided for each buried valve and the box shall not transmit shock or stress to the valve and shall be centered over the valve nut. Each valve not in the roadway shall be marked with a steel T post. The top of the post shall have a 4 x4 minimum steel plate welded to the top. The plate shall be labeled with the valve ID.
- B. Hydrants: Hydrants shall be located as shown on the approved plans. Final location will be approved by the Town in the field and should provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. Hydrants shall be accurately set to the proper bury lines so that bolts are accessible and shall be securely anchored when it is plumb. A gravel fill shall be placed around the hydrant barrel drain port as shown on the typical drawings. Each hydrant shall be connected to the main with a 6" minimum diameter branch controlled by an independent 6" gate valve, installed in accordance with the typical drawings for hydrant and gate valve installation adopted by the Town. The Contractor in the presence of the Town shall test each hydrant by operating it through several open and close cycles.
- C. Dead Ends: All unconnected ends of pipe shall have a valve, and plug or cap installed on it with appropriate restraint. In general, plugs shall be inserted into the bells of all dead-end fittings. Spigot ends of accessories, fittings and plain ends of plastic pipe shall be capped. Blind flanges shall be used on flange fittings. A reaction or thrust block and mechanical restraint such as a megalug shall be provided at all dead-ends of pipe.

- D. Thrust Blocks: A reaction or thrust block shall be provided at each bend, tee, valve, hydrant, plug, and at reducers or fittings where changes in pipe diameter or direction occur. The size and shape of the thrust blocking shall be as shown on the typical drawing. Concrete shall be a 6 sack, 4000 psi at 28 days mix approved by the Town. Maximum water cement ratio shall be 0.42. The concrete shall be placed between the poly wrapped pipe or appurtenance and the undisturbed wall of the trench. The concrete shall be placed in such a manner that no concrete is in contact with any bolts or nuts on the fitting etc. so that the pipe and fitting joints will be accessible for repair by poly wrapped the full joint and taping closed. In addition, a joint restraint system such as a megalug shall also be provided on all mechanical joints.
- E. Air Valves: Air valves shall be installed in all locations where air is likely to accumulate in the water line, most often at high spots in the line. A tap shall be made in the top of the line and a corporation stop installed in the tap. The line shall then be connected to an air valve installed in a manhole or vault that meets the requirements of the material specifications above and shall be installed in accordance the standard drawing adopted by the Town. The valve shall be installed at 4 feet below finished grade. A frost-free lid shall be provided. Adequate insulation shall be installed around the valve to protect it from freezing.
- F. Cross Connection Control Valves: Cross connection control valves shall be installed in a manner which conforms with the recommendations of the Foundation for Cross Connection Control and Hydraulic Research and applicable CDPHE regulations and shall have sufficient space around and access to the valve to allow for proper testing.
- G. Vaults: Vaults where needed or required shall be of concrete with minimum wall thickness of 6 inches or the minimum required to properly encase the re-enforcing steel required by the structure. The vault shall be of such size as to allow easy operation and maintenance of the equipment contained therein with no less than 18" clear around the outside of the pipe. A 24" minimum access hatch shall be provided over the manway steps to allow access to the vault. Opening size and location shall allow for removal of any facilities that need to be maintained. Vaults shall include either a floor drain or sump depending on groundwater conditions.

**3.10. Bedding and Compaction:** Bedding, backfilling, and compaction shall be in accordance, with Excavation Backfill, and Compaction Standard Specifications of the Town and pipe manufacturer's specification. Special attention shall be given to placing and compacting select bedding material in the pipe zone. The haunching on PVC pipe shall be compacted to 95% Standard Proctor. Bedding and pipe zone backfill of water lines shall be fine grained and relatively impermeable rather than a graded material. Backfill shall not be wheel compacted until there is a minimum of 36" of compacted cover over the top of the pipe.

### **3.11. Hydrostatic Testing**

The Contractor shall be required to perform hydrostatic tests on all water mains, laterals, dead ends, and service lines in accordance with AWWA specifications C600. Prior to making the test the Contractor shall advice the Town of the time and place of the test so that adequate inspection can be provided. Prior to performance of the test the pipeline shall be completely filled with water for a period of 24 hours.

