TECHNICAL SPECIFICATIONS AND DESIGN CRITERIA

FOR

WATER DISTRIBUTION FACILITIES

FOR

LAGUARDO UTILITY DISTRICT
WILSON COUNTY, TN

LaGuardo
UTILITY DISTRICT

BOARD OF COMMISSIONERS

MR. CLARK SAMPSON
MR. WILL OFENHEUSLE
MR. TERRY GRAY

MANAGEMENT

MR. JOEY HARDIN, GENERAL MANAGER

APPROVED _____
LAGUARDO UTILITY DISTRICT

DW20250828

APPROVED FOR CONSTRUCTION

THE DOCUMENT BEARING THIS STAMP HAS BEEN RECEIVED AND REVIEWED BY THE

TENNESSEE DEPT. OF ENVIRONMENT & CONSERVATION
DIVISION OF WATER RESOURCES

AND IS HEREBY APPROVED FOR CONSTRUCTION BY THE COMMISSIONER

Johanna McMinn
09/02/2025

THIS APPROVAL SHALL NOT BE CONSTRUED AS CREATING A PRESUMPTION OF CORRECT OPERATION OR AS WARRANTING BY THE COMMISSIONER THAT THE APPROVED FACILITIES WILL REACH THE DESIGNED GOALS.

APPROVAL EXPIRES ONE YEAR FROM ABOVE DATE

Issue Date - July 2025

ENGINEER

MAC Water LLC

ANDREW MCELHENNY
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
No. 117892
STATE OF TENNESSEE
08/04/25

ATTORNEY

SHERRARD ROE VOIGT & HARBISON

INDEX TO PROJECT MANUAL

These specifications give the minimum requirements for installation of water lines in the LaGuardo Utility District of Lebanon, Tennessee. Any special construction problems or conditions not covered under these specifications shall be submitted in writing to the District for approval.

The Standard Drawings are part of these specifications and all construction shall conform to the details shown on these drawings.

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WD-023A	Reduced Pressure Backflow Preventer Assembly (Plan)
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PART 1. PURPOSE

A. These Standards are guidelines for Developers, their Engineers and Contractors for the planning, design and construction of water distribution lines and associated appurtenances within the LaGuardo Utility District service areas.

B. These Standards shall govern the construction materials and installation of water distribution Districts that are, or will become, the responsibility of the LaGuardo Utility District to operate and maintain as part of their District.

C. These Standards are intended to meet or exceed the requirements of the State of Tennessee, Division of Water Supply and to aid in the design of water distribution Districts. This design should incorporate the highest level of standards of practice and specify materials of highest quality identified in the technical specifications.

D. The Standards identify a single set of standards, criteria, submittal requirements and approval procedures to be used in the planning, design, and construction of projects within the LaGuardo Utility District service area.

E. These Standards are not intended to serve as a step-by-step design and construction method nor can this manual address every situation that may arise. The application of sound engineering principles combined with the information contained herein is necessary to complete the planning, design, and construction for water distribution projects.

F. Nothing herein shall be construed to guarantee or assure any developer or subdivision of the availability of water service to any particular development or subdivision of land. Nor shall anything in this resolution be deemed to abrogate, alter or amend any required fee, charge, or rate previously established for any service of the LaGuardo Utility District.

PART 2. DEFINITIONS

A. Whenever the words, forms, or phrases defined or pronouns used in their stead occur in this document, or any document or instrument herein contemplated or to which these specifications apply, the intent and meaning shall be construed and interpreted as follows:

B. ABBREVIATIONS: The following organizations are referred to in these Specifications by abbreviations of their titles:

(a)	AASHTO	American Association of State Highway and Transportation Officials.
(b)	ANSI	American National Standards Institute
(c)	ARAP	Aquatic Resource Alteration Permit
(d)	ASA	American Standards Association
(e)	ASTM	American Society for Testing and Materials
(f)	AWWA	American Water Works Association
(g)	COE	Corps of Engineers
(h)	DIP	Ductile Iron Pipe
(i)	EPA	U.S. Environmental Protection Agency
(j)	LUD	LaGuardo Utility District
(k)	NEMA	National Electrical Manufacturer's Association
(l)	NPDES	National Pollution Discharge Elimination District
(m)	OSHA	Occupational Safety and Health Administration
(n)	PVC	Polyvinyl Chloride
(o)	ROW	Right-of-Way
(p)	TDEC	Tennessee Department of Environment & Conservation
(q)	TDOT	Tennessee Department of Transportation
(r)	TOSHA	Tennessee Occupational Safety and Health Administration
(s)	TVA	Tennessee Valley Authority
(t)	USGS	United States Geologic Survey
(u)	WEF	Water Environment Federation

C. BOARD: The current appointed members of the Board of the LaGuardo Utility District.

D BOARD ENGINEER: The professional engineering firm duly authorized by the Board to act on behalf of the District. This entity may be the same as the Design Engineer.

E. COUNTY: The County of Wilson within the State of Tennessee.

F. CUL-DE-SAC: A minor street with only one outlet and having an appropriate terminal for the safe and convenient reversal of traffic movement.

G. DEDICATION: The transfer of property from private to public ownership.

H. DESIGN ENGINEER: Shall mean the engineer registered and in good standing with the State Board of Registration of Tennessee who is the responsible for the design of all water improvements.

I. DEVELOPER: The legal or beneficial owner or owners of all the land proposed to be included in a given development or the authorized agent thereof. In addition, the holder of an option or contract to purchase, a lessee having a remaining term of not less than thirty (30) years, or other persons having an enforceable proprietary interest in such land shall be deemed to be a developer for the purpose of these Regulations.

J. DEVELOPMENT, SUBSTANTIAL COMPLETION OF: Completion and acceptance by the District of all water utilities (which shall be stubbed out to ownership tracts where appropriate); AND certification indicating that all required improvements have been installed or that sufficient bond exists to cover all costs of completion of the improvements; AND additional certificates and dedications necessary to insure adequate access for public protection and utilities as well as conformance to applicable plans and ordinance requirements.

K. DISTRICT: The LaGuardo Utility District.

L. EASEMENT: A grant by the property owner of use, by the public, a corporation, or person(s) of a strip of land for specified reasons, or as created by operation of law.

M. FIRE HYDRANT: A fire hydrant defined as having 2-2.5 inch nozzles and 1-4 ½ inch steamer nozzle and capable of providing fire flows of a minimum of 500 gpm at 20 psi residual pressure.

N. INSPECTOR: An authorized representative of the District assigned to make all necessary inspections and/or tests of the work performed, or of the materials furnished or being furnished by the Contractor.

O. LOT: A tract, plot, or portion of a subdivision or other parcel of land intended as a unit for the purpose, whether immediate or future, of transfer of ownership or for building development.

P. MATERIALS: Any substance specified for use in the work and its appurtenances.

Q. OFF-SITE IMPROVEMENTS: Consist of all water improvements and associated appurtenances that are outside the property limits of a new development or subdivision but that are required to achieve water service.

R. ON-SITE IMPROVEMENTS: Consist of all water improvements and

associated appurtenances that are contained within the confines of a new development or subdivision.

S. OR EQUAL: Wherever a particular process, material, device, detail, or part is specified herein, followed by these words or by similar or equivalent expressions, such words or expressions shall be understood to mean and permit the use of another process, material, device, detail or part that the District shall determine is fully equal in suitability, equality, durability, performance, and in all other respects, to the process, material, device, detail, or part herein specified for such use, and shall approve for such use in the work.

T. OWNER: The term “Owner” shall mean any person, group of persons, firm or firms, corporation or corporations, or any other legal entity having legal title to or sufficient proprietary interest in the land sought to be subdivided under these regulations.

U. PLANS: The official construction drawings or exact reproduction thereof which show and describe the water improvements to be done.

V. POLICIES: Policies which have been adopted by the District.

W. REGISTRAR – Registrar of Wilson County, Tennessee.

X. SANITARY SEWER – A sewer which transports wastewater.

Y. SPECIFICATIONS: A part of the document containing the written directions, provisions, and requirements for completing the work. Standards for specifying material or testing which are cited in the contract Specifications by reference shall have the same force and effect as if included in the contract physically.

Z. STATE: The State of Tennessee.

AA. STORM SEWER: A sewer which carries surface runoff and subsurface waters.

AB. STRUCTURES: Facilities such as bridges, culverts, catch basins, inlets, retaining walls, curbing, storm and sanitary sewer lines, water lines, underdrains, electrical ducts, manholes, lighting fixtures and poles, transformers, flexible and rigid pavements, buildings, vaults, and other manmade features that may be encountered in the work and not otherwise classified herein.

AC. SUBDIVIDER: Any person who (1) having an interest in land, causes it, directly or indirectly, to be divided into a subdivision or who (2), directly or

indirectly, sells, leases, or develops, or offers to sell, lease, or develop, or advertises for sale, lease, or development, any interest, lot, parcel, site, unit, or plat in a subdivision, and who (3) is directly or indirectly controlled by, or under direct, or indirect common control with any of the foregoing.

AD. SUBDIVISION: Shall mean the division of a lot, tract, or parcel of land into two (2) or more lots, plats, sites, or other division of land for the purpose, whether immediate or future, of sale or of building development. It includes re-subdivision and, when appropriate to the context, relates to the process of subdividing or to the land or territory being subdivided. It shall also include all divisions of land involving the dedication of new street(s) or change in existing streets. It shall also include the division of a tract of land into lots all fronting on an existing paved public road and not requiring the construction or extension of new roads or streets, municipal facilities or public improvements.

AE. DISTRICT: LaGuardo Utility District of Wilson County, Lebanon, Tennessee. (LUD)

AF. DISTRICT GENERAL MANAGER: General Manager of the LaGuardo Utility District.

AG. TDEC: The Tennessee Department of Environment and Conservation.

AH. WORK: The furnishing of all labor, materials, tools, equipment and incidental necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, Plans and Specifications.

PART 3. STANDARDS FOR CONSTRUCTION PLANS

A. Any person, firm or corporation ("developer") or homeowner desiring to have water service extended for a development shall meet all requirements previously outlined in these Standard Specifications.

B. All Construction Plan sheets prepared by the Design Engineer must have certain required signatures, including a Tennessee Professional Engineer's seal. The signatures indicate the following:

- "Design/Board Engineer": Indicates approval by the engineer whose stamp appears on the plans.

- "Approved for Construction": Indicates approval to proceed with construction of water facilities by the LaGuardo Utility District.

C. Water Distribution Construction Plans shall contain the following information:

1. A Title Sheet containing a location map at a scale not smaller than 1”=1,000’; the name of the project/development; and a sheet index.
2. Plan of proposed water system improvements, drawn at no smaller than 1”=50’, with all critical elevations.
3. Location, size, and material of all existing and proposed water mains in the subdivision, (or outside the subdivision if off-site connections are required), with locations of connections to other mains, service connections, valves, fire hydrants, blow-offs and all other appurtenance indicated
4. North arrow on each Plan sheet.
5. Tennessee Professional Engineer’s seal, signature and date of signing on each Plan sheet.
6. All topographic features, both existing and proposed.
7. All Property lines including lot numbers and rights-of-way.
8. Street layouts including names of streets, proposed right-of-ways, road widths, existing and proposed roadway grades, curbs and sidewalk locations.
9. References to applicable Standard Specifications of the District with respect to those required for the construction of water improvements proposed.
10. All proposed water utility easements.
11. Show all existing and proposed utilities including water, wastewater, gas, electricity, telephone, cable TV, and storm sewers.
12. Location of proposed drainage ways, streams, storm inlets, and storm drains, inverts, top of castings, detention ponds, ditches, etc. in the subdivision which might have an impact on water improvements.
13. Location of proposed sanitary sewers, manholes, inverts, top of castings, etc. in the subdivision which might have an impact on water improvements.
14. Location of proposed buried electrical, buried communication and buried natural gas lines in the subdivision which might have an impact on water improvements.
15. Location of easements and right-or-way for drainage ways.
16. All topographic features, both existing and proposed.
17. All property lines including rights-of-way.
18. Special details related to stream, railroad, highway or other type crossings.

D. Where proposed water improvements are located within or cross easements of another utility, it shall be the responsibility of the developer to provide the District with the letter of approval of the affected utility(ies) permitting the new District improvements.

PART 4. WATER MAIN AND APPURTENANCES DESIGN CRITERIA (ON-SITE

AND OFF-SITE IMPROVEMENTS)

A. All water mains shall be designed in accordance with these criteria; the Technical Specifications contained in Sections 3.01 through 3.03 of this document, and the standards of the Tennessee Department of Environment and Conservation. In cases where similar rules exist, the more stringent rule shall be applied.

B. Water distribution lines sizing shall be confirmed using the District's Hydraulic Water Model. This function shall be performed by the District Engineer.

C. In areas where the existing District does not support the minimum residual service pressure of 20 psi and peak service demand for domestic service, offsite improvements will be required to provide this level of service pressure. All costs of the offsite improvements to provide the minimum residual service pressure of 20 psi at the calculated domestic service demand will be borne by the developer or property owner less any costs for increased level of service required to benefit the LaGuardo Utility District.

D. All residential, commercial and retail developments shall be provided with a minimum of 500 GPM fire flow at 20 psi residual pressure if such capability is available. The District will review the proposed development for fire flow capability based upon their existing water District and with the requirements set forth by the City of Lebanon if development lies within their city limits. If it is determined that offsite improvements of up to one (1) mile can achieve the desired fire flow for the development, then all cost of offsite improvements to provide the fire service will be borne by the developer or property owner. If the District determines offsite improvements within this limit will not provide the minimum fire flow capability, then no fire hydrants will be permitted on the water line.

E. Maximum designed velocity of flow in water lines shall be 5.0 ft./sec. unless otherwise approved by LaGuardo Utility District.

F. All water mains will be ductile iron pipe, Class 52. Ductile iron will be required for water lines 12-inch and smaller under and inside roadways, inside bores, beneath creek crossings and in other special circumstances.

G. Where fire hydrants are installed, hydrants shall be provided at the following intervals:
   - For developments located inside the City Limits of the City of Lebanon, fire hydrant spacing shall be at 500-foot intervals in residential areas and 300-foot in commercial/industrial areas.
   - For developments located within Wilson County and not inside the Lebanon City Limits, fire hydrant spacing shall be in accordance with

2021 International Fire Code. Any questions shall be directed at the Wilson County Fire Marshal office, 615.444.8777 Ext. 8 or cowand@wilsonema.org.

Fire hydrants shall not be permitted on lines small than 6-inch diameter. A 6-inch diameter isolation valve is required for each hydrant. Valve and hydrant shall utilize restraint devices (e.g., Mega-Lug) to the tee or hydrant locking tees. At the conclusion of installation of new fire hydrants and prior to final acceptance by the DISTRICT, the developer or his contractor shall paint the bonnets of each fire hydrant in accordance with e classification of hydrants as set forth in the *Recommended Practice for Fire Flow Testing and Marking of Hydrants, NFPA 291, latest edition.* Colors shall be as follows:

- Class AA – rated capacity of 1,500 GPM or greater – light blue.
- Class A – rated capacity of 1,000 to 1,499 GPM – green.
- Class B – rated capacity of 500 to 999 GPM – orange.
- Class C – rated capcity of less than 500 GPM – red.
- Fire hydrant body – yellow.

The DISTRICT ENGINEER will provide the color coding for each new hydrant in the development utilizing the DISTRICT'S hydraulic water model.

H. Water mains shall be shall be installed outside the right-of-way (other than crossings of roads) and inside a dedicated public utility easement (either by plat or by dedication directly to the District). Water line plans shall clearly define the location of all water lines on the drawings. Dead-end mains shall extend to the last lot or parcel being served so that no service lines are installed in front of adjacent lots or parcels. Water lines on cul-de-sacs shall extend around the cul-de-sac and not through the paved area. Water lines shall be extended across the length of entire property being developed so service can be extended in future without disturbing existing property.

I. Water lines crossing beneath existing County/State roads shall be installed by means of bore and jacking. Casings and appurtenances shall be steel and sized as set forth in the technical specifications. Casing spacers and casing end seals shall be required for all pipes in casings. Crossings of State Highways shall be submitted by the Developer to TDOT for approval. LaGuardo Utility District shall be provided with a copy of TDOT permit prior to approval of construction plans.

J. All mains shall have a minimum of 36 inches of cover. Where rock is present in the trench, it shall be removed to a point no less than 6-inches below the pipe. A minimum of 1-foot clearance shall be provided on each side of the pipe as measured from the bell of the pipe.

K. Water mains and storm drains or sanitary sewers shall not be installed in the same trench.

L. Parallel Installations: Water mains shall be laid at least 10 feet horizontally from any sanitary sewer, storm sewer or sewer manhole, whenever possible; the distance shall be measured edge-to-edge. When local conditions prevent a horizontal separation of 10 feet, a water main may be laid closer to a storm or sanitary sewer provided that:
   1. the bottom of the water main is at least 18 inches above the top of the sewer.
   2. where this vertical separation cannot be obtained, the sewer shall be constructed of materials with joints that are equivalent to water main standards of construction and shall be pressure tested to assure water-tightness prior to backfilling.

M. Water Line Crossings: Water mains crossing house sewers, storm sewers or sanitary sewers shall be laid to provide a separation of at least 18 inches between the bottom of the water main and the top of the sewer, whenever possible. When local conditions prevent a vertical separation as described above, the following requirements shall be met.
   1. Sewers passing over or under water mains shall be constructed as described in 1.04.13.b.
   2. Water mains passing under sewers shall, in addition, be protected by providing a vertical separation of at least 18 inches between the bottom of the sewer and the top of the water main and adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking the water main.
   3. The length of the water pipe shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer.
   4. Both the sewer and the water mains shall be constructed of water pipe and tested to water main hydrostatic test standards.

N. All water service lines which cross under streets, highways, or any other paved surfaces must be placed individually inside a Schedule 40 PVC casing pipe, 2-inch minimum size for ¾-inch service line, to 3 ft. behind the curb or edge of pavement and 2 ft. back of sidewalks. All service lines shall be a minimum of 3/4-inch. Each lot shall be provided with a service line. No single service line arrangements providing service to two lots will be permitted. No single family lots (house, townhomes, cottages, villas, etc. developments will be allowed to utilize a master meter installation. All residential developments will be required to utilize individual metered water connections. Metering of apartment complexes and commercial developments will be considered on a case-by-case basis for master metering.

O. An “n-1”, where “n” is the number of intersecting pipes, valve arrangement shall be required at every water main intersection, where feasible.

P. Adequate thrust blocking shall be designed for the expected pressures, including the required test pressure. If location prohibits thrust blocking, all fittings, valves, and hydrants shall include the use of restraint devices (e.g., Mega-Lug) or rodding as directed by LaGuardo Utility District.

Q. Pressure regulators for individual services are required by the District in areas of pressure exceeding 80 psi. They **are not** part of the District’s portion of the service line for operation and maintenance. Pressure regulators shall be installed on the customer side of the water meter and are the responsibility of the property owner.

R. Any water facilities not specifically covered herein shall be presented to the District for its approval. It is recommended the District be contacted prior to detailed design to discuss specific requirements.

S. The LaGuardo Utility District reserves the right to utilize the District’s Board Engineer to design off-site and/or on-site water improvements. The Developer will be responsible for all engineering costs related to the design of these off-site and/or on-site improvements. Design fees for the improvements will be estimated by the District’s Board Engineer and approved by the District and Developer prior to commencement of design. Developer shall be required in these cases, to provide to the Board Engineer an electronic base file in CAD format (.dwg or .dgn) showing the layout of the proposed development including roads, rights-of-way, and property lines. In addition, construction plans for storm sewers and sanitary sewers and other underground utilities shall be provided in order to facilitate the water line design. Developer shall be required to pay costs of off-site and/or on-site design improvements to the District prior to Board Engineer beginning design. Board Engineer will provide completed design back to the District who will in turn release it to the Developer for construction after TDEC approval is received.

PART 5. CONSTRUCTION DRAWINGS APPROVAL

A. The Design Engineer will submit the District’s approved plans electronically through TDEC’s MyTDEC Forms portal for approval. The Developer will be responsible for all applicable TDEC review fees.

B. Upon receipt of TDEC approved plans by the Design Engineer, a minimum of two (2) State approved copies bearing the date of approval, the “RED” approval stamp and the approval TDEC project number shall be returned to District.

C. A copy of the approved construction plans showing the TDEC approval shall remain on site at all times during construction activities.

PART 6. EASEMENTS

A. Water mains to be dedicated to the District shall be constructed within dedicated, utility easements, at least 20 feet in width unless otherwise directed. All easements shall be prepared, signed and recorded in the office of the Registrar of Wilson County, Tennessee. Easement shall include a written description of the metes and bounds of the easement and include the square footage of the easement. Easement shall also include an exhibit drawing which outlines the easement layout. Easements may also be dedicated by recording of plat where applicable.

B. Off Site Easements – Where off-site easements are required to achieve water service, the District may assist in the acquisition of off-site easements but the developer shall reimburse the District for all costs associated with acquiring any easements or rights-of-ways necessary for the installation of said off-site water mains including legal fees, engineering fees and acquisitions costs.

C. All easements shall be obtained, signed and recorded in the Wilson County Registrar's office prior to start of construction activities.

PART 7. APPLICABILITY, LIMITATIONS AND VARIANCES

A. Applicability

This policy shall apply to all water main extensions from existing facilities. This policy shall not be applicable to requests for water services in areas where, because of elevation and remoteness, service cannot be extended from existing facilities of the District. Request for service to such areas should be presented to the District for its consideration.

B. Limitations

Service – Due to availability to service (elevation) or the availability of capacity within the service area of the District, water extensions to new developments or customers may be provided only when the District deems suitable capacity are available with existing facilities. Developers, prior to submission of any proposed development, should obtain necessary information regarding capacity options from the District.

C. Variances From and Effect of Preceding Policy as to Water Main Extensions

Whenever the District is of the opinion that it is to the best interest of the

District to construct a water main extension without requiring strict compliance with its extension policy, such extensions may be constructed upon such terms and conditions as shall be approved by a majority of the members of the District's Board.

The District to make water main extensions pursuant to this policy is permissive only, and nothing contained herein shall be construed as requiring the District extend service to any entity, person, or persons, even though such prospective customers meet all the requirements contained in the policy necessary to authorize the District to make such extensions.

PART 8. BONDS FOR WATER IMPROVEMENTS

A. Performance Bond for Water Improvements:

The District may accept cash, a letter of credit (valid for a minimum of thirteen (13) months), or a surety bond from a corporate surety licensed in the State of Tennessee, provided the security is deemed acceptable by the District's attorney. The bond amount shall be determined by the District's Engineer and shall cover 100% of the estimated cost of the water improvements. The Developer shall be responsible for reimbursing the District for all costs incurred in reviewing and approving the bond amount.

A performance bond must be submitted at the time of plat submittal if water improvements are not yet constructed. The bond must be received by the District before payment of fees and before the release of approved construction plans. The surety must include an automatic thirty (30) day renewal notice to the District before expiration.

Water improvements shall be fully installed and operational within one (1) year from the date of final plat approval unless the Developer requests an extension.

