CITY OF LONGMONT
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WATER DISTRIBUTION

500.00 MINIMUM DESIGN CRITERIA

500.01 GENERAL

1. All water distribution systems will comply to the requirements of the Standards and Specifications for water main and service line Construction and may include criteria established by the engineer for the overall hydraulics of the water utility system. Additional criteria shall be outlined during public improvement plan review as determined necessary by the engineer.

2. These Standards and Specifications apply to pipe sizes up to and including twelve (12) inches diameter. Sizes larger than twelve (12) inches shall be as determined by the engineer on a project by project basis. Additional details for larger diameter pipes are available from the Water Department.

500.02 DESIGN GUIDELINES

	SINGLE FAMILY	MULTIFAMILY	COMMERCIAL/INDUSTRIAL
MINIMUM FIRE FLOW*	2000 GPM	3500 GPM	3500 GPM
MAX MAIN PIPE VELOCITY	8 FT/SEC	8 FT/SEC	8 FT/SEC
MAX SERVICE LINE VELOCITY**	8 FT/SEC	8 FT/SEC	8 FT/SEC
STATIC MAX. P.S.I.	90 p.s.i.	90 p.s.i.	90 p.s.i.
PEAK DAY MIN. P.S.I.***	55 p.s.i.	55 p.s.i.	55 p.s.i.
PEAK HOUR MIN PRESSURE***	40 p.s.i.	40 p.s.i.	40 p.s.i.
MAXIMUM SYSTEM PRESSURE FLUCTUATION	40 p.s.i.	40 p.s.i.	40 p.s.i.

THE MAXIMUM LENGTH OF A DEAD END LINE SHALL NOT BE GREATER THAN 500 FEET WITHOUT APPROVAL OF THE ENGINEER.

* In accordance with the current Longmont Fire Department standards, however, the required fire flow for some projects may be greater. Refer to the adopted fire code for specific requirements. Minimum residual pressure during fire flow is 20 p.s.i.

** In accordance with the current IBC.

*** This pressure may not be possible for all situations. Quality of Life Benchmark.

500.03 PIPE SIZES

1. Minimum main line size shall be eight (8) inch, except for fire hydrant lines. Dead end water mains with less than the equivalent of ten ¾ inch domestic taps on the line may be six (6) inch diameter. For pipe sizes larger than twelve (12) inches, the Engineer will determine the Specifications.

500.04 SERVICE LINES

1. Service lines shall be of a size which is adequate to supply the requirements of the property being served. The minimum size allowable for a service line shall be ¾ inch. A one (1) inch domestic tap may be installed in areas where a residential fire sprinkler system may be installed. The requirements of the property being served shall be defined as peak demand, as calculated in the IPC, latest edition.

500.05 DEPTH

1. All water lines shall have at least four and one half (4.5) feet of ground cover from the top of the pipe to the finished ground surface.

500.06 ALIGNMENT

1. All water lines shall be laid, when possible, generally ten (10) feet north or west of the center line of the street. If the curves exceed the City's maximum allowed deflections for the type of water pipe, then fittings shall be used. Water and sewer lines shall be installed with a minimum ten (10) foot horizontal separation (edge to edge distance) unless otherwise authorized by the engineer. All weather vehicular access shall be provided to manholes and valve boxes installed in areas outside of the public roadway. This shall consist of a minimum ten (10) foot wide gravel, asphalt, or concrete path or roadway constructed to the thicknesses shown in the standard City details with a minimum fifty (50) foot outside radius and thirty (30) foot inside radius on curves. No water mains shall be installed within 15 (fifteen) feet of any existing building, retaining wall, or structure, unless approved by the engineer. No building, retaining wall, or structure shall be constructed within a minimum of fifteen (15) feet from any water main, unless approved by the engineer.

500.07 GRADE

1. All pipe shall be installed to the lines, grades, and depths specified in the approved plans. Fittings, valves, and hydrants shall be installed at the specified locations with joints centered, and all valve and hydrant stems plumb. No deviation shall be made from the required line or grade except with the written consent of the engineer.

2. Air and vacuum valves may be required at extreme high points on water lines twelve (12) inches and larger. Engineer may require installation on smaller lines as deemed necessary.

500.08 FUTURE CONNECTIONS

1. When future main extensions are possible, the main which can be extended must be valved such that only one valve will have to be closed when the main is extended. The valve must be restrained so that when the one valve is closed and the line to be extended is exposed, the valve will remain safely in place. Restraint may be made by the use of a swivel or flange joint or the following minimum lengths of pipe installed on the extension side of the valve:

4 inch pipe – 29 feet
6 inch pipe – 41 feet
8 inch pipe – 53 feet
10 inch pipe – 64 feet
12 inch pipe – 76 feet

These are minimum lengths and the design engineer shall be responsible for determining if these are acceptable or greater lengths are needed to develop sufficient friction.

500.09 VALVE SPACING

1. Valves shall be placed at locations to minimize water outages in case of a line break or repair. In general, valves will be placed on lines of twelve (12) inch or smaller diameter no more than five hundred (500) feet apart. Each fire hydrant shall have a hydrant valve. For lines larger than twelve (12) inch, the valve location and spacing will be determined by the engineer.

2. The valving of the mainlines between hydrants must be accomplished to prevent more than one hydrant from being out of service in the event of a mainline break or shutdown.

3. A minimum of two (2) valves shall be installed at every tee and three (3) valves installed at every cross, unless approved by the engineer.

500.10 FIRE HYDRANT LOCATION

1. The Developer shall provide fire hydrants which conform to the requirements of these Specifications. Fire hydrant location and spacing shall be determined by the Fire Department in accordance with the adopted Uniform Fire Code. Generally, the number of fire hydrants, their location and spacing shall be as follows:

    a. Residential Areas – Five hundred (500) feet between hydrants starting at street intersections.

    b. Multiple Dwellings – Five hundred (500) feet between hydrants and not more than two hundred (200) feet from the end of required emergency access.

    c. Commercial, Industrial, Storage – Five hundred (500) feet between hydrants and not more than two hundred (200) feet from the end of required emergency access.

    d. No fire hydrant line shall be connected to less than an eight (8) inch water main or to a "dead end" water main unless the hydrant can deliver 1500 G.P.M. with minimum of a twenty (20) P.S.I. residual, or specifically approved by the Engineer.

Variances from the above requirements shall be coordinated with and approved by the Fire Department.

500.11 FIRE LINES & FIRE HYDRANT LINES

1. A fire hydrant line shall extend from the hydrant tee and valve on the water main to the fire hydrant.

2. A private fire service line for use on an internal fire suppression system shall require a valve at the mainline and the valve will be owned and maintained by the City. The valve shall open left. The property owner shall own and maintain the fire service line from the mainline valve to the building or structure.

3. Plans for the installation of either of the above mentioned fire service lines must be submitted to the engineer for approval and must be stamped by a professional engineer. Plans must be submitted and approved by the engineer one week prior to construction.

4. Fire hydrant lines shall be ductile iron pipe or pvc pipe, with flanged or swivel tees. Any fittings used shall be class two hundred fifty (250) (minimum) cast or ductile iron. If the main line is PVC, AC or steel pipe, the fire hydrant run shall be PVC pipe. If the main line is DIP, the fire hydrant run shall be DIP.

5. The use of any private fire service line to supply more than one lot is not allowed.

6. Fire service lines shall be electrically insulated from the public mainline if the main line is metallic pipe.

7. On a case by case basis, as approved by the engineer, domestic taps may be allowed on private fire service lines provided that a valve is installed between the physical domestic tap on the fire service line and the water meter. This valve must remain accessible to the City so that the water may be turned off. The City shall own and maintain the fire service valve at the mainline as specified in Paragraph 2 above. The property owner shall maintain the fire service line from the fire service valve to the building or structure including the domestic service line from the fire service line to the building or structure.

510.00 MATERIALS

For a specific list of materials accepted by the City please see APPROVED MATERIALS LIST. A copy of the APPROVED MATERIALS LIST can be obtained from the Water/Wastewater Department.

511.00 DUCTILE IRON PIPE

511.01 DESCRIPTION OF PIPE

1. Pipe class shall be in accordance with the table below with thickness designed in accordance with A.N.S.I. A21.50 (A.W.W.A. C-150), and manufactured in accordance with A.N.S.I. A21.51 (A.W.W.A. C 151). Alternate thickness designs, when appropriate, may be approved by the Engineer.

TYPE OF PIPE	MINIMUM SPECIAL CLASS OF PIPE (FORMERLY DESIGNATED AS "STANDARD THICKNESS CLASS" IN AWWA C151)
Fire hydrant lines	52
Fire service lines	52
4 inch	51
6 inch	50
8 inch	50
10 inch	50
12 inch	50

2. All buried joints for ductile iron pipe shall generally be mechanical joint or push-on conforming to A.N.S.I. A21.11 (A.W.W.A. C 111).

511.02 COATING OF PIPE

1. Pipe and fittings shall be coated on the outside with a bituminous coating, in accordance with A.N.S.I. A21.51 (A.W.W.A. C l5l).

511.03 CEMENT LINING

1. Pipe and fittings shall be cement lined in accordance with A.N.S.I. A21.4 (A.W.W.A. C l04).

511.04 TAPPING

1. Ductile iron pipe shall be directly tapped up to and including two (2) inches unless otherwise directed by the engineer. Taps made on existing lines six (6) inches in diameter or smaller must be approved by the engineer and may require a tapping saddle.

2. Taps larger than two (2) inches in size shall be made only with approved tapping saddles or sleeves as determined by the engineer. Refer to APPROVED MATERIALS LIST.