The test shall be conducted in the presence of the Town or its authorized representative. The testing of the lines shall be done without being connected to existing lines unless approved by the Town. All necessary apparatus for pressure testing including the pump, pipe connection, gauges, and measuring devices shall be furnished by the Contractor at no cost to the Town. If connections to the existing lines are allowed by the Town, it is with the understanding that the Contractor assumes any and all responsibility in

case of damage or failure of the existing system. Leakage through connections to the existing system, leaks in the existing lines, or leaking valves under the test pressure will invalidate the test and required the Contractor to find another means to test the line.

Prior to testing, all air shall be bled from the lines. If permanent air vents are not located at all high points, the Contractor shall install corporation stops at such high points so the air can be expelled as the line is filled then the corps closed. The lines shall be tested at 150 psi or 1.5 times the normal working pressure of the lines, whichever is greater, for not less than two (2) hours when performing the combined pressure and leakage test. Test pressure shall be measured at the high point in the line. All taps, gauges (3" face, 0-200 psi, at least 5 psi gradations), and necessary equipment shall be provided by the Contractor as approved by the Town; however, the Town may utilize its own gauges if it so elects. Each section of the new line, between valves shall be tested to demonstrate that each valve will hold the test pressure. No pipe installed will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{N * D * \sqrt{P}}{7400}$$

Where:

- $L$  = Allowable leakage (gal/hr)
- $N$  = Number of joints in the line
- $D$  = Nominal Pipe Diameter (in)
- $P$  = Testing pressure (psig)

During the test, the test pressure shall not lose more than 5 psig without being pumped back up to the test pressure. The total gallons of water required to return the line to the test pressure at the end of the test period is the total leakage. If the total leakage is less than the allowable, the line can be given preliminary acceptance. All visible leaks will be repaired regardless of the amount of leakage. If leakage exceeds that allowed based on the above formula, Contractor shall identify problems, make repairs, and repeat the test until the leakage is less than or equal to the allowable leakage.

When separate pressure and leakage tests are to be performed, test procedures shall conform with the procedures detailed in AWWA C600. The duration of the pressure test shall be a minimum of one (1) hour and the duration of the leakage test shall be a minimum of four (4) hours.

Each gate valve shall be tested to ensure that it operates properly and provides watertight seal under 1 1/2 times operating pressure in the closed position.

### 3.12. Disinfection of Potable Waterlines

- A. General: Flushing and disinfection of potable waterlines shall be done in accordance with the procedure set forth in AWWA C651 Disinfecting Water Mains. All water lines and sections of water line which have been exposed including lines owned by other parties must be disinfected. The Contractor shall provide all temporary blowoffs, pumps, chlorination equipment, chlorine and all other necessary apparatus required. The placement of powder chlorine in each joint of pipe will not be allowed.
- B. Pipe Cleaning: If the pipe contains dirt or heavy encrusted matter that in the opinion of the Town Engineer will not be removed during the flushing operation, the Contractor shall clean and swab the interior of the pipe with a 5 percent chlorine solution.