The Developer is solely responsible for requesting an extension, which shall not exceed one (1) additional year. If an extension is not requested and granted, the District's approval shall be automatically voided. Any extension shall only be granted upon renewal of the bond. The District shall not consider reducing or releasing the performance bond until all water improvements have been fully completed and formally accepted.

If the Developer fails to fulfill the bond conditions, the District reserves the right to declare the bond forfeited and apply the funds to complete the required improvements. The District is not limited to the bond amount, and the Developer shall be responsible for any costs exceeding the posted security. Any remaining funds shall be returned to the Developer upon completion.

B. Maintenance Bond for Water Improvements.

Upon completion of all subdivision improvements, including both on-site and off-site water improvements, the Developer shall submit a written request to the District for acceptance of the improvements into the water distribution system. The request shall include:

1. Certification of Completion – A statement signed by the developer and contractor, including a notarized affidavit, certifying:
   - The total construction cost of the water improvements.
   - That all improvements have been constructed in full compliance with the District's specifications and have successfully passed all required inspections and testing by the District and TDEC.
   - That the Developer and contractor certify there are no known defects, liens, or outstanding issues related to the improvements.

2. Dedication Agreement – A properly executed agreement dedicating all water improvements to the District.

3. Water Improvements Maintenance Bond – A surety bond, letter of credit, or other financial security acceptable to the District's attorney shall be required.

4. Bond Amount – The bond amount shall be determined by the District's Engineer and shall not be less than 15% of the total cost of the water improvements. The Developer shall be responsible for reimbursing the District for all review and approval costs associated with setting and approving the maintenance bond.

5. Final Inspection & Acceptance – Before closing the Performance Bond and activating the Maintenance Bond, the District shall conduct a Final Inspection. Any deficiencies found during inspection shall be corrected before the District issues an Acceptance of Utilities letter.

6. Maintenance Period & Defect Liability – The Maintenance Bond shall remain in effect for one (1) year from the date of acceptance of the improvements and serves as financial security against any defects, including:
   - Defective or substandard materials
   - Poor workmanship
   - Negligent construction practices

   The Developer shall remain responsible for addressing defects that arise during the one-year maintenance period. If corrective actions are required, the District will require the Developer to remedy the issues at their own expense.

PART 9. OWNERSHIP OF WATER FACILITIES

A. All new water lines, pumping stations, tanks, and other appurtenances related to water shall be deeded and ownership transferred to the District. **No private water facilities will be permitted inside the District service area.**

B. Upon completion of such extensions and their acceptance by the District, such water improvements shall become the property of the District. The persons paying the cost of constructing such utilities shall execute any written instrument requested by the District to provide evidence of the District's title to such utilities. In consideration of such water utilities being transferred to the District, the District shall incorporate said utilities as an integral part of the District's water District and shall furnish service in accordance with the District's rules, regulations, and rate schedules, subject always to such limitation as may exist because of the size, elevation, and capacity of said utilities.

C. The District will not accept any existing water facilities that are not constructed to current District standards or new improvements that were not approved for construction following District requirements.

PART 10. PRIOR TO START OF CONSTRUCTION OF WATER IMPROVEMENTS

A. Prior to start of construction of water improvements, the following shall have occurred:

1. Payment of all fees.
2. Approval of construction plans from Tennessee Department of Environment and Conservation.
3. Submittal and approval of shop drawings by the District for project materials. The contractor for the developer shall provide submittals and shop drawings as set forth in Section 2.06 of this Manual for all materials proposed to be included in the installation of water appurtenances for approval by the District. No construction installation of water appurtenances shall occur until the submittals have been reviewed and approved by the District.
4. Attend and participate in a Pre-construction meeting with the District. Prior to start of construction, the developer or the developer's contractor shall notify the District ten (10) working days in advance of beginning work, by letter or email addressed to the District Superintendent, requesting a pre-construction conference.
5. All necessary permits from TDEC, TDOT, or other applicable governing agencies shall be submitted to the District.

B. A properly licensed general contractor approved by the District shall perform the work in extending the on-site and off-site District's water mains lines. For projects in excess of $25,000, the contractor must be licensed in the State of Tennessee. This license must also declare a major classification of Municipal and Utility (MU); or MU-A3; MU-B ;BC; BC-B.

C. The District will send the Start of Construction Notification to the State of Tennessee before start of construction activities.

PART 11. CONSTRUCTION INSPECTION

A. The District will provide inspection of all water installations to insure compliance with the provisions of this Manual.

B. No installation shall be covered until such time that the designated representative of the District has performed the appropriate inspection. The developer or his contractor is responsible for coordination with the inspector for timing of inspections. Cost of uncovering installation which was not inspected shall be borne by the developer or his contractor.

C. All materials being installed shall meet the requirements of the District and shall also be in compliance with the technical requirements of this Manual. Inferior, damaged or unapproved materials will not be installed and shall be removed from the site.

D. All testing required for approval of water mains shall be performed in the presence of the District inspector. Failure to perform tests in the presence of the inspector will result in re-testing. Contractor shall provide all equipment for testing of water lines.

E. The District inspector shall be allowed access to the site at any time as required to perform inspection of water mains. The District inspector shall not be responsible for interpretation of plans for areas of work other than related to the installation of water mains. No construction layout will be performed by the District inspector. No supervision or direction in the means and methods of installation by the Contractor will be provided by the District inspector. The District, its inspector nor its Engineer will not be responsible for any safety requirements and protocols of the Contractor.

F. Upon completion of installation of water improvements, the District will conduct a final inspection. Any deficiencies will be noted and a written deficiency list will be provided to the Contractor for correction prior to acceptance of the improvements.

G. The District inspector shall insure that all new mains are isolated from existing water mains. Only District personnel are authorized to operate

valves.

PART. 12 START OF WATER SERVICE

A. The District will not accept nor allow potable water supply connection on any new water main construction, until all pressure testing, bacteriological testing and approved documentation has been performed. All testing shall be documented with proof of results.

B. There will be no customer meters installed on a service tap before all testing has been completed and approved. The only use of the water permitted will be for filling, sampling, testing and flushing of the new water line.

PART. 13 SAFETY

A. The Contractor is responsible for meeting all safety requirements as set forth by Federal, State and local statutes. Contractor shall insure that all applicable OSHA and TOSHA requirements are met for installation of water lines and appurtenances. The LaGuardo Utility District, nor its Engineer are responsible for the safety of the Contractor's work force or the work environment.

END OF SECTION

1. SMOKING AND FIRE PRECAUTIONS

1.1 No smoking, fire or use of any fire- or explosion-producing tools or equipment will be permitted on the properties of oil companies or other concerns prohibiting same on their premises or at any locations where such may endanger said premises or the current operations thereon.

2. MANUFACTURERS QUALIFICATIONS

2.1 The manufacturers of all materials and equipment used must be reputable and regularly engaged in the manufacture of the particular material or equipment for the use and service to which it will be subjected.

3. DEVELOPER SHALL PAY FOR ALL LABORATORY INSPECTION SERVICE

3.1 All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards. The laboratory or inspection agency shall be selected by the Developer and approved by the Owner and DISTRICT. The Developer shall pay for all laboratory inspection services as a part of the Contract. Submit all material test reports to the DISTRICT in triplicate.

4. COMPLIANCE WITH STATE AND LOCAL LAWS

4.1 Comply with all applicable requirements of state and local laws and ordinances to the extent that such requirements do not conflict with federal laws or regulations.

5. MARKERS

5.1 Preserve all Corps of Engineers, USGS, TVA, State of Tennessee, and private markers; do not remove or disturb any such markers without prior approval from the DISTRICT. Any removal and replacement of such markers shall be at the expense of the Developer.

6. PAVEMENT REPAIR AND/OR REPLACEMENT

6.1 Whenever pipe trenches are cut across or along existing pavement or shoulders, backfill same and restore traffic over the cuts as quickly as possible by constructing a temporary twelve-inch (12") surface of Class A, Grade D crushed stone. Add material and otherwise maintain such surface until the permanent pavement is restored or until the entire project is accepted. All final

roadway pavement shall be in compliance with the Wilson County Road Commission or the City of Lebanon.

7. APPROVED CHEMICALS

7.1 All chemicals used during project construction or furnished for project operation, whether lubricant, herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, must show approval of either EPA or USDA. The use of all such chemicals and the disposal of residues shall be in strict conformance with all applicable instructions and regulations.

8. DEPARTMENT OF TRANSPORTATION PERMITS

8.1 The Developer will secure any permits and provide bond as required by the Tennessee Department of Transportation for the installation of permanent facilities on State highway rights-of-way. All such work shall be coordinated with and be subject to the approval of the Tennessee Department of Transportation, in addition to the approval of the DISTRICT. Any costs involved with the preparation and obtaining permits will be paid or reimbursed by the Developer.

8.2 The Developer will secure any permits as required by the Wilson County Road Commission for the installation of water lines within the rights-of-way of county roads. The Developer shall be responsible for complying with the requirements of the Commission, and all such work shall be coordinated with and be subject to the approval of the Wilson County Road Commission, in addition to the approval of the Owner.

9. STORMWATER/CONSTRUCTI ON/ARAP PERMITS

9.1 The Developer shall be responsible for obtaining all stormwater and Aquatic Resource Alteration Permits (ARAP) permits required by the State of Tennessee and Wilson County. A copy of the approved permits shall be submitted to the LaGuardo Utility District prior to the state of construction.

10. INSTALLATION, TESTING, AND GUARANTEE

10.1 The completely installed system shall be guaranteed against any and all defects of manufacture, materials, workmanship, or installation for a period of one (1) year from the date of acceptance. Refer to Section XX.XX for bonding requirements for maintenance bonds.

11. DRAWINGS OF RECORD

11.1 The Developer shall provide and keep up-to-date a complete record set of blueline prints, which shall be corrected daily to show every change, and the approved shop drawings. Keep this set of prints at the job site, and use only as

a record set. This shall not be construed as authorization for the Developer to make changes in the approved layout without definite instructions in each case. Turn the set over to the Owner upon completion of the project.

12. DETECTION TAPE

12.1 For location purposes, a two (2) inch metallic tape eighteen (18) inches above the water lines. Connection of the tape shall be performed by tying together.

13. UTILITIES

13.1 The Developer shall contact the owner of all underground utilities before beginning construction in the area. Carefully protect from damage all utilities in the vicinity of the work at all times. If it is necessary to repair, remove, and/or replace any such utility in order to complete the work properly, do so in compliance with the rules and regulations of the particular utility involved. Any such work shall be considered incidental to the construction of the project, and no additional payment will be allowed therefore.

14. WATER LINE MATERIALS

14.1 It is the sole discretion of the LaGuardo Utility District representative to determine the type of water line material to be used for the project.

END OF SECTION

General Requirements & Criteria For Reduced Pressure Principle Assemblies

PART 1. GENERAL

A. The Cross-Connection Coordinator (CCC) of the Lagaurdo Utility (LUD) must approve all new installation and repairs prior to any backflow device being placed into service. The CCC must meet with the Contractor or plumber for any of the following situations:

1. A new unit installation is required.
2. Changes are being made within the facility to the plumbing system (High risk or commercial customers only).

B. All units must be inspected when installed to verify that they meet the installation and performance requirements as set forth in the *"Manual for Cross Connection Control",* published by the Foundation for Cross-Connection Control and Hydraulic Research – University of Southern California. No test report will be accepted until the installed unit has been inspected and approved.

C. Once inspected by LUD, each new or repaired device must be tested by a State certified Backflow tester. Once the device has been tested, the results must be sent to LUD by the Owner or the tester. Test reports will not be accepted by LUD until the credentials of the tester have been received by LUD. This includes Backflow Testing Certification and Test Kit Certification.

D. The State of Tennessee, Department of Environment and Conservation requires that each device be tested annually once installed. It is the customer's responsibility to have the device tested and at the customer's expense. LUD will notify each backflow customer by mail to set a deadline for the annually testing occurrence.

E. The CCC can be contacted with questions regarding approved units. Double check valves are only allowed on some fire lines (see Section 01200). Every other situation requires a Reduced Pressure Backflow Preventer.

PART 2. INSTALLATION REQUIREMENTS FOR REDUCED PRESSURE BACKFLOW DEVICES

A. The unit must never be subject to flooding. Therefore:

1. It must never be located in a pit or other area subject to flooding.
2. Provisions must be made for discharging water directly through the wall of the enclosure housing the unit at a slightly higher elevation than surrounding ground level or maximum flood level.
3. The lowest part of the relief valve discharge port must set a minimum of 12 inches plus the nominal size of the discharge opening of the assembly above either:
    1. the ground,
    2. the maximum flood level,
    3. the top of opening in discharge pipe or enclosure wall.
4. If the unit is installed inside a building, the drain line must be a minimum of six (6) times the diameter of the unit, e.g., a 1 inch unit must have a 6 inch drain line. Air gap funnels are allowed for catching and directing small leaks to the drain, but adequate drainage for maximum discharge is still required to prevent flooding. Typically, units installed outside in an enclosure have adequate drainage from the enclosure itself.

B. The unit must be installed where it can be easily accessed, tested and repaired.

1. All units should be installed in accordance with the manufacturer's installation guidelines.
2. Removable enclosures should be removable with little effort.
3. Units installed in non-removable enclosures must have a minimum of 18 inches clearance on each side of the device to facilitate testing and repairs.
4. Units must be placed in the upright position in a horizontal run of pipe, unless otherwise specified by the manufacturer. In addition, the unit must be adequately supported.
5. Provisions must be made to protect the unit from freezing. The CCC must approve enclosures. Electricity to operate a heater for the enclosure is at the expense of the customer.
6. If not otherwise provided by the unit manufacturer, the device shall include two (2) shut-off valves with one installed immediately before and after the unit.
7. The unit shall not be painted, or the test cocks impaired. Each device should have test cocks installed with caps on each cock.
8. It is required that each device have a Y-strainer installed immediately upstream of the device unless servicing a fire line. The Y-strainer shall be equipped with a blowdown valve.
9. Unless otherwise approved, reduced pressure assemblies must have a PVC union located before and after the device for removal during winterization.

PART 3. FAILURE TO COMLY WITH REQUIREMENTS

A. If all guidelines for the installation, repair and testing are not met in a timely manner, LUD will be forced to discontinue water service to the meter until such time all conditions and requirements are met.

END OF SECTION

General Requirements & Criteria
For Double Detector Check Assemblies

PART 1. GENERAL

A. All backflow prevention assemblies will be inspected to verify that the unit meets the following requirements set forth herein. The Contractor is responsible for having the unit tested by a certified tester approved by the Laguardo Utility District (LUD) in order to verify that the installed unit meets the performance requirements as set forth in the latest edition by the *Foundation for Cross-Connection and Hydraulic Research of the University of Southern California* **before** they will be accepted.

B. Double Check Valve assemblies and Double Check Detector assemblies may only be used for Class 1-3 fire protection systems that do not contain any contaminants (at the discretion of the water provider to even allow). The customer or installer is cautioned to obtain prior approval from LUD before purchasing and installing double check valve and double check detector assemblies for each intended application.

PART 2. INSTALLATION REQUIREMENTS FOR DOUBLE CHECK AND DOUBLE CHECK DETECTOR ASSEMBLIES

A. A Double Check Detector Assembly (DCDA) must be in an accessible location with adequate space to facilitate maintenance and testing, and must be in accordance with the manufacturer's recommendations.

B. The DCDA must be located within 10 feet of the Post Indicator Valve (PIV), with the PIV being located on the inlet side of the DCDA, off the road right-of-way, and must be located within 100 feet of the water main unless otherwise approved. Except where a unit is located inside a heated building, the DCDA must be located in an approved, aboveground insulated box.

C. Only Class 52 Ductile Iron pipe may be installed from the tapping valve on the water main to the double check detector assembly.

D. No strainer is to be used in a fire line without LUD approval.

E. Pipelines shall be thoroughly flushed to remove foreign material and debris **BEFORE** installing the device.

F. All DCDA shall be installed in a horizontal position unless approved by LUD

and noted in the latest edition by the *Foundation for Cross-Connection and Hydraulic Research of the University of Southern California.*

G. The device should be adequately supported to prevent the assembly from sagging. Special supports are usually needed for 4-inch up to 10-inch diameter devices.

H. The lowest part of the device should be a minimum of 18 inches above the concrete base or maximum flood level, whichever is highest, in order to prevent any part of the assembly from becoming submerged.

I. In some instances, a Reduced Pressure Detector Assembly (RDPA) may be required. All regulations apply herewith. It is advised the customer obtain prior approval from the LUD for the device prior to purchase of one.

J. There shall be an approved backflow assembly on the bypass line.

K. The DCDA shall be installed prior to any branching and/or fire department connections (including the Siamese).

L. All fittings and fitting caps required for testing the device shall be installed on the device.

M. The bypass meter shall be purchased from LUD by the Owner or Developer. The bypass line on the assembly shall include a double check valve and shall be fitted to accept a ⅝" x ¾" water meter with male couplings on both ends and a laying length of 7¾". Only ⅝" x ¾" Hydrus 2.0 Ultrasonic meter with a plastic bottom is acceptable. If the assembly is purchased with a bypass water meter, the meter shall be as described above and calibrated to register in gallons.

N. Specifications and detailed drawings shall be submitted to and approved by LUD prior to installation of any device.

PART 3. ENCLOSURE SPECIFICATIONS

A. Backflow prevention devices subject to vandalism, potential freezing conditions, or other potential damage must be protected with an insulated enclosure. The following specifications shall be followed when an enclosure is used.

1. Access must be provided so LUD personnel may enter the enclosure when necessary.
2. Adequate space must be provided for the purpose of testing and repair to the assembly.

2.1 Units located in stationary enclosures should have at least two (2) feet clearance on each side of the assembly.

2.2 Units located in a constructed “hot box” enclosure should be a minimum of twelve (12) inches from all walls.

3. Provide and install manufactured backflow prevention assembly enclosure. The backflow prevention assembly enclosure manufacturer shall be a company specializing in the manufacture of backflow prevention assembly enclosures. Enclosures shall be assembled and mounted to a six (6) inch, wire reinforced, concrete pad (minimum 4,000 psi concrete) according to the manufacturer’s specifications.

4. If a heater is provided with the enclosure, the customer is responsible for the power feed to the enclosure and all costs related to recurring power bills.

END OF SECTION

PART 1. GENERAL

1.1 DESCRIPTION

A. This work shall consist of erosion control on all cut and fill operations, excavation, backfill, or other construction activities within the limits of the construction site, within any temporary or permanent easements, and within any borrow site used during the period of construction. The protection of these sites shall continue throughout the construction period. During flood seasons, protect the sites by sandbagging, the pumping of water, and any other means appropriate to restrain flooding of plant and equipment. During dry weather, sprinkle the sites with water or use other means as necessary to provide dust control. In case of abnormally cold weather, any construction such as excavation work may be delayed until warmer weather or covered to prevent freezing.

B. The temporary pollution control provisions contained herein shall be co-ordinated with the permanent erosion control features, to ensure economical, effective, and continuous erosion control throughout the construction and post-construction period.

PART 2. PRODUCTS

2.1 TEMPORARY BERMS

A. A temporary berm is constructed of compacted soil, with or without a shallow ditch, at the top of fill slopes or transverse to centerline on fills.

B. These berms are used temporarily at the top of newly constructed slopes to prevent excessive erosion until permanent controls are installed or slopes stabilized.

2.2 TEMPORARY SLOPE DRAINS: A temporary slope drain is a facility consisting of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half round pipe, metal pipe, plastic pipe, sod, or other material that may be used to carry water down slopes to reduce erosion.

2.3 SEDIMENT STRUCTURES: Sediment basins, ponds, and traps, are prepared storage areas constructed to trap and store sediment from erodible areas in order to protect properties and stream channels below the construction areas from excessive siltation.

2.4 CHECK DAMS

A. Check dams are barriers composed of large stones, sand bags, or other non-corrodible materials placed across or partially crossing a natural or constructed drainway.

2.5 TEMPORARY SEEDING AND MULCHING: Temporary seeding and mulching are measures consisting of seeding, mulching, fertilizing, and matting utilized to reduce erosion. All cut and fill slopes including waste sites and borrow pits shall be seeded when and where necessary to eliminate erosion.

2.6 BALED HAY OR STRAW CHECKS

A. Baled hay or straw erosion checks are temporary measures to control erosion and prevent siltation. Bales shall be either hay or straw containing 5 cubic feet or more of material.

B. Baled hay or straw checks shall be used where the existing ground slopes toward or away from the embankment along the toe of slopes, in ditches, or other areas where siltation erosion or water runoff is a problem.

2.7 TEMPORARY SILT FENCES: Silt fences are temporary measures utilizing woven wire or other approved material attached to posts with filter cloth composed of burlap, plastic filter fabric, etc., attached to the upstream side of the fence to retain the suspended silt particles in the runoff water.

PART 3. EXECUTION

3.1 PROJECT REVIEW: Prior to the Preconstruction Conference the Contractor shall meet with the governing storm water authority and go over in detail the expected problem areas in regard to the erosion control work. Different solutions should be discussed so that the best method might be determined. It is the basic responsibility of the Contractor to develop an erosion control plan acceptable to the governing stormwater authority. The approved plan is then to be incorporated into all permit requests and submitted by the Contractor to the appropriate regulatory agencies.

3.2 The project drawings show the minimum erosion and siltation control measures required for this job. If the Contractor desires to stockpile construction materials, stone, earth, etc., the location of same and protection thereof shall be outlined in an Erosion and Siltation Control Plan to be submitted to the governing storm water authority for review.

3.3 The Contractor shall submit a spill prevention plan to the governing stormwater authority for review. The contents of this spill prevention plan shall depend on what types of chemicals, lubricants and fuels will be used and if these will be stored on site. As a minimum, if no fuel or lubricants or other chemicals are stored on site, either temporarily in vehicular tanks or in skid or trailer mounted tanks, a plan shall be supplied which directs all employees of the Contractor in the proper procedures to be followed should a spill occur. For more complex chemical storage requirements, a more complex plan will be required.

3.4 PRECONSTRUCTION CONFERENCE: At the Preconstruction Conference, the Contractor shall submit for acceptance his schedule for accomplishment of temporary and permanent erosion control work, as are applicable for clearing and grubbing, grading, bridges, and other structures at watercourses, construction, and paving. He shall also submit for acceptance his proposed method of erosion control on haul roads and borrow pits and his plan for disposal of waste materials. No work shall be started until the erosion control schedules and methods of operations have been accepted by the governing storm water authority.

3.5 CONSTRUCTION REQUIREMENTS

A. The governing stormwater authority has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, the surface of erodible earth material exposed by excavation, borrow and fill operations, and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of adjacent streams or other watercourses, lakes, ponds, or other water impoundment. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and use of temporary mulches, mats seeding or other control devices or methods as necessary to control erosion. Cut and fill slopes shall be seeded and mulched as the excavation proceeds to the extent directed by the governing stormwater authority.

B. The Contractor shall be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in his accepted schedule. Temporary pollution control measures shall be used to correct conditions that develop during construction that were not foreseen during the preconstruction stage; that are needed prior to installation of permanent pollution control

features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project. Where erosion is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise erosion control measures may be required between successive construction stages. Under no conditions shall the surface area of erodible earth material exposed at one time by clearing and grubbing, exceed 750,000 square feet.