3. Service lines shall be electrically isolated from metallic water mains.

511.05 CORROSION PROTECTION

Whenever the installation of metallic mainline pipe is proposed, a soil resistivity survey of the construction area must be performed. The survey data and calculations, shall be submitted to the engineer. Joints of metallic pipe shall be bonded to provide electrical continuity and test stations installed at intervals approved by the engineer. See Details.

Where soils adjacent to construction areas are determined to have a resistivity of less than 1000 Ohm-Cm, or where stray current corrosion is, in the opinion of the engineer, expected to be severe, an approved non-metallic or cathodic protection system shall be installed with the

approval of the engineer. Additional measures may be required to insure protection from corrosion.

1. All metallic pipe, fittings, valves, and other appurtenances shall be wrapped in polyethylene or an approved coating. The polyethylene encasement shall prevent contact between the pipe and surrounding material. See details.

2. The polyethylene shall have a minimum wall thickness of eight (8) mils and be manufactured in accordance with A.W.W.A. Standard C 105, "Polyethylene Encasement for Gray and Ductile Cast-Iron Piping for Water and Other Liquids".

3. The polyethylene shall be applied to the pipe as shown in the Standard Details. A two (2) inch wide ten mil thickness polyethylene pressure-sensitive tape shall be used to close seams or hold overlaps.

4. Pipes of dissimilar metallic materials shall be insulated from each other using insulated flanges or fittings with test stations as approved by engineer.

512.00 POLYVINYL CHLORIDE PIPE

512.01 DESCRIPTION OF PIPE

1. All Polyvinyl Chloride (P.V.C.) pipe shall be manufactured according to A.W.W.A. Standard C 900, "Polyvinyl Chloride (P.V.C.) Pressure Pipe, four (4) inch through twelve (12) inch, for Water. No P.V.C. over twelve (12) inches in diameter will be installed without approval of the engineer. Following are additional requirements or exceptions.

512.02 JOINT TYPE

1. Pipe joints shall be made using an integral bell with an elastomeric gasket push-on type joint or using machined couplings of a sleeve type with rubber ring gaskets and machined pipe ends to form a push-on type joint. Solvent cement joints are strictly prohibited.

512.03 CLASS AND TYPE

1. All sizes of pipe (twelve (12) inches and less) shall be Class 150, dimension ratio eighteen (18) (DR 18) minimum.

512.04 TAPPING

1. Tapping of P.V.C. up to and including two (2) inch shall be done only with approved brass tapping saddles supplied by the Contractor and tapped by the City. All parts including bands, outlet, lugs, nuts and bolts are to be brass or stainless steel.

2. Taps larger than two (2) inches in size shall be made only with approved tapping saddles or sleeves as determined by the engineer. Refer to APPROVED MATERIALS LIST.

512.05 TRACING WIRE

1. All PVC pipe shall be installed with tracing wire taped securely to the top of the pipe and shall extend along the entire length of the pipe installed. The tracing wire shall be a minimum 14 AWG direct bury solid copper wire (see Details). The tracing wire shall be tested prior to and as a condition of construction acceptance.

2. Tracing wire shall be brought to grade at all fire hydrants or test stations as shown on the approved plans. The tracing wire shall be securely affixed to the barrel section of the fire hydrant and brought to grade as described in Section 522.03.

513.00 ASBESTOS CEMENT PIPE

513.01 USE

The installation of asbestos cement pipe is not permitted.

513.02 TAPPING OF EXISTING LINES

1. Existing asbestos cement pipe shall be tapped up to and including two (2) inches with an approved stainless steel tapped repair clamp. The make and model of the clamp shall be approved by the Engineer. When taps are larger than two (2) inches the engineer may require that a full section of pipe be removed and replaced with a non asbestos material. Refer to APPROVED MATERIALS LIST.

514.00 CAST AND DUCTILE IRON WATER WORKS FITTINGS

1. All cast iron fittings shall be manufactured in accordance with the following A.W.W.A. Standards: C104 “Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water”, C110 “Ductile-Iron and Gray-Iron Fittings, 3 In. – 48 In. (76 mm – 1,219 mm), for Water”, C153 “Ductile-Iron Compact Fittings for Water Service”, or C111 “Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings” with the following additional requirements or exceptions.

2. All fittings shall be furnished with mechanical joint ends conforming to referenced specifications, and in addition the tee-head bolts and hexagon nuts shall be fabricated from a high-strength, low alloy steel known in the industry as "Cor-Ten," "Usalloy" or equal. Accessories for the mechanical joint consisting of the gasket, gland and fasteners shall be furnished and packaged separately from the fittings. Each package shall be labeled in such a manner as to provide for proper identification and the number of units per package or bundle. All hydrant tees shall be mechanical by flanged joint or swivel tees.

3. All fittings shall be a minimum of 250 p.s.i. pressure rating and shall conform to the dimensions and weights shown in the tables of above referenced specifications. All fittings shall be made from gray-iron or ductile-iron.

4. All fittings shall be wrapped in polyethylene encasement. See details.

515.00 VALVES

515.01 GENERAL

1. All valve operating wrench nuts shall be installed no deeper than four (4) feet below finished grade. Stainless steel pins or a minimum of two (2) set screws may be used if any extension is necessary to meet this requirement.

2. Mainline valve placement shall be no greater than twenty-four (24) inches from any fitting. In-line tee connections shall have no less than two (2) valves, in-line cross fittings shall have no less than three (3) valves. This does not apply to fire hydrant tees.

3. See APPROVED MATERIALS LIST.

515.02 GATE VALVES

1. Gate valves shall be used on all lines up to and including twelve (12) inch and shall be resilient seated gate valves with non-rising stem, compression seating, double "0" ring stem seals, with two (2) inch square wrench nut, conforming to AWWA C-509 (see approved material list). Valves shall be the same size as the line which they serve and shall open left (counterclockwise). Valve ends shall be mechanical-joint, except for hydrant valves, which shall have one flanged or swivel valve end. See Details.

515.03 BUTTERFLY VALVES

1. All valves having a nominal inside diameter of greater than twelve (12) inches will be geared butterfly valves designed for direct burial and they shall conform to A.W.W.A. C-504, Class 150B. Valves will be tight closing rubber seat type with the seats bonded to the body. No metal to metal surfaces will be permitted. All valves will open left (counterclockwise) with a two (2) inch square nut conforming to A.W.W.A. C-509. The engineer may require butterfly valves to be installed in a vault.

515.04 TAPPING VALVES

1. Tapping valves shall conform to the above standards and any additional requirements requested by the engineer. Wet taps are allowed only on lines approved by the engineer.

2. Wet taps must be at least one nominal pipe size less than the diameter of the pipe being tapped.

515.05 BLOW-OFF VALVE ASSEMBLY

1. In all installations where the main will be permanently dead-ended, such as a cul-de-sac, a permanent blow-off assembly or fire hydrant shall be installed. Where the main will be temporarily dead-ended, for example the boundary of a subdivision filing, a temporary blow-off may be installed, unless a fire hydrant, which can serve additionally as a blow-off, is located at the main's temporary end. All plugs and caps unless otherwise specified, shall be provided with a concrete thrust block, or thrust shall be restrained by attaching suitable metal tie rods and clamps or joint restraints as specified. The blow-off shall be installed at a right angle to the main. See details.

2. Blow-off assembly sizing shall be dependant upon the size of line it is to be attached and will be sized to provide a flushing velocity in the main of at least two (2) feet per second.

3. Temporary blow-offs shall be approved by the engineer.

516.00 VALVE BOXES

1. All valve box sections shall be cast iron, screw type with lid. Bases shall be suitable for the valves furnished and for the depth of cover specified. The box shall have a circular base for support around the valve. See details and refer to APPROVED MATERIALS LIST.

517.00 CURB STOP BOXES

1. The approved list of curb stop boxes is located in the APPROVED MATERIALS LIST.

2. Curb stops installed must conform to A.W.W.A. C - 800 up to two (2) inches in size. Beyond two (2) inches, a gate valve must be used.

518.00 FIRE HYDRANTS

518.01 APPROVED TYPES

See Details and APPROVED MATERIALS LIST for further information.

518.02 REQUIREMENTS

1. All fire hydrants used in the City of Longmont Water System shall meet the following Specifications:

    a. Five (5) inch minimum hydrant valve opening, 5-1/4 inch main valve opening

    b. 2-hose nozzles, 2-l/2 inch National Standard thread

    c. 1-pumper nozzle, 4-l/2 inch National Standard thread

    d. Six (6) inch M.J. Shoe Connection inlet

    e. Operating nut, l-l/4 inch points to flat National Standard pentagon

    f. Open left

    g. Color - red with white caps and bonnet or operating nut

    h. 5.5 foot bury depth

    i. 150 p.s.i. working pressure

    j. Must comply with A.W.W.A. C 502

k. All extension sections must be class 52 ductile or cast iron and installed per the manufacturers recommendations

l. All fire hydrants will be of breakaway construction

m. All hydrants shall be NEW, unless an existing hydrant is in good operating condition and meets or exceeds the above standards. The use of an existing hydrant shall be approved by the engineer.

n. Upon Final Acceptance, hydrants must be painted with approved hydrant paint

520.00 GENERAL INFORMATION

520.01 OPERATION OF VALVES

1. When connecting to the existing water system, mainline valves on the existing system and connecting valves shall be operated by the Water Department personnel ONLY. The Contractor shall notify the Engineer and Inspector at least forty-eight (48) hours prior to needing any valve operated, except in the case of emergencies.

520.02 CONNECTION TO EXISTING SYSTEM

1. At locations where connections to existing water mains are to be installed, the contractor shall locate the existing mains both vertically and horizontally and verify their exact size and material in advance of the time scheduled for making the connections.