- C. Preliminary Flushing: The pipeline shall be flushed prior to disinfection, except when the tablet method is used, to remove all remaining foreign material. The flushing operation shall develop a minimum velocity of 5 ft./sec. for 5 minutes minimum through the length of the pipe. If dirt cannot, in the opinion of the Town Engineer, be removed by flushing, the pipe shall be cleaned and swabbed with a 5% hypochlorite disinfecting solution. Preliminary flushing cannot be used with the Tablet Method. Use of tablet method for disinfection is only allowed if the pipe has been kept clean and dry duration installation. If the pipe has not been kept clean, the tablet method is not allowed and preliminary flushing is required.
- D. Chlorine Application: In general, chlorine shall be applied using the continuous feed method. The tablet method may be used on short extensions (up to 2500 ft.) of small diameter mains (12-inch and smaller). Longer line segments require using the continuous feed method.
- E. Continuous Feed Method: Introduce water into the line at a constant rate while adding chlorine at a minimum concentration of 25 mg/l. Maintain the chlorinated water in the pipeline for a minimum of 24 hours after which period the treated water shall contain no less than 10 mg/l of chlorine throughout the entire length. Repeat the above procedure if the residual at the end of the 24 hours fails to meet the minimum concentration. Note that use of the slug method, requires 3 hours contact with not less than 100 mg/l solution and not less than 50 mg/l free Cl<sub>2</sub> at the end of the 3 hours.
- F. Tablet Method: This method shall not be used if trench water or foreign material has entered the line or if the water is below 5 degree C (41 degrees F). Because preliminary flushing cannot be used with this method, tablet method shall only be used when scrupulous cleanliness has been exercised. Place tablets in each section of pipe in sufficient number to produce a dose of 25 mg/l. Refer to Table 3 of AWWA C651 for the required minimum number of tablets (2 tablets for 6" and 3 for 8" pipe in 20' joints). All tablets within the main must be attached at the top of the pipe with an adhesive appropriate for potable water. Tablets shall also be placed on all hydrants. Introduce water into the pipeline at a rate no greater than 1 ft./sec. and retain the water in the pipeline for a period of 24 hours. The minimum residual shall be 5 mg/l throughout the line.
- G. Final Flushing: After the required retention period, flush all heavily chlorinated water from the main until the chlorine concentration is no higher than that prevailing in the system, or less than 1 mg/l. When the tablet method has been used, provide a flushing velocity equal to that of the preliminary flushing specified above.
- H. Disposal of Super Chlorinated Waters: All flushing of chlorinated water shall be completed in conformance with CDPHE guidance and in a manner that protects with environment and all property and improvements.
- I. Bacteriologic Tests: After completion of the final flushing and prior to placing the pipeline in service, collect samples from the end of the line and test for bacteriologic quality to show the absence of coliform organisms. The number and frequency of samples shall conform to the requirements of the public health authority having jurisdiction but in no case shall the number be less than one for chlorinated supplies and two collected 24 hours apart for unchlorinated supplies. Collect samples in sterile bottles from a standard corporation stop installed in the main. Do not collect samples using a hose or fire hydrant. Sterilize the corporation stop prior to sampling.
- J. Repetition of Procedure: If the original disinfection fails to produce satisfactory samples, repeat the disinfection procedure until satisfactory results are obtained.

- K. Disinfecting Existing Mains: The procedure outlined in this section apply primarily when existing mains are wholly or partially dewatered. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure present little danger of contamination and may not require disinfection as long as the repair parts and the pipe which will be covered are swabbed with chlorine immediately prior to connection.

When an old line is opened, either by accident or by design, the excavation is likely to be wet and could be contaminated. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

The following procedure is considered as a minimum that may be used.

- i. Swabbing with Hypochlorite Solution - The interior of all pipe and fittings used in making the repair (particularly couplings and tapping sleeves) and the open section of the existing line shall be swabbed with a 5% hypochlorite solution before they are installed.
- ii. Flushing - Thorough flushing is the most practical means of removing contamination introduced during repairs. If valving and hydrant locations permit, flushing from both directions is recommended. Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated and the water being discharged has a comparable chlorine residual to the water in the distribution system.

Where practicable, in addition to the above procedures a section of main in which the break is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described for new lines, except that the dose may be increased to as much as 500 mg/l, and the contact time reduced to as little as 1/2 hour. After chlorination, flushing shall be resumed and continued until discolored water is eliminated, and chlorine concentration is equal to that in the system.

Bacteriologic samples shall be taken after repairs to provide a record by which the effectiveness of the procedures can be determined. If the direction of flow is unknown, samples shall be taken on each side of the main break.



