



CITY OF ANACORTES ENGINEERING DEPARTMENT

CHAPTER 6

WATER



WATER ENGINEERING STANDARDS

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CHAPTER W1 – WATER PLANNING/DESIGN STANDARDS**W1-01 PLANNING CRITERIA****W1-01.1 Serve to Extreme of Property**

Ensure adjacent properties can be provided water service (Extend to extreme of property with adequate capacity and pressure)

W1-01.2 System Parameters

- A. Water velocity in mains – velocities shall not exceed 10 feet per second during the highest demand and fire flow.
- B. Distribution System Pressures (Measured at Water Meter):
 - Desirable - Minimum 50 PSI
 - Maximum 80 PSI
 - Allowable - Minimum 30 PSI
 - Maximum 125 PSIMinimum 30 PSI is allowed for existing systems.
Individual pressure reducing valves are required on all services when water pressure exceeds 80 PSI.
- C. Reservoir Replenishment – Facilities (i.e. transmission mains, pump stations) shall be sized to enable storage facilities to be refilled with 3-days after emergency or major fire. This is established by the City of Anacortes.

W1-01.3 Fire flow Requirements

Fire flow requirements shall be as determined by the prescriptive codes as adopted by the City of Anacortes.

- A. The Developer will determine the available fire flow by hiring a 3rd party company. The testing Agency will be certified.
- B. Minimum system pressure during fire flow analysis is 20 PSI at the fire location and 20 PSI throughout the rest of the system.
- C. Minimum fire flows shall be guided by fire resistance construction, total square footage, and any other built-in fire protection systems.

W1-02 GENERAL DESIGN STANDARDS

- A. Each fitting/valve shall have attachment type listed (e.g. FL, MJ, FLXMJ, etc).
- B. List pipe length (from center-of-fitting to center-of-fitting), size, and material alongside of each pipe, e.g. 150 LF – 8” D.I. Pipe material can be listed in a general note in lieu of listing along each pipe.
- C. Indicate type of pavement restoration required by the City of Anacortes, if working in the streets.
- D. Dimension existing and new main locations from the Right-of-Way line and/or property line, or label stations and offsets.

- E. Blocking – Reference Standard Details
- All bends, horizontal and vertical shall be restrained following the Water Standard drawings WA-07 and WA-08. All tees, reducers, valves and end caps shall be restrained in accordance with the Water Standard drawings WA-07 and WA-08. Restrained pipe joints may be used with prior approval. Such joints include Mega-lug, Field Lock Gasket or similar. If used, the restrained joint pipe length shall be a 54-foot minimum for a 6" to 8" pipe. Pipes that are larger in diameter will require additional restrained length, which will be designed by a qualified Engineer based in soil conditions.
 - Check if special blocking or joint restraint designs are necessary (e.g. poor soil, conflicting utility, etc.).
 - Show all blocking on any detail drawing that shows vertical bends.
 - See Appendix W-_- Approved Material List for joint restraint methods, other than concrete blocking.
- F. Check if system may require additional looping (i.e. eliminate dead end lines).
- G. To assure compatibility with existing system, check with the City of Anacortes Engineering Water Works Department to determine hydraulic gradients and pressure zones.
- H. Drawings shall reference distance to nearest existing valve and/or hydrant from new point of connection to existing main.
- I. Check with the local jurisdiction to verify permitting requirements.
- J. Provide a temporary 2" corp stop for filling, flushing, testing and disinfection of new water mains. Place corp stop at the high end of the line, where possible.
- K. If no sanitary sewer is available to discharge to for flushing, identify where and how the dechlorination process will take place.
- L. Cap end of existing water lines to be abandoned as follows:
- Asbestos cement lines: use end cap coupling
 - Cast or ductile iron lines: use MJ cap or plug
 - Brick and Jet Set
 - See also WSDOT Standard Specifications for proper abandonment
- M. Minimum water main size;
- 8 inch minimum when serving domestic and fire hydrants
 - 6 inch minimum may be used in localized conditions when fire hydrants are served by looped lines, based on the required fire flow. Subject to the City of Anacortes Engineering Water Works Department approval.
 - 4 inch minimum shall be used to serve water to end of cul-de-sacs where no future extension is required for potable water supply only.
- N. Pressure reducing station plans should show location of pressure relief discharge pipe and discharge point of floor drain (drain to daylight). Pressure relief discharge pipe shall be shown at a location that will not be subject to damage or erosion during discharge of water. All pressure reducing stations shall have two PRV's. The size will vary with the size of the line in which they are installed. The City of Anacortes Waterworks Department

shall determine the required sizes and the size and location of the vault containing the same.

- O. All water vaults (water service and pressure reducing stations) shall include designs for floor drain piping draining to daylight. Discharge point of vault floor drains shall be shown on the plan. Where vault floor drain cannot drain to daylight, consult with the City during project design review to determine the best alternative to a daylight drain. If a daylight drain cannot be achieved, a sump pump pit will be designed into the vault.

W1-03 VALVING

- A. 600' maximum distance between valves on distribution mains.
- B. Provide a valve at each end of an easement.
- C. At water main intersections, valves shall be placed on 3 out of 4 legs at each cross, and 2 out of 3 legs at each tee (unless tapping an existing water main. Or as deemed necessary by the City of Anacortes.
- D. Additional valves may be required for area isolation.
- E. Air/vacuum relief valves shall be installed at local high points in the water main and at the direction of the City of Anacortes Water Works Department.
- F. The notches in the valve casings shall be turned to the direction of flow.

W1-04 FIRE HYDRANTS

The following information is provided as a guideline to be used during design. The final number of hydrants and their locations shall be approved by the City of Anacortes Fire Marshall and Fire Chief.

- A. Guard posts are to be used only in parking lots when no curbs are present or in exposed areas in parking lots.
- B. Fireline/hydrants run over 50' in length must be 8" (terminate with tee, plug and hydrant assembly).
- C. Fire Hydrant locations: Shall be guided by the adopted SFCCOA.
- D. 3' minimum clearance shall be provided around all hydrants for operation.
- E. Piping between fire sprinkler vaults and protected building shall not be shown on water design.
- F. All private fire hydrants and sprinkler systems shall have a Detector Double Check that is installed in a vault near the property line, or in the building.
- G. Set back requirements: 2-feet from the back of curb and or sidewalk or 3-feet from any driveway approach.

W1-05 PIPE CLASS / PROTECTION / COVER

- A. Ductile iron water pipe shall be new, Class 50, cement mortar lined, conforming to ANSI Standard A21.50 (AWWA C-150). Check with the City of Anacortes Water Works Department for pipe sizes of 18-inches or larger.
- B. Ductile iron pipe shall be encased in a steel or ductile iron casing when crossing under improvements where ability to remove and replace pipe without disturbance to the improvements is needed. Casings are required when:
 - Crossings under rockeries are over 5' high.
 - Crossings under retaining wall footings over 5' wide.

- Crossings under reinforced earth retaining walls (both wall and reinforced material).

Casings shall extend a minimum of 5' past each edge of the improvement, or a distance equal to the depth of pipe whichever is greater. The carrier pipe shall be supported by casing spacers.

Minimum clearance between bottom of rockery and top of pipe or casing shall be 30-inches.

C. Water main depth of cover:

- 30-inches minimum from final grade before paving. This cover includes the top of the Crushed Surfacing Base Course. (See exception in W3-05.D below).
- 40-inches maximum from final grade before paving. This cover includes the top of the Crushed Surfacing Base Course.

D. Building setback requirements: This is to be used in unusual conditions when it is impossible to locate the water mains in the Public Right-of-Way.

- 10' minimum from covered parking to water main.
- 10' minimum from building (and retaining walls) to water main.
- 20' minimum easement shall be provided between buildings. The legal description for said easement shall be "10-foot either side of the pipe as constructed."

E. All ductile iron pipe and adjacent fittings shall be encased in 8-mil polyethylene per AWWA C105/A21.5

W1-06 CLEARANCE / OTHER UTILITIES

- A. All clearances listed below are from edge-to-edge of each pipe.
- B. Water services and sewer stubs shall have at least 5' horizontal separation.
- C. Check for crossing or parallel utilities. Maintain minimum vertical and horizontal clearances. Avoid crossing at highly acute angles (smallest angle measure between utilities should be between 45 and 90 degrees).
- D. At points where thrust blocking is required, minimum clearance between the concrete blocking and other buried utilities or structures shall be 5'.

E. Horizontal clearances from water main:

Cable TV	5'
Gas	5'
Power	5'
Storm Sewer	5'
Sanitary Sewer	10'
Telephone, Fiber Optics	5'

F. Vertical clearances from water main:

Cable TV	1'
Gas	1'

Power	1'
Storm Sewer	1'
Sanitary Sewer	2'
Telephone, Fiber Optics	1'

- G. Where the water main crosses above or below the sanitary sewer one full length of water pipe shall be used with the pipe centered for maximum joint separation. Washington Department of Ecology criteria will also apply.
- H. Send letter and preliminary plan to existing utilities to inform them of new construction. Request as-built information and incorporate into plans. At minimum, the following utilities should be contacted;
 - Cable Television
 - Natural Gas
 - Power
 - Sanitary Sewer
 - Storm Drainage
 - Telephone, Fiber Optics
- I. Draft plans shall be sent to the above listed utilities to allow coordination of projects.

W1-07 SLOPES

- A. Vertical bends shall be used when joint deflection would exceed one-half of pipe manufacturer's recommended maximum deflection.
- B. Pipe joints shall be restrained where slopes are 20% or greater. Joint restraint on slopes shall be megalug, Grip Rings and Field-Lok only.

W1-08 CONNECTION TO EXISTING SYSTEM

- A. When tapping water mains larger than 2-inches, use stainless steel tapping tee.
- B. Connection to existing mains 8" and larger shall be via a wet tap unless otherwise approved by the City of Anacortes.
- C. Size-on-size tapping tees are not allowed on A.C. pipe.
- D. Connection to the existing mains will be reviewed and approved by the City of Anacortes.
- E. Where cut-in connection is made, always install an in-line gate valve. (See W3-03(D) Valving). Locations of the cut-in connections must be located to minimize the number of existing customers that will be affected by the water outage. All fittings and materials shall be pre-assembled to insure that everything is on-site and to reduce the length of time for the scheduled shut down. The exact location shall be potholed in advance to determine, for sure, the pipe material and pipe outside diameter (O.D.). This will ensure that the correct sleeves are on-site before the actual cutting of the pipe.

W1-09 EASEMENTS

- A. Show easements on plans and identify width.
- B. Show easements on all private property. If easement is defined as a constant width on each side of water main, then show a segment of the easement and label as typical (typ.).
- C. All easements with public utilities shall be granted to the City of Anacortes.
- D. All easements shall be a minimum of 20' in width, unless otherwise approved or required by the City of Anacortes. (AMC 16.20.090 - Easements)
- E. Also, see Section W3-05.D. "Building Setback Requirements".

W1-10 SERVICES

- A. Minimum allowable service size shall be a 1" service line x 5/8"x3/4" meter. Check that the minimum pressure can be maintained when service is flowing at anticipated maximum levels. If friction losses will cause pressure at the building to drop below the minimum, increase the service line size as necessary to raise the pressure.
- B. Show location of the water services on the plan and indicate the size. Sizes and use shall be determined Building Department, per the Uniformed Plumbing Code.
- C. Irrigation may require a separate water main connection and service.
- D. Static service pressures at the water meter shall be determined at all lots/buildings to ensure compliance with system pressure standards.
- E. Plans shall identify lots/buildings where builder and owner should install individual pressure reducing valves. These are required on the customer side of service lines (after water meter box) when service pressures exceed 80 PSI.
- F. Service lines shall be at a 90-degree angle from the water main, unless otherwise approved by the City of Anacortes Water Works Department.

W1-11 BACKFLOW PREVENTION

"Per City Code 13.24, and Ordinance 1988 (See also Appendix F: Cross Connection Control Program), irrigation systems, fire sprinklers systems, and other water uses which may or will cause the contamination of the potable water supply by backflow, shall be required to install approved backflow prevention assemblies, and/or otherwise meet the requirements of the WAC 246-290-490, "Cross Connection Control Regulation in Washington State", and the recommendations of the PNWS-AWWA Cross Connection Control Manual, latest edition. Requirements may include premise, facility, or fixture isolation, or a combination of such, depending upon the degree of hazard. All backflow prevention assemblies installed shall be on the Washington state DOH list of approved backflow prevention assemblies, most recent edition at the time of installation, and shall be installed per the Standard Details.

Fire sprinkler system connections to the City's water system shall be owned and maintained by the property owner, beginning immediately downstream of the gate valve where the system connects to the City's water main.

The backflow prevention assembly on fire sprinkler system connections shall be located as close to the serving water main as possible, either on the owner's property or an easement dedicated to the owner's property.

Interior backflow prevention, when permitted, must meet the Uniform Plumbing Code requirements as administered by the Building Department. Such backflow prevention must also meet the requirements of the City of Anacortes Engineering Water Works Department.

Multi-family projects that have eight or more units and that require a double check valve assembly are strongly recommended to provide a bypass with equal backflow prevention to avoid loss of service during maintenance and repair.

Backflow prevention assemblies shall be installed in vaults for access, maintenance and replacement.

CHAPTER W2 – WATER MATERIALS

W2-01 GENERAL

All materials shall be new and undamaged. The same manufacturer of each item shall be used throughout the work.

Where reference is made to other specifications, it shall be the latest revision at the time of construction, except as noted on the plans or herein.

All material not specifically referenced shall comply with applicable sections of ANSI, ASTM, AWWA or the APWA/WSDOT Standard Specifications.

Approved manufacturer's and model numbers of various materials are listed in Appendix W-4 of these Engineering Standards. When specific manufacturers or models are listed, no substitutions will be allowed without prior approval by the City of Anacortes.

W2-02 WATER PIPE

C909 may be used as an alternative pipe for distribution lines with prior approval by the City of Anacortes Engineering Department

Ductile iron water pipe shall be new, Class 50, cement mortar lined, conforming to ANSI Standard A21.51 (AWWA C-151).

Ductile iron pipe shall be push-on joint (Tyton joint only) or mechanical joint (MJ) in accordance with ANSI/AWWA C111/a21.11, unless otherwise specified.

Flanged joints shall conform to ANSI Standard B16.1, class 125 drilling pattern, rated for 250 PSI working pressure.

Standard thickness cement mortar lining shall be in accordance with ANSI Standard A21.4 (AWWA C-104).

The Contractor shall furnish certification from the manufacturer of the pipe and gaskets being supplied that the inspection and all of the specified tests have been made and the results thereof comply with the requirements of this standard.

W2-03 POLYETHYLENE ENCASEMENT

Polyethylene encasement shall be 8-mil tube or sheet and will be furnished with all ductile iron pipe unless otherwise specified. Materials shall comply with ANSI/AWWA C105/A21.5.

W2-04 FITTINGS

All water main fittings shall be ductile iron, short body, cement mortar lined, and for pressure rating of 350 PSI for mechanical joint fittings and 250 PSI for flange joint fittings, unless otherwise noted. Metal thickness and manufacturing process shall conform to applicable portions of ANSI/AWWA C110/A21.10. Mechanical joint, ductile iron, compact fittings 24 inches and less shall be in accordance with ANSI/AWWA C153/A21.53. Flanged fittings, cast or ductile iron, shall conform to ANSI B16.1, class 125 drilling pattern.

Standard cement mortar lining shall be in accordance with ANSI/AWWA C104/A21.4.

Rubber gaskets for push-on-joints (Tyton) or mechanical joints (MJ) shall be in accordance with ANSI/AWWA C111/A21.11.

Gasket material for flanges shall be neoprene, Buna N, chlorinated butyl, or cloth-inserted rubber.

Type of connections shall be specified as push-on joint (Tyton), mechanical joint (MJ), plain end (P.E.), flanged (FL), and threaded.

W2-05 COUPLINGS

Flexible coupling and transition coupling cast components shall be ductile iron. Center rings and end rings shall be ductile iron in accordance with ASTM 536-80, Grade 65-45-12.

Gasket material shall be virgin SBR in accordance with ASTM D2000 3 BA715.

Bolts shall be high strength, low alloy steel track head bolts with national course rolled thread and heavy hex nuts. Steel shall meet ANSI/AWWA C111/A21.11 composition specifications. See section W2-07 below for bolts, nuts and washers.