2. Prior to connecting to existing water mains, the contractor shall have all personnel, materials, and equipment ready to connect the fitting to the existing main, so as to keep the shutoff time to a minimum. As soon as possible after making the connections, the contractor shall flush the connection so as to prevent contamination of the existing facilities. The Contractor shall take every precaution necessary to prevent dirt or debris from entering the main.

3. Connections to the existing water system shall be completed in a neat and workmanlike manner. The Inspector shall be notified at least forty eight (48) hours in advance and be present at all times during the Construction of the connection. The connection is subject to approval by the Engineer and the Inspector. Under NO circumstances shall a non-disinfected main, which cannot be isolated, be connected to an existing disinfected main.

4. The City does not guarantee the water tightness of its valves on existing facilities. If existing valves leak, the City shall assist in reducing the influx of water, but the Contractor must use methods at his own disposal to dewater the trench and complete any required testing or disinfection of the water line.

5. All connections shall be valved to separate new Construction from the existing system. Valves shall be kept closed until acceptance of the new system.

520.03 ABANDONMENT OF EXISTING WATER LINES OR "STUBS"

1. All water and water service lines that were installed and will not be used (such as a replat or a change in building configurations) shall be abandoned at the main line. This shall include excavating the main and removing any mainline valves on the line to be abandoned and replacing them with a plug. However, if the street was paved within the previous three (3) years and no street asphalt overlay is planned for the next five years, then the developer shall place in cash escrow with the City, sufficient funds for the City to abandon the service line in the future.

521.00 TAPPING

521.01 TAPPING AUTHORIZATION

1. Only City of Longmont Water Department personnel are permitted to tap existing water mains of the City system, up to and including 2" (two inch) taps. Taps greater than two (2) inches, subsequent to Water Department approval, shall be performed by a qualified Contractor. NOTE: no size on size wet taps will be allowed. All appropriate fees shall be paid prior to any tapping.

2. Taps will be scheduled when the Water/Wastewater Maintenance Department is contacted by the contractor. No tap will be scheduled less than forty (48) hours or two working days from the time the Water/Wastewater Maintenance Department is contacted for the tap. No tap will be scheduled until all fees have been paid.

3. When the tapping crew arrives at the site, they will inspect the preparation of the trench for safety, as defined by current O.S.H.A. Standards.

4. The pipe must be sufficiently exposed to accommodate the tapping equipment.

5. When all conditions are deemed safe as described in Paragraph three (3), Water/Wastewater personnel will physically make the tap(s).

6. If the conditions of Paragraph 3 & 4 are not satisfied, the Water/Wastewater personnel will not perform the tap and a new time will have to be scheduled.

7. If rescheduling is necessary due to the fault of the contractor, all costs for time lost on the originally scheduled tap may be billed to the contractor.

8. Taps are only made Monday through Thursday and until 12:00 p.m. (noon) on Fridays.

522.00 GENERAL PIPE INSTALLATION

522.01 LOWERING OF PIPE AND ACCESSORIES INTO TRENCH

1. Implements, tools and facilities satisfactory to the engineer shall be provided and used by the contractor for the safe and efficient execution of the work. All pipe, fittings, valves, hydrants and accessories shall be carefully lowered into the trench with suitable equipment in a manner that will prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. Pipe and accessories shall be inspected for defects prior to their being lowered into the trench.

Any defective, damaged or unsound material shall be repaired or replaced as directed by the Engineer. All foreign matter or dirt shall be removed from the interior and machined ends of pipe and accessories before it is lowered into position in the trench. Pipe shall be kept clean by means approved by the engineer during and after laying.

522.02 DRAINAGE OF MAINS

1. Mains shall be drained through drainage branches or blowoffs. Drainage branches, blowoffs, air vents, and appurtenances shall be provided with valves and shall be located and installed as shown on the plans. The engineer may require dechlorination.

522.03 LAYING OF PIPE

1. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in line. If that is not possible, the engineer or Inspector may require that before lowering the pipe into the trench, a heavy, tightly woven canvas bag be placed over each end and left there until the connection is to be made. The end of the pipe will be plugged or capped with approved materials when work stops. Pipe shall be laid with bell ends facing in the direction of laying, unless directed otherwise by the engineer. Where pipe is laid on a grade of ten (10) percent or greater, the laying shall start at the bottom and shall proceed upward with the bell ends of the pipe up-grade. No pipe shall be laid when, in the opinion of the engineer or the inspector, trench conditions are unsuitable.

2. A minimum fourteen (14) gage, direct bury, solid copper wire shall be buried directly above all pipe. The copper wire shall be attached to the top of the pipe and surface at each fire hydrant. The wire shall be taped to the front of the hydrant barrel and coiled around the barrel just below the top flange with an excess length of approximately sixteen (16) inches. See Details. If there is no fire hydrant where the tracing wire can be brought up, the wire may be brought up in a valve box as directed in the field.

3. For pipe outside the roadway the same as above shall be done with the following additions. There shall also be a warning tape installed eighteen (18) inches directly above the pipe.

522.04 CUTTING OF PIPE

1. The cutting of pipe for inserting valves, or fittings, shall be done in a neat and workmanlike manner without damage to the pipe or lining and so as to leave a smooth end at right angles to the axis of the pipe. Flame cutting of ductile pipe shall not be allowed. Asbestos cement pipe shall not be cut, but the entire section of pipe shall be removed to the nearest joint and replaced with a non asbestos type pipe.

522.05 DISSIMILAR MATERIALS

1. Cathodic protection and insulation shall be installed as required by the engineer. Particular care shall be taken to insulate between dissimilar materials. Damage to the polyethylene wrap prior to or during backfilling shall be repaired by the Contractor. All damage to the polyethylene wrap caused by tapping the pipe shall also be repaired by contractor.

Whenever it is necessary to join pipe of dissimilar metal, an approved insulated joint shall be installed. The City shall conduct a resistivity test across the joint. If the resistance test fails, the insulated joint shall be removed and repaired. The joint shall then be reinstalled and retested. This procedure shall continue until a successful test result is obtained. A test station shall then be installed near the joint for future testing of continuity.

2. Test stations for metallic mainlines shall be located in vehicular accessible areas no more than five hundred (500) feet apart or less as determined by the engineer. Cathodic protection systems shall be designed by a qualified, licensed engineer, who regularly designs corrosion protection systems of this type.

522.06 JOINING OF PIPE

1. Push on joints shall be accomplished in accordance with A.W.W.A. C600 “Installation of Ductile-Iron Water Mains and Their Appurtenances”, A.W.W.A. C605 “Underground Installation of Polyvinyl (PVC) Pressure Pipe and Fittings for Water”, and A.W.W.A. M23 “PVC Pipe - Design and Installation”. Longitudinal bending of PVC is not allowed. All deflection shall be through fittings or half of the manufacturer’s allowed joint deflection.

2. Mechanical joints shall be accomplished in accordance with A.W.W.A. C-600 "Installation of Ductile Iron Water Mains and Their Appurtenances".

3. Flanged (or swivel) joints shall be accomplished in accordance with A.W.W.A. C-115 "Flanged Ductile Iron and Grey Iron Pipe With Threaded Flanges", and A.W.W.A. C-110 "Ductile Iron and Grey Iron Fittings three (3) inch Through forty (48) inch., For Water and Other Liquids".

4. All requirements for the joining of different types of pipe with an inside diameter greater than eight (8) inches shall be done with an approved sleeve or transition piece. Type and style to be determined by the Engineer on a case by case basis.

522.07 PERMISSIBLE PIPE DEFLECTION

1. Pipe shall not be deflected either vertically or horizontally more than half of the limits allowed by the manufacturer.

523.00 RESTRAINT

523.01 THRUST BLOCKS

1. Concrete thrust blocks shall be designed for the internal pipe pressure, surge pressure and the soil bearing capacity. Thrust blocks shall be placed between solid ground and the fitting to be anchored; the area of bearing on the pipe and on the ground in each instance shall be approved by the Engineer. The thrust blocks shall be so placed that the pipe and fitting joints will be accessible for repair. All fittings and piping shall be protected with a suitable bond breaker prior to pouring a concrete thrust block. (The concrete shall have a minimum twenty eight (28) day compressive strength of 3000 p.s.i.) See Details for typical thrust block installations and sizing. Forms for thrust blocks may be required by the engineer.

523.02 METAL HARNESS

1. Metal harness of tie rods, clamps, and restraining glands of adequate strength to prevent movement may be used instead of concrete blocking, as directed by the engineer. Steel rods or clamps shall be coated and polywrapped. Use of tie rods is only as approved by the engineer.

523.03 RESTRAINT FOR HYDRANTS

1. The bowl of each hydrant shall be well braced against unexcavated earth at the end of the trench with concrete backing, or it shall be tied to the pipe with suitable metal tie rods or clamps, as directed by the engineer.

524.00 SERVICE LINES

524.01 GENERAL

1. Each subdivided lot shall be served by a separate service line and meter except as provided for in the municipal code. Refer to details for a typical service line installation for more information.

2. The meter pit shall be located six (6) feet behind the back of an attached walk. Where no walks or detached walks are to be installed, the location of the meter pit shall be subject to the approval of the engineer.

3. The owner of the premises shall maintain the curb stop box or meter pit so that it will always be conveniently accessible and in good working order, properly capped and clean of debris and other foreign matter, see Standard Detail.

4. All corporation stops shall have Corporation Cock (C.C.) threads.

5. All service lines supplying water from the City's system shall conform to one of the following types of pipe:

    a. Seamless copper tube, "Type K, soft", for service lines ¾ inch through and including two (2) inches.

    b. Ductile Iron Pipe conforming to these Standards for service lines three (3) inches or larger.

    c. PVC pipe conforming to these Standards for service lines four (4) inches and larger.

    d. No other type of pipe shall be allowed without the written approval of the Engineer.

