

Village of Tequesta Water Department Manual of Standards

Minimum Standards for the Design,
Construction and Maintenance of the Water
Distribution System

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SECTION 1 - GENERAL GUIDELINES

1.1 General

The Minimum Standards set forth in this document are intended to provide a basis for design and construction for those Utilities which come under the jurisdiction of the Village of Tequesta (Village). Applicable Federal, State and local environmental laws and regulations should be considered concurrently with this text. Any variation from these standards are to be approved in advance by the Village's Water Department Manager or the designated representative. Variations, in general, will not be approved unless requested in writing and are acceptable to the Village. It is intended that the requirements of these standards shall be applicable in all cases where the facilities being constructed or to be constructed shall be owned and/or operated and maintained by the Village of Tequesta. These requirements shall also be applicable to those portions of the facilities which will lie within public rights-of-way of the Village of Tequesta and Martin/Palm Beach Counties.

The Village assumes no responsibility for the design of improvements or for any material specified. Approval of the Plans and Specifications or use of the Minimum Standards does not relieve the Engineer of Record and/or Owner/Developer from his responsibility for providing a complete working system that does not adversely impact the operation of the existing system.

All referenced standards (AWWA, ANSI, ASTM, NSF, etc.) are the latest revisions thereof. The Village assumes no responsibility for standards developed by outside agencies. Note that the Village standards may not satisfy other agency requirements. Conflicts shall be deferred to the Village's Water Department Manager in writing for resolution.

The Village's responsibility for ownership, operation and maintenance of water mains or water service lines shall end at the meter. Hydrant mains and hydrants shall be owned by the Village, unless stated otherwise. If the hydrant is located in the County, the owner/developer shall be responsible for securing appropriate approvals from the associated County. Fire sprinkler mains shall be owned by the Village to the main line isolation valve. Proper easements and testing are required for all Village-owned facilities as described below.

It shall be the responsibility of the engineer of record to secure proper existing utility information, size facilities and prepare plans all in accordance with these minimum standards. The Village may, at their option, apply more stringent standards where site specific conditions warrant. Copies of all design criteria and calculations shall be provided to the Village.

All construction plans shall be reviewed and approved by the Village. No changes shall be made on approved plans without specific Village concurrence. The Village will

enforce the approved construction plans and specifications to a level equal to that of the minimum standards.

No construction shall start prior to a pre-construction conference with a Village representative in attendance. While the Village will make every effort to ascertain that the plans are in conformance with these standards, the right is reserved to enforce the minimum standards regardless. The Village reserves the right to review shop drawings.

1.2. Easements

Easements shall be of a sufficient width to guarantee that structures are not placed closer than 10 feet to a facility or main. In addition, the easement will allow unhindered access to all such facilities and mains. For easements adjacent and parallel to road right-of-ways, a minimum 10 foot wide easement shall be provided. A minimum 12 foot wide easement shall be provided for single mains in open areas. A 15 foot wide easement will be necessary for a main that runs down the side property line of a single family type dwelling, or through areas not typically accessible. A 30 foot wide easement will be necessary when multiple utilities (such as water and sewer) are placed parallel to each other. Wider easements may be required by the Village's Water Department Manager when design conditions warrant. Easements shall be recorded by the owner/developer in a manner and at such time as directed by the Village.

All work performed under the auspices of the Village Minimum Standards shall fully comply with any Wellfield Protection Rule, Conservation Ordinances and Comprehensive Plan Requirements adopted by the Village.

1.3. Operation & Maintenance Manuals

The Engineer of Record shall supply to the Village two (2) complete sets of operation and maintenance manuals for all electrical and mechanical components including pumps, motors, control circuits, radios, sensors, meters, wiring diagrams, etc.

1.4. Other Agencies

The Engineer of Record is warned that approval of plans and specifications by the Village is for water systems only. Separate approvals for stormwater systems; road repair/replacements; electrical work, wastewater systems etc. is required.

1.5. Existing Facilities

All taps, tie-ins, etc., to existing facilities shall only be completed within the presence of a Village representative. All connections shall be made in accordance with approved plans and specifications as issued by the Village.

SECTION 2 - DESIGN GUIDELINES

The Design Engineer/Engineer of Record should apply the following guidelines and submittal criteria for making a utility construction plan submission to the Village:

- 2.1. Two (2) sets of plans and specifications shall be submitted to the Village. Prepare plans on 24" x 36" sheets and specifications on 8 1/2" x 11" sheets. Specification sheets shall be bound. Use an appropriate scale no smaller than 1" = 50', unless a smaller scale is warranted and approved by the Village in advance of plan submittal. The scales used shall be same as on a standard engineer's scale. Vertical Profiles shall be in a scale of the Plan Horizontal Scale divided by 10.
- 2.2. Submit two (2) sets of paving and drainage plans, preliminary plat showing easements and dedication language, master plan layout for multi-phase project (if applicable), cover sheet with relevant location map, fire flow calculations, sewer calculations, restraint calculations, applicable D.E.P. permit application forms with attachments if applicable (four (4) copies of each application with original signatures are required).
- 2.3. Show clearly phase lines and match lines as appropriate.
- 2.4. Use standard Village details.
- 2.5. Provide all applicable detail drawings.
- 2.6. Avoid placing water mains under storm drains, drainage ditches or sewers, if possible.
- 2.7. Call out conflicts with existing utilities, with indicating "over" or "under" on plan sheet.
- 2.8. Profiles may be required for off-site water mains, depending upon the size of main being installed and the Utility conflicts encountered. Consult with the Village prior to submittal.
- 2.9. Avoid placing piping outside of road right-of-way areas. Easements are required for all facilities which fall outside of road right-of-ways.
- 2.10. Specifically address meter and service line requirements, and provide supporting calculations and historical data, if applicable. The Village will use the AWWA Publication, M22 "Sizing Water Service Lines and Meters" as a guideline for establishing meter and service line sizes.
- 2.11. Carefully check specifications to establish that the Village standards are met. Approved plans will be enforced.
- 2.12. Specify details for all connections to existing facilities.
- 2.13. All drawings submitted shall be neat and legible and shall conform to acceptable standards of drafting. Note all revisions in the revision block.

- 2.14. A Florida Registered Professional Engineer in the appropriate discipline shall sign and seal each set of plans submitted along with supporting calculations and applicable permit applications.
- 2.15. All material specified to be installed shall be new and unused except as approved by the Village.
- 2.16. Water mains shall be extended across the full width of the property frontage.

SECTION 3 - BASIS OF DESIGN - WATER SYSTEMS

There shall be no physical connection between a potable water supply and a questionable water supply which would allow unsafe (contaminated) water to enter the potable water system by direct pressure, vacuum, gravity or any other means. All potable water services around sewage pumping facilities shall be provided with an approved reduced pressure backflow-prevention device.

Hydraulic designs shall be based upon pressure data applicable to the portion of the service area which will serve the proposed facility. Air release valves in vaults shall be provided at all high points in the water main as required by the Village.

Design standards for water mains are as follows:

3.1. Cover

3.1.1. Minimum cover to finished grade over watermains shall be 30 inches except under asphalt roads where the minimum cover shall be 36 inches. Minimum cover in state roads shall be 36 inches.

3.1.2. Maximum cover shall be 48 inches unless approved by the Village.

3.2. Horizontal Separation

3.2.1. 10 feet to sanitary sewers or force mains (less than 10 feet requires pipe material to be Ductile Iron Pipe (DIP) for both watermain and Sewer/Force Main, if permitted by DEP).

3.2.2. 15 feet to buildings, top of bank of lakes and canals, other structures (10 feet absolute minimum - only when unavoidable, and pipe material is required to be DIP).

3.2.3. 10 feet minimum separation to gas mains.

3.2.4. 10 feet minimum to underground electric cable.

3.2.5. Current Florida Department of Protection (DEP) separation requirements.

3.3. Vertical Separation

3.3.1. Watermain shall cross over other pipes when possible.

3.3.2. 18 inch minimum separation between all pipes and cables shall be maintained (6-inch absolute minimum separation with DIP) when conforming to DEP separation requirements.

3.4. Layout

3.4.1. Permanent dead ends will not be accepted unless unavoidable. Dead ends, if accepted by the Village, shall be equipped with a blow-off for flushing purposes.

3.4.2. All water mains shall be placed in right-of-way areas or dedicated easements.

3.5. Water Main Material

Water mains shall be either ductile iron pipe (DIP) or polyvinyl chloride (PVC) as outlined below.

DIP shall be centrifugally cast and shall conform to AWWA C151/ANSI A21.51. PVC pipe 4-inch to 12-inch diameter shall conform to AWWA C900. PVC pipe 14-inch to 36-inch diameter shall conform to AWWA C905.

For water mains 12 inch diameter or smaller, ductile iron pipe Class 350 or polyvinyl chloride C900 DR 18 or thicker pipe shall be allowed . Pipe larger than 12-inch diameter shall be DIP Class 250, or PVC C905 DR 21, or thicker. Flanged pipe shall be DIP Class 250 (Special Class 53). Flanged DIP shall have threaded ductile iron fittings and shall conform to the requirements of AWWA C115. All flanges shall be Ductile Iron Class 150, ANSI B16.5. Flanges shall be flat faced and all joints shall use 1/8-inch black neoprene full faced gaskets. Pipe classes shall be determined based upon the installation and the use intended. Pipe classes shall be appropriately labeled on the drawings. All PVC pipe for potable water service shall bear the approved stamp of the National Sanitation Foundation (NSF). PVC pipe for watermain applications shall be color coded blue for water or spiral wrapped with blue marker tape not more than 18-inches on center. All exposed (above grade) potable water piping (DIP only) shall be color coded Tnemec Aqua Sky.

Ductile iron pipe and fittings shall be cement lined in accordance with AWWA C104. Mechanical joint ductile iron glands shall be ductile iron. Tee bolts and nuts shall be Cor-Ten steel.

Rubber-ring gaskets shall be suitable for the specified pipe sizes. Rubber-gasket joints shall conform to AWWA C111, and gaskets shall be furnished by the pipe manufacturer with the pipe. A nontoxic vegetable soap lubricant shall be supplied with the pipe in sufficient quantities for installing the pipe. The lubricant shall be approved by NSF for use with potable water mains.

3.5.1. DIP shall be required in the following circumstances:

3.5.1.1. Within 10 feet of sanitary and storm sewer pipes.

3.5.1.2. Within 15 feet of structures, canals or lakes.

- 3.5.1.3. Crossings over or under sewers, gas and storm pipes with less than 18 inches separation, with no joint allowed within 10 feet of crossing.
- 3.5.1.4. Beneath all paved areas, excluding driveways or sidewalks.
- 3.5.2. The Village may mandate DIP in any instances of off-site or on-site construction where future abuse to the line is possible due to location or circumstances, or in private property away from right-of-way areas.
- 3.5.3. Restrained Joints shall be DIP as follows:
For 12-inch and Smaller - Restrained joint shall be U.S. Pipe Field Lok, American Ductile Iron Pipe Lok-Fast, EBAA Iron Mega-Lug, or an equivalent product.

For 14-inch Diameter and Larger - Restrained joint shall be U.S. Pipe TR Flex, American Ductile Iron Pipe Lok-Ring, or an equivalent product.
Retainer Glands/Mega-Lug shall not be considered a fitting.

The restraint method shall be suitable for the pipe size thickness and test pressure as required for the specific design case. The plans shall indicate the restrained length of pipe each side of the fittings.
- 3.5.4. Thrust Blocking/Gravity Blocks:
In cases where restrained joints are not used, thrust blocks/gravity blocks shall be installed as required to properly restrain the piping system. At a minimum, thrust blocks/gravity blocks shall be provided on all below grade piping and fittings at the point where either a horizontal or vertical change in direction occurs.
- 3.5.5. Jack and Bore Installations:
Casing pipe used with jack and bores shall be in accordance with requirements of Florida Department of Transportation (FDOT) or the applicable railroad specifications, for the case that applies. Carrier pipe shall be restrained joint DIP as outlined in paragraph 3.5.3.
- 3.5.6. Mains may be tapped as long as the tapping line is smaller than the tapped line unless otherwise approved by the Village. See Section 3.9 for service tap requirements. Equal size line taps not approved by the Village shall require that a tee be cut into the main. Tees are also required at locations dictated by the Village. Tapped connections in pipe and fittings shall be made in such a manner as to provide a watertight joint and adequate strength against pull-out.

Tapping Sleeves and Valves shall be iron, mechanical joint, or wrap-around type of stainless steel, or epoxy coated steel. Tapping sleeves and valves are required for all taps 4-inches and greater. Taps less than 4-inches shall be provided with a service saddle. Valves shall be provided on all taps. Tapping sleeves shall be a minimum of 6 feet from pipe joints.

- 3.5.7. Galvanized steel piping shall only be used as sleeves for the installation of service line tubing under pavement areas. Use in the water distribution system in other areas is not acceptable.
- 3.5.8. Unspecified transitions from DIP to PVC are not allowed. Material for transition shall be indicated and specified.
- 3.5.9. All construction material shall be new first quality components, not previously used. Repair clamps are not acceptable. Damaged or faulty pipe and materials must be properly replaced. All gaskets shall be new. When connecting to existing valves or fittings, gaskets shall be replaced, not reused.
- 3.5.10. Polyethylene wrap shall be used in all locations subject to corrosive conditions. Locations shall be indicated on the drawings. Wrap shall be 8 mil polyethylene and shall be installed in accordance with ANSI/AWWA C105/A 21.5, Method A. Material shall meet the requirements of ASTM D-1248- latest revision.
- 3.5.11. The Engineer shall provide a complete set of "shop" drawings which shall indicate the Village's specific material requirements. In general, material requirements will be directed by the latest revisions of the specifications of AWWA, ANSI, ASTM, and NSF.

3.6. Water Main Size

The minimum size of water main shall be 6 inches. The design engineer shall be required to demonstrate the adequacy of such sizing. All water main sizes must be approved by the Village.

The new water main shall have the ability to meet maximum daily demands plus fire flow requirements as mandated by DEP/Health Department requirements and the Village Fire Department. The residual design pressure under all conditions shall not be less than 20 psi.

3.7. Valves, Fittings and Appurtenances

Valving of all water distribution systems shall be designed to facilitate the isolation of each section of pipeline between intersections of the piping network. Generally, the number of valves at an intersection shall be one less than the number of pipes forming the intersection. Gate valves, 12-inches and less, shall be the resilient seat type conforming to AWWA C509. Valves larger than 12-inches shall be butterfly valves, conforming to AWWA C504. All 12" valves shall be either butterfly or resilient seated gate valves as determined by the design engineer. Wafer valves shall not be accepted. Valves shall generally be installed at intervals of not more than 1,000 LF on transmission mains, at intervals of not more than 700 LF on main distribution loops and feeders, and on all primary branches connected to these mains. In high density areas, valves shall be

installed as required by the Village to minimize the number of persons affected by a break.

The Village shall determine which mains are distribution or transmission mains.

Valves shall turn counterclockwise to open. Valves shall be provided with valve stem extensions to within six-inches of ground surface, where centerline of pipe to grade is greater than four feet.

All valves, bends, tees, crosses and dead ends shall be restrained by a mechanical restraint system or concrete thrust blocks/gravity block as outlined in Paragraph 3.5.3. and 3.5.4. Thrust blocking/Gravity blocks shall be of poured-in-place concrete having a minimum compressive strength of 2,500 psi after 28 days of cure time. Calculations for mechanical restrained joints shall be provided by the design engineer. Concrete thrust blocks/gravity blocks shall be as noted in the Details.

All materials, fittings and appurtenances intended for use in pressure pipe systems shall be designed and constructed for a minimum working pressure of 150 psi unless the specific application dictates a higher working pressure requirement.

Standard pressure pipe fittings of sizes 3-inch ID and larger shall be ductile iron conforming to AWWA C110, with mechanical joints, unless flanged or restrained joints are required. Gray cast-iron fittings are not allowed. Ductile iron fittings shall be cement lined in accordance with AWWA C104. Mechanical joint fittings, 24-inches and smaller shall be rated for 350 psi working pressure. Flanged joint fittings 24-inches and smaller shall be rated for 250 psi working pressure. All fittings 30-inches and larger shall be rated for 250 psi working pressure. For sizes less than 3-inch ID, fittings shall be suitable to the pipe material and application. Glands for mechanical joint fittings shall be ductile iron, and tee bolts and nuts shall be Cor-Ten steel. Only bolt systems furnished by the manufacturer for mechanical joints are acceptable; nuts and bolts shall be new, not reused. Pipe gaskets shall be new as supplied by the pipe manufacturer. All flanges shall be ductile iron Class 150, ANSI B16.5. All flanges shall be flat faced with full face, 1/8" black neoprene gaskets on all flanged joints. All joints shall conform to AWWA C111. Bolts, nuts and washers for flanges shall be hot dip galvanized, except T-bolts shall be Cor-Ten steel.

All above grade flanged piping joints shall have 316 S.S. bolts, nuts and washers.

3.8. Fire Hydrants

Fire hydrants shall be provided in all water mains, transmission and distribution systems. Fire hydrants shall be spaced such that the maximum distance for protection will not be more than 500 feet as the fire hose lays. The appropriate Fire Department shall have final jurisdiction on all hydrant and fire sprinkler line locations during plan review.

A Fire Department approved plan is required with all preliminary plan submissions.

Each hydrant shall be capable of delivering a flow of at least 500 gallons per minute with a residual design pressure of not less than 20 psi.

Fire hydrants shall be Mueller or Clow of the dry barrel break-away type conforming to AWWA C502, with two (2) 2-1/2 inch threaded hose nozzles and one (1) 4-1/2 inch threaded pumper nozzle. Hydrants shall have a 5-1/4 inch interior valve opening and be restrained from hydrant to the tee at the main. Restraint by use of "all-thread" rods shall be allowed. At the discretion of the Village, additional protection for fire hydrants shall be provided including but not limited to concrete filled ductile iron traffic posts.

Fire hydrant branches (from main to hydrant) shall be a minimum of 6 inches inside diameter. Each branch shall be provided with a resilient seat gate valve located as close as possible to the main. Hydrants shall be located near road lines with pumper discharge nozzle facing as directed by the Fire Department. Hydrants shall be laid to minimize their vulnerability to traffic.

3.9. Water Service Lines and Taps

No direct service taps shall be allowed. Only double strap saddles shall be used. Saddles shall be ductile iron or bronze with CC thread pattern and material as required by the Village.

Water service taps on the main shall be spaced at a minimum distance of 18 inches apart and a minimum of 18-inches from a bell or fitting. Consecutive taps shall be offset 45 degrees. All service line taps shall be supplied with corporation stops. Angle meter valves must be installed for each service prior to the meter. All service lines shall be installed in accordance with the construction details of this manual. Service line tubing shall be polyethylene PE 3408 material conforming with AWWA C901, SDR 9. Tubing shall be installed in a continuous length with no in-line fittings except for Y's for multi meters between corporation stop and angle stop. Tubing shall be routed through a 2-inch PVC sleeve or galvanized steel for services under pavement. Minimum size for single services shall be 3/4-inch. Minimum size for double services shall be 1-inch to the Y-branch and 3/4-inch for each service from the Y-branch.

Services shall not exceed 100 feet from the main to the meter.

A service line valve shall be provided by the design engineer or developer on the building side of the meter in an easily-accessible location for use by the building tenant.

3.10. Meter Installation

Construction plans shall include a typical meter installation for each size meter to be installed as outlined in the Village's Standard Details. Each unit within a residential

building (i.e., duplex, triplex, etc.) shall have a separate meter, unless prior approval is received by the Village. The proper sizing of service lines is the responsibility of the design engineer. Meters will be available in the following sizes only: 5/8, 3/4, 1, 1-1/2, 2, 3, 4-inch, and larger standard sizes as necessary. No meter smaller than 3/4-inch will be allowed for irrigation. Meter boxes for 2 inch and smaller meters are standard. Industrial/Office/Commercial type developments will require above grade type meter installations as outlined in the Village's Standard Details. The Village reserves the right to request historical data for meter sizing.

The Village assumes no responsibility for undersized meters and problems associated with it.

All meters under 2" will be provided and installed by the Village. All meters remain the property of the Village.

Meters should generally be placed on the property line just outside of the right-of-way for residential (backside of sidewalks). In developments where the property line is not clearly defined (condominiums) the meter should be placed for ready access as approved by the Village. Meters shall not be placed in areas that can be fenced, such as backyards. Meter boxes shall be kept out of pedestrian walkways and out of driveway areas. For shopping centers, the developer's engineer should give special consideration to meter layout so as to satisfy these requirements. For those instances when the meter assembly falls outside the right-of-way, an easement shall be provided to the Village.