W2-06 ADAPTERS

All flanged by mechanical joints (FLXMJ) adapters shall be ductile iron.

W2-07 BOLTS IN PIPING

Bolts shall be malleable iron, Cor-ten, or stainless steel.

Bolts and nuts for flanged pipe and fittings shall conform in size and length with ANSI/AWWA C115/A21.15. T-bolts shall be malleable iron or Cor-ten in accordance with ANSI/AWWA C111/A21.11. Stainless steel bolts shall meet the requirements of ASTM A-307, Grade A. Shackle rods, nuts and washers shall be hot-dipped galvanized in accordance with AASHTO M 232 and coated thoroughly with asphaltic material.

Stainless steel nuts, bolts, and washers shall be type 304.

W2-08 FLANGE GASKETS

Gasket Material shall be neoprene, Buna N, chlorinated butyl, or cloth inserted rubber.

W2-09 GATE VALVES

The minimum requirements for all gate valves, 2" to 12", shall, in design, material and workmanship, conform to the Standards of AWWA C509.

Buried gate valves shall be iron body, bronze mounted, epoxy coated, resilient seat, non-rising stem, suitable for installation with the type and class of pipe being installed. Ends to be as specified. Operating stems shall be equipped with standard two (2) inch operating nut, and O-ring stem seals.

W2-10 VALVE CASING

Valve Casing shall be cast iron, two-piece, 8" or 18" slip type top section with flange located within 3" of top, with 24" bottom section (and extension, if required). Valve box lid shall be cast iron, 3 ½" deep and "Seattle" two tab.

Valve Casing paving risers shall be cast iron suitable for H-20 traffic loading.

All castings shall be coated with asphaltic varnish.

W2-11 VALVE OPERATING NUT EXTENSION

Use where valves are installed more than 3' below finished grade. Extensions are to be a minimum of 1' with only one extension per valve. The top of the valve nut extension shall maintain a depth of 2' to 3' below finished grade.

W2-12 BUTTERFLY VALVE

Butterfly valves shall conform to ANSI/AWWA C504, Class 150B. Valves in chambers shall have a manual handwheel operation. Buried valves shall have stem extension with AWWA 2-inch operating nut and suitable valve box.

W2-13 CHECK VALVE

Check valves shall be for 150 PSI working pressure, unless otherwise specified. Valve shall have adjustable tension lever and spring to provide non-slamming action under all conditions unless otherwise specified.

W2-14 AIR AND VACUUM RELEASE VALVE

Combination Air/Vacuum Release Valve shall be of the single housing style that combines the operating features of both an Air/Vacuum and Air Release Valve.

The Air/Vacuum portion shall automatically exhaust large quantities of air during the filling of the pipeline and automatically allows air to re-enter the pipeline when the internal pressure of the pipeline approaches a negative value due to column separations, draining of the pipeline, power outage, pipeline break, etc.

The Air Release portion shall automatically release small pockets of air from the pipeline while the pipeline is in operation and under pressure.

The Combination Air Valve shall have minimum 1" NPT inlet and outlet connection and be able to withstand a working pressure of 300 PSI.

See Detail WA-5, "2-inch Combination Air/Vacuum Breaker Valve", for the valve body and cover.

W2-15 PRESSURE REDUCING STATION

Unless otherwise shown on the construction plans, a standard pressure reducing station (Cl Valve) shall have a 6" pressure reducing valve with flanged ends and a bypass with a 2" pressure reducing valve with threaded ends. Pressure reducing valves shall have opening/closing speed controls, epoxy coated body, and valve position indicator. Pressure reducing valves (excluding pressure relief valve), 3" and smaller, shall be equipped with stainless steel trim (seat, stem, and cover bearing). If the differential pressure will exceed 80 PSI, the larger pressure reducing valve shall also be equipped with stainless steel trim. Pilot controls shall be on the side of the pressure reducing valve facing vault interior. Each pressure reducing valve shall include two 3/8" test cocks located on the opposite side of valve body from the pilot controls (one at inlet and one at outlet end of valve).

Strainers shall be installed on the inlet side of each pressure reducing valve with bronze ball valve sized to correspond with the strainer blow-off outlet size. A 2" pressure relief valve with threaded ends shall be installed on the discharge side of the 2" pressure reducing valve line and vented to atmosphere as shown on the plans.

The pressure reducing valve shall maintain a constant downstream pressure regardless of varying inlet pressure. The valve shall be a hydraulically operated diaphragm-actuated, globe

valve. The pilot control shall be a direct-acting, adjustable, spring loaded, normally open, diaphragm valve, designed to permit flow when controlled pressure is less than the spring setting. The control system shall include a fixed orifice.

The pressure relief valve shall maintain constant upstream pressure by bypassing or relieving excess pressure, and shall maintain close pressure limits without causing surges. The main valve shall be hydraulically operated, diaphragm-actuated, globe valve. The pilot control shall be a direct acting, adjustable, spring loaded, diaphragm valve, designed to permit flow when controlling pressure exceeds spring setting. The pilot control system shall operate such that as excess line pressure is dissipated the main valve shall gradually close to a positive, drip-tight seating.

All diaphragm-actuated valves shall contain a resilient, synthetic rubber disc, having a rectangular cross-section, contained on three one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. The diaphragm assembly containing a valve stem shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. This diaphragm assembly shall be the only moving part and shall form a seal chamber in the upper portion of the valve, separating operation pressure from line pressure. The diaphragm shall consist of nylon fabric bonded with synthetic rubber and shall not be used as a seating surface. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the valve or pilot controls. All necessary repairs shall be possible without removing the valve from the line.

Strainers shall be iron bodied "Y" type equal in size to corresponding pressure reducing valve. Strainer shall feature bolted cover machined to hold screen securely in place and tapped F.I.P.T. for blow-off outlet. Screen shall be constructed from perforated stainless steel. Wire mesh screens will not be allowed. Main-line strainer shall have flanged-ends and bypass strainer shall have threaded ends.

All components of a pressure reducing station, including the bypass and isolation valves will be contained within the vault of appropriate size to allow for installation and maintenance.

For Vault specifications, contact the City of Anacortes Water Works Department.

W2-16 FIRE HYDRANT

Fire Hydrants shall have a minimum valve opening of five and one-quarter (5-1/4") inch "O" ring stem seal, two – two and one half (2-1/2") inch N.S.T. hose nozzle connections, and one-four (1-4") inch P.C.T pumper connection with the City of Anacortes standard threads. The shoe connection shall be six inch mechanical joint with lugs. The operating nut is one and one-quarter (1-1/4") inch pentagonal. Hydrants shall be as shown on the approved materials list, with no exceptions. All hydrants shall be of the "Traffic Model" type with approved break-away features and brass to brass sub-seat.

Fire Hydrants are to be Mueller Model Super Centurion 200, East Jordon or M+H.

Fire Hydrants shall have a Red Head brand or equivalent with 5" Storz Rigid Female Adapter with cap and connecting cable. Storz Adapter shall not be painted.

W2-16.1 Fire Hydrant Color Public

Brand: Valspar Anti-rust
 Integrity Exterior/Oil/Gloss
 Daylight # 776608

		Ounces	Shots	Half Shots
Base: Clear	AXN	4	36	1
Can Size: Gal	KX	2	27	
	S		2	1
	T	4	30	1

Fire Hydrant Color Private

The bonnet color on a private hydrant shall be painted a different color from the Public hydrants.

Top Colors
 NFPA 291

Blue	1500 GPM or more	Very good flows
Green	1000-1499 GPM	Good for residential areas
Orange	500-999 GPM	Marginally adequate
Red	Below 500 GPM	Inadequate

W2-17 HYDRANT GUARD POST

Hydrant guard posts shall be 6" diameter concrete filled schedule 40 steel, 6 feet long. Pipe shall be painted with two (2) coats of Rust-Oleum high gloss fire hydrant yellow paint.

W2-18 METER SETTER

Refer to the WA-04 and WA-05 of the Water Works Standard drawings.

W2-19 CORPORATION STOP

Corporation stops shall be brass, Ford, Mueller or AY McDonald, in accordance with AWWA Standard C800 with iron pipe thread inlet by CTS (Copper Tubing Size) compression fitting for copper and Pex or M.I.P outlet, complete with coupling nut for copper service.

Corporation stops for 1" tap shall be a ball valve type. Corporation stops for 1.5" or larger require a resilient wedge gate valve with valve box set to street grade. See COA Standard Detail ST-02 for structure adjustments and perimeter seal requirements.

W2-20 METER BOX

Meter boxes and covers in Non-Traffic areas shall be constructed of reinforced concrete. Meter box covers shall include a touch couple reader port.

Meter boxes in Traffic areas shall be constructed of reinforced concrete. The traffic covers shall be constructed of cast iron, ductile iron or aluminum. The meter boxes and covers shall be designed for H-20 loading.

- 2-inch meter vaults: Berg Vault #2 or Fogtite #2
- 1-inch Meter Box: Fogtite B10
- 5/8x3/4 Meter Box: Fogtite B 9 1/2

W2-21 LATERAL SERVICE PIPE**W2-21.1 COPPER PIPE**

All copper pipe for underground water service 1" shall be seamless conforming to ASTM B88 (ANSI H33.1) Type "K" annealed tubing.

Copper service pipe 1 ½" or larger shall be Type K soft drawn, 20' lengths.

W2-21.2 REHAU MUNICIPEX A

CTS (Copper Tubing Size) with stainless steel inserts for all services

W2-22 PLASTIC SERVICE PIPE

Plastic service pipe shall be used only to reconnect portions of existing polyethylene service line; otherwise reconnection of service line from water main to water meter shall be copper pipe. All joints with plastic pipe shall be brass insert couplings or adapters with stainless steel clamps.

Working Pressure: Pipe shall have working pressure of 200 PSI at 73.4 F.

Plastic service pipe shall be Driscopipe 5100 ultra line or approved equal.

W2-23 CONCRETE BLOCKING

Blocking, encasement, or slope anchor concrete shall be mixed from materials acceptable to the Engineer and shall have a 30-day compressive strength of not less than 2,500 PSI. The mix shall contain five (5) sacks of cement per cubic yard and shall be of such consistency that the slump is between 1 inch and 5 inches. All concrete shall be mechanically mixed.

W2-24 JOINT RESTRAINT

Joint restraint methods shall be as per the approved materials list. Where shackle restraint is used, all parts shall be stainless steel.

W2-25 REDUCED PRESSURE BACKFLOW ASSEMBLY

All Reduced Pressure Backflow Assemblies shall be listed on the most current copy of "Accepted Cross-Connection Control Assemblies" published by Washington State Department of Health (D.O.H). The assembly shall include a tightly closing resilient seated shut-off valve on each end of the body and each assembly shall be fitted with four properly located resilient seated test cocks.

W2-26 REDUCED PRESSURE BACKFLOW ASSEMBLY WITH DETECTOR

This assembly shall include a line-sized D.O.H approved (listed on the most current copy of "Accepted Cross-Connection Control Assemblies" published by Washington State Department of Health (D.O.H). Reduced Pressure Backflow Assembly with a parallel ¾" meter and ¾" D.O.H. approved Reduced Pressure Backflow Assembly. Each assembly shall include a tightly closing resilient seated shut-off valve on each end of the body and each assembly shall be fitted with four properly located resilient seated test cocks.

W2-27 DOUBLE CHECK VALVE ASSEMBLY

All Double Check Valve Assemblies shall be listed on the most current copy of "Accepted Cross-Connection Control Assemblies" published by Washington State Department of Health (D.O.H). The assembly shall include a tightly closing resilient seated shut-off valve on each of the body and each assembly shall be fitted with four properly located resilient test cocks.

W2-28 DOUBLE CHECK VALVE ASSEMBLY WITH DETECTOR

This assembly shall include a line-sized D.O.H approved (listed on the most current copy of "Accepted Cross-Connection Control Assemblies" published by Washington State Department of Health (D.O.H). Double Check Valve Assembly with a parallel $\frac{3}{4}$ " meter and $\frac{3}{4}$ " D.O.H. approved Double Check Valve Assembly. Each assembly shall include a tight closing resilient seated shut-off valve on each end of the body and each assembly shall be fitted with four properly located resilient seated test cocks.

Specifications:

- Sensus SR11 with a plastic bottom.
- Electronic Register

All other appurtenances shall be as shown in the Standard Detail.

W2-29 BACKFLOW ASSEMBLY RESILIENT SEATED SHUT-OFF VALVES

Each valve shall be marked with model number with designation of resilient seat; such as "RS" or "R", which must be cast, molded, or affixed onto the body or bonnet of the valve. All ferrous bodied valves shall be coated with a minimum of 4 mls. Of epoxy or equivalent polymerized coating. 2" and smaller R.P.B.A.s and D.C.V.A.s shall use ball valves, and all 2 $\frac{1}{2}$ " and larger R.P.B.A.s and D.C.V.A.s shall use resilient seated gate valves for domestic supply and resilient seated O.S. and Y. valves for firelines.

The minimum requirements for all resilient seated gate valves shall, in design, material and workmanship, conform to the standards of AWWA C509.

W2-30 CONSTRUCTION FENCE

Barrier Mesh shall be manufactured from Low Density Polyethylene, stabilized against U.V. degradation, and with a special selection of pigments to ensure optimum visual performance under harsh weather conditions.

Barrier Mesh shall be corrosion-free and resistant to salt water and most chemicals.

Barrier Mesh shall present a visual target area of approximately 0.5 square meter per square meter of mesh.

W2-31 GRAVEL

- A. Foundation gravel shall be as specified in Section 9-03.9(1) "Ballast" of the Standard Specifications.
- B. Select Trench Backfill shall be as specified in Section (9-03.12(3) "Gravel backfill for Pipe Bedding" of the Standard Specifications.
- C. Crushed surfacing shall be as specified in Section 9-03.9(3) "Crushed Surfacing" of the Standard Specifications.
- D. Common Borrow shall be provided by the Contractor from an approved borrow site, and shall consist of a natural low plasticity material, free from large cobbles, excess moisture, lumps of clay, wood pieces and shall be suitable and satisfactory material for the construction embankments, sub grade, ditches or shoulder and other facilities.
- E. Use of recycled concrete for crushed surfacing base course (1 $\frac{1}{4}$ " minus) material is encouraged; provided that it is not used as a final surface finish.

Recycled concrete shall meet the requirements for crushed surfacing base course material set forth in Section 9-03.9(3) "Crushed Surfacing" of the Standard Specifications.

Manufacturers recovering concrete from sources other than concrete roadways, sidewalks, and slabs shall provide certification that the material supplied is free of contaminants.

Use of recycled concrete for crushed surfacing top course material (5/8" minus) is not allowed.

W2-32 STEEL CASING

Steel casing shall be black steel pipe conforming to ASTM A53.

Casing wall thickness shall be 0.250 inch for casings 24 inches or less in diameter and 0.375 inch for casings over 24 inches in diameter.

Carrier pipe for water shall be Ductile Iron, Class 50.

This does not apply to steel casings for Jacking or Boring.

W2-33 CONTROL DENSITY FILL

Pea Gravel 50%

Sand 50%

Cement 1 sack per Cubic Yard

CHAPTER W3 – POLICIES AND PROCEDURES

W3-01 SHUTDOWN POLICY

It is the policy of the City of Anacortes Public Works Department to require a minimum 48-hour notification to the affected property owners of any planned water main shutdown.

Any person or entity requesting a water main shutdown will work directly with the Operations Water Department to ensure proper notification is provided.

Contact the City of Anacortes Operations Water Department at 360.293.1921.

APPENDIX A:
CROSS CONNECTION CONTROL PROGRAM

Description:

Page:

1. CROSS-CONNECTION CONTROL PROGRAM

WAT - 22

Cross-Connection Control Program - City of Anacortes Water System

A. Requirement for Program

The City of Anacortes, (02200C), hereinafter referred to as “the Purveyor”, has the responsibility to protect the public water system from contamination due to cross connections. A cross connection may be defined as *“any actual or potential physical connection between a potable water line and any pipe, vessel, or machine that contains or has a probability of containing a non-potable gas or liquid, such that it is possible for a non-potable gas or liquid to enter the potable water system by backflow.”*

All public water systems are required to develop and implement cross-connection control (CCC) programs. The CCC requirements are contained in Washington Administrative Code (WAC) 246-290-490 of the Group A Drinking Water Regulations. The minimum required elements of a CCC program are:

1. Establishment of legal authority and program policies;
2. Evaluation of premises for cross-connection hazards;
3. Elimination and/or control of cross connections;
4. Provision of qualified personnel;
5. Inspection and testing of backflow preventers;
6. Quality control of testing process;
7. Response to backflow incidents;
8. Public education for consumers;
9. Record keeping for CCC program; and
10. Special requirements for reclaimed water use.

