

STANDARD SPECIFICATIONS WATER MAINS AND APPURTENANCES

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

DEVELOPER PROCEDURES

All Developer Procedures as established by Erie County Commissioners, Erie County Engineer, Erie County Regional Planning Commission and local political subdivisions shall be followed, which includes: entering into a Developers Agreement, following standards and basis of design, inspection, permits, record drawings (as-builts) in pdf format on mylar media, warranty and financial assurances. One (1) electronic copy in pdf format and two (2) sets of paper detail drawings (including plan and profiles, proposed and existing topography and all buried utilities) and specifications of all proposed water lines drawings on 24" x 36" sheets shall be submitted for review and approval to: Erie County Sanitary Engineer, c/o D.O.E.S., 554 River Road, P.O. Box 469, Huron, Ohio, 44839. Upon the Sanitary Engineers approval of the detail drawings and specifications for construction, the Developer will have one (1) year from approval date to complete the construction of the water and sanitary sewer lines or will have to resubmit for approval and at a minimum be subject to any new D.O.E.S. requirements.

The cost to record any and all easements and/or plats for Developer's projects for sanitary sewer lines, water lines, or pump stations to be dedicated to Erie County for ownership, operation and maintenance shall be at the cost of the Developer. The County shall invoice the Developer for these costs. The Developer shall pay said invoice within thirty (30) days of the invoice date.

O.R.C. 307.73 AGREEMENTS

Erie County may agree to an ORC 307.73 Agreement to allow a Developer to install a water line, dedicate it to the County as a public owned and maintained line in an easement and the County will collect and return connection fees from non-participating property owners as allowed under the law under the following terms:

1. Agreement Term: not-to-exceed 10 years.
2. Pro-rated front footage fees shall not exceed the County's current equalization fee as described in Water Rule 3. Section 1.C at the date of the agreement.
3. No successor and/or assignment of the agreement will be allowed for the D Developer.
4. Developer will pay for all costs involved in acquiring easements including the cost of recording said easements.

WATER DISTRIBUTION SYSTEM IMPROVEMENTS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/2010

LAST REVISION DATE: 7/01/2011

BASIS OF DESIGN

The Sanitary Engineer and local Fire Department Official shall determine whether or not the County has available adequate water capacity and pressure to allow for a development to proceed. Generally, in single family residential subdivision, the County will attempt to maintain a fire flow of 500 g.p.m. or more, preferably 1,000 g.p.m. in more dense residential areas and in dense commercial and industrial development, a minimum of 1,200 g.p.m. with a preferred 2,000 g.p.m. fire flow. No public water lines shall be installed smaller than eight inch (8") diameter for Water District "A" with fire hydrants, six inch (6") diameter for Water District "B" where fire hydrants may be added, and four inch (4") for Water District "B" where no fire hydrants are planned. Along major routes, water lines will consist of a minimum size of twelve inch (12") diameter. The Sanitary Engineer shall require all water lines and appurtenances to be sized for ultimate development of the entire service area.

Fire hydrants shall be spaced at the maximum 500 feet apart so that no more than 250 feet of fire hose along the frontage plus setback length is needed to reach each structure and in more dense development closer spacing shall be required as determined by the Sanitary Engineer and the local fire department. Fire hydrants along rural roads shall be located at all high spots in line for air release. Locate fire hydrants in curb lawn area in most subdivisions at least seven feet (7') behind curb to a maximum of fifteen feet (15') as required by Sanitary Engineer. Local fire departments shall also review and approve fire hydrant spacing.

Line valves shall be installed at all intersections on each branch near the intersection and at least every 2,000 feet elsewhere.

All twelve inch (12") diameter and larger water lines shall contain restrained joints at the fittings before and after, as recommended by the Ductile Iron Pipe Research Association. All dead end water lines eight inch (8") diameter and larger shall utilize restrained joints consisting of EBAA Iron restrained devices for PVC pipe, Series 1600 or approved equal at all joints within sixty feet (60') of the end of the line and shall include a line valve and fire hydrant at the end.

The Developer and/or Engineer shall not allow other utilities to be installed within five feet (5') horizontally of an installed water main or in the same trench as the water main except at crossings. Should this occur, the Developer will be responsible for maintaining the water mains and the Sanitary Engineer will not permit taps to said line until the other utility lines are relocated five feet (5') away from the water main.

Water lines shall be located within the public road right-of-way, along with other County utilities, such as sanitary sewers, storm sewers and drainage swales. All other utilities shall be located in Easements, outside the public right-of-way.

WATER DISTRIBUTION SYSTEM IMPROVEMENTS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

BASIS OF DESIGN (Continued)

Pursuant to EPA requirements, water mains shall be installed with at least a ten feet (10') horizontal and eighteen inch (18") vertical separation from any sanitary sewers. The County also requires a five foot (5') horizontal and eighteen inch (18") vertical separation from any storm sewers, measured from out-to-out.

Water lines shall be installed with a minimum cover of fifty-four inches (54") and to a maximum of seventy-two inches (72") over top of pipe.

WATER LINE MATERIAL MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

**IN THE CASE OF CONFLICTS BETWEEN WRITTEN SPECIFICATIONS AND DRAWINGS,
THE WRITTEN SPECIFICATION SHALL APPLY.**

SHOP DRAWING REQUIREMENTS

Two (2) copies of shop drawings containing manufacturers information concerning meeting the minimum required specifications shall be submitted to the Sanitary Engineer for approval by the contractor prior to installation for the following items: pipe, valves, fittings, fire hydrants, meter vaults, detector checks, reduced pressure backflow preventers, casing pipe, casing spacers, casing end seals, pipe stanchions, and appurtenances. All drawings shall be stamped and initialed as reviewed by the Contractor before submitting these documents to the Sanitary Engineer for acceptance. U.S. manufactured materials are preferred by Erie County and purchased from Erie County vendors where possible.

WATER LINE CONSTRUCTION STAKING

Water lines shall be staked prior to the installation of new pipe. Staking shall be for both line and grade every one-hundred feet (100') plus at all fittings and off-set at ten feet (10'). A professional surveyor will be required where the contractor does not have competent surveyors.

WATER LINE PIPE MATERIAL

Shall be PVC AWWA C-900 (4"-12") DR18 or C-905 (14"-30") DR125 with integral bell and spigot joints or high density polyethylene pipe (HDPE), DR11 with butt fused joints. Under special conditions, waterline pipe material may be Class 52 Ductile Iron Pipe with push-on type joints, cement lined (AWWA C-104) and shall meet the requirements of AWWA C-150 and AWWA C-151 where approved by the Sanitary Engineer. Two (2) No. 8 stranded wires shall be buried with all PVC and HPDE water mains located at the 10:00 and 2:00 positions and terminated in valve boxes, along with four inch (4") wide tape noting "WATER LINE BURIED BELOW" buried over pipe twelve inch (12") below finish grade.