Dedicated to protecting and improving the health and environment of the people of Colorado

## Low Risk Discharge Guidance Discharges of Potable Water January 15, 2016

### Scope and Purpose of Modification

This revised guidance document is effective January 15, 2016. In addition to editorial revisions, the following substantive modifications were made:

- Added definitions.
- Clarified the limitations on discharges for which this guidance is applicable, including what is included in a “potable water distribution system.”
- Clarified that certain discharges associated with “super-chlorinated” water may be allowed under this guidance when the criteria and conditions are met.
- Added conditions allowing for the use of chemical dechlorination.
- Clarified the requirements and practices for preventing erosion.
- Identified an allowable concentration for residual chlorine in discharges to classified surface waters, consistent with 5 CCR 1002-31, The Basic Standards and Methodologies for Surface Water.

Changes related to potable water distribution systems were made in response to comments received on the draft permit COG604000 General Permit for Discharges from Hydrostatic Testing of Pipelines, Tanks, and Similar Vessels. The final permit was issued on November 23, 2015 and is effective on April 1, 2016. Summaries of the comments and the division’s responses are included in the fact sheet for the final permit. In the final permit, the division excluded discharges of potable water from potable water distribution systems and reaffirmed that these discharges are more appropriately covered in accordance with WQP-27, Low Risk Discharges Policy, as an alternative to general permit coverage. The division determined that clarifications should be made to this guidance regarding the issues raised during the general permit renewal process and aligned the timeline of this update with the timeline for issuance of the final permit.

In regard to clarifications regarding what is included in a potable water distribution system, the division found that discharges associated with testing of new lines were consistent with scope of the guidance as long as the construction and installation methods did not render the water non-potable. Clarity was added to this guidance since construction contractors had previously applied and obtained authorization for the discharge of water, including potable water, associated with the installation and testing of new lines, under the COG604000 General Permit.

In regard to super-chlorinated water, the division determined that the super-chlorination of water in potable water distribution systems does not render the water non-potable, and that control measures for dechlorination of superchlorinated water are highly effective and widely available. Since comments on the COG604000 General Permit requested clarification regarding whether permit coverage under the general permit would be available for superchlorinated discharges, and since in response to other

comments the division excluded all discharges from potable water systems from the COG604000 General permit, the division is clarifying in this modification to the guidance document that certain discharges associated with super-chlorinated water may be allowed under this guidance.

### Background and Discussion

This discharge policy guidance has been developed in accordance with WQP-27, Low Risk Discharges Policy. This guidance is only applicable to discharges meeting the low risk discharge criteria and conditions identified below. **Refer to the Alternative Disposal Options section at the end of this document for additional information for discharges that do not meet the criteria and conditions of this guidance.**

When the provisions of this guidance are met, the division will not actively pursue permitting or enforcement for the discharge of potable water, unless on a case-by-case basis the division finds that a discharge has resulted in an adverse impact to the quality of any state waters receiving the discharge.

Discharges of potable water are a type of industrial activity with short term, infrequent discharges that with proper management are not expected to contain pollutants in concentrations that are toxic or that would cause or contribute to a violation of a water quality standard. The typical pollutant of concern is total residual chlorine, however, depending on how the discharge occurs, total suspended solids and oil and grease may become pollutants of concern. These pollutants can be handled using dechlorination techniques, filters, oil booms, and other control measures.

There are a large number of discharges of potable water. For example, approximately 2,000 public water systems are subject to the Colorado Primary Drinking Water Regulations (5 CCR 1002-11). There are additional public and private systems that distribute water intended for human consumption which are not subject to 5 CCR 1002-11. These systems operate potable water distribution systems that generate the types of discharges covered by this guidance. From October 2001 through December 2008, the division had a general permit in place, the Treated Water Distribution Permit (COG380000), to authorize discharges from potable water distribution systems. During the seven years permit coverage was available, 35 systems applied for and obtained permit coverage, a small number relative to the number of systems expected to discharge. The division established the Low Risk Discharge Policy in June 2008 to provide an alternative to general permit coverage for low risk discharges. The division issued the first low risk discharge guidance for potable water discharges in January 2009, which aligned with the timeline for termination of the COG380000 general permit. The division finds that these types of discharges may occur at all times of the year, and require a resource intensive effort to permit, without resulting in a clear general benefit to environmental quality due to the low risk nature of the discharge.

