

**Northern Kentucky
Water District**



2021

**Standard Specifications & Drawings
for the Installation of Water Mains**

PART 1 - GENERAL

1.01 **INTRODUCTION** Unless modified, deleted, replaced, or otherwise changed, the latest published addition of the following documents shall be the accepted standard for materials and/or procedures for the construction of water mains and appurtenances:
 A. Northern Kentucky Water District's Standard Drawings
 B. Natural Resources & Environmental Protection Cabinet, Division of Water
 C. Kentucky Public Service Commission Regulations
 D. American Water Works Association's Standards (AWWA)
 E. Recommended Standards for Water Works
 If a conflict exists between referenced sources, the more restrictive requirements shall prevail. The District shall provide interpretation as requested.

1.02 **DESCRIPTION** In general the following specifications are minimum requirement for water main design and installation. New design ideas and concepts are welcomed by the District, but subject to District's approval. Construction may be dictated by location, soil conditions, ground water, topography, etc. Additional provisions may be required by the District.

1.03 **DESIGN GUIDELINES** Plans are approved subject to the conditions of compliance with all applicable laws, rules, regulations and technical design and construction standards including, but not limited to all water quality standards set forth in 401 KAR chapter 8 and all technical design and construction standards as required by the Kentucky Division of Water. Deviation from applicable laws, rules, regulations and standards will only be considered with appropriate justification submitted to the District's Engineering Department. The proposed project may be constructed only in accordance with the approved plans. It is strongly recommended that the design engineer meet with the Water District prior to plan submittals for review of overall project. Extensions from and connections to the public water system will be approved by the District where proper pressures and flows permit, provided there is a sufficient water supply developed and available for domestic use and fire protection to take on new or additional extension or service without detriment to those already served. The District will run a hydraulic analysis for every new water main extension to ensure adequate water, as defined by the Ky. Public Service Commission, is available. The hydraulic analysis will: (a.) identify the existing and potential customer peak demand. (b.) demonstrate that the proposed water main projects can be flushed at a minimum of two and one half [2.5] feet per second [fps], while keeping system pressure above twenty [20] pounds per square inch [psi] within the pressure zone of the proposed project. (c.) demonstrate that the proposed water main project maintains thirty (30) psi under peak demand. (d.) demonstrate that the proposed water main project does not drop ground level pressure in any part of the pressure zone below 20 psi under all flow conditions. (e.) demonstrate pressures greater than or equal to (≥) thirty (30) psi are available on the discharge side of all water meters. Any needs in excess of the available water at the site, is the responsibility of the developer to provide (e.g. additional domestic needs for processing or increased fire protection requirements).

1.04

To allow for the future extension of the water system in an orderly manner, the water system shall be constructed to the developer's property limits which abut a proposed or existing public right-of-way or has a potential for future development and the termination shall be as described in the Standard Drawings and Specifications of the Water District or by connection to an existing main.

All improvement drawings shall consist of plan and profile views, street layout, lot or building layout and number, water main and appurtenance locations, and location of other utilities that may be in conflict. The Developer's Design Engineer is responsible to maintain an unobstructed area for the placement of the water main and appurtenances and allow no conflict with other utilities other than crossing of laterals. Utility laterals shall maintain a minimum of 6" outside diameter to outside diameter clearance except for storm and/or sanitary laterals which shall provide, 18" clearance below the water main.

The four-(4) foot area over the water main, (3' from curbside) shall be a non-paved, strip totally unobstructed with the exception of:

- a) removable, post type mail boxes;
- b) utility laterals (gas, electric, telephone, and cable television) maintaining a minimum of 6 inch outside diameter to outside diameter clearance;
- c) no more than 30' of continuous pavement used as driveways or parking pads;
- d) street and sidewalk crossings;
- e) sidewalks (may not be over main, but could encroach on this four-(4) foot area on street radius curves, and cul-de-sacs);

The ten-(10) foot area over the water main, centered (5' either side) shall be totally unobstructed with the exception of:

- a) items listed above;
- b) streets, curbs, and gutters;
- c) sidewalk pavement;
- d) storm drainage appurtenances

Additional requirements may be required for subdivision plans submittals that create double frontage lots (a lot other than a corner lot that has frontage on more than one public street) along public streets which currently do not have public water. The developer may be responsible for extending the water main along both sides of the double frontage lots if the property would benefit from the extension. If there is a future potential that a water main extension may be made by District's Extension Policy along the existing public street would be beneficial, as determined by the District, an agreement would need to be signed between the developer and the District.


Upon the request of the Developer, the District shall provide the Developer with a letter accepting the water main installation and the start of the one year maintenance period.

PLAN SUBMITTALS

Design drawings shall include both plan and profile views of the proposed water main. All plans submitted must be dated and bear the stamp and signature of a Professional Engineer licensed in the State of Kentucky and be on a 1" = 50' scale with plan sheets no larger than 24" x 36". Improvement plans shall be submitted in duplicate for preliminary review by the District. One copy of the improvement plan will be returned to the Engineer for corrections to meet District's Standards. The Engineer will need to revise and resubmit six (6) sets of plans. Also at this time a set of plans in digital format showing curb lines, a north arrow on a 1" = 50' scale will also be submitted for the District's GIS system. The District will not approve any project until these digital format plans have been received. Distribution of approved plans will be made by the District as follows: Three (3) copies retained by the District; one (1) copy to Planning Development Services; and two (2) copies returned to the Design Engineer when approval is granted and the District's Subdivision Agreement is signed and returned to the District by the Developer. A project approval period shall not exceed twenty-four (24) months, during which time the water main construction shall begin. Project approval does not relieve the Developer from the responsibility of obtaining any other approvals, permits, or licenses required by the Cabinet and other state, federal, and local agencies. Submittal to the Kentucky Division of Water will only be required if any of the following conditions exist :

If any phasing is to be allowed after the District has approved a set of drawings, the Developer shall provide to the District a set of the approved drawings with the proposed phasing shown in redlined notation. The drawing shall indicate any proposed additional appurtenances to the system per Standard 101. This redline shall provide dimensions of the proposed phased water main extension. Upon approval of the phasing by the District, and after construction of the system, the District's Inspector shall confirm the work was completed in accordance with the approved changes.

Water lines must be sized to meet the demands anticipated for the total development being designed. The design engineer and/or developer are responsible for properly sizing water mains to meet required demands of the development. Public water mains shall be installed in a public right of way with the exception of cross-country lines installed to eliminate dead ends and water mains installed on private property which are going to be maintained by the Water District.

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- a variance from these specifications is required and approved by the District.
- the project's overall length is greater than ten thousand (10,000) contiguous feet. Two (2) or more adjoining projects shall be considered one (1) project for the purposes of this requirement.
- the project consists of water pipes less than three inches (3") or greater than twelve inches (12") in diameter. This excludes: [1.] circulating two inch (2") water main projects of less than five hundred feet (500') shall qualify if future extension from the line will not occur and if the District determines that the two inch (2") line will benefit the overall system hydraulics and/or drinking water quality and [2.] projects consisting of water pipes greater than twelve inches (12") if the project only includes the relocation and/or rehab of the water main and no changes to pipe diameter.
- the project includes new construction or installation of treatment plants, storage tanks, chemical or pressure booster pumping stations.
- the project is funded in part or in full by the State Revolving Fund (SRF) or Congressional Special Appropriation Project Grants (SPAP).
- the project is under the jurisdiction of any regulating agency or funding agency other than the Kentucky Division of Water (external agencies), which in any way conflict with any regulatory process or funding process of these external agencies.
- the project impacts any outstanding state resource water, outstanding national resource water, exceptional water, or cold water aquatic habitat as defined at by 401 KAR Chapter 10.

If DOW approval is required an additional three (3) sets of plans must be submitted to the District along with a check made out to the Kentucky State Treasurer in the amount of \$150 for projects less than 10,000 linear feet and \$325 for projects longer than 10,000 by the Developer. Requirements contained within the DOW approval may make it necessary for a professional engineer to certify in writing that the project has been completed in accordance with the approved plans and specifications. If this is the case, the Developer shall secure these engineering services and supply said written certification upon completion of construction.

- 1.05 WATER MAINS ON PRIVATE PROPERTY Water mains installed on private property which are going to be maintained by the Water District, shall have a twenty-(20) foot wide easement with the water main centered in the easement area and shall have a justifiable benefit to the District (serving more than one property owner, hydraulic benefits, etc.) A four-(4) foot area over the water main shall be a non-paved, strip totally unobstructed with the exceptions as outlined in DESIGN GUIDELINES. With appropriate justification, paving may be approved within the four-(4) foot area over cross-country water mains. Outside the ten-(10) foot area over the water main, 5' either side but within the overall easement area, other utilities may be placed in this area. Proper documentation shall be provided for all easement areas. For areas that are on recorded subdivision plats, the following statement may be used in lieu of the grant of easement forms:

WATER MAIN EASE

The Water Main Easement(s) as shown on this plat are subject to the DECLARATION OF MASTER WATER FACILITY EASEMENT AGREEMENT as set forth in _____ (Document Location) of the _____ County Clerk's records at _____, Ky. (County Name) (Court House)

Document Location at Various Court Houses:

Court House	Document Location	County
Alexandria	Easement Book 129, Page 145	Campbell
Boone County	Easement Book 54, Page 195	Boone
Covington	Miscellaneous Book 504, Page 311	Kenton
Independence	Miscellaneous Book 228, Page 73	Kenton
Newport	Easement Book 304, Page 466	Campbell

For other areas, the Design Engineer shall prepare an easement document suitable for recording with the County Clerk. Documents shall consist of a sketch (8 1/2" by 14"), a legal description of the twenty (20) foot easement with back references to Deed Book and Page number, and a signed Grant of Easement Form (Restoration agreement) provided by the District prior to filling the main for sterilization.

- 1.06 WATER MAIN SIZE Minimum public water main size shall be 8", unless it is determined by the District that a dead-end main has no potential for future development, or it is determined by the District that a smaller main is adequate. The District may allow the last 600 feet of water main to be constructed as 6" water main, if a fire hydrant is deemed necessary by the Authority having Jurisdiction; or a smaller diameter main if a blow-off is sufficient. The water main around a cul-de-sac may be reduced to 4" ductile Iron or 2" polyethylene. A flushing device may be required, as determined by the District, on 4" ductile Iron and 2" polyethylene lines, if there is no potential for future development as determined by the District and proper fire hydrant spacing can be met. The District may consider the installation of conduits for cul-de-sac lots versus a main around the cul-de-sac. Conduits will need to be installed on the opposite lot lines of the electric service and at the proper depth with a tracing wire. Additional requirements may be required for the installation of conduits subject to the approval of the District. All water mains 16" and larger shall be min. class 50 ductile Iron as determined by the District. The District does not allow water mains 10", 14" & 18" in size.
- 1.07 DEAD ENDS OF WATER MAINS Dead ends to water mains shall be prohibited unless approved by the District. Dead ends may be approved if one or more of the following conditions exists:
- The distance between the dead end and the other tie-in point is greater than 600 feet.
 - Physical features exist between the dead end and the other tie-in point that in the opinion of the District make it impractical to tie them together.
 - Slopes between the dead end and the other tie-in point is greater than 3 to 1.
 - Slopes/terrain between the dead end and the other tie-in point is certified as geotechnically unstable by a qualified professional geotechnical engineer.
 - It is necessary to purchase easements to run a water line through existing developed lots.

The District reserves the right to require certain dead ends to be connected even though they meet the above conditions. No services shall be permitted to be tapped on cross-country water mains. For lines that dead end, a fire hydrant or blow-off shall be placed at the end of each line 6" in diameter or greater, and a flush hydrant or blow-off shall be required at the end of each line that is less than 6" in diameter. Each blow-off, fire hydrant, or flush hydrant shall be sized so that water velocity in the water main served by the blow-off or hydrant is greater than or equal to two and one half (2.5) fps during flushing. Flushing devices, blow-offs, or air relief valves shall not be connected to any sanitary sewer, combined sewer, septic tank or subsoil treatment system (hereinafter "non-storm sewer") or any storm sewer or storm drain, and shall be located at a distance greater than ten feet (10') from any non-storm sewer. Chambers, pits, or manholes containing valves, blow-offs, meters, or other such appurtenances shall not be directly connected to any non-storm sewer or any storm sewer or storm drain. Such chambers, pits, or manholes shall be drained to absorption pits underground or to the surface of the ground where they are not subject to flooding by surface water.


Cul-de-sacs streets of less than 300 feet long may be considered for the installation of a 4" ductile Iron looped water main for the elimination of the dead end. A fire hydrant shall be installed at the intersection of the cross street and a valve installed between the two tees for the 4" line.

- 1.08 MULTIPLE WATER MAIN FEEDS A minimum of two supply sources shall be required for subdivisions of one hundred (100) units or more, more than one street, and/or there is potential development area that exceeds the number of customers or streets previously mentioned.

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- 1.09 **MINIMUM WATER FLOW REQUIREMENTS** The water main extension at the most remote location shall be able to provide a minimum fire flow of 250 gpm for the installation of fire hydrants and the water system supporting this flow has the capability of providing this flow for a period of not less than two (2) hours plus consumption at the maximum daily rate. A minimum of 30 psi must be available on the discharge side of all meters. All water mains, including those not designed to provide fire protection, shall be sized after a hydraulic analysis based on flow demands and pressure requirements. If the water system cannot support the installation of fire hydrants, anchoring tees and valves shall be installed to allow for future fire hydrant installation when adequate water is available. If the water system extension is part of a subdivision development, the developer will be responsible for installing the anchoring tees and valves as described above and providing the District with a fire hydrant for each tee and valve installed as part of the subdivision. These fire hydrants will be installed by the District after water main improvements are made in the area which support the installation of fire hydrants.
- 1.10 **HIGH PRESSURE AREAS** Additional requirements may be necessary for high-pressure areas (125 psi static pressure or higher) as determined by the District.
- 1.11 **VALVES** Sufficient valves as determined by the District shall be provided on water mains so inconvenience and public health hazards are minimized during repairs, and their location shall be approved by the District. All valves shall be operated by or under the direction of District personnel only. Valves shall be installed at each end of cross-country water mains, and at separation of no greater than 1000 feet in urban residential areas; 500 feet in commercial areas; 1 mile in rural areas with few residents. Valves should be located at roadway intersections where practical.
- 1.12 **FIRE HYDRANTS** Fire hydrants shall be connected only to water mains adequately sized to carry fire flows and in no case to lines smaller than six (6) inches. An auxiliary valve shall be installed in all hydrant supply pipes. Fire hydrant drains shall not be connected to any sanitary sewer, combined sewer, septic tank or subsoil treatment system (hereinafter "non-storm sewer") or any storm sewer or storm drain, and shall be located at a distance greater than ten feet (10') from any non-storm sewer. Fire hydrant spacing shall be as recommended by the Planning and Development Services and the local fire department. Fire hydrants shall be located on or as close to side property lot lines as possible. Fire hydrants installed as part of a water main replacement project are to be replaced in approximately the same location as the existing one. Additional hydrants may be added when they are required for air release or flushing purposes as determined by the District.
- 1.13 **PARALLEL INSTALLATION OF WATER AND SEWER LINES**
Water mains shall be laid a distance of greater than or equal (\geq) to ten feet (10') horizontally from any existing or proposed sanitary sewer, combined sewer, septic tank or subsoil treatment system (hereinafter "non-storm sewer"). The horizontal distance shall be measured from outside diameter of the water main to outside diameter of the non-storm sewer. In cases where the District determines it is not practical to maintain a ten foot (10') separation, water mains may be installed closer to a non-storm sewer provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least eighteen inches (18") above the top of the gravity sewer. Documentation of this variance, including where the variance was required and how variance conditions were met, shall be maintained with the project records. If these conditions are unable to be met, plans and specifications shall be submitted to the Division of Water for review and approval. No deviation from the horizontal ten foot (10') separation shall be allowed if the non-storm sewer is a force main (sewer under pressure).

- 1.14 **CROSSING OF WATER AND SEWER LINES**
When water mains and sewers cross:
- Water mains shall be laid such that there shall be a vertical distance of greater than or equal to (\geq) eighteen inches (18") between the water main and sewer. The vertical distance shall be measured from the outside diameter of the water main to the outside diameter of the sewer line.
 - One (1) full length of the water pipe shall be located so that both joints of the water pipe shall be as far from the sewer as practical as determined by the Utility.
 - Where necessary, special structural support for the water and sewer pipes shall be required. No water pipe shall pass through or come in contact with any part of a non-storm sewer manhole.
- 1.15 **PARALLEL INSTALLATION WITH OTHER UNDERGROUND UTILITIES-**
Water mains should maintain a minimum lateral separation of 3 feet from all other underground utilities whenever possible, with the exception of sewers as stated elsewhere in these specifications.
- 1.16 **WATER CROSSINGS** Surface water crossings, both over and under water, present special issues which should be discussed with the District before improvement plans are prepared. Over water crossings, the pipe shall be adequately supported, protected from damage, freezing, and accessible for repair or replacement. The pipe shall be of special construction having flexible, restrained, or welded watertight joints. Valves shall be provided at both ends of water crossings so that the section can be isolated for test or repair. Where the water main is constructed under a blue line stream, the pipe shall be protected with concrete encasement. This encasement shall extend a distance equal to the width of the channel measured from top of bank to top of bank. The encasement shall be per Standard Drawing No. 110. Valves shall be installed on each side of the water crossing in areas not subject to flooding when crossing water courses greater than 15 feet in width (bank to bank). Permanent taps shall be installed on each side of the valve closest to the supply source to allow insertion of a small meter to determine leakage and obtain water samples. The Developer will be responsible for meeting the requirements of 401 KAR 4:050 and KRS 151.250 for sub-fluvial pipe line crossings. For subfluvial pipe crossings, a floodplain construction permit will not be required pursuant to KRS 151.250 if the following requirements of 401 KAR 4:050 Section 2 are met:
- No material may be placed in the stream or in the flood plain of the stream to form construction pads, coffer dams, access roads, etc. during construction of pipe crossings.
 - Crossing trenches shall be backfilled as closely as possible to the original contour.
 - All excess material resulting from construction displacement in a crossing trench shall be disposed of outside the flood plain.
 - For erodible channels, there shall be at least thirty inches (36") of backfill on top of all pipe or conduit points in the crossing.
 - For nonerodible channels, pipes or conduits in the crossing shall be encased on all sides by at least six inches (12") of concrete with all pipe or conduit points in the crossing at least six inches (12") below the original contour of the channel.
 - The weight of a pipe and its contents must exceed that of an equal volume of water at all points during normal operating conditions, or the applicant shall provide the Division with sufficient information to show that the pipe and joints have sufficient strength.
- 1.17 **SAFETY** The "Manual of Accident Prevention In Construction" published by the Associated General Contractors of America, O.S.H.A Regulations and other state and local safety regulations shall be followed.

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1.18 MAINTENANCE PERIOD The Developer shall be responsible for the maintenance of the installed water mains and appurtenances to District Standards for a period of not less than one (1) year from the date the water main is placed in service by the District. If an inspection reveals that the installation does not meet District standards, the developer will be notified in writing to correct all discrepancies and/or problems within 30 days after notification. If the problems are not corrected within the 30 day period, the District shall make the corrections at the expense of the Developer. The Developer shall then be billed by the District at a rate of time and material plus overhead or at the rate of actual cost plus overhead when completed by an available contractor hired by the District. Payment is required within 30 days of invoice date. Indebtedness to the Water District will result in no future water being provided to the Developer on all existing and future water main projects and/or phases until all indebtedness is paid in full.

1.19 APPLICATION FOR SERVICE Application for water service will only be accepted after the water main bacteria samples are shown to be negative following disinfection and the main is placed in-service by the District. No service installation will be scheduled until the water main is approved and turned on.

1.20 CONDUITS FOR WATER SERVICES IN ROCKY AREAS The Developer is responsible for notifying the District when rocky conditions are found in a development which could affect the installation of customer water service lines. In rocky areas, the Developer shall install service line conduits and be responsible for maintaining markings which identify the conduit's location. When service connections in developments require rock boring as a result of a developer's failure to install crossover conduits, the water service applicant will be billed for the full cost of the installation under the District's Invoice Billing Policy, less the connection fee paid at the time of application. This will apply to service connections tapped to water mains installed by a developer and put into service after January 1, 2020. The word "rock" is defined as boulders and solid masonry larger than 1/2 cubic yard in volume, or solid ledge rock and masonry which requires for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power operated hand tool. Photo evidence of rock encountered during service line installation is available upon request.

1.21 ORGANIC CONTAMINATION
Mains installed within 200 feet of petroleum tanks and other areas of organic contamination must be ductile iron pipe.

PART II - MATERIALS

2.01 WATER MAIN PIPE AND FITTINGS

A. Minimum Class 50 Ductile Iron Pipe (D.I.P) - A minimum of Class 50 Ductile Iron pipe shall conform to the latest edition of AWWA C151. All pipe shall be clearly marked as to class by the manufacturer "Push-on single gasket" type joints shall conform to the latest edition of AWWA C-111. Pipe shall have a standard thickness cement mortar lining in conformance with AWWA C-104.

Under no conditions shall pipe line deflection measured between joints exceed the manufacturer's published recommended standard for that type of pipe. The maximum deflection at push-on joints and/or mechanical joints shall be 5 degrees or as recommended by Manufacturer. All D.I.P. shall be blue polyethylene wrapped.

B. Polyvinyl Chloride Pipe (P.V.C.) - D.R. 18, P.V.C. pipe shall conform to the latest edition of AWWA C900, must be NSF approved and manufactured in accordance with ASTM standards. All pipe shall be clearly marked as to class by the manufacturer. The outside diameter shall be equivalent to D.I.P. Pipe shall have gasket bell end type joints furnished complete with gaskets meeting the latest edition of ASTM F477. Solvent weld joints are prohibited.

P.V.C. pipe shall be permitted for use in residential subdivisions and along city and county roads as approved by the District. Pipe size shall be limited to 6", 8" & 12". P.V.C. pipe shall not be installed in high pressure areas where the static system pressures exceeds 125 psi or other system conditions exist which increase pressures over 125 psi. as determined by the District. P.V.C. pipe cannot be used for cross country lines, along state highways, water crossings, or installed within 200 feet radius of oil or gasoline lines, underground storage tanks, petroleum storage tanks or pumping stations.

P.V.C. pipe may be tied into an existing ductile iron main in a subdivision when the extension is over 450 linear feet of main, or when the pipe is installed around a cul-de-sac or a dead-end street with no possible extension of the street as approved by the District. Transition between D.I.P. and P.V.C. pipe shall be made with some type of ductile iron fitting. Manufacturer approved transition joints shall be used between dissimilar piping materials.

Beveled spigot ends must have a minimum bevel of 8 degrees to a maximum bevel of 15 degrees. The vertical face of the spigot end may not exceed 75% of pipe wall thickness and the horizontal length of the bevel shall not exceed 1.25 inches. Field beveled spigot end shall be made per manufacturers recommendation and as approved by the District. The degree of bevel shall be approved for the type of pipe being installed.

P.V.C. Pipe Shipping, Handling & Storage - The front end of all pipe delivered by truck shall be covered for protection against exhaust fumes.P.V.C. pipe shall be protected from exposure to sunlight according to manufacturer's recommendations. Pipe will not be accepted for installation if discoloration is evident due to sunlight or other exposure. Pipe shall be stored in such a manner to prevent beaming the pipe.


C. Molecularly Oriented Polyvinyl Chloride Pressure Pipe (P.V.C.O.)

P.V.C.O. pipe shall conform to the latest edition of AWWA C909, must be NSF approved and manufactured in accordance with ASTM standards. All pipe shall be clearly marked as to class by the manufacturer. The outside diameter shall be equivalent to D.I.P. Pipe shall have gasket bell end type joints furnished complete with gaskets meeting the latest edition of ASTM D3139. Solvent weld joints are prohibited. P.V.C.O. pipe installation shall follow the P.V.C. C-900 Standards - Part II -Materials, 2.01, Section C of these specifications.

D. Polyethylene Pipe - Class 200, S.D.R. 9, 200 psi, ASTM D-2737, P.E. pipe shall conform to the latest edition of AWWA C901, must be NSF approved and manufactured in accordance with ASTM standards. All pipe shall be clearly marked as to class by the manufacturer. The outside diameter shall be equivalent to Copper Tubing Size (CTS). The P.E. pipe shall be homogeneous throughout and free of visible cracks, holes, kinks, foreign inclusions or other defects. It shall be uniform in color, opacity, density and other physical properties. Solvent weld joints are prohibited.