FITTINGS

For three inch through twenty-four inch (3"-24") mechanical joint ductile iron, fittings shall meet the requirements of ANSI/AWWA C-153/A21.53 and ANSI/AWWA C111/A21.11. Fittings shall be cement-lined and seal-coated in accordance with ANSI/AWWA C104/A21.4. All HDPE fittings shall be installed with proper expansion devices (flex washers) made for HDPE pipe and approved by Erie County Water Division Superintendent.

Mechanical fittings, when required, will use thrust block and Meg-a-Lugs, Model Ebba Series 1100 or approved equal through shop drawing submittal. All fittings shall utilize 316 stainless steel bolts and specially designed sacrificial anodes will be required.

WATER LINE MATERIAL MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

WATER LINE JOINTS

PVC AWWA C-900 and C905 joints shall incorporate rubber gaskets and meet ASTM F-477 and ASTM D-3139. HDPE pipe joints shall be butt fused. All eight inch (8") diameter and larger pipe joints shall include restrained joints at the fittings and before and after fittings as recommended by the Ductile Iron Pipe Research Association. Restrained joints shall be Mega-Lugs, Model Ebba Series 1100 or approved equal through shop drawing submittal. Pipe installed within casing pipe shall be restrained joints regardless of pipe diameter. D.I.P joints shall incorporate rubber gaskets and meet requirements of AWWA C-111. All restrained joint bolts shall be 316 stainless steel.

WATER LINE VALVES

Water line valves three inch through twelve inch (3"-12") shall be Resilient Wedge Gate Valve (RWGV) and meet the requirements of AWWA C509 latest edition, line valves shall be of full body design. Resilient Seat Compact-Type or Thin-Body Type valves are NOT ACCEPTABLE. The RWGV shall have a 250 PSIG working pressure and a 500 PSIG hydrostatic test pressure. The RWGV shall open "right" or "clockwise" and shall be supplied with a two inch (2") square-red wrench nut. The RWGV shall have Type 316 stainless steel bolts and nuts for the stuffing box and bonnet or specially designed sacrificial anodes may be used. Resilient Wedge Gate Valves shall be American AVK Series 25 or Mueller A-2360-E30 open right and side tap valves T-2360-16E302 open right, or approved equal.

Water line valves fourteen inch through twenty-four inch (14"-24") shall be Resilient Wedge Gate Valve (RWGV) and meet the requirements of AWWA C515 latest edition. The RWGV shall have a 250 PSIG working pressure. The RWGV shall open "right" or "clockwise" and shall be supplied with an enclosed bevel gear and a two inch (2") square-red wrench nut. The RWGV shall have Type 316 stainless steel bolts and nuts for the stuffing box and bonnet or specially designed sacrificial anodes may be used. Resilient Wedge Gate Valves and side tap valves shall be Mueller A2361-E302 open right or approved equal.

Water line valves for larger than twenty-four inch (24") diameter pipe shall be Butterfly valves, except for side tapping valves, and meet with requirements of AWWA C-504 Class/150B latest edition. Butterfly valves shall have a working pressure of 150 PSI and hydrostatic pressure of 300 PSI and shall open "right" or "clockwise" and supplied with a two inch (2") wrench nut with Type 316 stainless steel fasteners on actuators and stem or specially designed sacrificial anodes may be used. Butterfly valves shall be Mueller B3211 or approved equal.

Side tapping valves shall be as manufactured by Mueller Model No. T-2360-16 E302 open right, or approved equal by the Sanitary Engineer through a shop drawing submittal.

Air relief valves shall be as manufactured by Val-Matic, Model No. 38 or approved equal and shall be located in a standard meter crock setting.

WATER LINE MATERIAL MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

WATER LINE VALVES (Continued)

Valve manholes when required by the Sanitary Engineer shall be four feet (4') diameter precast concrete and designed for an H-20 loading.

Valve boxes shall be Tyler Model C, three piece cast iron with bell that will cover valve bonnet with sufficient vertical adjustment to finish grade.

FIRE HYDRANTS

Shall be American AVK 2780 or Mueller Super Centurion A-423-250 or specified herein. Fire hydrants shall comply with AWWA C502 latest edition, Dry-Barrel Fire Hydrants. Hydrants shall be of the compression-type with a five and one-quarter inch (5¼") valve opening, open left. The hydrant shoe shall be six-inch (6") M.J. with all accessories. The complete interior of the shoe shall be coated with a H.P. epoxy. The main valve assembly shall consist of two (2) all bronze drain outlets, a bronze seat ring, a bronze drain ring, and a bronze top main valve plate or upper valve plate. The hydrant stem shall be made of steel rod, one and one-quarter inch (1¼") minimum diameter, except for machined surfaces. All hydrants shall be furnished with one (1) five-inch (5") Red Head Storz nozzle, with 5-36 and two (2) two and one-half inch (2½") N.S.T. hose nozzles. All hydrants shall be drainable into pipe bedding material consisting of No. 8 limestone gravel pocket, unless specified differently by Erie County. All hydrants shall have Type 316 stainless steel bolts and nuts below the bury line or specially designed sacrificial anodes may be used, except the M.J. shoe connection T-bolts shall be Cor-Ten steel. Unless otherwise specified, hydrants shall be buried a minimum of five feet (5') deep. Locate fire hydrants in curb lawn area (between sidewalk and curb) in most subdivisions at least three feet (3') behind curb, along areas without sidewalks at least seven feet (7') behind pavement edge to a maximum of fifteen feet (15') as required by Sanitary Engineer.

All hydrants shall be painted red with white bonnet and caps using Rustoleum Red for metal and Rustoleum enamel paint for white, or equal. Paint shall be provided, upon request, by the Erie County Water Division.

All hydrant leads shall consist of anchoring pipe with appropriate concrete thrust blocks. As a minimum anchoring pipe shall include a two foot (2') or longer section of anchoring pipe between the valve and the hydrant. Any spacer pipe required between the tee and the valve shall consist of anchoring pipe or restrained joint pipe. Hydrant piping shall include swivel fittings or hydrant extension kit for height adjustment.

Watch valves shall meet requirements of AWWA C509 and shall open "right" or "clockwise". Watch valve boxes shall meet the requirements of line valve boxes as described.

WATER LINE MATERIAL MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

CATHODIC PROTECTION

All buried ductile iron water pipe materials such as valves, hydrant assemblies, and fittings shall be installed with sacrificial prepackaged anodes for corrosion protection. The following minimum size and type anodes are required: Fire Hydrant Assemblies – a 32# magnesium anode between watch valve and hydrant shoe and a 32# magnesium anode between the main and watch valve. Line Valves – a 32# magnesium anode. Fittings – a 32% magnesium anode. Water Meter Yokes In Pits – a 5% zinc anode.

Wire connections to buried ductile iron will be made with Cadweld Type “HA” soldered connections. The soldered connection will be insulated with electrical potting compound. The anode lead wires shall be ten feet (10') length and made of #12 copper wire with Type TW insulation, black in color. Each sacrificial anode will be installed with a test station wired to ground surface installed flush with the ground surface.

DISINFECTION

Disinfection of the lines shall take place after the lines have been properly flushed. Erie County shall provide the water necessary for the first flush (1-1/2 times the volume of the line being flushed) at no cost, but will charge for any water required beyond this volume. Disinfection shall be in accordance with AWWA C651 and is the responsibility of the Contractor.