Other CCC program requirements include:

1. Coordination with the Local Administrative Authority (LAA) (local building or plumbing official) regarding CCC activities;
2. Prohibition of the return of used water into the public water system (PWS) distribution system; and
3. Inclusion of a written CCC program in a Water System Plan (WSP) or a Small Water System Management Program (SWSMP).

B. Program Objectives

The objectives of the CCC program are to:

1. Reasonably reduce the risk of contamination of the public water distribution system; and
2. Reasonably reduce the Purveyor's exposure to legal liability arising from the backflow of any contaminant originating from the customer's plumbing system and then supplied to other customers; and
3. Cooperate with the LAA by joint operation of program administrative tasks.

C. Summary of Program Decisions

The following table summarizes the major policy and program decisions adopted for the City of Anacortes water system. The items in the table represent CCC program areas that have more than one acceptable approach or option.

Decision Item	Decision
1. Type of program [General, WAC 246-290-490(2)(e)]	
a. Premises isolation only	
b. Premises isolation and in-premises protection (combination program)	X
2. Extent of coordination with LAA [WAC 246-290-490(2)(d)]	
a. Information exchange	
b. Interaction	
c. Joint program	X
3. Relationship with customer [Element 1]	
a. Signed service agreement or contract	
b. Ordinance/resolution; implied service agreement	X
4. Enforcement of corrective action [Element 1]	
a. Rely upon shut-off of water service	X
b. Rely upon purveyor-installed premises isolation	
5. Assessment and re-assessment of hazard [Element 2]	
a. By purveyor's staff or equivalent	X
b. By cross-connection control specialist (CCS) employed by customer; report reviewed by purveyor's CCS	X
6. Location and ownership of premises isolation assembly [Element 3]	
a. On purveyor's service line	
b. On customer's service line	X
7. CCS option – purveyor's program management [Element 4]	
a. Purveyor's staff member certified	X
b. Inter-agency agreement or use other agency's CCS	
c. Contract with consultant CCS	
8. Testing of assemblies [Element 5]	
a. By purveyor's staff or purveyor-employed backflow assembly tester (BAT)	
b. By customer-employed (contractor) BAT	X
9. Cost recovery [WAC 246-290-100(4)(h) and -105(4)(p)]	
a. Borne by all customers (general water rates)	X
b. Assessed to specific class (commercial meters)	
c. Each customer directly bears cost	

D. Required Elements of Program

The Washington State Department of Health (DOH) requires CCC programs to include certain minimum elements. The elements are listed in WAC 246-290-490(3). This section describes how the water system intends to comply with each of the required program elements. Elements are numbered the same as they appear in the WAC.

Note: Throughout the CCC program, the term *customer* is used. *Customer* as used herein means the property owner and/or occupant of the premises served by the PWS (i.e., whoever interfaces with the PWS regarding water service).

Element 1: *Adoption of a written legal instrument authorizing the establishment and implementation of a CCC program.*

The City of Anacortes water system has adopted a resolution, No. 1988, reproduced as Exhibit A, which authorizes the Purveyor to implement a CCC program. The resolution also authorizes the system to terminate water service to consumers who do not comply with the resolution. However, the primary method for protection of the distribution system will be the installation of a backflow preventer by the customer, at the customer's expense.

For customers supplied prior to the adoption of the attached resolution, an implied service contract allows the Purveyor to protect the distribution system from contamination through a system-installed backflow preventer on a customer's service.

Element 2: *Development and implementation of procedures and schedules for evaluating new and existing service connections to assess the degree of hazard.*

Initial Cross-Connection Hazard Surveys

The procedures for evaluating the backflow prevention requirements for new and existing customers are as follows:

1. For all ***new non-residential services***, the Purveyor will require that the customer submit with the application for water service an evaluation (performed at customer's expense) by a DOH-certified cross-connection control specialist (CCS) of the hazard posed by the proposed plumbing system, with recommendations for the installation at the meter of either a double-check valve assembly (DCVA), a reduced-pressure principle backflow assembly (RPBA) or commensurate in-premises backflow preventer. The Purveyor may accept the recommendations or submit the recommendations to a CCS employed by the PWS for peer review and concurrence, before acceptance.

As an alternative to the above requirement for a survey by a DOH-certified CCS, the Purveyor, at his/her discretion, may conduct the evaluation and specify the backflow preventer required to be installed as a condition of service.

As an alternative to the above requirement for a survey by a CCS, the customer may agree to install an approved air gap (AG) or RPBA for premises isolation as a condition of service.

2. For all ***new residential services***, the Purveyor will require that the customer submit with the application for water service a completed "Water Use Questionnaire" (copy shown on APPENDIX B). If the customer's questionnaire indicates special plumbing, such as a lawn sprinkler system, or hazardous water use on the premises, the customer shall submit an evaluation by a DOH-certified CCS of the hazard posed by the proposed special plumbing system, with recommendations for the installation at the meter of either a DCVA, an RPBA or commensurate in-premises protection.

As an alternative to the above requirement for a survey by a DOH-certified CCS, the Purveyor, at his/her discretion, may conduct the evaluation and specify the backflow preventer required to be installed as a condition of service.

3. For all ***existing non-residential services***, the Purveyor will require the property owner or occupant to submit, within nine months of notification, an evaluation by a DOH-certified CCS, of the hazard posed by the plumbing system, with recommendations for the

installation at the meter of either a DCVA, an RPBA or commensurate in-premises backflow preventers. The Purveyor may accept the recommendations or submit the recommendations to a CCS employed by the Purveyor for peer review and concurrence, before acceptance.

As an alternative to the above requirement for a survey by a DOH-certified CCS, the Purveyor, at his/her discretion, may conduct the evaluation and specify the backflow preventer required to be installed as a condition of service.

As an alternative to the above requirement for a survey by a DOH-certified CCS, the customer may agree to install an AG or RPBA for premises isolation within 90 days of notification by the Purveyor or an alternate time period acceptable to the Purveyor.

4. For all **existing residential services**, the Purveyor will require the property owner or occupant to submit within four months of notification, a completed "Water Use Questionnaire." If the customer's reply indicates special plumbing or water use on the premises, the customer shall submit an evaluation by a DOH-certified CCS of the hazard posed to the water system by the plumbing system, with recommendations for the installation at the meter of either a DCVA, an RPBA or commensurate in-premises backflow preventers.

As an alternative to the above requirement for a survey by a CCS, the Purveyor may specify the backflow preventer required to be installed as a condition of service. The Purveyor's CCS will provide guidance on the type of backflow preventer to be installed.

5. For existing services, should the customer fail to supply the required information for a hazard assessment or fail to submit a completed "Water Use Questionnaire," the Purveyor may have the assessment made by a CCS employed by the Purveyor, require the installation of an RPBA for premises isolation, or take other such actions consistent with the previously stated policies.

Cross-Connection Hazard Survey Schedule for Initial Hazard Assessments

The schedule for initial hazard assessment is outlined in the following table. The schedule starts from the date the CCC program is established.

Initial Assessment Task	Schedule
Assessment of all new connections	At time of application for water service
Identification and assessment of high-hazard premises which are listed on Table 9 of Washington Administrative Code (WAC) 246-290-490	Within nine months
Identification and assessment of hazardous premises supplemental to Table 9 of WAC 246-290-490	Within 12 months
Identification of residential connections with special plumbing facilities and/or water use on the premises	Within 15 months

Cross-Connection Hazard Survey Schedule for Subsequent Hazard Re-Assessments

For subsequent cross-connection hazard surveys, procedures for evaluating the backflow prevention requirements are:

1. For **residential services**, the Purveyor will require the customer to submit, within two months of purveyor notification, a completed "Water Use Questionnaire." The procedure for evaluating the hazard re-assessment and the potential change in the required backflow prevention will be the same as the procedure used for the initial hazard assessment.
2. For all **commercial services**, the Purveyor will require the customer to submit a hazard re-assessment (at the customer's expense) by a DOH-certified CCS.
3. As an alternative to the above requirement for a survey by a DOH-certified CCS, the Purveyor, at his/her discretion, may conduct the evaluation and specify the backflow preventer required to be installed as a condition of service.

The frequency of hazard re-assessments will be as shown in the table below:

Type of Service	Frequency of Re-Evaluation
Any services with reduced-pressure principle backflow assembly (RPBA) installed for premises isolation	None required as long as the RPBA passes tests and inspection
Commercial services with double-check valve assembly (DCVA) installed for premises isolation	Every two years and upon change in use or ownership
Commercial services when purveyor relies upon in-premises protection	Every two years and upon change in use, ownership, or plumbing system
Residential services with special plumbing where the purveyor relies upon compliance with Uniform Plumbing Code (UPC)	Every 2-3 years (questionnaire)
Residential services with DCVA installed for premises isolation	Every 4-5 years (questionnaire)
Residential services with no known special plumbing or water use on the premises	Every 4-5 years and upon change in use, ownership, or plumbing system (questionnaire)

The Purveyor will inform the customer that the Purveyor's survey of a customer's premises (whether by a representative of the Purveyor or through the evaluation of a questionnaire completed by the customer) is for the sole purpose of establishing the Purveyor's minimum requirements for the protection of the public water supply system, and that the required backflow protection will be commensurate with the Purveyor's assessment of the degree of hazard.

The Purveyor will also inform the customer or any regulatory agencies that the Purveyor's survey, requirements for the installation of backflow prevention assemblies, lack of requirements for the installation of backflow prevention assemblies, or other actions by the purveyor's personnel or agent do not constitute an approval of the customer's plumbing system or an assurance to the customer or any regulatory agency of the absence of cross connections.

Element 3: *Development and implementation of procedures and schedules for elimination and/or control of cross-connections.*

Backflow Preventer Requirements

The following service policy shall apply to all new and existing customers:

1. The Purveyor will require that water service to all **non-residential customers** be isolated at the meter by a purveyor-approved DCVA or RPBA. All high-hazard connections of the type described in Table 9 of WAC 246-290-490 shall be isolated with an RPBA. All other non-residential customers shall be isolated with a DCVA. In lieu of isolation with a DCVA, other non-residential customers, with the concurrence of the Purveyor's CCS, may install in-premises protection commensurate with the degree of hazard, as determined by the Purveyor's CCS.
2. The Purveyor will require all **residential customers** with facilities of the type described in Table 9 of WAC 246-290-490 to be isolated with an RPBA. All other residential customers with special plumbing or water use on the premises will be isolated with a DCVA or in-premises protection in accordance with the Uniform Plumbing Code (UPC). "Special plumbing" includes, but is not limited to, the following:
 - An underground lawn irrigation system;
 - A solar heating system;
 - An auxiliary source of supply, e.g., a well or creek;
 - Piping for livestock watering, hobby farming, etc.;
 - Residential fire sprinkler system; and
 - Property containing a small boat moorage.
3. **Additional premises requiring premises isolation.** The Purveyor may supplement Table 9 of WAC 246-290-490(4) by identifying additional premises or premises types for which the Purveyor mandates premises isolation. Such premises may include aircraft and automotive manufacturers, pulp and paper mills, military bases, tall buildings, public swimming pools, etc.
4. **All remaining residential customers** will be isolated at the meter by a purveyor-installed meter check valve (single or dual). Residential customers not required to be isolated with an RPBA may install in-premises protection in accordance with the Uniform Plumbing Code (UPC) in lieu of isolation with a DCVA.
5. **For all customers that have a written service contract with the Purveyor**, the premises isolation DCVA or RPBA required above shall be:
 - Purchased and installed by the customer (at the customer's expense) immediately downstream of the water meter in accordance with the Purveyor's standards described hereinafter; and
 - Maintained, tested, and inspected in accordance with the Purveyor's standards described hereinafter.

For new customers, the Purveyor will not turn on water (except for testing purposes) at the meter until the customer complies with the above requirements.

The failure of the customer to comply with the above installation and maintenance requirements shall constitute a breach of contract by the customer. The Purveyor may then proceed with corrective action provisions stipulated in the contract.

6. **Customers without written contracts** are considered to have an implied contract that requires the customer to bear all reasonable costs of service. The Purveyor will install the required DCVA or RPBA on the service, upstream of the meter, and charge the customer for the cost of the initial installation, and all future maintenance, testing, and repair, as set forth in the Purveyor's schedule of rates and charges. The failure of the customer to pay these costs shall constitute a breach of contract by the customer, and the Purveyor will proceed with the established delinquency of payment procedures. As an alternative, the customer may sign a service contract and install the required backflow preventer downstream of the meter.

7. **Approved Backflow Preventers and Installation**

All backflow preventers relied upon by the Purveyor to protect the public water system shall meet the definition of "approved backflow preventer" as contained in WAC 246-290-010. The Purveyor will obtain and maintain a current list of assemblies approved for installation in Washington State from DOH.

All backflow preventers will be installed in:

- The orientation for which they are approved;
- A manner and location that facilitates their proper operation, maintenance, and testing or inspection;
- A manner that will protect them from weather-related conditions such as flooding and freezing; and
- Compliance with applicable safety regulations.

Installation standards contained in the Pacific Northwest Section, American Water Works Association (PNWS-AWWA) Manual or the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USCFCCCHR) Cross-Connection Control Manual shall be followed unless the manufacturer's requirements are more stringent.

The Purveyor has no regulatory responsibility or authority over the installation and operation of the customer's plumbing system. The customer is solely responsible for compliance with all applicable regulations and for prevention of contamination of his plumbing system from sources within his/her premises. Any action taken by the Purveyor to survey plumbing, inspect or test backflow prevention assemblies, or to require premises isolation (installation of DCVA or RPBA on service) is solely for the purposes of reducing the risk of contamination of the Purveyor's distribution system.

The Purveyor will inform the customer that any action taken by the Purveyor shall not be construed by the customer as guidance on the safety or reliability of the customer's plumbing system. The Purveyor will not provide advice to the customer on the design and installation of plumbing other than through the general public education program discussed in Element 8.

Except for easements containing the Purveyor's distribution system, the Purveyor will not undertake work on the customer's premises.

8. Schedule for Installation of Backflow Preventers

The following table shows the schedule that the Purveyor will follow for installation of backflow preventers when they are required (based on the hazard evaluation).

Type of Service	Schedule
New connections with cross-connection hazards	Before service is initiated
Existing connections with Table 9-type hazards and other high cross-connection hazards	Within 90 days after notification
Existing connections with other than Table 9 of WAC 246-290-490 or high cross-connection hazards	Within 180 days after notification
Existing fire protection systems using chemicals or supplied by unapproved auxiliary water source	Within 90 days after notification
Existing fire protection systems not using chemicals and supplied by purveyor's water	Within 1 year after notification

The Purveyor may consider granting an extension of time for installation of backflow preventer for an existing connection if requested by the premises owner.

Element 4: *Provision of qualified personnel, including at least one person certified as a CCS, to develop and implement the CCC program.*

1. **Program Administration:** The responsibility for administration of the CCC Program rests with the Purveyor. General policy direction and risk management decisions are established by the Mayor. By an inter-agency agreement, the Local Administrative Authority (LAA) may undertake certain administrative tasks, and the Purveyor may undertake additional tasks to assist the LAA.
2. The Purveyor will employ or have on staff at least one person certified by DOH as a CCS to implement the CCC program. As an alternative, or when no staff or employees are properly qualified, the Purveyor may retain a DOH-certified CCS on contract to provide the necessary expertise and services.
3. The following cross-connection related tasks will be performed by or under the direction of the Purveyor's certified CCS (on staff or under contract):
 - Preparation of and recommendation of changes to the CCC program;
 - Performance of and/or review of CCC hazard evaluations;
 - Recommendation of the type of backflow preventer to be installed;
 - Recommendation of schedules for retrofitting of backflow preventers;
 - Inspection of backflow preventers for proper application and installation;
 - Review of backflow preventer inspection and test reports;
 - Review of backflow testing quality control information;
 - Recommendation and/or the granting of exceptions to mandatory premises isolation;
 - Participation in or cooperation with other water utility staff in the investigation of backflow incidents and other water quality problems;
 - Completion of Backflow Incident Reports; and
 - Completion of CCC Activity and Program Summary Reports.