3.11. Backflow Prevention Devices

Backflow prevention devices shall be provided, as required by the Village and as set forth in these Standards. All irrigation systems, water services for industrial/office/commercial, schools, mobile home parks, multi-family residences and any other locations as determined by the Village shall require backflow prevention assemblies. Single family residences two-story and above shall, as a minimum level of protection, provide a double check valve device. Where a greater degree of protection is warranted, such as irrigation, the Village may require a reduced pressure backflow device. Water services to lift stations shall be fitted with reduced pressure backflow preventers.

All fire lines shall have reduced pressure backflow and appurtances as outlined in the Village's Standard Details.

Backflow prevention device assemblies shall be provided with all necessary parts and accessories for a complete operable installation. Assemblies shall be the latest approved product of a manufacturer regularly engaged in the production of equipment of this type. All assemblies shall be as approved by the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California. All assemblies shall be permanently labeled with the following information:

- A. Type of Assembly (Reduced Pressure, Double Check Valve, etc.)

- B. Name or Trademark
- C. Size
- D. Model Number
- E. Direction of Flow (shown by an arrow)
- F. Unit Serial Number
- G. Rated Working Water Pressure (RWWP)
- H. Rated Working Water Temperature (RWWT)

Type and size of assemblies shall be indicated on the drawings.

Backflow prevention device ownership and maintenance responsibilities shall be the property owner's. The Owner shall document yearly that the backflow prevention device has been tested annually by a qualified technician. A copy of a valid technician certification must be attached to the test results.

3.12. System Pressures

The design engineer shall not assume a pressure greater than 35 psi at the meter or detector check valve without confirmation from the Village. The design engineer, if possible, should field verify the available pressures prior to finalizing their design. The Village does not guarantee or warrant any pressure or flow above what the system can furnish. The Village reserves the right to limit water usage for irrigation in the event of drought, or requirement by DEP or SFWMD (South Florida Water Management District).

3.13. Fire Lines

All fire lines shall have reduced pressure backflow preventers with a 3/4" or 1" by-pass meter (to detect low flows). No exceptions shall be made regardless of sprinkler system type, configuration, etc.

SECTION 4 - CONSTRUCTION SPECIFICATIONS FOR WATER SYSTEMS

4.1. Installation

Installation of water mains and associated appurtances shall be in accordance with current AWWA specifications and manufacturer's requirements for their particular products. Loading or unloading and storage of pipe, fittings, valves, etc., shall be done in such a manner so as to avoid damage. The interior of all pipe, fittings, valves, etc., shall be kept free of dirt and foreign matter at all times. All piping shall be placed in a dry trench. Wet trench installation shall be allowed only upon written approval of the Village. All mains shall have a minimum of 30 inches (36 inches under roads and state roads) and maximum of 48 inches of cover to finished grade except where otherwise approved by the Village. Concrete thrust/gravity blocks shall be used at all points a change in direction of the pipeline occurs. Mechanical restraint systems shall be required where noted on the details or as an option to concrete thrust blocks. Concrete gravity blocks will be allowed where required. At all thrust/gravity blocks visqueen protection of bolts shall be provided. Calculations shall be provided for restrained joints.

All pipe shall be laid in trenches having a dry and stable bottom. Backfill shall be free of boulders and debris. Pipe shall be fully supported along its entire length. Sharp or rocky material encountered in the base shall be replaced with proper bedding. Pipe shall be laid on line and grade as designed. Pipe joints, gravity blocks, conflicts and service connections shall be left exposed until visually inspected and approved by a Village representative.

Metallic backed indicator tape is to be installed over all PVC mains at 12-inches below grade. Non-metallic indicator tape shall be installed over all DIP mains. The tape color shall be blue.

Fire hydrants shall be installed true and plumb with the center of the pumper nozzle approximately 18 inches above finished grade with break flange a minimum of 3" above finished grade. Hydrants shall not be placed in sidewalks. It will be the responsibility of the developer and contractor to move hydrants placed in the sidewalk prior to project acceptance.

All valves shall be placed according to plan unless movement is mutually agreed to. All valve stems shall be installed plumb. Valve stem extensions are required as described in Section 3.7. Air relief valves shall be installed at all high points in the pipeline where air can collect as shown on approved plans or as directed by the Village. Record drawings shall reflect the proper location of all mains, hydrants, services, valves and appurtances.

All road and railroad crossings and pavement cuttings shall be in accordance with the requirements of the particular authority governing the area.

4.2. Connection to Existing System

All connections to existing mains shall be made under the direct supervision of the Village. Valves on existing mains shall be operated by or under the direct supervision of Village personnel. Tapping sleeves and valves shall be pressure tested prior to tapping. If service must be cut-off to existing customers, the Village must have three (3) days notice to make necessary notifications. The contractor or developer may be required to assist in notifications. If service must be cut off, the contractor shall be ready to proceed with as much material preassembled as possible at the site to minimize the length of service interruption. The Department will postpone a service cut-off if, in the opinion of the Village, the contractor is not ready to proceed on schedule. Such connections may be required to be made at night (low demand conditions) to minimize effects.

No customer should be without water service for more than four hours. The Developer or Owner shall provide temporary services to Customers who may be without permanent service for over four hours.

Bacteriological testing (local chlorination) will be required for all pipe and fittings used to complete connections with the potable water system. Tapping sleeves and valves shall be chlorinated in accordance with the requirements of AWWA/FDEP/Health Department. All wet taps shall be witnessed by the Village representative. The pipe coupon shall be preserved and submitted to the Village inspector.

4.3. Cleaning and Flushing

Foreign material shall be kept out of all pipe or cleaned from the pipe prior to installation. Upon completion of installation, the mains shall be flushed and the water disposed of without creating a nuisance. Flushing must achieve a minimum water velocity of 2.5 feet per second in all portions of the pipe. The duration of the flushing shall be as directed by the Village. Cannon flushing may be required at the sole discretion of the Village. Temporary fittings, pipe, etc., to allow cannon flushing shall be provided at no cost to the Village. No flushing shall take place without a Village representative present.

The existing mains that the new mains are connected to may be required to be flushed under the direction of the Village when service is restored.

4.4. Testing

Contractor and developer shall provide all equipment (including a pressure gauge acceptable to the Village) and materials and labor necessary for pressure and leakage testing. All mains and services shall be tested for leakage. Water shall be supplied to the main at the expense of the developer and contractor and pumped to the required pressure of 150 psi. The main tested shall either be isolated from active potable lines or protected from leakage by a double valve arrangement. All water utilized for the pressure and leakage test shall be potable water with an adequate chlorine residual.

Water mains shall be tested by valve sections, based upon the maximum spacing of valves as required in Section 3.7. The maximum length of line to be tested as one section

will be 1,000 feet. The maximum allowable leakage shall be as determined in accordance with the current AWWA leakage specifications. The standard test length is two (2) hours at 150 psi. Testing procedures shall meet or exceed AWWA C600. The contractor shall successfully complete a pretest prior to scheduling the pressure and leakage test with the Village. The pressure and leakage test must be observed by a Village representative and the design engineer representative. The contractor shall replace or adjust components of the pipeline which fail the test. The pipeline shall then be tested as described above until it passes the test criteria. The pressure and leakage test shall be done concurrently.

Bacteriological testing shall not begin until after the pressure/leakage test, flushing and record drawings have been accepted by the Village.

4.5. Disinfection

Contractor and developer shall provide all equipment and materials necessary for disinfection. All mains shall be disinfected in accordance with FDEP/Health Department regulations. Bacteriological samples shall be taken from all sections of the main via standard sampling tap assemblies, and sent to an HRS-approved laboratory for analysis. Clearance is required from the DEP/Health Department before the Village will allow the main to be put into service. Sampling taps and testing chlorinated water used for disinfection shall be flushed to a location that will not damage adjacent property, persons, etc., and shall be provided by the contractor and developer at no cost to the Village.

SECTION 5 - RECORD INFORMATION

Record drawings, certified by the design engineer and a professional land surveyor, shall be provided for all projects. These drawings shall include elevations, lengths, stations, and locations, as appropriate, for all facilities including services. Drawings shall show location of existing facilities where crossed by new facilities.

A preliminary record set shall be submitted to the Village for review prior to submittal of the final record drawings. The preliminary set shall be "blue-line" with all deviations to the construction drawings clearly indicated in red. The preliminary set shall be certified by the design engineer and a professional land surveyor.

One reproducible mylar and two paper prints of the plan sheets and profiles (if applicable), shall be provided.

SECTION 6 - INSPECTION REQUIREMENTS

No work shall be covered until observed by a representative of the Village of Tequesta Water Department.

The Village representatives may inspect all construction and materials and may also inspect preparation, fabrication or manufacture of components, materials and supplies. The inspector is not authorized to revoke, alter or waive any requirements of the specifications, but is authorized and expected to call to the attention of the developer's engineer and/or contractor any observed failure of work or materials to conform to the plans or specifications. Failure of the Inspector to call to the attention of the Contractor any item not in conformance to the plans and specs shall not constitute acceptance of the item. The inspector shall have the authority to reject materials or suspend the work pending review. The inspector shall in no case act as foreman or perform other duties for the design engineer and/or contractor nor interfere with the management of the work. Advice which the inspector may give shall in no way be construed as binding to the Village or releasing the developer, his engineer or contractor from performing according to the intent of the plans and minimum Village Standards.

Inspections will be scheduled for regular working hours only, except for nights when service disruptions are involved. Work will not be scheduled for weekends or holidays. The Village shall be provided with at least two (2) full working days notice for scheduled inspections. Inspectors will make routine passes to the project to inspect such items as gravity blocks, materials on site, clearances between conflicting lines, etc. Scheduled inspections are also required for jack and bores, pressure/leakage tests, bacteriological sampling, water taps, and any time an existing Village facility is to be modified.

It shall be the design engineer's responsibility to schedule inspections, and their qualified representative shall be present at all scheduled tests and inspections. A scheduled inspection will be cancelled if the representative is not present. The design engineer shall have the Contractor pre-test water mains to minimize failures and the need for additional inspections. The design engineer shall prepare accurate record drawings and submit to the Village. In any case, record drawings must be submitted prior to service being provided to any phase of a project.

The Contractor shall be allowed one scheduled test and one scheduled retest at no cost for the Village representative. For additional tests, the Village shall bill the developer for the time of the Village Inspector at the amount defined within the Village rate structure.

The contractor shall be solely responsible for on-site safety and their ability to abide by the Florida Trench and Safety Act.

SECTION 7 - PROJECT ACCEPTANCE

No project shall be put into permanent use until the Village has accepted it. The Village requires the following items be completed prior to acceptance.

1. Signed and sealed record drawings are received.
2. Release of the project by DEP/HRS.
3. Village Inspector has viewed the items he is required to see.
4. Owner provides a Release of Lien stating all items given to the Village are free and clear of liens.
5. Copy of plat with recorded easements are received.
6. Copies of all testing (Bacteriological, Densities, Pressures, etc.) results are received.
7. Contracts for service are executed.
8. All other agencies having jurisdiction have been satisfied.
9. For projects within the un-incorporated areas of Martin/Palm Beach Counties, a copy of all releases from the appropriate County agencies.

SECTION 8 - APPROVED PRODUCT LIST

- 8.1. Fire Hydrants
 - 8.1.1. Mueller Centurion (Super Centurion 200 Catalog A-423, D-150 shoe)
 - 8.1.2. Clow Medallion

- 8.2. Resilient Seat Gate Valves 4" - 12"
 - 8.2.1. Mueller - Sure-Seal
 - 8.2.2. Kennedy
 - 8.2.3. American Cast Iron Pipe Company

- 8.3. Butterfly Valves 12" and Larger
 - 8.3.1. Mueller-Lineseal III
 - 8.3.2. American/Darling
 - 8.3.3. Kennedy
 - 8.3.4. Pratt
 - 8.3.5. Clow-AWWA
 - 8.3.6. Dezurik-AWWA

- 8.4. Tapping Valves (Resilient Seat Type Only)
 - 8.4.1. M & H - Style 3751-NRS
 - 8.4.2. American
 - 8.4.3. Mueller
 - 8.4.4. Kennedy
 - 8.4.5. Clow

- 8.5. Tapping Sleeve - Stainless Steel or Epoxy Coated Only
 - 8.5.1. JCM #432 (Stainless) or #412 (Epoxy Coated)
 - 8.5.2. Rockwell #622 (Epoxy Coated)

- 8.6. Tapping Sleeve - Mechanical Joint (Ductile iron)
 - 8.6.1. American
 - 8.6.2. Clow - F (varies)
 - 8.6.3. Mueller
 - 8.6.4. M & H - Style 974
 - 8.6.5. JCM #414 (Steel-Epoxy Coated)

- 8.7. Check Valves (Weight and Lever Type Only)
 - 8.7.1. M & H Style #159-02
 - 8.7.2. American "50" Line
 - 8.7.3. Clow - F-5382
 - 8.7.4. Dresser

- 8.8. Mechanical Joint and Flanged Fittings (AWWA/ANSI, Cement Lining)
 - 8.8.1. Tyler
 - 8.8.2. American
 - 8.8.3. U.S. Pipe

- 8.8.4. McWane
- 8.8.5. Nappco
- 8.9. Corporation Stops
 - 8.9.1. Ford cc Thread x Compression Fitting For P.E. Tubing
- 8.10. Meter Angle Valves (T-Handle, Locking Ring Type Only)
 - 8.10.1 Ford
- 8.11. Y-Branch
 - 8.11.1. Ford
- 8.12. Yokes
 - 8.8.1. Ford
- 8.13. Service Saddles (Double Strap Saddles Only)
 - 8.13.1. Rockwell
 - 8.13.2. Mueller
 - 8.13.3. Ford
- 8.14. Backflow Preventers
 - Residential
 - 8.14.1. Watts Double Check Valve Series 7: 3/4 & 1"
 - 8.14.2. Ford HS31 Series: 3/4" & 1"
 - 8.14.3. Febco Model 810
 - 8.14.4. Wilkins Model 700
 - Commercial
 - 8.14.5. Febco
 - 8.14.6. Watts
 - 8.14.7. Wilkens
- 8.15. Meters - 5/8", 3/4", 1" (Displacement Type, Magnetic Drive)
 - 8.15.1. Sensus
- 8.16. Meters - 2" and Larger
 - 8.16.1. Sensus Compound
- 8.17. Meter Strainers (2" and Larger Meters)
 - 8.17.1. Sensus
- 8.18. Fire Service Meters
 - 8.18.1. Sensus
- 8.19. Meter Boxes/Vaults - Vehicular Area
 - 8.19.1. Brooks Concrete Products Series 36, Dual H-4, 37, 38, 66
- 8.20. Meter Boxes/Vaults - Non-Vehicular Area

8.20.1. Brooks Products

8.21. Air Release Valves (Water) 1" Minimum

8.21.1. Apco - Model 200

8.21.2. Crispin

8.21.3. Val-Matic - VM 38

8.22. Manhole Frame and Covers

8.22.1. US Foundry No. 230-AB-M

8.22.2. Vulcan Foundry No. VM-101 (Water)

8.23. Pipe - PVC (Must Meet Village Standards)

8.26.1. Water Main

8.24. Pipe - DIP

8.27.1. U.S. Pipe

8.27.2. American

8.27.3. McWane

8.25. Valve Boxes (5¼" diameter only)

8.28.1. Tyler

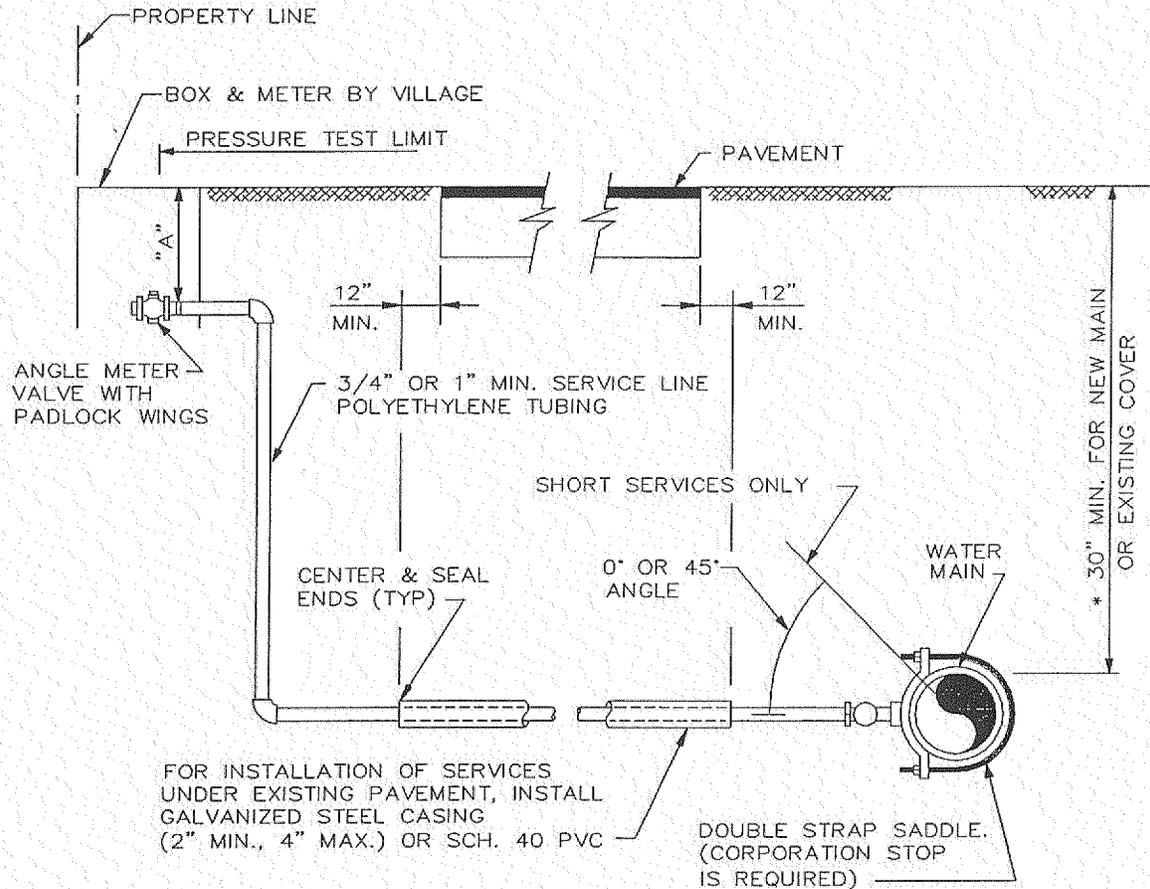
8.28.2. Clow

8.28.3. M & H

8.28.4. U.S. Foundry

SECTION 9 - STANDARD DETAIL USAGE CRITERIA

The details provided here are for the sole use on projects which will be owned and maintained by the Village of Tequesta. The modification of any detail is expressly prohibited without the written consent of the Village. Usage of the details on projects other than those owned by the Village is also strictly prohibited.