6. Service lines one and one half (1½) inch and larger shall have a curb stop and box installed within six (6) feet of the right-of-way (ROW).

7. Service lines shall not be installed in trenches containing conduits which carry any substances other than potable water without written permission of the engineer, service

lines shall be separated laterally from conduits which contain a potential health hazard by a minimum of ten (10) feet.

Exception: If it is not possible to achieve a ten (10) foot separation of the water and sewer services due to the size, location or other physical restraints of the lot, the lines may be installed in the same trench with the approval of the engineer and under the following conditions:

a. The water service must be installed eighteen (18) inches above the sewer service on a separately excavated shelf of undisturbed soil in the common trench.

b. Four and one half (4½) feet of cover must be maintained as a minimum over the water service.

8. All service lines will be inspected by the inspector. It is the responsibility of the contractor or developer to submit as-built drawings indicating the actual locations of all service stub-outs, prior to issuance of a final acceptance.

9. See Standard Details for a typical service line installation.

10. The installation of pumps directly fed by the City water system in service lines is prohibited.

11. All taps shall be at least eighteen (18) inches from any joint, fitting, valve or other tap unless approved otherwise by engineer.

12. Location of all service lines shall be marked with a "w" chiseled in the sidewalk or curb closest to the property line.

524.02 OWNERSHIP

1. The City shall maintain the water service line from the mainline to the curb stop, excluding the curb stop valve, box and stem, where a curb stop exists. In instances where no curb stop or outside meter exists, the City will maintain the service line from the main to the right-of-way line. In instances where an outside meter exists without a separate curb stop, the City will maintain the service line from the main to the meter, provided the meter is within fifteen feet of the right-of-way line. All remaining portions of the service line are to be maintained by the property owner, excluding the meter and backflow devices. If the domestic service line is tapped onto a private fire service line, as provided for in Section 500.11, the property owner shall maintain the fire service line from the fire service valve to the building or structure including the domestic service line from the fire service line to the building or structure.

525.00 SETTING OF VALVES AND FITTINGS

1. Valves, fittings, plugs, and caps shall be set and joined to pipe in the manner specified above in laying and joining of pipe. Valves in water mains shall be located as shown on the plans.

526.00 SETTING OF VALVE BOXES

526.01 VALVE BOXES

1. A valve box shall be provided for every valve that has no gearing or operating mechanism, or in which the gearing or operating mechanism is fully protected with a cast-iron grease case. The valve box shall be centered and plumb over the wrench nut of the valve, with the box cover one quarter (¼) inch below the surface of the surrounding pavement or such other level as may be directed by the engineer. See Details for valve and valve box installation.

527.00 SETTING HYDRANTS

527.01 LOCATION

1. Hydrants shall be located at least one (l) foot inside the right-of-way or water utility easement and five (5) feet from the side lot line and shall conform to one of the following conditions.

2. When placed behind the curb, the hydrant barrel shall be set so that no portion of the pumper or hose nozzle cap will be less than twenty-four (24) inches nor more than thirty (30) inches horizontal distance from the gutter face of the curb.

3. When set in the lawn space between the curb and the sidewalk, or between the sidewalk and the property line, no portion of the hydrant or nozzle cap shall be within six (6) inches of the sidewalk, or no greater than eighteen (18) inches from the sidewalk.

527.02 POSITION

1. All hydrants shall stand plumb and shall have their nozzles parallel with, or at right angles to, the appropriate curb, with the pumper nozzle facing the fire access. Hydrants shall be set to the established grade, with the safety flange approximately four to six (4 to 6) inches, or as per the manufacturers recommendations, vertically above the ground.

527.03 CONNECTION TO MAIN

1. Each hydrant shall be connected to the main with a six (6) inch flange or swivel joint controlled by an independent six (6) inch flanged by M.J. gate valve, unless otherwise specified. Dependent upon the soil conditions and the length of the hydrant run, the fittings and pipe lengths may require rodding as determined by the engineer.

527.04 HYDRANT DRAINAGE IN PERVIOUS SOIL

1. Wherever a hydrant is set in soil that is pervious, drainage shall be provided at the base of the hydrant by placing one (1) inch washed rock, from the bottom of the trench to at least six (6) inches above the waste opening in the hydrant and to a distance of (l) foot around the elbow.

527.05 HYDRANT DRAINAGE IN IMPERVIOUS SOIL

1. Wherever a hydrant is set in clay or other impervious soil, a drainage pit shall be excavated below each hydrant and filled with one (1) inch washed rock and under and around the elbow of the hydrant and to a level of six (6) inches above the waste opening. The drain pit shall be covered with polywrap prior to backfill.

527.06 USAGE AND OPERATION OF HYDRANTS

1. Water usage from a fire hydrant is strictly prohibited unless a special use permit is issued by the City of Longmont Water/Wastewater Department.

527.07 FILLING THE LINE

The new pipeline shall be filled slowly, filling at a rate which will not cause surges or exceed the rate at which air can be released. All air in the line shall be purged. Where blow-offs or hydrants are not available or effective in purging air from the line, the engineer shall require a tap to purge the line. The location and the size of the tap shall be at the Engineer's discretion. All costs related to make the tap shall be the contractor/developer responsibility. Tapping fees do not apply.

528.00 DISINFECTION AND FLUSHING

1. The chlorination of finished water mains shall be done prior to the hydrostatic testing. Before filling the main with water, the main shall be clean and free from debris to the satisfaction of the engineer.

2. Disinfection by chlorination of the main shall be performed prior to acceptance by the City. The chlorinating agent and method of application shall be approved by the Engineer in accordance with A.W.W.A. C-651.

3. If chlorine tablets are used for disinfection, the tablets shall be attached to the top of the pipe with A.W.W.A. and FDA approved adhesive specific for this purpose just prior to the installation of the pipe in the trench. (See APPROVED MATERIALS LIST)

4. After the water main is filled with water and chlorine, the chlorinated water shall be held in contact with the main for forty-eight (48) hours. At the end of the forty-eight (48) hours, the water in the main shall be tested by the Inspector, to ensure a residual chlorine content of not less than twenty five (25) mg/l and not more than one hundred (100) mg/l. The main shall then be thoroughly flushed to remove the heavily chlorinated water. Care shall be taken in flushing the main to prevent damage or danger to the public and the environment. The engineer may require Contractor to dechlorinate the flushed water.

5. After final flushing and before the new water main is opened to the distribution system, two consecutive sets of acceptable samples, taken at least twenty four (24) hours apart, shall be collected from the new main. The first set of samples shall be collected from every twelve hundred (1200) feet of the new water main and all fire hydrants, plus one set from the end of the line and at least one set from each branch more than one hundred (100) feet long. The first set of samples shall be taken of water that has stood in the new main for at least twenty four (24) hours after final flushing. The second set of samples shall be taken after completion of the hydrostatic testing at the locations(s)

used for hydrostatic testing. All samples shall be collected and tested in accordance with Standard Methods for the Examination of Water and Wastewater, and shall show the absence of coliform organisms, and, if required, the presence of a chlorine residual. Sampling and testing of residual chlorine and coliform organisms will be done by City.

6. If the initial disinfection fails to produce satisfactory bacteriological results or if tests indicate that other water quality parameters do not meet City potable water standards, the new main may be reflushed and shall be resampled. If check samples also fail to produce acceptable results, the main shall be rechlorinated by the continuous-feed or slug method of chlorination in accordance with A.W.W.A. C-651 until satisfactory results are obtained.

7. After completion of disinfection, new water mains with cement mortar linings shall be tested for pH. Mains with pH greater that 8.5 shall be thoroughly flushed until the pH is less than 8.5. pH testing will be done by the City.

529.00 HYDROSTATIC TESTS

1. No hydrostatic tests shall be made on any portion of the pipeline until all field placed concrete has had adequate curing time. Sufficient backfill shall be placed between joints and fittings to stabilize the constructed pipeline, however joints, fittings, valves, etc., may be required by the Inspector to remain uncovered so that visual inspection may be made at the time of testing. Tests shall include testing of service lines to and including the curb stop on new waterline installation.

2. All pipe shall be field tested to a minimum of 150 p.s.i. at all points in the line and 200 p.s.i. in private fire service mains.

3. The engineer shall be notified at least twenty four (24) hours in advance of any testing. All testing shall be done in the presence of the Inspector.

4. The contractor shall furnish the necessary equipment to do the pressure test including a calibrated meter. The pipeline shall be in a state of readiness for testing, having been filled, flushed of high chlorine, and purged of air.

5. While the test pressure is maintained for two (2) continuous hours, the allowable leakage from the pipe shall not exceed the formula listed below. An examination may be made of the pipeline in general during testing, and any leaks shall be repaired. Any pipe or fitting found to be cracked shall be removed and replaced. Cutting and replacing of pavement, excavating and backfilling are a necessary part of locating and repairing leaks discovered by pressure testing of pipe and the costs of these activities shall be borne by the contractor.

6. No leakage is allowed through the bonnet of any valve. Any valve that leaks through the bonnet will be removed and replaced.

   The hydrostatic pressure test shall be performed against each valve within the new piping system.

   Allowable Leakage for PVC Pipe (per AWWA C605):

$$L = \frac{ND\sqrt{P}}{7{,}400}$$

Where:

L = allowable leakage, in gallons per hour
N = number of joints in the length of pipeline tested
D = nominal diameter of the pipe, in inches
P = average test pressure during the leakage test, in pounds per square inch (gauge)

Allowable leakage at various pressures in shown in the following table. The values in the table are calculated on the basis of the above equation.