TESTING

Shall be performed after the main has been disinfected and flushed out, and shall be subject to a pressure and leakage test in accordance with AWWA C600 consisting of 150 psi/30 minutes. Testing will be performed by the Contractor under the supervision of the Erie County Department of Environmental Services Inspector or Water Division personnel.

Contractor shall install a one inch (1") diameter service at the end of all lines to a meter crock with a compression fitting shut off valve in the crock to be used for bacteria testing sampling. The meter crock and valve shall be provided by the D.O.E.S. Water Division. Bacteria sampling will be done by an Erie County D.O.E.S. Water Division employee. There shall be two (2) consecutive safe samples on a line before it will be turned on. Any additional samples beyond this will be subject to additional charges, which will include the cost of the sample and Water Division employee's time to collect and transport the sample.

SERVICE LINES

From main to meter pit all service lines, two inch (2") diameter and smaller, shall be CTS pipe and constructed of HDPE pipe with compression fittings rated for 200 psi. Larger services shall meet the requirements of Water Line Pipe Material. All service lines (two inch (2") diameter and smaller) from the meter pit to the customers building foundation shall be polyethylene CTS pipe and shall be constructed of pipe material and joints designed for a minimum pressure rating of 200 psi. Larger services shall meet the requirements of Water Line Pipe Material. All services shall be buried with a minimum ground cover of forty-eight inches (48") measured from finish grade.

WATER LINE MATERIAL MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10
LAST REVISION DATE: 7/01/11

SERVICE LINES (continued)

The Developer shall be responsible for installing continuous conduit carrier pipes under pavement for service line installations to each lot, building, condominium, etc. to be served which are located across the street from the water main. Continuous conduit carrier pipes shall be two inch (2") in diameter schedule 40 rigid PVC conduit, sunlight resistant gray, and provided by the D.O.E.S. Water Division. The carrier pipe shall be installed from within two feet (2') of the water main to the edge of right-of-way beyond any utilities, such as storm sewers or tile on the opposite side. Erie County Water Division is responsible for tapping the main and installing the service lateral in public right-of-way or in utility easement, plus install the water meter pit, where one inch (1") diameter or smaller service lines are installed. Larger than one inch (1") diameter, the Contractor shall install the meter pits as needed.

Water services for commercial, industrial and institutional installations may be required to have backflow prevention device(s) installed and tested by a certified plumber as determined by the Sanitary Engineer and as required by the State of Ohio. Water services for irrigation are required to have a backflow prevention device. Annual testing and reporting of test results to Erie County will be required for all backflow prevention devices.

THRUST BLOCKS

Thrust blocks shall be provided at fittings, valves or changes in direction of pipe or as determined by the Sanitary Engineer. Thrust blocks shall consist of concrete with a minimum 28-day compressive strength of 4,000 psi and shall be installed using the dimensions shown in the standard drawings. The Contractor shall use forms to ensure all pipe fitting joints and bolts are free of concrete.

CONNECTION TO EXISTING MAINS

New mains to connect to existing Erie County water mains shall generally be with tapping valves and sleeves, unless approval is obtained from the Sanitary Engineer to shut-off the existing main. The Contractor shall perform all excavation and provide and install all materials, except the Erie County Water Division shall install the tap. Tapping valves shall meet all requirements of main line valves.

WATER LINE MATERIAL MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

ROAD AND RAILROAD CROSSINGS

Ohio Turnpike and Railroad Crossings:

D.I.P. water mains shall be installed in welded steel encasement pipe with minimum wall thickness of 0.375 inches, with a minimum I.D. of eight inches (8") larger than the O.D. of the D.I.P. measured at the bell, installed with use of a bore machine. The annular space shall be filled with sand or approved grout mixture. All PVC lines installed in casing pipes shall have restrained joints and shall contain at least (3) stainless or plastic casing spacers (restrained) per pipe length as well as casing end seals as manufactured by Advance Products and Systems, Inc. (318-233-6116), or approved equal. All D.I.P. lines installed in casing pipes shall have restrained joints and shall contain at least two (2) spacers per pipe length; and all HDPE pipe installed in casing pipe shall contain one (1) spacer for every ten feet (10') of pipe.

State, County, Township, Village and City Roads:

These roads may be directional drilled or opened cut upon applicable political subdivision approval, backfilled and road repaired to the local jurisdiction's specifications.

WARRANTY

All new public water lines, sanitary sewer lines and appurtenances installed shall have a one year warranty against any manufacturer defects, installation defects, workmanship or failures of the system. Trench backfill and pavement installed as part of a public water or sewer project shall have a two year warranty against settlement, cracking, raveling, deterioration or shrinking of joint seal products, etc. Term of the warranties shall commence upon County written acceptance of the public lines and appurtenances.

STANDARD SPECIFICATIONS SANITARY SEWER MAINS AND APPURTENANCES

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

DEVELOPER PROCEDURES

All Developer Procedures as established by Erie County Commissioners, Erie County Engineer, Erie County Regional Planning Commission and local political subdivisions shall be followed, which includes: entering into a Developers Agreement, following standards and basis of design, inspection, permits, record drawings (as-builts) on mylar media, warranty and financial assurances. One (1) electronic copy in pdf format and two (2) sets of paper detail drawings (including plan and profiles, proposed and existing topography and all buried utilities) and specifications of all proposed water lines drawings on 24" x 36" sheets shall be submitted for review and approval to: Erie County Sanitary Engineer, c/o D.O.E.S., 554 River Road, P.O. Box 469, Huron, Ohio, 44839. Upon the Sanitary Engineers approval of the detail drawings and specifications for construction, the developer will have one year from approval date to complete the construction of the construction of the water and sanitary sewer lines or will have to resubmit for approval and at a minimum be subject to any new D.O.E.S. requirements.

The cost to record any and all easements and/or plats for Developer's projects for sanitary sewer lines, water lines, or pump stations to be dedicated to Erie County for ownership, operation and maintenance shall be at the cost of the Developer. The County shall invoice the Developer for these costs, the Developer shall pay said invoice within thirty (30) days of the invoice date.

O.R.C. 307.73 AGREEMENTS

Erie County may agree to an ORC 307.73 Agreement to allow a developer install a sanitary sewer line, dedicate it to the County as a public owned and maintained line in an easement and the County will collect and return connection fees from non-participating property owners as allowed under the law under the following terms:

1. Agreement Term: not-to-exceed 10 years
2. Pro-rated front footage fees shall not exceed the County's current equalization fee as described in Water Rule 3. Section 1.C at the date of the agreement.
3. No successor and/or assignment of the agreement will be allowed for the developer.
4. Developer will pay for all costs involved in acquiring easements including the cost of recording said easements.