4. The Purveyor may delegate other CCC program activities to other personnel who are not certified CCSs, including clerical support staff. These activities include:
 - Administration of paperwork associated with service agreements;
 - Mailing, collecting, and initial screening of hazard evaluation/water use questionnaires;
 - Mailing of assembly testing notices;
 - Receiving and screening of assembly testing reports;
 - CCC program database administration and record keeping;
 - Dissemination of public education material; and
 - Assisting tasks associated with coordination with the LAA.
5. The following table identifies the current CCS employed or retained on contract by the Purveyor:

Name of CCS	Terry Nemeth & Jeff Beltramini
Address	2201 37 th st
City, State, Zip	Anacortes, Washington 98221
Telephone Number	(360) 293- 1921
CCS Certification Number	7246 10208

Element 5: *Development and implementation of procedures to ensure that approved backflow preventers are inspected and/or tested (as applicable).*

1. Inspection and Testing of Backflow Preventers

All backflow preventers that the Purveyor relies upon for protection of the water system will be subject to inspection and, if applicable, testing. This includes backflow preventers installed for in-premises protection that the Purveyor relies upon for protection of the water systems.

- The Purveyor's DOH-certified CCS will inspect backflow preventers for proper application (i.e., to ensure that the preventer installed is commensurate with the assessed degree of hazard).
- Either a DOH-certified CCS or backflow assembly tester (BAT) will perform inspections of backflow preventers for correct installation.
- A DOH-certified backflow assembly tester will test all assemblies relied upon by the Purveyor to protect the public water system.

2. Frequency of Inspection and Testing

Inspection and testing of backflow preventers will be conducted:

- At the time of installation;
- Annually, after installation;
- After a backflow incident; and
- After a repair, reinstallation, relocation, or re-plumbing.

The Purveyor may require a backflow preventer to be inspected and/or tested more frequently than once a year, when it protects against a high-health hazard or when it repeatedly fails tests or inspections.

3. Responsibility for Inspection and Testing

The Purveyor will be responsible for inspection and testing of all purveyor-owned backflow preventers.

The Purveyor will require the customer to be responsible for inspection and testing of backflow preventers owned by the customer. The customer shall employ, at customer expense, a DOH-certified BAT to conduct the inspection and test within the time period specified in a testing notice sent by the Purveyor. The test report shall be completed and signed by the BAT, then countersigned and returned by the customer to the Purveyor before the due date specified by the Purveyor. The customer may request an extension of the due date for returning a test report by submitting a written request to the Purveyor. The Purveyor may grant one extension up to 90 days.

4. Approved Test Procedures

The Purveyor will require that all assemblies relied upon to protect the water system be tested in accordance with DOH-approved test procedures as specified in WAC 246-290-490(7)(d). Any proposal to use alternate test procedures must be approved by the Purveyor's CCS.

5. Notification of Inspection and/or Testing

The Purveyor will notify all customers who own backflow preventers that are relied upon to protect the public water system to have their backflow preventer(s) inspected and/or tested. Notices will be sent out not less than 30 days before the due date of the inspection and/or test. The notice will also specify the date (up to 30 days after the due date of the inspection and/or test date) by which the inspection/test report must be received by the Purveyor.

6. Enforcement

When a customer fails to send in the inspection/test report within 15 days after the due date specified, and the Purveyor has not approved an extension, the Purveyor will take the following enforcement action:

- If the customer has not sent in the inspection/test report within 10 days of the due date given in the first notice, the Purveyor will send a second notice, by certified mail, giving the customer an additional 7 days to send in the report. The notice will also inform the customer that failure to satisfactorily respond to this notice will result in service shut-off.
- The Purveyor will send copies of the second notice to occupants of the premises (if different from the customer) and to the LAA.
- If the customer has not responded satisfactorily within 7 days of the due date specified in the second notice, the Purveyor will implement water service shut-off procedures.

Element 6: *Development and implementation of a backflow prevention assembly testing quality assurance/quality control program.*

1. List of Pre-Approved BATs

The Purveyor will maintain a list of local, DOH-certified BATs that are pre-approved by the Purveyor to perform the following activities:

- Backflow preventer inspection for proper installation; and
- Backflow assembly testing.

The Purveyor will also maintain a list of local DOH-certified CCSs that are pre-approved by the Purveyor to perform the following activities:

- Cross-connection hazard evaluations;
- Backflow preventer inspection for proper application; and
- Backflow preventer inspection for proper installation.

The list(s) will be revised annually or more frequently if necessary.

2. Pre-Approval Qualifications

BATs and CCSs who wish to be included on the Purveyor's pre-approved list must apply to the Purveyor and furnish the following information:

- Evidence of current DOH certification in good standing;
- Make and model of testing equipment (BAT listing only);
- Evidence of test equipment verification of accuracy and/or calibration within the past 12 months (BAT listing only);
- Evidence showing possession of a license to operate a business in City of Anacortes.

3. Quality Assurance

The Purveyor's CCS will review the inspection/test report forms submitted by the customer within 30 days of receipt. The Purveyor's CCS may accept reports that are signed by a CCS or BAT not on the pre-approved CCS or BAT list provided that the same information as listed in "Pre-Approval Qualifications" is also submitted. The Purveyor's CCS will provide follow up on reports that are deficient in any way.

The Purveyor's CCS will also report incidences of fraud or gross incompetence on the part of any BAT or CCS to DOH Operator Certification program staff.

Element 7: *Development and implementation (when appropriate) of procedures for responding to backflow incidents.*

1. Backflow Incident Response Plan

The Purveyor's CCS will participate in developing a backflow incident response plan that will be part of the water system's emergency response program as required by WAC 246-290-415(2). The incident response plan will include, but will not be limited to:

- Notification of affected population;
- Notification and coordination with other agencies, such as DOH, the LAA, and the local health jurisdiction (LHJ);
- Identification of the source of contamination;
- Isolation of the source of contamination and the affected area(s);
- Cleaning, flushing, and other measures to mitigate and correct the problem; and
- Apply corrective action to prevent future backflow occurrences.

2. Technical Resources

The Purveyor will use the manual *Backflow Incident Investigation Procedures*, First Edition, 1996, published by the PNWS-AWWA as a supplement to the Backflow Incident Response Plan.

Element 8: *Development and implementation of a cross-connection control public education program.*

1. Customer Education

The Purveyor will distribute with water bills, at regular intervals, public education brochures to system customers. For residential customers, such brochures will describe the cross-connection hazards in homes and the recommended assemblies or devices that should be installed by the homeowner to reduce the hazard. The education program will emphasize the responsibility of the customer in preventing the contamination of the public water supply. The Purveyor's staff will produce the public education brochures or the Purveyor will obtain brochures from:

- PNWS-AWWA;
- Spokane Regional Cross-Connection Control Committee (SRC4);
- Western Washington Cross-Connection Prevention Professionals Group (The Group);
- USC FCCCHR;
- Other national backflow prevention associations; and/or
- Other water utilities.

The information distributed by the Purveyor will include, but not be limited to, the following subjects:

- Cross-connection hazards in general;
- Irrigation system hazards and corrective actions;
- Fire sprinkler cross-connection hazards;
- Importance of annual inspection or testing of backflow preventers; and
- Thermal expansion in hot water systems when backflow preventers are installed.

The Purveyor will distribute information brochures to all customers every two to three years, and to every new customer at the time of signing of a service agreement.

2. Public Outreach

In cooperation with other water utilities, the Purveyor will participate in an outreach program consisting of:

- Distribution of cross-connection control information to hardware and plumbing stores serving the area;
- Participation in fairs, exhibits, and other events; and
- Special education sessions for irrigation contractors, fire sprinkler contractors, etc.

Element 9: *Development and maintenance of cross-connection control records.*

Types of Records and Data to be Maintained

The Purveyor will maintain records of the following types of information required by WAC:

- Service connections/customer premises information including:
 - Assessed degree of hazard and required backflow preventer to protect the public water system.
- Backflow preventer inventory and information including:

- Air gap (AG) location, installation and inspection dates, inspection results and person conducting inspection;
- Backflow assembly location, assembly description (type, manufacturer, make, model, size, and serial number), installation, inspection and test dates, test results, and person performing test; and
- Information on atmospheric vacuum breakers used for irrigation system applications, including manufacturer, make, model, size, dates of installation and inspections, and person performing inspections.

Where applicable, the foregoing information will also be maintained for backflow preventers installed for in-premises protection that are relied upon by the Purveyor to protect the public water system.

By inter-agency agreement, the Purveyor will maintain the foregoing information for backflow preventers required by the LAA, but which are **not** relied upon by the Purveyor for protection of the water system.

As a courtesy, the Purveyor will send a reminder letter to the customer thirty days prior to the annual due date of the assemblies. If the test report is not received within thirty days, a second (registered) letter will be sent. This letter will inform the customer that if a test report is not received within seven days their water will be shut off for noncompliance.

2. Reports to be Prepared and Submitted to DOH

The Purveyor will prepare the following reports required by WAC:

- Cross-connection control program activities report for the calendar year, to be sent to DOH when requested;
- Cross-connection control program summary information, when required, or when there are significant policy changes;
- Backflow incident reports to DOH (and voluntarily to the PNWS-AWWA CCC Committee); and
- Documentation when exceptions to mandatory premises isolation are granted.

At a minimum, the Purveyor's CCS will prepare and sign the exceptions reports.

- The Purveyor's CCS will prepare and sign all CCC-related reports required by WAC.
- The manager of the public water system shall sign the report before submission to DOH.

Element 10: *Additional cross-connection control requirements for reclaimed water.*

At this time the City of Anacortes does not receive or distribute reclaimed water. In the event that reclaimed water use is proposed within the PWS's service area, the Purveyor will make all cross-connection control requirements mandated by the Permitting Authority in accordance with Chapter 90.46 RCW part of the written CCC program plan and comply with such additional requirements.

E. Other Provisions

1. Coordination with Local Administrative Authority

Both WAC 246-290-490 and the Uniform Plumbing Code amended for Washington require coordination between the water purveyor and the Local Administrative Authority (LAA) in all matters pertaining to cross-connection control.

The Purveyor will provide a copy of this CCC program to City of Anacortes Building Department via a copy of the Purveyor's water system plan or in a separate document. The Purveyor will inform the LAA of any changes in policy or procedure that may impact the LAA.

The Purveyor will provide information to the LAA in a timely manner regarding any:

- Requirement imposed on a residential customer for the installation of a DCVA or an RPBA on the service, with a description of the cross-connection hazard identified;
- Upgrade of the backflow prevention for premises isolation, i.e., from a DCVA to an RPBA;
- Action taken to discontinue water service to a customer; and
- Backflow incident known by the Purveyor to have contaminated the public water system or a customer's plumbing system.

2. **Written Agreement with Local Administrative Authority**

The Purveyor will pursue development of a written agreement with the Local Administrative Authority regarding the details of the coordination between the two parties. The agreement will include, but not be limited to, the following items:

- The purpose of the written agreement;
- Identification of the parties and other interested agencies;
- Delineation of responsibilities;
- Procedures regarding new service connections;
- Procedures regarding existing and changes to existing services;
- Special policies and procedures, such as for fire protection and irrigation services;
- Procedures regarding water service shut-offs, backflow incidents, and other events;
- Communications between parties; and
- Other contingencies.

3. **Prohibition of Return of Used Water.** *The public water system must prohibit the intentional return of used water to the Purveyor's distribution system per WAC 246-290-490 (2)(l).*

Used water is defined as water that has left the control of the Purveyor. This includes water used for heating and cooling purposes and water that may flow back into the distribution system from customers with multiple connections.

Therefore, it is the policy of the City of Anacortes water system to:

- Prohibit the intentional return of used water to the distribution system by any customer served by the public water system; and
- Require that all customers with multiple connections, where the hydraulics permit the potential return of used water, to install a backflow preventer (DCVA or RPBA) commensurate with the degree of hazard at each point of connection.

4. **Unapproved Auxiliary Supplies.** All water supplies other than those owned by the Purveyor are considered unapproved auxiliary supplies as defined in WAC 246-290-010. The Purveyor will require the installation of an RPBA for premises isolation at the service connection to any customer having an unapproved auxiliary supply on the premises that is interconnected with the Purveyor's water system.

5. **Tanker Trucks.** The Purveyor may allow tanker trucks to obtain water from the Purveyor's water system under the following conditions:
 - The tanker truck is equipped with an approved AG or an approved RPBA with a current satisfactory inspection or test report.
 - The tanker truck will obtain water from purveyor-designated watering points only. These watering points are equipped with purveyor-installed backflow preventers.
6. **Temporary Water Connections.** The Purveyor will not supply water through temporary connections, such as those used for construction projects or main disinfection, except through a backflow preventer arrangement approved by the Purveyor.
7. **Interties and Wholesale Water Customers.** The Purveyor will require that interties with other public water systems (PWS) or wholesale customers (such as mobile home parks) be isolated at the point of delivery by:
 - A minimum of a DCVA; and
 - A minimum of an RPBA if the Purveyor considers the purchasing system or wholesale customer to pose a high-health hazard to the Purveyor's system.

The Purveyor may waive or reduce the level of protection at the intertie, if the customer:

- Is a Group A public water system **not** exempt from DOH regulation as per WAC 246-290-020(2);
- Has a CCC program that complies with WAC 246-290-490 and which has been approved by DOH; and
- Implements the CCC program at a level satisfactory to the Purveyor.

F. Relationship to Other Planning and Operations Program Requirements

The Purveyor will consider the requirements and consequences of the cross-connection program upon the planning and operations requirements of the water utility. Such considerations include, but are not limited to ensuring:

- And promoting adequate communication between CCC program personnel and other water utility staff;
- That adequate training is provided to all staff to recognize potential cross-connection control problems;
- That cross-connection issues be considered in water quality investigations;
- That the design of the water distribution system makes adequate provisions for expected head losses experienced by backflow assemblies;
- That the CCC program personnel be consulted in the design of water and wastewater treatment facilities and when proposals are made to receive or distribute reclaimed water;
- That operations under normal and abnormal conditions do not result in excessive pressure losses; and
- That adequate financial and administrative resources are available to carry out the CCC program.

Washington State Department of Health
**Drinking Water Regulations Relating to
Cross-Connection**

(This section has been extracted from WAC 246-290,
Group A Drinking Water Regulations)

Definitions, abbreviations and acronyms relating to cross-connections which have been extracted from **WAC 246-290-010**.

"Approved air gap" means a physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or nonpressurized receiving vessel. To be an air gap approved by the department, the separation must be at least:

- Twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one inch, when unaffected by vertical surfaces (sidewalls); and:
- Three times the diameter of the supply piping, if the horizontal distance between the supply pipe and a vertical surface (sidewall) is less than or equal to three times the diameter of the supply pipe, or if the horizontal distance between the supply pipe and intersecting vertical surfaces (sidewalls) is less than or equal to four times the diameter of the supply pipe and in no case less than one and one-half inches.

"Approved atmospheric vacuum breaker" means an AVB of make, model, and size that is approved by the department. AVBs that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or that are listed or approved by other nationally recognized testing agencies (such as IAPMO, ANSI, or UL) acceptable to the local administrative authority are considered approved by the department.

"Approved backflow preventer" means an approved air gap, an approved backflow prevention assembly, or an approved AVB. The terms "approved backflow preventer," "approved air gap," or "approved backflow prevention assembly" refer only to those approved backflow preventers relied upon by the purveyor for the protection of the public water system. The requirements of WAC 246-290-490 do not apply to backflow preventers installed for other purposes.

"Approved backflow prevention assembly" means an RPBA, RPDA, DCVA, DCDA, PVBA, or SVBA of make, model, and size that is approved by the department. Assemblies that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or other entity acceptable to the department are considered approved by the department.

"Backflow" means the undesirable reversal of flow of water or other substances through a cross-connection into the public water system or consumer's potable water system.

"Backflow assembly tester" means a person holding a valid BAT certificate issued in accordance with chapter 246-292 WAC.

"Backpressure" means a pressure (caused by a pump, elevated tank or piping, boiler, or other means) on the consumer's side of the service connection that is greater than the pressure provided by the public water system and which may cause backflow.