NOTES:

1. SUCCESSIVE TAPS INTO THE WATER MAIN SHALL BE SPACED A MINIMUM OF 18" APART. TAPS SPACED BETWEEN 18" TO 48" SHALL BE OFFSET TO EACH SIDE OF THE MAIN, OR OFFSET 45°.
 2. METER BOX SHALL BE SET TO CONFORM TO FINISHED GRADE ADJACENT TO PROPERTY LINE. METER BOX SHALL NOT BE PLACED IN SIDEWALK OR DRIVEWAY AREAS. SERVICE LINES SHALL NOT BE PLACED UNDER DRIVEWAYS.
 3. TUBING TO BE POLYETHYLENE
 4. ALL 5/8" & 1" METERS REQUIRE A 3/4" & 1" LOCKING ANGLE METER VALVE RESPECTIVELY.
 5. 2" METER REQUIRES BY-PASS
 6. DIMENSION "A" = 7" (5/8" METER)
= 8" (1" METER)
= 12" (2" METER)
 7. MAXIMUM SERVICE LENGTH IS 100' TO METER.
- * 36" MIN. IN STATE ROAD R/W & UNDER ASPHALT

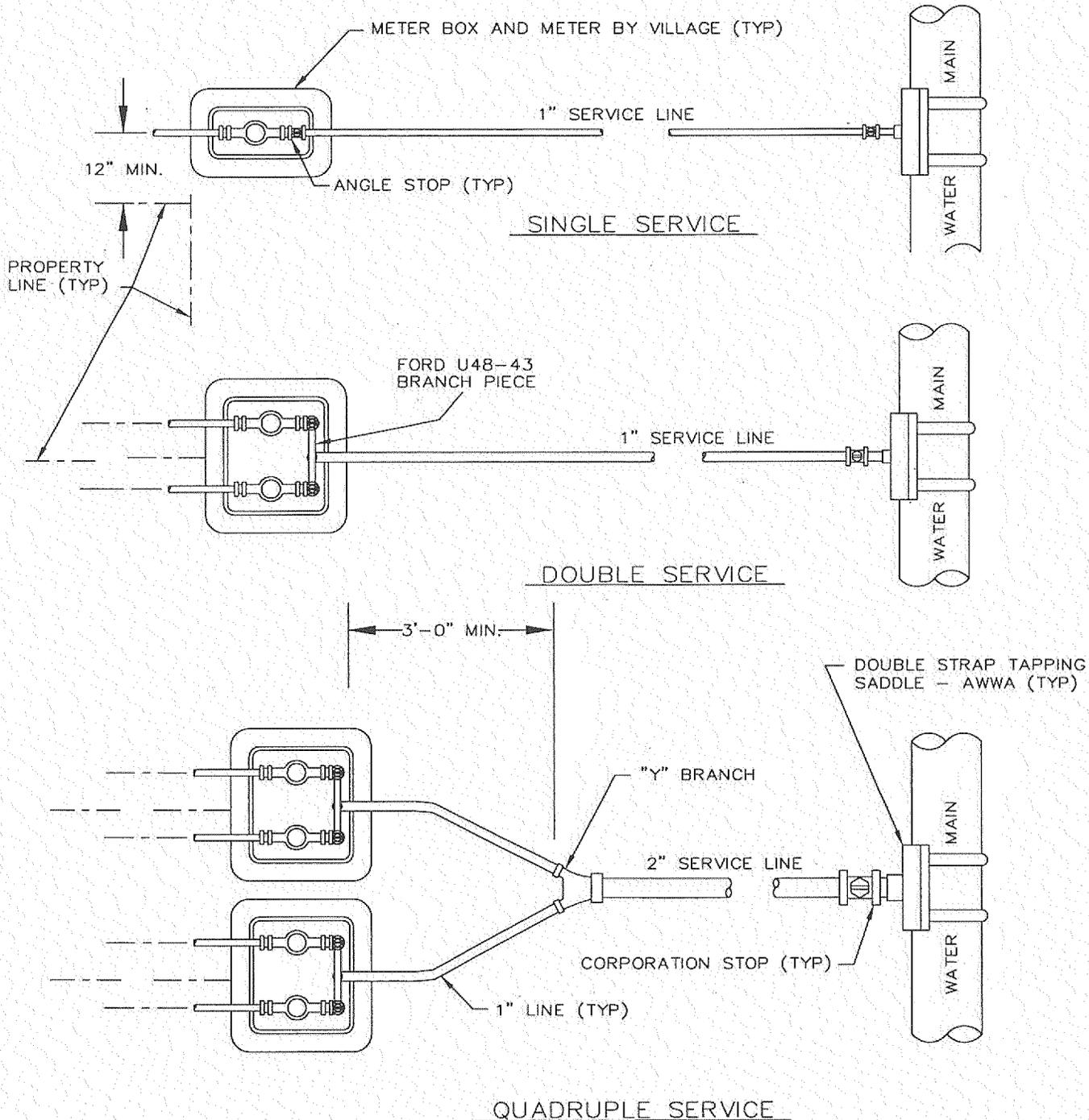
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

TYPICAL SERVICE CONNECTION (UNDERGROUND)
FOR
5/8", 1" OR 2" METER

PAGE No

D1



NOTES:

1. AUTHORIZED SERVICE LINE MATERIAL SHALL BE POLYETHYLENE TUBING.
2. MULTIPLE SERVICE/METER INSTALLATIONS OF MORE THAN 4 METERS PER SERVICE AND SERVICE LINES LARGER THAN 2" IN DIAMETER SHALL BE HANDLED ON AN INDIVIDUAL BASIS.
3. NO FITTINGS BETWEEN CORP. STOP & ANGLE VALVE OR CORP. STOP & "Y" BRANCH FOR MULTIMETER INSTALLATIONS.

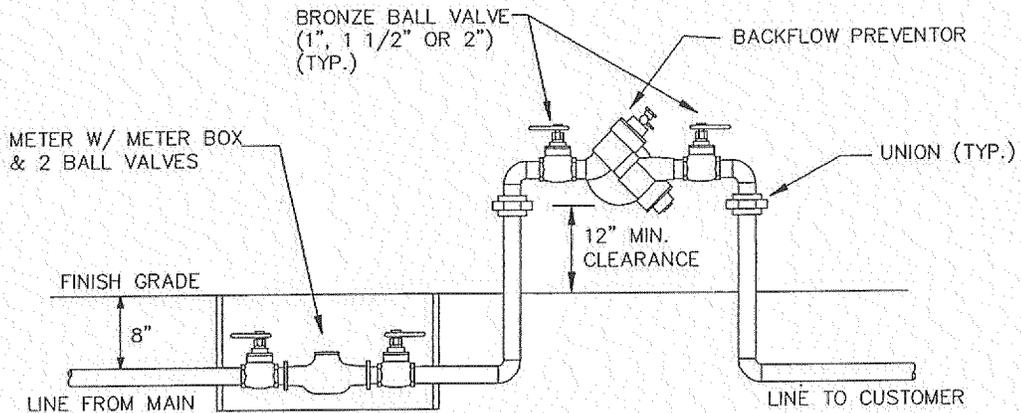
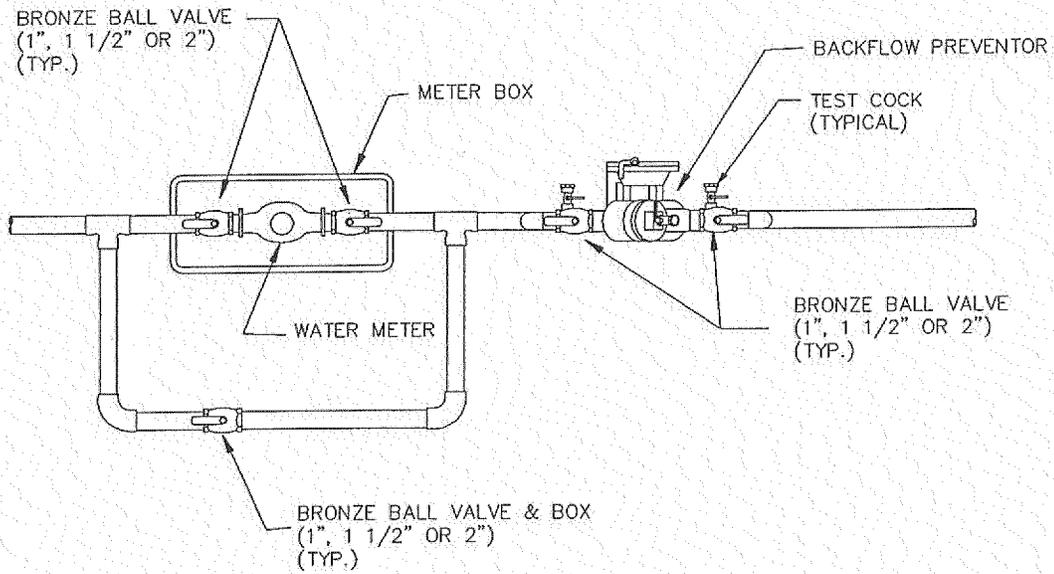
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

TYPICAL SERVICE FOR
MULTIPLE SERVICES
(TWO OR MORE)

PAGE N^o

D2



NOTES:

1. ALL PIPING IS METER SIZE
2. ALL PIPING IS BRASS WITH THREADED FITTINGS
3. THIS DETAIL IS ALSO APPLICABLE TO 5/8" AND 3/4" SERVICE WHERE A BACKFLOW PREVENTION DEVICE IS REQUIRED

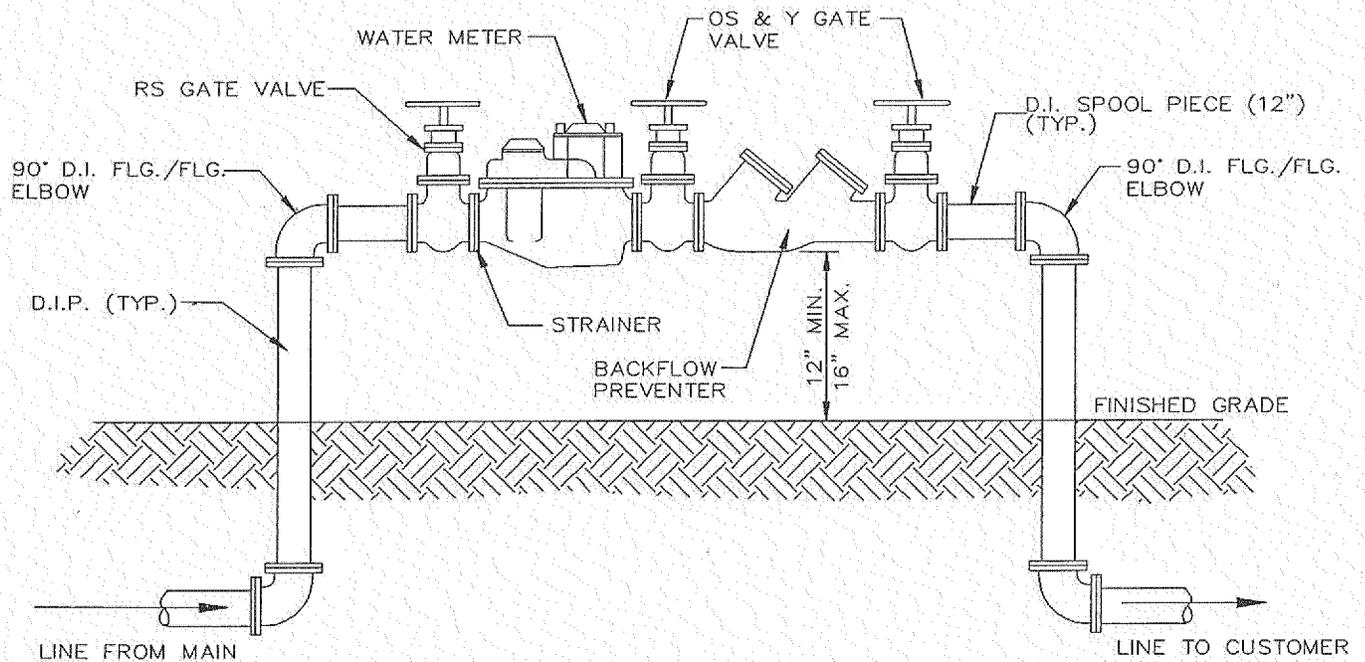
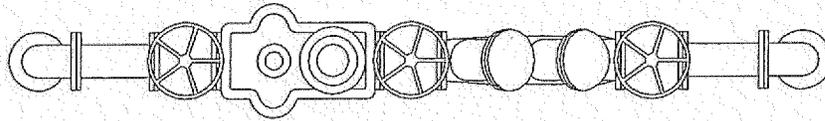
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

1", 1 1/2" AND 2" METER
(ABOVE GROUND)

PAGE N^o

D3



NOTES:

1. ALL PIPE AND FITTINGS SHALL BE CLASS 51 DUCTILE IRON CEMENT LINED.
2. MECHANICAL JOINT FITTINGS SHALL BE REQUIRED UNDERGROUND AND FLANGED FITTINGS FOR ABOVE GROUND USE, NO UNIFLANGES PERMITTED.
3. PAINT THE ENTIRE ABOVE GROUND ASSEMBLY, IN ACCORDANCE WITH THE VILLAGE STANDARD. DO NOT PAINT OVER NAME/SERIAL PLATE OR BRASS FITTINGS.
4. SUPPORT PIERS OR PIPE JACKS AS APPROVED BY THE VILLAGE, EXACT LOCATION TO BE DETERMINED IN THE FIELD BY VILLAGE.
5. BACKFLOW PREVENTION DEVICES AND ASSOCIATED VALVES SHALL BE SUPPLIED BY THE CONTRACTOR.
5. METER TO BE SUPPLIED BY CONTRACTOR PER V.O.T. SPECIFICATION.

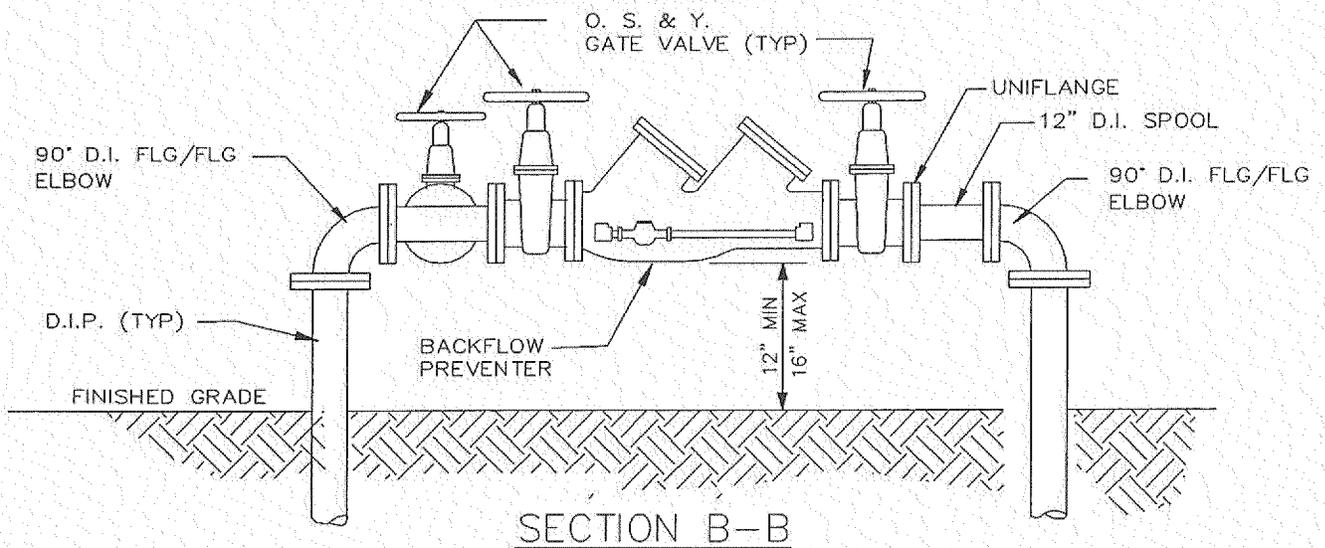
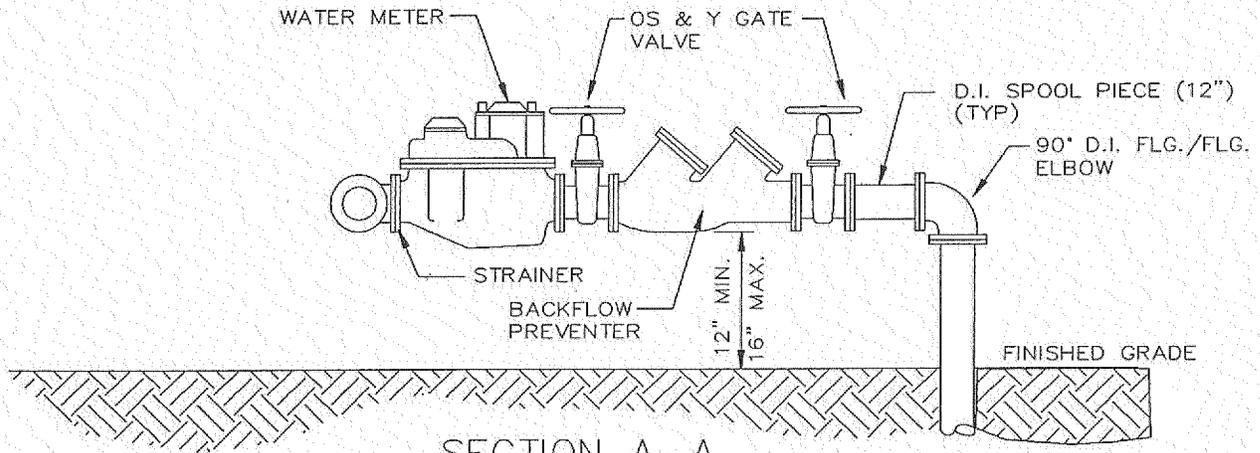
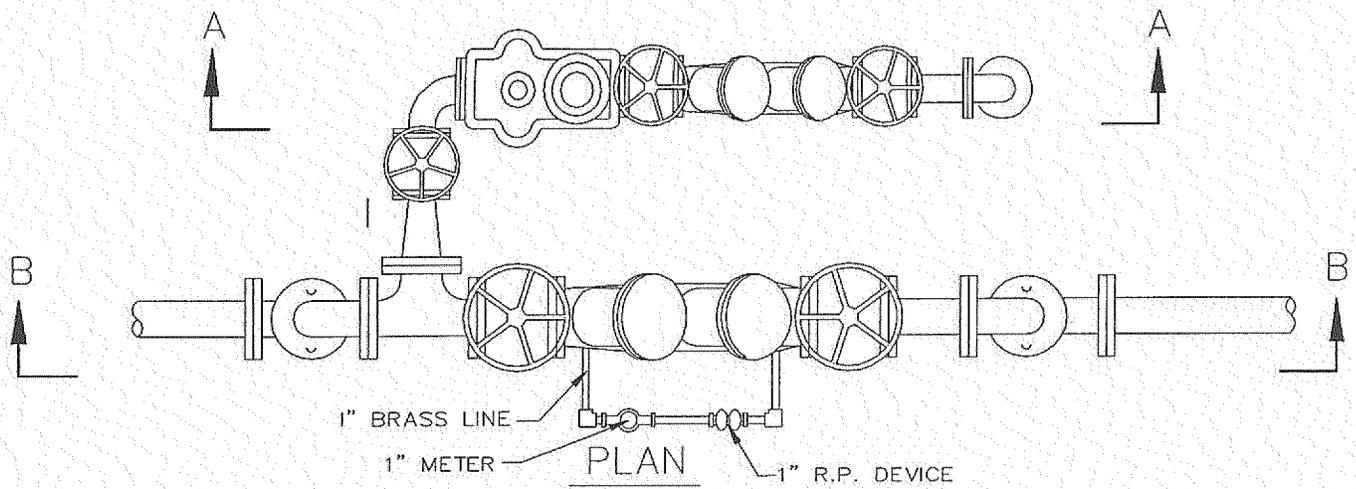
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

3" AND 4" METER / BACKFLOW ASSEMBLY

PAGE N^o

D4



NOTES:

1. ALL PIPE AND FITTINGS SHALL BE CLASS 350 DUCTILE IRON CEMENT LINED.
2. MECHANICAL JOINT FITTINGS SHALL BE REQUIRED UNDERGROUND AND FLANGED FITTINGS FOR ABOVE GROUND USE.
3. PAINT THE ENTIRE ABOVE GROUND ASSEMBLY, IN ACCORDANCE WITH THE VILLAGE STANDARDS. DO NOT PAINT OVER NAME/SERIAL PLATE OR BRASS FITTINGS.
4. SUPPORT PIERS OR PIPE JACKS AS APPROVED BY VILLAGE, EXACT LOCATION TO BE DETERMINED IN THE FIELD BY VILLAGE.
5. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE BY-PASS METER ASSEMBLY.

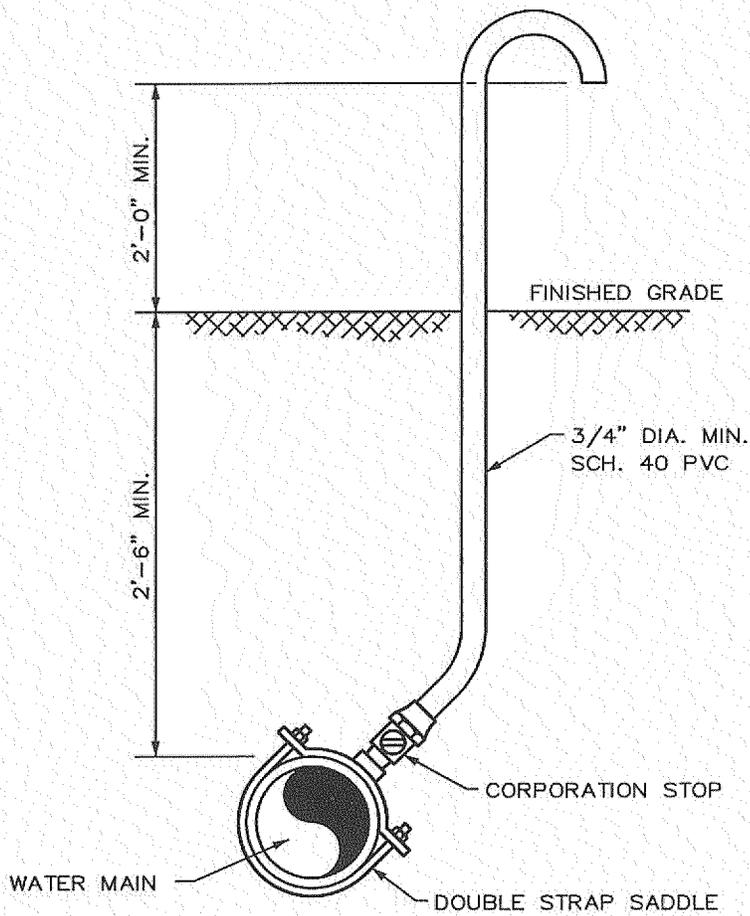
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

SERVICE AND FIRE LINE ASSEMBLY

PAGE N^o

D5



NOTE:

SAMPLE POINT SHOULD BE A SERVICE LINE OR FIRE HYDRANT
IF POSSIBLE.