WASTEWATER COLLECTION SYSTEM IMPROVEMENTS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

BASIS OF DESIGN

The Sanitary Engineer shall determine whether or not the County wastewater collection and tributary treatment system has available capacity to allow for a development to proceed. Gravity sewers shall consist of a minimum size of eight inch (8") diameter for mainline sewers and six inch (6") diameter for service laterals at full flow minimum velocities of 2 fps. The Sanitary Engineer shall require sewers and pump stations to be sized and to be installed at depths for the ultimate development of the entire tributary service area. Gravity sewers shall be required in place of force mains/pressure sewers when the Sanitary Engineer determines it is in the public interest to do so.

Generally, design shall be in accordance with Ohio E.P.A. regulations, the latest version of "Ten State Standards" and shall conform to the proceeding Standard Minimum Required Specifications and Standard Drawings.

The Developer and/or Engineer shall not allow other utilities to be installed within five feet (5') horizontally of an installed sanitary sewer or in the same trench as the sanitary sewer except at crossings. Should this occur, the Developer will be responsible for maintaining the sewer mains and the Sanitary Engineer will not permit taps to said line until the other utility lines are relocated five feet (5') away from the sanitary sewer.

Sanitary sewer lines shall be located within the public road right-of-way, along with other County utilities, such as water mains, storm sewers and drainage swales. All other utilities shall be located in Easements, outside the public right-of-way.

Pursuant to EPA requirements, water mains shall be installed with at least a ten foot (10') horizontal and eighteen inch (18") vertical separation from any sanitary sewers. The County also requires a five foot (5') horizontal and eighteen inch (18") vertical separation from any storm sewers, measured from out-to-out.

Bulkheads shall be installed once for every 200 lineal feet of sanitary sewer installed. Bulkheads will consist of an impervious material which will prevent ground water from passing through pipe bedding and backfill materials. Such materials may include native clays, low strength mortar, or a mixture of ODOT 304 limestone with bentonite.

WASTEWATER COLLECTION MATERIAL MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: **7/01/11**

IN THE CASE OF CONFLICTS BETWEEN WRITTEN SPECIFICATIONS AND DRAWINGS, THE WRITTEN SPECIFICATION SHALL APPLY.

SHOP DRAWING REQUIREMENTS

Two (2) copies of shop drawings containing manufacturers information concerning meeting the minimum required specifications shall be submitted to the Sanitary Engineer for approval by the Contractor prior to installation for the following items: pipe, fittings, manholes with appurtenances, oil/grit interceptors, grease traps, pump stations, electrical controls, valves, castings, casing pipe, casing spacers, casing end seals, etc. All drawings shall be stamped and initialed as reviewed by the Contractor before submitting these documents to the Sanitary Engineer for acceptance. U.S. manufactured materials are preferred by Erie County and purchased from Erie County vendors where possible.

LINE CONSTRUCTION STAKING

Gravity sanitary sewers and force mains shall be staked prior to the installation of new pipe. Staking shall be for both line and grade every fifty feet (50') plus at all fittings and off-set at ten feet (10'). A Professional Surveyor will be required where the Contractor does not have competent surveyors. All public gravity sewers shall be installed with the use of a laser to insure installed to grade.

GRAVITY MAIN LINE AND SERVICE LATERAL SEWER PIPE

Sewer pipe buried less than four feet (4') of cover in road or driveway areas shall be of Class 52, Ductile Iron Pipe, cement lined, with rubber gasket bell and spigot push on joints or PVC pipe as specified below installed in a rigid sleeve such as D.I.P. or welded steel pipe.

Sewer pipe buried with less than eighteen feet (18') of cover shall be:

PVC (solid wall pipe, PVC compounds shall meet the requirements of ASTM D-1784, cell class 12454-B), SDR 35 six inch through fifteen inch (6" - 15") diameter pipe and ASTM F-679 eighteen inch through thirty inch (18" - 30") diameter pipe, conforming to ASTM D3034, with joints conforming to ASTM D3212. Installed pipe testing shall meet or exceed ASTM D-1784 for leakage and five percent (5%) deflection. Fittings shall conform to ASTM D-3034. Gaskets shall conform to ASTM F-477. Pipe bedding shall consist of No. 8 or 9 limestone to the dimensions shown on the standard drawings haunched in place.

WASTEWATER COLLECTION MATERIAL

MINIMUM REQUIRED SPECIFICATIONS

AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

GRAVITY MAIN LINE AND SERVICE LATERAL SEWER PIPE (Continued)

Sewer pipe buried with more than eighteen feet (18') of cover shall be:

PVC (solid wall pipe, PVC compounds shall meet the requirements of ASTM D-1784, cell class 12454-B), pipe shall meet minimum pipe stiffness rating of PS-115 and shall consist of SDR 26 or thicker walled pipe as needed, as recommended by the manufacturer for the actual buried depth, conform to ASTM D3034 through fifteen inch (15") diameter and ASTM F679 for larger sizes. Installed pipe testing shall meet or exceed ASTM D-1784 for leakage and five percent (5%) deflection. Fittings shall conform to ASTM D-3034. Pipe bedding shall consist of No. 8 or 9 limestone to the dimensions shown on the standard drawings, haunched in place. All new public sanitary gravity sewers shall be CCTV upon completion of installation and provide Erie County DOES with a DVD and log of same.

Special/alternate pipe different than those specified above for gravity sewer installations use may be considered for special conditions, such as directional drilled HDPE or steel encased cement lined D.I.P. for under roads and water courses when sewer grade elevations will permit, or other pipe subject to approval by the Erie County Sanitary Engineer.

Service lateral pipe shall be six inch (6") diameter consisting of PVC (solid wall pipe) as meeting the above described specifications. Larger pipe may be required for larger water user customers subject to Sanitary Engineers approval. A typical sanitary sewer service drawing is included at the end of these specifications. **Service lateral pipes shall not be installed without a Connection Permit from the County and without calling two (2) work days in advance for inspection at (419) 656-0577. County service lateral inspections will only be performed during normal County work hours.** Service laterals shall only serve gravity drains in the customers structure which are above the vertical elevation of the closest downstream public sanitary sewer manhole cover. Drains below this elevation maybe connected using a grinder pump system for lower level sewage to prevent a public sewer backup into the structure. Basement or lower level gravity drains such as floor drains, toilet, sink, showers, slop sinks, clothes washer drains, etc. may not be connected by gravity to a service lateral, but will require a grinder pump system and force main/pressure sewer piped to the gravity service lateral. Service laterals shall have a clean out installed within three feet (3') of the building foundation exterior. Service laterals shall not have any bends other than 45-degree or 22.5-degree bends. 90-degree bends are not acceptable. One cleanout should be installed for every three hundred feet (300') of pipe installed and spaced and located to allow for easy cleaning. In developments where connection to a service lateral will not occur for more than thirty (30) days, the Developers Contractor shall install locator rings at their cost over the end of the service pipe meeting the inspectors requirements.

WASTEWATER COLLECTION MATERIAL

MINIMUM REQUIRED SPECIFICATIONS

AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

GRAVITY MAIN LINE AND SERVICE LATERAL SEWER PIPE (Continued)

The locator ring shall be as manufactured by 3M Scotchmark #1253, green, mid-range sewer markers as sold by Hughes Supply located in Toledo (1.419.874.8487) and in Elyria (1.440.439.4040). The locator ring shall be buried on average of three feet (3') below finish grade, but not more than four feet (4') below finish grade. Record drawings shall include detail information locating in plan and vertical depth (m.s.l. elevation) the end of each service lateral.