"Backsiphonage" means backflow due to a reduction in system pressure in the purveyor's distribution system and/or consumer's water system.

"Combination fire protection system" means a fire sprinkler system that:

- Is supplied only by the purveyor's water;
- Does not have a fire department pumper connection; and
- Is constructed of approved potable water piping and materials that serve both the fire sprinkler system and the consumer's potable water system.

"Consumer" means any person receiving water from a public water system from either the meter, or the point where the service line connects with the distribution system if no meter is present. For purposes of cross-connection control, "consumer" means the owner or operator of a water system connected to a public water system through a service connection.

"Consumer's water system," as used in WAC 246-290-490, means any potable and/or industrial water system that begins at the point of delivery from the public water system and is located on the consumer's premises. The consumer's water system includes all auxiliary sources of supply, storage, treatment, and distribution facilities, piping, plumbing, and fixtures under the control of the consumer.

"Cross-connection" means any actual or potential physical connection between a public water system or the consumer's water system and any source of nonpotable liquid, solid, or gas that could contaminate the potable water supply by backflow.

"Cross-connection control program" means the administrative and technical procedures the purveyor implements to protect the public water system from contamination via cross-connections as required in WAC 246-290-490.

"Cross-connection control specialist" means a person holding a valid CCS certificate issued in accordance with chapter 246-292 WAC.

"Cross-connection control summary report" means the annual report that describes the status of the purveyor's cross-connection control program.

"Flow-through fire protection system" means a fire sprinkler system that:

- Is supplied only by the purveyor's water;
- Does not have a fire department pumper connection;
- Is constructed of approved potable water piping and materials to which sprinkler heads are attached; and
- Terminates at a connection to a toilet or other plumbing fixture to prevent the water from becoming stagnant.

"High health cross-connection hazard" means a cross-connection which could impair the quality of potable water and create an actual public health hazard through poisoning or spread of disease by sewage, industrial liquids or waste.

"In-premises protection" means a method of protecting the health of consumers served by the consumer's potable water system, located within the property lines of the

consumer's premises by the installation of an approved air gap or backflow prevention assembly at the point of hazard, which is generally a plumbing fixture.

"Local administrative authority" means the local official, board, department, or agency authorized to administer and enforce the provisions of the Uniform Plumbing Code as adopted under chapter 19.27 RCW.

"Low health cross-connection hazard" means a cross-connection that could cause an impairment of the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of such potable waters for domestic use.

"Premises Isolation" means a method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection or alternative location acceptable to the purveyor to isolate the consumer's water system from the purveyor's distribution system.

"Reclaimed water" means effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for beneficial use or a controlled use that would not otherwise occur, and it is no longer considered wastewater.

"Unapproved auxiliary water supply" means a water supply (other than the purveyor's water supply) on or available to the consumer's premises that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor.

"Uniform Plumbing Code" means the code adopted under RCW 19.27.031(4) and amended under chapter 51-46 WAC. This code establishes statewide minimum plumbing standards applicable within the property lines of the consumer's premises.

"Used water" means water which has left the control of the purveyor.

Abbreviations and Acronyms

AG	air gap
AVB	atmospheric vacuum breaker
BAT	backflow assembly tester (for WAC 246-290-490)
CCS	cross-connection control specialist
DCDA	double check detector assembly
DCVA	double check valve assembly
IAPMO	International Association of Plumbing and Mechanical Officials
PVBA	pressure vacuum breaker assembly
RPBA	reduced pressure backflow assembly
RPDA	reduced pressure detector assembly
SVBA	spill resistant vacuum breaker assembly
UBC	Uniform Building Code
UL	Underwriters Laboratories Inc.
UPC	Uniform Plumbing Code

APPENDIX B – Residential Questionnaire

Dear Customer:

As part of our on-going efforts to ensure the safety of your drinking water, we are required to protect our system against cross connections. As described in the enclosed brochure, cross connections are connections between the drinking water plumbing and a source of contamination. Cross-connections can make our drinking water unsafe.

The purpose of this questionnaire is to help determine if you have any special plumbing or activities that pose an increased risk of contamination to our water system. Please fill out the following questionnaire and check the appropriate boxes below:

Name: _____

Address: _____

Phone Number: _____

My residence has:

- an automatic sprinkler or irrigation system
- swimming pool
- hot tub
- livestock watering
- residential fire sprinkler system
- private well or other secondary source of water for irrigation
- solar heating system
- photo developing equipment
- water treatment system (such as a water softener)
- gray water system
- water supply to dock or boat moorage
- septic pump
- none of the above

Completed by (please sign): _____ Date: _____

Please return this questionnaire to:

Thank you for your help. If you checked any of these boxes we may be contacting you in the future to request further information.

APPENDIX B:
STANDARD WATER PLAN NOTES

Description:

1. WATER NOTES
2. GENERAL NOTES
3. RIGHT-OF-WAY TESTING PRACTICE

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The standard plan notes must be included on all plans. At the applicant's discretion, notes which in no way apply to the project may be omitted; however, the remaining notes must not be renumbered. For example, if General note C were omitted, the remaining notes should be numbered A, B, D, E, F, etc.

- A. No connection to the existing mains will be allowed except by means of an approved backflow prevention device prior to satisfactory flushing, testing, disinfections and receipt of satisfactory bacteriological test results.
- B. Any persons performing Hot Taps shall be approved in advance by the City of Anacortes. Superior Tapping Inc. at 1.888.859.9221 or Spears Taps, Inc. at 425.485.4764 are acceptable companies.
- C. Pipeline materials and installation are to conform to the latest revision of the following standards:
 - Ductile Iron Pipe design (AWWA C150/A21.50)
 - Ductile Iron Pipe manufacturing process (AWWA C151/A21.51)
 - Cement Mortar Lining (AWWA C104/A21.4)
 - Polyethylene Encasement (AWWA C105/A21.5)
 - Ductile Iron Pipe joints (AWWA C111/A21.11)
 - Ductile Iron Resilient Wedge Gate Valves (AWWA C515)
 - Dry Barrel Fire Hydrants (AWWA C502)
 - Ductile Iron fittings (AWWA C153/A21.53 and C110/A21.10)
 - Disinfections (AWWA C651)
 - Ductile Iron Pipe installation (AWWA C600)

Owner shall furnish to the City of Anacortes Engineering Representative copies of the certifications that all materials meet the AWWA specifications.

- D. Ductile Iron Pipe to be Thickness Class 50 or Pressure Class 350.
- E. All Ductile Iron Pipe shall be poly wrapped in accordance with the manufacturer's guidelines. Poly wrap shall be 8 mil minimum thickness and taped at the seams. Loose bagging will be folded and secured to the pipe.
- F. Fire Hydrants are to be Mueller Model Super Centurion 200, AVK or M+H.
- G. Fire Hydrants shall be set vertical plumb with the pumper port facing the street.
- H. Fire Hydrants shall be set as such that the break away joint is no more than 6-inches above and no less than 3-inches above the finished grade.
- I. There shall be 3-foot minimum clearance around the fire hydrants.
- J. Fire Hydrants shall have a Red Head brand or equivalent with 5" Storz Rigid Female Adapter with cap and connecting cable.
- K. The water services to the property line from the main line shall be 1-inch minimum copper and shall be installed in accordance with Section 7-15 of the current version of the Standard Specifications for Road, Bridge and Municipal Construction and the City of Anacortes Construction Guidelines.

- L. Installation of Thrust Blocks shall conform to the City of Anacortes Construction Guideline details, “Thrust Block No. 1 (WA-7)” and “Thrust Block No. 2 (WA-8)”. Soil Bearing strength of 2,500 PSF shall be used in most areas above the water table. A qualified soils engineer will evaluate subsurface conditions, which indicate a lesser soil strength in the native material. The Contractor shall use plastic sheeting to prevent contact between the concrete and the fittings. The City of Anacortes Engineering Department shall inspect thrust Blocks prior to backfilling the trench.
- M. The water main shall have a minimum of 30-inches or a maximum cover of 40-inches from the final grade before paving. This cover includes the top of the Crushed Surfacing Base Course.
- N. The waterline shall be fitted with a watertight plug at any anytime work is delayed or stopped and overnight. If newly installed waterline is contaminated with ground water, the entire length of pipe affected shall be thoroughly cleaned prior to installing additional pipe.
- O. Maintain a minimum 1-foot vertical separation and a 30-inch horizontal separation between the waterline and all other Utilities except Sanitary Sewer, which is to be a 10-foot horizontal separation. Waterline trench is not to be shared with other Utilities.
- P. Trench excavation, bedding and backfill for water mains shall be in accordance with section 7-10 of the current version of the Standard Specifications for Road, Bridge and Municipal Construction and the City of Anacortes Construction Guidelines trench details.
- Q. Maximum length of open trench shall be 100-feet.
- R. All WSDOT requirements for traffic control shall be met at all times.
- S. The City of Anacortes Engineering Department must be notified at least 48-hours prior to commencing construction and for inspection requests.
- T. Inspections shall include pipe installation, pipe bedding, bagging, thrust blocking, pressure testing and trench backfill.
- U. TESTING PROTOCOL: Prior to construction, a proctor and sieve analysis shall be submitted, reviewed and approved by the City of Anacortes on all material used in the Right-of-Way. See the City of Anacortes Testing Schedule.
- V. The Contractor shall furnish all labor, equipment and material to disinfect, flush and conduct a pressure test of the completed waterline as specified in Sections 7-11.3(11) and 7-11.3(12) of the current version of the Standard Specifications for Road Bridge and Municipal Construction.
- W. Dechlorination will be required of all disinfection water flushed from waterlines which cannot be conveyed to existing Sanitary Sewer Systems.
- X. The water line, including the corp. stops to the water services, shall be pressurized to 225 PSI with no greater than a 5 PSI pressure drop over a 2-hour period. The City of Anacortes Public Works Inspector, Engineer or designated representative shall witness this test.

- Y. The Contactor shall notify and coordinate with the City of Anacortes Water Department prior to the start of construction and prior to any water shut off or turn on that will affect the water system. Water Department personnel will operate distribution valves.
- Z. Scheduled waterline shut downs: 72-hours notice required. Contact 360.293.1921 for scheduling.
- AA. Emergency waterline shut downs: Contact 360.293.1921. The Water Department will be notified. Also, contact the Public Works Inspector at 360.661.3547.
- BB. Contractor is responsible for obtaining the water sample bottle from the Skagit County Health Department prior to scheduling bacterial sampling. The length of pipe will determine the number of samples taken.

The standard plan notes must be included on all plans. At the applicant's discretion, notes which in no way apply to the project may be omitted; however, the remaining notes must not be renumbered. For example, if General note C were omitted, the remaining notes should be numbered A, B, D, E, F, etc.

1. WORK HOURS:

The City of Anacortes Ordinance allows work from 7:00 A.M. to 10:00 P.M, seven days a week (COA Ord. #2316). Someone in charge to be on site at all times when work is in progress. If work is done on weekends, please inform the Project Manager so the City of Anacortes can have an Inspector on site. Contractor will be billed for City of Anacortes Overtime.

2. CALL 48-HOURS BEFORE THE FOLLOWING:

For Inspection contact 360.299.1951.

- A. Prior to work start-up
- B. Prior to any utility construction in the right of way.
- C. Prior to pouring cast-in-place concrete structures.
- D. Prior to placing any crushed rock on roadway sub grade.
- E. Prior to placing curb, gutters and sidewalks.
- F. Prior to asphalt paving.

3. MATERIALS AND WORKMANSHIP:

- A. All materials used, must meet WSDOT, APWA and City of Anacortes specifications.
- B. All work and materials that do not meet the above specifications must be removed as directed by the Project Inspector.
- C. SUBGRADE COMPACTION TESTS:** Will be done before any C.S.B.C is put in place, all trenches will be tested for compaction. The Material Testing Lab needs **24-HOUR NOTICE**. Use the testing protocol provided by the City. Items to be compaction tested will include the pipe bedding (Section 7-08.3(1)C), Backfill (Section 7-08.3(3) and sub grade for surfacing (Section 2-06.3(2)) and asphalt (Section 5-04.3(10)B).
- D. INSPECTION:** All aspects of this project will be inspected including piping, backfill, sub grade, concrete and asphalt, as well as forms, curb, gutter and sidewalk. If a portion gets backfilled before inspection, the contractor will dig up that portion for inspection. **24-HOUR NOTICE REQUIRED**. Know the schedule and let the City know.
- E. TESTING PROTOCOL:** Prior to construction, a proctor and sieve analysis shall be submitted, reviewed and approved by the City of Anacortes on all material used in the Right-of-Way. See the City of Anacortes Testing Schedule.
- F. All compaction test shall be approved by the City of Anacortes Engineer and Project Manager prior to placing of crushed surfacing, asphalt, curb, gutter, sidewalk (Including trench restoration when test may be required in each lift).

- G. City of Anacortes may require additional tests on sub grade, trenches, concrete, or asphalt. The costs of testing shall be paid for as indicated in the contract documents.

4. TRAFFIC CONTROL AND PUBLIC SAFETY:

- A. **FLAGGING:** All flaggers must have Flagging Certificates and must have attended a flagging course or an off duty police officer is required. The job will be shut down if any uncertified people are flagging. A stop work order will be given and work will not proceed until a certified person is flagging.
- B. **SIGNAGE:** All signage must be per the Manual Uniform Traffic Devices. Before job is to begin, proper signage will be in place with flaggers in place if needed. Extra signage may be needed. Be ready to rent signs if needed.
- C. **TRAFFIC CONTROL PLAN:** Needs to be submitted and approved by the Assistant City Engineer prior to Construction start. Traffic Control plan shall include the location of signage, flaggers, work zone, safe zone, and traffic flow and needed dimensions. **No Detours Allowed** without approval from the Assistant City Engineer.
- D. **FOR STREET CLOSURE:** Call 911.
- E. **CONSTRUCTION SAFETY:** is the responsibility of the contractor.

5. ROADWAY EMBANKMENT AND SUBGRADE CONSTRUCTION:

- A. Crushed Surfacing shall be compacted to 95% of maximum density. No recycled material allowed.
- B. Embankment and sub grade must be compacted to 95% of maximum density.
- C. Proper moisture must be maintained throughout placing and compacting.
- D. Compaction testing to be performed by an independent lab. Use a "Modified Proctor".

6. TRENCHES IN DEVELOPED RIGHT-OF-WAY:

See City of Anacortes Standard Construction Details and Section 7 of the current WSDOT Specifications for Road, Bridge and Municipal Construction.

- A. Pipe zone shall be compacted to 90% of maximum density.
- B. Trench zone shall be compacted to 95% of maximum density in 12-inch lifts.
- C. Crushed Surfacing shall be compacted to 95% of maximum density. No recycled material allowed.

7. DRAINAGE SYSTEM CONSTRUCTION:

- A. Any permanent flow control facility used as a temporary settling basin shall be modified with the necessary erosion control measures and shall provide adequate storage capacity. If the facility is to function as an infiltration system, the temporary facility must be graded so that the bottom and sides are at least three (3) feet above the final grade of the permanent facility.

- B. Overflows, spillways, gravel filter windows, must be constructed per plans and specifications. No Deviations. As-built for verification required.
- C. Quarry rock must be sound “hard” durable rock. No recycled material.
- D. Grass lined swale shall be constructed per the details provided. No Deviation allowed. All swales must be operational before acceptance.
- E. Catch Basins must be set to line grade using no more than two (2) adjustment bricks.
- F. Minimum 1-foot separation between pipes in Type II Catch Basins.

8. RESTORATION OF RIGHT-OF-WAY:

- A. Contractor must leave the right-of-way, equal to existing or better condition
- B. Place compacted topsoil (Section 9-14.1(1), (2) and (3)) and seed all areas disturbed by excavation. (Section 9-14.2).
- C. All drainage systems must be fully cleaned, restored and operational before final acceptance. (Section 7-07.3).