Allowable leakage per 50 joints of PVC pipe* (gph)

Avg. Test Pressure (psi)	Nominal Pipe Diameter (in)				
	4	6	8	10	12
200	0.38	0.57	0.76	0.96	1.15
175	0.36	0.54	0.72	0.89	1.07
150	0.33	0.50	0.66	0.83	0.99
125	0.30	0.45	0.60	0.76	0.91
100	0.27	0.41	0.54	0.68	0.81

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

Allowable Leakage for Ductile Iron Pipe (per AWWA C600):

$$L = \frac{SD\sqrt{P}}{133{,}200}$$

Where:

L = allowable leakage, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of the pipe, in inches
P = average test pressure during the leakage test, in pounds per square inch (gauge)

Allowable leakage at various pressures in shown in the following table. The values in the table are calculated on the basis of the above equation.

Allowable Leakage per 1,000 feet of pipeline* (gph)

Avg. Test Pressure (psi)	Nominal Pipe Diameter (in)					
	3	4	6	8	10	12
200	0.32	0.43	0.64	0.85	1.06	1.28
175	0.30	0.40	0.59	0.80	0.99	1.19
150	0.28	0.37	0.55	0.74	0.92	1.10
125	0.25	0.34	0.50	0.67	0.84	1.01
100	0.23	0.30	0.45	0.60	0.75	0.90

*If the pipeline under test contains sections of various diameters, the testing allowance will be the sum of the testing allowance for each size.

7. Operational Inspection

   a. At the completion of the project and in the presence of the inspector, the contractor shall operate all valves, hydrants, and water services to ascertain that the entire facility is in good working order; that all valve boxes are centered and valves are opened; that all hydrants operate and drain properly; that all curb boxes are plumb centered; and that water is available at all curb stops.

530.00 WATER METERS

530.01 GENERAL

1. All work and materials must be acceptable to the engineer.

2. All work and materials are subject to inspection by the City of Longmont at all times.

3. There shall be only one City water meter per service tap purchased. Specifically, the City will not provide individual water meters nor metered billing services in multi-unit structures.

4. The tap, water service line between the main and the meter, and water meter may all be the same nominal size. Where the meter size is smaller or larger than the service line size, the water service size shall be considered equal to the water meter size. There shall be installed upstream and downstream of said meter a pipe of the same diameter and 20 (twenty) times that diameter in length. Variation between service line and meter size must be approved by the engineer.

5. The City reserves unto itself sole responsibility for testing and certifying the accuracy of City water meters. No one shall in any way attempt to test, certify, or calibrate a City owned water meter without City approval.

6. Modification, alteration or relocation in metering equipment must be approved by the City.

7. Water meter and offsite reading equipment costs, fees, and repair costs shall be determined by the City of Longmont.

8. The City shall have the sole right to determine the rated size, kind, type, make, and component configuration of water meters and offsite reading equipment.

530.02 OWNERSHIP

1. Water meters and off-site reading equipment shall be obtained from the City of Longmont, upon payment of fees, and shall remain in the City's ownership.

2. City ownership of water meters extends only to the body and register of the meter.

3. Water meters installed at a premise shall remain with that premise and are not transferable.

530.03 MATERIALS

1. Materials shall be in accordance with the APPROVED MATERIALS LIST.

2. Water meter couplers, companion flanges, and jumper bars for sizes 3/4 inch through four (4) inches shall be obtained from the City Water Meter Shop. Larger sizes shall be obtained by special arrangement.

3. The user/customer has the sole responsibility to determine the potential loads a meter pit and meter vault will require and shall provide the structural strength required. The City may require AASHTO HS-20 loading at its option.

4. No solder containing lead shall be used. All soldering fluxes, plumbing pastes, pipe dopes, sealants, coatings, gaskets, and similar material which may come into contact with potable water must be non-toxic and approved for general plumbing use.

530.04 INSTALLATION

1. Whenever possible, the installation of water meter vaults in streets, roadways, driveways, alleys, or parking lots will not be allowed. Meters for residences shall be placed in a pit (for 3/4" or 1" services) outside of the structure as indicated in the detail drawings. Meters for commercial/industrial buildings may be placed inside the building as approved by the Engineer. Meters for larger services (greater than 1") may be placed in minimum four (4) foot diameter vault with a one (1) inch conduit from the vault to the structure with 18-4 bellwire inside. The vault must be within three hundred (300) feet of the structure. Meters for all irrigation taps receiving a waiver (parks, arterial streets and primary greenways) must be placed in a minimum 60 (sixty) inch diameter vault for service lines two (2) inch and less.

2. The water meter shall be situated such that it is protected from freezing and frost damage.

3. Water meter pit locations and installations must be acceptable and meet the approval of the engineer (see details). Water meter pits shall not be installed with the construction of the water service line until such time as the electric service lines, or other adjacent utilities, have been installed unless otherwise approved by the engineer. For installation outside the City limit, the meter pit shall be installed immediately adjacent to right-of-way (ROW).

4. All meter settings must be inspected before backfilling.

5. If the street or ground is not to final grade at the time of installation of the meter, the owner must raise or lower the meter vault when the final grade is established. Top of pit lid must be a minimum of two (2) inches above dirt level if no sod or other landscape covering is in place at the time of final inspection.

6. Galvanized piping is not allowed.

7. The service line through and on both sides of the meter pit/vault must be of the same material.

8. No branch connections shall be made in the meter pit. Connections must be made more than five (5) feet from the meter pit on the downstream side.

9. Valves four (4) inch diameter and larger shall be supported by adjustable steel supports, and one and one half (1½) inch diameter and larger meters shall be supported by concrete blocks with steel shims if needed.

10. Manhole rings and covers shall be in conformance with the wastewater section of these Standards, except "WATER" shall be cast in the cover.

11. See APPROVED MATERIALS LIST for meter pits and covers.

12. Settings of meters other than shown and detailed herein shall be considered as non-standard and shall require prior approval of proposed piping layout, meter setting and structural design of vault for each separate installation.

13. Backflow prevention devices will be required in accordance with the Municipal Code.

14. Customer/users and contractors shall be responsible for obtaining all locations for underground utilities and services prior to excavation.

15. The following apply to two (2) feet in diameter water meter pit installation.

    a. The pit shall rest upon brick supports or concrete block.

    b. The installed pit shall have its top locking lid at the same elevations as the grade of the adjacent landscaping. Care shall be taken that drainage of surface waters be directed away from the pit lid and do not puddle over the pit.

    c. Both the inner frost lid and the top locking lid shall be installed on the pit. The locking mechanism shall be fully functional.

    d. When installed, the water meter shall not be touching or resting against the pit barrel or pit cone assembly. The water meter shall lie horizontal and be essentially level.

    e. Water meter pits shall not contain any plumbing fixture, fitting, valve, or pipe not directly a part of the pit assembly, the water meter set, or the water meter itself. Lawn irrigation tees, valves, and winterizing fittings shall not be allowed inside a water meter pit.

    f. The meter must be within eighteen (18) to twenty (20) inches below the top lid.

16. The following apply to four (4) feet and larger water meter vault installation.

    a. Water meter vaults proposed for water meters larger than two (2) inches, manifold water meter sets, fire line rated water meters, or specifically constructed

water meter sets shall have site and design plans approved by the engineer prior to the start of construction.

b. Vaults are to be of water tight construction. Vaults larger than sixty (60) inches shall have a sump pit.

c. To the extent possible, the top of the water meter register head shall be visible from the opened access lid. The water meter shall be equipped with off-site reading equipment as specified by the City Water/Wastewater Operations and Maintenance Division.

d. All vaults shall have a one inch polypipe installed from the vault to the building with 18-4 bellwire inside. The conduit shall be water tight buried to a depth of at least twenty four (24) inches.

e. Where the conduit enters the building, there must be a Plain Old Telephone System (POTS) or analog line within twenty (20) feet of the conduit's end for use by the off-site reading equipment.

f. Bypasses for one and one-half (1½) inches and larger meters are required for commercial, industrial and multi-family users (see details). Bypass sizes are to be determined by owner.

g. Water meter setters for one and one half (1½) inches and two (2) inches will be comparable to the Ford 70 Series Coppersetters (horizontal inlet and outlet) key valve inlet and outlet. Setters will be a minimum of twelve (12) inches in height and will have an inlet valve, outlet valve and a bypass with valve. Setters will be plumbed with compression fittings like the Ford 70 Series Coppersetters (CTS in and out). See APPROVED MATERIALS LIST. Setters will be installed perpendicular to the vault floor with one (1) inch diameter support rods or pipe with a minimum length of eighteen (18) inches installed for support. Setters for dedicated irrigation systems do not have to have a bypass.

17. The following apply to inside installations.

a. Bypasses for one and one half (1½) inches and larger meters are required for commercial, industrial and multi-family users. Bypass sizes are to be determined by the City.

b. Inside installations of meter three (3) inches and larger shall have accessible within twenty (20) feet and in the same room as meter a POTS telephone line for use by off site reading equipment.

18. The box for collecting off site readings shall be installed on a wall approximately forty eight (48) inches off the floor and shall be immediately accessible to service workers.

19. The property owner is required to bear the costs of relocating a meter and/or remote when his actions limit existing free and easy access for the meter readers or introduces a safety hazard. This would include remodeling, additions, fences, new landscaping, pets, etc...

20. When installing one and one half (1½) inches and larger water meters/backflow devices inside commercial buildings and inside of a locked room, a lock box, locked with an approved lock with a key to the room, must be provided for access by the City and installed just outside of the locked door. The lock box must be purchased from the City warehouse.

530.05 ACCESS - WATER METERS

1. Free, easy, and ready access for the purposes of testing, certification, repair, maintenance, or replacement shall be provided to water meters at any reasonable hour.

2. All water meters have to be periodically tested and certified. The customer/user shall take whatever measures are necessary for providing this periodic access.