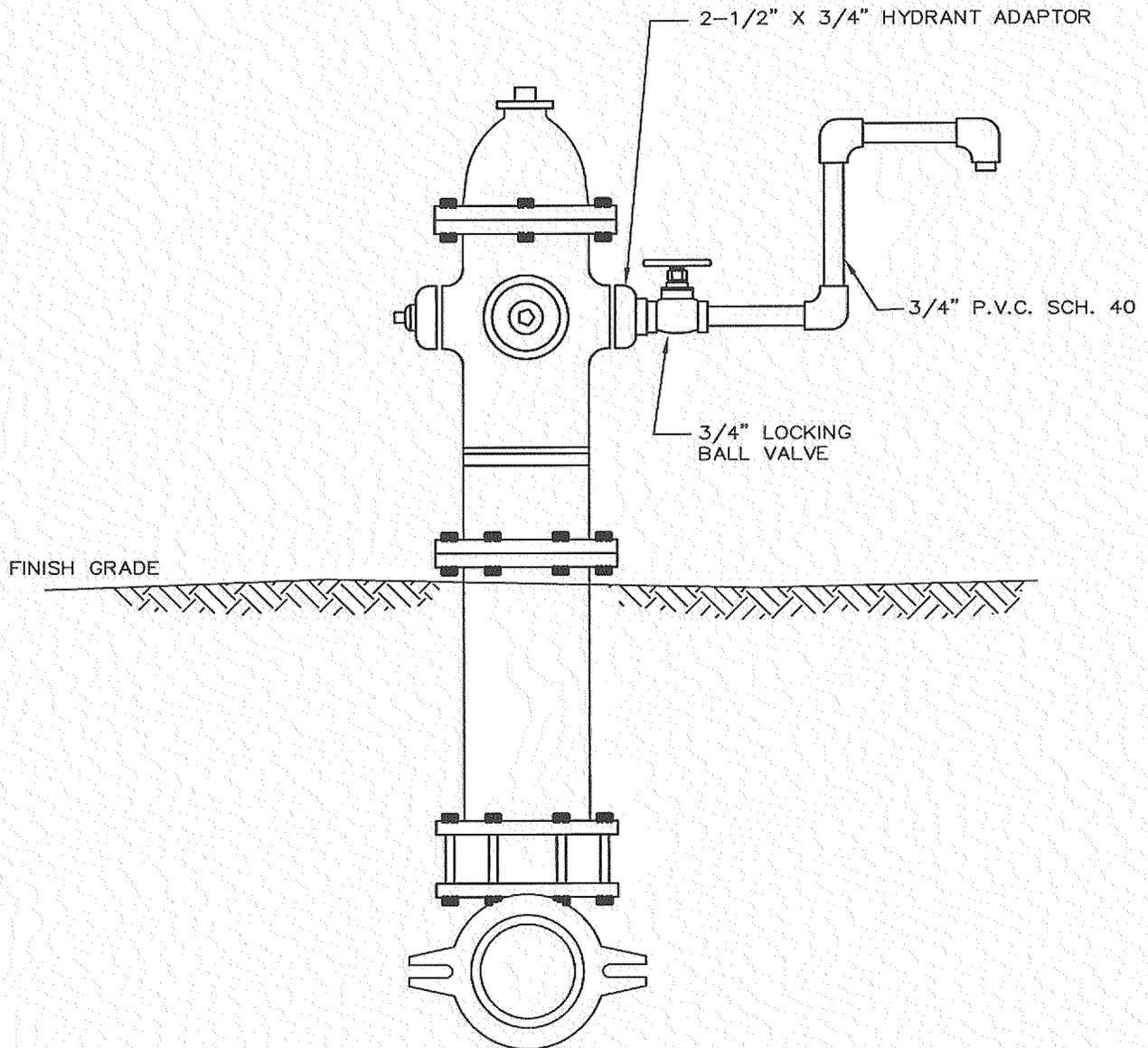
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

SAMPLING POINT (ON MAIN)

PAGE N^o

D6



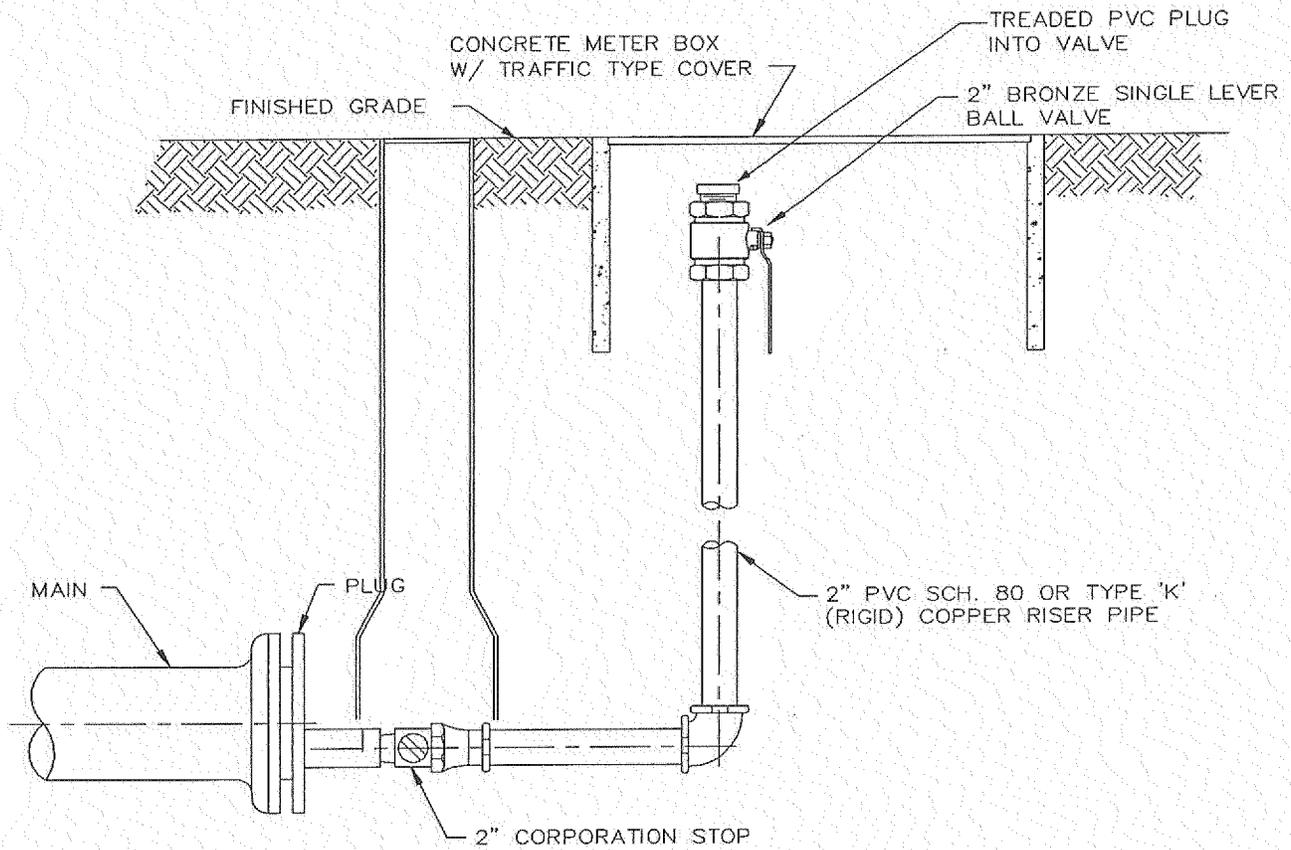
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

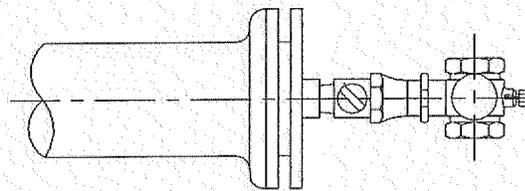
SAMPLING POINT (ON HYDRANT)

PAGE N^o

D7



ELEVATION



PLAN

NOTES:

1. GALVANIZED PIPING AND FITTINGS SHALL NOT BE USED ON TEMPORARY OR PERMANENT BLOWOFFS.
2. THE MAIN SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH THE VILLAGE STANDARDS. THE NUMBER OF PIPE LENGTHS TO BE RESTRAINED SHALL BE PER THE MANUFACTURER RECOMMENDATION.

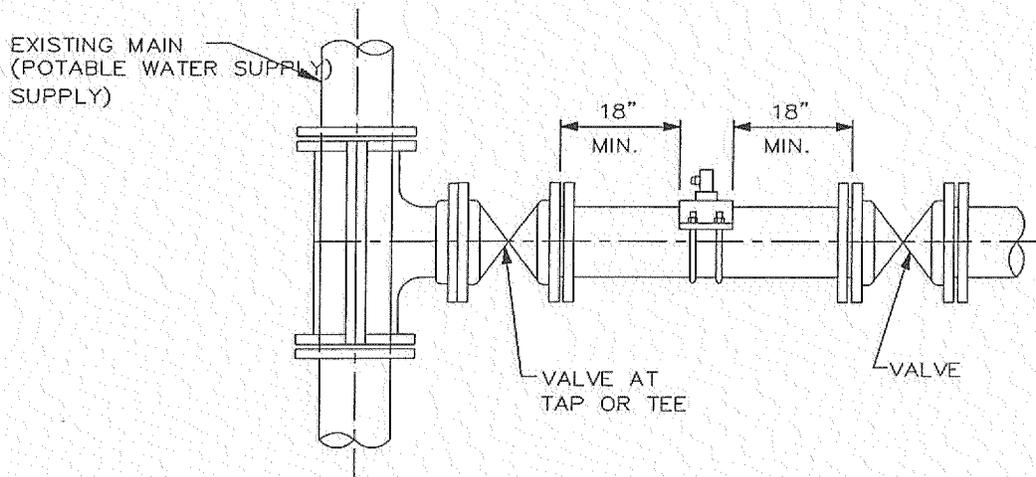
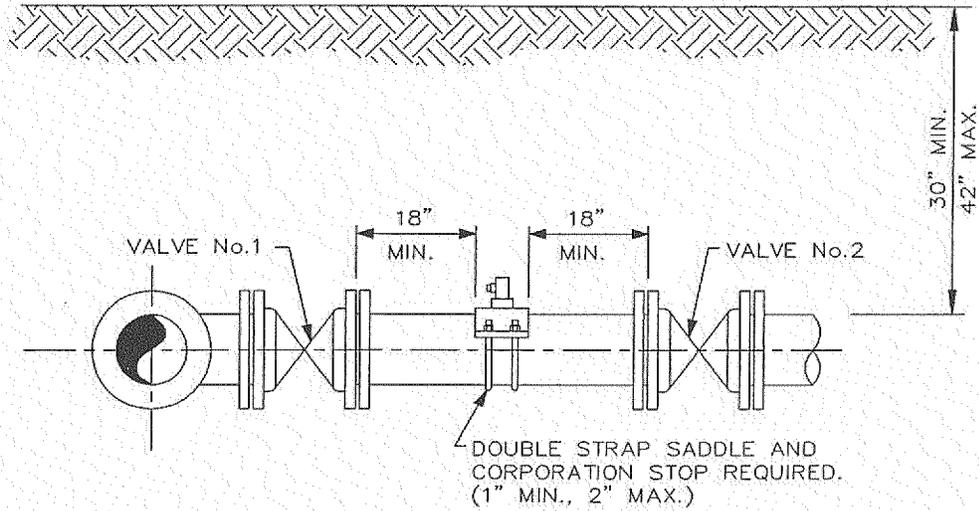
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

TYPICAL 2" TERMINAL END BLOWOFF

PAGE N^o

D8



NOTES:

1. BOTH VALVES SHALL BE KEPT CLOSED EXCEPT FOR FILLING, FLUSHING AND BACTERIOLOGICAL TESTING PURPOSES.
2. THE CORPORATION STOP MAY BE USED FOR FEEDING CHLORINE SOLUTIONS, AND FOR VENTING DURING PRESSURE/LEAKAGE TESTS.
3. THE VILLAGE SHALL BE NOTIFIED BEFORE FILLING AND FLUSHING. VALVES ON EXISTING SYSTEM SHALL BE OPERATED ONLY BY VILLAGE PERSONNEL.
4. AFTER BACTERIOLOGICAL CLEARANCE, VALVE NO. 2 IS TO BE LEFT OPEN WITHOUT A VALVE BOX.
5. PRESSURE TEST PUMP CONNECTS TO SERVICE LINE OR BLOWOFF. NO EXTRA TAPS ARE PERMITTED UNLESS APPROVAL HAS BEEN BY THE VILLAGE.

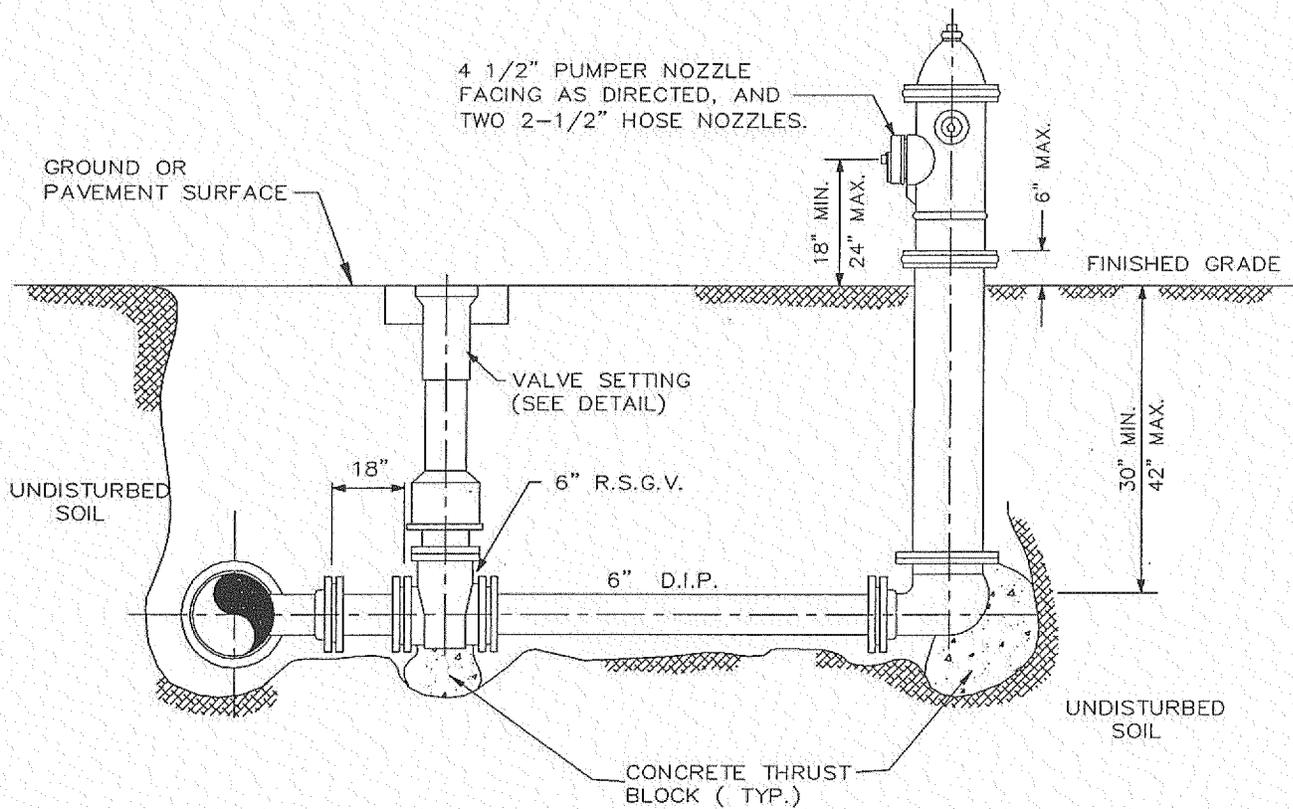
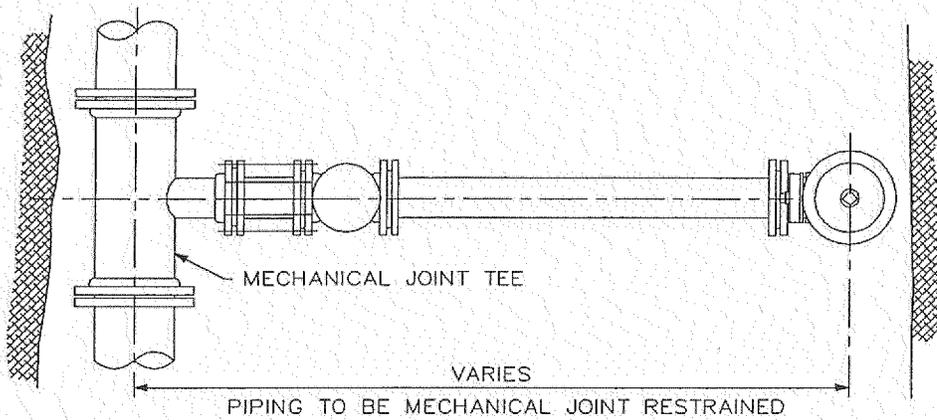
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

DOUBLE VALVE DETAIL

PAGE N^o

D9



NOTES:

1. HYDRANT SHALL BE INSTALLED PLUMB AND TRUE.
2. THE MODEL AND COLOR HYDRANT SHALL BE PER VILLAGE REQUIREMENTS.
3. VALVE SHALL BE PLACED ADJACENT TO MAIN, TIED TO TEE.
4. ANCHOR TEES ARE PERMITTED.
5. ALL HYDRANTS SHALL BE TEE'D OFF OF MAINS.
6. HYDRANTS SHALL NOT BE PLACED IN SIDEWALKS, ROADWAYS OR BIKEPATHS.