9. FINAL INSPECTION AND ACCEPTANCE:

See Section 1-05.11 and Section 1-08.5)

- A. When Contractor has completed all of the work on the approved plans, the contractor will:
 - Complete the “Final Inspection Guidelines for Contractors Inspection Form”.
 - Give the completed “Final Inspection Guidelines for Contractors Inspection Form” to the PW Inspector and request a site inspection. All site inspections are on Wednesdays between 9 am and 12 pm.
- B. The Project Manager, Engineer of Record, Inspector, Contractor and other City of Anacortes Departments will walk the site and create a punch list. The Contractor will complete the punch list and check off each item, then return it to the Inspector for re-inspection. The Inspector will verify that items on walk through are completed.
- C. The City will not make the final inspection until the physical work required by the contract and approved plans, including final cleanup and all work ordered by the Project Manager, have been completed. (Section 1-05.11)
- D. Final approval of the project will not be granted until “as built” drawings (both digital and hard copy) have been received and approved by the Project Manager.
- E. The Contractor must furnish all documentation required by law, to allow the City of Anacortes to process final acceptance of the contract.

19. MISCELLANEOUS:

- A. **AS-BUILTS:** The Developer will supply to the City, one hard copy and one electronic file (AutoCAD Version 2002) of as-built drawings to include all City utilities. The as-built drawings will be submitted to the Project Manager at

substantial completion for review and approval prior to the issuance of final project approval and acceptance.

UTILITY LOCATES NUMBER: 1.800.424.5555. Required before starting any groundwork.

City of Anacortes Public Works Road Right-of-way Testing and Inspection Practice

Utility Trenches:

Compaction Testing

Perform at least 2 compaction tests (ASTM D 2922 nuclear method) per 100 lineal feet of trench, one at sub-grade level, one at 50% of the trench depth if a hoe-pack is used for compaction. In addition, test all road crossings at sub-grade and 50% depth. If walk-behind compaction equipment is used (i.e. jumping jack) test each 12" of depth.

Trench backfill should be compacted to at least 95% of the maximum dry density according to the modified proctor (ASTM D 1557). Fill should be placed in horizontal lifts not to exceed 12 inches of loose thickness and follow WSDOT 7-08.3(3) specifications in the current WSDOT Specifications Manual.

Using a loaded, 10 yard gravel truck, proof roll the trench lines to verify that a firm and unyielding condition prevails over the entire length of the trenches at the road sub-grade elevation.

Sieve analysis of backfill material

Sample the imported fill material for sieve analysis prior to trench backfilling at a minimum interval of one sample per day of operation.

Sample of materials to be used shall be submitted prior to construction to determine conformance to WSDOT specifications 9-03.12(3) for pipe zone material, 9-03.19 for trench backfill and 9-03.9 for Aggregates for Ballast and Crushed Surfacing.

Samples should be taken from material delivered to the site.

Road Sections:

Proof Rolling

Prior to placing structural fill for the road section, testing lab and city engineer representatives should observe a proof roll of the undisturbed native sub-base using a loaded dump truck (15 ton minimum certified by load ticket). In areas of significant pumping and yielding, scarify, aerate and re-compact existing materials (WSDOT 2-06). If loose native soil conditions prevail, over-excavate the deleterious material to the satisfaction of testing lab representative and city engineer. After 18" of over-excavation, place a woven structural geo-textile fabric that is equivalent to or better than a Mirafi 500x product. Backfill over-excavated areas with clean (<7% fines) structural fill compacted to 95% of the maximum dry density (ASTM D 1557).

Once the entire road section is placed and prior to paving, testing lab representative should observe a proof roll of the sub-grade to ensure that there are no yielding or pumping areas.

Compaction Testing for Road Sections:

Granular and crushed aggregate

Roadbed fill materials should be compacted to 95% of the maximum dry density (ATSM D 1557) and verified with the nuclear method (ATSM D 2922).

For every lift placed in the roadway, compaction testing should occur twice per 100 linear feet, one on either side of the centerline at locations determined by city engineer representative.

Fill material unable to be tested by the nuclear method, such as rock fills, should be tested by a loaded, 10 yard dump truck proof roll.

Asphaltic Concrete Pavement

Prior to placement of pavement, the city shall make a determination of sub-grade acceptance based upon test results and the observations of a firm and unyielding surface. The city shall also establish test area boundaries. The contractor shall supply the city with a mix design including values for the theoretical maximum density of the asphalt being used on the project.

Specification for minimum allowable density for asphalt is 92% of the theoretical maximum density.

The point of acceptance is when the asphalt reaches 175 degrees f.

When the contractor indicates that the pavement is ready for acceptance or it reaches 175 degrees f., whichever is sooner, the city shall supervise 5 nuclear densometer readings at random locations within every test area. A test area shall not exceed 200 tons of asphalt, however, smaller areas may be determined, such as cul-de-sacs may be singled out as a test area or individual streets within a street network may be singled out as test areas, even though these areas would be less than 200 tons.

The results of the densometer readings for each test area shall be evaluated and the average applied to the entire test area. If the average is below minimum, the owner may request core tests to be taken at his expense and at locations determined by city personnel, within 24 hours of the final paving of the test area. Five core tests shall be taken for each test area and the results evaluated and the average applied to the whole test area.

If the pavement is below minimum compaction subsequent to the final testing procedures, the owner may increase depth of the final lift of asphalt as directed by the city engineer, or provide payment to the city as directed by the city engineer.

All isolated areas within test areas that fall below 88.0% shall be subject to extensive testing and subsequent removal of the asphalt, unless otherwise directed by the city engineer.

The use of a correction factor to correct density readings obtained from the nuclear densometer is acceptable upon authorization by the city engineer in the following instances: 1) first lift overlays on existing pavement; 2) first course over granular material.

TESTING AND INSPECTION SUMMARY:**Testing Frequency**

<u>Work phase</u>	<u>Frequency of Testing/Inspection</u>	<u>Required Results</u>
Trench back filling	2 tests every 100 feet of trench, at sub-grade and 50% of fill depth or below top of trench at time of test	95%
Roadbed materials	2 test every 100 feet of roadway, one for each side of centerline	95%
Asphalt	5 test per 200 tons	92%

Roadway Sections

<u>Work phase</u>	<u>Frequency of Testing/Inspection</u>	<u>Required Results</u>
Native roadway Sub-base	1 proof roll of undisturbed native soil prior to placing fill, but after stripping of overburden.	No yielding or deflection
Roadbed fill materials	2 test every 100 feet of roadway, one for each side of centerline	95%
	1 proof roll at sub grade elevation prior to paving.	No yielding or deflection
Trench backfill	2 tests every 100 feet of trench, at sub-grade and 50% of fill depth or below top of trench at time of test	95%
	1 proof roll of trench lines after completion of backfill and compaction	No yielding or deflection

Laboratory Analysis

<u>Work phase</u>	<u>Frequency of Testing/Inspection</u>	<u>Required Result</u>
Trench backfilling	1 gradation prior to backfilling, a minimum of one per day of work. 1 proctor prior to backfilling	To design Spec's
Roadbed fill materials	1 gradation prior to filling, a minimum of one per day. 1 proctor prior to placing fill.	To design Spec's

Asphalt

1 rice density per day of paving,
1 extraction, fracture and gradation
for every 200 tons of asphalt place
in a day

To design
Spec's

GENERAL REQUIREMENTS:

All test reports shall be faxed to the City Engineer representatives (A copy each for the project manager and inspector) within 1 business day. Failing tests shall be noted and marked.

Testing Lab shall be WABO certified and under the supervision of a qualified registered Geologist or Engineer. All procedures shall meet ASTM and WSDOT/APWA Standards.

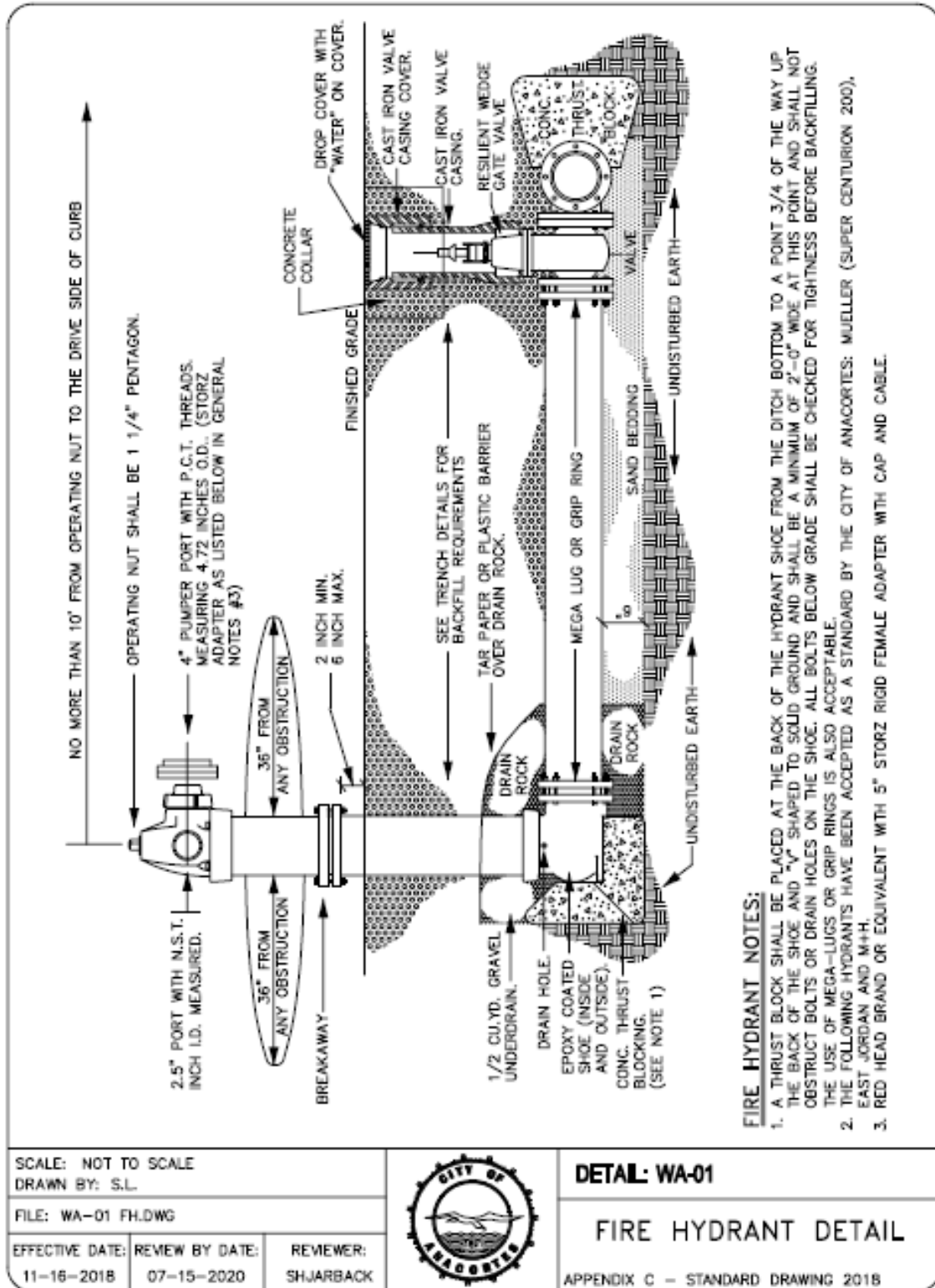
All sample locations shall be clearly indicated by project stationing and the depth in relationship to sub grade elevation.

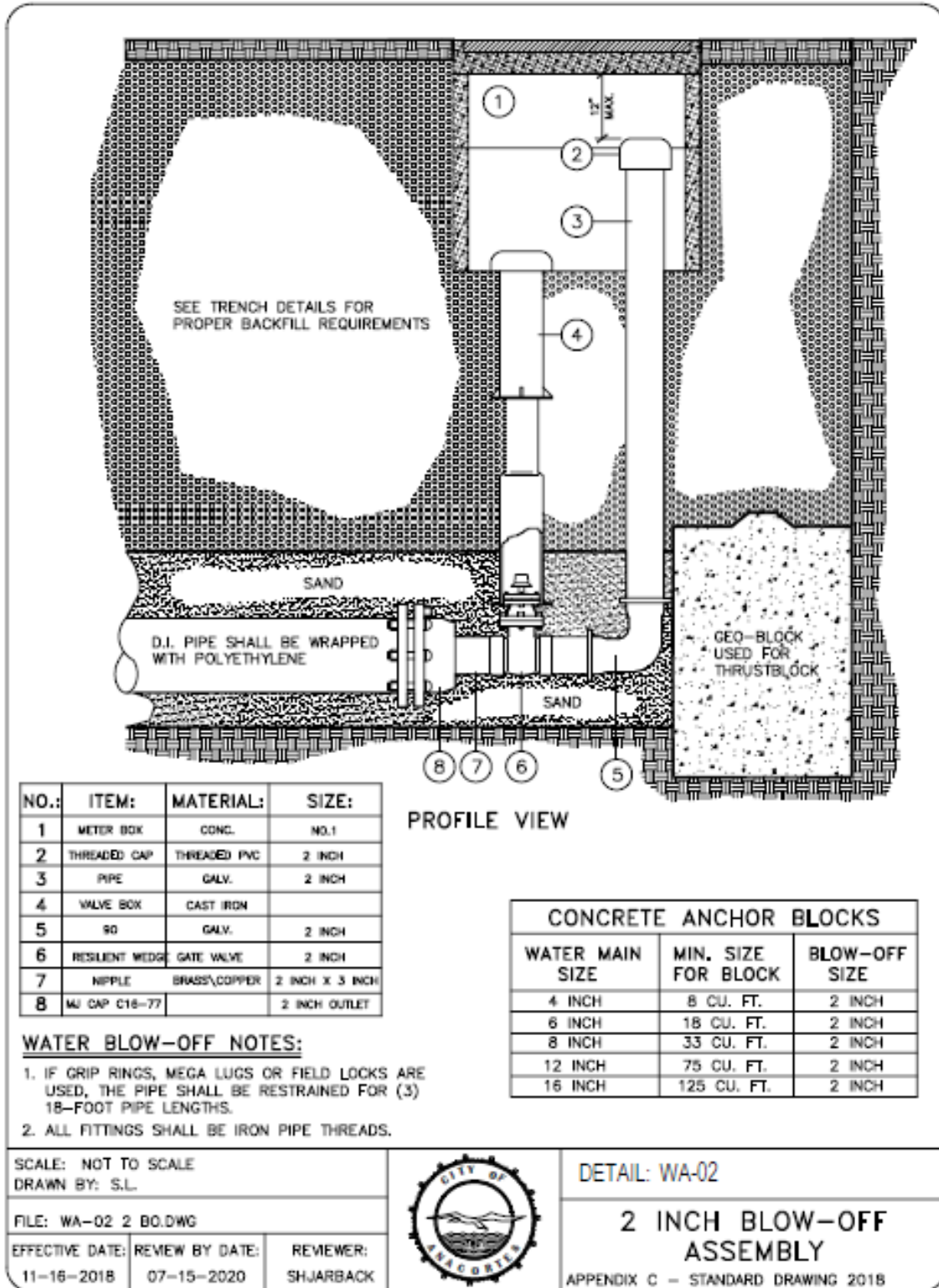
Material sources, locations, sampling methods, dates, lab personnel, sample identifier, etc. shall be clearly indicated for each proctor or gradation. Each density test shall specifically indicate the reference standard for the test material.