C. The governing stormwater authority may limit the area of excavation, borrow, and embankment operations in progress commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent pollution control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.

D. The governing stormwater authority may decrease the amount of surface area or erodible earth material to be exposed at one time by clearing and grubbing, excavation, borrow and fill operations as determined by his analysis of project conditions.

E. In the event of conflict between these requirements and pollution control laws, rules or regulations, or other Federal, State, or Local agencies, the more restrictive laws, rules, or regulations shall apply.

F. The contractor is solely responsible for providing and maintaining proper erosion control. Any liability that may arise from erosion control or lack thereof is totally the responsibility of the Contractor.

3.6 CONSTRUCTION OF STRUCTURES

A. Temporary Berms

1. A temporary berm shall be constructed of compacted soil, with a minimum width of 24 inches at the top and a minimum height of twelve (12) inches, with or without a shallow ditch, constructed at the top of fill slopes or transverse to centerline on fills. Temporary berms shall be graded so as to drain to a compacted outlet at a slope drain. The area adjacent to the temporary berm in the vicinity of the slope drain must be properly graded to enable this inlet to function efficiently and with only minimum ponding in this area. All transverse berms required on the downstream side of a slope drain shall extend

across the grade to the highest point at approximately a ten (10) degree angle with a perpendicular to centerline. The top width of these berms may be wider and the side slope flatter on transverse berms to allow equipment to pass over these berms with minimal disruptions. When practical and until final roadway elevations are approached, embankments should be constructed with a gradual slope to one side of the embankment to permit the placement of temporary berms and slope drains on only one side of the embankment.

B. Temporary Slope Drains

1. Temporary slope drains shall consist of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half round pipe, metal pipe, plastic pipe, flexible rubber, or other materials which can be used as temporary measures to carry water accumulating in the cuts and on the fills down the slopes prior to installation of permanent facilities or growth of adequate ground cover on the slopes.

2. Fiber matting and plastic sheeting shall not be used on slopes steeper than 4:1 except for short distances of 20 feet or less.

3. All temporary slope drains shall be adequately anchored to the slope to prevent disruption by the force of the water flowing in the drains. The base for temporary slope drains shall be compacted and concavely formed to channel the water or hold the slope drain in place. The inlet end shall be properly constructed to channel water into the temporary slope drain. Energy dissipators, sediment basins, or other approved devices shall be constructed at the discharge end of the slope drains to reduce erosion downstream. An ideal dissipator would be dumped rock or a small sediment basin which would slow the water as well as pick up some sediment. All temporary slope drains shall be removed when no longer necessary and the site restored to match the surroundings.

C. Sediment Structures

1. Sediment structures shall be utilized to control sediment at the foot of embankments where slope drains discharge; at the bottom as well as in the ditch lines atop waste sites; in the ditch lines or borrow pits. Sediment structures may be used in most drainage situations to prevent excessive siltation of pipe structures. All sediment structures shall be at least twice as long as they are wide.

2. When use of temporary sediment structures is to be discontinued, all sediment accumulation shall be removed, and all excavation

backfilled and properly compacted. The existing ground shall be restored to its natural or intended condition.

D. Check Dams

1. Check dams shall be utilized to retard stream flow or restrict stream flow within the channel. Materials utilized to construct check dams are varied and should be clearly illustrated or explained in the Contractor's erosion control plan.

2. All check dams shall be keyed into the sides and bottom of the channel. A design is not needed for check dams.

E. Temporary Seeding and Mulching: Seeding and mulching shall be performed in accordance with the Section 02485 Seeding.

F. Baled Hay or Straw Erosion Checks: Hay or straw erosion checks shall be embedded in the ground four (4) to six (6) inches to prevent water flowing under them. The bales shall also be anchored securely to the ground by wooden stakes driven through the bales into the ground. Bales can remain in place until they rot, or be removed after they have served their purpose, as determined by the governing stormwater authority. The Contractor shall keep the checks in good condition by replacing broken or damaged bales immediately after damage occurs. Normal debris cleanout will be considered routine maintenance.

G. Temporary Silt Fences

1. Temporary silt fences shall be placed on the natural ground, at the bottom of fill slopes, in ditches, or other areas where siltation is a problem. Silt fences are constructed of wire mesh fence with a covering of burlap or some other suitable material on the upper grade side of the fence and anchored into the soil.

2. The Contractor shall be required to maintain the silt fence in a satisfactory condition for the duration of the project or until its removal is requested by the governing stormwater authority. The silt accumulation at the fence may be left in place and seeded, removed, etc., as directed by the governing stormwater authority. The silt fence becomes the property of the Contractor whenever the fence is removed.

H. Under no circumstances will spent oil wastes be discharged anywhere on the site.

3.7 MAINTENANCE

A. The temporary erosion control features installed by the Contractor shall be acceptably maintained by the Contractor until no longer needed or permanent erosion control methods are installed. Any materials removed shall become the property of the Contractor.

3.8 EROSION CONTROL OUTSIDE PROJECT AREA: Temporary pollution control shall include construction work outside the project area where such work is necessary as a result of construction such as borrow pit operations, haul roads, and equipment storage sites.

END OF
SECTION

PART 1. GENERAL

1.1 The work called for by this section shall consist of clearing and grubbing, loosening, loading, removing, and disposing of, in the specified manner, all wet and dry materials (including rock) encountered that must be removed for construction purposes; furnishing, placing, and maintaining all sheeting, shoring, bracing, and timbering necessary for the proper protection and safety of the work; the workmen, the public, and adjacent property and improvements; the dewatering of trenches and other excavations; the preparation of satisfactory pipe beds; the backfilling and tamping of trenches, foundations, and other structures; the preparation of fills and embankments; the removal of unsuitable material from outside the normal limits of excavation and, where ordered by the District, their replacement with suitable materials; and all other grading or excavation work incidental to or necessary for the work. This work shall be performed as specified below.

PART 2. PRODUCTS

Not Used.

PART 3. EXECUTIONS

3.1 PREPARATION OF THE SITE

A. Before starting construction, remove from the work site all vegetable growth (except as hereinafter excluded), debris, and/or other objectionable matter as well as any buildings and/or other structures that the drawings and/or the DISTRICT specifically indicate are to be removed. Dispose of this refuse material in a manner acceptable to the DISTRICT.

B. In certain areas it may be desirable for existing trees, shrubs, or other vegetation on the site to be preserved for the permanent landscape. Such vegetation may be shown on the drawings, specifically listed in the specifications, marked on the site, or identified by the DISTRICT. In no case damage or remove such growth without written permission from the Owner.

C. If the area to be excavated is occupied by trees, brush, or other vegetable growth, clear such growth, grub the excavated area, and remove all large roots to a depth of not less than two (2) feet below the bottom of the proposed construction.

Dispose of the growth removed in a manner satisfactory to the District. Fill all holes or cavities created during this work that extend below the subgrade elevation with suitable material, and compact to the same density as the surrounding material.

D. Trees, cultivated shrubs, etc., that are situated within public rights-of-way and/or construction easements through private property but not directly within the excavation area shall remain undisturbed unless it is necessary to remove them so that the work can be performed safely. Take special precautions to protect and preserve such growth throughout all stages of the construction.

E. Preparation of the site shall be considered an integral part of the excavation and one for which no separate payment shall be allowed.

3.2 UNSUITABLE MATERIALS

A. Wherever muck, quicksand, soft clay, swampy ground, or other material unsuitable for foundations, subgrade, or backfilling is encountered, remove it and continue excavation until suitable material is encountered. The material removed shall be disposed of in the manner described below. Refill the areas excavated for this reason with one (1) inch to two (2) inch lifts of crushed stone up to the level of the lines, grades, and/or cross sections shown on the drawings. The top six (6) inches of this refill shall be No. 67 (TDOT) crushed stone for bedding.

3.3 ROCKS AND BOULDERS

A. Any material that is encountered within the limits of the required excavation that cannot be removed except by drilling and/or blasting, including rock, boulders, masonry, hard pan, chert, shale, street and sidewalk pavements, and/or similar materials, shall be considered as unclassified excavation, and no separate payment will be made therefore.

B. Should rock be encountered in the excavation, remove it by blasting or otherwise. Where blasts are made, cover the excavation with enough excavation material and/or timber or steel matting to prevent danger to life and property. The Contractor shall secure, at his own expense, all permits required by law for blasting operations and the additional hazard insurance required. Observe all applicable laws and ordinances pertaining to blasting operations.

C. Excavate rock over the horizontal limits of excavation and to a depth of not less than 6 inches below the bottom of pipe up to 30 inches in diameter

and not less than 12 inches below the bottom of larger pipes if rock extends to such depth. Then backfill the space below grade with No. 67 (TDOT) crushed stone or other approved material, tamp to the proper grade, and make ready for construction. For brick or monolithic concrete sewers and for structures, excavate rock to the outside bottom of the structure or sewer.

3.4 DISPOSAL OF MATERIALS

A. Whenever practicable, all materials removed by excavation that are suitable for backfilling pipe trenches or for other purposes shown on the drawings or directed by the NE shall be used for these purposes. Any materials not so used shall be considered waste materials and disposed of by the Contractor as specified below.

B. Waste materials may be deposited in spoil areas at locations approved by the District. Do not leave in unsightly piles but instead spread in uniform layers, neatly level, and shape to drain. Seed as specified in Section 02485, Seeding.

C. Once any part of the work is completed, properly dispose of all surplus or unused materials (including waste materials) left within the construction limits of that work. Leave the surface of the work in a neat and workman like condition, as described below.

D. The disposal of waste materials shall be considered an integral part of the excavation work and one for which no separate payment shall be allowed.

3.5 EXCAVATION FOR TRENCHES, MANHOLES, AND STRUCTURES

A. Unclassified excavation for pipelines shall consist of the excavation necessary for the construction of water, sewer, and other pipes and their appurtenances (including manholes, inlets, outlets, headwalls, collars, concrete saddles, and pipe protection) that are called for by the drawings. It shall include clearing and grubbing where necessary, backfilling and tamping pipe trenches and around structures, and disposing of waste materials, all of which shall conform to the applicable provisions set forth elsewhere in these specifications.

B. The Contractor may, if he chooses, use a motor-powered trenching machine. If he does, however, he shall be fully responsible for the preservation or repair of existing utility service connections.

C. Unless the construction of lines by tunneling, jacking, or boring is called for by the drawings or specifically authorized by the District , make excavation for pipelines in open cut and true to the lines and grades

shown on the drawings. Cut the banks of trenches between vertical parallel planes equidistant from the pipe centerline. The horizontal distance between the vertical planes (or, if sheeting is used, between the inside faces of that sheeting) shall vary with the size of the pipe to be installed, but shall not be less than the distance determined by the following formula: d + 24 inches, where "d" represents the internal diameter of the pipe in inches. The pipe shall be installed in the center of the trench. When approved in writing by the DISTRICT, the banks of trenches from the ground surface down to a depth not closer than 1 foot above the top of the pipe may be excavated to non-vertical and nonparallel planes, provided the excavation below that depth is made with vertical and parallel sides equidistant from the pipe centerline in accordance with the formula given above. Any cut made in excess of the formula d + 24 inches shall be at the expense of the Contractor and may be cause for the DISTRICT to require that stronger pipe and/or a higher class of bedding be used at no cost to the Owner.

D. For rigid pipe, shape the bottom of all trenches to provide uniform bearing for the bottom of the pipe barrel. For plastic sewer lines, provide a minimum of 6 inches of No. 67 (TDOT) crushed stone for bedding.

E. Excavate bell holes for bell and spigot pipe at proper intervals so that the barrel of the pipe will rest for its entire length upon the bottom of the trench. Bell holes shall be large enough to permit proper jointing of the pipe. Do not excavate bell holes more than two (2) joints ahead of pipe laying.

F. Excavation for manholes, inlets, and other incidental structures shall not be greater in horizontal area than that required to allow a two (2) foot clearance between the outer surface of the structure and the walls of the adjacent excavation or of the sheeting used to protect it. The bottom of the excavation shall be true to the required shape and elevation shown on the drawings. No earth backfilling will be permitted under manholes, inlets, headwalls, or similar structures. Should the Contractor excavate below the elevations shown or specified, he shall, at his own expense, fill the void with either concrete or granular material approved by the DISTRICT.

G. Do not excavate pipe trenches more than 200 feet ahead of the pipe laying, and perform all work so as to cause the least possible inconvenience to the public. Construct temporary bridges or crossings when and where the DISTRICT deems necessary to maintain vehicular or pedestrian traffic.

H. In all cases where materials are deposited along open trenches, place them so that in the event of rain no damage will result to the work and/or to adjacent property.

I. Excavation for other structures may be performed with non-vertical banks except beneath pavements or adjoining existing improvements. Do not permit the horizontal area of the excavation to exceed that required to allow a 2 foot clearance between the outer surface of the structure and the banks of the excavation or the sheeting used to protect the embankments. The bottom of the excavation shall be true to the required shape and elevation shown on the drawings.

3.6 SHEETING, SHORING, AND BRACING

A. Take special care to avoid damage wherever excavation is being done. Sufficiently sheet, shore, and brace the sides of all excavations to prevent slides, cave-ins, settlement, or movement of the banks and to maintain the specified trench widths. Use solid sheets inwet, saturated, or flowing ground. All sheeting, shoring, and bracing shall have enough strength and rigidity to withstand the pressures exerted, to keep the walls of the excavation properly in place, and to protect all persons and property from injury or damage. Separate payment will not be made for sheeting, shoring, and bracing, which are considered an incidental part of the excavation work.

B. Wherever employees may be exposed to moving ground or cave-ins, shore and lay back exposed earth excavation surfaces more than 5 feet high to a stable slope, or else provide some equivalent means of protection. Effectively protect trenches less than 5 feet deep when examination of the ground indicates hazardous ground movement may be expected. Guard the walls and faces of all excavations in which employees are exposed to danger from moving ground by a shoring system, sloping of the ground, or some equivalent protection.

C. Comply with all OSHA standards in determining where and in what manner sheeting, shoring, and bracing are to be done. The sheeting, shoring, and bracing system shall be designed by a professional engineer licensed in the State of Tennessee and shall be subject to approval by the DISTRICT. However, such approval does not relieve the Contractor of the sole responsibility for the safety of all employees, the effectiveness of the system, and any damages or injuries resulting from the lack or inadequacy of sheeting, shoring, and bracing.

D. Where excavations are made adjacent to existing buildings or structures or in paved streets or alleys, take particular care to sheet, shore, and brace the sides of the excavation so as to prevent any undermining of or settlement beneath such structures or pavement. Underpin adjacent structures wherever necessary, with the approval of the DISTRICT.

E. Do not leave sheeting, shoring, or bracing materials in place unless this is called for by the drawings, ordered by the DISTRICT, or deemed necessary or advisable for the safety or protection of the new or existing work or features. Remove these materials in such a manner that the new structure or any existing structures or property, whether public or private, will not be endangered or damaged and that cave-ins and slides are avoided.

F. Fill and compact all holes and voids left in the work by the removal of sheeting, shoring, or bracing as specified herein.

G. The Contractor may use a trench box, which is a pre-fabricated movable trench shield composed of steel plates welded to a heavy steel frame. The trench box shall be designed to provide protection equal to or greater than that of an appropriate shoring system.

3.7 THE DEWATERING OF EXCAVATION

A. Provide and keep in operation enough suitable pumping equipment whenever necessary or whenever directed to do so by the District. Give special attention to excavations for those structures that, prior to proper backfilling, are subject to flotation from hydrostatic uplift.

3.8 BORROW EXCAVATION

A. Whenever the backfill of excavated areas or the placement of embankments requires more material than is available from authorized excavations, or whenever the backfill material from such excavations is unsuitable, then obtain additional material from other sources. This may require the opening of borrow pits at points accessible to the work. In such cases, make suitable arrangements with the property owner and pay all incidental costs, including any royalties, for the use of the borrowed material. Before a borrow pit is opened, the quality and suitability of its material shall be approved by the District. All state and local regulations concerning borrow pits, drainage and erosion control shall be strictly followed.

B. Excavate borrow pits in such a way that the remaining surfaces and slopes are reasonably smooth and that adequate drainage is provided over the entire area. Construct drainage ditches wherever necessary to provide outlets for water to the nearest natural channel, thus preventing the formation of pools in the pit area.

C. Property clear and grub borrow pits, and remove all objectionable matter from the borrow pit material before placing it in the backfill.

D. The taking of materials from borrow pits for use in the construction of backfill, fills, or embankments shall be considered an incidental part of the work; no separate payment shall be made for this.

3.9 BACKFILLING

A. Begin backfilling after the line construction is completed and then inspected and approved by the DISTRICT. On each side of the line, from the bottom of barrel to eighteen (18) inches above the top of the pipe, the backfill material shall consist either of fine, loose earth like sandy soil or loam or of granular material that is free from clods, vegetable matter, debris, stone, and/or other objectionable materials and that has a size of no more than 2 inches. Place this backfill simultaneously on either side of the pipe in even layers that before compaction are no more than 6 inches deep. Thoroughly and completely tamp each layer into place before placing additional layers. If no material meeting these requirements is available onsite, the Contractor shall provide and import at no additional expense, suitable backfill material meeting these requirements. Backfill shall, at locations beneath or closely adjacent to pavement (driveways, streets and roadways), consist of No. 67 (TDOT) crushed stone.

B. If plastic water pipe is used, install No. 67 (TDOT) crushed stone in a 12 inch envelope on all sides of the pipe, then add the remaining backfill up to 1 foot above the top of the pipe as described in the previous paragraph.

C. From 1 foot above the pipe upward, the backfill material may contain broken stones that make up approximately 3/4 of the backfill's total volume. However, if this type of backfill is used, there must be enough spalls and earth materials to fill all voids completely. The maximum dimension of individual stones in such backfill shall not exceed 6 inches, and the backfill material shall be placed and spread in even layers not more than 12 inches deep. At locations beneath or closely adjacent to pavement or at locations of improvements subject to damage by displacement, tamp and thoroughly compact the backfill in layers that, before compaction, are 6 inches deep. In other areas, the backfill for the upper portion of the trenches may be placed without tamping but shall be compacted to a density equivalent to that of adjacent earth material as determined by laboratory tests. Use special care to prevent the operation of backfilling equipment from causing any damage to the pipe.

D. If earth material for backfill is, in the opinion of the DISTRICT, too dry to allow thorough compaction, then add enough water so that the backfill can be properly compacted. Do not place earth material that the DISTRICT considers too wet or otherwise unsuitable.

E. Wherever excavation has been made within easements across private property, the top 1 foot of backfill material shall consist of fine loose earth free from large clods, vegetable matter, debris, stone, and/or other objectionable materials.

F. Wherever trenches have been cut across or along existing pavement, temporarily pave the backfill of such trenches by placing Class A, Grade D, crushed stone as the top 12 inches of the backfill. Maintain this temporary pavement either until the permanent pavement is restored. On heavily traveled roadways, cold mix or leveling course binder 2 inches thick shall be installed and maintained until permanent pavement is installed.

G. Conduct backfilling around manholes, inlets, outfalls, and/or structures in the same manner as specified above for pipelines except that even greater care is necessary to prevent damage to the utility structure.

H. Wherever pipes have diameters of 15 inches or less, do not use power operated tampers to tamp that portion of the backfill around the pipe within 1 foot above the pipe.

I. Perform backfilling so as not to disturb or injure any pipe and/or structure against which the backfill is being placed. If any pipe or structure is damaged and/or displaced during backfilling, open up the backfill and make whatever repairs are necessary, whenever directed to do so by the DISTRICT.

J. Backfilling and clean-up operations shall closely follow pipe laying; failure to comply with this provision will result in the DISTRICT's requiring that the Contractor's other activities be suspended until backfilling and clean-up operations catch up with pipe laying.

K. Compaction Requirements: Unless specified otherwise elsewhere, under buildings and 2 times the depth of pipe beyond, and under roads and 2 times the depth beyond the shoulder, compact to 95% maximum density in accordance with ASTM C698. In all other locations, compact to 90% maximum density.

3.10 MAINTENANCE

A. Seed and maintain in good condition all excavated areas, trenches, fills, embankments, and channels until final acceptance by the Owner.

B. Maintain trench backfill at the approximate level of the original ground surface by periodically adding backfill material wherever necessary and whenever directed to do so by the DISTRICT. Continue such maintenance until final acceptance of the project, or until the DISTRICT issues a written release.

3.11 SLOPES

A. Neatly trim all open cut slopes, and finish to conform either with the slope lines shown on the drawings or the directions of the DISTRICT. Leave the finished surfaces of bottom and sides in reasonably smooth and uniform planes like those normally obtainable with hand tools, though the Contractor will not be required to use hand methods if he is able to obtain the required degree of evenness with mechanical equipment. Conduct grading operations so that material is not removed or loosened beyond the required slope.

END OF SECTION

PART 1. GENERAL

1.1 This work shall be performed in all disturbed areas not receiving such site improvements as buildings, roads, walks, sod, planting, etc., and shall include, but not necessarily be limited to, all seed bed preparation; the supplying and placing of soil additives, seed, and mulch wherever required by the drawings or directed by the DISTRICT; and maintenance.

1.2 Unless otherwise approved inwriting by the DISTRICT, seeding operations shall be limited to the following planting periods:

A. Spring - March 1 through May 30
B. Fall - August 15 through October 31

1.3 Refer to other sections for items affecting seeding. Coordinate this work with that specified by other sections for timely execution.

PART 2. PRODUCTS

2.1 GRASS SEED: Kentucky 31 Fescue (Festuca elatior) and/or annual rye meeting the requirements of the State Department of Agriculture and furnished in new bags or bags that are sound and not mended; no "below standard" seed will be accepted.

2.2 FERTILIZER: commercially manufactured; Grade 10-10-10; furnished in standard containers that are clearly marked with the name, weight, and guaranteed analysis of the contents and that ensure proper protection in transportation and handling; and in compliance with all local, state, and federal fertilizer laws.

2.3 AGRICULTURAL LIMESTONE: containing a minimum of 85% calcium carbonate and magnesium carbonate combined, 85% of which passes a No. 10 mesh sieve.

2.4 MULCH: stalks of rye, oats, wheat, or other approved grain crops properly cured prior to bailing, air dried, and reasonably free of noxious weeds and weed seeds or other material detrimental to plant growth.

PART 3. EXECUTION

3.1 Perform all seeding and related work as a continuous operation. Sow seed as soon as the seed bed has been prepared, and perform subsequent work in a continuous manner.

3.2 Before beginning seeding operations in any area, complete the placing of topsoil and final grading, and have the work approved by the DISTRICT.

3.3 Scarify, disk, harrow, rake, or otherwise work each area to be seeded until the soil has been loosened and pulverized to a depth of not less than 2 inches. Perform this work only when the soil is in a tillable and workable condition.