P.E. pipe shall be permitted for use in residential subdivisions cul-de-sacs only as approved by the District. Pipe size shall be limited to 2". P.E. pipe shall not be installed in high pressure areas where the static system pressures exceeds 125 psi or other system conditions exist which increase pressures over 125 psi. as determined by the District. P.E. pipe cannot be used for cross country lines, along state highways, water crossings, or installed within 200 feet radius of oil or gasoline lines, underground storage tanks, petroleum storage tanks or pumping stations.

P.E. pipe expands and contracts when exposed to temperature changes, allowances shall be made during installation. Normally P.E. pipe will "snake" itself in the trench enough to provide sufficient slack. An extra 6" per 100' of pipe per 45 F temperature change should be added to compensate for thermal conditions.

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E. Tracing Wire All water mains, including out-of-service stubs intended for future extension, shall be installed with copper tracing wire (P.V.C. coated) taped to the top of the pipe every 5'. Maximum tracing wire length shall be 500' without terminating in a curb stop box. Curb stop boxes shall not be located in the pavement areas. Splices in the tracing wire shall be kept to a minimum and approved by the District. If splices are required they shall be made with copper split bolt (lisco #ik-8 or approved equal) and taped with electrical tape. Jumper wires must be run from the main tracing wire and secured to all water meter service lines.

F. Fittings - All fittings and accessories shall be Ductile Iron, rated for a minimum of 200 psi working pressure or as specified herein. The fittings and accessories shall be new and unused. (NOTE: Certain areas of the Northern Kentucky Water District require materials used, to be of a higher working pressure than 200 psi.) All pipe fittings shall be mechanical joint fittings. Mechanical joints shall conform to AWWA C111. Bolts and nuts shall be high strength, corrosion resistant alloy, such as "Cor-Ten" or approved equal. Ductile Iron Compact Fittings shall conform to AWWA C153 and Full Body Fittings to AWWA C110. A bituminous seal coat shall be applied to the outside of the fitting. All ductile iron fittings shall be cement lined and seal coated in accordance to AWWA C104.

2.02 POLYETHYLENE WRAP All ductile iron pipe, fittings, valves, and fire hydrant leads shall be polyethylene wrapped, installed according to the current edition of AWWA C105. Polyethylene wrap shall be blue in color. Ductile iron fittings, valves, and fire hydrant leads used in the installation of P.V.C. pipe shall be included. Polyethylene wrap shall be 8-mil thickness low-density film or 4-mil thickness high-density cross-laminated polyethylene tube per AWWA C105. The contractors shall cut the roll in tubes 2 feet longer than a standard length of pipe.

Each tube shall be slipped over the length of pipe, centering to allow a one foot overlap on each adjacent pipe section. After the lap is made, slack in the tubing shall be taken up for a snug fit, and the overlay shall be secured with polyethylene tape. Pipe shall not be wrapped and stored on site for any period of time, but wrapped and immediately placed in the trench, fittings shall be wrapped prior to installing blocking or pads. (see Standard Drawing #104) Polyvinyl chloride pipe requires no wrap. Odd shaped appurtenances such as valves, tees, fittings, and other ferrous metal pipeline appurtenances shall be wrapped by using a flat sheet of polyethylene. Wrapping shall be done by placing the sheet under the appliances and bringing the edges together, folding twice, and taping down.

B. Water mains greater than or equal to (≥) 16 inches in diameter which contain metallic piping and/or fittings shall be installed with cathodic protection designed by a NACE certified corrosion specialist. This specialist shall be responsible for:

- Performing field soil analysis/survey along a proposed water main project alignment.
- Review design drawings and material specifications prepared by others and provide recommendations for consideration.
- Providing all necessary and appropriate services in connection with conducting corrosion evaluation of the proposed project, corrosion protection analysis, design installation details/schedule/specifications.
- Preparation of standard corrosion protection specification for inclusion with the District's specifications.
- Review the proposed pipe material and provide recommendations on cathodic protection/control and/or protective coatings.
- Providing a report/recommendations for the long-term cathodic protection of the proposed project which could include the following: the size, type, configuration, quantity, and spacing of recommended galvanic anodes, joint bonding, isolation couplings, wiring, etc.; all soil analysis/measurements, calculations, locations, corrosion monitoring & test stations; and provisions to mitigate DC interference to nearby metallic structures.

2.03 VALVES All valves shall open by turning counter-clockwise with the operation of a 2 inch square operating nut. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. Valves shall have mechanical joint ends except Tapping Valves.

A. GATE VALVES Valves 12 inches and smaller shall be resilient seated gate valves, non-rising stem with rubber "O" ring packing seals, rated at 250 psi working pressure and conform to the applicable portions of AWWA Standard C509, Latest Edition. High pressure gate valves shall be required when the pressure exceeds 200 psi. Valve bodies shall be ductile iron, glands shall be the same material as the valve. All external dome and packing bolts shall be stainless steel. The valves shall open by turning counter-clockwise. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. Valves shall have mechanical joint ends unless otherwise shown on the plans or directed by the District. An extension stem shall be furnished if required, to bring the operating nut within 3-1/2 feet of finished grade. Extension stems shall be securely fastened to the valve stem. The Contractor shall make all valves tight under their working pressures after they have been placed and before the main is placed in operation. Unless otherwise approved by the District, all valves 16" and larger shall be ductile iron resilient wedge gate valves with beveled gearing (lay down gate valves). Valve shall be ductile iron body, non-rising stem, open left, 2" square operating nut, epoxy coated, mechanical joint (inlet & outlet connections), O-ring type packing, resilient wedge, 250 psi working pressure, and conforming in all other ways to AWWA Standard C515 American Flow Control 2500 Resilient Wedge Gate Valve or approved equal. Valve body, external dome, and packing bolts to be assembled with stainless steel bolts grade 304 or better.

B. TAPPING SLEEVE AND VALVES - No tapping sleeves and valves unless approved by Northern Kentucky Water District. Tapping sleeves and valves shall be designed for a working pressure of 200 psi. The tapping sleeve together with the tapping valve shall be tested at 250 psi for visible leakage before the main is tapped. Tapping sleeve and valve used in high pressure areas shall be tested at 350 psi.

1. Tapping Sleeves - Tapping sleeves shall be a two piece body with mechanical joint type ends, and be so designed as to assure uniform gasket pressure and permit centering of the sleeve on the pipe. Stainless steel type tapping sleeves with full gasket maybe considered, but will need to be approved by the District prior to installation.

2. Tapping Valves - Tapping valves shall be resilient seated gate valves, rated at 200 psi (unless installed in high pressure service area) and conform to the applicable portions of AWWA Standard 509, latest edition except that the seat rings shall be oversized to permit entry of the tapping machine cutter. All external dome and packing bolts shall be stainless steel. Tapping valves shall be ductile iron body, non-rising stem with rubber "O" ring packing seals. Tapping valves shall have a flange on one end for bolting to the tapping sleeve and a mechanical joint type end connection on the slotted standard flange or other adapters for connection to the tapping machine.

C. VALVE STEM EXTENSIONS A valve stem extension shall be installed by the contractor to bring the operating nut within 2 1/2 to 3 1/2 ft. of final grade. Extension stems will be supplied by the Water District if the extension is justified. The contractor shall measure the needed length and provide a minimum of 48 hours notice for receipt of stem extension.

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2.04 **VALVE BOXES** All valves shall be provided with valve boxes. Valve boxes shall be of standard, adjustable, heavy duty cast iron extension type, two piece, 5 1/4 inch shaft, screw type, and of such length as necessary to extend from valve to finished grade, Tyler #562-S, Tyler #564-S or approved equal. Valve box cover shall be stamped "Water". Tops shall be set at final established grade. If valve boxes are not of sufficient height to bring the top of the box to final grade, a section of 6" ductile iron pipe for pavement areas and 6" PVC for non-pavement areas may be used to extend the valve box to final grade with prior approval from the District. The length of pipe shall permit the valve box to be adjusted up and down. All valves will be installed with a box-lok type valve box centering ring or approved equal.

2.05 **FIRE HYDRANTS** All fire hydrants shall have auxiliary valves for isolating water flow to the hydrant. All fire hydrants and auxiliary valves shall be positively locked to the water main by restrained joints, hydrant adapters, or other approved method. Hydrants shall be designed to 200 psi working pressure and shall be shop tested to 300 psi hydrostatic pressure with the main valve both open and closed. High pressure fire hydrants will be required when pressures exceed 150 psi.

The barrel shall have a breakable safety section and/or base bolts just above the ground line. Hydrants shall have a main valve opening of 5 1/4 inches, a 6 inch mechanical joint inlet to be suitable for setting in a trench 3' 6" deep minimum, and shall be the traffic style hydrant so that the main valve remains closed when the barrel is broken off. Hydrants shall have a dry top and shall be self draining, when the main valve is closed. Self draining hydrants shall drain to dry wells provided exclusively for that purpose. Hydrant drains shall not be connected to storm or sanitary sewers. Hydrants located generally in the Covington System and other areas determined by the District (flood zones) shall have all drain holes plugged prior to installation. Hydrants shall be rotatable in a minimum of eight (8) position in 360 degrees.

All hydrants shall have two (2) - two and one half (2 1/2) inch hose nozzles and one (1) steamer or pumper connection threaded to conform to Northern Ky. Water District's Standards: steamer nozzle shall be National Standard Thread and 2 1/2" outlets shall be Old Cincinnati Thread. The operating nut and the nuts of the nozzle caps shall be square in shape, measuring one (1) inch from side to side. Hydrant body shall be painted yellow for areas designed for 150 psi working pressure and red for areas in excess of 150 psi.

All hydrants shall be right hand open, clockwise. The following fire hydrants are approved for installation in the District's system: Mueller, Waterous, U.S. Pipe, M & H, Kennedy and American Darling.

2.06 **PRESSURE REDUCING VALVES** Pressure reducing valves will be installed by the District in regular 2" and smaller meter settings when the static system pressure is at or above 125 psi for new and old services when deemed necessary by the District. Pressure reducing valves are only installed to protect the meter. The District will not be liable for any damage due to pressure conditions caused by or arising out of the failure or defective condition of such pressure regulator or for damage that may occur through the installation, maintenance, or use of such equipment.

2.07 **AIR RELEASE VALVES AND/OR TAPS** Air release valves shall be installed in the high points of the water mains where hydrants are not installed and as required by the District and in accordance with Standard Drawing No. 106. 8" and smaller water mains, tap size and piping shall be 3/4", 12" water main-1", & 16" and larger water main-2". Temporary taps of suitable size may be required at certain points on the water main for the release of air for filling and/or flushing purposes. Temporary taps will be removed and plugged after use. Automatic air relief valves shall not be used in situations where manhole or chamber flooding may occur. The open end of an air relief pipe from automatic valves shall be extended a distance of greater than or equal to (≥) one foot (1') above grade and shall be provided with a screened, downward facing elbow or an equivalent standard as determined by the best professional judgment of the District. Manually operated air release valves shall include a camlock-type coupling and waste valve. The pipe from a manually operated air release valve shall be extended to the top of the pit.


2.08 **STEEL CASING PIPE** Casing pipe shall be steel pipe with a minimum yield strength of 35,000 psi with a minimum wall thickness as listed below:

Nominal Diameter Casing Pipe	Normal Wall Thickness	Nominal Diameter Casing Pipe	Normal Wall Thickness
Under 14"	0.251"	26"	0.438"
14" & 16"	0.282"	28" & 30"	0.469"
18"	0.313"	32"	0.501"
20"	0.344"	34" & 36"	0.532"
22"	0.375"	38", 40", & 42"	0.563"
24"	0.407"	48"	0.626"

The inside diameter of the casing pipe shall be at least four (4) inches greater than the outside diameter of the carrier pipe joints. Steel casing sections shall be connected by welding, conforming to AWWA C206. All carrier pipe placed in steel casing pipe shall be minimum class 50 ductile iron pipe and conform to the latest edition of AWWA C151. Carrier pipe gaskets shall develop a wedging action between pairs of high-strength stainless steel elements spaced around the gasket (FIELD LOK, FASTGRIP or approved equal gaskets). Adequate pipe spacers shall be installed to ensure that the carrier pipe is adequately supported in the center of the casing pipe throughout its length, particularly at the ends to offset settling and possible electrical shorting. Manufactured pipe spacers shall be installed per manufacturer's installation requirements. There shall not be any metallic contact between the casing and carrier pipe. Casings shall have both ends sealed up in such a way as to prevent the entrance of foreign material. See Standard Drawing #114 for installation details.

PART III - INSTALLATION OF WATER MAINS AND APPURTENANCES

3.01 **GENERAL** Water mains and appurtenances shall be installed in compliance with AWWA standards (C600 for D.I.P., C605 for P.V.C. type pipe and C901 for P.E.) and/or manufacturer recommendations. Water main pipe and fittings shall be laid on a good level foundation with no gaps or humps under the pipe or fittings. Excavation shall be done by hand at joints to prevent the pipe and fittings from being supported by the mechanical joint or slip joint bell. Transition between D.I.P. and P.V.C. type pipe shall be made with some type of ductile iron fitting. Manufacturer approved transition joints shall be used between dissimilar piping materials. Repairs to or section replacement of D.I.P. shall not be made using P.V.C. materials. Pipe shall be laid with the bell ends facing in the direction of laying.

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The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations. ALL OPEN ENDS ARE TO BE CLOSED WITH CAPS OR PLUGS AT ALL TIMES WHEN PIPE LAYING OPERATIONS ARE NOT IN OPERATION AND AT THE END OF THE DAY. All caps or plugs shall be properly installed and blocked in advance of filling, flushing, and testing mains. All securing and blocking shall be inspected by the District prior to back filling of ditch.

If the existing water main material being tapped or connected to is asbestos concrete, then during the process of tapping the asbestos concrete water main, the contractor shall conform to OSHA regulations governing the handling of hazardous waste. Pieces of asbestos concrete resulting from the tap shall be doubled bagged, placed in a rigid container and disposed of in an approved landfill.

3.02 **CONTRACTORS RESPONSIBILITY** If the existing water main being tapped or connected to is cathodically protected, an isolation coupling shall be required. All work performed on any water mains and/or appurtenances that are owned or anticipated to be owned by the District shall be completed under the direction of the District adhering to an acceptable plan approved by the District. A minimum 24 hours notice shall be given to the District by the contractor prior to the start of water main work. One set of District approved plans shall be on the job site during construction. Water main construction will not be permitted to start until all approvals are received. There shall be no deviation from the approved plans without written approval from the District.

A. If the interruption of service to any customer of the District is necessary, the Contractor shall make arrangements to provide such shutdown and notify District customers at the direction of the District Inspector. All private residents shall be notified no less than 48 hours and all businesses commercial and Industrial customers shall be notified no less than 1 week prior to the interruption of service. All shutdowns shall be coordinated with the effected residents, with priority given to any special needs customers such as hospitals, schools, and customers with medical needs.

B. Contractor shall be responsible for relieving any water main pressure (whether air or water) before removing any cap, plug, fire hydrant, valve, etc.

3.03 **HANDLING** Pipe, fittings, valves, hydrants, and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Pipe hooks that extend inside the ends of the pipe shall not be used for handling the pipe since they could damage the lining. Under no circumstances shall such materials be dropped. Pipe handled on skid ways shall not be skidded or rolled against other pipe. All bolts shall be tightened with proper wrenches and must have equal tension. The interior of all pipe, fittings and other accessories shall be kept free from dirt and foreign material at all times. When handling P.V.C., P.V.C.O. & P.E. pipe care should be taken to avoid abrasion damage, gouging of the pipe, rocks, and any stressing of the bell joints or damage of the bevel ends.

3.04 **TRENCHING, GRADE, AND COVER** Typically no trenching or laying of pipe or fittings shall be done until pavement (curbs) has been installed. In cases where water main installation is required under new pavement (side streets) main may be installed from trench stakes. When main installation is done prior to the pavement completion, test holes may be required by the District if valve depth, service taps or other evidence indicates that the minimum or maximum cover requirements are not met or that the main is in the wrong location. The contractor will be responsible for digging test holes at intervals required by the District to verify depth and location.

All trenching, grade, and cover work shall conform to the lines and grades established, and shall be done according to the drawings and specifications, subject to such modifications as the District may determine to be necessary during the execution of the work. Trenches for water lines shall be of a depth that will provide a minimum cover over the top of pipe of three (3) feet and a maximum of four (4) feet from the final finished grade. Cover over four feet in depth will not be allowed unless approved by the District to avoid interference with other utilities. Kentucky Dept. of Transportation requires a minimum of 42" of cover for water mains along state highways.

The Contractor shall establish all locations, lines, and grades in advance of all work where practical. In addition the Contractor will keep the Northern Kentucky Water District informed a reasonable time in advance of the times and places in which the Contractor intends to work (minimum advance notice shall be one working day, 24 hours).

3.05 **TRENCH EXCAVATION**

A. **TRENCH WIDTH** Widths of trenches shall be held to a minimum to accommodate the pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits:

Earth

Minimum - outside diameter of the pipe barrel plus 8 inches, 4 inches each side of pipe.

Maximum - nominal pipe diameter plus 24 inches.

Rock

Minimum - 24" or less, nominal pipe size: outside diameter of pipe barrel plus 12 inches, @ 6 inches each side.

Minimum - Larger than 24", nominal pipe size: outside diameter of pipe barrel plus 18 inches, @ 9 inches each side.

Maximum - nominal pipe diameter plus 24 inches.


B. **BUTTERFLY VALVES**

Trench width shall be over excavated 24" on the side that the operating mechanism is located on the butterfly valve when the surrounding area cannot be hand dug.

3.06 **BOTTOM PREPARATION** The Contractor shall use excavation equipment that produces an even foundation. For the entire length of the trench, a compacted 3" layer of sand, shall be installed below the pipe. Bell holes and depressions for joints, valves, and fittings shall be dug after the trench bedding has been graded in order that the pipe rest upon the prepared bedding for as nearly its full length as practicable. Bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint. Stones found in the trench shall be removed for a depth greater than or equal to (≥) six inches (6") below the bottom of the pipe.

3.07 **UNSTABLE SUB-GRADE MATERIAL** When the sub-grade is found to include non-approved backfill material (rock, refuse, organic material, etc.), such material shall be removed to a minimum of six (6) inches below the bottom of the pipe and backfilled with sand, backrun or granular material and thoroughly compacted.

3.08 **UNSTABLE SUB-GRADE** If the material forming the trench bottom is not suitable for a good foundation, a further depth shall be excavated and backfilled with an approved backfill material and thoroughly compacted or a foundation shall be constructed using piling, treated timbers, concrete, or other materials as directed and approved by the District.

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- 3.09 **PIPE LAYING** Pipe shall be laid with bell ends facing in the direction of laying. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and the pipe forced home. All pipe shall be laid with ends abutting and true to line and grade. Deflection of pipe joints in excess of the manufacturer's recommendations shall not be permitted. Caps or plugs shall be installed to prevent the entrance of foreign material whenever pipe laying operations are not in progress.
- 3.10 **PIPE CUTTING** Cutting of pipe for installing valves, fittings, or hydrants shall be done in a neat and workmanlike manner without damage to the pipe or lining. The end shall be smooth and at right angles to the axis of the pipe. Flame cutting of metal pipe by means of an oxyacetylene torch shall not be permitted.
- 3.11 **PUSH-ON JOINTS** The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant, per manufacturers recommendation, shall be applied to the spigot end. (Special lubricant shall be suitable for use in potable water) With the spigot end centered in the bell, the spigot is pushed home per manufacturers recommendations. Insertion of spigot into PVC type pipe bell should be inserted until the reference mark is flush with the end of the bell. Over insertion of the pipe is not recommended per the manufacturer. Pipe joint materials which prevent permeation by petroleum products shall be used within 200 foot radius of oil or gasoline lines, underground storage tanks, petroleum storage tanks or pumping stations.
- 3.12 **MECHANICAL JOINTS** Mechanical joints for D.I.P. and P.V.C. type pipe require that the spigot be carefully located in the bell. The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. These clean surfaces shall be brushed with a special lubricant just prior to slipping the gasket over the spigot end and into the bell. (Special lubricant shall be suitable for use in potable water) The lubricant shall also be brushed on each gasket prior to installation to remove the loose dirt and lubricate the gasket as it is force into its retaining space. P.V.C. type pipe spigot ends shall be field cut smooth and at right angles to the axis of the pipe for installation in mechanical joint fittings. Care shall be taken to ensure that the P.V.C. plain end is completely home into the mechanical joint fitting.
- 3.13 **RESTRAINED JOINTS** Restrained joint-type pipe and fittings shall only be used as approval by the District. Retaining glands, field lock gaskets, or retaining flanges maybe used as temporary blocking but shall not be considered as providing a permanent restrained joint or as an alternate for permanent concrete blocking. The use of these type of restraining joints need to be approved by the District prior to installation.
- 3.14 **SETTING VALVES** Valves shall be set on a firm solid concrete block foundation so that no load will be transferred to the connecting pipe. Valves in water mains shall, where possible, be located on the side property lines extended, unless otherwise shown on the plans. A valve box shall be provided for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve. The box cover shall be set flush with the surface of the finished pavement unless otherwise shown. All valves boxes with the exception of isolating valves for fire hydrants that are located in non-paved areas shall have a minimum 2' by 2' by 4" concrete pad as shown in Standard Drawing No. 105, unless a smaller pad is approved by the District.

- 3.15 **SETTING FIRE HYDRANTS** Hydrants shall be located as shown on the plans or as directed by the District. The location shall provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. All hydrants shall stand plumb with the pumper nozzle facing the curb. Hydrant shall be set to the established grade, with the traffic flange within 4" above final grade in accordance to Standard Drawing No. 109. Each hydrant shall be controlled by an independent gate valve with valve box. All valves used for hydrant control shall be anchored to the branch tee. Fire hydrant barrel extension shall be limited to a one piece assembly only, stacking two or more extensions is prohibited. Maximum fire hydrant barrel extension is 2 feet.
- 3.16 **CROSS-COUNTRY WATER MAINS** All cross-country water mains shall be installed with a tracing wire as described in Part II, Section 2.01 - F- Tracing Wire.
- 3.17 **THRUST BLOCKING** All bends over five (5) degrees, tees, plugs, reducers, and hydrants shall be securely blocked against movement with concrete thrust blocks placed against undisturbed earth in accordance with Standard Drawing No. 104 & 104-A. Thrust blocks shall be approved by the District prior to backfilling. Water mains shall have concrete thrust block at all pipe intersections and changes of direction to resist forces acting on the pipeline. All concrete thrust blocks shall be poured in such a manner that the bolts can be replaced without disturbing the blocking. All caps or plugs used in mains to undergo hydrostatic test shall be properly installed and blocked in advance of testing mains. All caps or plug installations shall be approved by the District representative before the main is subjected to the pressure test. The District may permit the use of restrained type glands, gaskets, 3/4" welded eye bolts @ a 90 degree bend & 3/4" threaded rods or other means as prior approved by the District for temporary restraint only. Permanent concrete thrust restraint shall be provided with any temporary restraint. Duc-Lucs are prohibited for use.
- 3.18 **TRENCH BACKFILL TO 12" OVER PIPE BARREL** All trench excavations shall be backfilled immediately after pipe is laid with the exception of thrust blocks. Compacted sand material shall be used to backfill the trench from the bottom of the pipe barrel to the 12" over the pipe barrel Lime sand is not permitted. Backfill material shall be free from cinders, refuse, organic material, boulders, top soil, frozen material, material with a high void content, rocks 1 1/2" or larger measured in any direction, sharp stones and crushed rocks larger than 3/4", or other materials which in the opinion of the District is unsuitable. No flushing of backfill shall be permitted to achieve compaction.
- 3.19 **REMAINING TRENCH BACKFILL IN NON-PAVEMENT AREAS** From 12" above the pipe barrel to the surface, excavated trench material may be used as backfill material or as required by local or county authorities. No material shall be used for backfill that contains frozen earth, vegetable or organic material, debris, rocks 8" or larger measured in any direction, or earth with an exceptionally high void content. Compaction of remaining trench backfill shall be as required by local or county authorities.
- 3.20 **REMAINING TRENCH BACKFILL IN EXISTING PUBLIC ROADWAYS** Roadway opening permits shall be obtained from the local City, County or Ky. State Dept. of Highways if applicable. The minimum requirements for backfill beneath all existing public roadways from 12" above the pipe barrel to sub-grade shall be flowable fill unless City, County, or State have additional requirements. The flowable fill shall comply with the latest edition of the Kentucky Transportation Cabinet/ Department of Highways "Standard Specifications for Road and Bridge Construction". The remaining trench backfill to final grade shall match the existing pavement/surface conditions.

