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 ¾”, 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.