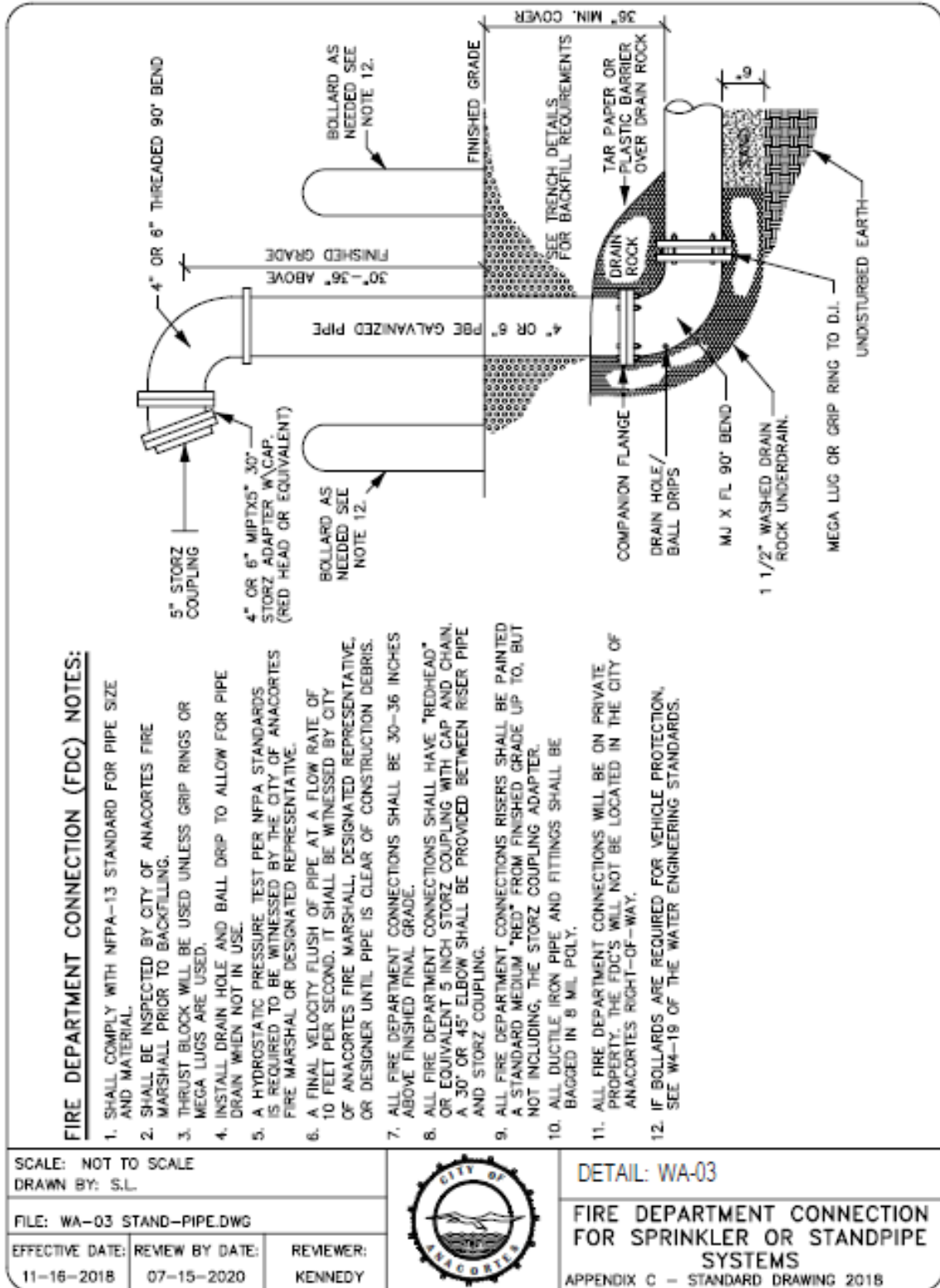
Indicate the contractors intended or stated use of the material (ie, bedding, ballast, trench backfill, etc.)

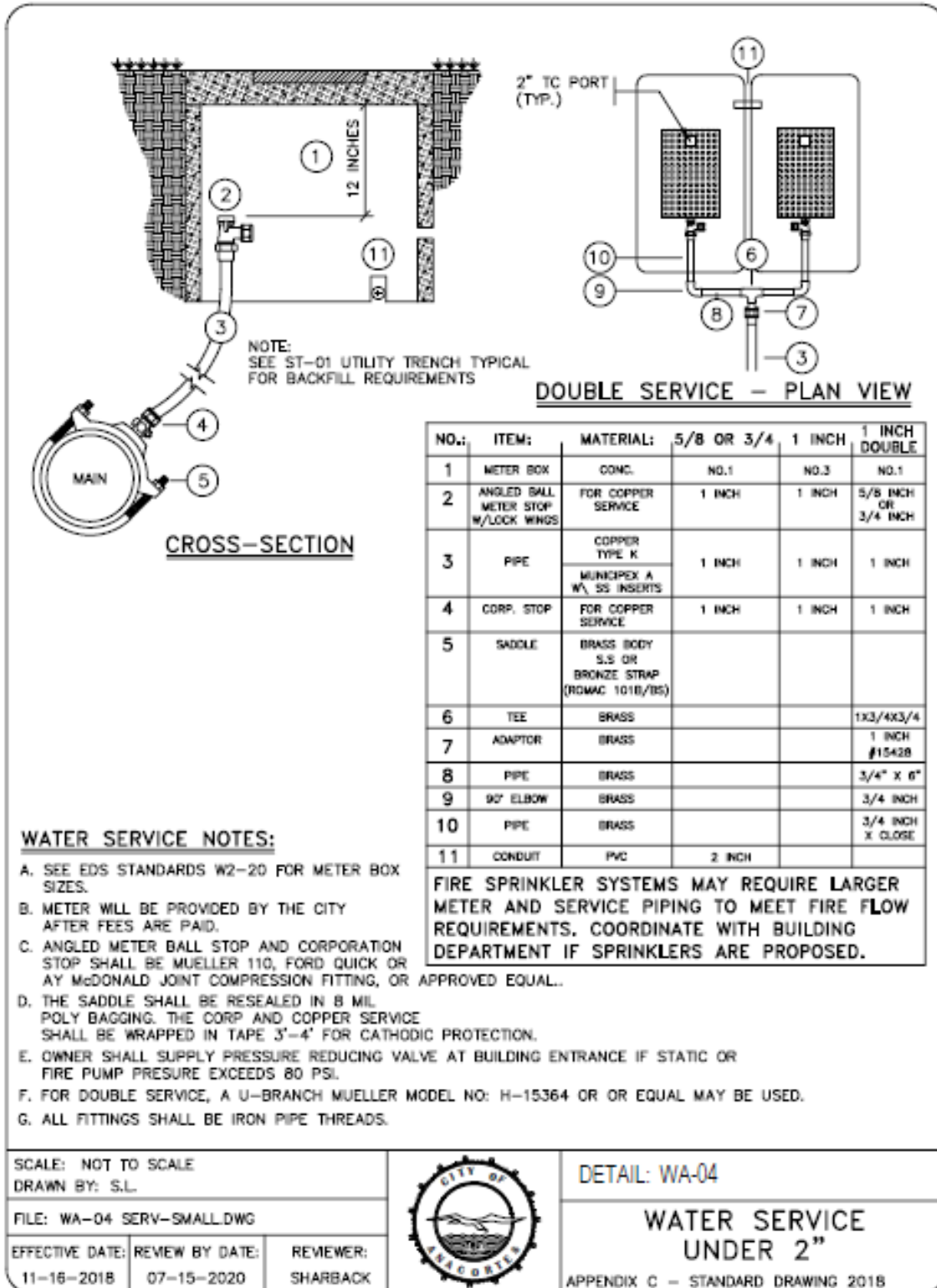
**APPENDIX C:
WATER WORKS STANDARD DRAWINGS**

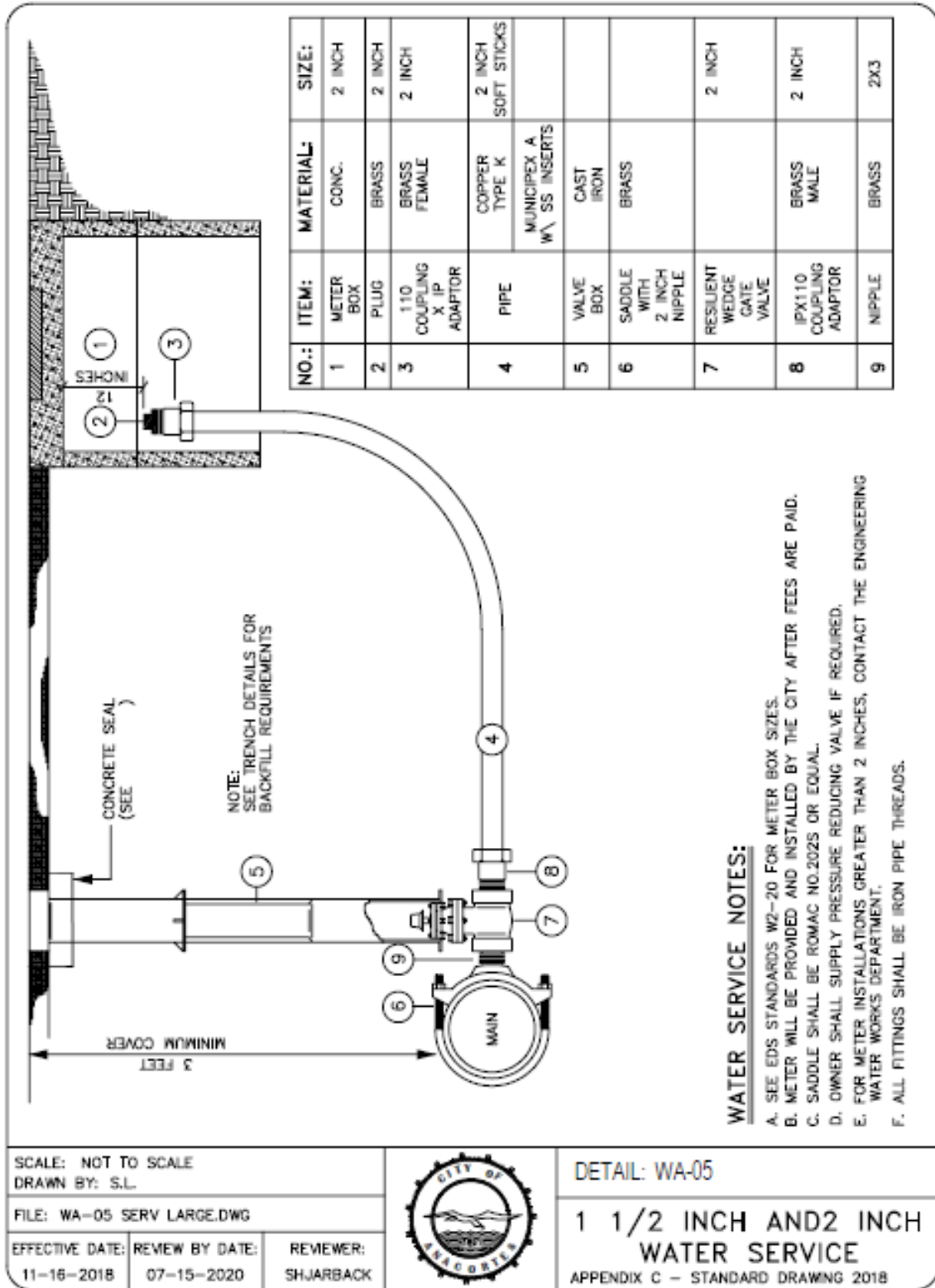
<u>Description:</u>	<u>Page:</u>
10. WA-01 FIRE HYDRANT DETAIL	WAT-57
11. WA-02 2" BLOWOFF ASSEMBLY DETAIL	WAT-58
12. WA-03 FIRE DEPARTMENT CONNECTION FOR SPRINKLER OR STANDPIPE SYSTEMS	WAT-59
13. WA-04 WATER SERVICE UNDER 2" DETAIL	WAT-60
14. WA-05 WATER SERVICE 1 ½" AND 2" WATER SERVICE DETAIL	WAT-61
15. WA-06 1" COMBINATION AIR/VACUUM BREAKER VALVE DETAIL	WAT-62
16. WA-07 2" COMBINATION AIR/VACUUM BREAKER VALVE DETAIL	WAT-63
17. WA-08 THRUST BLOCKING HORIZONTAL BENDS AND VALVES DETAIL	WAT-64
18. WA-09 THRUST BLOCKING VERTICAL BENDS DETAIL	WAT-65
19. WA-10 PIPE SUPPORT FOR METERS LARGER THAN 2" DETAIL	WAT-66