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3.21 DISINFECTION New or relocated water mains shall be thoroughly disinfected in accordance with 401 KAR Chapter 8:150 Section 4 (1) upon completion of construction and before being placed into service. To disinfect the new or relocated lines, the Utility shall use chlorine or chlorine compounds (disinfectants) in such amounts as to produce an initial disinfectant concentration of at least fifty (50) ppm and a residual disinfection of greater than or equal to (\geq) twenty-five (25) ppm at the end of twenty four (24) hours. The line disinfection shall be followed with thorough flushing and the lines shall be placed into service if, and only if, coliform monitoring of the line does not show the presence of coliform. If coliform is detected, repeat flushing of the line and coliform monitoring. If coliform is still detected, repeat disinfection and flushing as if the line has never been disinfected. Continue the described process until monitoring does not show the presence of coliform. The application shall be as approved by the District and in accordance with AWWA C651 and applicable Ky. Division of Water requirements. The presence or absence of total coliform monitored by sampling and analysis as needed shall be determined for the new or relocated water main(s). Samples shall be taken at connection points to existing lines at one (1) mile intervals and at dead ends, and from each branch of the new or relocated water main. Sample bottles shall be clearly identified as "special" construction tests. For new construction projects, the distribution system, using the most expedient method, shall maintain coliform test results. Chlorinated water resulting from disinfection of project components shall be disposed in a manner which does not violate 401 KAR 10:030. The contractor shall be responsible for de-chlorination of the disinfection water. All non-disinfected fittings used for tie-ins or repairs shall be cleaned and swabbed with a hypochlorite disinfecting solution prior to installation.

A. TABLET METHOD Calcium hypochlorite tablets shall be installed in each length of pipe to insure a sufficient dosage of 50 ppm based on the following table:

Pipe Diameter	Tablets per Length
6"	2 ea. -5 gram tablets
8"	4 ea. -5 gram tablets
10"	6 ea. -5 gram tablets
12"	8 ea. -5 gram tablets
16"	14 ea. -5gram tablets

The tablets shall be attached by an adhesive meeting the requirements of NSF/ANSI 61. Tablets shall be attached inside and at the top of the main with approximately equal numbers of tablets at each end of the pipe. Tablets must be water soluble.

B. LIQUID CHLORINE METHOD Disinfection may be done by the addition of suitable amounts of chlorine in the form of liquid sodium hypochlorite as per AWWA B300 to obtain the results as the previous method described. Note: Permission for this method of disinfection shall be obtained by the District prior to construction.

3.22 PRESSURE TESTING and Leak Detection. All installed pipe shall be monitored for leaks by physical testing, as needed. Pressure Testing must be in accordance with the latest edition of AWWA Standards C600. The water main being tested shall have all air expelled by additional flushing or the installation of taps on high points in the line. The pressure of the water main shall be gradually increased to obtain a minimum pressure of 100 psi over the design pressure (250 psi minimum) at the lowest elevation point of the water main or as directed by the District. The test will be for a two (2) hour duration and will not vary by more than 5 psi. All tests performed for each test section shall be witnessed and approved by a representative of the District, in the event any test is performed without a representative of the District, the Contractor shall be required to test the section again. Leakage is defined as the amount of water used to maintain the test pressure.

3.23 Cross Connections Cross connections shall not be allowed, in accordance with 401 KAR 8:020.

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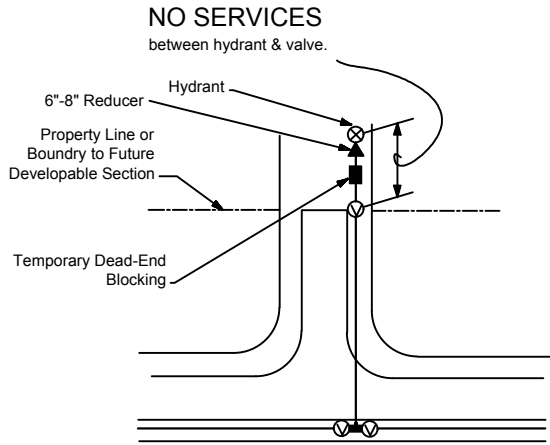
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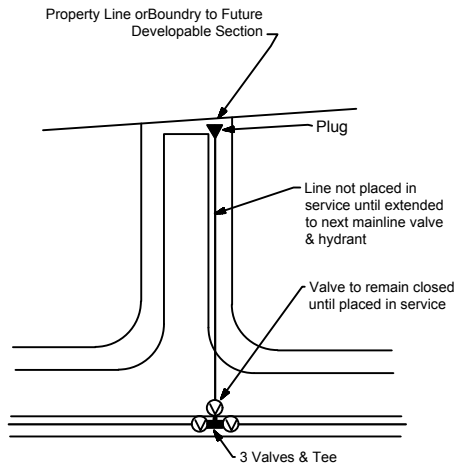
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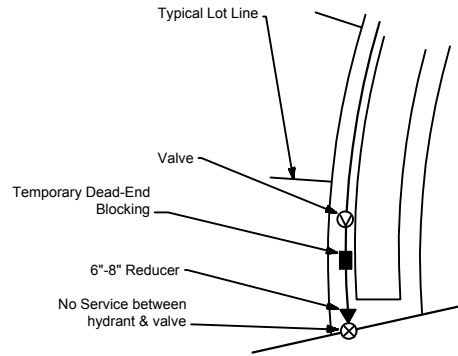


FUTURE SIDE STREET WITH SERVICE ON BRANCH LINE

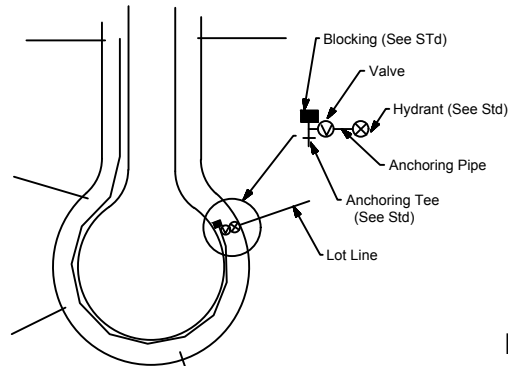


FUTURE SIDE STREET WITHOUT SERVICES ON BRANCH LINE

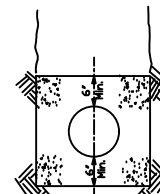
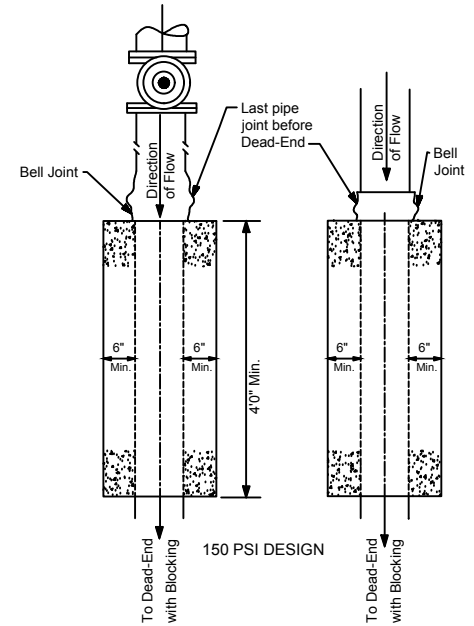
Water Mains under paved surface shall not exceed maximum 30 lin.Ft., this does not apply to streer intersections.



DEAD-END STREET WITH PROPOSED FUTURE EXTENSION



CUL-DE-SAC WITH DEAD-END FIRE HYDRANT



Blocking shall be Class "A" Concrete or Flowable Fill as approved by the District.

DETAIL FOR TEMPORARY DEAD-END BLOCKING

NOTE: Blocking shall be inspected by the District prior to backfilling.

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	JMPS	8/22/24

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WATER MAINS TERMINATIONS

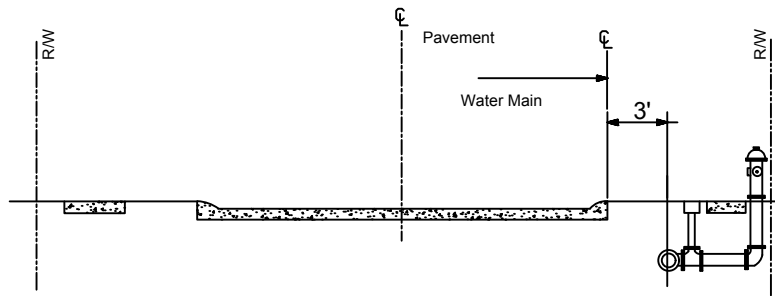
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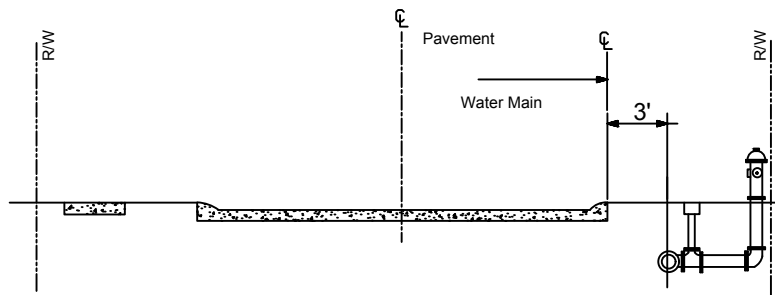
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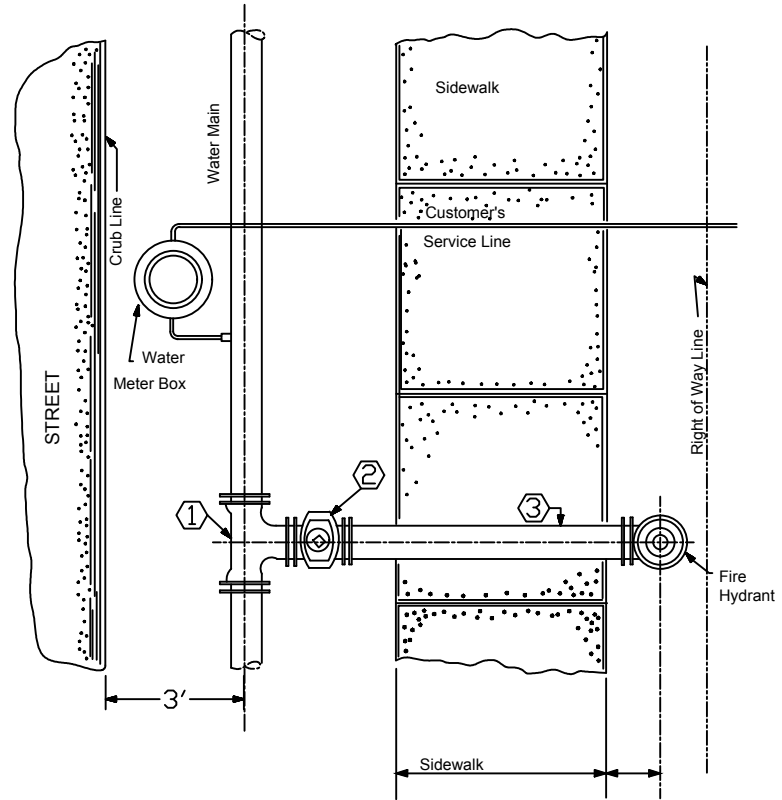
STREET WITH SIDEWALK



STREET WITHOUT SIDEWALK

DRAWING NOTES

- ① Mechanical Joint Anchoring Tee-Clow No.F-1217 or equal as approved.
- ② Mechanical Joint Gate Valve
- ③ Mechanical Joint Anchoring Pipe Clow No.F-1216 or Approved equal Length as required.



All ductile iron pipe, fittings and valves shall be wrapped with polyethelene encasement in accordance with specifications.

REVISION	BY	DATE
1.	MPS	1/15/21
	MPS	02/23

The 3' under 2ymin. not for intersect.
Detail temp. standard blocking.

N. KY. WATER DISTRICT

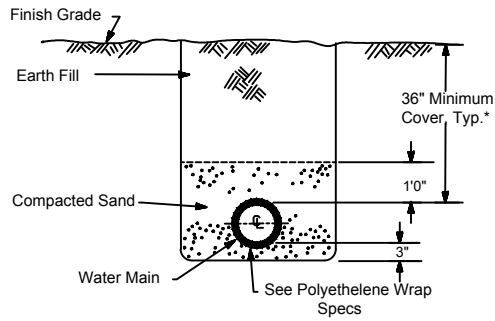
WATER MAINS TERMINATIONS

DRAWN BY: SAR

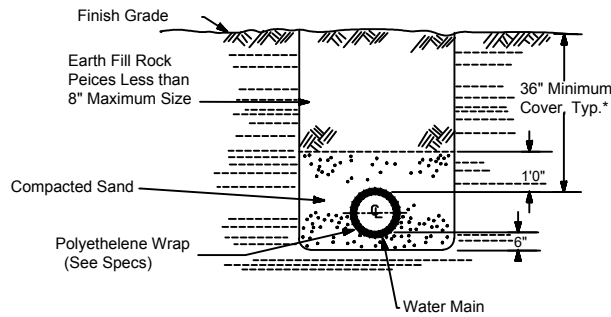
APPROVED: *[Signature]*

DATE: 2/1/2021

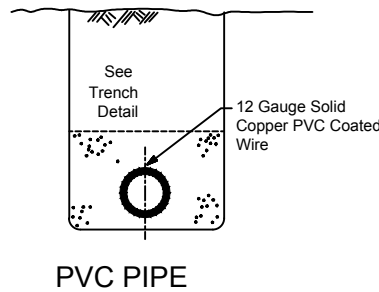
STANDARD DRAWING NO: 102



**EARTH CUTS
TRENCH DETAIL**

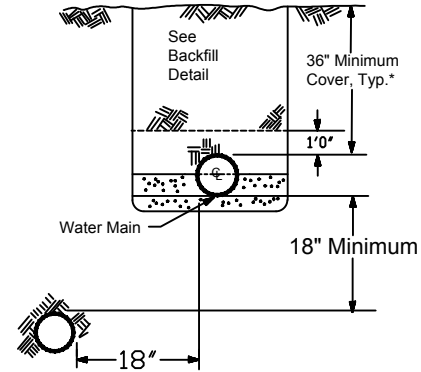


**ROCK CUTS
& UNSTABLE SUBGRADE
TRENCH DETAIL**



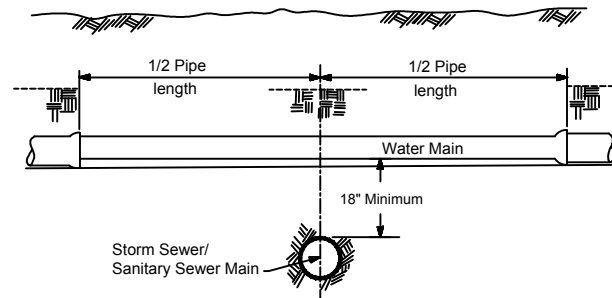
PVC PIPE

ALTERNATE TO BE USED ONLY ON APPROVAL
BY THE DISTRICT



Water Main must be located a minimum of 10 feet lateral distance from any existing or future sewer lines or manholes, or as shown in the above alternate.

**WATER MAIN PARALLELING
SEWER MAIN**



WATER MAIN CROSSING SEWER

SUBDIVISION CONSTRUCTION

* Unless Otherwise Noted

REVISION	BY	DATE
1	MPS	11/5/93
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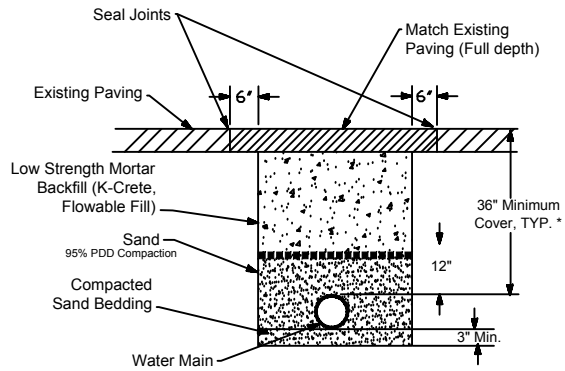
N. KY. WATER DISTRICT
TYPICAL PIPELINE TRENCH
DETAIL

DRAWN BY:
SAR

APPROVED:
[Signature]

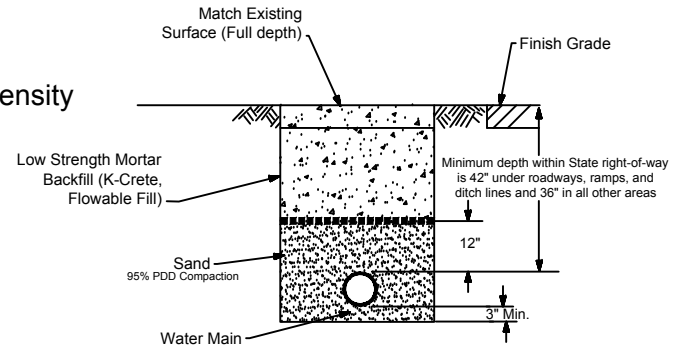
DATE:
2/1/2021

STANDARD
DRAWING NO:
103

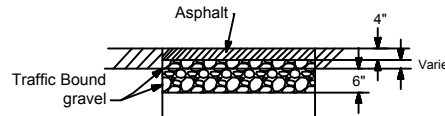


UNDER ASPHALT CONCRETE PAVEMENT

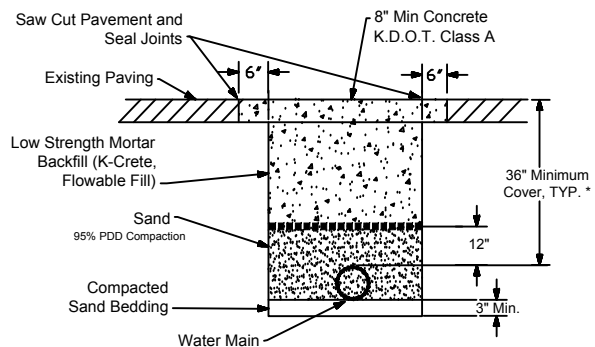
PDD= Standard Proctor Dry Density
-ASTM D698



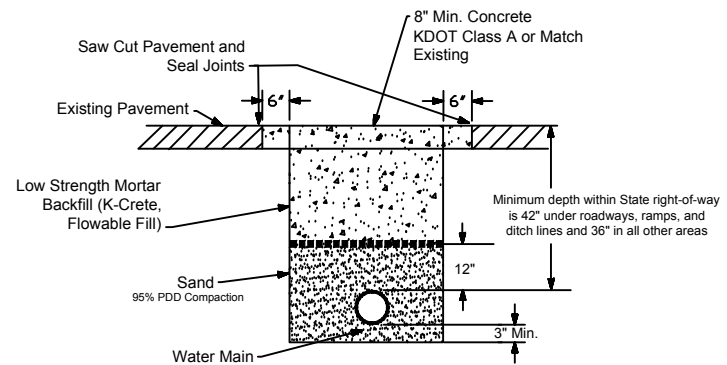
UNDER SHOULDER OF STATE MAINTAINED STREET



TEMPORARY STREET RESTORATION



UNDER CONCRETE PAVEMENT

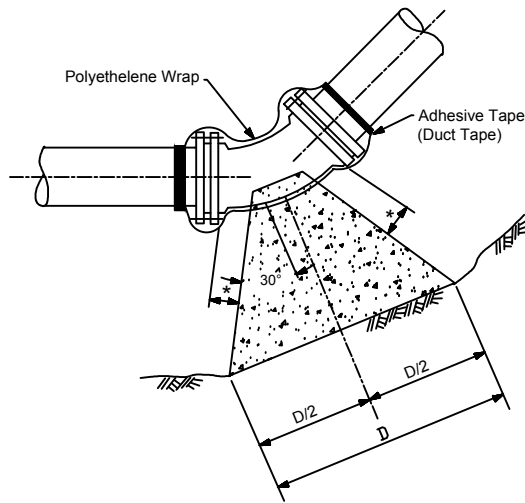


UNDER STATE MAINTAINED STREET

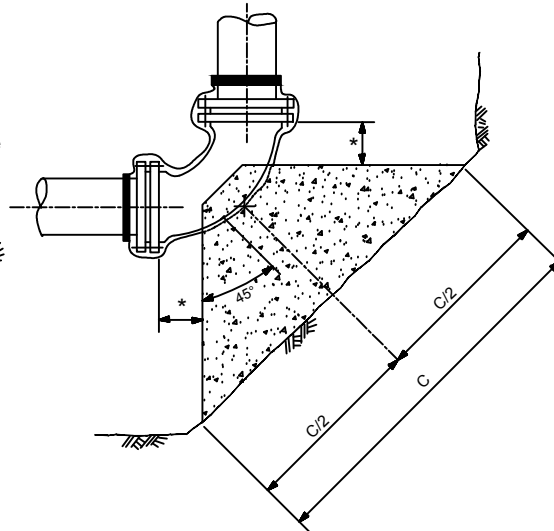
* 48" Maximum Cover

ALL CONSTRUCTION

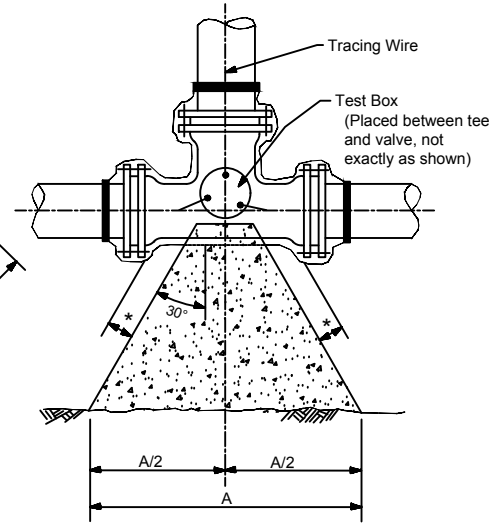
BY	DATE
MPA	10/20/05
REVISION	
1.	All streets low strength mortar
N. KY. WATER DISTRICT	
TYPICAL PIPELINE TRENCH DETAIL	
DRAWN BY: SAR	
APPROVED: <i>[Signature]</i>	
DATE: 2/1/2021	
STANDARD DRAWING NO: 103-A	



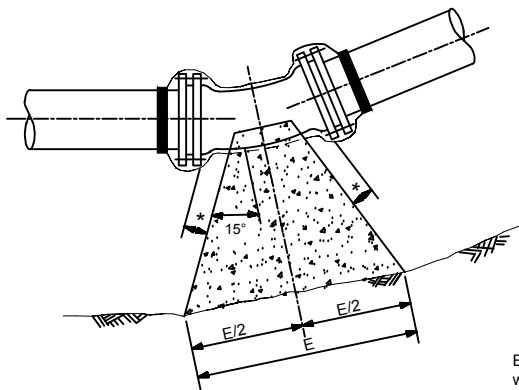
45° BEND



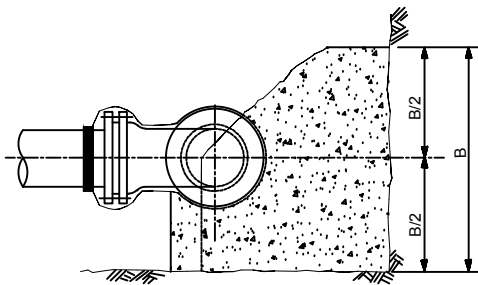
90° BEND



TEE (DEAD END OR FIRE HYDRANT SIMILAP)



11 1/4° & 22 1/2° BEND



ELEVATION

Blocking shall be poured after blue polyethelene wrap is in place.
Blocking shall be inspected by the District prior to backfilling.