When a building(s) is abandoned, existing service laterals shall be cut and capped with a watertight cap. A locator ring shall be installed as described above and a record drawing locating the service connection pipe end in plan and profile shall be provided to the Sanitary Engineer by the demolition contractor or property owner.

Connecting service laterals to existing sewer pipe mains shall be as follows:

- a. To PVC Sewer Mains - cut out a section of existing sewer main, install a manufactured PVC wye (with six inch (6") branch) with water tight Fernco pipe adapter(s). Where applicable Inserta-tees, manufactured by Inserta Fittings Company, (1.503.358.2110) or approved equal. Bed the pipe connection with No. 8 or 9 limestone, haunched in place to twelve inches (12") over top of pipe.
- b. To Concrete Sewer Mains - core pipe and install a manufactured flexible watertight six inch (6") rubber boot with stainless steel band(s), Model NPC Kor-N-Tee as manufactured by NPC (1.800.626.2180) or approved equal. Bed around the pipe connection with No. 8 or 9 limestone, haunched in place to twelve inches (12") over top of pipe.
- c. To Vitrified Clay Pipe Sewer Mains - remove one (1) section of existing pipe (joint-to-joint), install a manufactured watertight PVC with six inch (6") branch with sleeve section as needed with two (2) watertight Fernco pipe adapters, or where applicable Inserta-tees, manufactured by Inserta Fittings Company (1.503.357.2110), or approved equal. Bed around the pipe connection with No. 8 or 9, haunched in place to twelve inches (12") over top of pipe.

Service lateral connections to manholes shall use a KOR-N-SEAL or approved equal (only allowed in special cases and only one (1) inside drop per manhole allowed). **Service laterals from the public sewer main to the building foundation shall not be installed until the building foundation and basement construction has been completed.** A native clay bulkhead dam must be installed on all service laterals typically near the Public Road right-of-way.

WASTEWATER COLLECTION MATERIAL MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

GRAVITY MAIN LINE AND SERVICE LATERAL SEWER PIPE (Continued)

Grease traps shall be installed in services for all food service businesses and oil/grit interceptors on all services for customers with floor drains in garage/warehouse type buildings. They will be sized as required by the State of Ohio Building and Plumbing Codes with minimum effective size of 500 gallons. The customer shall be responsible to maintain by cleaning/pumping the trap on a regular schedule. Traps shall be constructed water tight and shall meet the requirements of proceeding manhole specifications for joint construction, chemical additive in the concrete mix, external joint seam wrap, pipe connections and infiltration vacuum testing. All seals (water tight pipe to structure seals, precast concrete top and manhole seals) shall be constructed of oil resistant materials. Grease traps and interceptors shall be of precast concrete meeting the requirements of manhole concrete ring walls and ring wall joints. Grease traps and oil/grit interceptors shall be field tested for infiltration using a vacuum test at four inches (4") of mercury for five (5) minutes, with less than a one-half inch (1/2") reduction per ASTM C 1613-069.1.1. Grease trap openings/cleanouts at the top shall be sealed with ConSeal CS-102, or equal, between metal frames, grade adjustment rings, and top of trap. Two (2) openings for cleaning shall be provided, one over the inlet and the other over the outlet area of the grease trap. No internal chimney seal is required. The inlet pipe size from the building foundation to the grease trap shall be four inch (4") diameter with a four inch (4") diameter outlet to three feet (3') outside the tank, then increased to a minimum six inch (6") diameter sewer pipe for the remainder of the service to the public sewer.

Grease traps shall conform to the Ohio Administrative Code 4101:3-13-02. Grease traps for commercial/institutional kitchen wastes shall be installed so they receive all grease bearing waste except those from garbage disposals. Grease traps shall be installed immediately outside the building where there is easy access for cleaning, unless it is impractical, in which case they may be installed adjacent to and outside of the food preparation area. Grease traps shall be at least 500 gallon effective capacity or larger sized to allow for cooling of liquids before discharge. Grease traps shall be inspected frequently and cleaned frequently and as often as necessary to retain the grease wastes. The use of enzymes for the cleaning of grease traps is not permitted.

Oil and sand/grit interceptors shall conform to the Ohio Administrative Code 4101:3-13-02. Oil interceptors are required for garages and service stations where automobiles are serviced. Sand/Grit interceptors are required for car washes, garages and other areas where sand, dirt, solids and semisolids, or other heavy solids potentially plugging sanitary service laterals and public sanitary sewers. Oil interceptor effective volumes will be not less than one cubic feet above the outlet for each one hundred square feet of floor area to be drained to the interceptor, should only a portion of the buildings floor area drain to the interceptor only that area needs to be considered in this calculation. Sand/Grit interceptors shall be sized and designed based on the volume of water and wastes produced and the rates of flow, thereof.

WASTEWATER COLLECTION MATERIAL

MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

PRESSURE SEWER/FORCE MAIN PIPE

Pressure sewer/force main pipe shall be designed for a minimum pressure of 150 p.s.i. and shall consist of:

- a. PVC, conforming to AWWA C900, DR 18 (solid wall pipe with PVC compounds meeting the requirements of ASTM D-1784 meeting the requirements of cell classification 12454-A or 12454-B), pipe shall include integral bell gasketed joints with re-enforced gaskets which are locked in place at the factory; or
- b. Ductile Iron Pipe (DIP) shall have a minimum wall thickness of Class 52, with push-on type joints, cement lined (AWWA C104), and shall meet the requirements of AWWA C150 and C151.
- c. Pressure sewer pipe shall be pressure tested to 150 psi for thirty (30) minutes without leakage.
- d. Restrained joints shall be used at a minimum at all joint fittings and at the next pipe joint from each fitting in all directions. Restrained joints shall consist of Meg-a-Lugs, Model Ebba Series 1100 or equal as approved by the Erie County Sanitary Engineer.
- e. 412 stainless steel bolts shall be used on all fittings and be subject to equal cathodic protection as required for the "Water Line Material Specification".
- f. Thrust blocks shall be used at all change of direction fittings in addition to the restrained joints, same as required for the "Water Line Material Specifications".
- g. Grinder pump pressure sewers/force mains shall be a flexible, PE 3408, 200 psi, SODR9, ASTM D2737 rated waterline pipe material, jointless material to the gravity sewer.
- h. All high points in force main shall have installed an air release valve in a manhole consisting of a one inch (1") sewage combination air valve as manufactured by Apco Valve and Primer Corporation (representatives McStay & Associates: 216-439-7208), or equal.
- i. Two (2) No. 8 stranded wires shall be buried with all PVC and HDPE pressure sewer pipes located at the 10:00 and 2:00 positions and terminated in valve boxes, along with four inch (4") wide tape noting "SEWER FORCE MAIN BURIED BELOW" buried over pipe twelve inch (12") below finish grade.