3. There shall be a clear line of access to the water meter. This access line shall be free of any impediment, including safety hazards, to the movement of personnel and necessary tools, equipment, or material.

4. Lines of access and openings governing access to the water meter set shall be large enough to accommodate the passage of the water meter without the water meter having to be dismantled in any way. It is the responsibility of the customer/user to move belongings, material, or property to insure reasonable conditions of access.

5. There shall be no obstruction of any sort which would necessitate the reaching around, through, behind, under, or over in order to perform usual and necessary work. Nor shall there be any obstruction which would impair the clear vision of the water meter. The area around the water meter shall be fully sufficient for a person to place his body squarely before and in close proximity to the water meter, have a clear view of the meter, and have room to operate customary tools without hindrance.

6. Whenever security considerations necessitate that access to a water meter be controlled through the use of a lock, alarm, or other such device, the customer/user shall make known to the Superintendent the procedures to be followed for ready access through such locks, alarms, or other security arrangements.

531.00 BACKFLOW CONTROL

531.01 GENERAL

1. All work and materials must be acceptable to the engineer.

2. All work and materials are subject to inspection by the City of Longmont at all times.

3. Property owners shall ensure all privately owned backflow devices be tested on a schedule determined by the City, by a Certified Cross Connection Control Technician.

4. Modification, alteration or relocation in backflow device equipment must be approved by the City.

5. All work necessary to achieve installation of a backflow prevention device or assembly shall be inspected. Inspections will be required as follows:

a. Any work on a water service line, including all piping valving work, and underground vaults shall be approved by a Water Department Inspector prior to any backfilling.

b. Backflow prevention device sets, device installation, and discharge piping where appropriate, shall be approved by City Water/Wastewater Operations and Maintenance personnel prior to device installation.

c. For commercial and multi-family, no Certificate of Occupancy will be issued without an approved inspection and device test result submitted to the Water/Wastewater Operations and Maintenance Division.

6. Backflow prevention devices shall be required on the domestic line for commercial, industrial, and multi-family units where four (4) or more units are connected by a common meter and tap.

7. The specific make, model, and manufacturer shall be found in the most recent listing published by The Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California's (FCCC&HR) "List of Approved Backflow Prevention Assemblies." In the cases of single family residences, the assemblies shall bear the approval of the American Society of Sanitary Engineers (ASSE).

8. Backflow prevention devices that are to be owned by the City shall be of a make and model as shown on the Approved Materials List.

531.02 BACKFLOW PREVENTION DEVICES REQUIRED

1. An approved backflow prevention device or assembly used for protection by containment is required on any water service line whenever there is an actual or potential situation when backflow due to backpressure and/or backsiphonage can occur.

2. The City Water/Wastewater Operations and Maintenance staff shall make an inventory of water use in any facility or location which is supplied potable water from the City's water distribution system to determine the degree of hazard which might exist.

3. On remodels or retrofit situations, subsequent to the hazard inspection, the City Water/Wastewater Operations and Maintenance staff will notify the customer of the type of backflow prevention device required.

4. Where hazards are largely unknown or hazard inspections cannot be conducted for whatever reason the highest degree of protection may be required.

531.03 OWNERSHIP

1. Backflow prevention devices shall be privately owned and maintained by the property owner.

2. Backflow prevention devices used for protection by containment remain with a premise and are not transferable to another premise, property, area, or street address.

3. Only properly trained and certified cross-connection control personnel are permitted to install, repair, replace, relocate, maintain, test, certify, modify, or otherwise affect the internal workings of a backflow prevention device.

531.04 DESIGN REQUIREMENTS

1. Definitions

AIR GAP: The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, pool, or other device and the flood level rim of said vessel or container. An approved air-gap shall be at least double the diameter of the supply pipe, measured vertically, above the flood level rim of the vessel or container; and, in no case less than one (1) inch.

BACKFLOW: Refer to Ordinance 14.06.010 Definitions.

BACKPRESSURE: Refer to Ordinance 14.06.010 Definitions.

BACK SIPHONAGE: Refer to Ordinance 14.06.010 Definitions.

CONTAINMENT: Refer to Ordinance 14.06.010 Definitions.

CERTIFIED CROSS-CONNECTION CONTROL TECHNICIAN: Refer to Ordinance 14.06.010 Definitions.

APPROVED TESTING LABORATORY: The Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (FCCC&HR) and the American Society of Sanitary Engineers (ASSE).

2. Location requirements

a. Backflow prevention devices or assemblies used for protection by containment shall be located on the building side of City owned water meters.

b. Backflow prevention devices or assemblies used for protection by containment shall be located such that all water entering the premise or property through the water service line shall pass through the device or assembly prior to any use by the customer/user. There shall be no fitting, fixture, or other means capable of diverting water form the service line before the device. The exceptions are as follows:

1. There may be closed loop bypass around the backflow prevention device or assembly, provided the bypass itself has in it a similar type approved backflow prevention device or assembly. The purpose shall only be to insure continuous water delivery while one device or assembly is undergoing testing, maintenance, repair, or replacement.

2. Landscape irrigation systems may be teed before the backflow prevention device used for containment, provided such systems are themselves properly equipped with an approved backflow prevention device or assembly.

3. The City may authorize more than one approved backflow prevention device or assembly when physical conditions in a retro-fit situation pose unusual problems to the installation of a single device or assembly.

3. Underground vaults

a. The user/customer has the sole responsibility to determine the potential loads an underground vault will require and shall provide the structural strength required.

b. Site plans and construction details for proposed installation of underground vaults which will be subjected to the loads of motor vehicles shall be submitted to and receive the approval of the engineer prior to the commencement of construction. Whenever possible, the siting of underground vaults in streets, roadways, driveways, alleys, or parking lots will not be allowed. The location of underground vaults on any premise where there is any routine handling of petroleum products, chemicals, hazardous, or toxic materials shall be such that spillage, flow, or runoff of those materials will be away from the underground vault. Care shall be taken that ground slope, landscaping, and other provisions for runoff will not cause any accumulation of such materials inside, over, or adjacent to the vault.

4. Pressure Increases

a. Most backflow prevention devices and assemblies, by the very nature of their design, do not allow any release of pressure which may build up on the customer/user's side of the piping or plumbing system to escape back to the City's water distribution system. Customer/users must insure that there is adequate protection from increases in water pressure on the downstream or user's side of a backflow prevention device or assembly.

THE CITY DOES NOT ACCEPT NOR TAKE ANY RESPONSIBILITY NOR LIABILITY FOR DAMAGES OF WHATEVER KIND WHICH MAY BE OCCASIONED BY OR RELATED TO AN INCREASE OR DECREASE IN PRESSURE IN THE PIPING OR PLUMBING SYSTEM DUE TO THE INSTALLATION OR OPERATION OF AN APPROVED BACKFLOW PREVENTION DEVICE OR ASSEMBLY.

b. The customer/user shall maintain in good working order pressure relief valves on his hot water tanks, boilers, and hot water heating systems. Further, the customer/user shall install and maintain whatever additional pressure relief valves, water hammer arrests, pressure expansion tanks, or other means deemed prudent and wise.

5. Shutoff valves

a. The customer/user shall cause to be installed and shall maintain in good operating order a curb stop and at least one (1) other valve in the service line before the backflow prevention device or assembly used for protection by containment. Both the curb stop and additional valve shall be capable of fully stopping all water flows into the device or assembly. The isolating valves on the

backflow prevention devices or assemblies are not to be considered in lieu of these valves. The isolating valves are to be used only for testing and certifying the device, not for the control of water flow through any piping or plumbing system.

6. Drainage

   a. Certain types of approved backflow prevention devices and assemblies are specifically designed to dump or vent water to the atmosphere as an expected part of their operation. The customer/user shall be responsible for providing whatever drainage work may be needed to control and carry away water which may be dumped or vented by such devices or assemblies.

   b. The City accepts no responsibility nor liability for damages or injury caused or related to the dumping or venting of water, or water mixed with other materials.

   c. Reduced pressure principle devices (RP devices) may dump or vent large quantities of water under pressure. These devices or assemblies are equipped with an air gap funnel to catch the dumped or vented water. The customer/user shall provide whatever piping is necessary from the outlet side of the air gap funnel to effectively and safely carry away and dispose of any dumped or vented water or water mixed with other substances.

7. Stop and Waste Valves

   a. Stop and waste valves on the upstream side of a backflow control device will be allowed only if the valves can vent to daylight. No upstream stop and waste valve may be buried nor be situated such that it is, or potential can be, submerged by the water it vents or dumps, any other water, or any other liquids.

531.05 MATERIALS

1. Materials shall be in accordance with the APPROVED MATERIALS LIST.

2. No solder containing lead shall be used. All soldering fluxes, plumbing pastes, pipe dopes, sealants, coatings, gaskets, and similar materials which may come into contact with potable water must be non-toxic and approved for general plumbing use.

531.06 ACCESS - BACKFLOW PREVENTION

1. Free, easy, and ready access for the purposes of testing, certification, repair, maintenance, or replacement shall be provided to backflow prevention devices or assemblies used for protection by containment at any reasonable hour.

2. All backflow prevention devices have to be periodically tested and certified, most of them annually. The customer/user shall take whatever measures are necessary for providing this periodic access to the device or assembly for the purposes of testing and certification.

3. There shall be a clear line of access to the backflow prevention device or assembly. This access line shall be free of any impediment, including safety hazards, to the movement of personnel and necessary tools, equipment, or material.

4. Lines of access and openings governing access to the device set shall be large enough to accommodate the passage of the backflow prevention device or assembly without the device or assembly having to be dismantled in any way. It is the responsibility of the customer/ user to move belongings, material, or property to insure reasonable conditions of access.