3.4 Apply fertilizer and agricultural limestone uniformly over the seed bed, and lightly harrow, rake, or otherwise incorporate them into the soil for a depth of approximately 1 inch at the following rates:

Fertilizer: 15 pounds per 1,000 square feet
Agricultural Limestone: 40 pounds per 1,000 square feet

3.5 Sow seed uniformly with a rotary seeder, wheelbarrow seeder, hydraulic equipment or by other satisfactory means.

3.6 The seeding rate shall be 5 pounds per 1,000 square feet for Kentucky 31 Fescue (Festuca elatior).

3.7 When seeding during March 1 through April 1 and October 1through November 20, add an additional 3 pounds per 1,000 square feet of annual rye grass.

3.8 Perform no seeding during windy weather or when the ground surface is frozen, wet, or otherwise untillable.

3.9 Spread mulch material evenly over the seeded areas immediately following the seeding operation. Mulch Rate: 2 bales (100 pound minimum) per 1,000 square feet

3.10 The mulch rate may be varied by the DISTRICT, depending on the texture and condition of the mulch material and the characteristics of the area seeded. Cover all portions of the seeded areas with a uniform layer of mulch so that approximately 25% of the ground is visible.

3.11 No equipment, material storage, construction traffic, etc., will be permitted on newly seeded ground.

3.12 Dispose of all surplus materials as directed by the District.

PART 4. INSPECTIONS

The District shall inspect the seeding within 60 days after planting and determine if it is acceptable.

PART 5. GUARANTEE

5.1 Secure an acceptable growth of grass in all areas designated for seeding.

5.2 An area is considered acceptable if it is represented by a minimum of 100 seedlings per square foot of the permanent species of grass representative of the seed mixture. If an acceptable growth is not obtained on the first planting, reseeding and re-mulching will be required.

5.3 If the planting is less than 50% successful, rework the ground, re-fertilize, reseed, and re-mulch.

END OF SECTION

PART 1. GENERAL

1.1 This work shall include all soil preparation and the storage, transportation, placing, and maintenance of sod at all locations having a slope greater than or equal to 3.1 to 1 or as directed by the District.

1.2 Temporary storage of sod is permitted, however, take care to maintain the sod in a live, growing condition. Sod shall be rejected if it is permitted to decay or dry out to the extent that, in the judgment of the District, its survival is doubtful. Dispose of rejected sod as directed by the District at no expense to the Owner.

1.3 Set sod between March 1 and October 15 and when the soil is in a workable condition.

1.4 Do not set sod out of season unless soil conditions are favorable and written permission is obtained from the DISTRICT.

1.5 Refer to other sections for items affecting sodding. Coordinate this work with that specified by other sections for timely execution. The Contractor shall be wholly responsible for the scheduling, ordering, receiving, storing and installing of all sodding materials.

PART 2. PRODUCTS

2.1 SOD: Kentucky 31 Fescue (Festuca Elatior); new sod consisting of live, dense, well rooted growth; well suited for the intended purpose and soil conditions; completely free of noxious weeds and grasses (Bermuda grass, quack grass, Johnson grass, Canada thistle); and containing less than five (5) plants of objectionable weeds per 100 square feet if nursery grown or ten (10) such plants if field grown.

2.2 FERTILIZER: commercially manufactured, Grade 10-10-1O; furnished in standard containers that are clearly marked with the name, weight, and guaranteed analysis of the contents and that ensure proper protection in transportation and handling; and in compliance with all local, state and federal fertilizer laws.

2.3 AGRICULTURAL LIMESTONE: containing a minimum of 85% calcium carbonate and magnesium carbonate combined; 85% of which passes a No. 10 mesh sieve.

PART 3. EXECUTION

3.1 Before beginning sodding operations in any area, complete the placing of topsoil and final grading, and have the work approved by the NE.

3.2 Scarify each area to be sodded a minimum of two (2) inches.

3.3 Apply fertilizer and agricultural limestone uniformly over the sod bed at the rates shown below. Immediately prior to placing sod, water the sod bed until it is saturated to a depth of one (1) inch, and keep it moist until the sod is placed.

Fertilizer: 15 pounds per 1,000 square feet of 10-10-10
Agricultural Limestone: 40 pounds per 1,000 square feet

3.4 Place sod as soon as practical after its removal from point of origin. Keep it moist while displaced.

3.5 Place sod by hand so that the edges are in close contact and in a position to break joints with the long dimension perpendicular to the slope. Fit and pound the sod into place with a ten (10) inch by ten (10) inch wood tamp or other similar implements.

3.6 Immediately after placing the sod, thoroughly wet and roll it.

3.7 Two weeks after the sod is installed, top dress and thoroughly water it. Top dressing shall consist of the following:

1/2 to 1 pound: 38% urea formaldehyde per 1,000 square
feet 20 pounds: 6-12-12 per 1,000 square feet

3.8 No equipment, material storage, construction traffic, etc., will be permitted on newly sodded areas.

3.9 Dispose of all surplus material as directed by the District.

3.10 The District will review the sod for acceptance 30 days after installation, at which time the maintenance period will begin as stated in these specifications. This acceptance by the District is for the purposes of payment only.

PART 4. INSPECTIONS

The DISTRICT shall inspect the sod within 30 days after installation and determine if it is acceptable.

PART 5. GUARANTEES

Establish an acceptable growth of the specified sod on all areas indicated on the drawings or as directed by the DISTRICT. An area is considered acceptable if the majority of each piece of sod is alive and healthy and generally free from weeds, insects and disease.

END OF SECTION

PART 1. GENERAL

1.1 The work specified by this section shall consist of repairing or replacing all damaged pavement, whether public or private caused by installation of water lines. Dirt shoulders, roads, streets, drives, and walks are to be restored to their original condition as an incidental part of the installation of utilities. Repair damaged base on either side of a trench wherever necessary. Trim the oxidation surface to neat lines outside of the trench wall, and repave the entire area as specified below and as shown on the drawings or on the standard drawings.

1.2 Both these specifications and the drawings make reference to the current edition of the standard specifications of the Tennessee Department of Transportation (TDOT). Even though the weather limitations, construction methods, and materials specifications contained in the TDOT specifications may not be explicitly repeated in these specifications, they shall, wherever applicable to the work called for by this section, be considered as implied and therefore adhered to. However, the various subsections "Basis for Payment" contained in the TDOT specifications shall not be considered applicable.

A. Refer to other sections for work related to that covered by this section.

PART 2. PRODUCTS

2.1 MINERAL AGGREGATE BASE: Class A, Grading D crushed stone (TOOT specifications, Section 303, subsection 903.05)

2.2 BITUMINOUS PRIME COATS: cutback asphalt, Grade RC-250, or emulsified asphalt, Grade AE-P (Section 402, Subsections 904.02 and 904.03)

2.3 CRUSHED STONE CHIPS: Size 6 or Size 7 (Subsection 903.14)

2.4 DOUBLE BITUMINOUS SURFACE: for both courses, either cutback asphalt, Grade RC-800 or RC-3000, or emulsified asphalt, Grade RS-2 (Subsections 904.02 and 904.03)

2.5 ASPHALTIC CONCRETE BINDER: Grading Bor C, as directed by the AJE (Section 307)

2.6 BITUMINOUS TACK COAT: Grade AE-3 (Section 403, Subsection 904.03)

2.7 ASPHALTIC CONCRETE SURFACE: Grading E (Section 411)

2.8 QUICK DRY TRAFFIC MARKING PAINT (WHITE AND YELLOW): Subsection 910.05.

PART 3. EXECUTION

3.1 SUBGRADE

A. Before any base material is installed, compact the subgrade of the area to be paved to 95% of optimum density as determined by ASTM D698 (Standard Proctor).

B. The backfill material shall contain no topsoil or organic matter. For all areas where subgrade has been prepared, test for uniformity of support by driving a loaded dump truck at a speed of 2 to 3 mph over the entire surface. Make further improvements on all areas that show a deflection of 1 inch or more. When completed, the finished subgrade shall be hard, smooth, stable, and constructed in reasonably close conformance with the lines and grades that existed prior to beginning construction.

C. When a base course is compacted, cut back the surface course of the existing pavement a minimum of 1 foot beyond the limit of the joint between the old and new base course or as shown on the standard drawings. Take special care to ensure good compaction of the new base course at the joint. Apply and compact the surface to conform to the existing pavement so that it will have no surface irregularity.

3.2 BASE

A. Install a mineral aggregate base of the type specified above in accordance with Section 303 of the TDOT specifications. The maximum compacted thickness of any one layer shall be 6 inches and the total thickness of the base shall be that indicated by the standard drawings or as shown on the plans.

3.3 SEAL COAT SURFACE

A. Uniformly apply a bituminous prime coat of either emulsified asphalt, Grade AE-P, or cutback asphalt, Grade RC-250, over the entire width of the area to be surfaced at a rate of 0.3 gallon per square yard. Immediately after application, uniformly cover the entire area with Size 7 crushed stone chips at a rate of 12 pounds per square yard.

3.4 DOUBLE BITUMINOUS SURFACE

A. Apply the first course at a rate of 0.38 to 0.42 gallon per square yard with either emulsified asphalt, Grade RS-2, or cutback asphalt, Grade RC-800 or RC-3000, and then immediately cover with Size 6 crushed stone chips at a rate of 33 to 37 pounds per square yard. After this is rolled, apply the second course at a rate of 0.30 to 0.35 gallon per square yard, and at once uniformly cover with Size 7 chips at a rate of 20 to 25 pounds per square yard. Then roll the entire area.

B. After the application of the cove aggregate, lightly broom or otherwise maintain the surface for a period of 4 days, or as directed by the DISTRICT. Maintenance of the surface shall include the distribution of cover aggregate over the surface to absorb any free bitumen and cover any areas deficient in aggregate. Sweep excess material from the entire surface with rotary brooms. Sweep the surface at the time determined by the DISTRICT.

3.5 ASPHALTIC CONCRETE BINDER

A. Apply a bituminous prime coat of emulsified asphalt, Grade AE-P, or cutback asphalt, Grade RC-250, at a rate of 0.38 to 0.42 gallon per square yard. Take care to prevent the bituminous material's splashing on exposed faces of curbs and gutters, walls, walks, trees, etc; if such splashing does occur, remove it immediately. After the prime coat has been properly cured, apply an asphaltic concrete binder to the thickness shown on the standard drawings or the plans.

B. Carefully place the material to avoid segregation of the mix. Broadcasting of the material will not be permitted. Remove any lumps that do not readily break down.

3.6 ASPHALTIC CONCRETE SURFACE

A. If the asphaltic concrete surface course is to be placed directly on the mineral aggregate base, place a bituminous prime coat as described above. If, however, the surface course is to be placed on a binder course, then apply a bituminous tack coat of the sort specified above under PRODUCTS at a rate of 0.05 to 0.10 gallon per square yard. Take care to prevent the bituminous material's splashing on exposed faces of curbs, gutters, walls, walks, trees, etc.; if such splashing does occur, remove it immediately. After the prime or tack coat has been properly cured, apply the asphaltic concrete to the thickness shown of the drawings or standard drawings.

Apply the surface course as described above for the binder course.

3.7 SMOOTHNESS

A. The finished surfaces shall conform to the lines and grades that existed prior to construction. No deviations, variations, or irregularities exceeding 1/4 inch in any direction when tested with a 12 foot straightedge will be permitted in the finished work, nor will any depressions that will not drain. Correct all such defects.

3.8 SAMPLING AND TESTING

A. Submit to the District test reports made by an independent testing laboratory on the crushed stone aggregate, bituminous materials, and asphaltic concrete design mixes, and obtain his approval of these reports before starting paving operations.

B. Tests shall be made of the completed elements of the pavement to ascertain the compacted thickness of the base and surface courses. If sections with deficient thicknesses are found, the full section for a reasonable distance on each side of the deficiency shall be refused. Remove and reinstall all such sections. Patch all test holes in connection with thickness tests.

C. When making surface tests, furnish one man to mark all surface defects for corrections.

END OF SECTION

PART 1. GENERAL

1.1 Refer to other sections for work related to that specified under this heading.

PART 2. PRODUCTS

2.1 VALVES & VALVE BOXES

A. Valves on water lines twelve (12) inches and smaller shall be resilient seat, ductile iron body. All gate valves shall be in accordance with or exceed AWWA C509. Working pressure shall be 250 psi.

B. Valves shall be supplied with 0-ring seal stuffing boxes and shall open to the left utilizing a non-rising stem. The valve body, bonnet and bonnet cover shall be fully coated with fusion bonded epoxy to a minimum thickness of 8 mils. Gate valves twelve inches and smaller shall be Mueller, American Flow Control, or M & H, or equal, with mechanical joints ends. Threaded ends are acceptable for 2-inch gate valves.

C. All valve box castings shall be made accurately to the required dimensions, and shall be sound, smooth, clean and free from blisters and other defects. Defective casting which have been plugged or otherwise treated to remedy defects shall be rejected. Contact surfaces of frames and covers shall be machined so that the covers rest securely in the frames with no rocking and with the cover in contact with the frames for the entire perimeter of the contact surface. All castings shall be thoroughly cleaned subsequent to machining and before rusting begins, painted with a bituminous coating so as to present a smooth finish, tough and tenacious when cold, but not tacky with no tendency to scale. Install valve boxes on each proposed valve in accordance with the details shown on the standard drawings. The cover of the valve box shall read “WATER”.

2.2 TAPPING SLEEVES AND VALVES

A. Tapping sleeves for use in tapping DIP lines shall be stainless steel, full circle sleeves, Romac Industries Style SST III or equal. The outlet flange dimensions and drilling shall comply with ASNI B16.1, Class 125 and MSS SP-60.

B. Tapping valves for use in tapping cast iron or ductile iron water lines shall be flanged by mechanical joint valves meeting or exceeding all applicable

requirements of ANSI/AWWA Standard C500. The inlet flange shall comply with ANSI B16.1, Class 125 drilling and with MSS SP-60. The mechanical joint outlet shall comply with ANSI/AWWA Standard C111. The valves shall be of the double disc, parallel seat type with a non-rising stem and a 2" square operating nut. Valves shall be Mueller H-667 or equal.

2.3 INSERTION VALVE

A. Insertion valve shall be 304 stainless steel for the body, flange, mounting components, valve stem, and hardware. The Hydra-Stop Insta-Valve 250 shall be used or equal. The IV 250 valve cartridge and completion plug shall be reinforced composite polymer. The bonnet shall be epoxy-coated carbon steel, and sealing components shall be BUNA-N rubber or EPDM

B. Insertion valve shall meet NSF/ANSI Standard 61 and 372 for drinking water safety and undergo factory pressure testing to 250 psi working pressure and 375 psi test pressure. Welds shall be fully passivated for corrosion resistance.

2.4 BLOW-OFF HYDRANTS

A. Blow-off hydrants shall be post type standard fire hydrants, M&H Style 33, with 2-1/8 inch valve opening and one 2-1/2 inch hose nozzle, appropriate bury depth, and a with 3 inch mechanical joint shoe. Hose nozzle threads, operating nut, and cap shall conform to local government standards. Install a gate valve of the size indicated on the plans ahead of each blow-off hydrant.

2.5 FIRE HYDRANTS

A. Fire hydrants shall comply in all respects with AWWA C502 and shall be of the compression type, with the main valve opening against the pressure and closing with the pressure. The main valve opening shall be not less than 4-1/2 inches in diameter. The main valve facing of the hydrant shall be made of balata or similar material especially suited and proven for the service intended. The bottom stem threads of the main valve rod shall be fitted with an acorn nut or suitable means for sealing the threads away from the water. Hydrants shall be connected to the main by a 6 inch mechanical joint shoe, unless otherwise shown on the drawings, and fitted with strapping lugs. Two 2-1/2 inch hoses and one 4-1/2 inch steamer nipple shall be threaded and screwed into the nozzle section and then pinned to prevent turning.

B. Operating nut shall be provided with convenient means to afford lubrication to ensure ease of operation and the prevention of wear and corrosion.

C. Hydrant shall be the dry barrel type, and hydrant shoe shall have two positive acting noncorrodible drain valves that drain the hydrant completely by opening as soon as the main valve is closed and by closing tightly when the

main valve is open. Drain valves operated by springs or gravity will not be acceptable.

D. The packing gland located in the bonnet shall be solid bronze, and gland bolts shall be steel with bronze nuts. A double 0-ring seal may be used in lieu of conventional stuffing box.

E. The hydrant shall open by being turned to the left and be so marked on the bonnet in cast letters with an arrow.

F. Threads on hose and steamer nipples, operating nut, and cap nuts shall conform to local Water Department standards.

G. Bury shall be as required for the installation, with the depth being measured from grade line to bottom of trench or connecting pipe.

H. Hydrants shall be 4 1/2" M&H™ Model 129 and painted yellow from the factory unless otherwise specified on the drawings. In addition, Bonnets shall be colored according to the engineer's color code list.

I. Any hydrant extensions that are required for grade adjustment of the fire hydrant assembly must be factory-furnished M&H™ parts. No aftermarket extensions will be approved.

PART 3. EXECUTION

3.1 SETTING VALVES AND FITTINGS

A. General

1. Set valves, fittings, plugs, and caps and joint to pipe in the manner heretofore specified for cleaning, laying, and jointing pipe.

2. All valves and fittings shall be restrained by Romac Grip Ring, Mega-lug™, Sigma or, Ford UFR1500SA, UFR1400DA, or equal. See Water Lines for specifications regarding mechanical restraint devices.

3. Valves deeper than 36 inches shall be provided with valve nut extensions with set screws.

4. Each new completed hydrant shall have the bonnet painted the color of flow capability with TNEMEC Hi-Build TNEME-Gloss alkyd paint from the factory. Contractor is responsible to ensure that existing hydrants required must be painted with TNEMEC Hi-Build TNEME-Gloss alkyd paint.

B. Location of Valves

1. Valves in water mains shall, where possible, be located on the street property lines extended unless otherwise shown on the drawings.

C. Valve Boxes

1. Provide a valve box for every valve.

2. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the wrench nut of the valve, with the box cover flush with the surface of the finished pavement or such other level as may be directed by the DISTRICT.

3.2 SETTING HYDRANTS

A. Location

1. Locate hydrants as shown on the drawings or as directed by the DISTRICT and in a manner that will provide complete accessibility and also minimize the possibility of damage from vehicles or injury to pedestrians.

B. Position

1. All hydrants shall stand plumb. Set hydrants to the established grade, with center of steamer nozzle at least 12 inches above the finished grade, as shown on the drawings or as directed by the DISTRICT. In no circumstance shall more than one (1) hydrant adjustment device be allowed to be installed on a new hydrant installation to achieve proper ground clearance.

C. Connection to Main

1. Connect each hydrant to the main with a 6-inch ductile iron anchor tee, and a 6-inch gate valve. The hydrant shoe and the valve shall be connected with an anchor coupling. In the event the hydrant has to be placed further from the valve than allowed by a coupling, the hydrant shall be rodded to the gate valve with a minimum of 3 anchor rods.

D. Hydrant Drainage

1. Provide drainage at the base of the hydrant by placing coarse gravel or crushed stone from the bottom of the trench to at least 6 inches above the waste opening in the hydrant to a distance of 1 foot around the elbow. Connect no drainage system to a sewer.

E. Anchorage for Hydrants

1. If using an anchor coupling, brace the bowl of each hydrant well against unexcavated earth at the end of the trench with concrete blocking.
2. Anchor Couplings - Tyler Union D132 will be used between the gate valve and tee, and the gate valve and the fire hydrant.
3. Ford Uni-Flange - Use Ford Uni-Flange series 1400 for all ductile iron pipe. The Developer shall use the Uni-Flange unless the conditions do not allow.

END OF SECTION

PART 1. GENERAL

1.1 Contractor shall be responsible for safely storing materials needed for the work that have been accepted by him until they have been incorporated into the completed project. Keep the interiors of all pipes, fittings, and other accessories free from dirt and foreign matter at all times.

1.2 Wherever reaction blocking is necessary, it shall be considered an integral part of the water line work, and no separate payment shall be made for it.

1.3 All new pipe shall be ductile iron. PVC pipe will only be allowed for repair or connection to existing PVC water lines.

PART 2. PRODUCTS

2.1 DUCTILE IRON PIPE AND FITTINGS

A. Ductile cast iron pipe shall be made of good quality ductile iron that meets the requirements for nodular iron castings of ASTM E8. It shall be plain end ductile iron pipe with push-on, single gasket joints. The design thickness shall be that specified by ANSI A21.50/AWWA C150 except that all pipe with a diameter of 12 inches or less shall have a wall thickness of Class 52 and all pipe with a diameter of 14 inches or more shall have a thickness of Class 51 unless otherwise specified on the drawings.

B. Ductile iron pipe shall be centrifugally cast in metal or sand-lined molds and shall conform to the specifications of ANSI A21.51/AWWA C151. It shall be made and tested in accordance with ASTM A339 and shall be subjected to and able to withstand a hydrostatic pressure of 500 psi. The maximum depth of pits shall be half that allowed in the AWWA specifications.

C. The length of each individual piece of ductile iron pipe shipped must be plainly marked on that piece of pipe.

D. The push-on, single gasket joints shall be either Fastite (manufactured by American Cast Iron Pipe Company), Tyton (U. S. Pipe and Foundry Company), Super Bell-Tite (Clow Corporation), or other joints of similar type and equal quality. They shall be UL approved and able to withstand 200 psi of operating pressure. Pipe shall be furnished in lengths of 18’ to 20’.

E. Where noted on the drawings, restrained joint pipe may be accomplished by the use of gripper-style restraint gaskets. Gripper style restraint gaskets shall be Fast-Grip™ by American Cast Iron Pipe Co., Field-Lok 350™by US Pipe Co., Sure Stop 350™ by McWane Pipe Co., or approved equal.

F. The bell of each pipe shall have a tapered annular opening and a cast or machined retaining groove for the gasket. The gasket groove shall have a flared design so that maximum deflection will be provided. The plain spigot end of the pipe shall be beveled in order to simplify its entry into and centering within the bell and the compression of the gasket.

G. The gasket shall be of high quality vulcanized rubber made in the form of a solid ring to exact dimensions. The design of the gasket groove in the bell of the pipe and the design, hardness, and other properties of the gasket itself shall be such that the joint is liquid tight for all pressures from a vacuum to a maximum rating of 350 psi of internal liquid pressure.

H. Enough lubricant shall be furnished with each order to provide a thin coat on the spigot end of each pipe. This lubricant shall be approved for being in contact with potable water and shall be nontoxic, impart no taste or smell to the water, and have no harmful effect on the rubber gasket. It shall have a consistency that will allow it to be easily applied to the pipe in either hot or cold weather and that will enable it to adhere to either wet or dry pipe. In no case shall lubricant other than that supplied by the pipe manufacturer be used.

I. Standard and special fittings shall be ductile iron. Use compact mechanical joint fittings. All fittings shall conform to the specifications of ANSI A21.10/AWWA C153.

J. Pipe and fittings shall be lined with enameline or a thin cement lining as specified in ANSI A21.4/AWWA C104. In addition, a bituminous seal coat or asphalt emulsion spray coat approximately 1 mil thick shall be applied to the cement lining in accordance with the pipe manufacturer's standard practices.