GENERAL PIPE REQUIREMENTS & TESTING

All manufacturers recommendations for installation, unloading, trench preparation, assembly, backfill, pressure or infiltration test, deflection tests, etc. shall be followed unless in conflict with these specifications, latest version of Ten State Standards or with Ohio EPA requirements.

WASTEWATER COLLECTION MATERIAL MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

SEWER PIPE BEDDING

Sewer Pipe Bedding shall consist of No. 8 or 9 limestone haunched in place to the dimensions shown on the standard trench drawing for all gravity, service laterals and pressure sewer pipe installed by open trench method to twelve inches (12") over top of pipe. A native clay bulkhead dam will be installed at a minimum for every 200 feet of sewer pipe installed by open trench method and on every service lateral outside of the mainline sewer trench.

STEEL ENCASUREMENT PIPE

Under Railroad Crossings and the Ohio Turnpike or as required by the County, sewer pipe shall be installed in welded steel encasement pipe with minimum wall thickness of 0.375 inches, with a minimum I.D. of eight inches (8") Larger than the O.D. of the sewer pipe, (measured at the bell) installed with the use of a bore machine. The annular space shall be filled with sand or approved grout mixture. All PVC sewers installed in casing pipes shall have restrained joints and shall contain at least three (3) stainless steel, plastic, or pretreated wooden casing spacers per pipe length as well as casing end seals or approved equal. All D.I.P. installed in casing pipe shall have restrained joints and shall contain at least two (2) spacers per pipe length; and all HDPE pipe installed in casings shall contain one (1) spacer for every ten feet (10') of pipe.

MANHOLES

All manholes are permit required confined spaces and shall be watertight structures made of precast concrete sections with full depth channels and shall meet the requirements of ASTM C478, plus have external joint wraps, chimney seals and use concrete additives for water tightness. All existing manholes, which are to receive a new sewer pipe connection may be required to be replaced if not already constructed to the proceeding specifications as determined by the Sanitary Engineer. All inspections by D.O.E.S. will be performed to determine the need for replacement or rehabilitation.

Concrete ring walls. Concrete for manhole ring walls shall be constructed of Class A, 4,000 psi, 28 day compressive strength (6.5 bags per c.y.), with a waterproofing additive consisting of XYPEX Concentrate Admix C-2000 as manufactured by XYPEX Chemical Corporation, 13731 Mayfield Place, Richmond, B.C., Canada VGU (1.604.273.5265), Ipanex as manufactured by IPA Systems, Inc., 2745 North Amber Street, Philadelphia, Pa., (1.800.523.3834), Penetron Admix as manufactured by ICS/Penetron International, TTD, 45 Research Way, Suite 203, East Setauket, New York 11733 (1.631.941.9700) or approved equal. Reinforced steel and ring wall dimensions shall be as shown on standard manhole drawing. Lift holes if provided shall be filled watertight. Lift holes shall be filled with a non-shrink grout after set in place if they are thru holes. Cone sections shall include a minimum two inch (2") high smooth vertical interior face at the top to allow for the installation of the lower section of the internal chimney seal.

WASTEWATER COLLECTION MATERIAL

MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

MANHOLES (Continued)

Ring wall joints. Joints shall be formed entirely of concrete employing a round rubber gasket conforming to ASTM C443, shall be self-centering and made a uniform watertight joint. Joints damaged during installation shall be replaced with new ring walls. This joint seal shall be lubricated with Conseal CS-2000 or approved equal. Ring wall joints shall be further sealed for water tightness by installing an external joint/seal wrap consisting of Conseal/Con Wrap CS-212, twelve inch (12") width with CS-75 primer as manufactured by Concrete Sealants, Inc., 8917 South Palmer Road, New Carlisle, OH 45344 (1.800.332.7325), or approved equal. Minor concrete joint damage may be repaired with hydraulic cement in the field.

Connections. All sewer pipe connections shall be flexible and watertight. The sewer pipe at the spring line shall not extend to the manhole flow channel. Any space left between the end of pipe inside the manhole and the concrete channel shall be filled with ConSeal CS-1500, or equal, waterproof flexible joint filler in a smooth workman like manner, which will not restrict solids to pass. Connections shall consist of flexible rubber boots with stainless steel bands. Connections should be installed at the factory when possible, including future sewer pipe stubs. Factory installed connections shall be Z-LOK for four foot (4') diameter manholes with sewer pipe sizes with O.D. less than 18.25 inches or A-LOK for larger manholes and sewer pipes as manufactured by Products, Inc., P.O. Box 1647, 697 Tullytown, PA 19007 (1.800.822.ALOK), or approved equal. Connections of sewers to existing manholes shall be KOR-N-SEAL, as manufactured by NPC, Inc., 250 Elm Street, P.O. Box 301, Milford, N.H. 03055, (1.800.626.2180) or approved equal.

Manhole Steps. Shall conform to the requirements of ASTM C478 except that the steps shall be polypropylene with steel reinforcement. Manhole steps shall not be installed in shallow manholes (4' deep or less).

Grade Adjustment. Shall be of precast concrete conforming to ASTM C478, shall be held in place with tar/asphaltic cement, no more than three (3) rings used per manhole and shall not exceed twelve inches (12") of total height adjustment. Precast concrete grade rings shall not be less than a two inch (2") height. One- one inch (1") grade ring made of plastic or neoprene rubber may be used on each manhole as needed.

Frames and Covers. Shall be gray iron castings conforming to ASTM A48 and shall be cleaned and factory dipped in coal tar pitch varnish at the factory or cleaned and field coat applied with asphaltic paint. Covers shall have solid (without vents) lids, unless otherwise specified. Typical frame and covers shall be Neenah R-1782, East Jordan model 1710, (8-1/2 inch high), East Jordan V-1317, (5 inch high), or approved equal. Watertight frames and covers shall be Neenah R-1916-F, East Jordan "Watertite" 1047 or approved equal.

WASTEWATER COLLECTION MATERIAL

MINIMUM REQUIRED SPECIFICATIONS

AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

MANHOLES (Continued)

Drop Manhole Connections. Shall consist of an inside drop, conforming to the preceding connection paragraph with the addition of utilizing a GPK drop pipe fitting as manufactured by GPK Products, Inc., Fargo, ND 58108-2872 (1.701.277.3225) or approved equal, with internal drop pipe clamps at the top and bottom of the drop pipe and every four feet (4') in between manufactured of 316 stainless steel strap anchored with anchor bolts such as 3/8 inch diameter Stainless Wejet or equal anchors as supplied by Fastenal (1.419.621.8228), or Spoerr Concrete, (1.800.252.5205). Generally, drop pipe diameter shall be one pipe size smaller than the inlet sewer pipe diameter with six inch (6") diameter a minimum. At the bottom of the drop pipe will be a 45 degree bend directing the flow smoothly into the flow channel, toward the outlet sewer pipe. Leave all caps off GPK ends.