The criteria provided in this guidance must be met, and all of these conditions must be followed, by anyone claiming to discharge under this low risk guidance.

The following are examples of common discharges that **do not meet** the criteria for discharging under this guidance. Discharges that do not meet the criteria for coverage under this guidance shall otherwise be disposed of properly, which may include sending to the sanitary sewer with permission of the local wastewater treatment facility or treating and discharging under a CDPS discharge permit (see the Alternative Disposal Options section at the end of this document).

- Discharges associated with installing or repairing pipe, fittings, and appurtenances for distribution of potable water and for which the discharge water would not meet the definition of potable water are not covered by this guidance. For example, the following would not be covered under this guidance:

discharges from cleaning debris and foreign materials from new sections of pipe which have pollutant concentrations making the water unsuitable for human consumption in accordance with Colorado Primary Drinking Water Regulations (5 CCR 1002-11).

- Discharges from cleaning or maintaining components at a construction or utility yard are not covered by this guidance.
- Discharges from a distribution system, tank or storage facility that is used for conveyance or storage of materials other than potable water are not covered under this guidance.

### Criteria, Conditions, and Control Measures

#### ➤ Definitions

- ❖ **Backflow Prevention Assembly or Device:** means any mechanical assembly or device installed at a water service line or at a plumbing fixture to prevent a backflow contamination event, provided that the mechanical assembly is appropriate for the identified contaminant at the cross connection and is an in-line field-testable assembly.
- ❖ **Classified State Surface Water:** is a surface water with a classification in the Classification and Numeric Standards Regulation for each of the seven river basins in Colorado. Classifications for each segment within the river basin can be found in the numeric and standards table for each basin regulation.
- ❖ **Control measures:** are any best management practice or other method used to prevent or reduce the discharge of pollutants to waters of the state.
- ❖ **Potable Water:** means water suitable for human consumption in accordance with Colorado Primary Drinking Water Regulations (5 CCR 1002-11), or water intended for human consumption from a public or private supply system not subject to 5 CCR 1002-11.

#### ➤ Low Risk Discharge Criteria

This guidance is applicable to point source discharges that meet the following criteria and that meet the conditions listed in the next section. See the Alternative Disposal Options section for guidance on addressing water not meeting these criteria.

- ❖ The discharge shall be of potable water from a potable water distribution system, including tanks and storage facilities that are part of that system. This includes lines supplying potable source water to other systems, not separated by a backflow preventer, where free mixing with the potable system occurs (e.g. fire suppression lines, irrigation lines, etc.). A system has been “maintained for potable water distribution use” when it will be or is currently delivering or storing potable water (i.e. existing systems).

#### ➤ Conditions

The following conditions must be followed by anyone discharging potable water. See the Alternative Disposal Options section for guidance on addressing water not meeting these conditions.

- ❖ **Exclusion of Process Discharges:** With the exception of hydrostatic testing of potable water distribution systems, the potable water shall not be used in any additional processes. Processes include, but are not limited to, any type of washing, heat exchange, manufacturing, or hydrostatic testing of pipelines not associated with treated water distribution systems.
  
- ❖ **Requirement for Removal of Chlorine:** If the discharge is directly to a state surface water (any stream, creek, gully, whether dry or flowing), it must not contain any residual chlorine in excess of 0.011 mg/L. The operator is responsible for determining what is necessary for removing chlorine from the discharge. If the discharge is to a ditch, chlorine content may be limited by the owner of the ditch. However, if the ditch returns flow to classified state surface waters, it must not contain residual chlorine in excess of 0.011 mg/L at the point where it discharges to the classified state surface water. It is recommended that if an operator is unsure of the status of the receiving water for a discharge in accordance with this guidance, that they assume a receiving water is a classified state surface water and therefore subject to the 0.011 mg/L chlorine limitation.
  