K. Fitting laying lengths shall conform to ANSI A21.10/AWWA C153, compact body.

L. Fittings shall be in accordance with the standard mechanical joint fittings manufactured by the U.S. Pipe and Foundry Company, American Cast Iron Pipe Company, Clow Corporation, or equal.

M. The pipe manufacturer is to furnish the DISTRICT a certificate of inspection, sworn to by the factory inspector in the presence of a notary public, stating that the pieces of pipe in the shipment were made and tested in accordance with ANSI A21.51 and that they were subjected to and with-stood a hydrostatic pressure of 500 psi. Each statement is to give the number of pieces of pipe in the shipment, the length of each piece of pipe, and the serial number of each piece of pipe making up the shipment. In addition, the weight of each individual piece of pipe making up the shipment is to be listed opposite the serial number of each pipe length and attached to the certificate of inspection.

N. Where noted on the drawings, polyethylene film shall be furnished and installed with ductile iron pipe. PE films shall be either linear low-density polyethylene film with an 8-mil minimum thickness or high-density, cross-laminated polyethylene film with a 4-mil minimum thickness meeting the requirements of ANSI/AWWA C105/A21.5; minimum film thickness and material size (LLDPE or HDCLPE); applicable range of nominal pipe diameter size; and labeling stating "*Warning-Corrosion Protection-Repair Any Damage".*

PART 3. EXECUTION

3.1 INSTALLATION OF WATER LINES

A. Lay water lines to and maintain at the lines and grades required by the drawings. All fittings, valves, and hydrants shall be at the required locations, the spigots centered in the bells, and all valves and hydrant stems plumb.

B. Unless otherwise indicated by the drawings, all water pipes shall have at least thirty-six (36) inches of cover. No departure from this policy shall be made except with the approval of the DISTRICT.

C. Provide and use tools and facilities that are satisfactory to the DISTRICT and that will allow the work to be done in a safe and convenient manner. All pipe, fittings, valves, and hydrants are to be unloaded from the trucks using suitable tools and equipment. Use a derrick, ropes, or other suitable tools or equipment to lower all pipe, fittings, valves, and hydrants into the trench one piece at a time. Lower each piece carefully so that neither it nor any protective coating or lining it may have will be damaged. Under no circumstances drop or dump water line materials into the trench.

D. Any pipes strung out along the route of the proposed lines before the actual installation of those lines is due to take place shall not be lowered into the trench until they have been swabbed to remove any mud, debris, etc., that may have accumulated within them. Remove all unnecessary

material from the bell and spigot end of each pipe. Before any pipe is laid, brush and wipe clean the outside of its spigot end and the inside of its bell, and leave dry and oil-free.

E. Take every precaution to keep foreign material from getting into the pipe while it is being placed in the line. If the crew laying the pipe cannot put it into the trench and in place without allowing earth to get inside, then put a heavy, tightly woven canvas bag of suitable size over each end of the pipe, and leave in place until it is time to connect that pipe to the one adjacent to it.

F. Place no debris, tools, clothing, or other materials in the pipe during laying operations.

G. After a length of pipe has been placed in the trench, center the spigot end in the bell of the adjacent pipe, and then insert to the depth specified by the manufacturer and bring to the correct line and grade. Secure the pipe in place by tamping an approved backfill material around it.

H. Bell holes shall be big enough so that there is ample room for the pipe joints to be properly made. Between bell holes, carefully grade the bottom of the trench so that each pipe barrel will rest on a solid foundation for its entire length.

I. Restraining of Pipe, Valves and Fittings

1. All fittings and valves shall be installed using mechanical restraint devices. All fittings including tapping tees shall be installed with a concrete restraint thrust device poured for each fitting and matching the requirements of the standard details for concrete thrust blocks. Dead end lines shall be restrained with a concrete reverse thrust block matching the requirements of the standard details for concrete thrust blocking matching the requirements of the standard details for reverse concrete thrust blocks. Restraint gaskets placed in pipe joints may be used in circumstances where directed and approved by the DISTRICT but do not eliminate the need for concrete thrust blocks. Vertical oriented fittings shall be restrained with stainless steel rods and clamps or by other means as directed by the DISTRICT.
2. Prior to pouring concrete for thrust blocks, all loose material and trash shall be removed from the excavated areas, forming to be in place with either forms or sandbags matching the standard thrust block dimensions and the excavation shall be free from standing water and mud. Plastic sheeting shall be placed in a manner to protect the glands and bolts from being covered or embedded in the concrete. The DISTRICT shall review all thrust block forms prior to placement of concrete.
3. Concrete pours shall occur at temperatures above freezing (32^0F). Thrust blocks shall be poured using 4,000 psi f_c concrete. Concrete

slump should be in the 4”-5” slump range. Slumps greater than 5 inches are not permitted. Se of bagged. Pre-manufactured concrete mix (Sak-crete™) placed directly in the excavation in bagged form without mixing for use as a thrust block is not allowed. Bagged, pre-manufacturer concrete is permissible if mixed onsite in a mixer and poured into the thrust block form area.

4. Concrete thrust blocks shall be poured and have at least seven (7) days of cure time prior to testing of new water lines.

J. Whenever pipe laying is not in progress, close the open ends of pipe either with a watertight plug or by other means approved by the DISTRICT. If the joints of any pipe in the trench cannot be completed until a later time, caulk them with packing in order to make them as watertight as possible; this shall be done not only at the end of each working day but also before work is stopped for lunch periods, bad weather, or any other reason. If there is water in a trench, leave this seal in place until the trench has been pumped completely dry.

K. Cut pipe so that valves, fittings, or closure pieces can be inserted in a neat and workmanlike manner and without any damage to the pipe. Follow the manufacturer's recommendations concerning how to cut and machine the ends of the pipe in order to leave a smooth end at right angles to the pipe's axis.

L. Lay pipe with the bell ends facing in the direction of laying unless otherwise directed by the DISTRICT.

M. Wherever pipe must be deflected from a straight line (in either the vertical or horizontal plane) in order to avoid obstructions or plumb stems, or wherever long radius curves are permitted, the amount of deflection shall not exceed that necessary for the joint to be satisfactorily made, nor that recommended by the pipe manufacturer, and shall be approved by the DISTRICT.

N. Lay no pipe in water or when it is the DISTRICT's opinion that trench conditions are unsuitable. If crushed stone is used to improve trench conditions or as backfill for bedding the pipe, its use is considered incidental to the project, and no separate payment will be made for its use.

O. Where a water line crosses over a sanitary sewer, use a full joint of pipe with a standard mechanical joint, and center over the sewer. Where a water line is to be parallel to a sanitary or storm sewer, lay it at least 1O feet from the sewer. If it is not practical for the water and sewer lines to be separated as described above, then lay the water line at least 18 inches above the top of the sewer.

P. Joint all pipe in the exact manner specified by the manufacturer of the

pipe and jointing materials.

Q. For detection purposes, a 12 gauge solid strand copper tracing wire (shielded) shall be installed as per the manufacturer's instructions. Connections between wires shall be soldered or connected with wire nut fasteners and wrapped. The wire shall be brought completely up into every valve box so that a locator can be hooked directly to it.

3.2 HYDROSTATIC TESTS

A. Pressure Test

1. After pipe has been laid and backfilled as specified above, subject all newly laid pipe or any valved section thereof to a pressure of 200 psi. All services are to be laid prior to testing the main and tested as part of the test of the main.

2. The duration of each pressure test shall be at least two hours.

3. Slowly fill each valved section of pipe with water, and apply the specified test pressure (based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge) with a pump connected to the pipe in a manner satisfactory to the NE. Furnish the pump, pipe, connections, gauges, and all necessary apparatus.

4. Before applying the specified test pressure, expel all air from the pipe. If hydrants or blowoffs are not available at high places, make the necessary taps at the points of highest elevation before testing, and insert plugs after the test has been completed.

5. Carefully examine all exposed pipes, fittings, valves, and hydrants during the test. Remove any cracked or defective pipes, fittings, valves, or hydrants discovered in consequence of this pressure test, and replace with sound material in the manner specified. Repeat the test until the results are satisfactory to the DISTRICT.

B. Leakage Test

1. Conduct the leakage test after the pressure test has been satisfactorily completed. Furnish the pump, pipe, connections, gauges, measuring devices, and all other necessary apparatus as well as all necessary assistance to conduct the test.

2. The duration of each leakage test shall be two hours; during the test,

subject the main to a pressure of 200 psi.

3. Leakage is defined as the amount of water which must be supplied to the newly laid pipe or any valved section in order to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.

4. No pipe installation will be accepted until the leakage is zero.

3.3 DISINFECTION

1. The District will keep a log of all disinfection procedures, including but not limited to:
   a. time when line was filled,
   b. time when line was disinfected,
   c. how much disinfection,
   d. flushing procedures,
   e. how long (time) line was flushed,
   f. time between flushing
   g. Bac-T sampling.

A. During construction, take precautions to protect pipe interiors, fittings, and valves against contamination. When pipe laying is not in progress (e.g., at the end of the day's work), place watertight plugs in the ends of all pipe already in the trench; if water accumulates in the trench, leave the plugs in place until the trench is dry. Complete the joints of all pipe in the trench before stopping work for any reason.

B. If dirt or other foreign material that has gotten into a pipe will not, in the opinion of the DISTRICT, be removed by flushing, clean the interior of the pipe, and swab with a disinfecting solution of 5% hypochlorite.

C. Make water flow from the existing distribution system or some other source approved by the DISTRICT into the newly laid pipeline, and add chlorine to it. Feed water into the pipe, and chlorine into the water, at constant, measured rates so proportioned that the chlorine concentration in the water in the pipe is kept at a minimum of 25 mg/l available chlorine. To ensure that this concentration is maintained, measure the chlorine residual at regular intervals.

D. Table I shows how much chlorine is needed for each 100 feet of line for pipes of various diameters. A 1% chlorine solution may be prepared either with 1 pound of calcium hypochlorite for each 8.5 gallons of water or with sodium hypochlorite.

TABLE I

CHLORINE REQUIRED TO PRODUCE A 50 MG/L
CONCENTRATION IN 100 FEET OF PIPE, BY DIAMETER

Pipe Size (Inches)	100% Chlorine (Pounds)	1% Chlorine Solutions (Gallons)
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88
14	0.328	3.96
16	0.428	5.12
18	0.540	6.48
20	0.680	8.00
24	0.980	11.52

E. While the chlorine is being applied, manipulate valves so that the treatment dosage will not flow back into the line that is supplying the water. Continue the application of chlorine until the entire line being treated is filled with the chlorine solution. Then retain the chlorinated water in the line for at least 24 hours, during which time all valves and hydrants in the line being treated shall be operated so that appurtenances can also be disinfected. After 24 hours, the treated water shall have a chlorine concentration of at least 10 mg/l throughout the line.

F. After the applicable retention period, flush the heavily chlorinated water from the line until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 mg/l. Perform such flushing only at sites where there is adequate drainage.

G. The velocity of the water used to flush a line shall be at least 2.5 fps. The flow rates required to produce this velocity in various sizes of pipe are shown in Table II.

TABLE II

REQUIRED OPENINGS TO FLUSH PIPELINES
(40 PSI RESIDUAL PRESSURE)

Pipe Size (Inches)	Flow Required To Produce 2.5 fps Velocity (gpm)	Orifice Size (Inches)	Hydrant Outlet Nozzles Number	Size (Inches)
4	100	15/16	1	2-1/2
6	220	1- 3/8	1	2-1/2
8	390	1- 7/8	1	2-1/2
10	610	2- 5/16	1	2-1/2
12	880	2- 13/16	1	2-1/2

H. Once a line has been flushed, test to make certain that the residual chlorine in the water is within acceptable limits.

I. It must be noted that flushing is no substitute for taking preventative measures before and during the laying of water lines. Certain contaminants--especially those in caked deposits--are difficult or even impossible to remove by flushing, no matter how high the velocity. Further-more, in pipes with diameters of 16 inches or more, it can be difficult to achieve even the minimum recommended flushing velocity of 2.5 fps.

J. After flushing the line for the suitable amount of time, the line must set inactive for 48 hours before taking any Bac-T samples.

3.4 BACTERIOLOGICAL TESTS

A. After a water line has undergone final flushing but before it is placed into service, collect a sample for bacteria-logical testing every 2,500 feet and at every branch or dead end.

B. Collect these samples in sterile bottles treated with sodium thiosulfate. Do not use a hose or fire hydrant to collect samples. One suggested sampling method is to install a standard corporation cock in the line with a copper tube gooseneck assembly; after the samples have been taken, the gooseneck assembly can be removed and retained for later use.

C. Take the samples collected to an approved laboratory to be tested for bacteriological quality in order to determine if they contain any coliform organisms. If the initial disinfection fails to produce satisfactory samples, repeat disinfection until satisfactory samples are obtained.

D. When the samples tested are found to be satisfactory, the water line may be placed in service.

3.5 DISINFECTION PROCEDURE AFTER CUTIING INTO OR REPAIRING EXISTING LINES

A. The procedures outlined above apply primarily to cases in which the lines are wholly or partially dewatered.

B. However, leaks or breaks that are repaired with clamping devices while the lines remain full of water under pressure present little danger of contamination and require no disinfection.

C. When an existing line is opened, whether by accident or design, the excavated area could be wet and contaminated because of the presence of sewers nearby. The danger of contamination from such pollution can be lessened if liberal quantities of hypochlorite are applied to the open trenches.

It is better to use tablets for disinfection in such cases because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation site.

D. Where practical, treat the lines by the slug method in accordance with AWWA C601.

E. The following disinfection procedure is considered the minimum that may be used when existing lines are repaired:

1. Swab the interior of all pipes and fittings (particularly couplings and tapping sleeves) that are to be used in repairing an existing line with a solution of 5% hypochlorite before installing them.

2. The most practical means of removing contamination introduced into a line during repairs is to give the line a thorough flushing. If the locations of valves and hydrants make it possible, flushing in both directions is recommended. Start flushing as soon as repairs are completed, and continue until all discolored water is eliminated.

3.6 CLEANUP

A. After completing each section of water line, remove all debris and all construction materials from the work site. Then grade and smooth over the surface of both sides of the line. Leave the entire area clean and in a condition satisfactory to the District.

END OF SECTION

PART 1. GENERAL

1. Refer to other sections for work related to that specified under this heading.

PART 2. PRODUCTS

2.1 The service assembly shall include a corporation cock, Rehau Munipex service pipe gooseneck, copper setter, meter, meter box, and tapping saddle as required.

2.2 Any brass goods furnished under this specification shall be new and unused and as manufactured by Ford. All fittings shall conform to ANSI/AWWA Standard C800, latest revision. All brass components in contact with potable water must be made from either CDA/UNS Brass Alloys C89520 or C89833 with a maximum lead content of 0.25% by weight. Brass alloys not listed in ANSI/AWWA C800 Paragraph 4.1.2 are not approved. Brass saddles shall be made from CDA/UNS C83600.

2.3 CORPORATION STOP: The corporation cock shall be of solid bronze suitable for a compression flange on the service pipe and for tapping into the water main at a vertical angle. This cock shall be a Ford FB1000-3-Q-NL (3/4”) or Ford FB1000-4-Q-NL (1”).

2.4 SERVICE PIPE: Service pipe shall be 3/4 inch or 1" Rehau Municipex Tubing with inserts . Goosenecks shall be a minimum of 3 feet long. Service lines shall be installed with a twelve (12) gauge coated copper wire from the water line to the meter box. Long side services shall be encased in Schedule 40 PVC piping having no joints from back of sidewalk to back of sidewalk and or curb.

2.5 COPPER SETTERS: Copper setters 5/8 inch x 3/4 inch with compression fittings shall be VBH72-7WR-44-33-Q-NL with integral angle stop and provisions for locking. Each assembly shall include an angle meter check valve.

2.6 WATER METERS: All meters shall be frostproof and have integrated leak detection, with bronze castings similar to the Hydrus 2.0 Ultrasonic meter with Itron Cellular 500W module. Meters shall have the capability of automatic meter reading compatible with the District's integration devices. Meters shall be straight reading in gallons. Water meters shall meet or exceed C715 AWWA/ANSI Standards, or latest version. **See attachments at the end of the section.**

2.7 METER BOXES: Meter boxes for 5/8 inch x 3/4 inch assemblies shall be DFW

Plastics or equal, DFW1800-18-BODY (Box). The meter box lid shall be a DFW Plastics Model DFW1200E-EAF1MLPF SMALL-LID cast iron (ASTM A48, Class 30B), non-traffic load rated lid. Meter box lid shall include antenna Lid Adapter Itron 2725.

2.8 LID ADAPTER: Meter Box Lid shall include the Antenna Lid Adapter Itron 2725 or approved equal.

2.9 TAPPING SADDLES: Tapping saddles shall be used for tapping all DIP pipe and shall be Ford FC202, and shall be threaded to accept the corporation cock specified above. Saddles used for tapping C900 DR14 shall be Ford S - 90 and saddles used for tapping existing SDR21 Class 200 shall be Ford S - 70. No taps larger than one (1) inch shall be made in any size pipe without approval by the District.

2.10 CASING PIPE FOR SERVICE LINES: Refer to specification section 01000 1.04.14 in General Requirements and Design Criteria for casing pipe for service line requirements.

PART 3. EXECUTION

3.1 Make no taps on dry lines without approval from the District.

3.2 The service line shall have a minimum of 18 inches cover. After the line is installed and yoke set, turn water on service pipe between yoke and main, blowing any accumulated trash out of the pipe.

3.3 In general, install the meter box where the plans show off the road right-of-way. Set plumb approximately one (1) inch above the existing of proposed grade and so that surface drainage will not enter it. Fill from the existing or proposed grade to the top of the meter box at a slope of one (1) inch in 12 inches. When the cut or fill slopes on streets extend beyond the street right-of-way, install the meter box at the top or toe of slope, as applicable, or as directed by the AJE.

3.4 The service main shall not be taut from stop to cock.

3.5 Set the yoke plumb and level with a brace placed in the middle where designed.

3.6 All service lines crossing state, county or city roads shall be bored or jacked. The service lines under paved roads shall be cased with 2" diameter PE pipe, continuous with no joints. Service line casings shall extend from toe of slope to toe of slope or to a point 2 feet beyond the back of curb or to a point 3 feet beyond the back of ditch. Where casing crosses a ditch, the minimum depth of cover below the ditch shall be 24 inches.

3.7 All service lines crossing state, county, or city roads shall be bored and jacked.

3.8 All service taps will be made separately and away from any asphalt or concrete unless approved by the LaGuardo Utility District.

HYDRUS 2.0
ULTRASONIC METER

DIEHL
Metering

APPLICATION
Highly accurate, lead-free brass ultrasonic smart water meter for all residential, commercial and industrial installations

FEATURES
- Extreme low-flow accuracy and long term measurement stability
- Integrated leak detection
- Mountable in any installation position
- Lead-free copper alloy "CUPHIN®" body
- UV resistant housing with IP 68 rating
- Over 40 days of hourly data storage
- Diehl Extended Encoder protocol that includes, temperature, alarms and error messages, etc.
- Meets or exceeds C715 AWWA/ANSI Standards
- Complies with NSF/ANSI Standards 61, Annex F/G as well as FCC part 15 B

smart in solutions

HYDRUS 2.0
ULTRASONIC METER

GENERAL TECHNICAL DATA

		HYDRUS 2.0
Potable water temperature range	°F	34 ... 122
Ambient operating temperature	°F	34 ... 158
Ambient storage temperature	°F	-4 ... +140(> 90° F max. for one hour)
Maximum pressure	psi	300
Power supply		Two 3.6 VDC lithium batteries
Battery lifetime		Up to 20 years
Interfaces		Optical, industry standard Encoder protocol, ASCII output for compatibility with all AMR/AMI systems, Diehl Extended protocol is available
Data storage		Alarms and consumption values (42 days memory configurable value hourly / daily)
Protection class		IP 68
Operating performance		In the temperature range of 45 to 85° F, meter consumption measurement is accurate to ±1.5% over the normal flow range (reference: approved Diehl Metering test bench, ISO9001 certified)

TECHNICAL DATA DISPLAY

	HYDRUS 2.0
Display indication	LCD, 9-digit, additional symbols/display counter/unit
Units	Flow and volume (gpm, gal, ft³, m³)
Values displayed (depending on configurations)	Volume - high resolution volume - flow - reverse flow - medium temperature - display test - current /continuous / historic error and alarm status - leak - metrology log access - display counter - units - accounting day, date and volume - software checksum
Alarms	Leak Alarm; Low Power; Tampering Alarm; Reverse Flow; Over Flow; Temperature Alarm; No Usage

APPROVAL

	HYDRUS 2.0
NSF	Complies with NSF/ANSI Standard 61, Annex F/G
AWWA	Meets or exceeds applicable sections of the AWWA/ANSI C715 Standards
FCC	Complies with FCC part 15 B

MATERIAL

	HYDRUS 2.0
Measuring pipe	Lead-free copper alloy "CUPHIN®"
Register housing	Engineered Polymer
Transducers	Composite
Reflectors	Stainless steel

Diehl Metering LLC
1813 N. Mill Street, Suite C | Naperville, IL 60563
info-dmus@diehl.com
331-204-6540

smart in solutions

HYDRUS 2.0

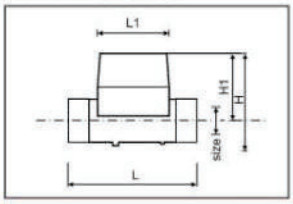
ULTRASONIC METER

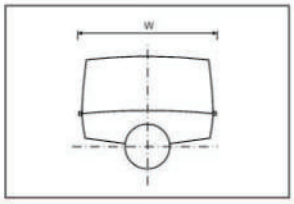
TECHNICAL DATA

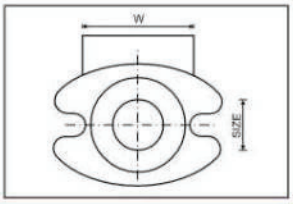
Size			⅝" x ½"	⅝" x ¾"	¾" S	¾"
Lay length	L	Inch	7½	7½	7½	9.0
Safe Maximum Operating Capacity (SMOC)		gpm	0.08 - 22	0.1 - 22	0.1 - 32	0.1 - 32
Minimum test flow rate		gpm	0.025 - 0.08	0.04 - 0.1	0.04 - 0.1	0.04 - 0.1
Operating range accuracy		%	±1.5	±1.5	±1.5	±1.5
Low flow range accuracy		%	±5	±5	±5	±5
Pressure loss			4.3 psi at 15 gpm	2.0 psi at 15 gpm	2.0 psi at 15 gpm	2.0 psi at 15 gpm
Operating performance			In the temperature range of 45 to 85 °F, meter consumption measurement is accurate to +/- 1.5% over the normal operating flow range (reference: Approved Diehl Metering test bench, ISO 9001 certified)			

Size			1"	1 ½"	2"	2"
Lay length	L	Inch	10⅛	13	10	17
Normal test flow limits up to SMOC		gpm	0.1 - 55	0.16 - 100	0.8 - 170	0.8 - 170
Minimum test flow rate		gpm	0.055 - 0.1	0.1 - 0.16	0.55 - 0.8	0.55 - 0.8
Operating range accuracy		%	±1.5	±1.5	±1.5	±1.5
Low flow range accuracy		%	±5	±5	±5	±5
Pressure loss			1.5 psi at 25 gpm	3.5 psi at 70 gpm	3.6 psi at 110 gpm	3.6 psi at 110 gpm
Operating performance			In the temperature range of 45 to 85 °F, meter consumption measurement is accurate to +/- 1.5% over the normal operating flow range (reference: Approved Diehl Metering test bench, ISO 9001 certified)			

DIMENSIONS







Size			⅝" x ½"	⅝" x ¾"	⅜" S	¾"
Lay length	L	Inch	7½	7½	7½	9.0
Register length	L1	Inch	3.5	3.5	3.5	3.5
Register width	W	Inch	3.7	3.7	3.7	3.7
Overall height	H	Inch	4.0	4.0	4.0	4.0
Height from center of pipe to top	H1	Inch	2.7	2.7	2.7	2.7
Nominal thread size			¾" - 14 NPSM	1" - 11½ NPSM	1" - 11½ NPSM	1" - 11½ NPSM
Net weight		lbs.	2.8	2.8	2.8	3.1

Size			1"	1 ½"	2"	2"
Lay length	L	Inch	10¾	13	10	17
Register length	L1	Inch	3.5	3.5	3.5	3.5
Register width	W	Inch	3.7	3.7	3.7	3.7
Overall height	H	Inch	4.2	5.3	5.8	5.8
Height from center of pipe to top	H1	Inch	2.8	3.3	3.3	3.3
Nominal thread size			1¼" - 11½ NPSM	flanges	flanges	flanges
Net weight		lbs.	3.5	14.1	16.1	19.2

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Itron Cellular 500W Module

Itron Cellular 500W Modules are IPv4 endpoints designed to operate on Itron's Cellular solution. Featuring a compact design, industry-leading battery life, firmware download, and technology designed to adapt and grow with your business, the Itron Cellular 500W Module can help you streamline your operations and maximize your resources today.