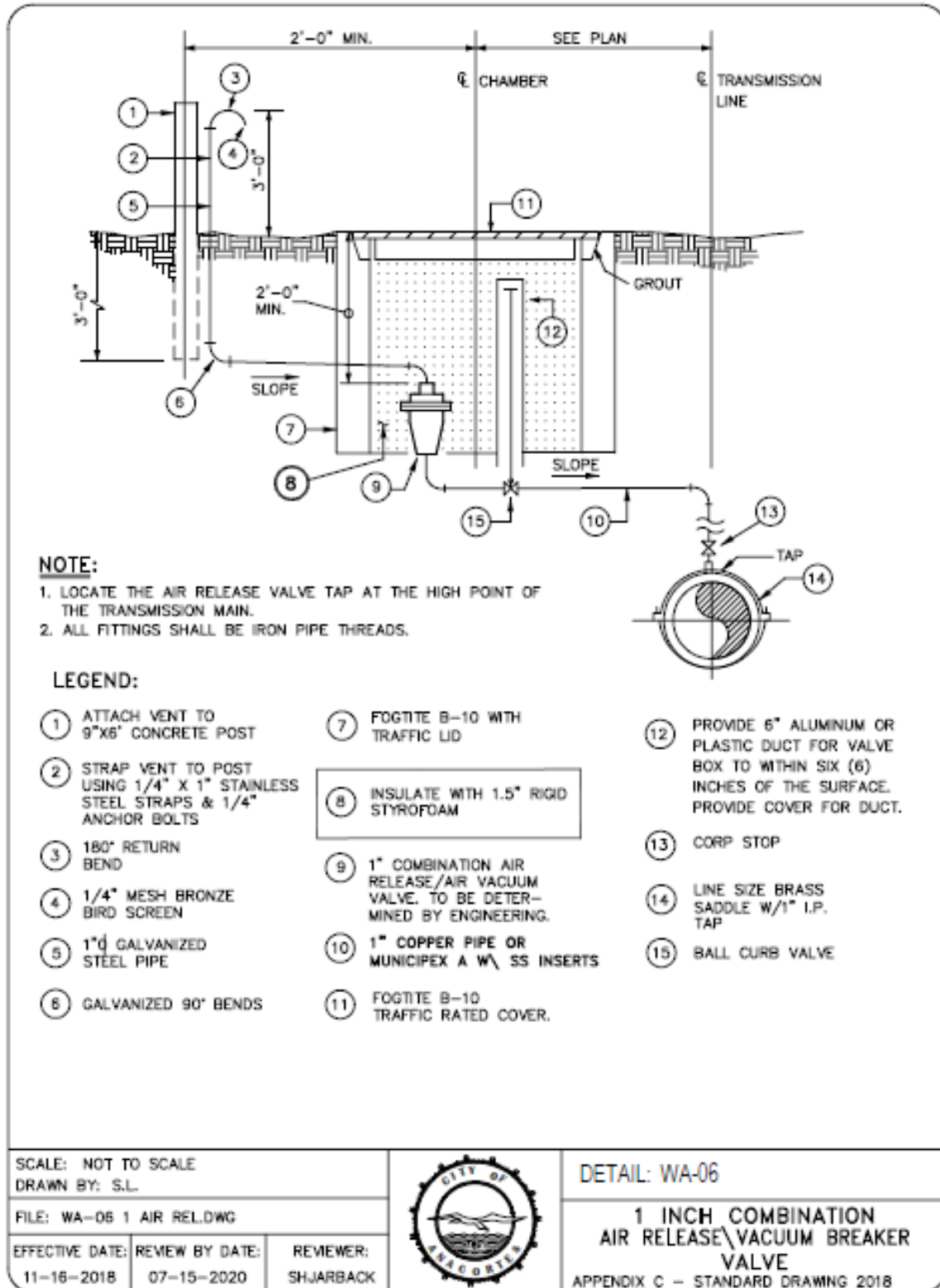


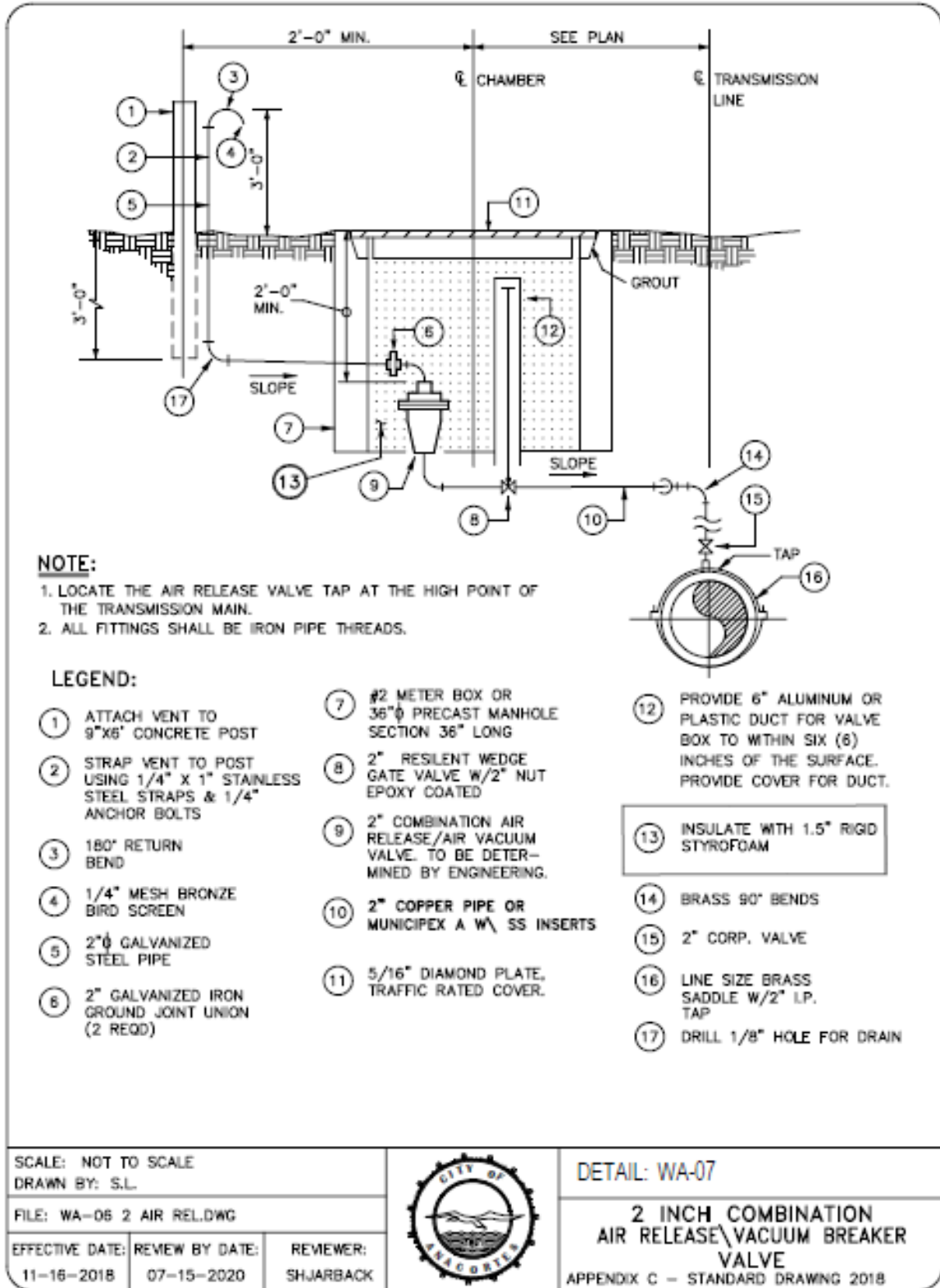




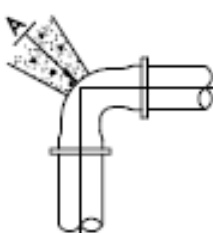




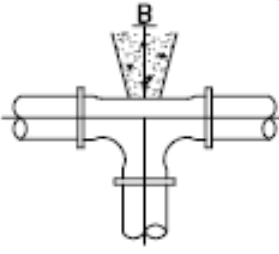





THRUST BLOCK – TABLE							
PIPE SIZE:	PRESSURE PSI:	MINIMUM BEARING AREA AGAINST UNDISTURBED SOIL SQUARE FEET					X (100PSI)
		A	B	C	D	E	
4"	200	2/(1)	1/NONE	1/NONE	NONE	NONE	NONE
	300	3/(2)	2/(2)	2/(1)	1/(1)	NONE	
6"	200	4/(3)	3/(2)	3/(1)	1/(1)	1/NONE	NONE
	300	6/(4)	4/(3)	3/(2)	2/(1)	1/NONE	
8"	200	7/(5)	5/(3)	4/(3)	2/(2)	1/(1)	3/(2)
	300	11/(8)	8/(5)	5/(4)	3/(2)	2/(1)	
10"	200	11/(8)	8/(6)	6/(4)	3/(2)	2/(1)	4/(3)
	275	16/(11)	11/(7)	9/(6)	5/(3)	3/(2)	
12"	200	14/(11)	11/(8)	9/(6)	5/(3)	3/(2)	5/(4)
	250	24/(16)	17/(11)	13/(9)	7/(5)	4/(3)	
14"	200	22/(13)	16/(11)	12/(8)	8/(4)	3/(2)	7/(6)
	250	33/(22)	23/(16)	18/(12)	9/(6)	5/(3)	
16"	200	29/(16)	21/(14)	16/(11)	8/(6)	5/(3)	10/(7)
	225	33/(16)	23/(16)	17/(12)	9/(6)	5/(3)	
18"	200	38/(24)	26/(17)	20/(13)	10/(7)	5/(4)	13/(9)
20"	200	45/(29)	32/(21)	24/(16)	13/(8)	7/(4)	16/(11)
24"	200	64/(43)	46/(30)	35/(23)	18/(12)	9/(6)	23/(16)




90° BEND



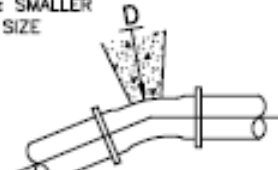
TEE




CAP



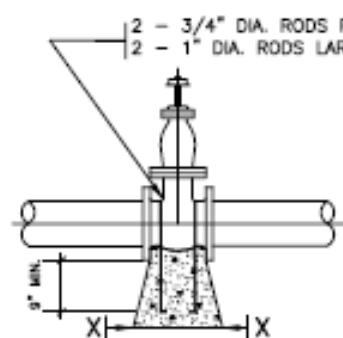
45° BEND



22 1/2° BEND



11 1/4° BEND



GATE VALVE

SAFE BEARING LOADS IN LB./SQ.FT. THE SAFE BEARING LOADS GIVEN IN THE FOLLOWING TABLE ARE FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET.

SOIL	SAFE BEARING LOAD LB. PER SQ. FT.
*MUCK, PEAT, ETC.	0
SOFT CLAY	1,000
SAND	2,000
SAND AND GRAVEL	3,000
CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

* IN MUCK OR PEAT, ALL THRUSTS SHALL BE RESTRAINED BY PILES OR TIE RODS TO SOLID FOUNDATIONS OR BY REMOVAL OF MUCK OF PEAT AND REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THRUST.


THRUST BLOCK NOTES:

- SQUARE FEET OF CONCRETE THRUSTS – BLOCK AREA BASED ON SAFE BEARING LOAD OF 2000/3000 POUNDS PER SQUARE FOOT.
- AREAS MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES AND SOIL CONDITIONS.
- CONCRETE BLOCKING SHALL BE CAST IN PLACE AND HAVE MINIMUM OF 1/4 SQUARE FOOT BEARING AGAINST THE FITTING.
- BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DIS-MANTLING JOINT.
- CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.
- ADDITIONAL BLOCKING MUST BE PROVIDED IF GATE VALVE IS AT END OF LINE DURING TESTING.
- WASTE BLOCKS MAY BE ALLOWED IN AREAS OF UNDISTURBED SOILS. THE SIZE OF THE BLOCK DEPENDS ON THE SIZE OF PIPE, PRESSURE, ETC. POUR CONCRETE BETWEEN THE WASTE BLOCK AND BEND TO FILL THE VOID. THIS ACTION IS BY WRITTEN REQUEST ONLY.

SCALE: NOT TO SCALE
DRAWN BY: S.L.

FILE: WA-07 TB1.DWG

EFFECTIVE DATE: 11-16-2018 REVIEW BY DATE: 07-15-2020 REVIEWER: SHJARBACK

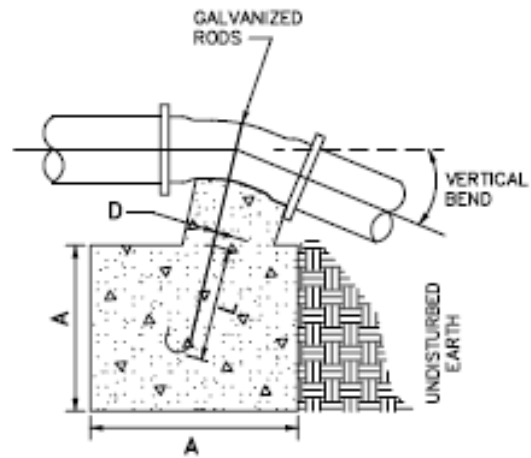


DETAIL: WA-08

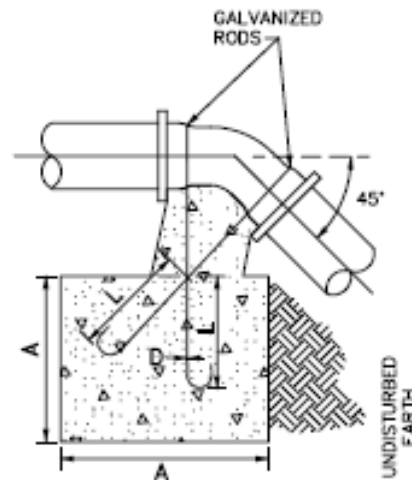
**THRUST BLOCKING
HORIZONTAL BENDS
AND VALVES**

APPENDIX C – STANDARD DRAWING 2018

VERTICAL BLOCKING FOR 11 1/4°-22 1/2°-30° BENDS					
PIPE SIZE:	VB	CU FT	A	D	L
4"	11 1/4°	8	2.0'	3/4"	1.5'
	22 1/2°	11	2.2'		2.0'
	30°	17	2.6'		
6"	11 1/4°	11	2.2'	3/4"	2.0'
	22 1/2°	25	2.9'		
	30°	41	3.5'		
8"	11 1/4°	16	2.5'	3/4"	2.0'
	22 1/2°	47	3.6'		
	30°	70	4.1'		
12"	11 1/4°	32	3.2'	3/4"	2.0'
	22 1/2°	88	4.5'	7/8"	3.0'
	30°	132	5.1'		
16"	11 1/4°	70	4.1'	7/8"	3.0'
	22 1/2°	184	5.7'	1 1/8"	4.0'
	30°	275	6.5'	1 1/4"	
20"	11 1/4°	91	4.5'	7/8"	3.0'
	22 1/2°	225	6.1'	1 1/4"	4.0'
	30°	330	6.9'	1 3/8"	4.5'
24"	11 1/4°	128	5.0'	1"	3.5'
	22 1/2°	320	6.8'	1 3/8"	4.5'
	30°	480	7.9'	1 5/8"	5.5'
VERT. BLOCK. FOR 45° BENDS					
4"	45°	30	3.1'	3/4"	2.0'
6"		68	4.1'		
8"		123	5.0'		
12"		232	6.1'	3/4"	2.5'
16"		478	7.8'	1 1/8"	4.0'
20"		560	8.2'	1 1/4"	
24"	820	9.4'	1 3/8"	4.5'	



VERTICAL BLOCKING
FOR 11 1/4° - 22 1/2° - 30° BENDS



VERTICAL BLOCKING
FOR 45° BENDS

THRUST BLOCK NOTES:

1. CONCRETE BLOCKING BASED ON 200 PSI PRESSURE AND 2500 PSI CONCRETE.
2. WASTE BLOCKS MAY BE ALLOWED IN AREAS OF UNDISTURBED SOILS. THE SIZE OF THE BLOCK DEPENDS ON THE SIZE OF PIPE, PRESSURE, ETC. POUR CONCRETE BETWEEN THE WASTE BLOCK AND BEND TO FILL THE VOID. THIS ACTION IS BY WRITTEN REQUEST ONLY.

SCALE: NOT TO SCALE

DRAWN BY: S.L.

FILE: WA-08 THRUSTBLOCK2.DWG

EFFECTIVE DATE:

11-16-2018

REVIEW BY DATE:

07-15-2020

REVIEWER:

SHJARBACK



DETAIL: WA-09

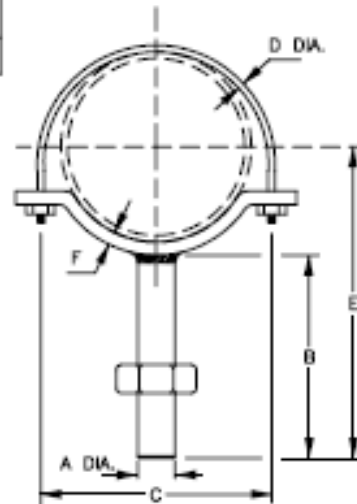
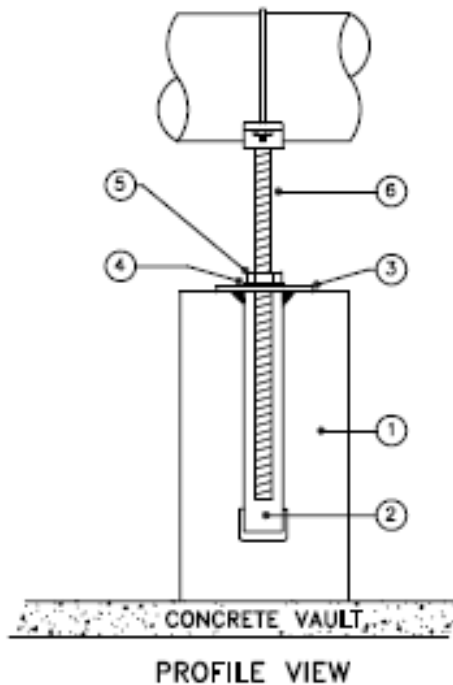
**THRUST BLOCKING
VERTICAL BENDS**

APPENDIX C - STANDARD DRAWING 2018

PIPE SUPPORT: WEIGHTS-DIMENSIONS (INCHES)

PIPE SIZE	A	B	C	D	E	F	WEIGHT APPROX. LB. EA.
2	5/8	8	2 11/16	1/4	9 7/16	1/4X1	1.2
2 1/2	5/8	8	3 5/16	3/8	9 11/16	1/4X1	1.4
3	5/8	8	3 15/16	3/8	10	1/4X1	1.6
3 1/2	5/8	8	4 7/16	3/8	10 1/4	1/4X1	2.6
4	7/8	8	5 1/4	1/2	10 1/2	1/4X1 1/4	3.0
5	7/8	8	6 1/8	1/2	11	1/4X1 1/4	3.2
6	1	8	7 1/4	5/8	11 11/16	3/8X1 1/2	4.9
8	1	8	9 3/8	5/8	12 11/16	3/8X1 1/2	6.2
10	1 1/4	8	11 1/2	5/8	13 7/8	1/2X2	10.5
12	1 1/4	8	13 1/2	5/8	14 7/8	1/2X2	11.8

SIZE RANGE: 2 THROUGH 12
 MATERIAL: CARBON STEEL
 FINISH: BLACK
 SERVICE: STANCHION TYPE SUPPORT WHERE VERTICAL ADJUSTMENT IS REQUIRED, PLUS THE ADDITIONAL STABILITY PROVIDED BY U-BOLT ATTACHMENT TO PIPE.
 ORDERING: SPECIFY PIPE SIZE TO BE SUPPORTED, FIGURE NUMBER, NAME.



PIPE SUPPORT PROFILE
 FIGURE 1

LIST OF MATERIALS:

#	DESCRIPTION:
1	8" PVC SEWER PIPE FILLED WITH CONCRETE
2	CAPPED 1 1/2" STEEL PIPE
3	3/16 PLATE (3"X3" WELDED TO THE 1 1/2" STEEL PIPE WITH A 1 1/4" HOLE DRILLED IN THE CENTER OF PIPE.
4	STEEL WASHER WITH A 1 1/4" HOLE.
5	ADJUSTABLE NUT.
6	GRINNEL ADJUSTABLE PIPE SUPPORT. SEE FIG. 191

SCALE: NOT TO SCALE
 DRAWN BY: S.L.

FILE: WA-09 SUPPORT.DWG

EFFECTIVE DATE: 11-16-2018
 REVIEW BY DATE: 07-15-2020
 REVIEWER: SHJARBACK



DETAIL: WA-10

PIPE SUPPORT JACK
 FOR METERS LARGER
 THAN 2 INCH
 APPENDIX C - STANDARD DRAWING 2018