- ❖ **Exclusion of Discharges with Cleaning Materials and Added Chemicals:** The addition of cleaning materials or chemicals to the potable water source water or discharge is not allowed under this guidance, except for additional chlorine and dechlorination chemicals meeting the conditions below.
  - Additional chlorine may be added to the potable water source for the purposes of maintaining the potable water distribution system, including the use of super-chlorinated water. Special attention should be paid to the selection and use of control measures implemented for dechlorinating superchlorinated waters.
  - Dechlorination chemicals may be added to the discharge for the purposes of removing residual chlorine and in accordance with the manufacturer's label.
  
- ❖ **Controlling Erosions:** The discharge shall not cause erosion of a land surface that could cause pollution of the receiving water. Signs of visible erosion that have the potential to cause pollution without downstream controls measures implemented include the formation of rills or gullies on the land surface. Energy dissipation devices designed to protect downstream areas from erosion by reducing velocity of flow (such as hose attachments and erosion controls), may be necessary to prevent erosion.
  
- ❖ **Limiting Solids in Discharge:** The discharge shall not contain solid materials in concentrations that can settle to form bottom deposits detrimental to the beneficial uses of the state waters or form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses.
  
- ❖ **Additional Requirements and Property Rights:**
  - All discharges must comply with the lawful requirements of federal agencies, municipalities, counties, drainage districts, ditch owners, and other local agencies regarding any discharges to storm drain systems, conveyances, ditches or other water courses under their jurisdiction.
  - The guidance included in this document in no way reduces the existing authority of the owner of a storm sewer, ditch owner, or other local agency, from prohibiting or placing additional conditions on the discharge.

➤ **Implementation of Control Measures**

Control measures should be implemented as necessary to meet the conditions above, by anyone discharging in accordance with this guidance. The following control measures have been developed by the division to help ensure that the discharge will not negatively affect water quality. When implementing control measures to meet the criteria and conditions of this guidance may not be practical, see the Alternative Disposal Options section for additional solutions.

❖ **Discharges to the Ground:** For discharge to the ground, the water should not cause any toxicity to vegetation. When discharging, allow the water to drain slowly so that it soaks into the ground as much as possible.

❖ **Chlorine:**

▪ **Discharge to the Ground instead of Dechlorination:** The conditions for removing chlorine are not applicable when a discharge is to the ground and does not result in water reaching a state surface water. This option should be considered as an alternative to dechlorination.

▪ **Dechlorination:** Potable water is expected to contain chlorine at concentrations greater than the 0.011 mg/L chlorine limitation, and therefore removal of residual chlorine must be done for any direct discharge to state surface waters, or for any discharge to a storm sewer or conveyance where the chlorine will not dissipate to below the 0.011 mg/L limitation prior to reaching a state surface water. Dechlorination, if necessary, may be achieved by allowing water to stand uncovered until no chlorine is detected; ensuring dechlorination occurs between the location it is released from the potable water system but prior to reaching the classified state surface water; or by using a portable dechlorinator.

▪ **Additional Control Measures for Chemical Dechlorination:** Many portable dechlorinators rely on the addition of chemicals to remove chlorine from the discharge. All chemical additions must be in accordance with the manufacturer's specifications. When using chemicals in the dechlorination process, the operator must ensure the following: that proper quantities and rates are used, based on the concentration of chlorine; that adequate mixing occurs; and that enough time is allowed prior to flow reaching a surface water for the dechlorination chemicals to react with the chlorine in the water. In cases where the discharge of water that had been super-chlorinated will occur, operators should allow additional time for the chlorine to dissipate.

▪ **Determining if Chlorine Concentration is below 0.011 mg/L:** It is the operators' responsibility to ensure that adequate processes are followed to meet the 0.011 mg/L chlorine limitation prior to discharge to a classified state surface water. It is not required that an EPA approved test method be used to make this determination.