INTRODUCTION

Itron Cellular 500W Modules offer advanced bi-directional communications designed specifically for Itron's cellular solution as well as Itron's industry-leading ChoiceConnect™ solutions. The Itron Cellular 500W Module enables easy migration from mobile to network operations as your business needs evolve. The ability to perform firmware downloads over the network allows the utility to ensure they have the latest features available without having to visit each service point. With Itron's supported communications technology, network and mobile systems can be deployed side-by-side in hybrid configurations to ensure maximum efficiency and reliability in both high- and low-density meter populations.

The Itron Cellular 500W Module is available in two housing designs, supporting both water pit and remote installations. Both pit and remote housings support encoder and pulser register types with a single endpoint. Itron's auto-sensing technology allows the Itron Cellular 500W Modules to detect what register model it is attached to, removing the need to program the endpoint at installation. Itron Cellular 500W Modules include an integral connector port and a telemetry port standard. The telemetry port enables the use of Itron's acoustic leak sensor and third-party remote disconnect valves.

SUPERIOR PERFORMANCE

The Itron Cellular 500W Module utilizes narrowband, low-power wide area cellular (LTE-M Cat-M1) and RF transmission to minimize interference, improve range, and deliver higher read integrity. The module transmits smaller and more efficient data transitions in less time, lowering cost of communications. Peak radiated power is less than 250 milliwatts.

RELIABILITY

The electronics in the Itron Cellular 500W Module are fully encapsulated within a specially formulated potting material. This protects the module's components from water, contaminants, corrosion, rough handling and temperature cycling. With their straightforward, rugged design, the Itron Cellular 500W Module uses significantly fewer components than most competing products, resulting in greater reliability. The advanced, integrated antenna operates effectively in a wide range of meter box installations. The Itron Cellular 500W Module offers peace of mind with a 20-year prorated warranty.

SPECIFICATIONS

LOWER COST OF OWNERSHIP

The Itron Cellular 500W Module features industry-leading battery life, ensuring your meter data collection investment achieves substantially better financial returns than competing solutions with batteries that typically last only 10 to 12 years. With the advancements in leak, reverse flow (absolute encoder version only) and tamper detection, the Itron Cellular 500W Module necessitates fewer field investigations and lower expenditures for customer and field service. The Itron Cellular 500W Module includes a low battery alarm that helps utilities to plan and manage module replacements in the field.

LEAK MANAGEMENT

Non-revenue water management is critical to any water utility's success. Modules can be paired with Itron's Leak Sensor which collects and analyzes changes in pipe acoustics. This data indicates probable leaks in the distribution system environment to detect both new and pre-existing leaks automatically. Leak Sensor technology, coupled with the module's internal customer-side leak detection algorithm and the option to compare data from groups of the utility's production meters, provides the utility with a highly accurate picture of the overall health of the water distribution system.

Extended Meter Alarms

The Itron Cellular 500W Module can relay the extended meter alarms provided by new solid state and electronic meters. These alarms include:

- Empty Pipe
- Temperature
- High/Low Pressure
- High Flow
- Meter Low Battery
- Meter Tampering
- Reverse Flow
- Zero Consumption

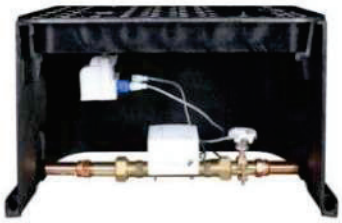
Approved IoT Reading Systems offer full bi-directional communication capability

- Temetra® solution
- OpenWay® Collection Manager
- Performance Manager
- Action Manager
- Itron Security Manager (ISM)
- Network Manager

Mounting Options

Itron Cellular 500W Modules have a compact housing and features specifically designed for water pit mounting options.

- This solution requires RF-friendly lids. Support for concrete lids is investigated on a per-installation basis. Steel-lids are not supported/recommended.
- Rod-mount on a ½ inch diameter fiberglass or other non-metallic rods.
- Through-the-lid mounting with a pre-drilled 1.75 inch hole and up to 2.5 inch maximum lid thickness
- Direct-mount to any flat surface with screw kit
- Wall-mount for installation to the side of residence or building using screw kit
- Pipe-mount for installation on pipe sizes from ¾ inch to 4 inches



Functional Specifications	Pit Moudle	Remote Module	Features	
Dimensions	4.5 in. Height 3.9 in. Diameter at base 1.7 in. Diameter at top 9.6 oz. Weight	4.5 in. Height 5.05 in. Width 3 in Depth 9.6 oz. Weight	Data Logging	Network Mode: Standard 15-minute interval within the last 40 days Mobile Mode: Any hourly reading within the last 40 days
Network Mode	LTE-M cellular network	LTE-M cellular network	Meter Compatibility	The Itron Cellular 500W Module is compatible with water meters from leading water manufacturers such as Badger, Honeywell, Diehl, Master Meter, Neptune, Kamstrup, and Sensus
Mobile Mode	ISM Band, 908-924 MHz	ISM Band, 908-924 MHz		
Operating Temperature	-20C to +60C	-40C to +70C		
Storage Temperature	-40C to +75C for a maximum of 1,000 hours	-40C to +75C for a maximum of 1,000 hours		
Humidity Limits	0 to 100% (submersible)	0 to 100% (submersible)		
Power Source	Single "D" cell Lithium Thionyl Chloride battery	Single "D" cell Lithium Thionyl Chloride battery		

Itron

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END OF SECTION

Large Meters, Double Detector Check Valves & Appurtenances

PART 1. GENERAL

1.1 Refer to sections for work related to that specified under this heading.

PART 2. PRODUCTS

2.1 PRECAST METER VAULTS

A. Shall meet the requirements of ACI 318, latest edition.
B. Shall meet the requirements of ASTM C857 and AASHTO Standard Specifications for Highway Bridges
C. Be rated for 300 psf loading condition.
D. Have a concrete compressive strength at 28 days of at least 4,000 psi.
E. Be reinforced with ASTM A615, Grade 0 reinforcing steel.
F. Include four (4) lifting rings on top slab exterior.
G. Include ladder bars/steps on interior aligned beneath the hatch at 12 inch centers.
H. Include an integral cast-in-place aluminum hatch in the top lid for the box.
I. Include provisions for a sump in one corner.
J. Be sized as shown on the standard details.
K. Include butyl sealant between all precast sectional joints.

2.2 ALUMINUM HATCHES

A. Hatches shall be single leaf or double leaf as shown on the drawings.
B. hatch shall have a ¼" thick one-piece, mill finish, extruded aluminum frame, incorporating a continuous concrete anchor.
C. Door panels shall be ¼" aluminum diamond plate, reinforced to withstand a live load of 300 PSF uniform live load.
D. Door shall open to 90 degrees and automatically lock with T-316 stainless steel hold open arms with aluminum release handles. Unit shall lock with a non corrosive lock bar and non-corrosive handle.
E. Hatches shall be by Halliday Products or approved equal.

2.3 ELECTRO-MAGNETIC WATER METERS FOR IRRIGATION SERVICE

A. Electro-magnetic water meters shall be a battery powered meter using Faraday's Law of electromagnetic induction.
B. The meter body shall be stainless steel grade 304 and the flow tube shall be stainless steel grade 316.

C. The liner shall be polyethylene epoxy and the electrodes shall be stainless steel grade 316.
D. The register shall be stainless steel with glass lens. The register housing and lid shall be UV resistant.
E. Meter shall conform to AWWA C701 laying lengths and be equipped with ANSI/AWWA Class 125 pound flanges.
F. Meter shall be equipped with a pulse output device that can be attached to a radio transceiver. The pulse output shall be programmed in the factory to meet the Owner's AMR capabilities.
G. Meter sampling rate shall be 0.5 seconds and be equipped with battery for a minimum 20-year life.
H. A LCD readout shall be provided incorporating totalized flow, and a flow rate indicator.
I. Include an evoQ4 Sensus Protocol encoder module designed for use with 3 wire radio endpoints to allow interface with pit pads for touch reading or AMR devices. Encoder module shall be NEMA 6P/IP68 rated and have a lithium battery with minimum 10-year life.
J. Include an Itron 2725 Antenna Lid Adapter.
K. Meter size shall be as shown on the drawings.
L. Meter shall be Elster evoQ_4. No substitution is allowed.
M. Developer is responsible for purchasing all meters 2 inches and greater.

2.4 DOUBLE CHECK DETECTOR ASSEMBLIES

A. Double Check Detector Valves shall be NSF/ANSI 6.1, ASSE 1048 approved.
B. The device shall be furnished complete with OSY shutoff valves and test cocks.
C. The main body shall be epoxy coated ductile iron.
D. The device shall be accessible for maintenance without removing the device from the main line.
E. The bypass meter shall conform to the information outlined in Section 02718 "Water Service Assemblies" and this specification 02720.2.3 "Electro-magnetic Water Meters" with encoder suitable to work with the Owner's AMR meter system.
F. Size shall be as shown on the plans.
G. Devices shall be Watts Series 709DCDA or Wilkins Model 350Da or approved equal.
H. Contractors must refer to Sections 01100, "General Requirements & Criteria for Reduced Pressure Principle Assemblies" and Section 012000, "General Requirements & Criteria For Double Detector Check Assemblies"

2.5 REDUCE PRESSURE BACKFLOW PREVENTER ASSEMBLIES

A. Reduced Pressure Backflow Prevention Assembly shall be NSF/ANSI/CAN 6.1, ASSE 1047, approved and supplied with full port OS & Y gate valves.
B. The seat disc elastomers shall be EPDM.
C. The main body shall be epoxy coated ductile iron (ASTM A 536), the seat ring

and check valve shall be NORYL. The stem shall be stainless steel (ASTM A 276).

D. The checks and relief valve shall be accessible for maintenance without removing the device from the main line.
E. Size shall be as shown on the plans.
F. Devices shall be ZURN WILKINS Model 375DA Reduced Pressure Detector Backflow Prevention Assembly or approved equal.

2.6 INSULATED ENCLOSURES

A. Insulated enclosures shall be provided for double check detector assemblies.
B. Material of fabrication shall be 5052-H32 marine grade aluminum, mill finish.
C. Enclosure shall be insulated with 1.5 inches (9.0 R-value) minimum thickness polyisocyanurate foam laminated to a glass fiber reinforce facer on each side.
D. Structural members shall be redwood.
E. Enclosure shall be provided with two (2) access panels with one access panel containing the drain panel. Access panels shall be completely removable and include built-in lockage folding t-handles. The drain panel shall have a stainless steel hinge and spring as a positive means of closure. The drain panel shall be designed to remain closed except during water discharge.
F. Enclosure shall be furnished with a heater to maintain an interior temperature of 40^0F with an outside temperature of -30^0F.
G. Enclosures shall be Safe-T-Cover™ Series X00-ALor approved equal.

2.7 SUMP PUMPS

A. Where positive drainage from meter pits is not available with gravity discharge, a sump pump shall be furnished in the meter vault.
B. Sump pump shall be 120V with a 15-foot power cord.
C. Cast iron housing with permanently lubricated maintenance free motors and baked on epoxy finish.
D. Non-clog vortex impeller.
E. 1-1/2 inch discharge and automatic vertical mount float actuated on/off.
F. 0.3 HP with 43 GPM discharge rate at 15’ TDH.
G. Pumps shall be Zoeller or Dayton or approved equal.

2.8 PIPE STANDS

A. Pipe saddles shall be adjustable constructed of electro-galvanized steel.
B. Adjustable pipe saddle supports shall be Cooper B-Line Type B3093 with B3088T (galvanized) threaded pipe stand for 2” through 8” diameter pipe.

2.9 PIPE SEAL DEVICES

A. Pipe seal devices shall consist of rubber sections to form a mechanical seal

between pipes penetrating through walls. Belt is to provide a watertight seal to withstand up to 20 psig. Rubber sections to be manufactured of EPDM. Metal hardware to be 316 stainless steel.

B. Acceptable models to be Pipe Seal™ Type E or Link-Seal™ Type S316 or approved equal.

PART 3. EXECUTION

3.1 SETTING VALVES AND FITTINGS

A. General

1. Set valves, fittings, plugs, and caps and joint to pipe in the manner heretofore specified for cleaning, laying, and jointing pipe.

2. All valves and fittings shall be restrained by Romac Grip Ring, Mega-lug™, Sigma or, Ford UFR1500SA, UFR1400DA, or equal. See Water Lines for specifications regarding mechanical restraint devices.

3. Valves deeper than 36 inches shall be provided with valve nut extensions with set screws.

B. Location of Valves

1. Valves in water mains shall, where possible, be located on the street property lines extended unless otherwise shown on the drawings.

C. Valve Boxes

1. Provide a valve box for every valve.

2. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the wrench nut of the valve, with the box cover flush with the surface of the finished pavement or such other level as may be directed by the DISTRICT.

3.2 SETTING HYDRANTS

A. Location

1. Locate hydrants as shown on the drawings or as directed by the DISTRICT and in a manner that will provide complete accessibility and also minimize the possibility of damage from vehicles or injury to pedestrians.

B. Position

1. All hydrants shall stand plumb. Set hydrants to the established grade, with center of steamer nozzle at least 12 inches above the finished grade, as shown on the drawings or as directed by the DISTRICT. In no circumstance shall more than one (1) hydrant adjustment device be allowed to be installed on a new hydrant installation to achieve proper ground clearance.

C. Connection to Main

1. Connect each hydrant to the main with a 6-inch ductile iron anchor tee, and a 6-inch gate valve. The hydrant shoe and the valve shall be connected with an anchor coupling. In the event the hydrant has to be placed further from the valve than allowed by a coupling, the hydrant shall be rodded to the gate valve with a minimum of 3 anchor rods.

D. Hydrant Drainage

1. Provide drainage at the base of the hydrant by placing coarse gravel or crushed stone from the bottom of the trench to at least 6 inches above the waste opening in the hydrant to a distance of 1 foot around the elbow. Connect no drainage system to a sewer.

E. Anchorage for Hydrants

1. If using an anchor coupling, brace the bowl of each hydrant well against unexcavated earth at the end of the trench with concrete blocking.

2. Anchor Couplings - Tyler Union D132 will be used between the gate valve and tee, and the gate valve and the fire hydrant.

3. Ford Uni-Flange - Use Ford Uni-Flange series 1400 for all ductile iron pipe and Ford Uni-Flange Series for all PVC pipe. The Developer shall use the Uni-Flange unless the conditions do not allow.

F. Final Painting

1. The finished hydrants shall have the bonnet painted to the color of flow capability. The DISTRICT will dictate the color coding of the bonnet.

3.3 SETTING METER VAULTS AND METERS

A. Meter vaults shall be set plumb and level. Top of vault shall extend at least 3 inches above surrounding finish grade with positive drainage away from meter vault. A minimum of 8 inches of clear excavation shall occur around the exterior walls of the vault and 2 feet where pipe connections or fittings occur on the exterior of the vault. A minimum of 8-inches of crushed stone shall be

placed beneath the vault.

B. Butyl mastic shall be placed in continuous strips between each precast joint section of the vault.

C. All pipe penetrations shall be sealed with pipe-seal devices to insure a watertight fit between vault openings and pipe and to prevent groundwater intrusion into the vault.

D. Sump pumps shall be piped with 1-1/2-inch diameter Schedule 40 PVC pipe from the pump to and through the top of the vault and be discharged onto the ground surface beyond the top of the vault lid. A 90^0 bend is required at the top discharge. The pump discharge line shall be equipped with a check valve and a true union inside the vault to allow for ease of removal of the pump without removal of all pipe.

E. A GFCI outlet shall be furnished by the developer to provide power to the sump pump. The DISTRICT will not provide the power for the sump pump.

F. Where available, drainage of vaults may be accomplished with gravity drainage using 2" Schedule 40 PVC pipe.

G. The DISTRICT shall be provided with a lock handle to open the lid.

H. Meter radio read antenna shall be wired with enough slack to allow for opening of the lid without damage to the wiring or antenna. The antenna shall be mounted in the lid with an adequately sized field drilled opening.

I. Meters shall be set level and plumb. All 2-inch meters shall be equipped with a meter setter. Larger meters shall be equipped with a flange coupler adaptor to facilitate meter removal.

J. Meters shall be supported with a minimum of two (2) pipe supports beneath the meter. In the case of use of a linesetter, two (2), ½ inch PVC braces shall be placed on the linesetter for bracing.

K. Meters shall be set with at least 12 inches of vertical clearance above the floor of the vault.

3.4 BACKFLOW PREVENTION ASSEMBLIES REQUIREMENTS

Refer to Sections 01100 and 01200 for this information.

END OF SECTION

PART 1. GENERAL

1.1 The work to be performed hereunder shall consist of the installation of a casing pipe for the purpose of installing a water line as shown on the drawings or as called for in these specifications. It shall include the excavation of a boring pit, auger boring between the points as specified on the drawings, furnishing and installing of the carrier pipe, and disposing of the excavated materials in the manner herein provided.

PART 2. PRODUCTS

2.1 CASING PIPE

A. The casing pipe shall be of steel meeting the latest approved American Railway Engineering Association "Specifications" for Pipelines for Carrying Flammable and Nonflammable Substances." The steel casing pipe shall have a minimum yield strength of 35,000 PSI and shall have the minimum wall thickness shown in the following table:

TABLE OF MINIMUM WALL THICKNESS FOR STEEL CASING PIPE
FOR EBO LOADING

Carrier Pipe Diameter	Casing Pipe Diameter	Nominal Thickness
4 inches	8 inches	0.250 inches
6 inches	12 inches	0.250 inches
8 inches	16 inches	0.312 inches
10 inches	20 inches	0.312 inches
12 inches	24 inches	0.312 inches

B. When the casing pipe is installed without benefit of a protective coating, the wall thickness shown above shall be increased to the nearest standard size, which is a minimum of 0.063 inches greater than the thickness shown.

2.2 CARRIER PIPE: The carrier pipe shall be Class 52 DIP, unless otherwise noted on the drawings.

2.3 CASING SPACERS: The casing spacer shall be a two (2) piece shell made from T- 304 stainless steel of a minimum 14 gauge thickness. The shell shall be lined with a ribbed PVC extrusion with a retaining section that overlaps the edges of the shell and prevents slippage. Bearing surfaces (runners) shall be ultrahigh molecular weight polymer for abrasion resistance and a low coefficient of friction. The runners shall be attached to support structures (risers) at appropriate positions to properly support the carrier within the casing and to ease installations. The runners shall be attached mechanically by punched riser section and bolt heads TIG welded for strength. Riser shall be made of T-304 stainless steel of a minimum 10 gauge. All risers 6" and over in height shall be reinforced and MIG welded to the shell. *Standard positioning within the casing* will require the height of the risers and runners combined shall be sufficient to provide not less than three fourths inch between the casing pipe and the outside diameter of the bell. *Centered positioning within the casing* will require the risers and runners to be dimensioned to center the carrier pipe in the casing with a top clearance of one half inch minimum. All welds and metal surfaces shall be chemically passivated. Casing spacers shall be Model CCS as manufactured by Cascade Waterworks Mfg. Co. of Yorkville, IL or prior approved equal.

The size of the casing spacers shall be determined by the manufacturer's recommendation for each size carrier pipe and casing. The length and size of casing, the quantity of spacers needed and the configuration requirement to be determined by the Engineer, based on the application required. But in no case, will the minimum number of casing spacers per pipe joint be less than three (3).

2.4 CASING END SEALS

A. Casing ends shall be sealed with casing end seals. Casing end seals shall be 1/8” thick neoprene rubber with ½” wide T304 stainless steel worm gear bindings. Seals shall be pull-on type.

PART 3. EXECUTION

3.1 BORING

A. The boring shall be accomplished by means of auguring to the size, line, and grade shown on the drawings.

3.2 INSTALLATION OF CASING PIPE

A. For open cut of casing pipes, install the steel casing pipe into the open cut as the trench excavation proceeds. Weld sections of casing pipe together to provide watertight joints, and replace the protective coatings in areas where it is damaged by welding.

B. For boring casing pipes, jack the steel casing pipe into place as the boring proceeds. Weld sections of casing pipe together to provide watertight joints. Casing pipe shall extend to a from toe of slope to toe of slope or from a point 2 feet beyond back of curb or from a point 3 feet beyond center of ditch line.

C. Do not remove unacceptable casing without prior approval from the DISTRICT. If the removal of casing pipe is permitted, make proper provisions to prevent caving in of the earth surrounding the casing. All abandoned openings shall be filled with flowable fill.

3.3 INSTALLATION OF CARRIER PIPE

A. The carrier pipe shall be furnished by the Contractor. Upon acceptance of the casing, install the carrier pipe in the casing by jacking it through the casing utilizing casing spacers to align the carrier pipe to offset any minor variations in the alignment of the casing.

B. Ductile iron pipe Class 52 shall be installed in the casing pipe.

3.4 LAYOUT OF WORK

A. The Owner will provide the necessary control points required by the Contractor for this construction. The Contractor will provide the detailed layout required to keep the tunnel or bore on grade.