Invert/Flow Channel. Invert/flow channels shall be installed at the factory. The minimum flow channel width and depth shall match the O.D. of the outgoing sewer pipe diameter. The minimum radius of flow channel curvature shall be equal to 1.5 times the I.D. of the outlet sewer pipe diameter and shall be smooth. Manhole diameter shall be designed appropriately to allow for the minimum radius. Flow channel shall also be installed for all future stub sewers installed with the installation and for all drop pipe connections. The bench above the channel shall be sloped at a grade of 4:1 toward the flow channel. Flow channels shall be U shaped with a cross section width slightly larger than the outside diameter of the largest pipe connected to the manhole. All flow channel and benches shall be installed in a workman like manner. Non-smooth flow channel manhole bottoms shall be rejected and have to be remanufactured at the factory causing a possible delay to the project. All upstream connecting pipes shall be installed to "match crowns" (top outside of pipes).

Chimney Seals. Shall be internal chimney seals as manufactured by Cretex Specialty Products, P.O. Box 26, Waulesha, WI 53187 (1.800.345.3764) or WrapidSeal external chimney seals as manufactured by CANUSA a division of Shaw Resource Services Inc., 2408 Timberloch Place, Building C-8, The Woodlands, Texas 77380 (1.281.367.8866) or approved equal, as required by the Sanitary Engineer. External chimney seals must be installed with properly adjusted expander rings in a water tight manner.

WASTEWATER COLLECTION MATERIAL MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

MANHOLES (Continued)

Manhole Infiltration Test. The manhole from invert to top of casting, with chimney seal in place, shall be field tested for infiltration using a vacuum test at ten inches (10") of mercury for sixty (60) seconds, with less than a one inch (1") reduction.

All new manholes receiving wastewater from a pressure sewer/forcemain or within 100 lineal feet of another manhole receiving wastewater from a pressure sewer/forcemain shall have all concrete interior walls, channels and bench areas field coated with Aromatic Polyurea Spray for Concrete as manufactured by Elastomer Specialties, Inc., 10908 S. 264th East Ave., Broken Arrow, OK 74014 (1.800.786.4244) including a five (5) year warranty against H₂S corrosion or equal.

Backfill Material And Installation.

Pipe backfill material over sewer pipe bedding and around manholes within a forty-five (45) degree plane of influence of gravel or paved driveways and within influence of private and public roads shall at a minimum consist of ODOT 304 limestone installed in eighteen inch (18") lifts and mechanically compacted to ninety-five percent (95%) modified proctor. In areas of public roads, the backfill shall meet the requirements of the appropriate public official whom maintains the paved road.

PUMP STATIONS

PUBLIC SUBMERSIBLE PUMP STATIONS

General requirements of typical wastewater pump station includes, but is not limited to, the following: Duplex submersible pumps with controls as manufactured by Hydromatic, **Vaughn chopper pumps for high clogging conditions** or equal, in a concrete wet well with a separate valve vault. The wet well and valve vault shall be at a minimum eight feet (8') diameter to a maximum of twelve feet (12') diameter, Class A (4,000 psi) reinforced concrete designed for H-20 highway loadings, with sufficient size top hatches to remove all pumps, valves and equipment, with hatches made of aluminum (safe Hatch from Flyght or equal), hinged and padlocked, designed to same water tight specifications as sanitary manholes and shall include steps. Wet well shall have a hopper shaped bottom with all interior concrete surfaces field coated with Aromatic Polyurea Spray for Concrete as manufactured by Elastomer Specialties, Inc., 10908 S. 264th East Ave., Broken Arrow, OK 74014 (1.800.786.4244) including a five (5) year warranty against H₂S corrosion or equal. Hydromatic Pumps with flanged assembly for break away fittings are preferred with one spare pump provided. Victaulic D.I.P. shall be provided in the valve vault. In the wet well provide stainless or fiberglass guide rails to remove the pumps. Provide one (1) spare Hydromatic Pump with motor.

Size the vault for expansion to handle the ultimate service area design flow. Electric controls shall include circuit breaker system, level controls, alternating pump controls, lighting, HOA for motor starters, soft start and stop (future condition) for all motors larger than 25HP motor starters.

WASTEWATER COLLECTION MATERIAL

MINIMUM REQUIRED SPECIFICATIONS

AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

PUMP STATIONS

PUBLIC SUBMERSIBLE PUMP STATIONS (Continued)

All electric controls in stainless steel NEMA 4X weatherproof enclosures. Four (4) wire contacts shall be provided and left open and labeled in the control panel for connection of an auxiliary portable generator to provide power during a station primary power outage.

Pump Stations shall include as a minimum the following items:

- a. Use duplex PC boards. Hydromatic Duplex Q with duplex PC boards. High level and seal failure boards for alarms only.
- b. Control panel shall have an internal Plexiglas door inside the box with control switches, gauges, etc., on the inside door and external door shall be lockable.
- c. All electrical panels shall be located a distance of four feet (4') from wet well on a separate concrete pad on a non-corrosive mounting frame of sufficient size to support both a telemetry panel and a stainless steel electrical service panel. Mounting surface shall consist of aluminum or stainless steel posts with stainless steel unistrut system with stainless steel fasteners.
- d. Three (3) stainless steel NEMA 4X terminal boxes shall be provided; one (1) for tip floats and one (1) for pumps to be located with control panel mounting frame.
- e. Check valves shall have external weighted swings.
- f. Minimum one-quarter inch (1/4") stainless steel lift chains for lifting pump and motor. Pumps shall have stainless steel lifting bail.
- g. Stainless steel bracket for hanging tip floats.
- h. Isolation valves shall be short bodied quarter turn plug valves.
- i. Dresser couplings shall be installed in forcemain pipes between wet well and valve vault.
- j. A four inch (4") quick disconnect compression type connection shall be provided in the valve vault piping to connect a portable pump hose, used for emergency by-passing the pumps or wet well.
- k. The pump station alarm system shall include a cellular RTU compatible with alarm website and connected to local phone line installed complete to call out alarms listed above.
- l. Conduit shall be PVC underground to terminal box, aluminum afterward with gas seals before entering control panel or telemetry panel.
- m. Provide exterior area lighting.
- n. Provide a GFI 120 volt receptacle in the control panel.
- o. All control panels shall be grounded to a six feet (6') grounding rod and grounding cable in a conduit to protect against corrosion.
- p. Valve vault shall drain to wet well through a red valve check valve, series 39 or approved equal located in a sump in valve vault with vault floor sloped to sump.

WASTEWATER COLLECTION MATERIAL MINIMUM REQUIRED SPECIFICATIONS AND INSTALLATION STANDARDS

REVISION DATES: 06/15/1999, 01/14/2000, 12/01/2000, 6/11/01, 7/01/02, 7/01/03, 7/01/04, 7/01/06, 7/01/07, 7/01/2008, 7/07/10

LAST REVISION DATE: 7/01/11

PUBLIC SUBMERSIBLE PUMP STATIONS (Continued)

- q. Provide two (2) complete copies of O&M Manuals for all pumps, motors and controls.
- r. A one year warranty shall be provided from the manufacturer(s) of the pumps, controls, valves, piping with fittings and all structures beginning from the time of successful completion, startup and submittal of O&M Manuals, covering the cost of all material and labor defects.
- s. Level controls will consist of a submersible transducer for VFD motors and/or mercury float type for low level alarm, pumps off, lead pump on, lag pump on and high level alarm plus one spare (total of six)
- t. No spare parts for pumps are necessary except as listed above.