5. There shall be no obstruction of any sort which would necessitate the reaching around, through, behind, under, or over in order to perform usual and necessary work. Nor shall there be any obstruction which would impair the clear vision of the device set. The area around the device set shall be fully sufficient for a person to place his body squarely before and in close proximity to the device set, have a clear view of the set, and have room to operate customary tools without hindrance.

6. Whenever security considerations necessitate that access to a backflow prevention device or assembly be controlled through the use of a lock, alarm, or other such device, the customer/user shall make known to the superintendent the procedures to be followed for ready access through such locks, alarms, or other security arrangements.

531.07 SPACE AND LOCATION REQUIREMENTS

1. The following requirements shall apply to backflow prevention device or assembly sets in all newly constructed structures or facilities and, where reasonable, in all retro-fit situations:

    a. A minimum vertical distance of twelve (12) inches shall exist between the ground or floor and the lowest point on the device or assembly, including the air gap funnel on reduced pressure principle (RP) devices.

    b. The lowest point on the device or assembly shall not exceed thirty (30) inches above the floor, ground, or a firm, permanent footing surface.

    c. The closest side of the device or assembly sized two (2) inch and smaller shall not be less than two (2) inches from any wall or obstruction and shall be at least four (4) inches from any surface which is subjected to freezing temperatures on its other side. Larger devices or assemblies which require companion flanges for installation shall have a minimum clearance of twelve (12) inches from the closest wall or obstruction.

    d. At least one side of the device or assembly shall be open to ready and easy access.

    e. The piping side of all unions and companion flanges shall allow sufficient room to introduce bolts, nuts, and use usual tools. In no case shall the piping side of a union or companion flange be closer than four (4) inches to a wall, floor, or other obstruction.

    f. There shall be at least twelve (12) inches of clearance between the test cocks and any adjacent wall, fixture, or ceiling.

    g. No device or assembly set shall be installed in or above a ceiling.

h. No device or assembly shall be located such that any vented or dumped water cannot be safely carried away without damaging property.

i. No device or assembly, including any air gap funnel, shall be located such that it is likely to be submerged in the water it vents or dumps, in ground water, or in other water or liquids which may be present.

j. No device or assembly shall be located either above or below a hazardous location, such as a chemical mixing tank, electrical apparatus, electronic equipment, or a storage site for chemicals or other hazardous materials.

k. All devices or assemblies shall be located such that they are protected against vandalism, mischief, and deterioration due to atmospheric conditions. Customers/users who are retro-fitting the backflow prevention device set may request a variance to the above requirements when they deem them to be unduly burdensome. Such request should be directed to the City Water/Wastewater Operations and Maintenance Division which will make an investigation and render a decision.

531.08 INSTALLATION REQUIREMENTS FOR AIR GAPS

1. Properly constructed and located air gaps are approved for protection by containment for all degrees of hazard. Air gaps used for protection by containment are most commonly used for applications on tank loading stations, pools used for swimming, wading, or therapy, chemical processing tanks, and sumps or tanks which provide water for pumping. Air gaps shall conform to the following:

   a. They shall be located downstream of the City water meter.

   b. They shall be constructed such that no hose, piping arrangement, or other fixture may be attached to defeat the air gap separation. This includes any solid funnel arrangement installed to prevent splashing.

   c. They shall be constructed such that the potable water supply line is at a vertical distance of not less than two inside pipe diameters (of the potable supply line) above the flood level of the receiving vessel, and in no case shall the air gap between the potable line and the receiving vessel be less than one (1) inch.

   d. When the potable supply line discharge is within two (2) inside pipe diameters of any wall or protrusion, the required vertical air gap between the potable supply discharge and receiving vessel shall be extended to a minimum of three (3) inside pipe diameters of the potable supply line, or two (2) inches, whichever is greater.

   e. There shall be adequate drainage arrangements to handle full volume overflows of the receiving vessel.

   f. The water supply or service line shall be protected from freezing.

g. Air gaps used for protection by containment shall be considered approved backflow prevention devices and shall be inspected at least annually.

531.09 INSTALLATION REQUIREMENTS - REDUCE PRESSURE PRINCIPLE (RP) OR REDUCED PRESSURE DETECTOR CHECK (RPDC) DEVICES OR ASSEMBLIES

1. A reduced pressure principle (RP/RPDC) device or assembly shall be installed for protection by containment whenever the degree of hazard is high and there is a potential risk of contamination to the City's water distribution system. RP/RPDC devices or assemblies shall be installed at any premises or location where toxic or hazardous materials are routinely handled or present. RP/RPDC devices or assemblies shall meet the following:

   a. When installed horizontally, they shall be in an upright position, essentially plumb, and with the relief valve pointed down. RP/RPDC devices or assemblies larger than two (2) inches in size must be installed horizontally.

   b. RP devices two (2) inches and smaller may be installed in a vertical position provided the water flow will be in an upward direction through the device or assembly. Such installations require the addition of a vent elbow such that the outlet of the air gap funnel will be pointing down.

   c. RP devices two (2) inches and smaller shall be equipped with full port/quarter turn ball isolating valves.

   d. RP/RPDC devices sized two and one-half (2½) inch and larger are normally provided with resilient seat butterfly type isolating valves. OS & Y type gate valves can be substituted for the butterfly valves when the device or assembly is to be used in a fire suppression water line.

   e. RP/RPDC devices shall be protected against frost and freeze damage.

   f. RP/RPDC devices shall not be installed in underground vaults unless such vaults have a drain to daylight which is capable of carrying the maximum possible discharge from the device. The drain shall be provided with a twenty-four (24) mesh non-corrodible screen at the discharge to prevent any material from entering the waste line and creating a plug. A sump pump shall not be utilized in lieu of a drain to daylight.

   g. Installation of an RP/RPDC device above ground in a small enclosure is acceptable provided that the enclosure has non-corrodible screened opening(s) which will provide the necessary drainage without the air gap funnel being submerged in the vented or dumped water.

   h. RP/RPDC devices installed inside structures may have a drainage line through an exterior wall to daylight provided any dumped or vented water exiting the drain line will not pose a hazard to the public. Such drain line shall be equipped with a non-corrodible screen at the discharge opening.

i. RP/RPDC devices may have drain lines connected to a sewer system, provided a building permit is obtained and a City plumbing inspector approves the sewer system connection.

j. The City may elect to remove the operators or handles from the isolating valves or to chain them together to prevent unauthorized operation of the isolating valves.

531.10 INSTALLATION REQUIREMENTS FOR DOUBLE CHECK VALVE (DCV) DEVICES OR ASSEMBLIES

1. A double check valve (DCV) device or assembly shall be installed if the degree of hazard is low, with little or no risk of bodily harm should the device or assembly fail. Customers/users or contractors have the option of substituting a reduced pressure principle device or air gap for a DCV. DCV devices shall conform to the following:

   a. When installed horizontally, DCV devices or assemblies shall be in an upright position and essentially plumb.

   b. DCV devices may be installed vertically, provided, the water flow is in an upward direction through the device.

   c. DCV devices two (2) inches and smaller shall be equipped with full port/quarter turn ball isolating valves.

   d. DCV devices sized two and one-half (2½) inches and larger are normally provided with resilient seat butterfly type isolating valves. OS & Y type gate valves can be substituted for the butterfly valves when the device or assembly is to be used in a fire suppression water line.

   e. DCV devices shall be protected against frost and freeze damage.

   f. DCV devices may be installed in underground vaults, either alone or in conjunction with water meters. The following provisions shall be met:

      1. Vaults must be a minimum of four (4) feet in diameter for DCV devices sized two (2) inches and smaller. Vaults for larger DCV devices shall conform to the minimum space requirements on the appropriate Engineer's approved detail drawing.

      2. Standard water meter pits cannot be used for DCV installations.

      3. Vaults containing both water meters and DCV devices must provide sufficient working room to perform usual maintenance, repair, or replacement of both the water meter and the DCV device.

      4. Vaults must satisfy all access and siting requirements.

      5. Vaults must provide that the DCV not be submerged due to high water tables, infiltration of ground waters, or infiltration by surface runoff. Properly screened drains to daylight, sump pumps, or water proof

construction may be required to ensure the DCV is not subjected to submersion.

g. Installation of a DCV device above ground in a small enclosure is acceptable, provided that the enclosure provides the necessary frost protection and conditions of access.

h. The City may elect to remove the operators or handles from the isolating valves or to chain them together to prevent unauthorized operation of the isolating valve

531.11 INSTALLATION REQUIREMENTS FOR PRESSURE VACUUM BREAKER (PVB) DEVICES OR ASSEMBLIES

1. Pressure vacuum breaker (PVB) devices or assemblies shall only be used for protection by containment for water service lines supplying landscaping irrigation systems. PVB devices cannot be used in lieu of reduced pressure principle or double check valve devices or assemblies. PVB devices shall conform to the following:

a. PVB devices shall be installed in an upright position and essentially plumb.

b. PVB devices shall be installed with the critical level mark, or bottom of the device if it has no critical level mark, a minimum of twelve (12) inches above the highest point of downstream usage.

c. PVB devices shall not be installed where they are, or where they will be subjected to backpressure. However, they can be subjected to continuous line pressure, provided it is not greater than the water pressure on the supply side of the device.

d. PVB devices used for protection by containment of a landscaping irrigation system shall be equipped with full port/quarter turn isolating ball valves.

e. PVB devices can have valves, including "stop and waste" type, on their downstream side.

f. PVB devices shall be protected against frost and freeze damage. Air ports for winterizing the device by means of blowing out water are acceptable upstream of the PVB device provided the air port is not, nor is likely to be, submerged.

g. Installation of a PVB device above ground in a small enclosure is acceptable provided that the enclosure provides the necessary conditions of access and adequate drainage.