4. GUARANTEE OF WORK

4.1 Guarantee a usable completed casing between the points specified and to the line and grade specified. The allowable tolerance at the downstream end point of the bore shall be such that the invert of the carrier pipe may be positioned within a vertical area limited on the top by an elevation no higher than the elevation shown on the drawings and on the bottom by an elevation no lower than the existing inlet pipe invert. For sewers, the sides shall be a minimum of 8 inches inside the interior face of the manhole at the end of the bore.

4.2 The allowable tolerance at the upstream end point of the bore shall be such that the invert of the carrier pipe may be positioned at the elevation shown on the drawings.

END OF SECTION

Concrete for Utility Lines

PART 1. GENERAL

1.1 This item shall include furnishing and installing concrete blocking, cradles, anchors, caps, pipe protection, and/or encasement at the locations shown on the drawings and/or directed by the DISTRICT.

PART 2. PRODUCTS

Not used.

PART 3. EXECUTION

3.1 Concrete work shall conform to ACI 301-72 (as revised), as modified by the supplemental requirements below:

A. Strength

1. The strength of concrete shall be 4,000 psi unless otherwise shown on the drawings.

B. Durability

1. All concrete exposed to weather shall be air entrained.

C. Slump

1. Concrete shall be proportional and produced to have a slump of 3 inches with a 1 inch tolerance.

D. Admixtures

1. Air entrainment, mandatory for concrete exposed to weather, may be used. A water reducing admixture (retarding, normal, or accelerating, depending on placing temperature), may be used if approved by the DISTRICT.

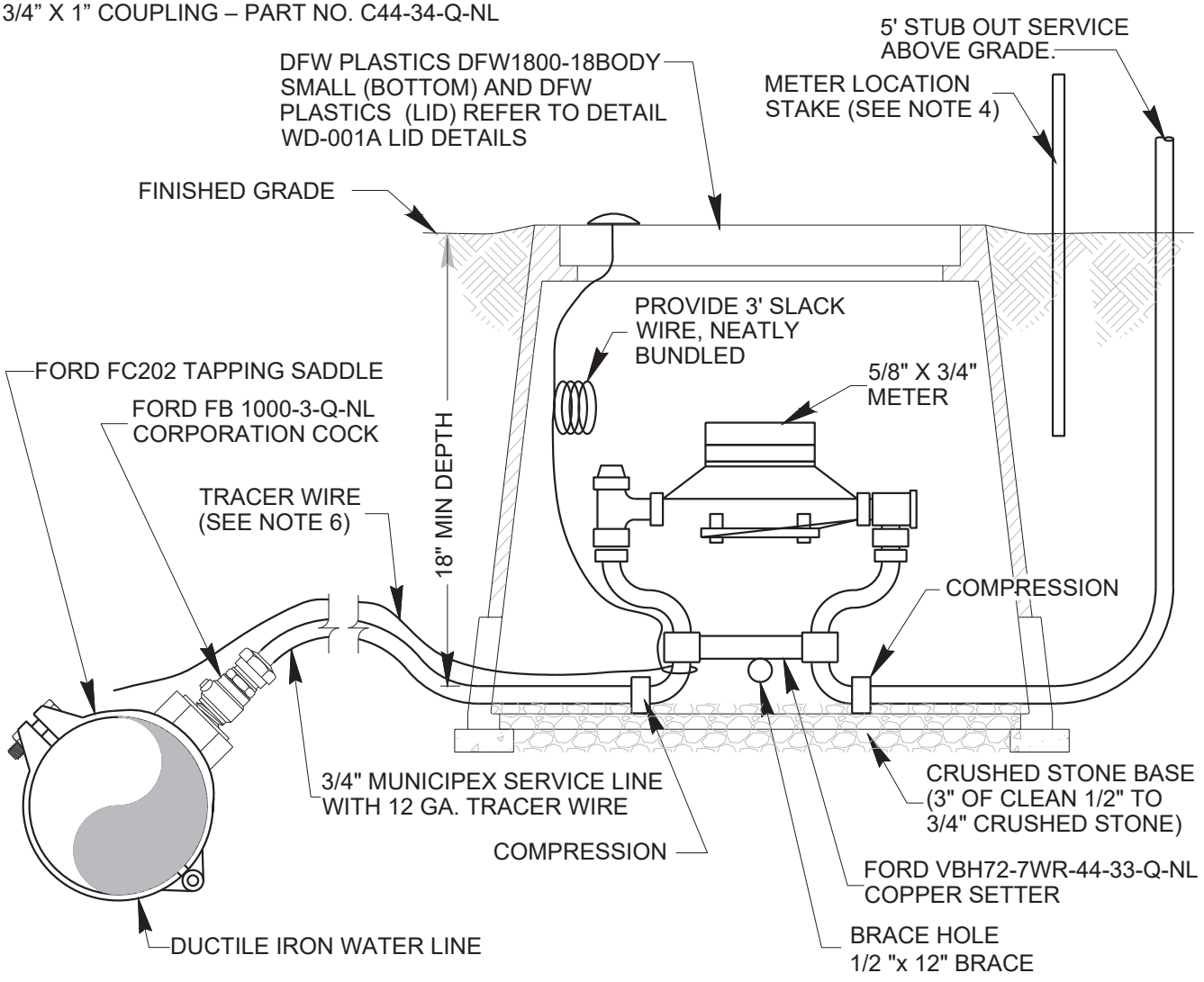
E. Reinforcing Steel

1. Yield strength of reinforcing steel shall be 60,000 psi.

END OF SECTION

NOTES:

1. USE SADDLE FOR TAPS INTO ALL D PIPES.
2. USE SADDLE FOR TAPS INTO EXISTING PVC PIPE.
3. WATER METER SHALL BE SUPPLIED BY THE DISTRICT.
4. METER BOX MUST BE MARKED WITH A STAKE THAT STANDS NO LESS THAN 4' TALL PAINTED BLUE.
5. METER SETTERS MUST HAVE " PVC 1/2 BRACE 1 FOOT LONG INSTALLED IN SETTER SO THAT SETTER WILL STAND UP STRAIGHT.
6. ALL TRACER WIRE NEEDS TO BE RAN INTO METER BOXES & WRAPPED AROUND BOTTOM OF SETTER WITH ENOUGH SLACK TO COME OUT OF TOP OF BOX.
7. ALL METER SETTERS NEED 5 FOOT PIECE OF PEX INSTALLED ON UTLET SIDE OF SETTER & LET PIPE COME TO ABOVE TOP OF GROUND WHEN BACKFILLED.
8. IN SUBDIVISIONS WHERE REQUIRED, THE CONTRACTOR SHALL USE 1" MUNICIPEX FOR BOTH SHORT AND LONG WATER SERVICE LINES WITHIN THE CITY OF LEBANON. WHEN INSTALLING BOTH A DOMESTIC AND IRRIGATION METER FOR A NEW LOT, THE CONTRACTOR MUST INSTALL A 3/4" X 1" COUPLING FITTING AND REDUCE THE PIPE SIZE AS NEEDED TO FIT THE INDIVIDUAL METERS.
   REQUIRED COMPONENTS:
   1" CORPORATION COCK – PART NO. 1000-4-Q-NL
   3/4" X 1" COUPLING – PART NO. C44-34-Q-NL

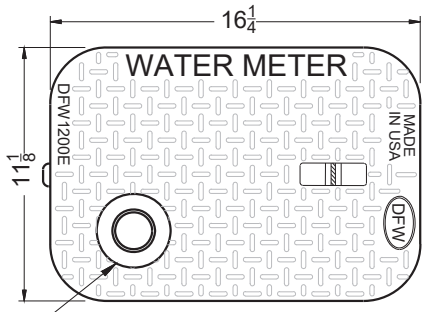


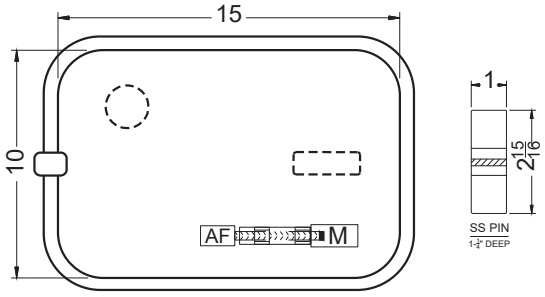
REVISIONS	DATE

3/4" DOMESTIC METER ASSEMBLY

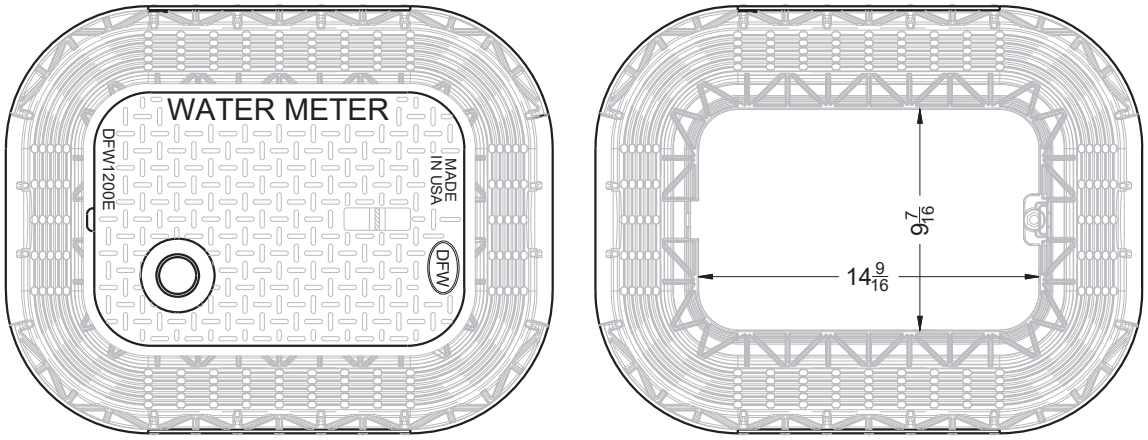
LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-001
DATE: 04/2025

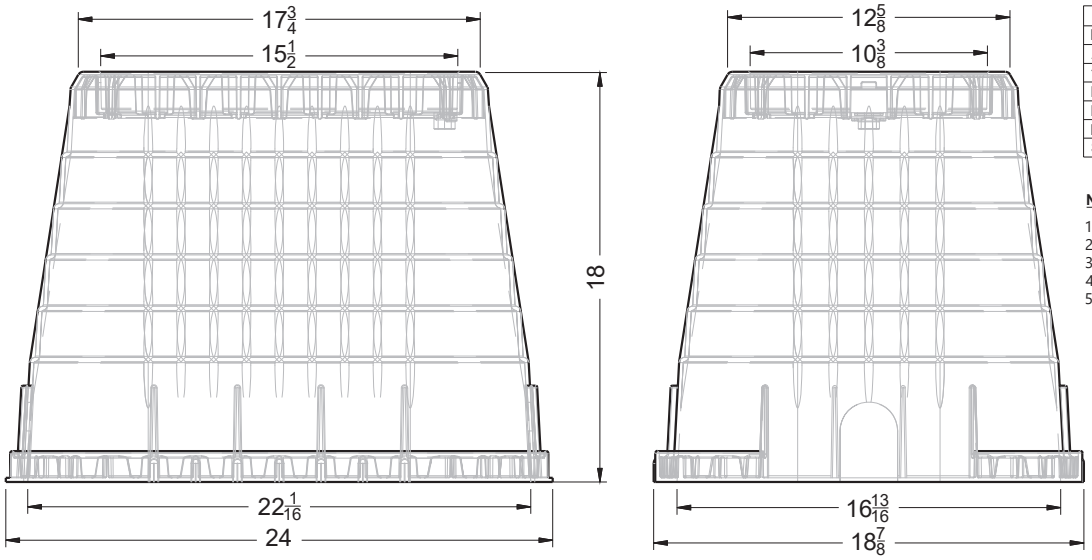




DFW1200E-EAF1MLPF SMALL-LID



DFW1800-18-EAF1MLPF SMALL



DFW1800-18-BODY

BODY KEY	
18	18" DEEP BOX

LID KEY	
E	1200E LID
AF	ANTI FLOAT MATERIAL
1	BLACK COLOR
M	MAGNET
LP	LARGE PICKHOLE
F	KNOCKOUT HOLE
SMALL	BADGER ENDPOINT

NOTES:

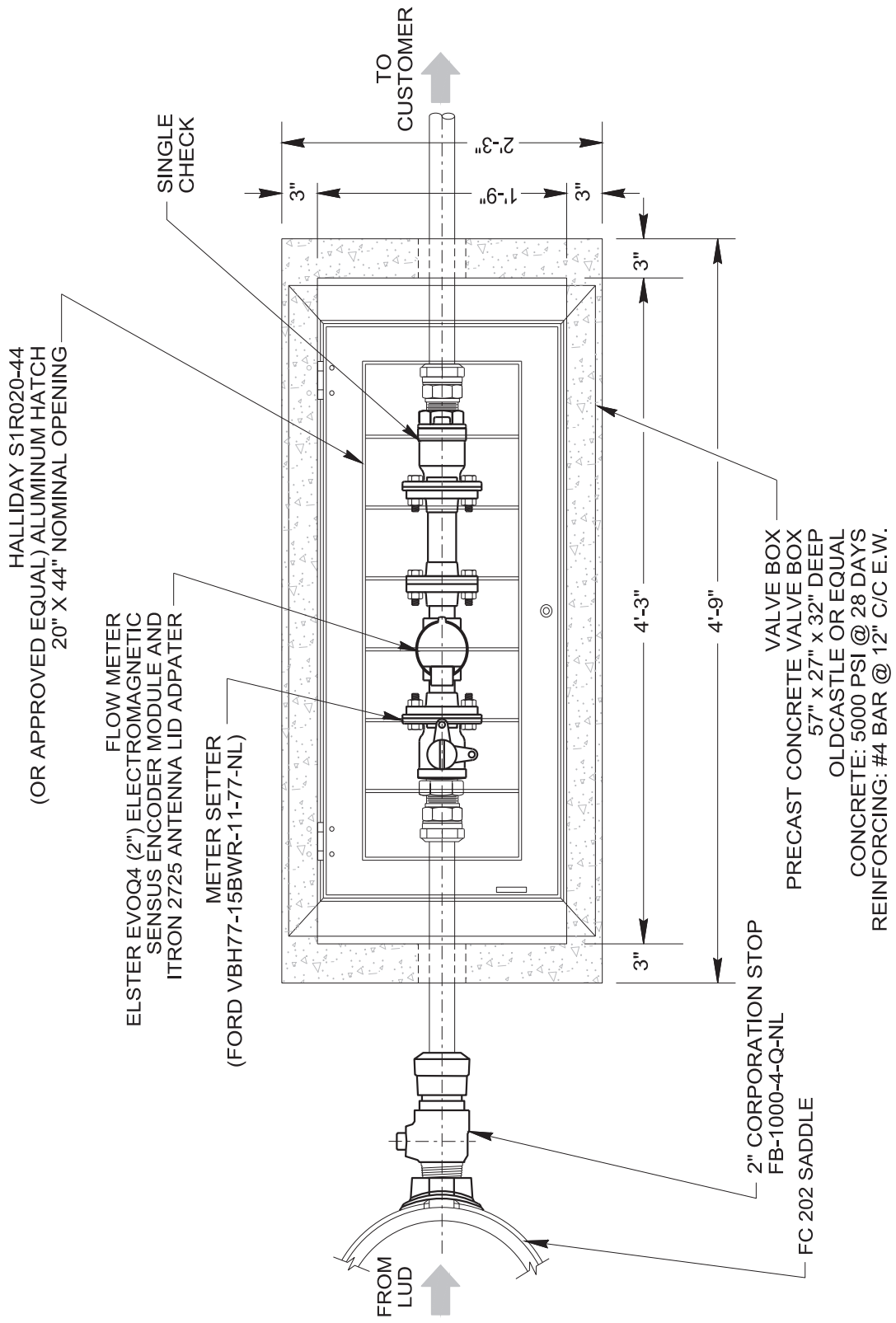
1) DIM'S ± 1/8" U.N.O.
2) LID MATERIAL: ANTI-FLOAT
3) BODY MATERIAL: HDPE
4) WALL THICKNESS: 1/4" MINIMUM
5) I.W.A. = INSIDE WORK AREA

REVISIONS	DATE

3/4" DOMESTIC METER ASSEMBLY LID

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-001A
DATE: 04/2025

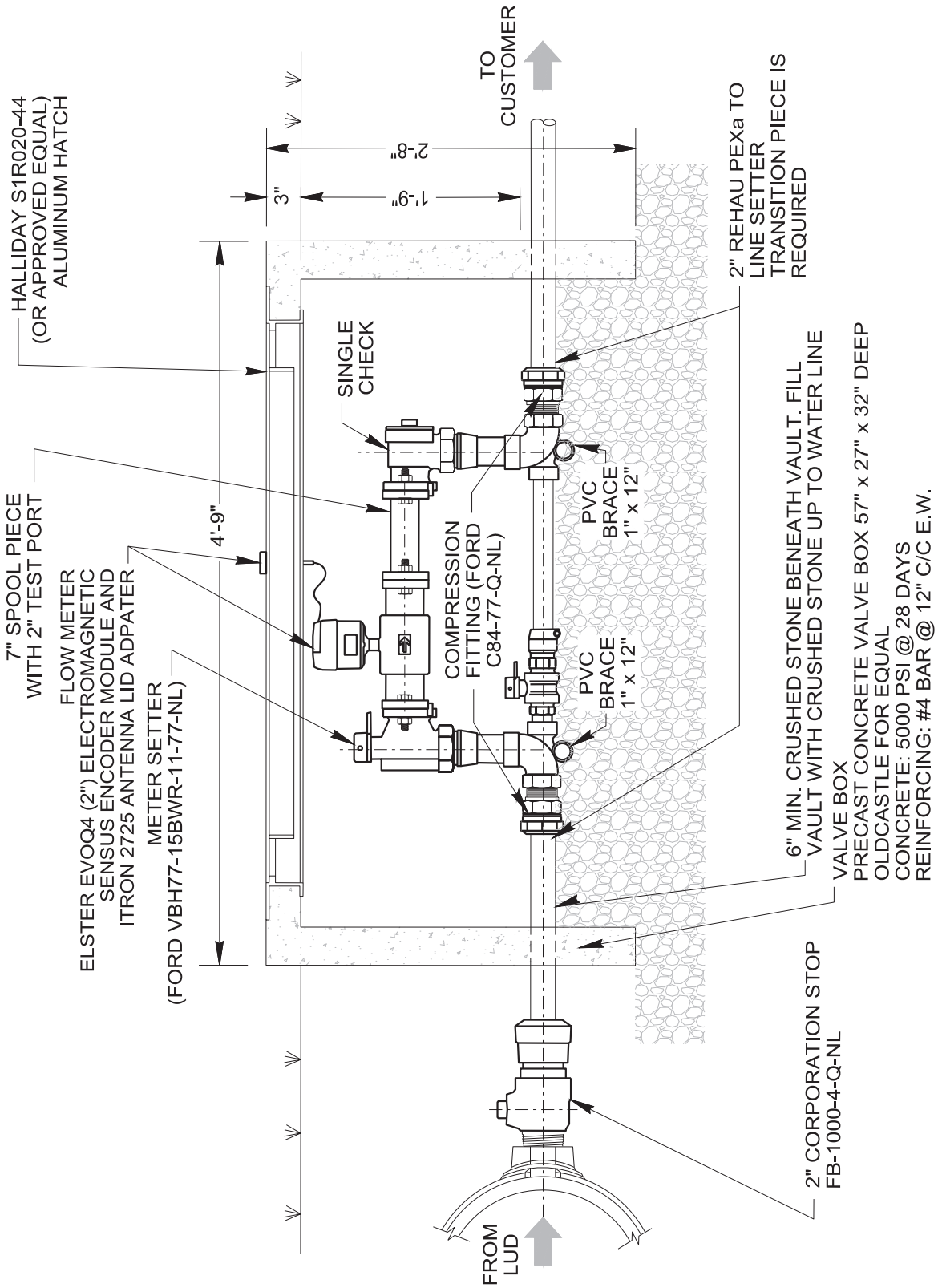


REVISIONS	DATE

2" DOMESTIC / IRRIGATION METER ASSEMBLY PLAN

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-002A
DATE: 04/2025



REVISIONS	DATE

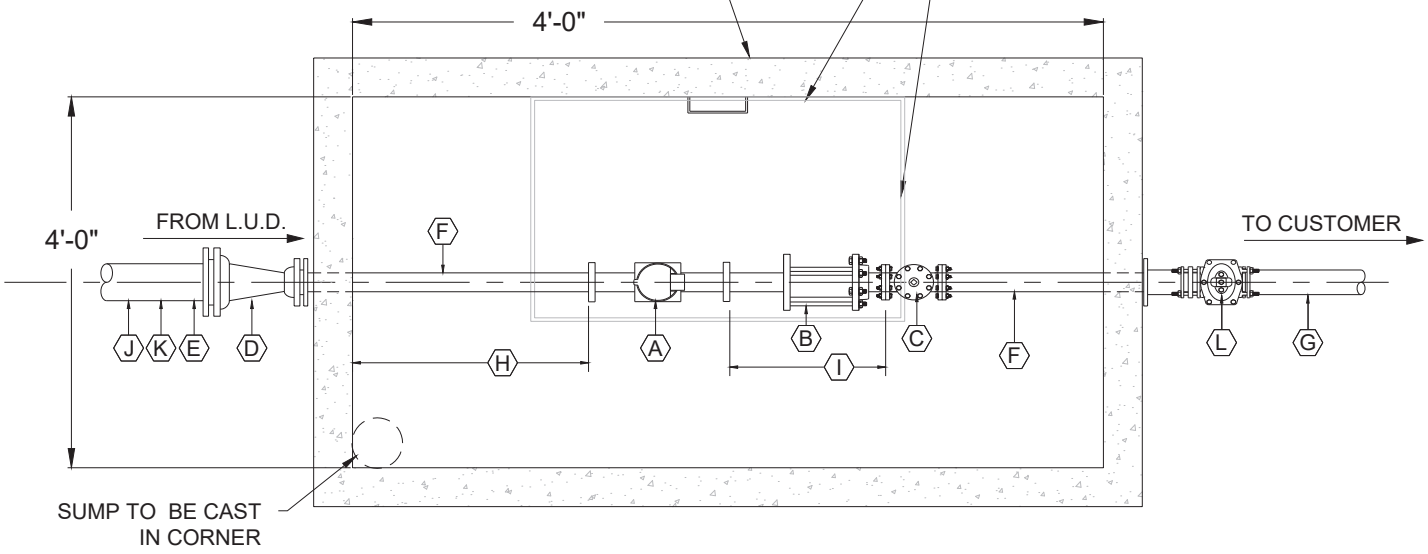
2" DOMESTIC / IRRIGATION METER ASSEMBLY ELEVATION

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-002B
DATE: 04/2025

METER VAULT SHALL BE A 4'x4'x4' PRECAST OR CAST-IN-PLACE METER VAULT PER THE DISTRICT'S STANDARDS. PROVIDE 2" SCH. 40 PVC. DRAIN TO DAYLIGHT OR SUMP WITH SUMP PUMP AND DISCHARGE PIPING TO DAYLIGHT.