150 PSI/250 PSI

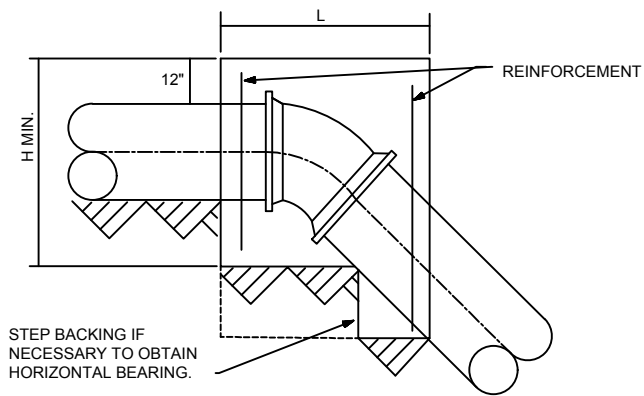
PIPE SIZE	A	B	C	D	E
6"	2'0"/2'6"	1'6"/1'6"	3'0"/3'6"	1'6"/2'0"	1'0"/1'0"
8"	2'6"/3'6"	2'0"/2'0"	3'6"/4'6"	2'0"/2'6"	1'0"/1'6"
10"	3'6"/4'0"	2'6"/2'6"	4'6"/5'6"	2'6"/3'0"	1'6"/1'6"
12"	4'0"/5'0"	3'0"/3'0"	5'6"/6'6"	3'0"/3'6"	1'6"/2'0"
16"	5'0"/6'0"	3'0"/4'0"	7'0"/8'6"	4'0"/4'6"	3'0"/3'0"
20"	6'0"/7'6"	5'0"/5'0"	7'0"/10'6"	4'0"/6'0"	3'0"/3'0"

* Distance to be 1/2" longer than entire length of the bolt used.

NOTES

- 1 DIP Fittings shall be per specifications.
- 2 Concrete to be 3500 psi.
- 3 All fittings to be Mechanical Joint.
- 4 Thrust blocks to be placed against undisturbed earth - use additional concrete as required for over excavation.
- 5 Blocking to be placed in a manner so that bolts can be removed without disturbing the block.
- 6 Thrust block bearing surface must be suitable for a design bearing pressure of 2,500 psi.

REVISION 	BY DATE
N. KY. WATER DISTRICT CONCRETE THRUST BLOCK DETAIL	
DRAWN BY: SAR	
APPROVED: 	
DATE: 2/1/2021	
STANDARD DRAWING NO: <div style="font-size: 2em; font-weight: bold; text-align: center;">104</div>	



SECTION A-A

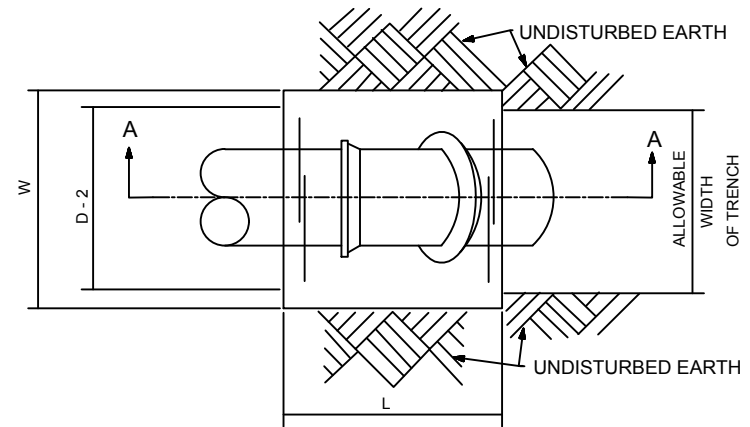
CONCRETE BACKING FOR VERTICAL BENDS

1. BACKING DESIGNED FOR 3000 POUNDS PER SQUARE FOOT SOIL BEARING AND 150 POUNDS PER SQUARE INCH INTERNAL PRESSURE.
2. PROVIDE MINIMUM CONCRETE REINFORCEMENT OF 2 PAIR OF TWO 5" "U" BARS @ 12" C.
3. CENTER BACKING ON BEND.

BLOCKING FOR SIZES NOT SHOWN SHALL USE THE NEXT LARGER SIZE.

SIZE of PIPE	DEGREE OF BEND											
	11 1/4				22 1/2				45			
	L"	W"	H"	VOL.	L"	W"	H"	VOL.	L"	W"	H"	VOL.
4"	12	24	16	2.7	15	30	18	4.7	22	36	24	11.0
6"	12	43	18	5.4	16	48	34	15.1	30	55	24	22.9
8"	12	54	24	9.0	18	57	36	21.4	36	57	33	39.2
12"	20	63	36	26.3	37	62	37	49.2	48	62	51	88.0
16"	31	65	38	44.4	60	65	39	88.2	65	65	65	159.2
20"	45	70	40	73.0	56	70	60	136.4	72	76	78	247.5
24"	47	72	54	106.0	67	74	69	198.4	88	84	84	360.1

NOTE: VOLUMES GIVEN IN CUBIC FEET



PLAN

REVISION	BY	DATE

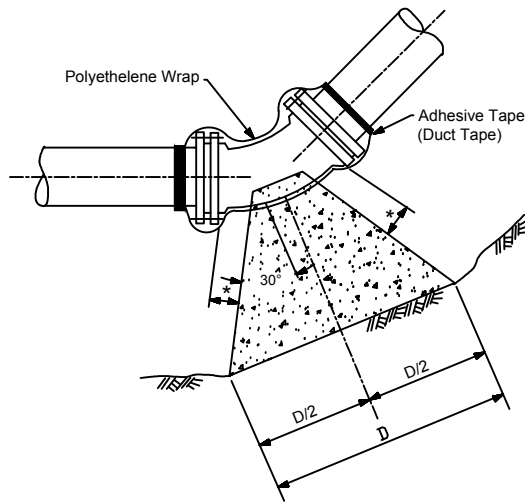
N. KY. WATER DISTRICT
 CONCRETE THRUST BLOCKING
 FOR VERTICAL BENDS

DRAWN BY:
 SAR

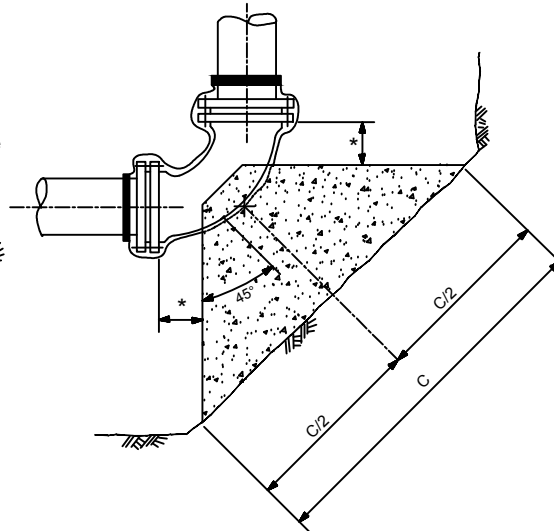
APPROVED:


DATE:
 2/1/2021

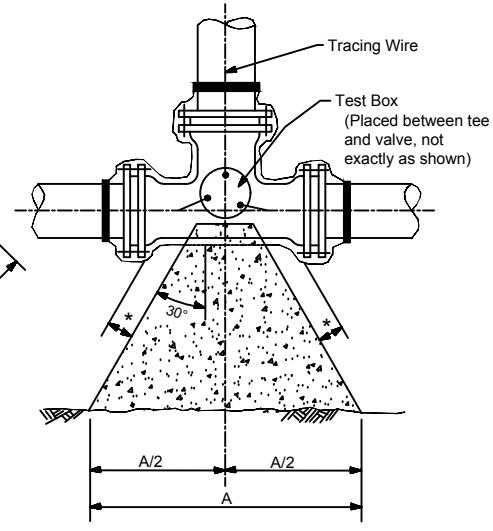
STANDARD
 DRAWING NO:
 104-A



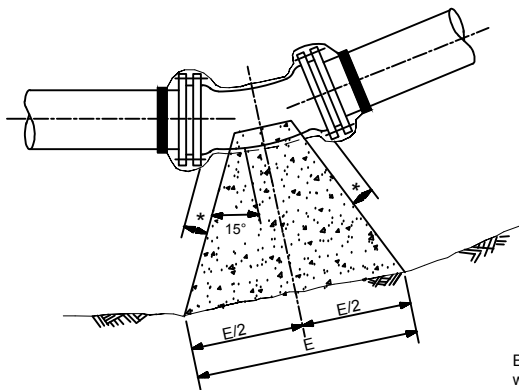
45° BEND



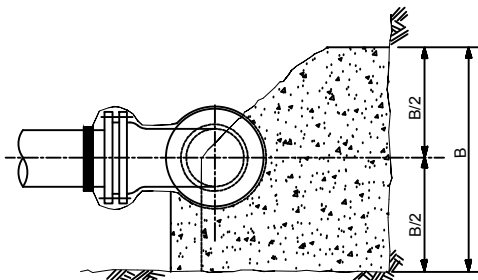
90° BEND



TEE (DEAD END OR FIRE HYDRANT SIMILAP)



11 1/4° & 22 1/2° BEND



ELEVATION

Blocking shall be poured after blue polyethelene wrap is in place. Blocking shall be inspected by the District prior to backfilling.

150 PSI/250 PSI

PIPE SIZE	A	B	C	D	E
6"	2'-6"	2'-0"	3'-0"	2'-0"	2'-0"
8"	3'-0"	2'-6"	4'-6"	2'-6"	2'-6"
12"	5'-6"	3'-0"	7'-6"	4'-0"	3'-0"
16"	7'-6"	3'-6"	11'-0"	6'-0"	4'-0"
24"	14'-6"	4'-0"	20'-6"	11'-6"	6'-0"
30"	22'-6"	4'-0"	31'-6"	17'-0"	9'-0"

* Distance to be 1/2" longer than entire length of the bolt used.

NOTES

- 1 DIP Fittings shall be per specifications.
- 2 Concrete to be 3500 psi.
- 3 All fittings to be Mechanical Joint.
- 4 Thrust blocks to be placed against undisturbed earth - use additional concrete as required for over excavation.
- 5 Blocking to be placed in a manner so that bolts can be removed without disturbing the block.
- 6 Thrust block bearing surface must be suitable for a design bearing pressure of 2,500 psi.

REVISION	BY	DATE

N. KY. WATER DISTRICT
**CONCRETE THRUST BLOCK
 DETAIL**

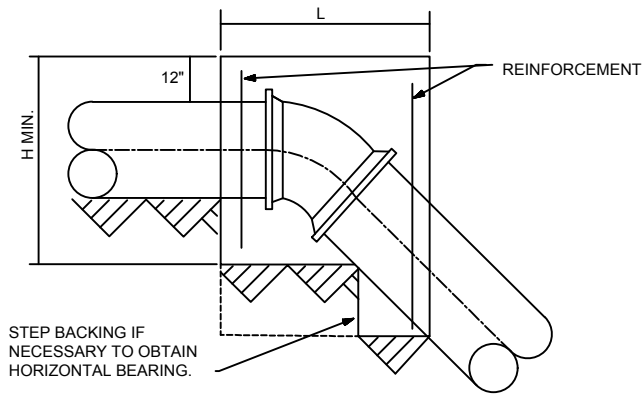
DRAWN BY:
 SAR

APPROVED:


DATE:
 2/1/2021

STANDARD
 DRAWING NO:

104-M



SECTION A-A

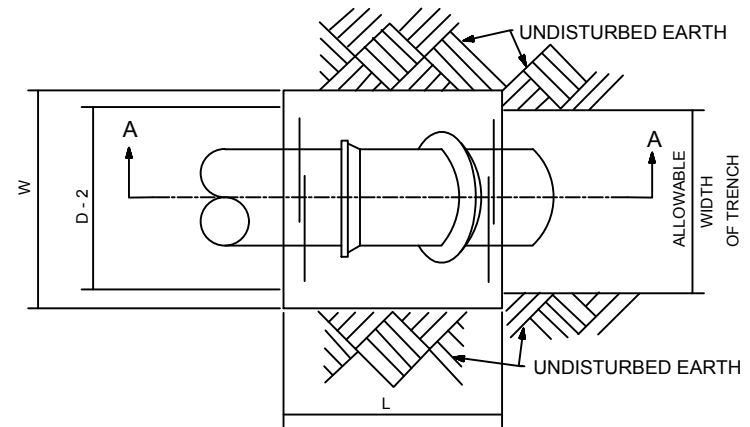
CONCRETE BACKING FOR VERTICAL BENDS

1. BACKING DESIGNED FOR 3000 POUNDS PER SQUARE FOOT SOIL BEARING AND 150 POUNDS PER SQUARE INCH INTERNAL PRESSURE.
2. PROVIDE MINIMUM CONCRETE REINFORCEMENT OF 2 PAIR OF TWO 5" "U" BARS @ 12" C.
3. CENTER BACKING ON BEND.

BLOCKING FOR SIZES NOT SHOWN SHALL USE THE NEXT LARGER SIZE.

SIZE of PIPE	DEGREE OF BEND			
	11.25			
	L"	W"	H"	VOL.
24"	50	84	84	204.2
30"	60	96	96	320.0

NOTE: VOLUMES GIVEN IN CUBIC FEET



PLAN

REVISION	BY	DATE

N. KY. WATER DISTRICT
 CONCRETE THRUST BLOCKING
 FOR VERTICAL BENDS

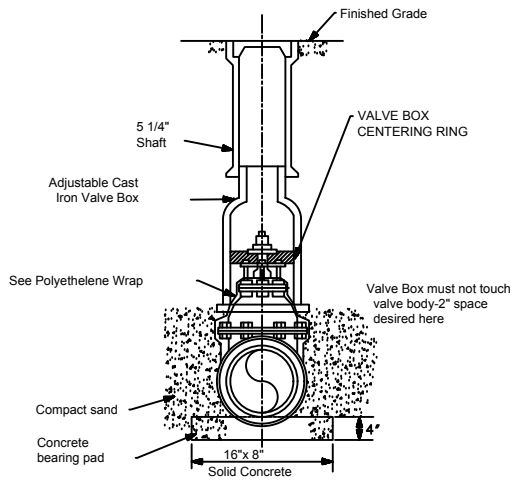
DRAWN BY:
SAR

APPROVED:
AKK

DATE:
2/1/2021

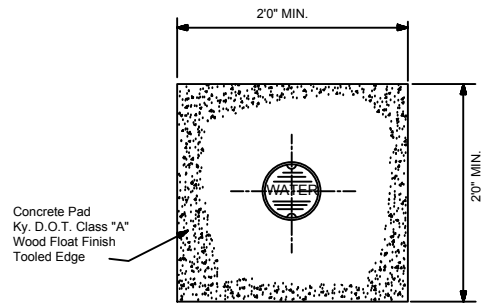
STANDARD
DRAWING NO:

104-M1

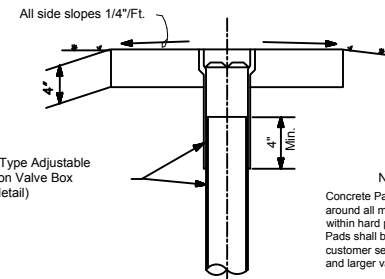


Detail Valve Box Installation

Note: Valve box shall not transmit shock or stress to the valve



PLAN



ELEVATION

Screw Type Adjustable Cast Iron Valve Box (See detail)

NOTES

Concrete Pads shall be constructed around all main line valve boxes except within hard paved areas. Concrete Pads shall be constructed around customer service line valve boxes 3\"/>

REVISION	BY	DATE
1	MPS	8/29/13
2	MPS	9/22/13

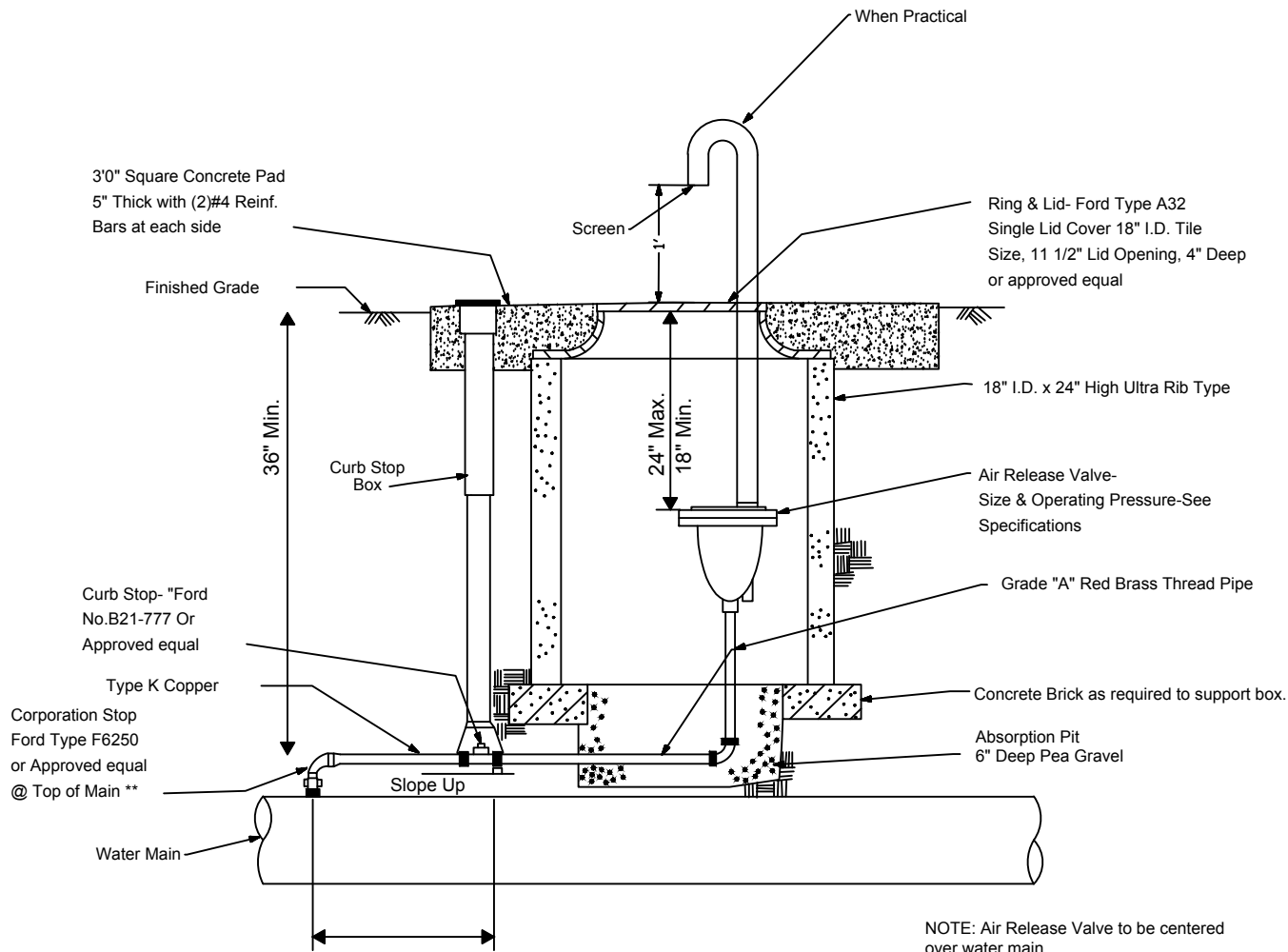
N. KY. WATER DISTRICT
VALVE BOX AND
VALVE PAD DETAIL

DRAWN BY:
SAR

APPROVED:
[Signature]

DATE:
2/1/2021

STANDARD
DRAWING NO:
105



** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

NOTE: Air Release Valve to be centered over water main.
Air Release Valves larger than 1" use:
vault size 24"x24"
lid Ford Type MC 24 &
Extension Ring Ext-2 or approved equal.

REVISION	BY	DATE

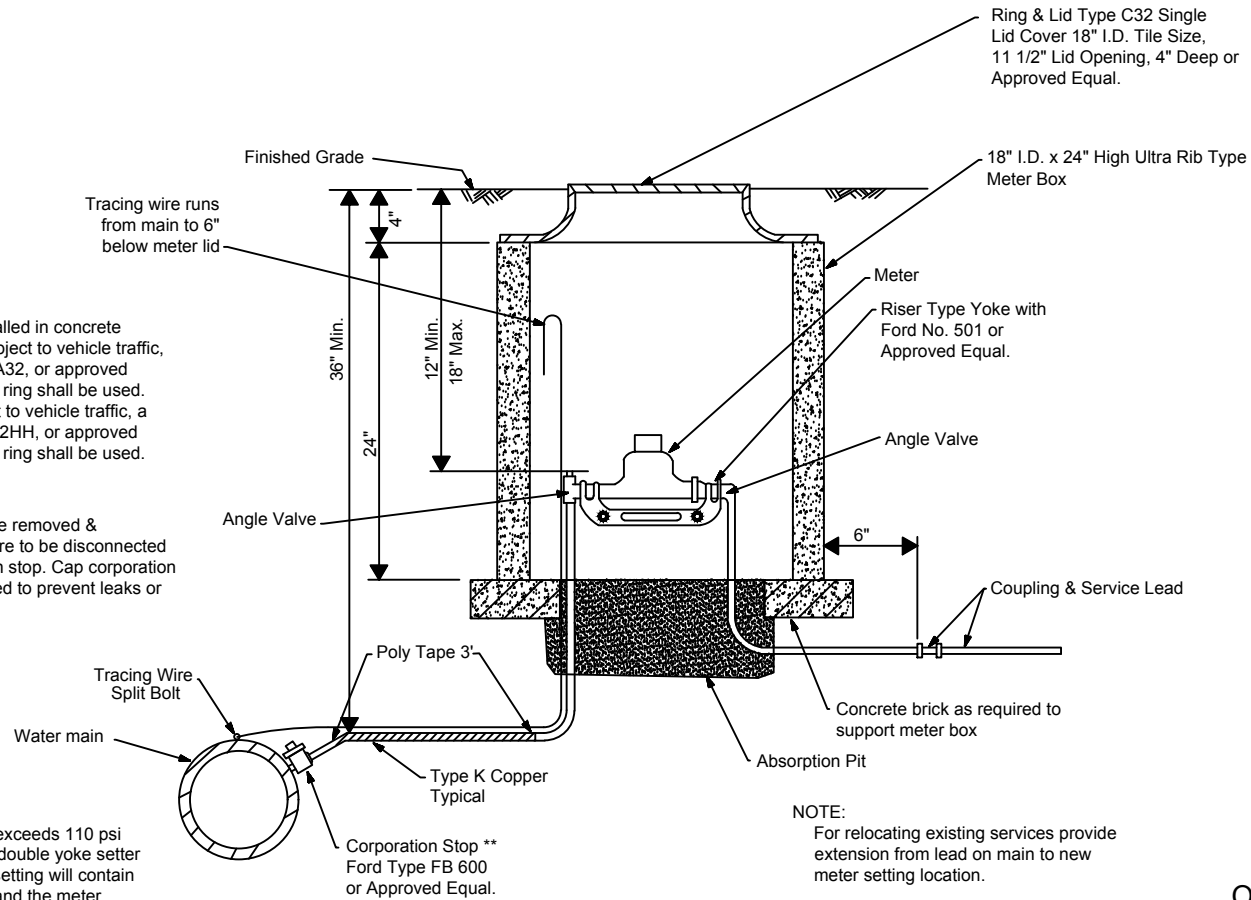
N. KY. WATER DISTRICT
N KY WATER DISTRICT
AIR RELEASE VALE

DRAWN BY:
SAR

APPROVED:
[Signature]

DATE:
2/1/2021

STANDARD
DRAWING NO:
106



NOTE:
Services installed in concrete areas, not subject to vehicle traffic, a Ford Type A32, or approved equal, lid and ring shall be used. Areas subject to vehicle traffic, a Ford Type A32HH, or approved equal, lid and ring shall be used.

NOTE:
Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop.

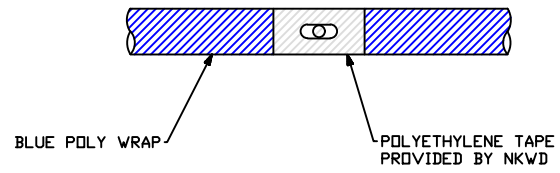
NOTE:
When the pressure exceeds 110 psi on a new service, a double yoke setter shall be used. This setting will contain a pressure reducer and the meter.

NOTE:
For relocating existing services provide extension from lead on main to new meter setting location.