Developers or their agents shall own and maintain the pump station, including paying for all utilities until an equivalence of a minimum of five (5) single family homes are connected to and contributing wastewater flow to the new pump station at which time Erie County will inspect the station one last time and if in acceptable condition will accept for ownership, operation and maintenance the new pump station.

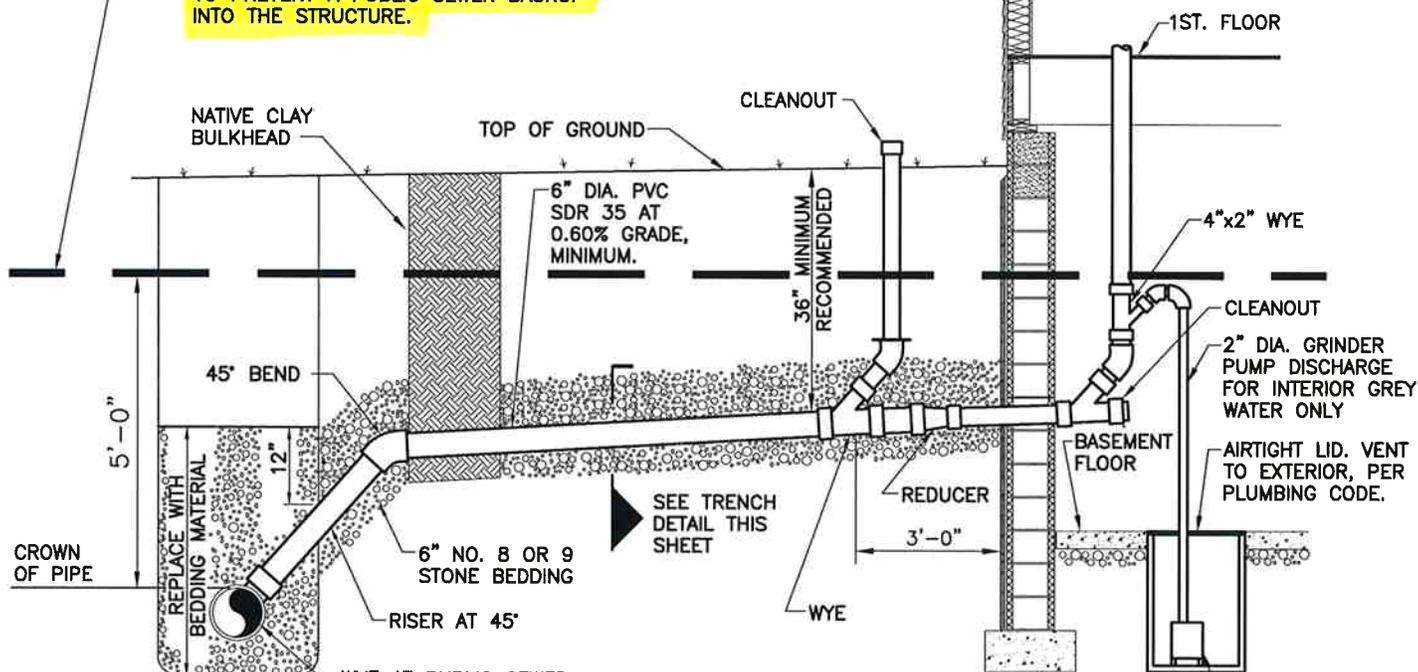
GRINDER PUMP STATIONS

Grinder pump stations may be used in homes and/or businesses where the public sewer does not meet the required depth to serve the customer by gravity as described in the Service Lateral section of these standards. It is recommended to use a submersible positive displacement type grinder pump that is designed to pump against varying heads as manufactured by Environmental One and represented by The Craun-Liebing Co. of Cleveland, Ohio (1.800.221.1251). A single submersible grinder pump with spare pump is recommended for a single-family home installation. Multiple home installations connecting to a shared grinder pump station or businesses using a submersible grinder pump station shall require a duplex (2 pumps) submersible grinder pump station, designed by a Professional Engineer, EPA Permit-to-Install, and an agreement as to ownership, use, operation and maintenance, recorded with the property deed of all customers utilizing the pump station. **Grinder pump stations shall be the responsibility of the private sewer customer(s) to own, maintain and operate.**

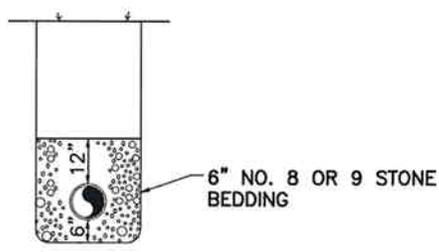
WARRANTY

All new public water lines, sanitary sewer lines and appurtenances installed shall have a one year warranty against any manufacturer defects, installation defects, workmanship or failures of the system. Trench backfill and pavement installed as part of a public water or sewer project shall have a two year warranty against settlement, cracking, raveling, deterioration or shrinking of joint seal products, etc. Term of the warranties shall commence upon County written acceptance of the public lines and appurtenances.

ALL GRAVITY DRAINS IN STRUCTURES (SHOWER/TUB DRAINS, SINK DRAINS, TOILET OUTLETS, CLOTHES WASHER DRAINS, DISH WASHER DRAINS, ETC.) WHICH ARE ABOVE THE VERTICAL ELEVATION OF THE CLOSEST DOWNSTREAM PUBLIC SANITARY SEWER MANHOLE COVER CAN CONNECT BY GRAVITY. DRAINS BELOW THIS ELEVATION MAY BE CONNECTED USING A GRINDER PUMP SYSTEM FOR LOWER LEVEL SEWAGE, TO PREVENT A PUBLIC SEWER BACKUP INTO THE STRUCTURE.



SUMP FOR GRINDER PUMP IF NEEDED FOR BASEMENT, BATHROOM, LAUNDRY, WASTEWATER, AND FLOOR DRAINS. (NO EXTERIOR FOUNDATION/FOOTER DRAINS OR DOWNSPOUT WATER TO THIS SUMP. VENT TO EXTERIOR OF HOUSE OR BUSINESS.)



TRENCH DETAIL

NOTES:

- 1.) NO 90° BENDS PERMITTED.
- 2.) INSTALL ONE (1) CLEANOUT FOR EVERY 300 FEET OF INSTALLED PIPE.
- 3.) ALL EXTERIOR WATER FROM FOUNDATIONS, FOOTER DRAINS, YARD DRAINS, DRIVEWAY DRAINS, ETC. ARE PROHIBITED FROM CONNECTING TO THE SANITARY SEWER SYSTEM.

SCALE: NONE

ERIE COUNTY, OHIO
DEPARTMENT OF ENVIRONMENTAL SERVICES

TYPICAL SANITARY SEWER SERVICE