- **Discharge Testing:** There are a variety of methods to test for chlorine in the field, but the operator should ensure that the method selected is capable of detecting total residual chlorine down to the 0.011 mg/L limitation. For many methods, it will be necessary to have a test result indicating no (0 mg/L) residual chlorine to ensure that this limitation is met. A common and affordable test method is using a "color-wheel test kit" available from a variety of suppliers of chemical testing/analysis equipment. It is highly recommended that analysis occur for all superchlorinated discharges.

- **Discharging without Testing:** In some cases, it may be possible for an operator to make a determination that the chlorine concentration in a discharge is below 0.011 mg/L without analysis. This may be based on a determination that the given hold time or travel time to a classified state water, based on other discharge-specific variables, will adequately reduce chlorine levels to result in the chlorine limitation

being met. It is the operator's responsibility to ensure they understand the variables associated with a specific discharge to ensure that the chlorine limitation has been met.

- ❖ **Pollutants Picked Up After Release:** The discharge should be conducted to minimize the potential to pick up additional pollutants following release from the potable water distribution systems and prior to discharge to a water of the state.
  - The discharge should be conducted to minimize the potential to pick up additional suspended solids and to control erosion. It is understood that minimal suspension of sediment is inherent to any water running across soils. However potential water quality impacts should be minimized through practices such as diffusing flows and avoiding flows across bare soils.
  - The discharge should be conducted to minimize the potential that it will contact petroleum products/waste, and avoid picking up any oil and grease. When possible, an absorbent oil pad, boom or similar device should be used to eliminate oil from the discharge. A visible sheen must not be evident in the discharge.
  
- ❖ **Preparing and Installing Components:** When installing new pipe, fittings and appurtenances into a potable water distribution system, the components should be prepared and maintained in a way to minimize the potential for contribution of pollutants to discharges covered under this guidance.
  - All pipe, fittings, and other appurtenances associated with the discharge should meet industry standards for cleanliness for a public water. Examples of standard operating procedures include, but are not limited to, those found in ANSI/AWWA Standard C600-10, (*Installation of Ductile-Iron Mains and Their Appurtenances*), or any other applicable standard operating procedures that reflect industry standards of cleanliness. When it is necessary to remove debris, foreign material or other gross contamination from components prior to installation, wastewater generated from such activities may not be covered under this guidance. Such activity should occur at a location that allows for generated wastewater to be sent to the sanitary sewer with permission of the local wastewater treatment facility. Such wastewater could also be otherwise collected and disposed of.
  - Practices should be implemented during transport, storage, installation, and maintenance to minimize introduction of contaminants to pipe, fittings, and other appurtenances that could contribute pollutants to discharges.
  
- ❖ **Removing Pollutants:** Control measures for filtering or settling suspended solids and other debris should be used to remove solids or other debris that have either been picked up after discharge or that originated from within the potable water system. Examples of suspended solid removal practices include but are not limited to, check dams and filter bags. As a final measure downstream from additional control measures, inlet protection can be used to provide some additional removal and to allow for redundancy. Pollutant removal control measures should be used and maintained in accordance with the manufacturers' specifications.

#### Alternative Disposal Options

Water that does not meet the criteria of this guidance or that cannot be discharged in a manner that meets the conditions of this guidance must be either authorized by a CDPS discharge permit issued by the division, or disposed of through an alternative means. Because the water sources addressed in this



guidance are not covered by an existing general permit, it is expected that obtaining a CDPS permit will not be a practical solution for most discharges.

Water not meeting the criteria and conditions of this guidance may be sent to the sanitary sewer with permission of the local wastewater treatment facility or otherwise collected and disposed. If discharge is to the sanitary sewer, contact the local wastewater treatment facility prior to discharge. System owners may grant blanket authorization to discharge to their systems. This must be done to ensure that the facility is able to accept the discharge. Not all facilities are able to accept such discharges. Note that additional restrictions or local guidelines may apply.

If the waste is collected for disposal, it may be hauled off site for disposal at a facility that is authorized to discharge the water through an existing CDPS permit or in accordance with disposal requirements administered through the Colorado Hazardous Materials and Waste Management Division.

Alternatively the water may be land applied in a way that results in complete evapotranspiration. This will likely only be an option when the quantities of water are small.