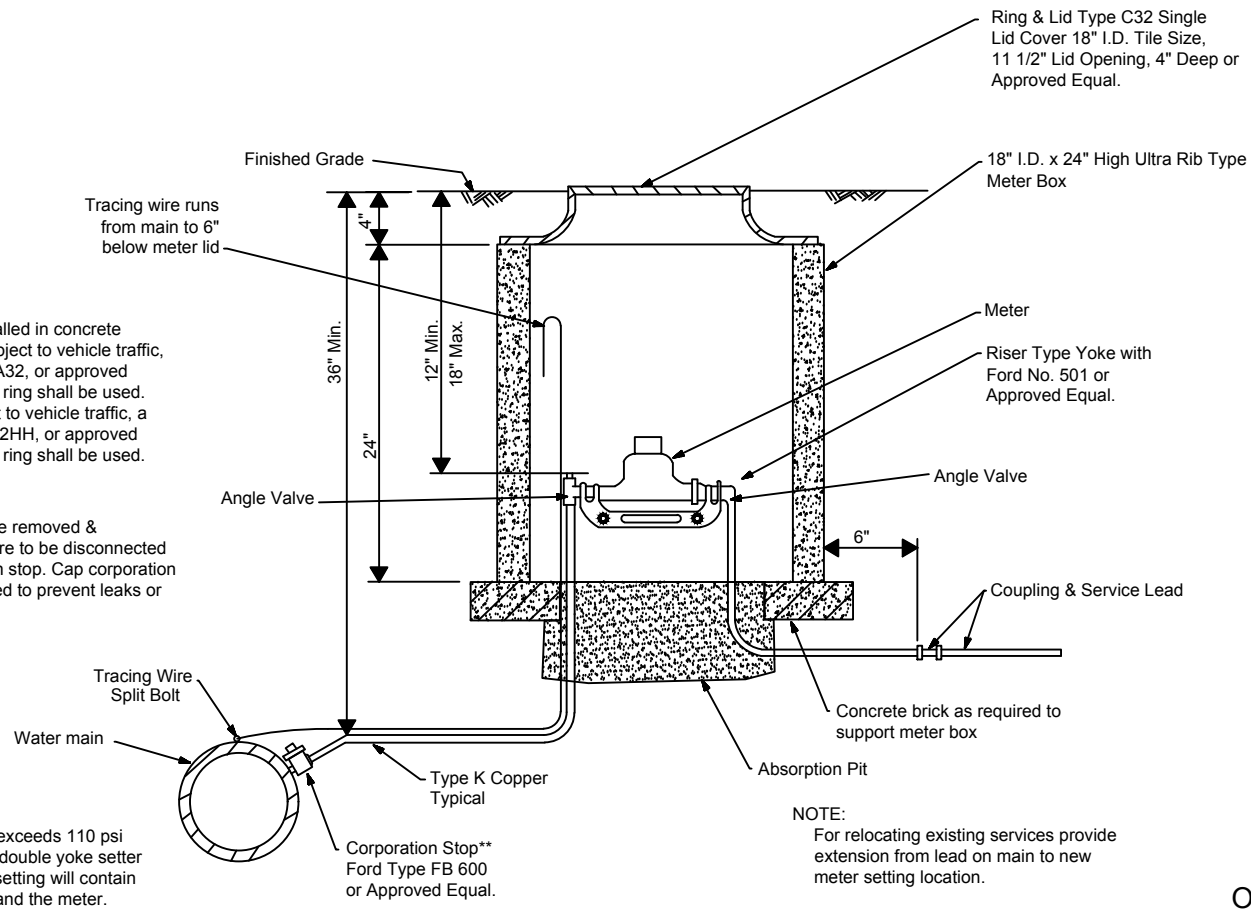
PVC Mains-Use single band brass saddle Ford Type 101 BS or equal.

** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

ONLY FOR D.I. PIPE



REVISION	BY	DATE
N. KY. WATER DISTRICT		
5/8" & 1" METER SETTING COPPER		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 107		



NOTE:
 Services installed in concrete areas, not subject to vehicle traffic, a Ford Type A32, or approved equal, lid and ring shall be used. Areas subject to vehicle traffic, a Ford Type A32HH, or approved equal, lid and ring shall be used.

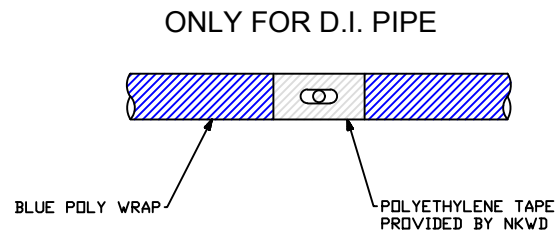
NOTE:
 Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop.

NOTE:
 When the pressure exceeds 110 psi on a new service, a double yoke setter shall be used. This setting will contain a pressure reducer and the meter.

NOTE:
 For relocating existing services provide extension from lead on main to new meter setting location.

PVC Mains-Use single band brass saddle Ford Type 101 BS or equal.

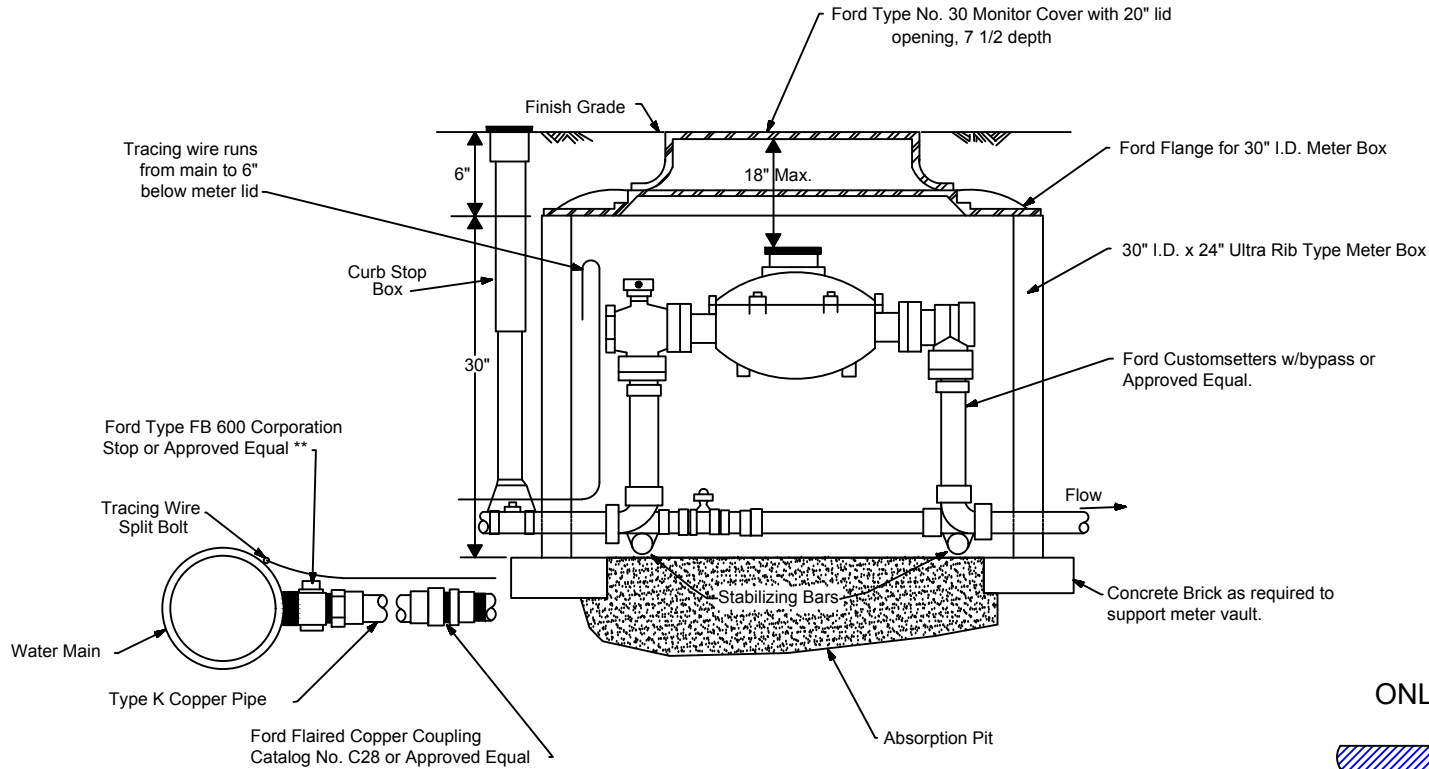
** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop



REVISION	BY	DATE
N. KY. WATER DISTRICT		
5/8" & 1" METER SETTING PEX-A SERVICE LINE		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 107-A		

Note: Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop. For relocating existing services provide extension from lead on main to new meter setting location.

Note: If service is installed in sidewalk or pavement area, a heavy duty lid shall be installed.

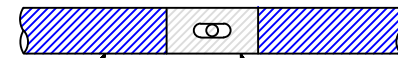


** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

Notes: Pressure regulators are required for new services where the pressure exceeds 110 psi.

Notes: PVC Mains - use single band brass saddle Ford Type 101BS or equal.
D.I.P. Mains 8" or smaller use a double strap brass tapping saddle Ford Type 202B or equal.

ONLY FOR D.I. PIPE



BLUE POLY WRAP

POLYETHYLENE TAPE PROVIDED BY NKWD

REVISION	BY	DATE

N. KY. WATER DISTRICT
1-1/2" & 2" METER SETTING

DRAWN BY: SAR

APPROVED: *[Signature]*

DATE: 2/1/2021

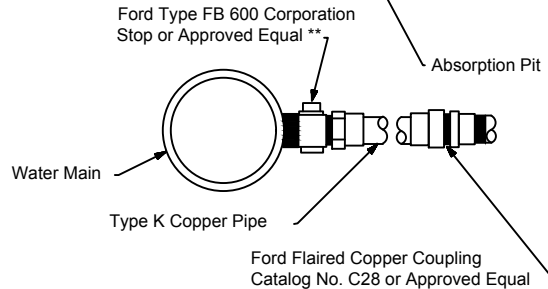
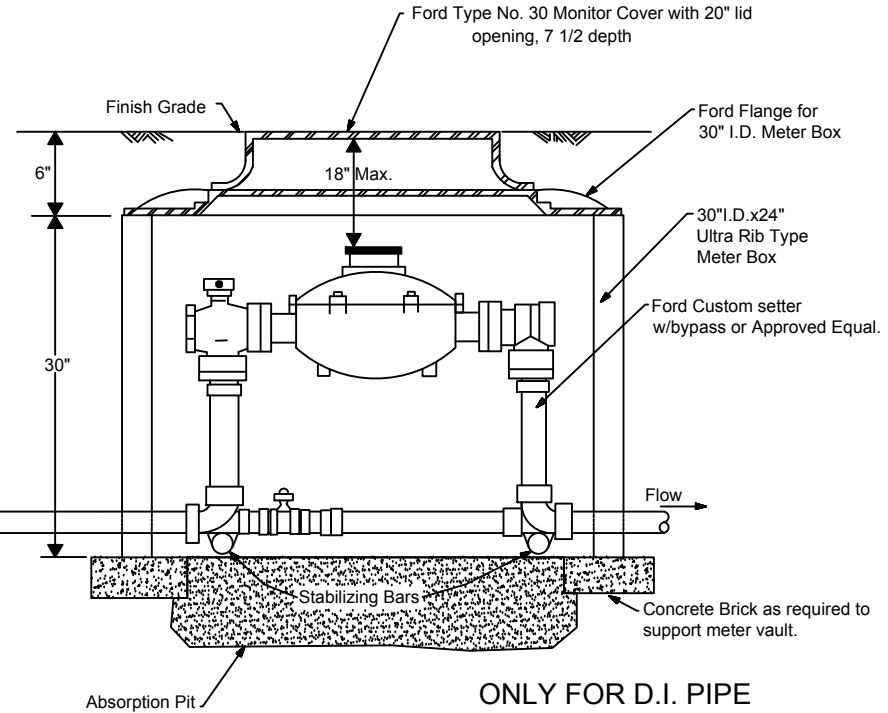
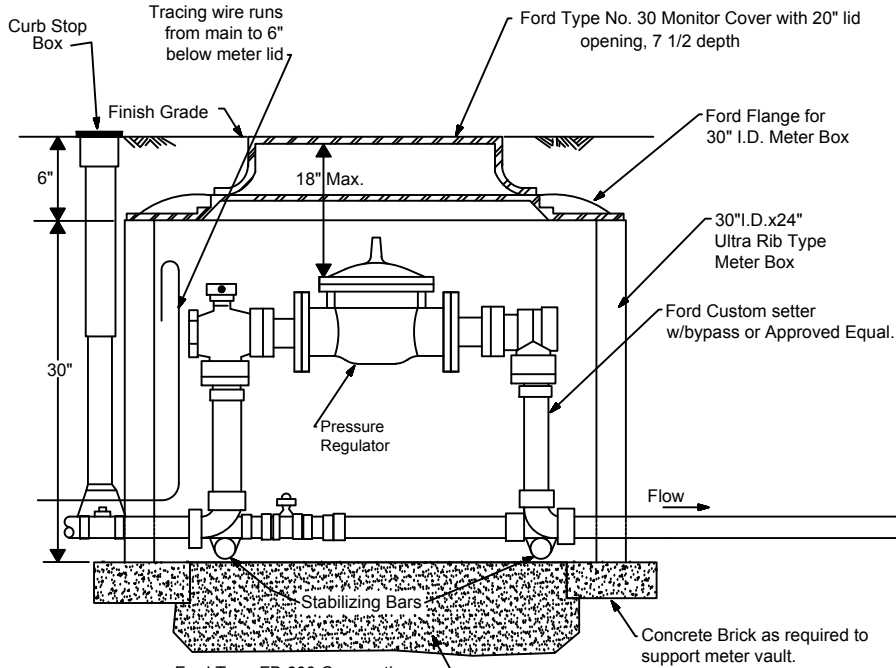
STANDARD DRAWING NO:

108

Note: Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop.
For relocating existing services provide extension from lead on main to new meter setting location.

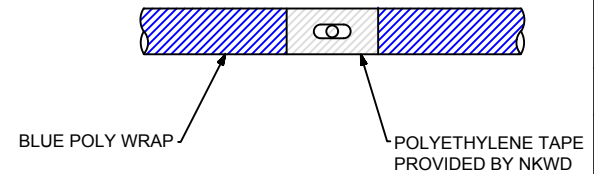
Note: If service is installed in sidewalk or pavement area, a heavy duty lid shall be installed.

Notes: Pressure regulators are required for new services where the pressure exceeds 110 psi.

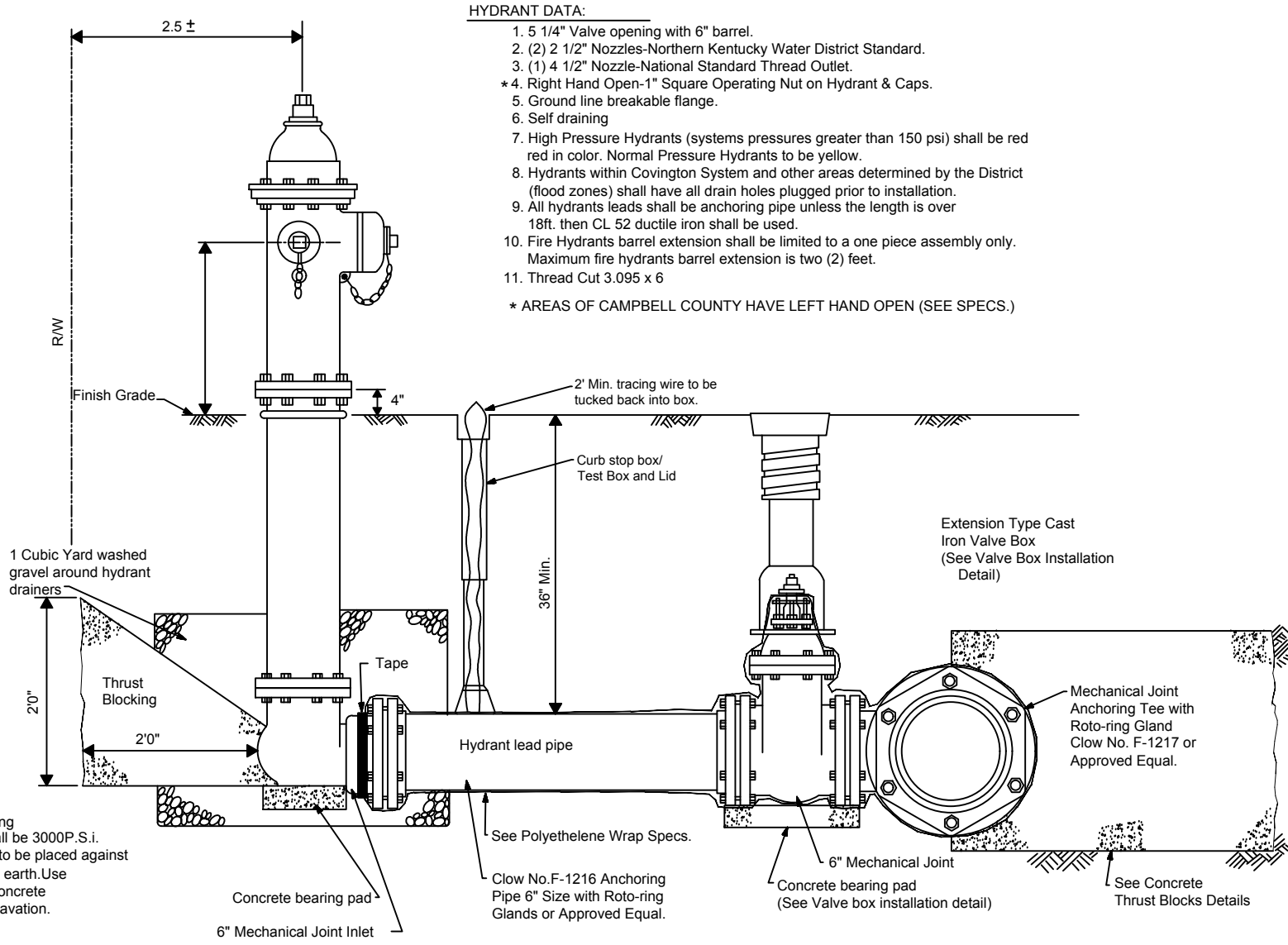


Notes: PVC Mains - use single band brass saddle Ford Type 101BS or equal.
D.I.P. Mains 8" or smaller use a double strap brass tapping saddle Ford Type 202B or equal.

** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop



REVISION	BY	DATE
N. KY. WATER DISTRICT		
1-1/2" & 2" METER SETTING		
REQUIRING PRESSURE REGULATOR		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 108-A		

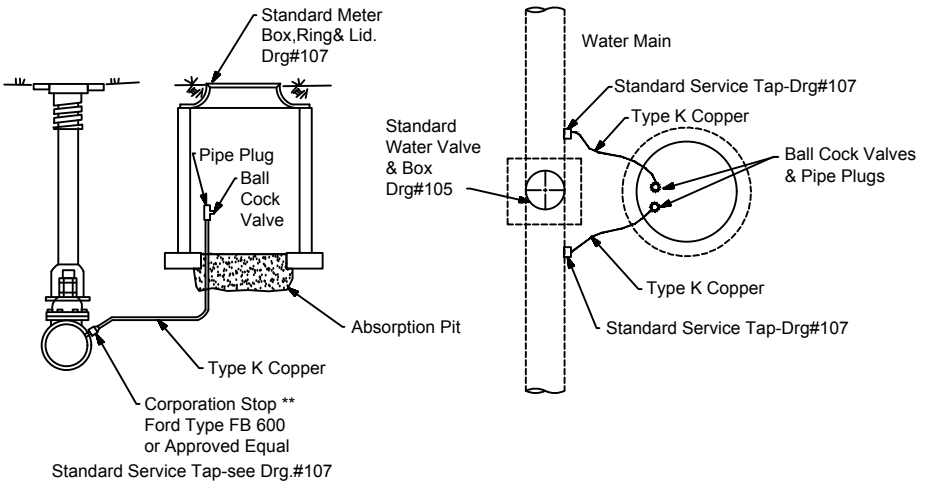
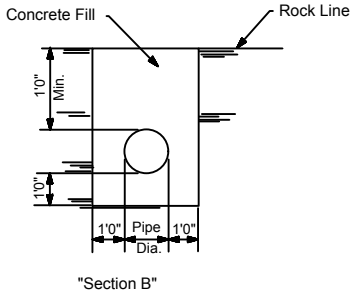
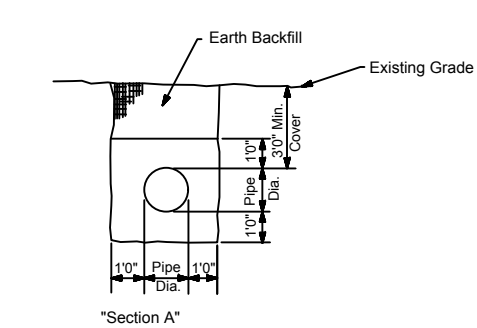
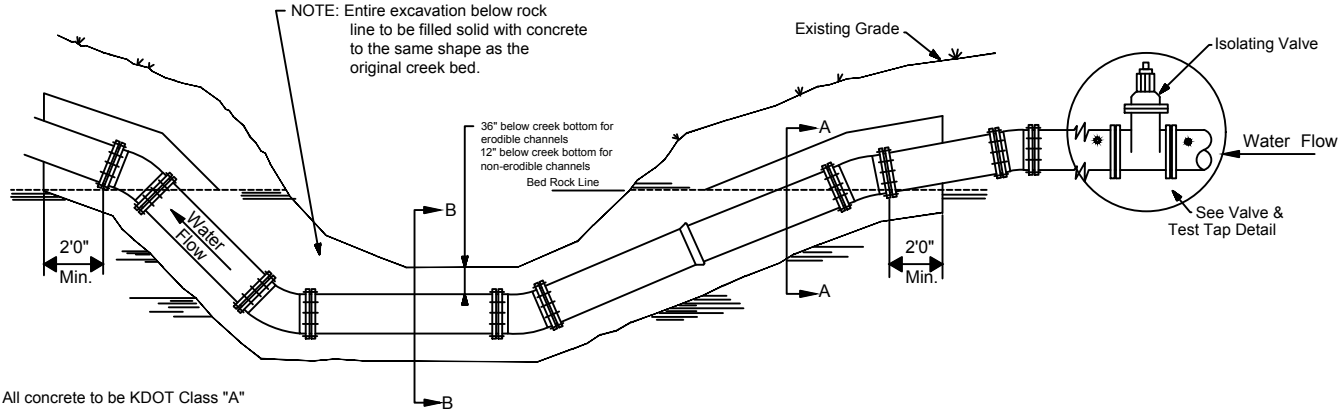


- HYDRANT DATA:**
- 5 1/4" Valve opening with 6" barrel.
 - (2) 2 1/2" Nozzles-Northern Kentucky Water District Standard.
 - (1) 4 1/2" Nozzle-National Standard Thread Outlet.
 - * Right Hand Open-1" Square Operating Nut on Hydrant & Caps.
 - Ground line breakable flange.
 - Self draining
 - High Pressure Hydrants (systems pressures greater than 150 psi) shall be red in color. Normal Pressure Hydrants to be yellow.
 - Hydrants within Covington System and other areas determined by the District (flood zones) shall have all drain holes plugged prior to installation.
 - All hydrants leads shall be anchoring pipe unless the length is over 18ft. then CL 52 ductile iron shall be used.
 - Fire Hydrants barrel extension shall be limited to a one piece assembly only. Maximum fire hydrants barrel extension is two (2) feet.
 - Thread Cut 3.095 x 6
- * AREAS OF CAMPBELL COUNTY HAVE LEFT HAND OPEN (SEE SPECS.)

REVISION	BY	DATE
	MPS	9/22/03
	MPS	12/22/03
	MPS	10/25/05

N. KY. WATER DISTRICT	
HYDRANT ASSEMBLY	
DRAWN BY:	SAR
APPROVED:	<i>[Signature]</i>
DATE:	2/1/2021
STANDARD DRAWING NO:	109

NOTE: Isolating Valve same as other side crossing.
No test taps on this side.



VALVE & TEST TAP DETAIL

Valve shall be installed in areas not subject to flooding
No services will be tapped between the isolating valve on the creek crossings.

** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

REVISION	BY	DATE

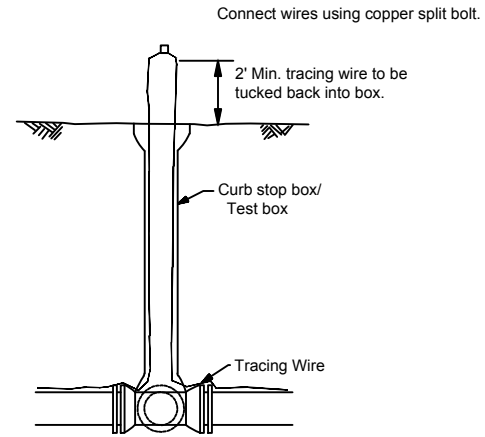
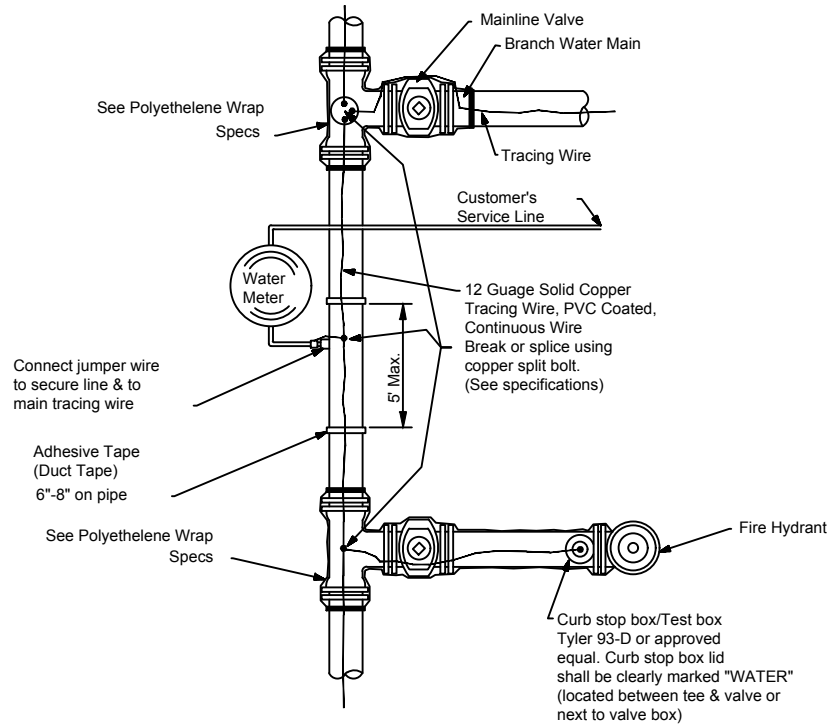
N. KY. WATER DISTRICT
CONCRETE ENCASEMENT AT
CREEK CROSSING

DRAWN BY:
SAR

APPROVED:
[Signature]

DATE:
2/1/2021

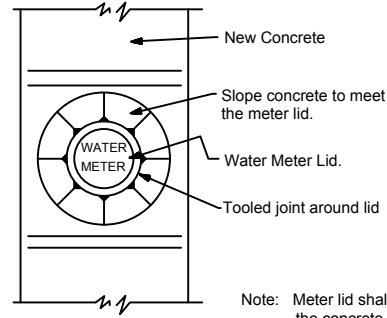
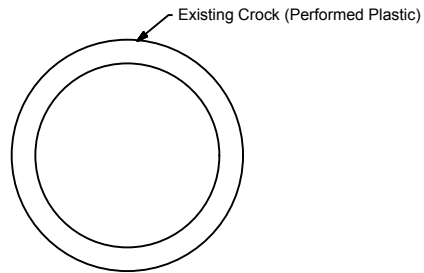
STANDARD
DRAWING NO:
110



DUCTILE IRON AND PVC PIPE WITH DUCTILE IRON FITTINGS

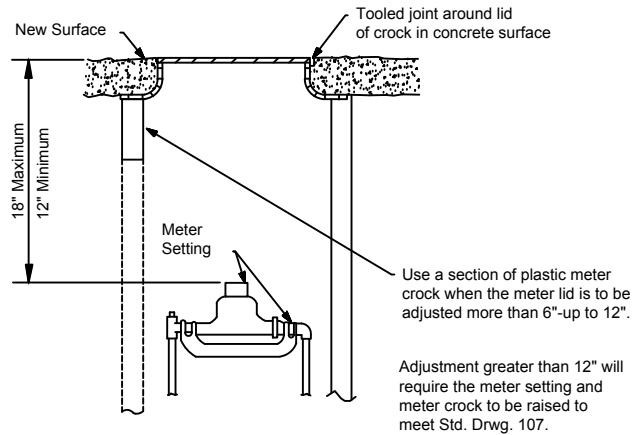
Note: Curb stop box/test box shall not be installed in paved areas.

REVISION	BY DATE	
	BY	DATE
N. KY. WATER DISTRICT		
TRACING WIRE		
INSTALLATION DETAIL		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 111		



Note: Meter lid shall be flush with the top of the concrete surface. The concrete surface shall be tapered to provide a smooth transition to the meter lid. A tooled joint shall be formed around the meter lid.

NOTE: SERVICES INSTALLED IN CONCRETE AREAS, NOT SUBJECT TO VEHICLE TRAFFIC, A FORD TYPE A32, OR APPROVED EQUAL, LID AND RING SHALL BE USED. AREAS SUBJECT TO VEHICLE TRAFFIC, A FORD TYPE A32HH, OR APPROVED EQUAL, LID AND RING SHALL BE USED.



PLASTIC (PVC) METER CROCKS shall be raised by use of an adapter with a section of plastic crock cut to achieve final grade.

At no time shall wood be used to adjust the ring and lid to grade.

Meter ring and lids shall be reset solidly and shall have no broken edge to allow dirt to enter the crock.

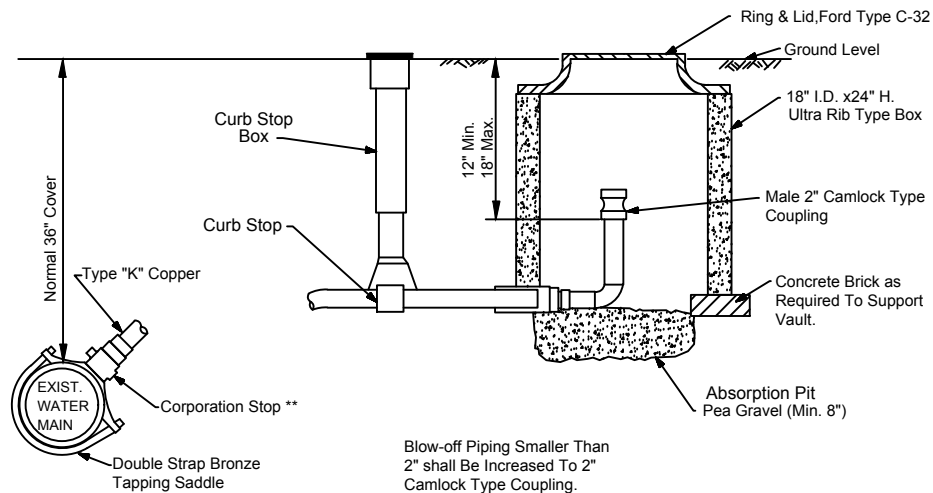
If the meter box is damaged beyond repair it shall be replaced. See Standard Drawing 107.

RAISING CURB STOPS OR VALVE BOXES:

Curb stop boxes and valve boxes shall be raised by turning the upper section to meet grade. If the upper section cannot be raised in this manner it shall be carefully broken off and replaced.

New upper sections shall be supplied by NKWD

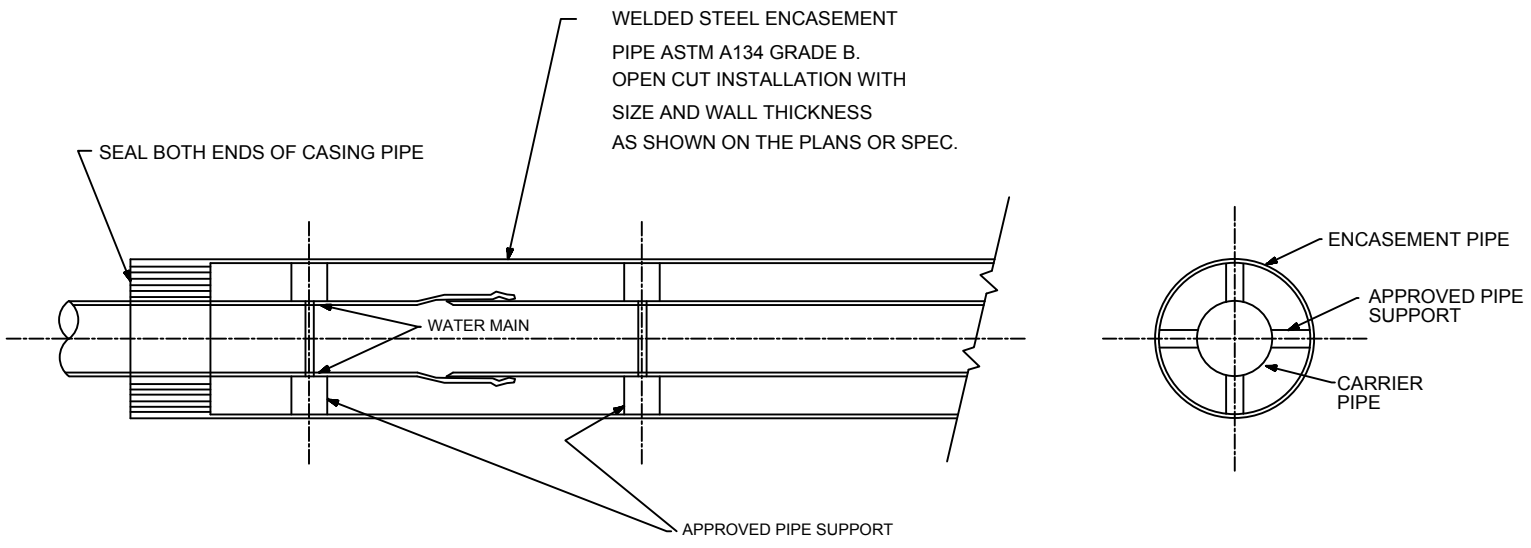
REVISION	BY	DATE
N. KY. WATER DISTRICT		
ADJUSTING RING & LID TO GRADE		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 112		



** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

TYPICAL FLUSHING DEVICE
INSTALLATION and Manual
Air Release Valve N.T.S.

REVISION	BY DATE	
	BY	DATE
N. K.Y. WATER DISTRICT		
TYPICAL FLUSHING DEVICE INSTALLATION and MANUAL RELEASE VALVE		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 113		



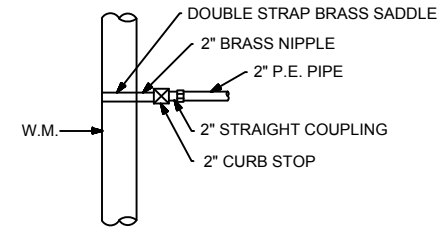
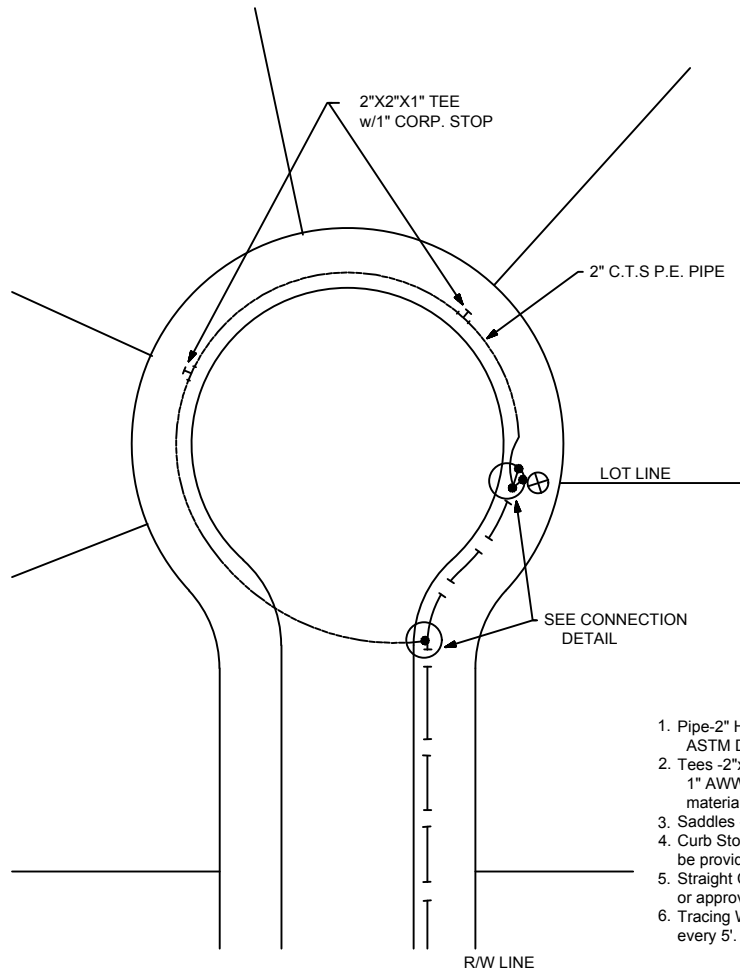
1. All carrier pipe placed in steel casing pipe shall be minimum class 50 ductile iron pipe and conform to the latest edition of AWWA C151.
2. Carrier pipe gaskets shall develop a wedging action between pairs of high-strength stainless steel elements spaced around the gasket (FIELD LOK , FASTGRIP, or approved equal gaskets).

NOTE: CASING PIPE JOINTS SHALL BE SEAM WELDED SO THAT CASING IS WATER TIGHT FROM END TO END.

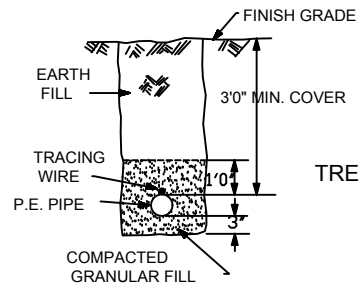
ENCASEMENT PIPE DETAIL

NO SCALE

REVISION	BY	DATE
	JS	2/1/21
1	Remove Carrier PII	
N. KY. WATER DISTRICT		
ENCASEMENT PIPE DETAIL		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 114		



CONNECTION DETAIL



TRENCH DETAIL

Materials

1. Pipe-2" High Density Polyethylene Water Service Pipe, Class 200 (SDR-9), CTS-OD, 200psi, ASTM D-2737.
2. Tees -2"x2"x1" with Pack Joints both ends, side outlet tapped for corp stop. Ford FB 600 1" AWWA Taper Threads with Ford 1"-F600 Corporation Stop or approved equal. materials will be provided by the Water District.
3. Saddles - Ford 202B Double Strap Brass Saddles (IP Threads) or approved equal.
4. Curb Stops - Ford 2" B11-777 Ball Valves for Iron Pipe or approved equal. A curb stop box shall be provided.
5. Straight Couplings - Ford 2" C84-77 Male Iron Pipe Thread to Pack Joint type fittings for P.E. Pipe or approved equal.
6. Tracing Wire- 12 gauge solid copper (P.V.C. coated) tracing wire taped to the top of the pipe every 5'.

GENERAL INFORMATION

1. This detail is not designed to eliminate dead-end water mains. This is an alternate to installing 6" or 8" pipe around a cul-de-sac.
2. Tees for services need to be dropped off on the opposite lot lines of the electric and other utilities.
3. Tees for services will need to be properly installed with some type of above ground markers.
4. P.E. Pipe shall be installed after the curb are installed.
5. The only joints made in the P.E. pipe shall be made at the water service tees.
6. 1" copper tubing will need to be provided for one of the water service tees for flushing purposed.

REVISION	BY	DATE

N. KY. WATER DISTRICT	DRAWN BY: SAR
	APPROVED: <i>[Signature]</i>
DATE: 2/1/2021	STANDARD DRAWING NO: 115

**Northern Kentucky
Water District**



2021


**Standard Specifications & Drawings
for the Installation of Meters Pits**

PIT CONSTRUCTION SPECIFICATIONS

PART I - GENERAL

- 1.01 INTRODUCTION Unless modified, deleted, replaced, or otherwise changed, the latest published addition of the following documents shall be the accepted standard for materials and/or procedures for the construction of meter pits:
1. Northern Kentucky Water District's Standard Drawings
 2. Natural Resources & Environmental Protection Cabinet, Division of Water
 3. Kentucky Public Service Commission Regulations
 4. American Water Works Association Standards (AWWA)
- If a conflict exists between referenced sources, the more restrictive requirements shall prevail. The District shall provide interpretation as requested.
- 1.02 REQUIREMENTS FOR METER PIT INSTALLATION The following are guidelines for meter pit installations:
- A. Meter pit will not be required to be installed if the following conditions can be met:
- Firelines-1. An approved back flow prevention device shall be installed as the first device inside the building on the fire line before any taps or branches -and-
2. The fire department connection shall be located downstream of the approved back flow prevention device -and-
 3. The domestic water service is 2" or smaller which will be installed per Standard Drawings #107, 107-A, or 108.
- Domestic Services-- 2" or smaller domestic water services shall be installed by the District per Standard Drawings #107, 107-A, or 108.
- B. Meter pits shall be required to be installed if one or more of the following conditions exists:
- Firelines-- The fire department connection is required by the authority having jurisdiction to be installed near the public right-of-way. An approved double check assembly shall be required to be installed per Standard Drawing #204, 206, or 207R.
- Domestic Services-- 3" or larger domestic water services shall be installed per Standard Drawings #205R, 207R, or 208.
- 1.03 CONTRACTORS RESPONSIBILITY All work performed on any meter pit and/or appurtenances that are owned or anticipated to be owned by the District shall be completed under the direction of the District adhering to an acceptable plan approved by the District. A minimum of 24 hours notice shall be given to the District by the contractor prior to the start of work. If the interruption of service to any customer of the District is necessary, the Contractor shall make arrangements to provide such shutdown and notify District customers at the direction of the District Inspector. One set of District approved plans shall be on the job site during construction. There shall be no deviation from the approved plans without written approval from the District.

- 1.04 EXISTING PITS Any changes, modifications, or alterations made to an existing pit structure, piping, etc., it shall be brought up to current standards. Compliance subject to the discretion of the Water District.
- 1.05 PLANS Plans are approved subject to the conditions of compliance with all applicable laws, rules, regulations and standards. The proposed project may be constructed only in accordance with the approved plans. Plans submitted to the District for approval shall have a Ky. Professional Engineer or Certified Fire Suppression Technician stamp and signature. Two sets of plans should be submitted for preliminary review and four sets for final review.
- 1.06 DESCRIPTION In general the following specifications are minimum requirements as pit design. Construction may be dictated by location, soil conditions, ground water, topography, etc. Additional provisions may be required upon submission for approval.
- 1.07 ACCESSIBILITY OF PITS Accessibility for maintenance and testing of all meter pits shall be provided. A means of access for maintenance vehicles shall be constructed of a hard, all weather surface at least 10' wide and designed to support the heaviest vehicle, within 15' of the pit.
- 1.08 WATER MAINS ON PRIVATE PROPERTY Meter pits and appurtenances installed on private property outside of normal conditions which are going to be maintained by the Water District shall have proper documentation provided for all easement areas. See appropriate sections of District's Standards Specifications & Drawings for the Installation of Water Mains for procedures.
- 1.09 HIGH PRESSURE AREAS Additional requirements may be necessary for high pressure areas (110 psi static pressure or higher) as determined by the District.
- 1.10 MAINTENANCE PERIOD The Owner shall be responsible for the maintenance of the installed meter pit and appurtenances to District Standards for a period of not less than one (1) year from the date the meter pit is placed in service by the District. Meter pits will be placed in service when the meter pit is 100% completed to District Standards.
- 1.11 MINIMUM REQUIREMENTS Floor slab shall be 6" thick concrete sloping at 1/8 inch per foot to drain or sump location. Dimensions of slab shall be 4 inches larger all around than outside pit walls. Pit shall be drained by a 4" drain or larger as required, leading to grade or a storm sewer. When a drain is not practical an electric operated sump pump shall be used.
- Walls shall be 8" thick concrete. Top slab shall be 8" thick reinforced concrete with #5 bars @6" O.C. maximum, spanning in short direction and #5 bars @18" O.C. maximum, in long direction. Two (2) #5 bars, two (2) feet long are to be placed at 45 degree to each corner of slab openings. Reinforcing shall be placed 1-1/2" clear from the bottom of the slab or inside wall faces. Additional reinforcement may be required.
- Pit openings shall have lids as indicated or as approved in traffic areas of a type operable by a single person. Removable aluminum ladders shall be furnished in all pits.
- 1.12 METER PIT DIMENSIONS Minimum inside pit dimensions shall be: Height - 5 feet; Width - 5 feet; Length - 6 feet.

REVISION	BY	DATE
N. KY. WATER DISTRICT MATERIAL SPECIFICATIONS FOR PIT CONSTRUCTION		
DRAWN BY: SAR		
APPROVED: 		
DATE: 2/1/2021		
STANDARD DRAWING NO: 201		

1.13 QUALITY ASSURANCE

- A. Standards: The following publications shall be hereby made a part of these specifications.
1. "Specifications for Structural Concrete for Buildings ACI 301-72 (Revised 1975) with Selected ACI and ASTM Referenced, Sp-15(73)" by the American Concrete Institute.
 2. "Placing Reinforcing Bars, CRSI-WCRSI Recommended Practices" by the CRSI-WCRSI Committee on Bar Placing.
 3. "Standard Specifications for Road and Bridge Construction by the Kentucky Department of Transportation, Bureau of Hwy. 4. Specifications for the Design and Construction Load-Bearing Concrete Masonry by the National Concrete Masonry Association.

1.14 Or Equal All materials referenced are for design purpose only. Any other materials that are "equal" can be used with prior approval from the District.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete: Ready mixed type meeting K.D.O.T "Class A", 3,500 psi at 28 days compressive strength, 4" maximum slump.
- B. Reinforcing Steel: Deformed #5 bars conforming to ASTM A615, A616, or A617, grade 60.
- C. Curing Compound: Acrylic based "non-residual" type meeting ASTM C309 Type 1 not less than 18 % to cure, harden and seal concrete.
- D. Lid: 48" x 54" double door, aluminum lid with locking padlock bar, centered over the meters, Halliday Products Model #A4854 or approved equal. If padlock bar creates hazard, other locking mechanisms maybe considered.
- E. Removable Metal Ladder: Removable metal ladder shall be an approved OSHA Type 1 Industrial Heavy, 250 pound aluminum ladder. Ladder must reach from the pit floor and extend into the pit opening. The bottom of the ladder shall be blocked to prevent it from kicking out but still be removable.
- F. Waterproofing: The exterior side of the pit walls shall be waterproofed with one coat of one of the following materials applied in accordance with the Manufacturer's recommendations: Thoroseal; U.S.S. Chemical Tarmastic #102; Koppers Bitumastic Super Service Black; Damchex; Amercoat #78; or an approved equal.
- Voids between pipes and chamber walls shall be grouted with a hydraulic cement such as Waterplug or an approved equal before waterproofing pit.
- G. Waterstop: A waterstop shall be provided in the pit floor to the pit walls.
- H. Floor Drain: Raised or beehive dome grate, 4" minimum, similar to Wade #1634; Josam #7324-N; or an approved equal.
- I. Pit Drain Line: Cast iron, Schedule 40 PVC, Plastic STM #35 or ductile iron, 4" minimum.
- J. Alternate To Pit Drain Line: Electric Submersible Sump Pump, Little Giant, Big John, Stock #3P-639A Model #6-CIA or approved equal. Note: This alternative shall only be used when a drain line is impractical as determined by the District. (See drawing #202 & Part 4 of Pit Specifications)


K. Packaged, Prefab Meter Vaults: Packaged, prefab meter vaults are acceptable with approval from the Water District.

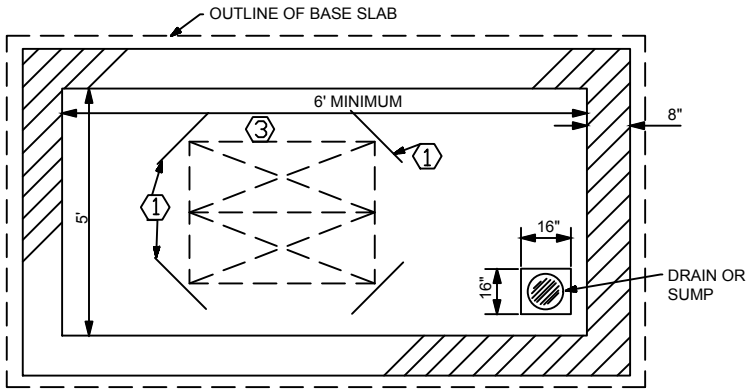
PART 3 - EXECUTION

3.01 WORKMANSHIP Earth cuts may be used for forms of base slab provided vertical sides are kept true and sharp. All embedded items, reinforcing, piping, etc. shall be secured in place prior to placing of the concrete. Concrete shall be protected from loss of moisture for a curing period of at least 7 days. All concrete shall be deposited within 1-1/2 hours following the initial mixing of water and cement. Wall finish may be a rough form finish. Top slab finish shall be wood float with tooled edges.