531.12 INSTALLATION REQUIREMENTS-ATMOSPHERIC VACUUM BREAKER (AVB) DEVICES OR ASSEMBLIES

1. Atmospheric vacuum breaker (AVB) devices or assemblies shall only be used for protection by containment for water service lines supplying landscaping irrigation systems. AVB devices cannot be used in lieu of pressure vacuum breaker, reduced pressure principle, or double check valve devices or assemblies. AVB devices shall conform to the following:

a. AVB devices shall be installed in an upright position and essentially plumb.

b. AVB devices shall be installed with the critical level mark, or the bottom of the device if it has no critical level mark, a minimum of six (6) inches above the highest point of downstream usage.

c. AVB devices shall not be installed where they are, or where they will be, subjected to backpressure from any cause. There cannot be any valves of any type downstream of the AVB device, nor can AVB devices be used in situations where the floating check disk or poppit will be in a closed position for more than twelve (12) continuous hours.

d. AVB devices used for protection by containment of a landscaping irrigation system shall be installed in each zone of the irrigation system, downstream of all solenoid or zone control valves, such than when the water supply to each zone is shut-off, the float check disk, or poppit, will immediately drop.

e. AVB devices shall be protected against frost and freeze damage. Air ports for winterizing the device by means of blowing out water are acceptable upstream of the AVB device provided the air port is not, nor is likely to be, submerged.

531.13 INSTALLATION REQUIREMENTS FOR IN-LINE DUAL CHECK (IDC) DEVICES OR ASSEMBLIES

1. In-line dual check (IDC) devices or assemblies are approved for residential and commercial locations where potable water use is limited to drinking, family cooking, bathing, and washing. The IDC device or assembly can only be installed when the lowest degree of backflow hazard exists. The IDC device or assembly shall not be subjected to any backpressure condition. IDC devices or assemblies shall conform to the following:

   a. IDC devices or assemblies shall be considered for protection by containment only when they are configured with a water meter setter or resetter. By themselves, dual in-line checks are not approved for containment unless the application has been specifically authorized by the Superintendent.

   b. IDC devices or assemblies offer the least amount of protection against backflow. The City reserves the right to require all IDC devices or assemblies to be upgraded to devices or assemblies offering higher degrees of protection at any time it is considered wise or prudent. Customers/users are strongly urged to treat IDC devices or assemblies as a temporary compliance of having a backflow prevention device installed.

   c. IDC devices or assemblies shall not be considered in lieu of any other required backflow prevention device or assembly.

   d. The City reserves the right to require that previously installed IDC devices or assemblies not so equipped to be retro-fitted with venting or pressure relief ports, testing ports, and/or other means which would increase their effectiveness as a backflow preventor.

e. All IDC devices shall meet the appropriate standard of the ASSE.

531.14 BACKFLOW PREVENTION DEVICE SETS

1. The backflow prevention device set and connected piping or plumbing shall be firmly supported so that there is no centerline misalignment in the device set when the device or assembly is not in place. The backflow prevention device or assembly is not to be used to support nor bear the weight of other components in plumbing or piping system.

2. No part or component of the device set is to be used for any purpose other than holding and securing the backflow prevention device or assembly in place.

3. In no case shall the backflow prevention device set allow the device or assembly to rest directly upon a lower weight bearing surface. Removable blocking or approved jacks shall be used between the device or assembly and the bearing surface to provide needed support to the device or its set. Such blocking shall be of cement block, brick, or similar non-biodegradable materials.

4. Only bottom support as provided by movable blocking or approved jacks shall be in contact with the backflow prevention device or assembly. No strapping, pipe hangers, or similar supporting devices shall be attached or connected to the device or assembly itself.

5. All backflow prevention device sets shall be thoroughly flushed to remove all Construction debris and foreign matter from them and the service line or plumbing system piping prior to device installation.

531.15 TESTING AND CERTIFICATION OF BACKFLOW CONTROL DEVICES OR ASSEMBLIES

1. Testing of Backflow Control Devices is the responsibility of the property owner. Devices must be tested by a Certified Cross-Connection Control Technician prior to the issuance of a Certificate of Occupancy. The successful test results must be provided to the City before a Certificate of Occupancy will be issued.

2. Each year after the first test, the property owner will be notified in writing by the City of the need to recertify the Backflow Control Devices at each property. The property owner will have sixty (60) days to have all Backflow Control Devices on the referenced property tested by a Certified Cross-Connection Control Technician. If the testing is not completed in the sixty (60) days, the City may terminate water service to the property.

3. The inspections, tests, and replacement of Backflow Control Devices shall be the expense of the property owner.

4. Testable backflow assemblies for lawn sprinkler system of single family residences where there is no injection or mixing of fertilizer or any other foreign substances shall be tested on a schedule determined by the City.

5. Repair Parts

a. Only replacement parts produced by or specifically recommended by the Backflow Control Device manufacturer shall be used in the repair of the Backflow Control Devices.

b. The reuse of parts from check valves by reversing the part will not be allowed.

6. All testing gauges used by Certified Cross-Connection Control Technicians shall be check for accuracy at least yearly, and proof of testing shall be provided to the City upon request.

531.16 RECORDS AND REPORTS

1. All testers will use test forms approved by the City. All inspections, tests, and maintenance will be recorded on said forms.

2. Within ten (10) days of the completion of inspections, tests, or maintenance, a completed form must be submitted to the City and to the property owner.

3. A Certified Cross-Connection Control Technician shall attach a tag to the

531.17 CERTIFIED CROSS-CONNECTION CONTROL TECHNICIAN CRITERIA

1. Certified Cross-Connection Control Technicians shall provide the following information to the City. The information will be included in a backflow prevention tester's list of certified testers in the area. The information can be mailed or faxed to:

City of Longmont Water/Wastewater Department
1100 S Sherman St - Building 4
Longmont, CO 80501
FAX (303) 651-8812

a. Copy of current Cross Connection Control and Backflow Tester Certificate.

b. Test kit calibration certificate from an authorized manufacturer's calibration/repair laboratory or an ISO 9002 certified calibration/repair laboratory for instrument repairs or measurements. Document calibration must be National Institute of Standards and Technology (NIST) traceable and meet the current ASME/ANSI B40.04 standards.

c. The certified calibration report shall include the following:

1. Indicate minimally the descending reading at 10, 7, 5, 2, 1, and 0 PSID with a minimum required tolerance range of +/- 0.1 PSID.

2. Data as found (data prior to any adjustment of the test kit).

3. After calibration data or returned information documented (data after adjustment, if required)

d. Must be licensed by the City

531.18 BACKFLOW PREVENTION DEVICES ON IRRIGATION SYSTEMS

1. Per the requirements of the International Plumbing Code, all landscaping irrigation systems which use potable water shall be equipped with a proper backflow prevention device. The City Building Inspection Department will inspect all residential irrigation systems. Inspections of multi-family, commercial, and commercial irrigation systems will be inspected by the City Water/Wastewater Department. Testing of all devices will be by a Certified Cross-Connection Control Technician or properly trained personnel.

2. Water service lines which are dedicated solely to supplying irrigation water shall conform to all appropriate procedures and conditions based upon a hazard inspection and a determination of the necessary type of device and its installation as required for protection by containment.

3. Landscaping irrigation systems which are supplied with potable water by means of a tee in a water service line which also supplies water for other uses shall conform to the following:

    a. Air gap separations and reduced pressure principle (RP) devices or assemblies shall be acceptable in all situations.

    b. All irrigation systems which have pumps, or other means of producing backpressure, chemical injection of any kind or type, or are capable of using water from another source, shall be equipped with air gap separation or reduced pressure principle (RP) devices or assemblies.

    c. All irrigation systems which do not produce any backpressure and utilize only potable water from the City's distribution system may be equipped with a reduced pressure principle valve (RP), pressure vacuum breaker (PVB), or atmospheric vacuum breaker (AVB) devices or assemblies, provided, each type of device is installed in conformance with its appropriate installation requirements.

    d. Each and every pipe, water line, or other means used to provide potable water to an irrigation system shall have an approved backflow prevention device or assembly installed in it.

531.19 BACKFLOW PREVENTION DEVICES ON FIRE SUPPRESSION LINES

1. Unless otherwise required by ordinance, all newly constructed or modified fire suppression systems using potable water from the City's water distribution system shall be required to have an approved backflow prevention device or assembly installed. Modified shall mean any expansion, piping alteration or realignment, rebuilding, or piping replacement in an existing system. Such fire suppression systems shall conform to the following:

    a. Reduced pressure principle (RP) devices or assembles shall be installed whenever any chemical additive, pump, injection, or other means of producing backpressure, except for a “siamese” type connection, is present. RP devices or assemblies shall also be installed in any situation where a second source of water is utilized, or may be utilized. All other fire suppression lines shall be protected with a double check backflow prevention device.

b. All backflow prevention devices or assemblies shall conform to their appropriate installation requirements.

c. Where a single water service line is used for supplying domestic water and fire suppression water, both the portion of the piping system supplying the domestic water and the portion supplying fire suppression water shall have installed the appropriate backflow prevention devices or assemblies.

532.00 TEMPORARY WATER USE-PERMIT REQUIRED

1. Temporary use of potable water from the City's water distribution system by means of a temporary water tap, a temporary service line, a fire hydrant, or other devices shall require a permit from the City, subject to availability. Said permit shall include provisions for payment of water used, installation of a meter, installation of an appropriate backflow prevention device, deposit and daily rental charge. For temporary hydrant water, only City designated ("blue top") fire hydrants may be used unless otherwise approved on the permit. The City will require a minimum of two working days advance notice prior to the issuance of any temporary water use permit. At its sole discretion, the City may suspend temporary water use permits with one (1) week’s notice.