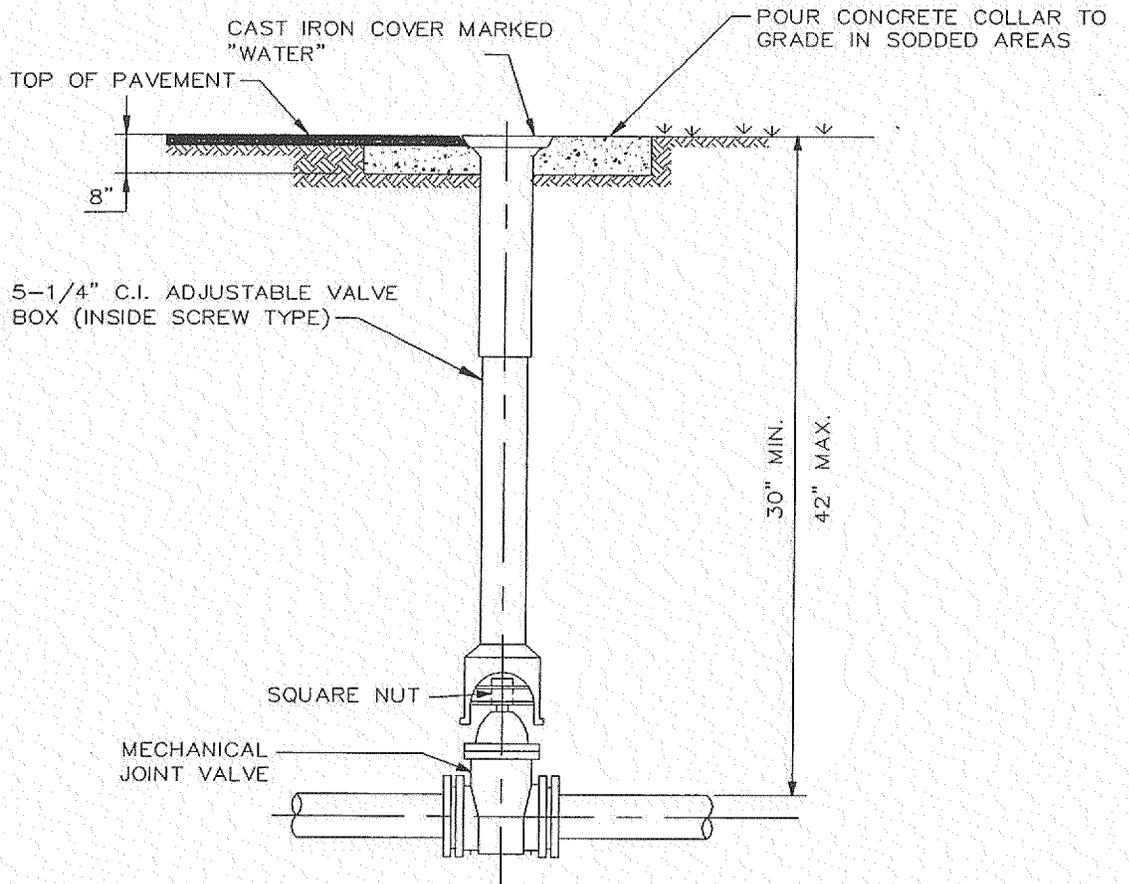
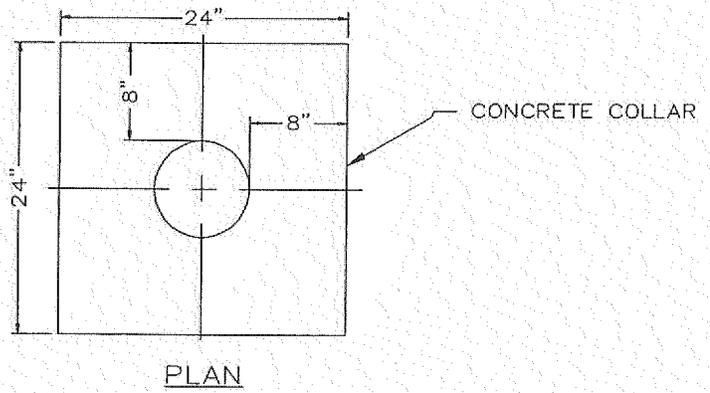
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

TYPICAL
FIRE HYDRANT ASSEMBLY

PAGE N^o

D10



NOTE:
VALVE NUT EXTENSION IS REQUIRED ON ALL VALVES WITH MORE THAN 36" OF COVER. EXTEND NUT TO WITHIN 18" OF VALVE BOX RIM.

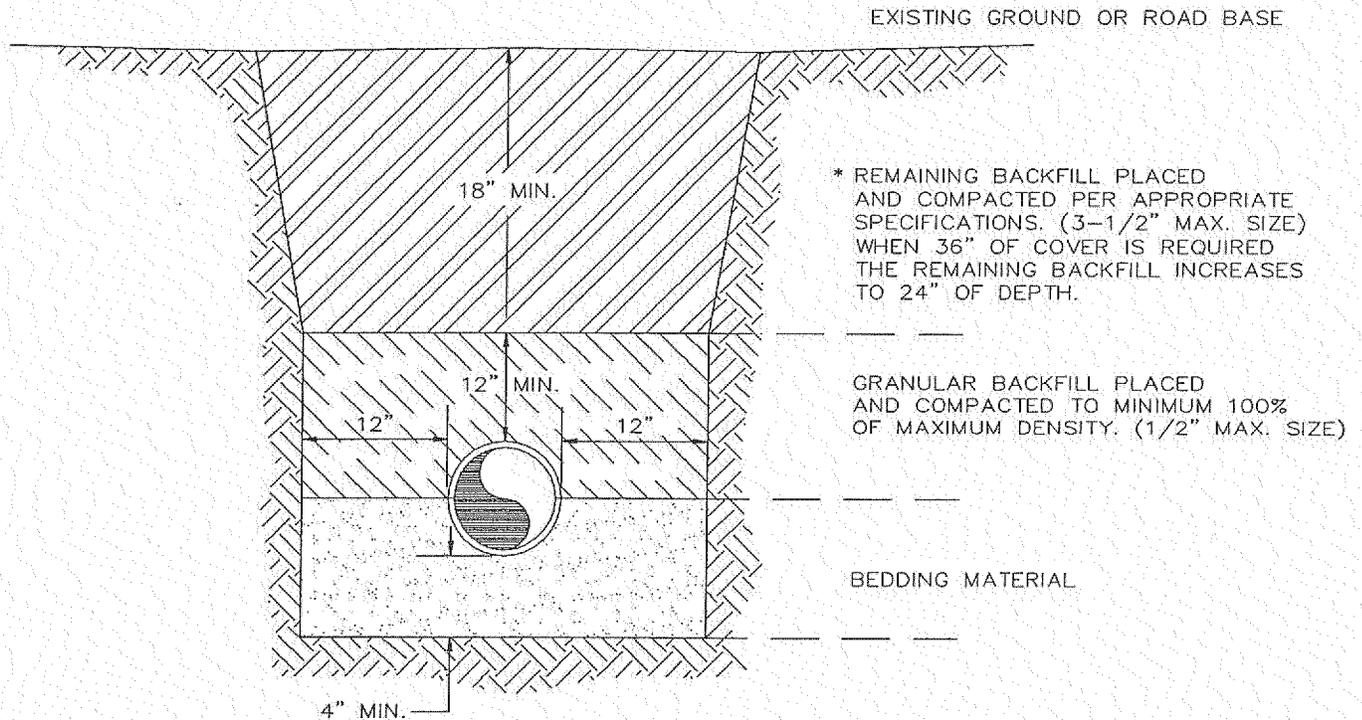
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

TYPICAL VALVE SETTING

PAGE No

D11



NOTES:

1. BEDDING MATERIAL SHALL CONSIST OF IN-SITU GRANULAR MATERIAL - 1/2" MAX. SIZE. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS AND LARGER ROCK SHALL BE REMOVED.
 2. THE PIPE SHALL BE FULLY SUPPORTED FOR ITS ENTIRE LENGTH WITH APPROPRIATE COMPACTION UNDER THE PIPE HAUNCHES.
 3. THE PIPE SHALL BE PLACED IN A DRY TRENCH, UNLESS A WET TRENCH INSTALLATION IS APPROVED BY THE VILLAGE.
 4. BACKFILL SHALL BE FREE OF UNSUITABLE MATERIAL SUCH AS LARGER ROCK, MUCK AND DEBRIS.
 5. ALL WORK SHALL CONFORM TO STATE OF FLORIDA TRENCH SAFETY ACT.
- * COMPACT TO 100% UNDER EXISTING & PROPOSED ROADS. COMPACT TO 85% ON ALL OTHER AREAS UNLESS NOTED ELSEWHERE.

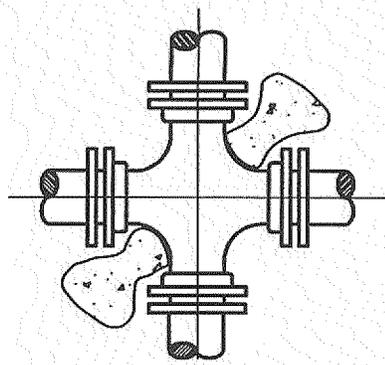
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

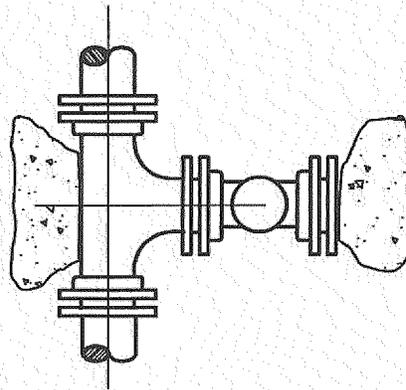
TYPICAL TRENCH DETAIL

PAGE N^o

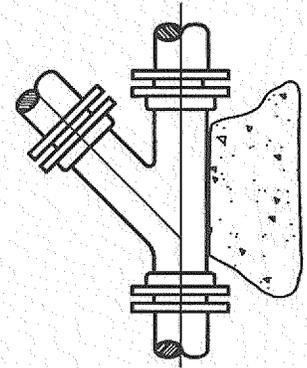
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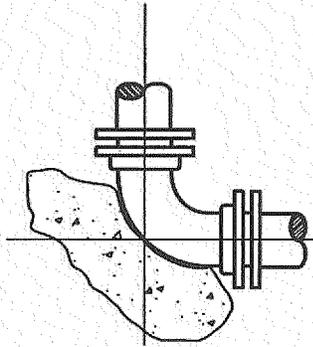
CROSS



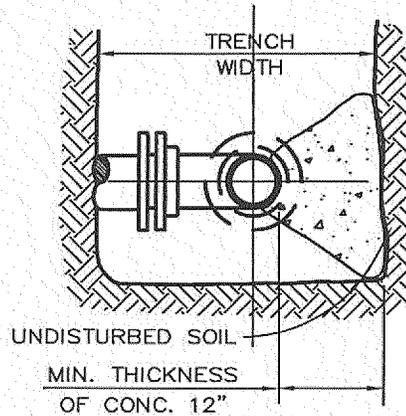
TEE W/ GATE VALVE



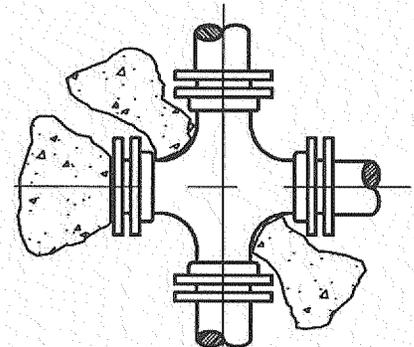
WYE WITH PLUG



ELBOW



TYPICAL SECTION



CROSS WITH PLUG

PIPE DIA. (ins.)	90° ELBOW	45° ELBOW	22 1/2° ELBOW	11 1/4° ELBOW	WYES / TEES	PLUGS
	CONC. (cu. ft)					
2	0.5	0.5	0.5	0.5	0.5	0.5
3	1.0	1.0	1.0	1.0	1.0	1.0
4	1.2	1.0	1.0	1.0	1.0	1.0
6	2.6	1.4	1.0	1.0	1.0	1.0
8	4.6	2.5	1.3	1.0	3.3	3.3
10	7.3	3.9	2.0	1.0	5.9	5.9
12	10.0	5.7	2.9	1.5	7.7	7.7
14	14.2	7.7	3.9	2.0	10.0	10.0
16	18.5	10.0	5.6	2.6	13.4	13.4
18	23.4	12.7	6.5	3.3	16.6	16.6
20	28.8	15.6	8.0	4.7	20.0	20.0
24	41.7	22.3	10.2	5.9	29.0	29.0

1. CALCULATIONS BASED ON 150 P.S.I. PRESSURE AND 2000 P.S.F. SOIL BEARING VALUES.
2. THRUST BLOCKS SHALL BE FORMED AND POURED AGAINST UNDISTURBED SOIL. KEEP "T" BOLTS CLEAR OF CONCRETE, WRAPPED IN VISQUEEN FOR FUTURE ACCESS.
3. BEFORE POURING, PLUGS SHALL BE WRAPPED IN VISQUEEN AND A BOARD PLACED IN FRONT.
4. CONCRETE SHALL BE 2500 P.S.I. MIN.

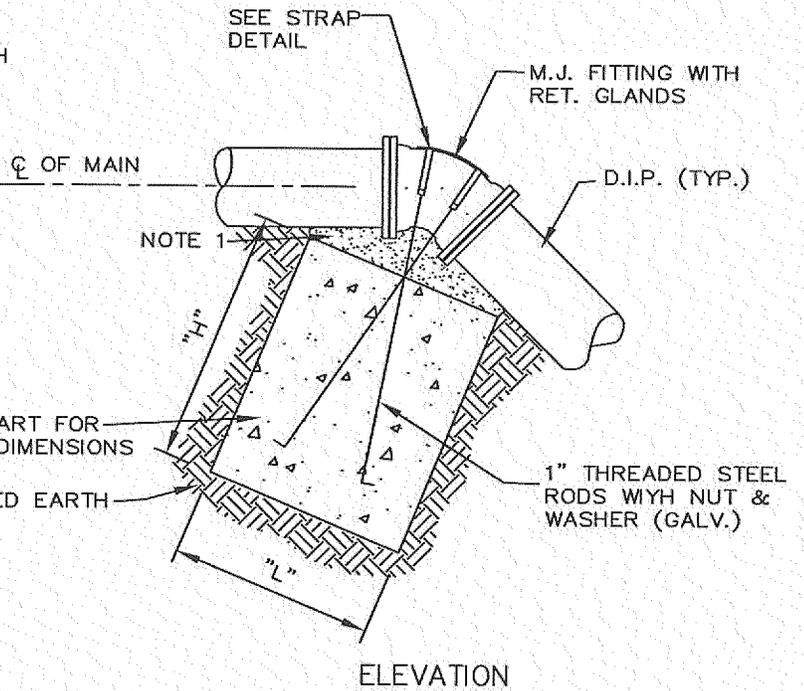
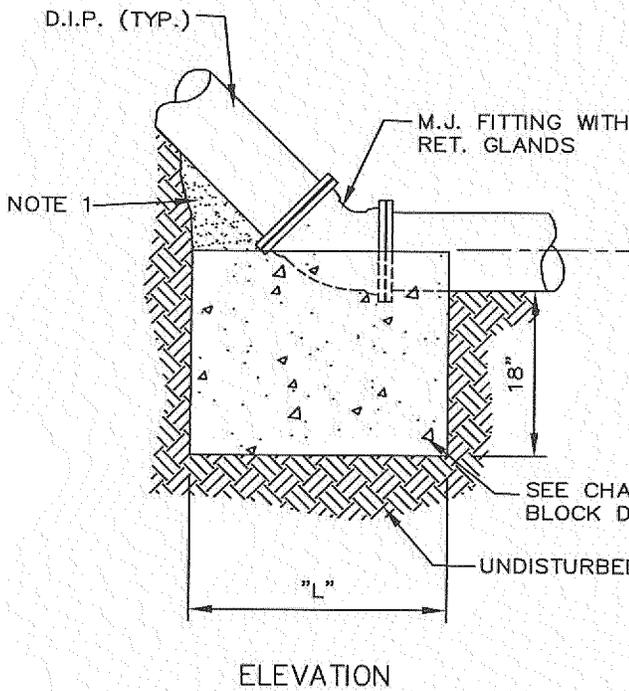
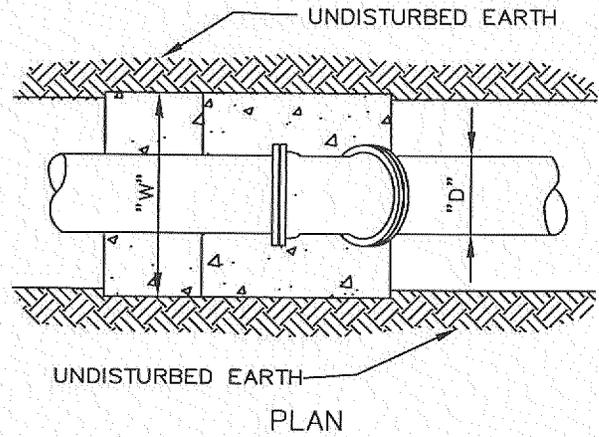
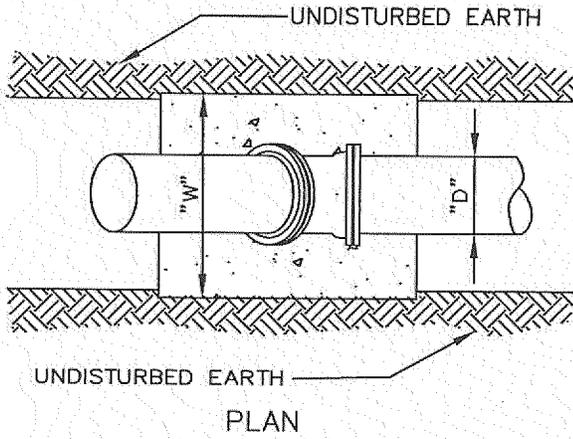
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

THRUST BLOCKING DETAIL

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BLOCKING DETAIL
FOR
VERTICAL SAG
N.T.S.

BLOCKING DETAIL
FOR
VERTICAL CREST
N.T.S.

NOTES:

1. ANY VOID BETWEEN MAIN AND GRAVITY BLOCK TO BE FILLED WITH GROUT BY CONTRACTOR
2. FITTINGS SHALL BE WRAPPED WITH SUITABLE COVERING TO PREVENT ADHERENCE TO GRAVITY BLOCK.

VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

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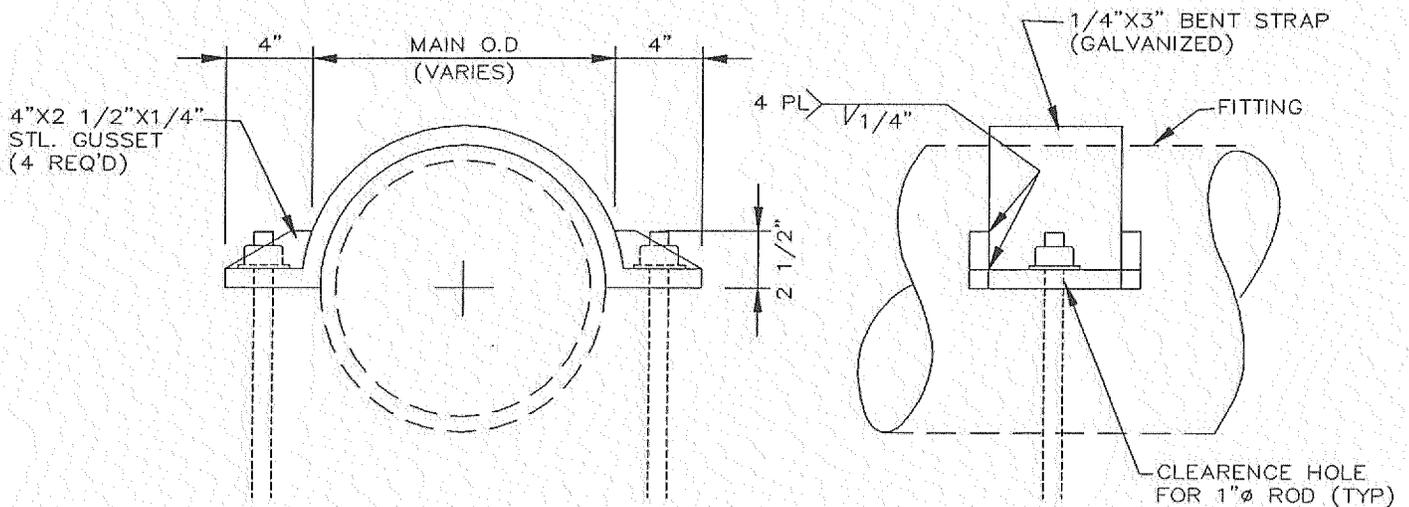
GRAVITY BLOCKS
FOR PRESSURE PIPING

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PIPE DIA. "D"	VERTICAL CREST											
	DEGREE OF BEND											
	11 1/4°			22 1/2°			45°			90°		
	"W"	"L"	"H"	"W"	"L"	"H"	"W"	"L"	"H"	"W"	"L"	"H"
6"	36"	16"	18"	36"	24"	24"	48"	28"	30"	54"	36"	36"
8"	48"	20"	20"	48"	30"	24"	54"	36"	36"	60"	46"	48"
12"	54"	24"	30"	54"	36"	40"	66"	48"	48"	72"	60"	60"
24"	72"	48"	48"	76"	60"	66"	96"	72"	84"	-	-	-

PIPE DIA. "D"	VERTICAL SAG											
	DEGREE OF BEND											
	11 1/4°			22 1/2°			45°			90°		
	"W"	"L"	-	"W"	"L"	-	"W"	"L"	-	"W"	"L"	-
6"	6"	36"	-	6"	36"	-	18"	36"	-	24"	36"	-
8"	8"	36"	-	12"	36"	-	24"	36"	-	36"	36"	-
12"	18"	36"	-	30"	36"	-	42"	42"	-	54"	48"	-
16"	36"	36"	-	48"	48"	-	60"	60"	-	72"	72"	-
24"	48"	42"	-	60"	54"	-	78"	78"	-	96"	96"	-
36"	60"	54"	-	84"	78"	-	96"	96"	-	120"	120"	-



STRAP DETAIL

NOTES:

1. GUSSETS REQ'D FOR 16"Ø AND LARGER MAINS.
2. STRAPS WITH GUSSET TO BE GALVANIZED AFTER WELDING.

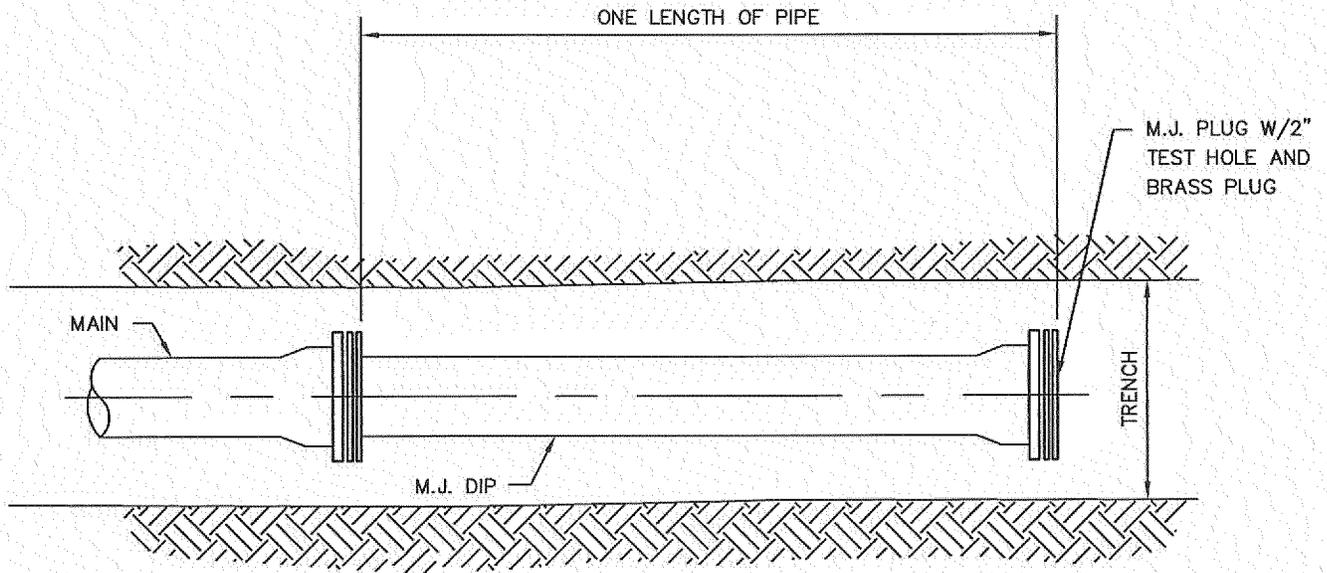
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

GRAVITY BLOCKS
FOR PRESSURE PIPING

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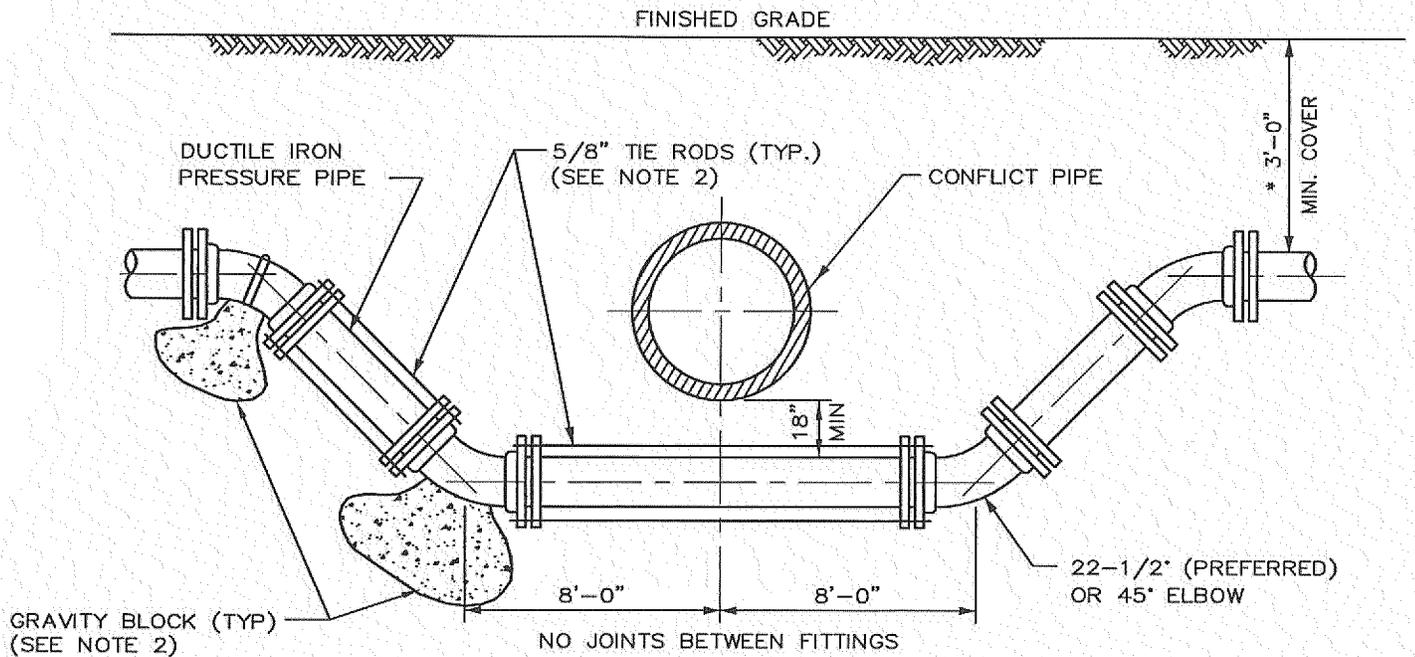
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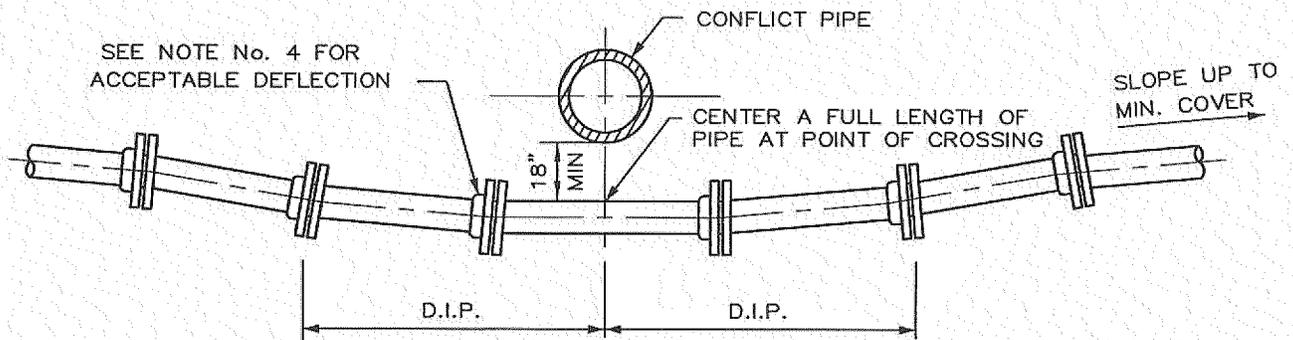
PLAN

NOTE:

1. TERMINAL END SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH VILLAGE STANDARDS. THE NUMBER OF PIPE LENGTHS TO BE RESTRAINED SHALL BE PER THE MANUFACTURERS RECOMMENDATION. ALL TERMINAL ENDS SHALL HAVE TERMINAL BLOWOFFS.



FITTING TYPE



DEFLECTION TYPE

NOTES:

1. THESE METHODS ARE TO BE USED WHEN INSUFFICIENT COVER EXISTS TO ALLOW PRESSURE PIPE TO CROSS ABOVE CONFLICT PIPE WITH 6" VERTICAL SEPARATION AND MAINTAIN 30" COVER TO FINISHED GRADE.
 2. FITTINGS SHALL BE RESTRAINED WITH MECHANICAL RESTRAINTS AND EITHER GRAVITY BLOCKS OR TIE RODS.
 3. THE DEFLECTION TYPE CROSSING IS PREFERRED.
 4. DO NOT EXCEED 75% OF MANUFACTURERS RECOMMENDED MAXIMUM JOINT DEFLECTION.
 5. MECHANICALLY RESTRAIN ALL FITTINGS, AS PER MANUFACTURERS RECOMMENDATION.
- * 36" MIN IN STATE ROAD R/W AND UNDER ASPHALT

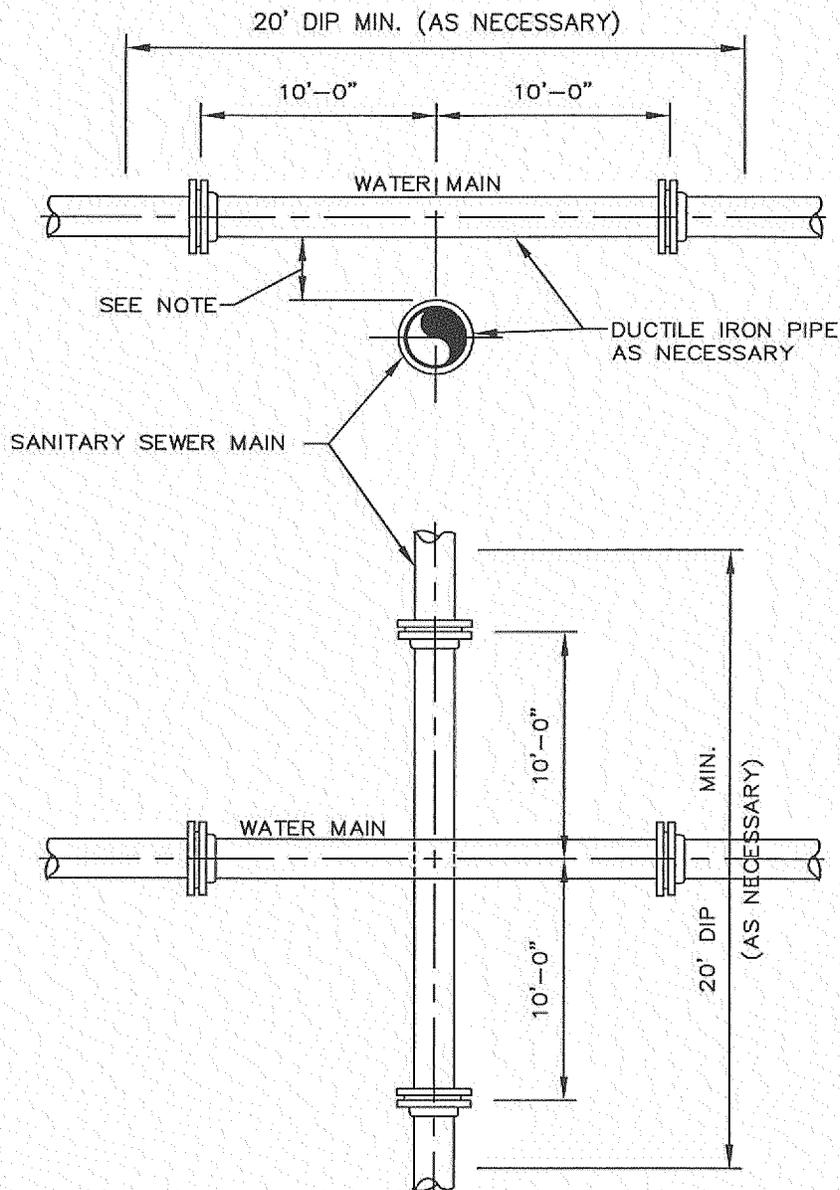
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

PRESSURE PIPE CONFLICT DETAIL

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NOTES:

1. STORM SEWER, GRAVITY WASTEWATER AND RECLAIMED WATER MAIN CROSSING UNDER POTABLE WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF EIGHTEEN (18) INCHES BETWEEN THE INVERT OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, THE CROSSING SHALL BE ARRANGED SO THAT THE STORM/WASTEWATER/RECLAIMED WATER PIPE JOINTS AND POTABLE WATER MAIN JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING WITH NO LESS THAN TEN (10) FEET BETWEEN ANY TWO JOINTS, BOTH PIPES SHALL BE D.I.P., AND THE MINIMUM VERTICAL SEPARATION SHALL BE 6 INCHES. WHERE THERE IS NO ALTERNATIVE TO STORM/WASTEWATER/RECLAIMED WATER PIPES CROSSING OVER A POTABLE WATER MAIN, THE CRITERIA FOR MINIMUM 18" VERTICAL SEPARATION BETWEEN LINES AND JOINT ARRANGEMENT, AS STATED ABOVE, SHALL BE REQUIRED, AND BOTH PIPES SHALL BE D.I.P. IRRESPECTIVE OF SEPARATION. D.I.P. IS NOT REQUIRED FOR STORM SEWERS.
2. MAINTAIN MIN. TEN (10) FEET HORIZONTAL DISTANCE BETWEEN POTABLE WATER MAIN AND STORM SEWER, WASTEWATER MAIN, OR FORCE MAIN. MAINTAIN MIN. THREE (3) FEET HORIZONTAL DISTANCE BETWEEN RECLAIMED WATER MAIN AND POTABLE WATER MAIN, STORM SEWER, WASTEWATER GRAVITY MAIN OR FORCE MAIN
3. FORCE MAIN CROSSING POTABLE WATER MAIN OR RECLAIMED WATER MAIN SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF EIGHTEEN (18) INCHES BETWEEN THE OUTSIDE OF THE FORCE MAIN AND OUTSIDE OF THE POTABLE WATER MAIN OR RECLAIMED WATER MAIN WITH THE POTABLE WATER MAIN OR RECLAIMED WATER MAIN CROSSING OVER THE FORCE MAIN.
4. RECLAIMED WATER SYSTEM MAIN SHALL BE IDENTIFIED AS REQUIRED.

VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

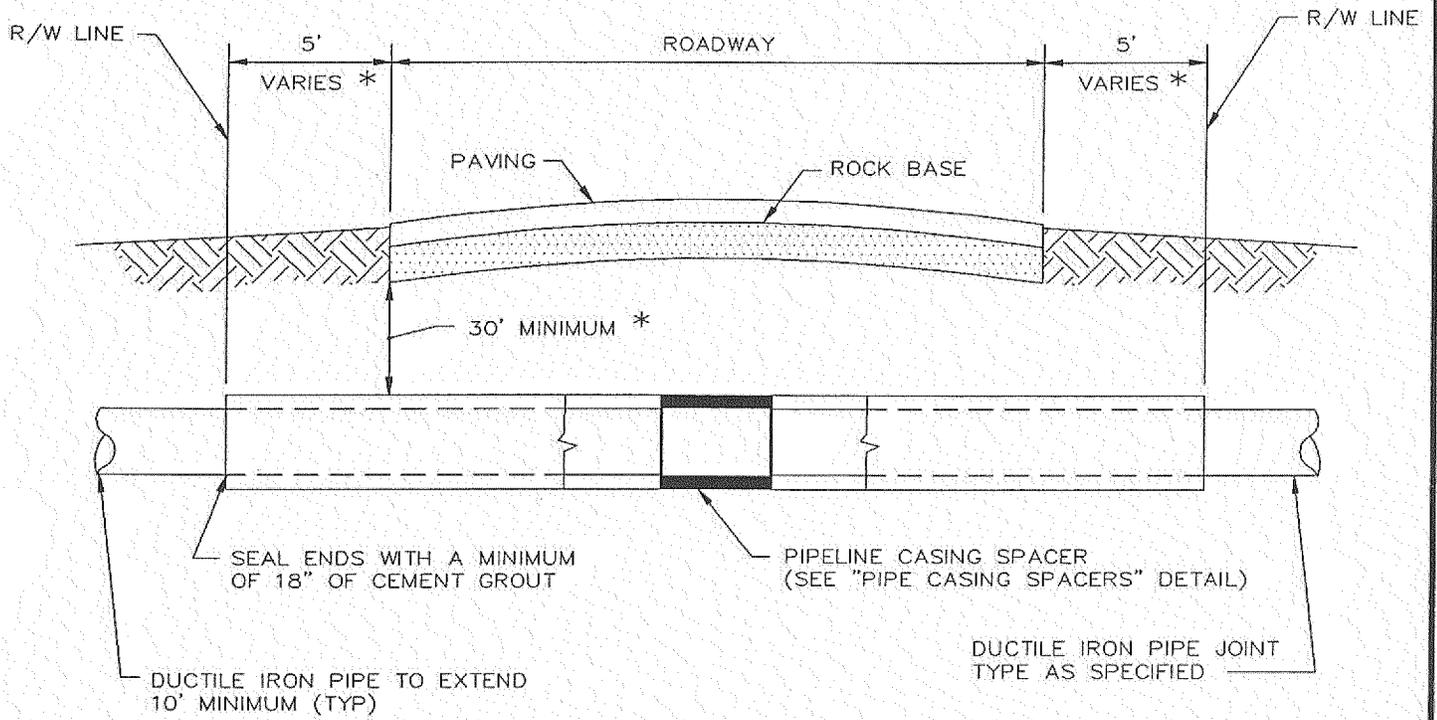
REVISION

WATER MAIN, SANITARY SEWER AND STORM SEWER
CONFLICT

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JAN. 2000



	NOMINAL PIPE SIZE	* STEEL CASING	* THICKNESS SCHEDULE
FIELD LOK GASKET	4"	12"	.375
	6"	16"	.375
	8"	18"	.375
	10"	20"	.375
	12"	24"	.375
RESTRAINED JOINT	14"	24"	.375
	16"	30"	.375
	18"	30"	.375
	20"	36"	.375
	24"	42"	.500
	30"	48"	.500
	36"	54"	.500
	42"	60"	.500
	48"	72"	.500

* INDICATES A MINIMUM TO BE INCREASED TO SUIT F.D.O.T. AND RAILROAD PERMIT REQUIREMENTS OR TYPE OF RESTRAINED JOINT TO BE USED.

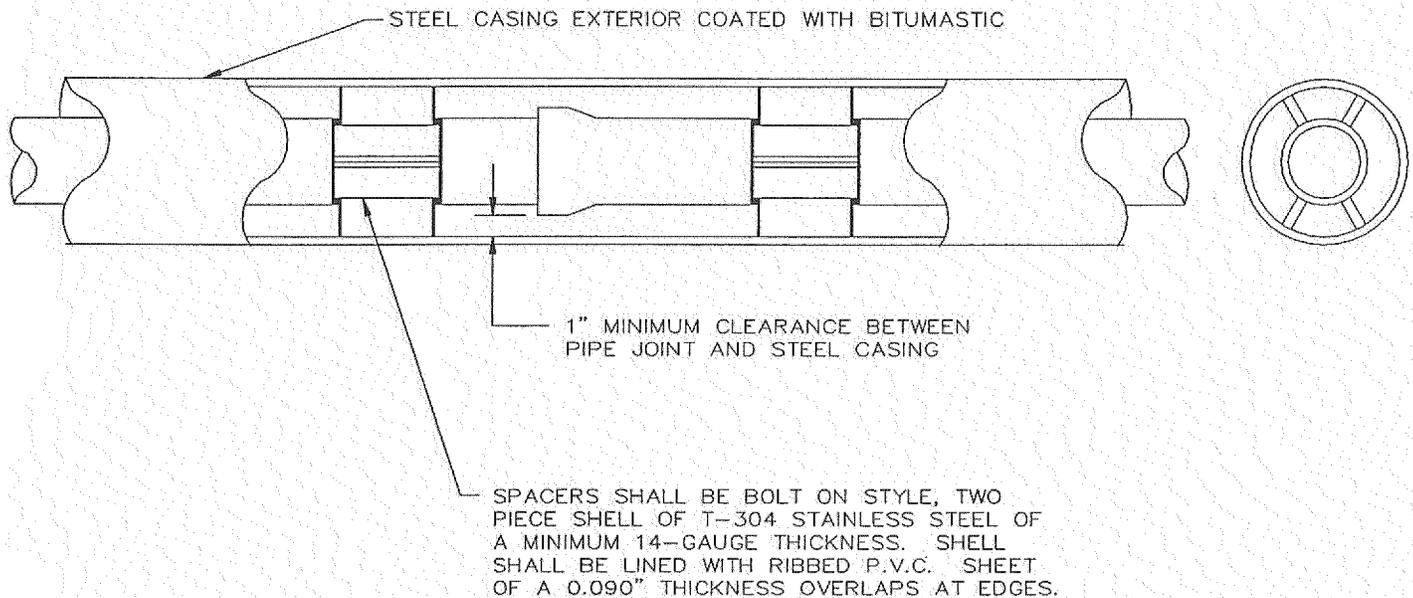
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

CASING INSTALLATION DETAIL

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NOTES:

1. U.S. PIPE FIELD LOK GASKET SYSTEM SHALL BE USED FOR 4" THRU 12" DIAMETER PIPE.
2. RESTRAINED MECHANICAL JOINTS SHALL BE USED FOR PIPE 14" DIAMETER AND ABOVE AND SHALL HAVE FACTORY WELDED RETAINING RINGS. AMERICAN RESTRAINED JOINT PIPE OR APPROVED EQUAL MAY BE USED.
3. FOR PIPE 4" THRU 48" IN DIAMETER, TWO (8") STAINLESS STEEL PIPE CASING SPACERS PER PIPE JOINT (CASCADE MFG. CO. OR APPROVED EQUAL) SHALL BE REQUIRED.
4. PROVIDE ADDITIONAL CASING SPACER @ 24" FROM EACH END.

VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

PIPE CASING SPACERS DETAIL

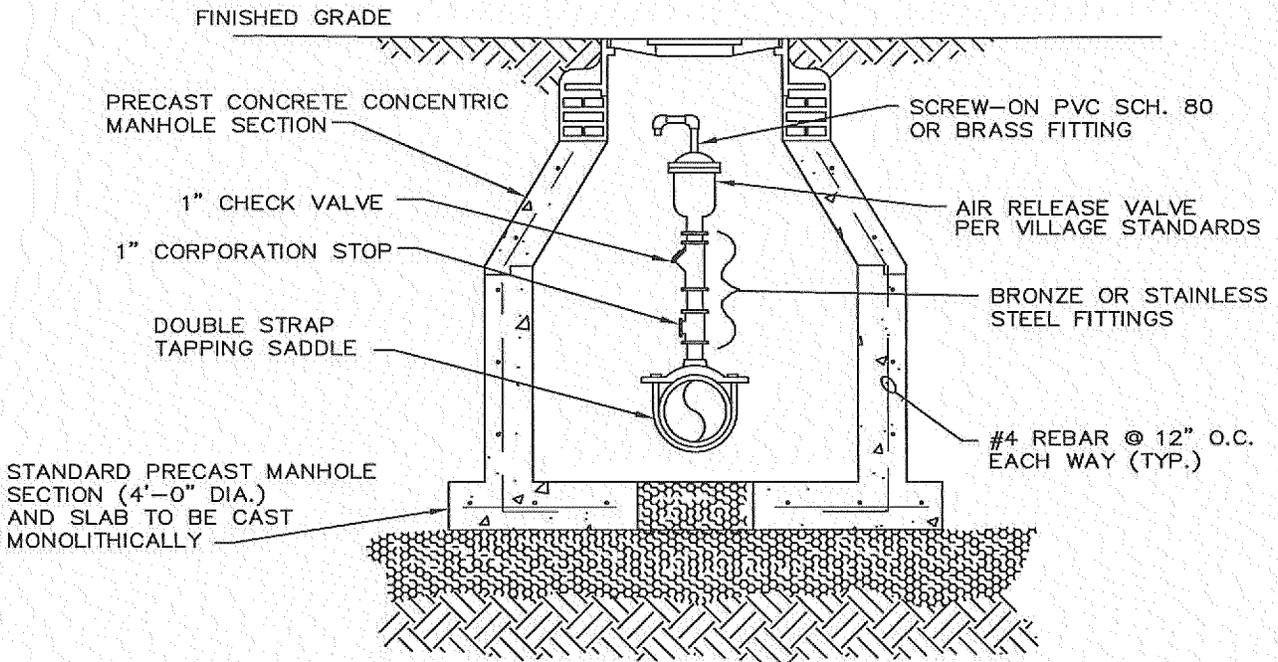
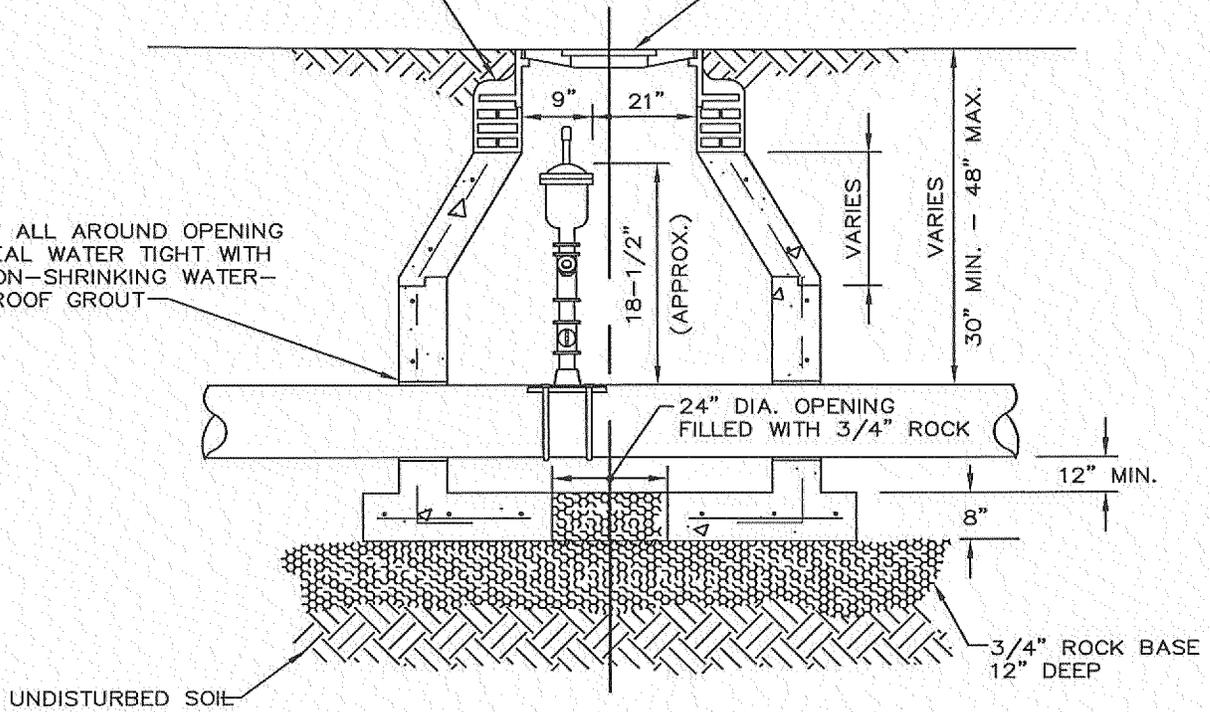
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ADJUST WITH COURSE(S) OF BRICK AND MORTAR TO BRING TO GRADE (MIN. 2 COURSES OF BRICK - 6") (MAX. 5 COURSES OF BRICK - 18")

"WATER" TO BE CAST IN COVER (SEE "MANHOLE FRAME AND COVER")

4" ALL AROUND OPENING SEAL WATER TIGHT WITH NON-SHRINKING WATER-PROOF GROUT



VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

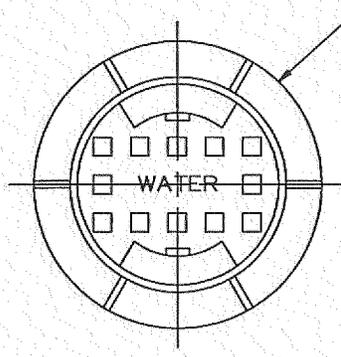
REVISION

AIR RELEASE VALVE (UNDERGROUND WATERMAIN)

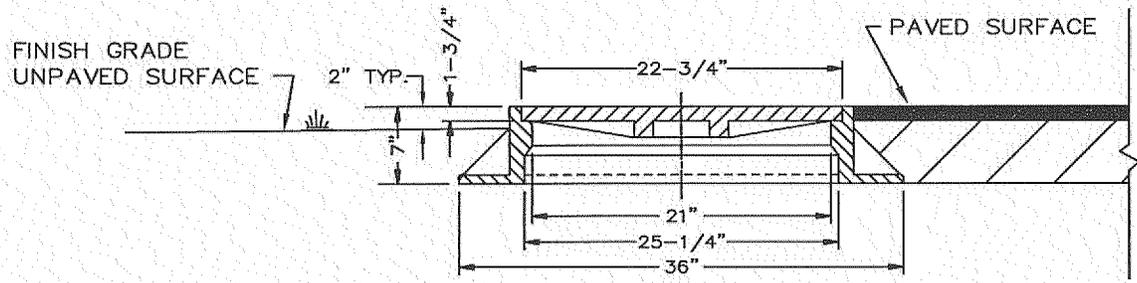
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PLAN



SECTION

NOTES:

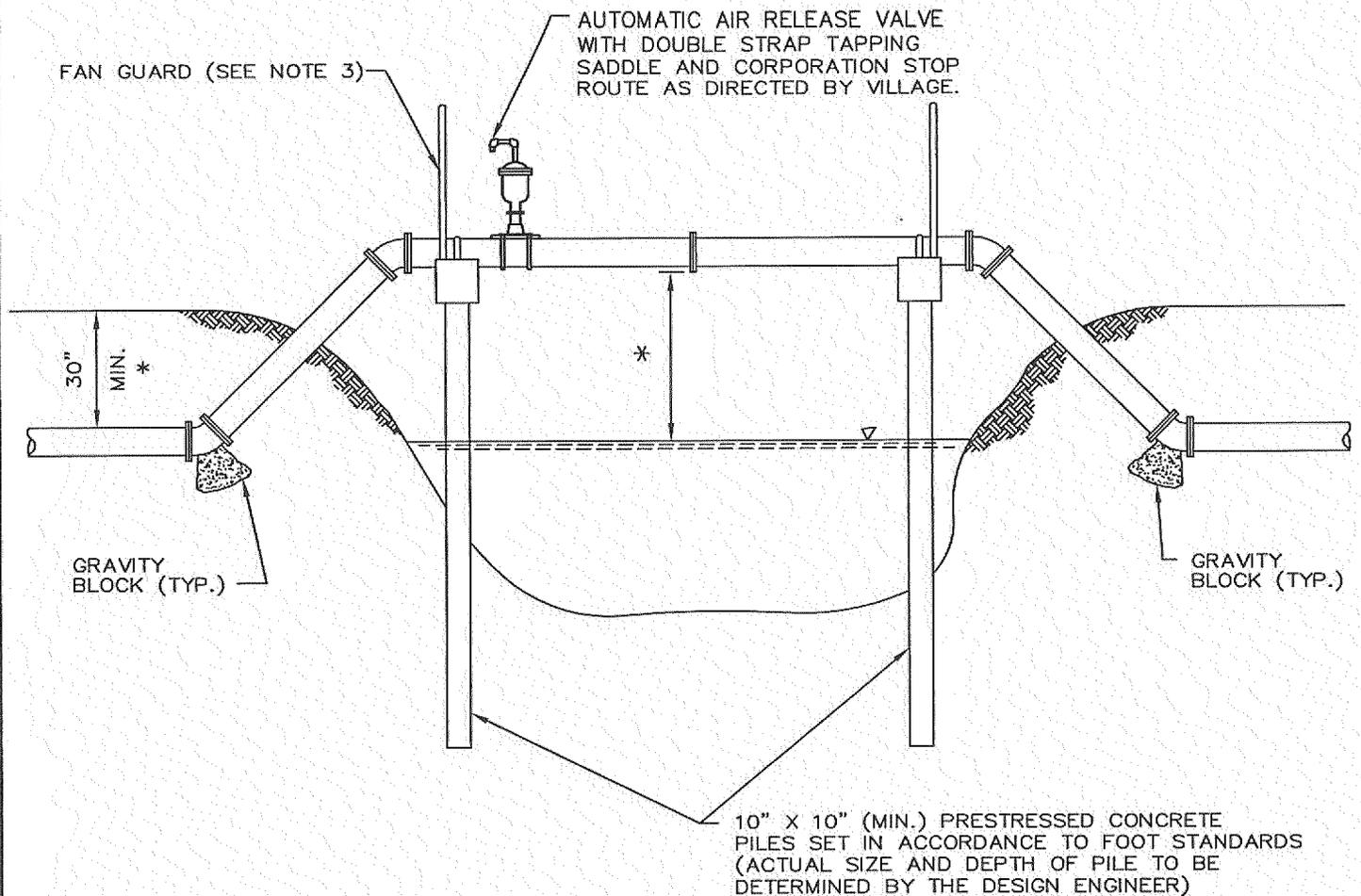
1. A WATER-TIGHT MANHOLE "RAIN GUARD" INSERT SHALL BE INSTALLED IN ALL MANHOLES.

REVISION

STANDARD MANHOLE FRAME AND COVER

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NOTES:

1. ALL EXPOSED PIPE SHALL BE DUCTILE IRON WITH FLANGED FITTINGS. RETAINER GLANDS AND UNIFLANGE TYPE FITTINGS ARE NOT ALLOWED. O-RING GASKETS ARE REQUIRED FOR FLANGED FITTINGS AND JOINTS.
2. SPAN LENGTHS AS REQUIRED BY PERMITTING AGENCY AND IN ACCORDANCE WITH PIPE MANUFACTURERS RECOMMENDATION.
3. FAN GUARDS ARE REQUIRED. SEE "TYPICAL FAN GUARD" DETAIL.
4. PIPE SHALL BE CRADLED ON NEOPRENE, 1/2" THICK MINIMUM.
5. TIE-DOWN STRAPS SHALL FIT PROPERLY AND SECURE PIPE IN CRADLE.
6. PIPE CRADLE IN CAP SHALL CONTACT 1/2 CIRCUMFERENCE OF PIPE.
7. SHOW ULTIMATE CANAL SECTION AND RELEVANT ELEVATIONS AND DISTANCES ON THIS DETAIL.
8. STAINLESS STEEL (316) REQUIRED FOR ALL STRAPS, SADDLES, FLANGE BOLTS, NUTS AND OTHER HARDWARE FOR INSTALLATIONS OVER ALL WATER BODIES (ANTI-GALL COMPOUND TO BE USED WHEN ASSEMBLING STAINLESS STEEL NUTS AND BOLTS).
9. LENGTH OF SPAN WILL DETERMINE NUMBER OF PILES REQUIRED.
10. AERIAL CROSSING TO BE COATED PER F.D.O.T. SPECIFICATIONS ON PIPING ATTACHED TO BRIDGE STRUCTURES.
11. ALL ABOVE GRADE PIPING AND APPURTENANCES (ACCEPT FOR THE FAN GUARD) SHALL BE COATED IN ACCORDANCE WITH VILLAGE STANDARDS.

* PER REGULATORY AGENCY

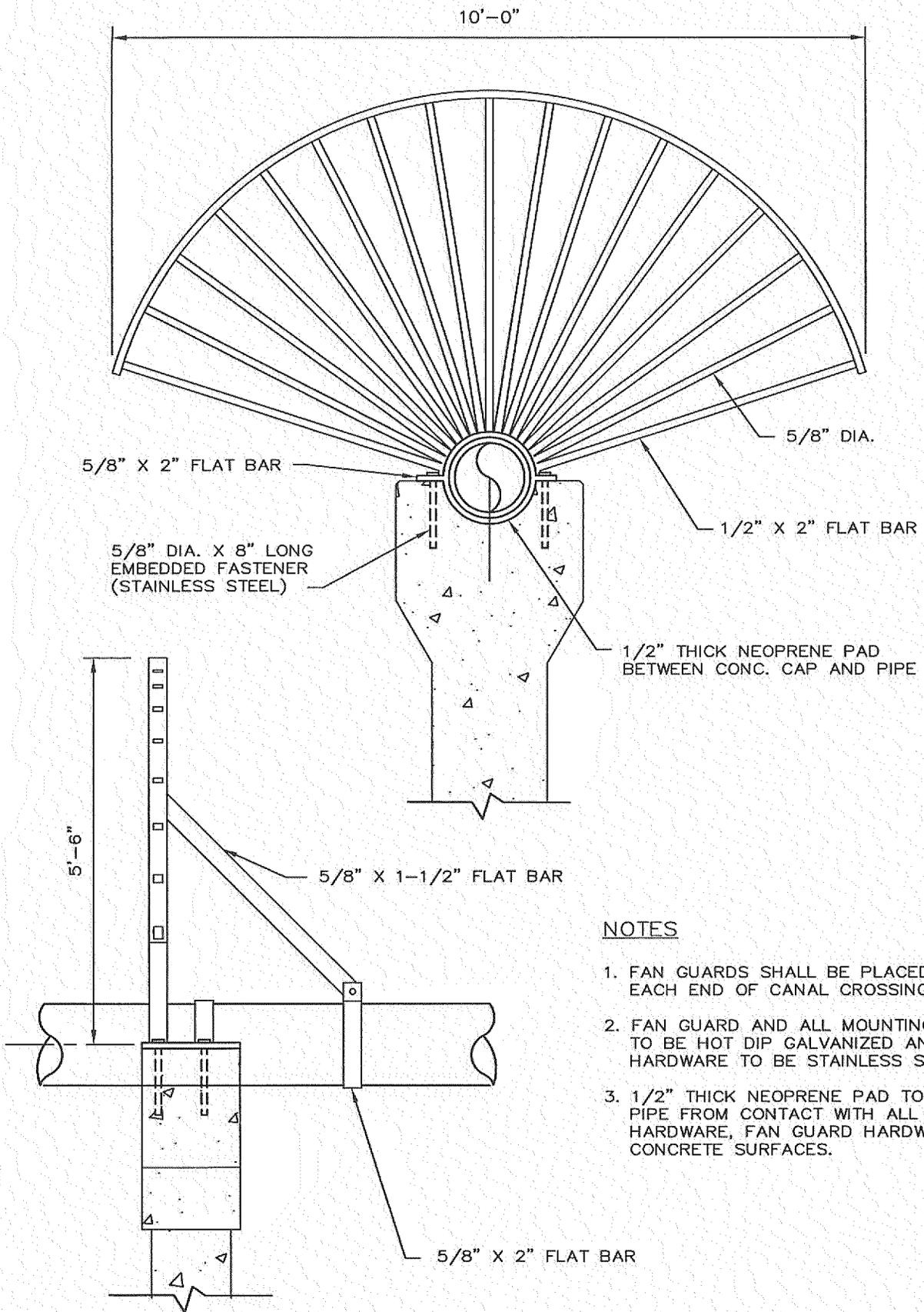
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

CANAL CROSSING (AERIAL)

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NOTES

1. FAN GUARDS SHALL BE PLACED AT EACH END OF CANAL CROSSING.
2. FAN GUARD AND ALL MOUNTING BRACKETS TO BE HOT DIP GALVANIZED AND MOUNTING HARDWARE TO BE STAINLESS STEEL.
3. 1/2" THICK NEOPRENE PAD TO INSULATE PIPE FROM CONTACT WITH ALL MOUNTING HARDWARE, FAN GUARD HARDWARE, AND CONCRETE SURFACES.

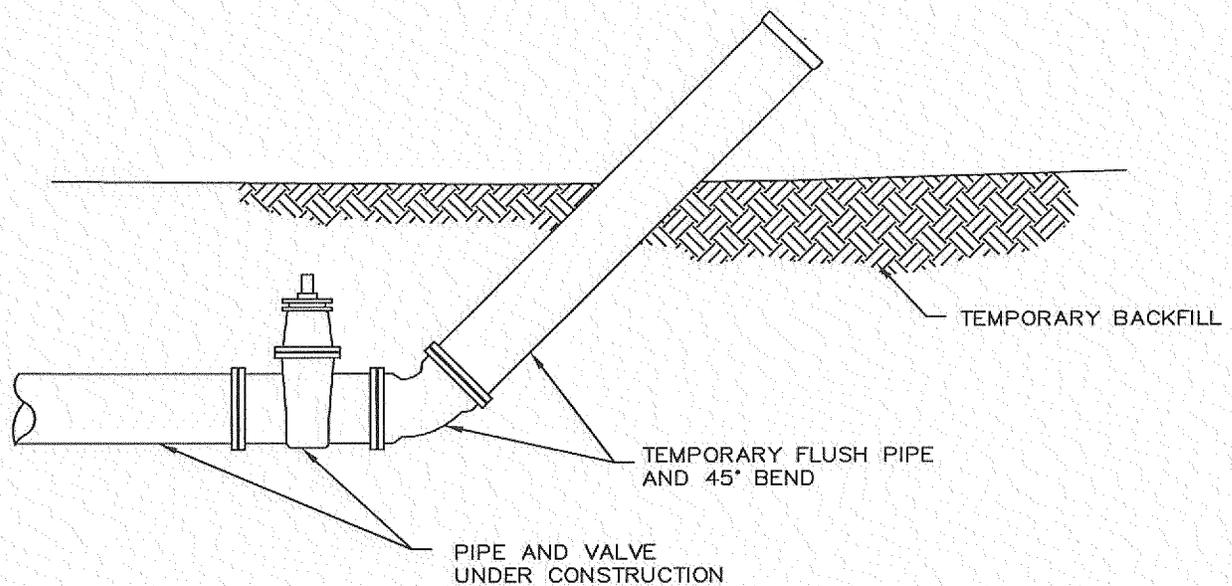
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

TYPICAL FAN GUARD

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NOTES:

1. UPON COMPLETION OF THE PIPE INSTALLATION FOR ANY SECTION, THE MAINS SHALL BE CANNON FLUSHED TO REMOVE DIRT AND ANY OTHER FOREIGN MATTER BY ACHIEVING A MINIMUM VELOCITY OF 2.5 FEET PER SECOND IN THE PIPE. MAINS MAY BE EITHER TEMPORARILY LAID ABOVE GRADE OR TEMPORARY FITTINGS, PIPE ETC. MAY BE USED TO FACILITATE CANNON FLUSHING.
2. INSTALL A 45° BEND AND ASSOCIATED PIPING AS SHOWN TO DIRECT THE FLUSHING WATER AWAY FROM THE IMMEDIATE WORK AREA AND EXERCISE DUE CARE SO AS TO ENSURE THAT THE WATER USED IN FLUSHING DOES NOT CAUSE A NUISANCE OR INFLICT PROPERTY DAMAGE.
3. BENDS AND PIPING SHALL BE THE SAME SIZE AS THE LINE TO BE FLUSHED.
4. PRIOR TO THE ACTUAL LINE FLUSHING OPERATION. THE CONTRACTOR SHALL PROPERLY NOTIFY THE VILLAGE OF SUCH INTENDED WATER USE.
5. NO EXISTING VALVES SHALL BE TURNED ON OR OFF, EXCEPT BY AUTHORIZED VILLAGE PERSONNEL.
6. FLUSHING SHALL NOT BE ACCOMPLISHED WITHOUT THE ACTUAL PRESENCE OF THE VILLAGE.
7. AFTER THE LINE UNDER CONSTRUCTION HAS BEEN SUCCESSFULLY FLUSHED THE CONTRACTOR SHALL REMOVE THE TEMPORARY PIPING ARRANGEMENT AND PROCEED WITH THE REMAINING CONSTRUCTION AS SPECIFIED.
8. ALL PIPING SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH VILLAGE STANDARDS. THE NUMBER OF PIPE LENGTHS TO BE RESTRAINED SHALL BE PER MANUFACTURERS RECOMMENDATION.