PART 4 - ELECTRIC SUMP PUMPS

- 4.01 DESCRIPTION In general the following specifications are a minimum requirements for the design and installation of Electric Submersible Sump Pumps in meter pits where a normal drain line is impractical.
- 4.02 ELECTRIC WORK All electric work shall be installed according to the National Electric Code and all other applicable codes. All work shall be inspected by an Electrical Inspector and certification provided to the District.
- 4.03 RESPONSIBILITY The property owner is responsible for providing continuous electric service for the electric sump pump at the owner's expense. The property owner shall be responsible for the maintenance and upkeep of all electrical boxes, conduit, circuit breaker box, circuit breaker, outlet and wiring outside the pit.
- 4.04 MATERIALS
- A. Electric Submersible Sump Pump: Electric sump pump shall be U.L. Listed, Little Giant, Stock #3P639, Model #6-CIA.
 - B. Electric Junction Box: Water resistant, U.L. Listed, P.V.C electrical box shall be installed on the inside of the pit on the wall closest to the sump pump nearest the ceiling.
 - C. Electrical Piping: Electric piping shall be U.L. Listed for underground use, rigid or plastic installed at least 18" below grade.
- 4.05 INSTALLATION
- A. Sump Pump Hole: A 4" deep hole shall be provided in the floor of the pit.
 - B. Discharge Piping: Piping for the water discharge from the electric sump pump shall be plastic or copper. Minimum piping size shall be 1 1/2". A 1/8" hole shall be bored above the check valve of the discharge pipe if freezing temperatures will affect the pipe.
 - C. Water Discharge: Water discharge shall be directed into a storm sewer or drainage ditch, if this is impractical, water discharge shall be directed on to a 16" x 16" concrete pad.
 - D. Electric Service Line: The electric line to the pit shall be only used for the pit sump pump, no other electrical taps shall be made on this line.
 - E. Manufacturer Instructions: Manufacturer's instructions should be followed for installation.

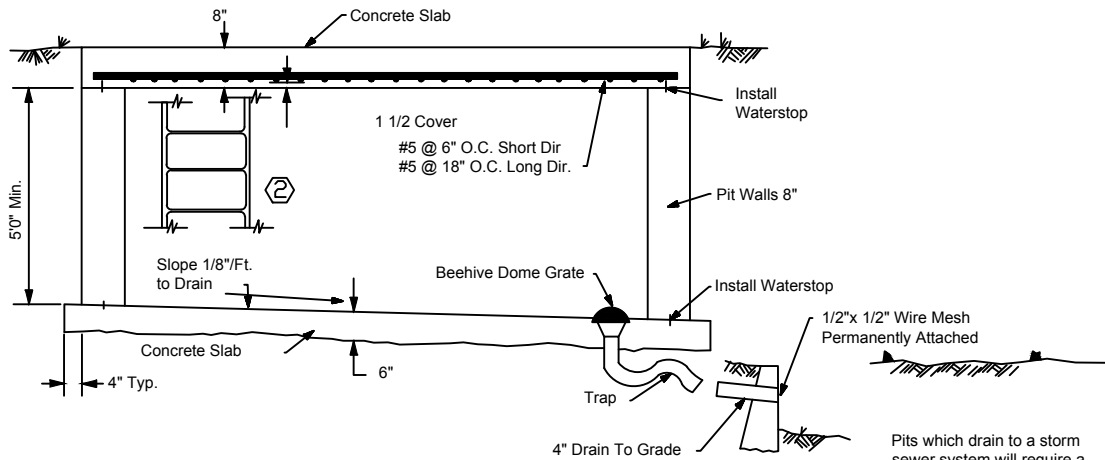
REVISION					
BY DATE					
N. KY. WATER DISTRICT		MATERIAL SPECIFICATIONS FOR PIT CONSTRUCTION			
DRAWN BY: SAR					
APPROVED: 					
DATE: 2/1/2021					
STANDARD DRAWING NO: 201-A					



DRAWING NOTES

- ① (2) #5 Reinforcing Bars, 2'6" Long @ 45° Each Corner of Lid or Pit Opening.
- ② Removable ALuminum Ladder Within Pit.
- ③ Lid In Top Slab To Be Centered Over Meter(S). Lids Shown Are For Non-Traffic Area Locations.

Lids Within Traffic Areas Shall Be Guarded With Approved Post Surrounding The Pit Or Lid, Or The Lid Shall Be Adequate To Support The Imposed Weight And Be Operated By A Single Person As Approved By K.C.W.D. #1.



Pits which drain to a storm sewer system will require a variance from Division of Water

REVISION	BY	DATE
	MEGA	10/14/20
N. KY. WATER DISTRICT		
TYPICAL PIT DETAIL		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 202		

PART 1 - PRODUCTS

1.01 MATERIALS

- A. Underground Piping & Appurtenances: All underground piping and appurtenances shall conform to appropriate sections of District's "Standard Specifications & Drawings for the Installation of Water Mains". All underground piping 4" and larger shall be polyethylene wrapped Class 50 or higher Ductile Iron Pipe from the public water main to the meter pit.
- B. Piping Inside Pits: Pipe installed inside the pit shall be a minimum thickness of Class 53 flanged ductile iron pipe for 3" and larger piping. The pipe shall extend through the pit walls.
- C. Fittings: All fittings and accessories shall be Ductile Iron, rated for a minimum of 200 psi working pressure or as specified herein. The fittings and accessories shall be new and unused. (NOTE: Certain areas of the Northern Kentucky Water District require materials used, to be of a higher working pressure than 200 psi.) All pipe fittings inside the meter pit shall be flanged.
- D. 2" and Smaller Service Branch Lines: Type K or L copper conforming to ASTM B88. Valves, fittings, and nipples shall be brass.
- E. Gate Valves 3" & Larger, Inside Pit: Conforming to AWWA Standard C509. Outside stem and Yoke (OS&Y), ductile iron body, left hand open, resilient wedge, wheel operated, flanged connection, gate valves. Clow Resilient Wedge Gate Valve or approved equal. Valves installed as part of a back flow prevention assembly shall be approved by the F.C.C.C.R., U.S.C.
- F. Valves 2" % Smaller: All 2" and smaller valves shall be ball valves.
- G. Glands, Gaskets, Bolts & Nuts: Conforming to AWWA C111.
- H. Bypass Lines on 3" & Larger Meter Lines: A bypass line of equal or one size less than the domestic line shall be installed on all domestic meter services 3" or larger. Minimum bypass line size is 3".
- I. Meters: As purchased from Northern Kentucky Water District.
- J. Pressure Reducing Valves: On domestic lines, pressure reducing valve will be required to be installed when the static system pressures is at or above 125 psi. They will be installed before the meter and are installed to protect the meter only. The District will not be liable for any damage due to pressure conditions caused by or arising out of the failure or defective condition of such pressure regulator or for damage that may occur through the installation, maintenance, or use of such equipment. Pressure reducing valves shall be installed at least 5 pipe diameters away from the meter. Cla-Val Model 690-48 shall be installed on 3" and larger lines. This may also include electronic devices, sight gauge, or any other such devices per District requirements. 0 thru 300 psi gauges shall be provided on the inlet and outlet sides of the pressure reducing valve.

- K. Back flow Prevention Assembly: All assemblies shall be listed and approved by the Foundation for Cross-Connection Control Research, University of Southern California (F.C.C.C.R.,U.S.C.) and the District. The testable assembly consists of the back flow prevention unit and two approved shut-off valves. Valves shall be full port ball valves for 2" and smaller and outside stem and yoke, resilient wedge, left hand open, gate valves for 3" and larger. Assemblies shall be delivered completely assembled by the original manufacturer with all components as approved by F.C.C.C.R.,U.S.C. The assembly shall not be separated or altered in anyway. The type of back flow prevention assembly to be installed shall be determined by the N.K.W.D. (see Back flow Prevention Device Assembly Standard Drawings Figure II-a for general guidelines). All approved back flow devices shall be tested and certified that it works properly after system activation. Special permission must be obtained from the District to install a reduced pressure back flow prevention assembly in a pit.


- L. Booster Pumps: Booster pumps 3" and larger installed on water lines shall be equipped with a Pump Suction Control Valve and/or a Low Pressure Cut-off Device which is designed to modulate the pump discharge or shut-off the booster pump when the pressure on the suction-side of the pump drops to 20 psi.

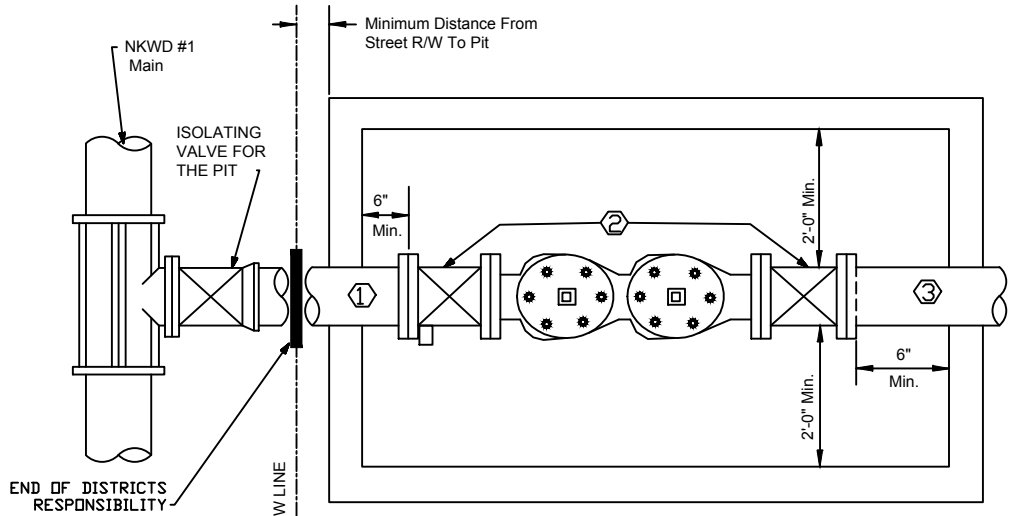
These devices shall be designed to prevent water hammer to the public water system. Pump Suction Control Valve and/or a Low Pressure Cut-off Device shall be inspected and tested for proper operation at the time of installation and at least annually thereafter. The property owner shall maintain a complete record of all test, inspections and repairs to the devices. The devices shall not be bypassed, made inoperative, or removed without authorization from the District.

PART 2 - EXECUTION

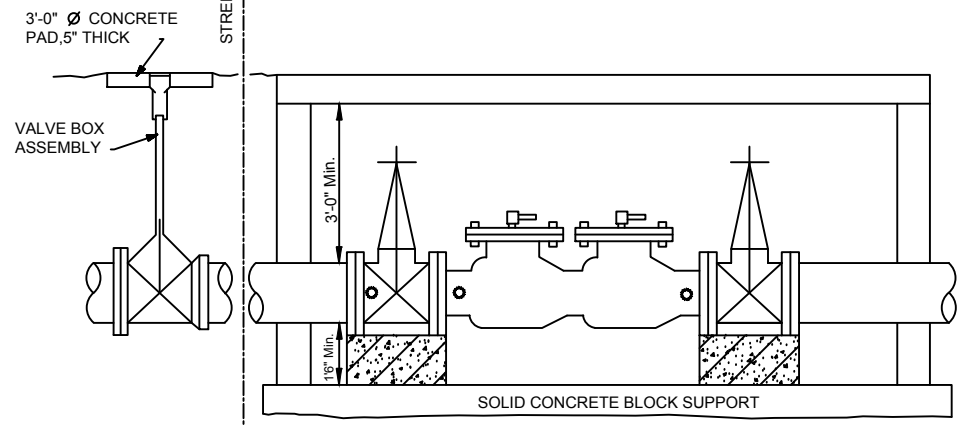
2.01 INSTALLATION

- A. Pipe Laying: Conforming to AWWA Standard C600. Maintain a minimum pipe cover of 3'-0" with continuous pipe support for entire length. All underground piping and appurtenances shall be installed according to appropriate sections of District's "Standard Specifications & Drawings or the Installation of Water Mains".
- B. Pit Components: Adequately supported by solid concrete blocks or supports set on the floor slab. 2" or smaller domestic service lines may be supported by brackets mounted on the pit wall.
- C. Anchorage: Inlet valves on 3" or larger piping shall be securely anchored to the pit wall when piping is sleeved through the wall. Additional rodding may be required at the discretion of the District.
- D. Disinfection: The interior of all surfaces in contact with the potable water system, tapping sleeve, valves, couplings and pipe shall be swabbed with a 5 % hypochlorite solution prior to installation.
- E. Valve Box Protection: The valve box over the tapping sleeve if located outside of a hard paved area shall have a minimum 2'x2'x4" square pad cast around the lid. Refer to standard drawing No. 105.
- F. Flushing of Mains: Lines shall be flushed at a rate 2.5 ft/s.

REVISION	BY	DATE	N. KY. WATER DISTRICT PIPING SPECIFICATIONS FOR PIT CONSTRUCTION
DRAWN BY:			SAR 
APPROVED:			
DATE:			2/1/2021
STANDARD DRAWING NO:			203



PLAN



ELEVATION

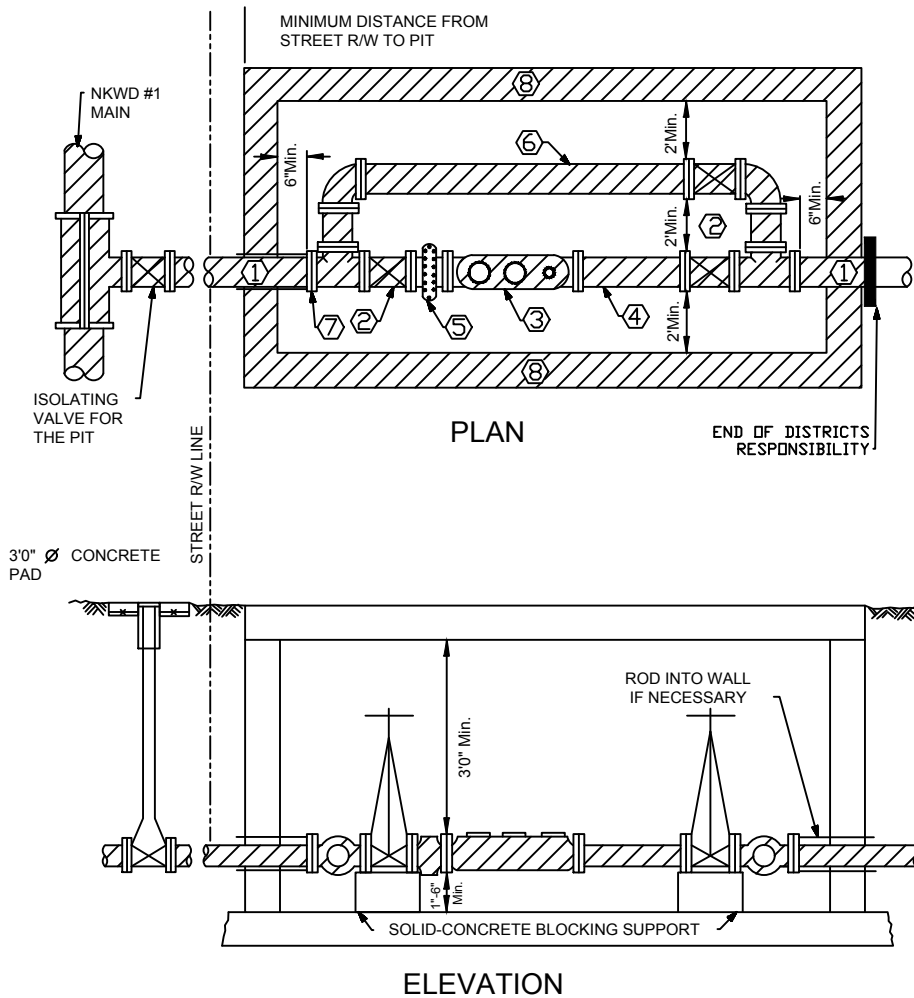
DRAWING NOTES

- ① Piping Class 52 With Flanged Ends Within Pits.
- ② An approved Double Check Valve Assembly shall be required on Fire Lines by the following governing bodies: Kentucky Public Service Commission, Kentucky Division of Water, and Kentucky Division of Plumbing.
- ③ Plain End Pipe By Plain End Pipe With Uniflange Coupler In Pit

GENERAL NOTES

- 1. SEE DRAWING NO.202 FOR PIT CONSTRUCTION DETAILS
- 2. SEE DRAWING NO. 201 FOR PIT MATERIALS SPECIFICATIONS
- 3. SEE DRAWING NO. 203 FOR PIT SPECIFICATIONS
- 4. ANY PUMPER CONNECTION SHALL BE INSTALLED DOWNSTREAM OF OUTLET VALVE & BACK FLOW DEVICE.
- 5. ANY POST INDICATOR SHALL BE TYPE THAT WILL ATTACH TO WHEEL OPERATOR AND ALLOW OPERATION OF VALVE WITHIN PIT.
- 6. SHADED AREAS INDICATE WHAT THE PROPERTY OWNER WILL MAINTAIN AFTER THE WARRANT PERIOD EXPIRES.

REVISION	BY DATE	
	BY	DATE
N. KY. WATER DISTRICT		
DOUBLE CHECK VALVE		
SETTING FOR FIRE SYSTEM ONLY		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 204		



DRAWING NOTES

- ① PIPING CLASS 52 WITH FLANGED END WITHIN PIT.
- ② VALVES WITH OUTSIDE SCREW AND YOKE, FLANGED CONNECTIONS. (RESILENT SEATED VALVES)
- ③ 2.5" OR LARGER COMPOUND METER
- ④ FLANGED COUPLING ADAPTER OVER PLAIN END PIPE FLANGED BY PLAIN END PIPE.
- ⑤ STRAINER
- ⑥ BYPASS LINE SHALL BE EQUALIVANT IN SIZE AS THE FEED LINE OR THE NEXT SIZE SMALLER (3" MINIMUM SIZE)
- ⑦ If system pressures exceed 110 psi, a regulator SHALL BE INSTALLED AS SHOWN (DWG NO. 201 item No. 1.09)
- ⑧ SHADED AREA DISTRICTS RESPONSIBILITY

GENERAL NOTES

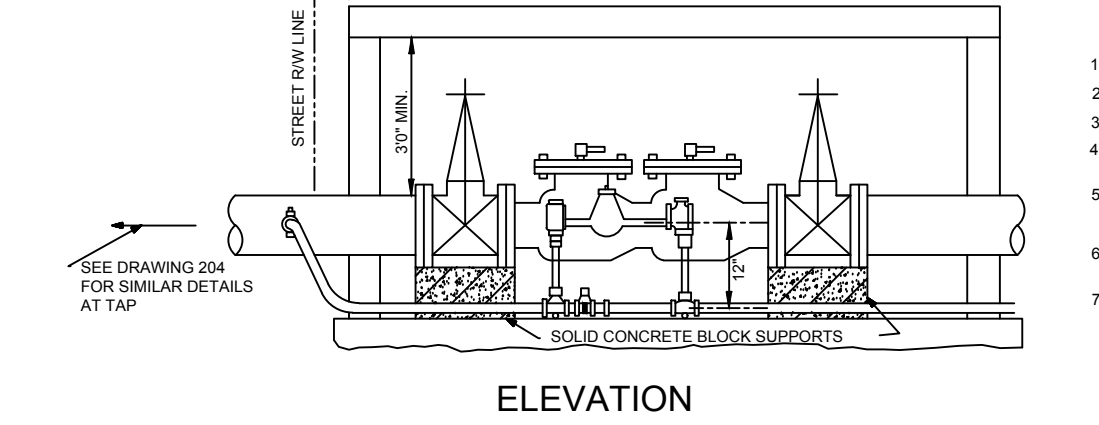
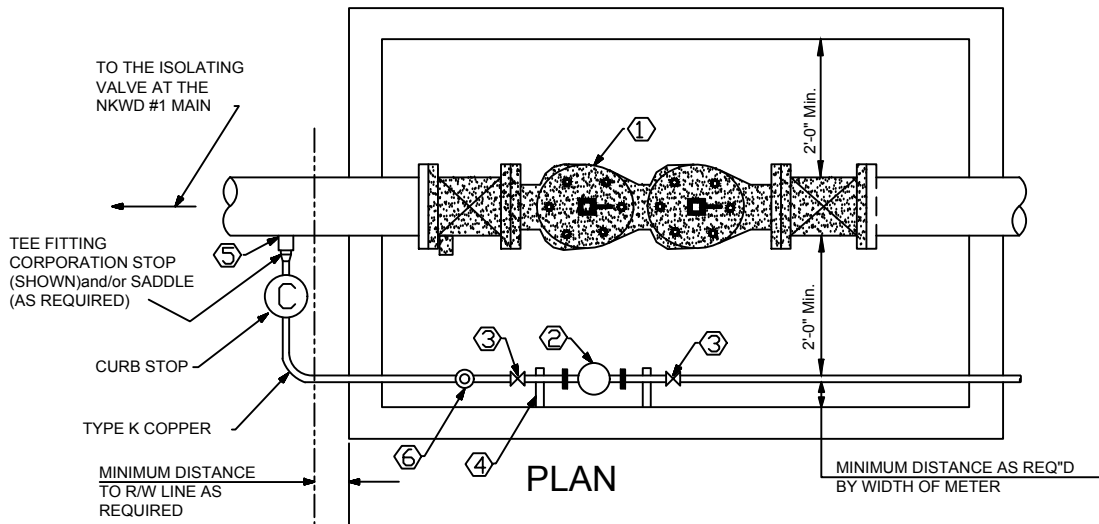
- 1. SEE DRAWING 202 FOR PIT CONSTRUCTION DETAILS.
- 2. SEE DRAWING 201 FOR PIT MATERIALS SPECIFICATIONS.
- 3. SEE DRAWING 203 FOR PIPING SPECIFICATIONS.
- 4. An approved Double Check Valve Assembly shall be required on Fire Lines by the following governing bodies: Kentucky Public Service Commission, Kentucky Division of Water, and Kentucky Division of Plumbing.

REVISION	BY	DATE
	MPA	10/30/20
	MPA	2/6/22

N. KY. WATER DISTRICT	COMPOUND METER ETC.
	NOTE 4-GEN. NOTE

METER SETTINGS	2.5" AND LARGER
----------------	-----------------

DRAWN BY:	SAR
APPROVED:	<i>[Signature]</i>
DATE:	2/1/2021
STANDARD DRAWING NO:	205-R



DRAWING NOTES

- ① REFER TO DRAWING NO.204 FOR DETAILS OF FIRE BRANCH PIPING.
- ② 2" OR SMALLER DOMESTIC METER TO ALIGN WITH BACK FLOW DEVICE.
- ③ VALVE
- ④ BRACKETS FOR PIPE SUPPORT.
- ⑤ ON 8" AND SMALLER PIPING, TAPS MADE SHALL BE MADE WITH BRONZE SADDLE FOR 1 1/2" OR 2" TAPS.
- ⑥ PRESSURE REDUCING DEVICE (if pressures exceed 110 psi)

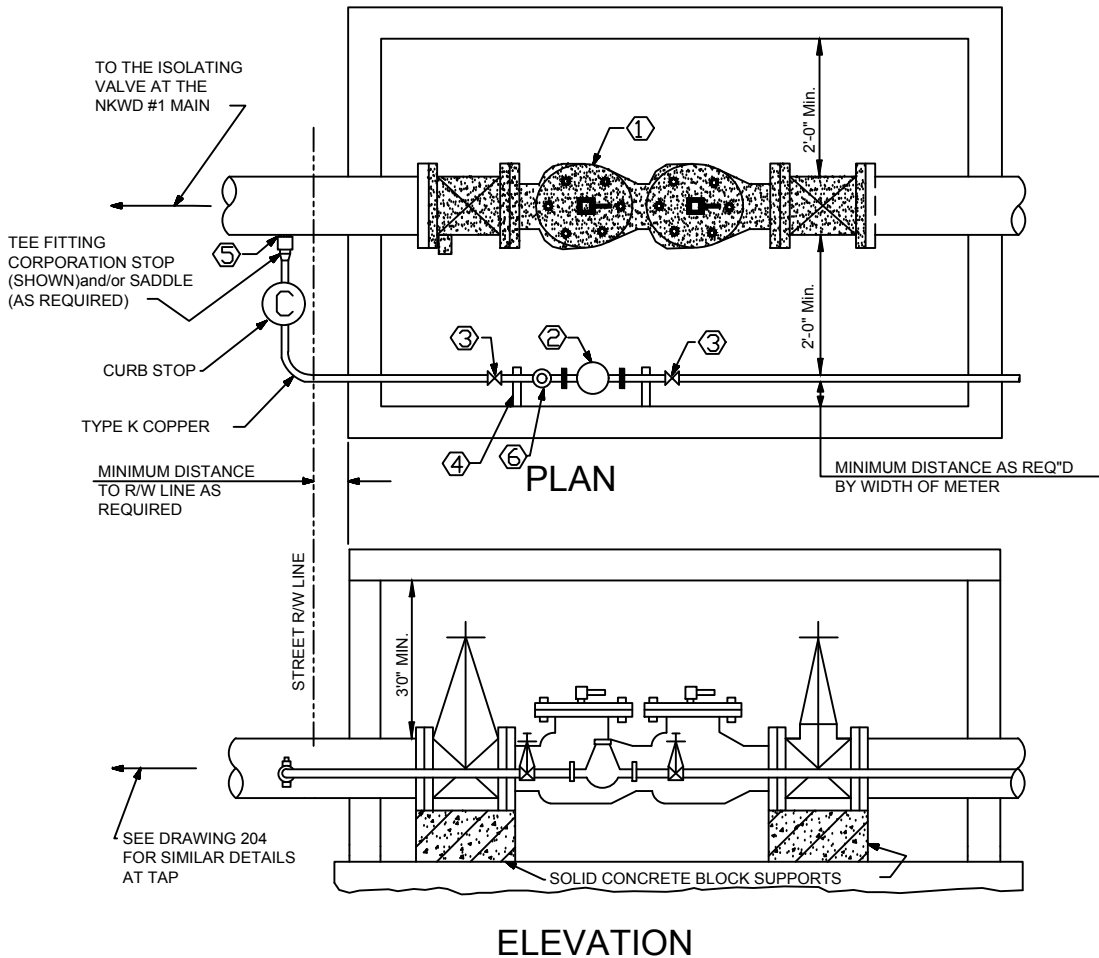
GENERAL NOTES

- 1. SEE DRAWING 202 FOR PIT CONSTRUCTION DETAILS.
- 2. SEE DRAWING 201 FOR PIT MATERIALS SPECIFICATIONS
- 3. SEE DRAWING 203 FOR PIPING SPECIFICATIONS
- 4. ANY PUMPER CONNECTION SHALL BE INSTALLED DOWNSTREAM OF OUTLET VALVE & BACK FLOW DEVICE.
- 5. ANY POST INDICATORS SHALL BE TYPE THAT WILL ATTACH TO WHEEL OPERATOR AND ALLOW OPERATION OF VALVE WITHIN PIT.
- 6. 1 1/2" \$ 2" METERS WILL COME WITH CUSTOM SETTER.(BOTH TO BE PURCHASED FROM NKWD)
- 7. An approved Backflow Prevention Assembly shall be required on Fire Lines by the following governing bodies: Kentucky Public Service Commission, Kentucky Division of Water, and Kentucky Division of Plumbing.

REVISION	BY	DATE
	MEP	10/09/20
	MEP	1/22/21
	GN	2/1/21

N. KY. WATER DISTRICT
DUAL SERVICE BRANCH
SETTING WITH 2" OR 1 1/2" METERS

DRAWN BY: SAR
APPROVED: <i>[Signature]</i>
DATE: 2/1/2021
STANDARD DRAWING NO: 206



DRAWING NOTES

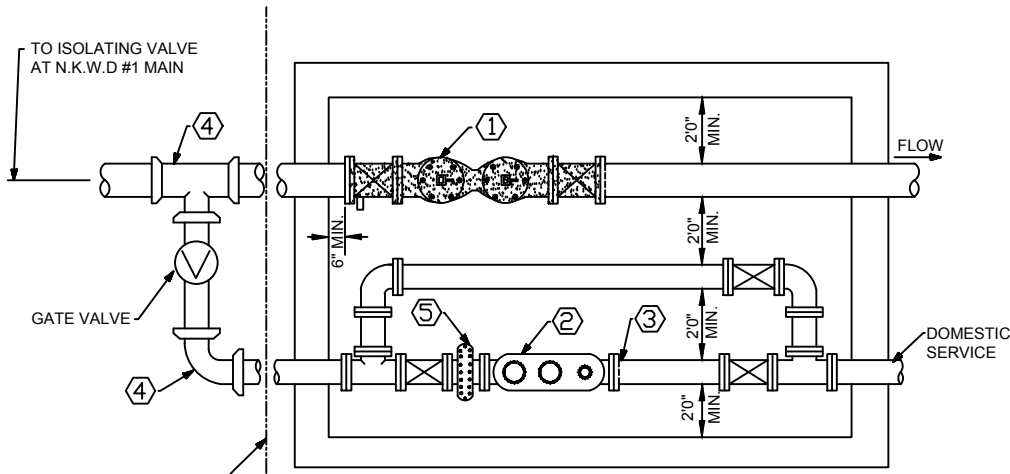
- ① REFER TO DRAWING NO.204 FOR DETAILS OF FIRE BRANCH PIPING.
- ② 1" OR SMALLER DOMESTIC METER TO ALIGN WITH BACKFLOW DEVICE.
- ③ VALVE
- ④ BRACKETS FOR PIPE SUPPORT.
- ⑤ ON 8" AND SMALLER PIPING, TAPS MADE SHALL BE MADE WITH BRONZE SADDLE FOR 1 1/2" OR 2" TAPS.
- ⑥ PRESSURE REDUCING DEVICE (if pressures exceed 110 psi)

GENERAL NOTES

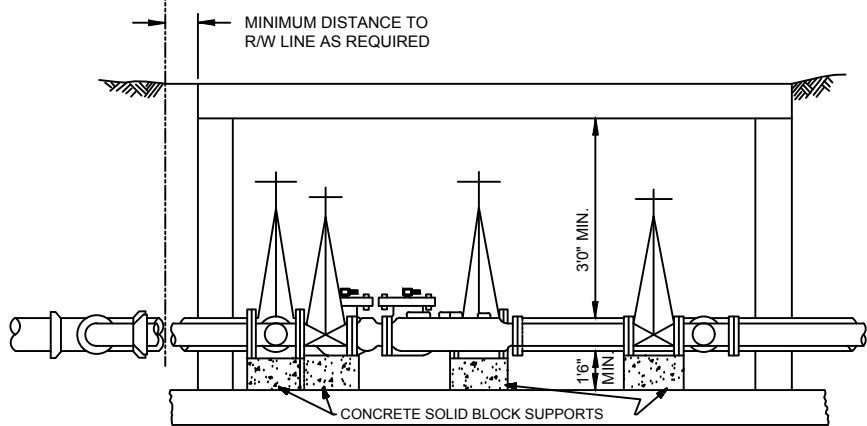
1. SEE DRAWING 202 FOR PIT CONSTRUCTION DETAILS.
2. SEE DRAWING 201 FOR PIT MATERIALS SPECIFICATIONS
3. SEE DRAWING 203 FOR PIPING SPECIFICATIONS
4. ANY PUMPER CONNECTION SHALL BE INSTALLED DOWNSTREAM OF OUTLET VALVE & BACK FLOW DEVICE.
5. ANY POST INDICATORS SHALL BE TYPE THAT WILL ATTACH TO WHEEL OPERATOR AND ALLOW OPERATION OF VALVE WITHIN PIT.
6. 1" & SMALLER METERS WITH COUPLINGS TO BE PURCHASED FROM NKWSD.
7. An approved Approved Backflow Prevention Assembly shall be required on Fire Lines by the following governing bodies: Kentucky Public Service Commission, Kentucky Division of Water, and Kentucky Division of Plumbing.

REVISION	BY	DATE
	MPA	01/08/20
	ADD LOCKWAL METER	
	ADD DOUBLE CHECK ASSEMBLY	02/28/21

N. KY. WATER DISTRICT DUAL SERVICE BRANCH SETTING W/1" & SMALLER METER
DRAWN BY: SAR
APPROVED: 
DATE: 2/1/2021
STANDARD DRAWING NO: 206-A



PLAN



ELEVATION

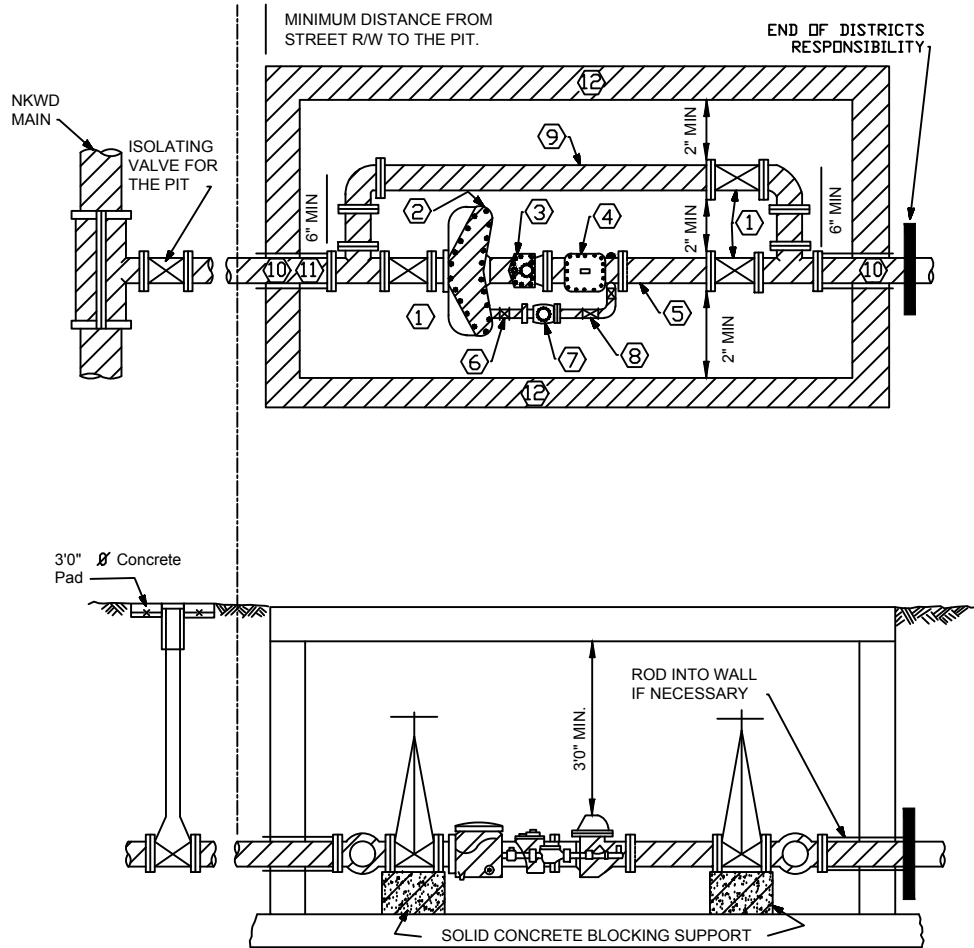
DRAWING NOTES

- ① REFER TO DRAWING NO. 204 FOR DETAILS OF FIRE BRANCH PIPING.
- ② 2.5" OR LARGER DOMESTIC COMPOUND METER REFER TO DRAWING NO.205 FOR DETAILS OF DOMESTIC SERVICE LINE PIPING.
- ③ FLANGED COUPLING ADAPTER OVER PLAIN END PIPE 1'0" LONG MINIMUM. (OPTIONAL)
- ④ PROVIDE CONCRETE THRUST BLOCKS (SEE DRAWING NO. 104) OR OTHER APPROVED MEANS AS REQUIRED TO RESTRAIN JOINTS.
- ⑤ STRAINER

GENERAL NOTES

- 1. SEE DRAWING NO. 202 FOR PIT CONSTRUCTION DETAIL.
- 2. SEE DRAWING NO. 201 FOR PIT MATERIALS SPECIFICATIONS.
- 3. SEE DRAWING NO. 203 FOR PIPING SPECIFICATIONS.
- 4. ANY POST INDICATOR SHALL BE TYPE THAT WILL ATTACH TO WHEEL OPERATOR AND ALLOW OPERATION OF VALVE WITHIN THE PIT.
- 5. ANY PUMPER CONNECTION SHALL BE INSTALLED DOWNSTREAM OF FIRE BRANCH OUTLET VALVE AND ANY BACK FLOW DEVICE.
- 6. SHADED AREA INDICATES WHAT THE PROPERTY OWNER WILL MAINTAIN AFTER THE WARRENTY PERIOD EXPIRES.
- 7. An approved Approved Back flow Prevention Assembly shall be required on Fire Lines by the following governing bodies: Kentucky Public Service Commission, Kentucky Division of Water, and Kentucky Division of Plumbing.

REVISION	BY DATE	
N. KY. WATER DISTRICT		
DUAL SERVICE BRANCH		
SETTING W/2.5" & LARGER METER		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 207-R		



NOTE: STRAINER, METER & DETECTOR CHECK VALVE SHALL BE U.L. LISTED ASSEMBLY PURCHASED FROM N. KY WATER DISTRICT.

DRAWING NOTES

- ① VALVES WITH OUTSIDE STEM AND YOKE, FLANGED CONNECTION (RESILIENT SEATED VALVES)
 - ② U.L. FIRE RATED STRAINER
 - ③ METER
 - ④ U.L. LISTED DETECTOR CHECK
 - ⑤ SPOOL PIECE, 12", FLANGED & PLAIN END
 - ⑥ GATE VALVE
 - ⑦ LOW FLOW METER
 - ⑧ CHECK VALVE
 - ⑨ BYPASS LINE SHALL BE EQUALIVANT IN SIZE AS THE FEED LINE OR THE NEXT SIZE SMALLER (3" MINIMUM SIZE)
 - ⑩ CLASS 52 PIPING WITH FLANGED END WITHIN PIT.
 - ⑪ PRESSURE REDUCING VALVE TO BE LOCATED BEFORE THE METER WHEN REQUIRED BY THE DISTRICT AND AFTER THE METER WHEN REQUIRED BY THE CUSTOMER
 - ⑫ SHADED AREA DISTRICTS RESPONSIBILITY
1. ANY PUMPER CONNECTION SHALL BE INSTALLED DOWN STREAM OF OUTLET VALVE & BACK FLOW DEVICE
 2. ANY POST INDICATOR SHALL BE THE TYPE THAT WILL ATTACH TO THE WHEEL OPERATOR AND ALLOW OPERATION OF VALVE WITHIN THE PIT.
 3. SEE DRAWINGS 202, 201 & 203
 4. An approved Approved Back flow Prevention Assembly shall be required on Fire Lines by the following governing bodies: Kentucky Public Service Commission, Kentucky Division of Water, and Kentucky Division of Plumbing.

REVISION	BY DATE	
	BY	DATE
N. KY. WATER DISTRICT		
FIRE RATED METER SETTING 4" & LARGER FOR PROPERTIES WITH PRIVATE FIRE & DOMESTIC WATER SERVICE		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 208		

GENERAL NOTES

TYPE OF REGULATOR

Hydraulic Regulator Model

690-01 Reduced Port Determined by NKWD
 90-01 Full Port CALVAL

Regulator to be capable of reducing pressure to a range between 75 - 150 psi

Accessories for Hydraulic Regulator

Stainless Steel Seats with o-ring

X101-Site Tube Part used to identify if valve is opened or closed
 w/ Rising Stem

Valve with Speed Control - To Be Determined by NKWD Stops Water Hammer

Pressure Gauge - installed on low flow pipe between isolation valve and outlet of pressure control of P.R.V. This should consist of isolation ball valve to pressure gauge and a pressure bleed off.

Low Flow 2"

2" Low Flow- Shall have unions installed for easy removal of small regulator-Regulator can be the same as District keeps in stock

2" shall be tapped with Brass Saddle and shall be Type K copper
 2" shall have Ball valves installed

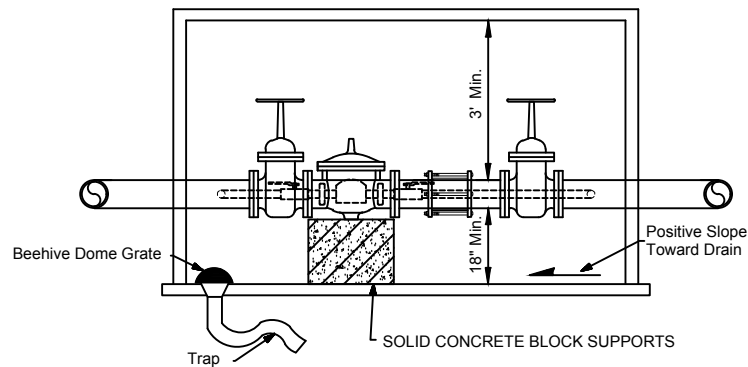
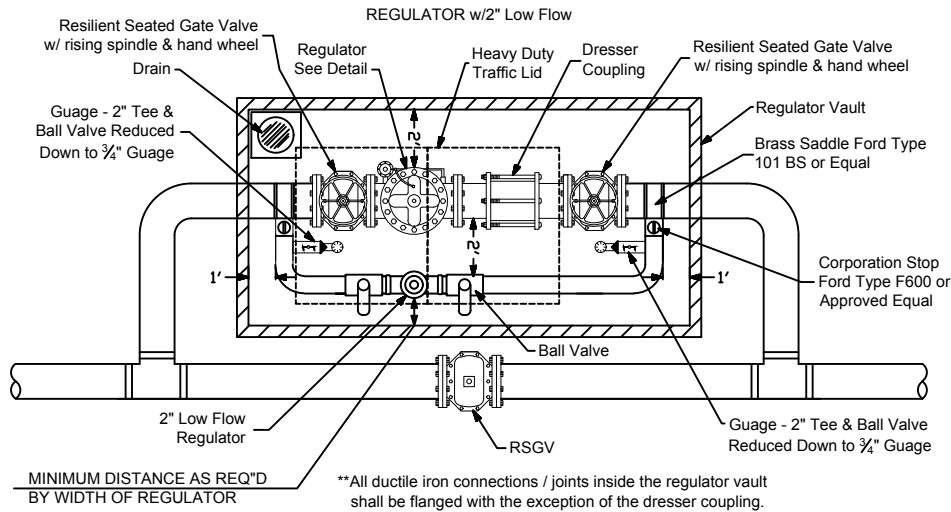
Regulator Vault

Refer to drawing #202 for the Meter Vault and Drain.

Paint

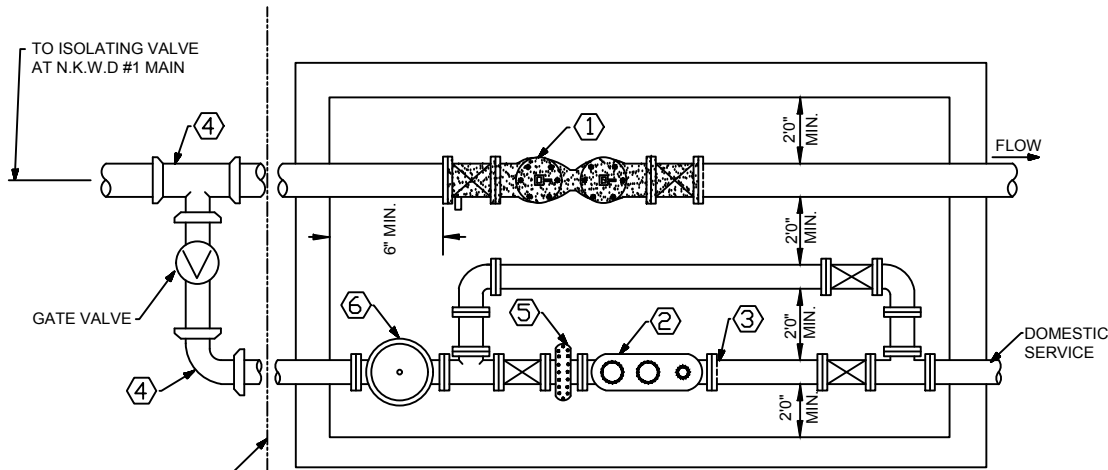
All piping, valves, and fittings inside the vault shall be painted with the exception of copper, brass, and stainless steel.

Preparation: Near-white blast cleaning or factory primed.
 One coat epoxy primer.
 One Coat Polyurethane enamel (blue).

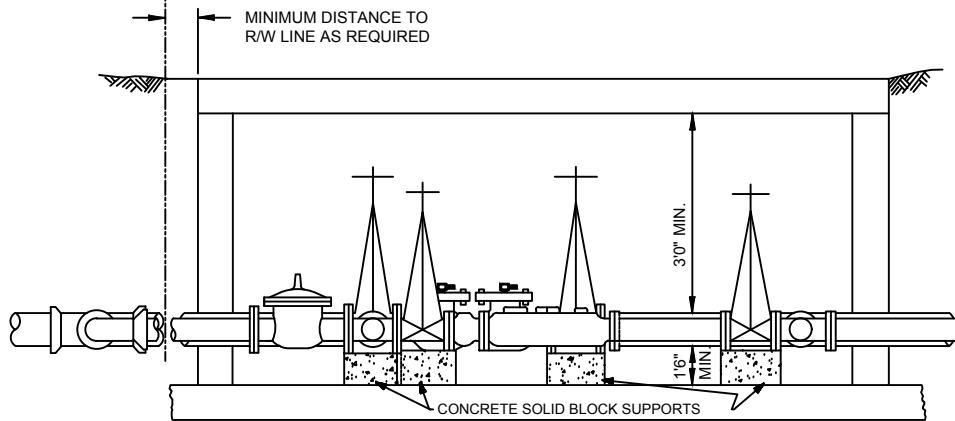


REVISION	BY	DATE

N. KY. WATER DISTRICT REGULATOR VAULTS WITH 2" LOW FLOW	DRAWN BY: SAR APPROVED: DATE: 2/1/2021 STANDARD DRAWING NO: 210
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PLAN



ELEVATION

DRAWING NOTES

- ① REFER TO DRAWING NO. 204 FOR DETAILS OF FIRE BRANCH PIPING.
- ② 2.5" OR LARGER DOMESTIC COMPOUND METER REFER TO DRAWING NO.205 FOR DETAILS OF DOMESTIC SERVICE LINE PIPING.
- ③ FLANGED COUPLING ADAPTER OVER PLAIN END PIPE 1'0" LONG MINIMUM. (OPTIONAL)
- ④ PROVIDE CONCRETE THRUST BLOCKS (SEE DRAWING NO. 104) OR OTHER APPROVED MEANS AS REQUIRED TO RESTRAIN JOINTS.
- ⑤ STRAINER
- ⑥ CLA-VAL 90-01 or 690-01 (if system pressure exceeds 110 psi)

GENERAL NOTES

- 1. SEE DRAWING NO. 202 FOR PIT CONSTRUCTION DETAIL.
- 2. SEE DRAWING NO. 201 FOR PIT MATERIALS SPECIFICATIONS.
- 3. SEE DRAWING NO. 203 FOR PIPING SPECIFICATIONS.
- 4. ANY POST INDICATOR SHALL BE TYPE THAT WILL ATTACH TO WHEEL OPERATOR AND ALLOW OPERATION OF VALVE WITHIN THE PIT.
- 5. ANY PUMPER CONNECTION SHALL BE INSTALLED DOWNSTREAM OF FIRE BRANCH OUTLET VALVE AND ANY BACK FLOW DEVICE.
- 6. SHADED AREA INDICATES WHAT THE PROPERTY OWNER WILL MAINTAIN AFTER THE WARRENTY PERIOD EXPIRES.
- 7. An approved Approved Back flow Prevention Assembly shall be required on Fire Lines by the following governing bodies: Kentucky Public Service Commission, Kentucky Division of Water, and Kentucky Division of Plumbing.

REVISION	BY DATE	
N. KY. WATER DISTRICT DUAL SERVICE BRANCH SETTING W/3" & LARGER METER		
DRAWN BY: SAR		
APPROVED: <i>[Signature]</i>		
DATE: 2/1/2021		
STANDARD DRAWING NO: 211		