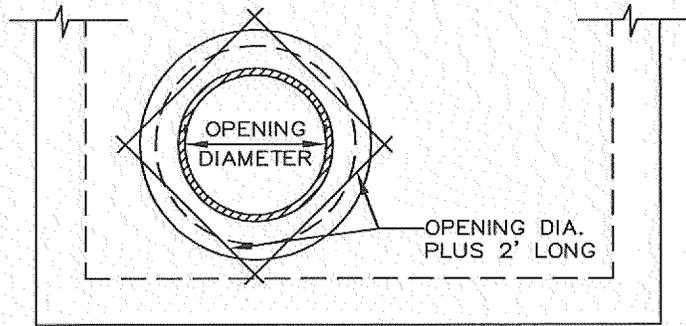
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

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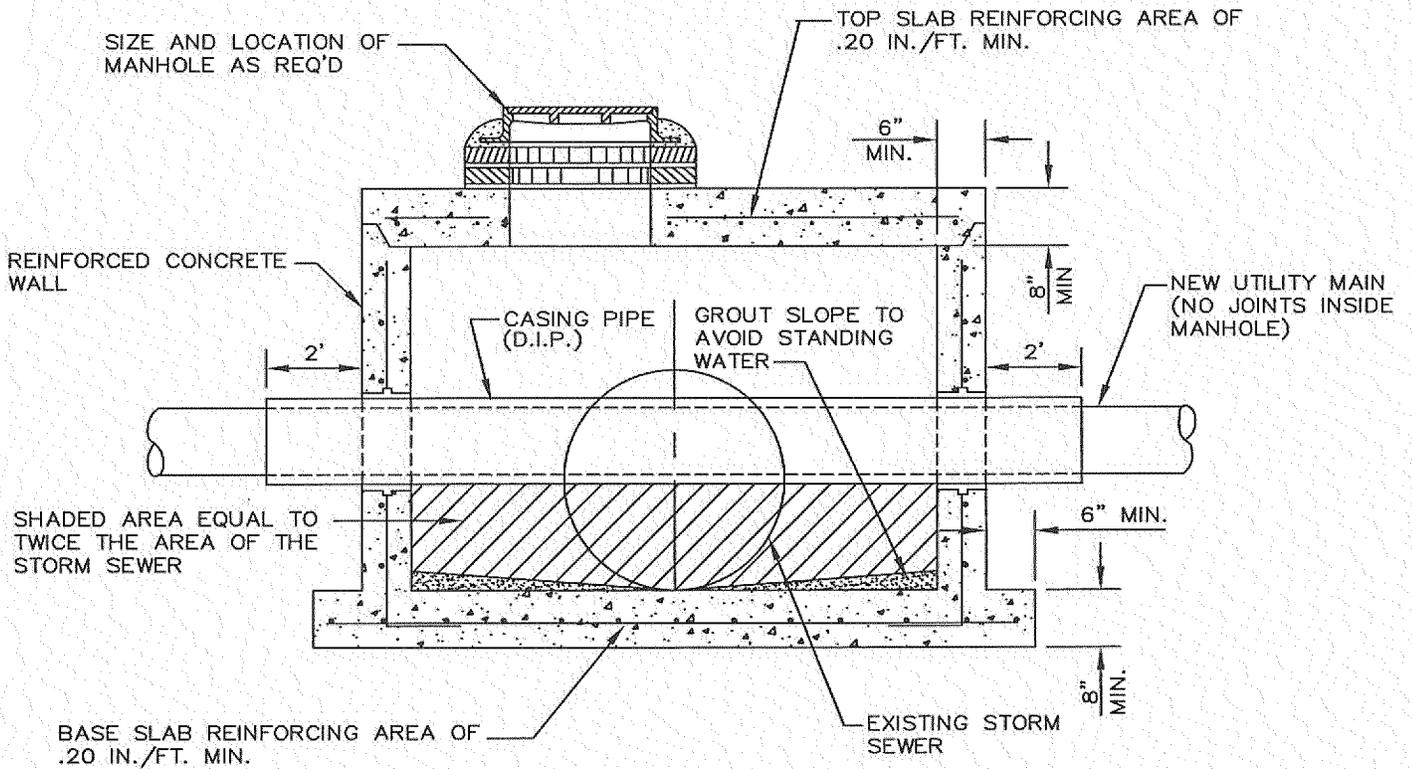
CANNON FLUSHING DETAIL

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PARTIAL PLAN



NOTES:

1. WHERE CONDITIONS PERMIT THE LOWEST POINT OF CONFLICT MAIN AT OR ABOVE CENTER LINE OF STORM SEWER.
2. CONFLICT MANHOLES WILL BE ALLOWED WHERE DESIGN PROBLEMS AND ECONOMICS PROVE THEM TO BE THE ONLY VIABLE SOLUTION AS APPROVED BY VILLAGE.
3. CONFLICT MANHOLES WILL NOT BE ALLOWED FOR WATER MAINS CROSSING GRAVITY WASTEWATER SYSTEMS.

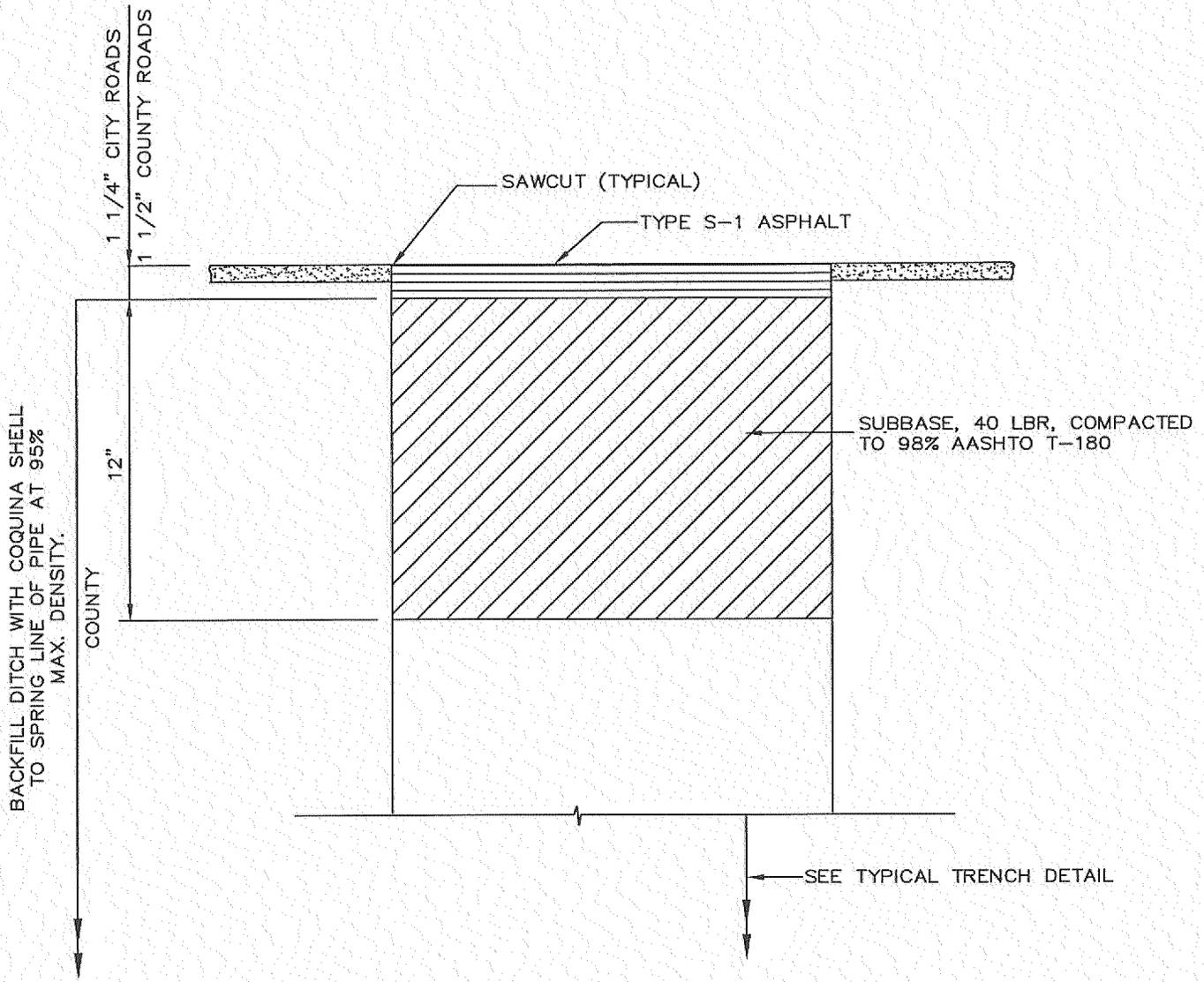
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

CONFLICT MANHOLE

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BACKFILL DITCH WITH COQUINA SHELL TO SPRING LINE OF PIPE AT 95% MAX. DENSITY.

COUNTY

12"

1 1/4" CITY ROADS
1 1/2" COUNTY ROADS

SAWCUT (TYPICAL)

TYPE S-1 ASPHALT

SUBBASE, 40 LBR, COMPACTED TO 98% AASHTO T-180

SEE TYPICAL TRENCH DETAIL

NOTE:

1. FOR ASPHALT DRIVEWAYS, THE SUBBASE SHALL BE 8" MIN.

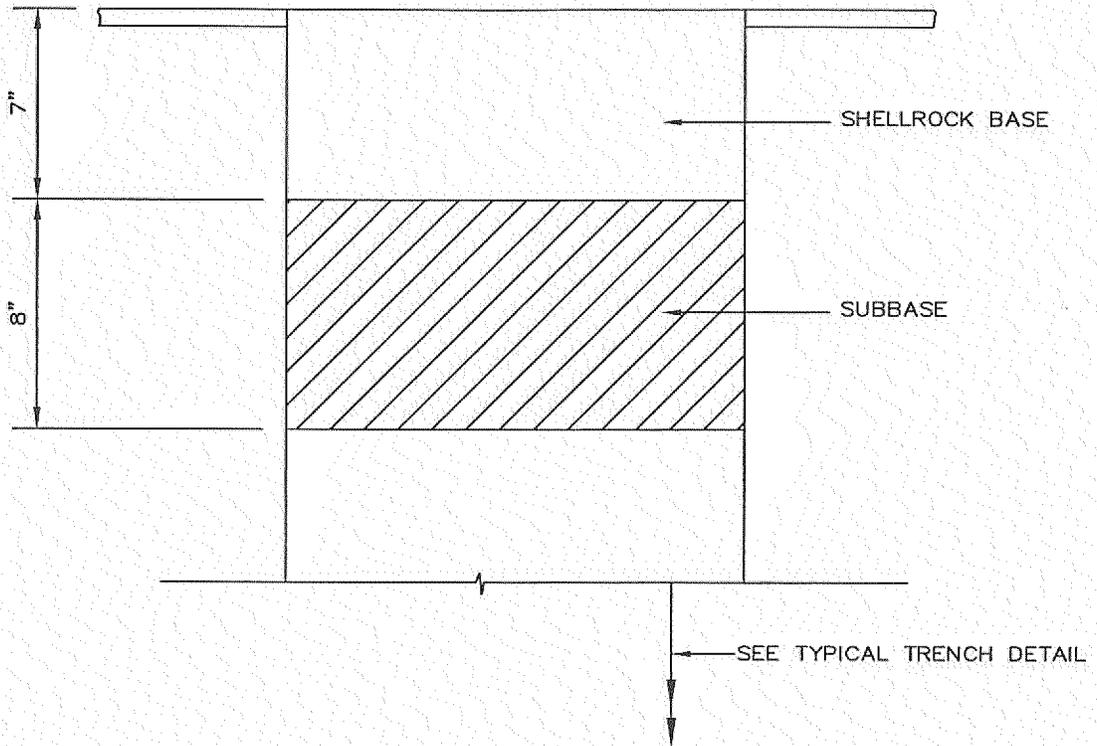
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

REVISION

PAVEMENT REPLACEMENT DETAIL

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NOTE:

1. ROCK BASE SHALL BE 100 LBR, COMPACTED TO 98% AASHTO T-180.
2. SUBBASE SHALL BE 40 LBR, COMPACTED TO 98% AASHTO T-180.

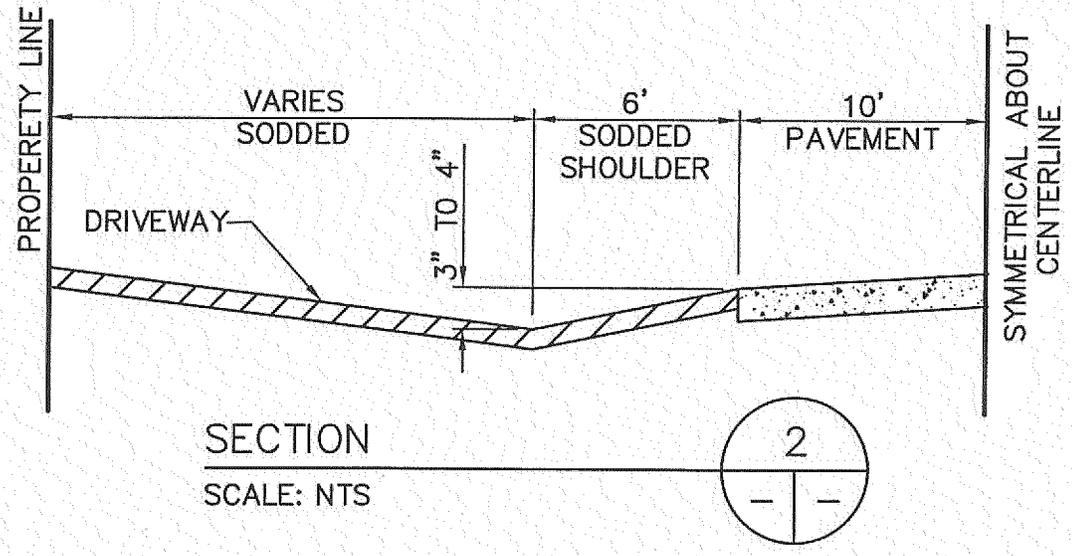
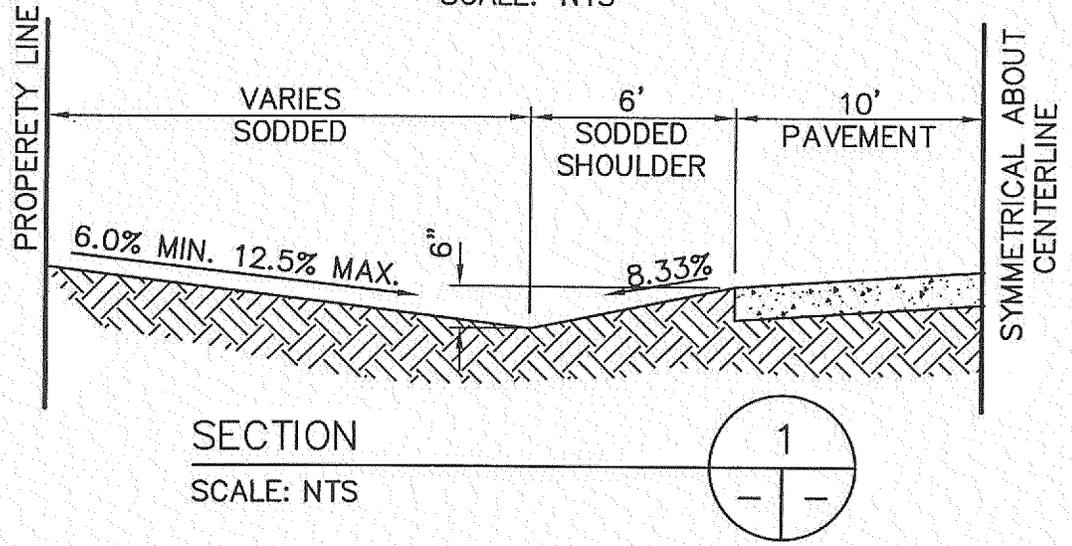
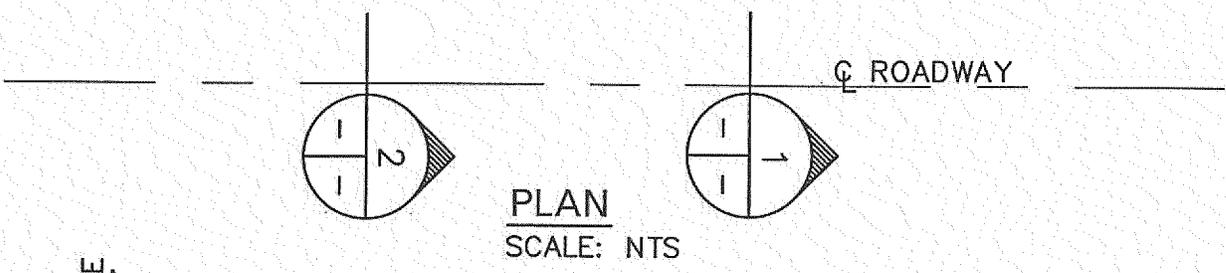
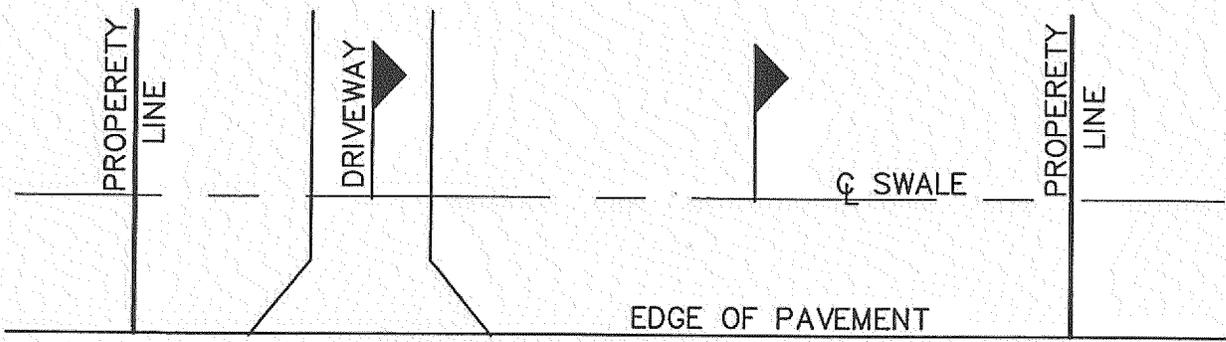
VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

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SHELLROCK ROAD / DRIVEWAY REPLACEMENT DETAIL

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VILLAGE OF TEQUESTA CONSTRUCTION STANDARDS & DETAILS

<p>REVISION</p>	<p>TYPICAL SWALE / DRIVEWAY CROSS SECTIONS</p>	<p>PAGE N^o D28</p>
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