24"x36" HALLIDAY ALUMINUM ACCESS HATCH, MODEL W1C3672, CENTERED OVER STEPS, W/ PROVISIONS FOR LOCKING. HOLE SHALL BE DRILLED FOR ANTENNA



BACKFLOW PREVENTER NOTE:

ALL METERS MUST HAVE REDUCED PRESSURE BACKFLOW PREVENTER PER L.U.D. REQUIREMENTS INSTALLED DOWNSTREAM OF THE METER. BACKFLOW PREVENTERS MAY BE INSTALLED WITHIN BUILDINGS IN A HORIZONTAL POSITION IF DESIRED. OUTDOOR BACKFLOW PREVENTERS MUST BE INSTALLED ABOVEGROUND IN HEATED ENCLOSURES MOUNTED ON CONCRETE PADS PER THE MANUFACTURER'S REQUIREMENTS.

NO CONNECTIONS ARE ALLOWED TO PUBLIC WATER LINE BETWEEN THE METER AND THE BACKFLOW PREVENTER.

A	3" ELSTER EVOQ4 METER RADIO READ (FLANGED) W/ SENSUS ENCODER MODULE & ITRON CELLULAR 500W MODULE
B	3" EPOXY COATED DISMANTLING JOINT
C	2" TEST PORT
D	6"x3" REDUCER MJ (SIZE MAY VARY)
E	LUD WATER MAIN (SIZE VARIES)
F	3" WATERLINE DIP CLASS 52
G	CUSTOMER WATER LINE (SIZE VARIES)
H	15" STRAIGHT PIPE (SPACING REQUIRED FOR METER ACCURACY)
I	9" STRAIGHT PIPE (SPACING REQUIRED FOR METER ACCURACY)
J	IF WATERMAIN IS EXISTING, THAN ROMAC SSTII TS&V OR EQUAL. CONNECTION SHALL BE FL x MJ.
K	IF WATERMAIN IS NEW, THEN CONNECTION SHALL BE MJ x MJ.
L	3" GATE VALVE, MJ

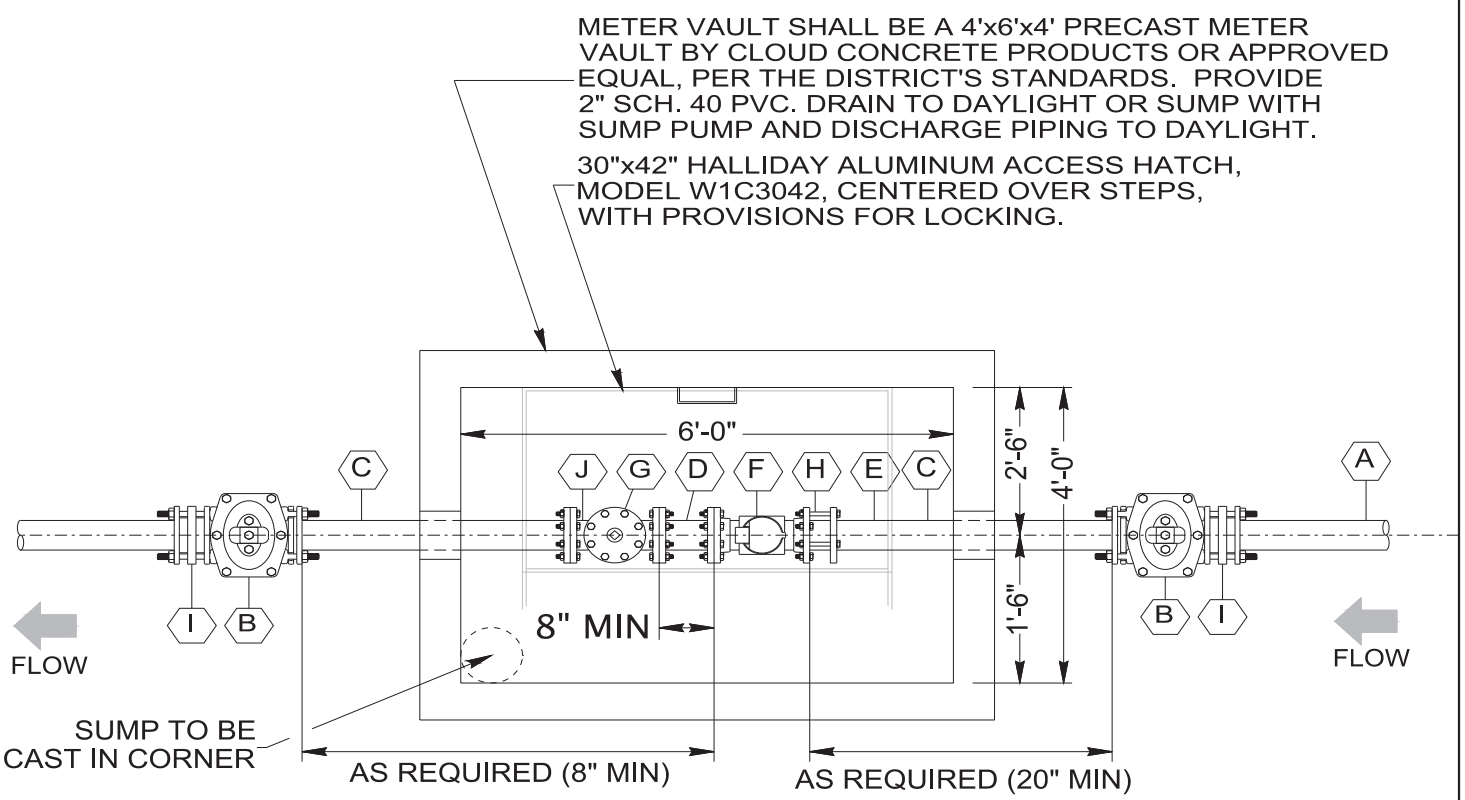
IN THE CASE OF THIS DETAIL BEING USED FOR A FIRE METER, THE UPSTREAM GATE VALVE SHALL BE A POST INDICATOR VALVE (PIV).

REVISIONS	DATE

3" DOMESTIC METER ASSEMBLY

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-002C
DATE: 04/2025



BACKFLOW PREVENTER NOTE:

ALL METERS MUST HAVE REDUCED PRESSURE BACKFLOW PREVENTER PER L.U.D. REQUIREMENTS INSTALLED DOWNSTREAM OF THE METER. BACKFLOW PREVENTERS MAY BE INSTALLED WITHIN BUILDINGS IN A HORIZONTAL POSITION IF DESIRED. OUTDOOR BACKFLOW PREVENTERS MUST BE INSTALLED ABOVEGROUND IN HEATED ENCLOSURES MOUNTED ON CONCRETE PADS PER THE MANUFACTURER'S REQUIREMENTS.

NO CONNECTIONS ARE ALLOWED TO PUBLIC WATER LINE BETWEEN THE METER AND THE BACKFLOW PREVENTER.

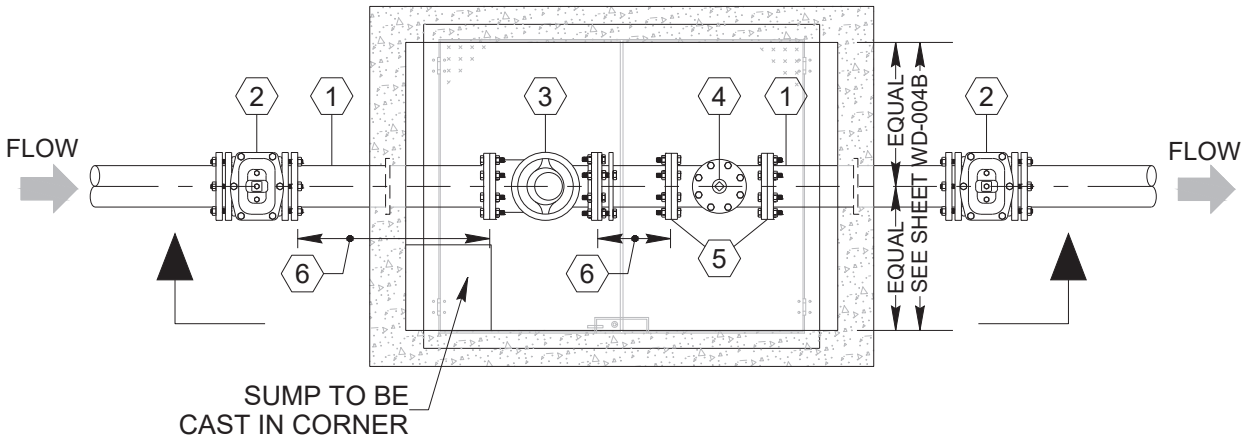
A	4" DUCTILE IRON PIPE, MJ, THK. CL 52, TO WATER MAIN
B	4" GATE VALVE w/ BOX, MJ
C	4" DUCTILE IRON PIPE, MJ. THK. CL 52
D	4" DUCTILE IRON PIPE, FL x FL, THK. CL 52
E	4" DUCTILE IRON PIPE, FL x MJ, THK. CL 52
F	4" ELSTER EVOQ4 METER W/ SENSUS ENCODER MODULE & ITRON CELLULAR 500W MODULE
G	2" TAP WITH BALL VALVE FOR METER TESTING PURPOSES
H	4" EPOXY COATED DISMANTLING JOINT
I	4" MJ FOSTER ADAPTER
J	4" x 4" FLANGED TEE WITH 4" BLIND FLANGED TAPPED WITH 2" BALL VALVE

REVISIONS	DATE

4" DOMESTIC METER ASSEMBLY

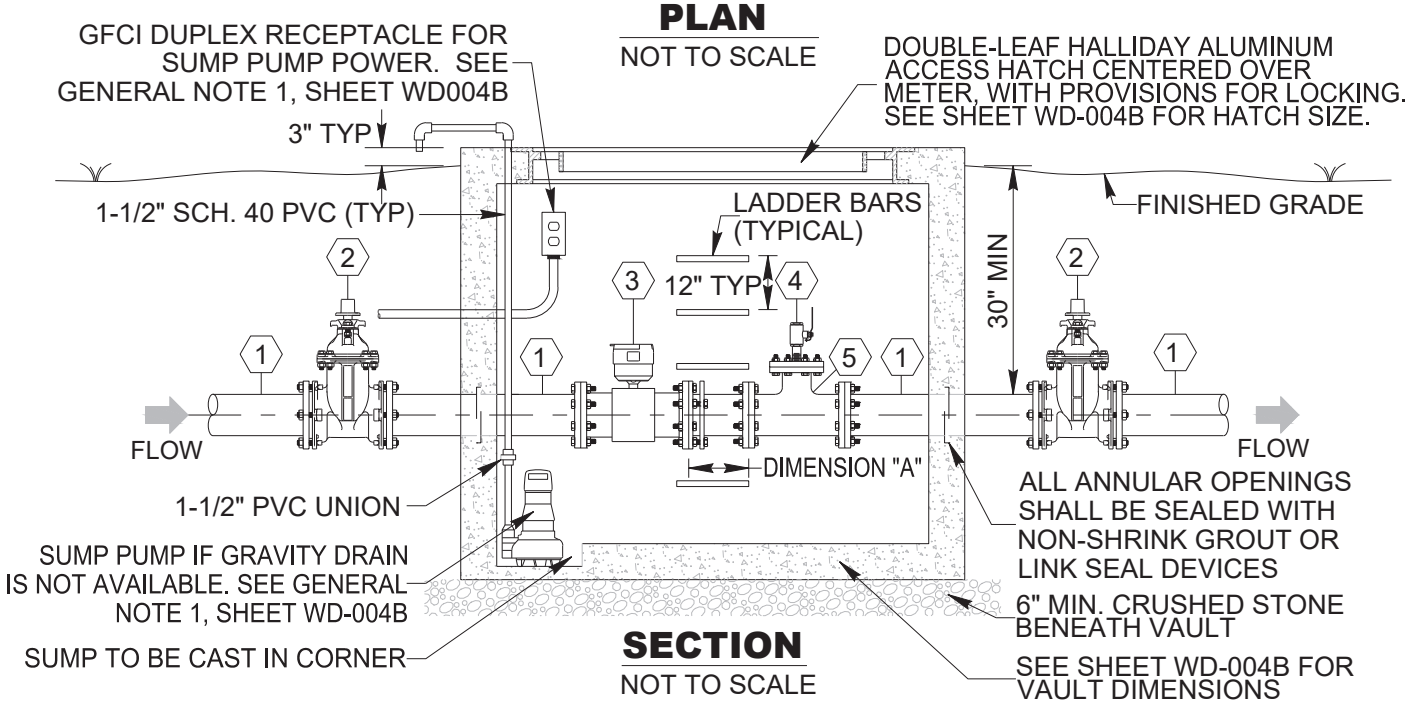
LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-003
DATE: 04/2025



PLAN

NOT TO SCALE



SECTION

NOT TO SCALE

BACKFLOW PREVENTER NOTE:

ALL METERS MUST HAVE REDUCED PRESSURE BACKFLOW PREVENTER PER L.U.D. REQUIREMENTS INSTALLED DOWNSTREAM OF THE METER. BACKFLOW PREVENTERS MAY BE INSTALLED WITHIN BUILDINGS IN A HORIZONTAL POSITION IF DESIRED, AS LONG AS THEY ARE WITHIN 100' OF THE METER. OUTDOOR BACKFLOW PREVENTERS MUST BE INSTALLED ABOVEGROUND IN HEATED ENCLOSURES MOUNTED ON CONCRETE PADS PER THE MANUFACTURER'S REQUIREMENTS.

NO CONNECTIONS ARE ALLOWED TO PUBLIC WATER LINE BETWEEN THE METER AND THE BACKFLOW PREVENTER.

REVISIONS	DATE

6" AND 8" DOMESTIC METER ASSEMBLY PLAN AND SECTION

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-004A
DATE: 04/2025

LINE SIZE	MIN. INSIDE VAULT SIZE	HATCH SIZE	DIMENSION "A" (MIN)	DIMENSION "B" (MIN)
6"	4' x 6' x 5' DEEP	60" x 48"	12" (2 PIPE DIA.)	30" (5 PIPE DIA.)
8"	6' x 8' x 6' DEEP	72" x 48"	16" (2 PIPE DIA.)	40" (5 PIPE DIA.)

DEVICE AND FITTING SCHEDULE

NO.	DESCRIPTION
1	CL. 52 DIP
2	GATE VALVE WITH VALVE BOX
3	ELSTER EVOQ4 METER ROADIO READ W/ SENSUS ENCODER MODULE & ITRON CELLULAR 500W MODULE
4	2" TAP W/ 2" BALL VALVE FOR METER TESTING PURPOSES
5	4" BRANCH DI FLANGED TEE WITH 4" BLIND FLANGE TAPPED FOR 2" COPPER
6	THE METER SHOULD BE INSTALLED SUCH THAT 5 PIPE DIAMETERS OF STRAIGHT PIPE THE SAME SIZE OF THE METER UPSTREAM AND 3 PIPE DIAMETERS THE SAME SIZE AS THE METER DOWNSTREAM TO PREVENT TURBULENT JETTING

1. ALL FITTINGS AND VALVES TO INCLUDE MECHANICAL RESTRAINT DEVICES.
2. ALL FITTINGS, DEVICES, AND VALVES SHALL BE SAME NOMINAL SIZE AS METER (I.E. 6" PIPE FOR 6" METER, 8" PIPE FOR 8" METER, ETC.)

GENERAL NOTES:

1. THE CONCRETE VAULT FOR THE MASTER METER ASSEMBLY SHALL BE FURNISHED WITH A CAST IN PLACE ACCESS HATCH AS SPECIFIED HEREON. IF A POSITIVE, ADEQUATELY SIZED DRAIN TO DAYLIGHT CANNOT BE PROVIDED DIRECTLY FROM THE VAULT, A SUMP SHALL BE CAST INTO THE BASE OF THE VAULT, AND THE VAULT INSTALLATION SHALL BE COMPLETE WITH A SUMP PUMP SET AS REQUIRED, WITH PIPED DISCHARGE TO DAYLIGHT AT AN APPROVED LOCATION. SUMP PUMP SHALL BE A ZOELLER MODEL 63 (OR APPROVED EQUAL). 0.3 HP, 110 VAC, 1Ø, AUTOMATIC, 10' UL LISTED CORD WITH 3-WIRE GROUNDED PLUG, 1-1/2" DISCHARGE, 14 GPM @ 20' HEAD.

2. IT SHALL BE THE OWNER'S / DEVELOPER'S RESPONSIBILITY TO MEET AND PROVIDE ANY AND ALL POWER REQUIREMENTS ASSOCIATED WITH THE SUMP PUMP IN THE MASTER METER VAULT, IF APPLICABLE. AT A MINIMUM A GFCI DUPLEX RECEPTACLE ON A 20 AMP DEDICATED CIRCUIT MOUNTED IN A WEATHERPROOF ENCLOSURE WITH WHILE-IN-USE COVER SHALL BE PROVIDED FOR THE SUMP PUMP. IN NO CASE SHALL THE LAGUARDO UTILITY DISTRICT BE RESPONSIBLE FOR PROVIDING POWER TO THESE INSTALLATIONS.

3. COORDINATE ALL WORK AS SHOWN HEREON WITH THE LAGUARDO UTILITY DISTRICT, INCLUDING CONNECTIONS TO EXISTING OR PROPOSED LINES AND THE CONSTRUCTION OF THE PUBLIC IMPROVEMENTS, IF APPLICABLE.

4. FOR THE PUBLIC PORTION OF THE PROPOSED FIRE LINE, ALL PIPING SHALL BE NEW DUCTILE IRON PIPE, AWWA THICKNESS CLASS 52, AND ALL MECHANICAL JOINT FITTINGS SHALL BE NEW DUCTILE IRON FITTINGS WITH MEGA-LUG GLANDS.

5. ALL VALVES WITH MECHANICAL JOINTS SHALL HAVE MEGA LUG GLANDS.

6. FOR CLARITY, PIPING AND METER SUPPORTS HAVE NOT BEEN SHOWN HEREON. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR FURNISHING AND INSTALLING ALL REQUIRED SUPPORTS.

7. THE TAP FOR METER TESTING PURPOSES (ITEM 8 AT LEFT) SHALL INCLUDE A 2" TAP AND CORPORATION STOP WITH A 2"x6" BRASS SPOOL PIECE, THREADED ON BOTH ENDS TO FACILITATE CONNECTION OF THE METER TESTING APPARATUS. COORDINATE WITH THE LAGUARDO UTILITY DISTRICT.

8. THE INTERNAL TO THE CONCRETE METER VAULT SHALL HAVE AN INTEGRAL DISMANTLING JOINT, SMITH-BLAIR MODEL 975. FOR CLARITY THE DISMANTLING JOINT HAS NOT BEEN SHOWN HEREON.

SEE SHEET WD-004A FOR VAULT PLAN AND SECTION

REVISIONS	DATE

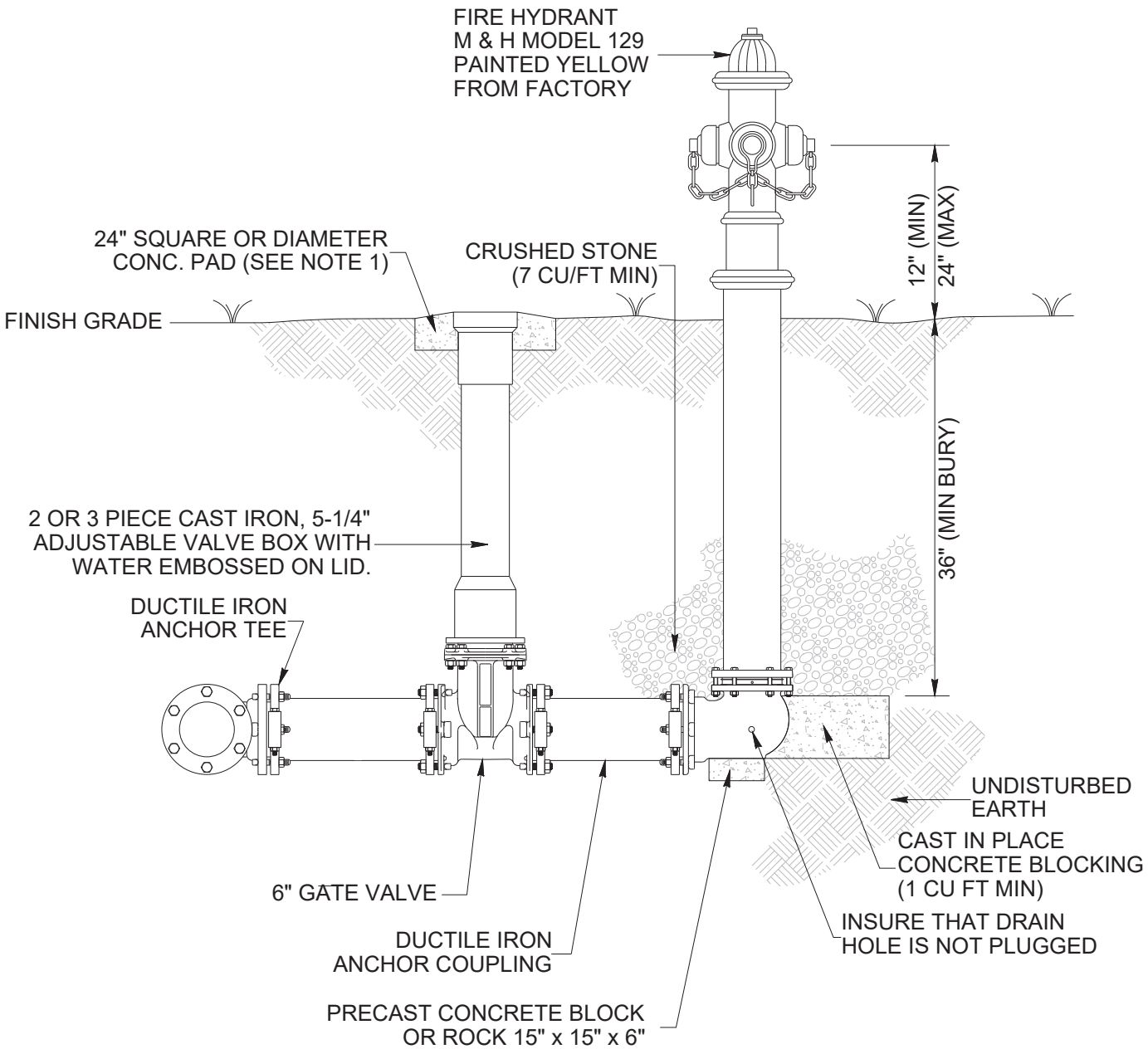
6" AND 8" DOMESTIC METER ASSEMBLY GENERAL NOTES AND DEVICE LISTING

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-004B
DATE: 04/2025

NOTES:

1. CONCRETE PAD SHALL BE POURED IN PLACE. PRECAST NOT ACCEPTABLE.
2. OPERATING NUT, OPENING DIRECTION, CAP NUTS, THREAD AND CONNECTIONS MUST BE APPROVED IN WRITING BY THE OWNER AS CONFORMING TO HIS STANDARDS.



REVISIONS	DATE

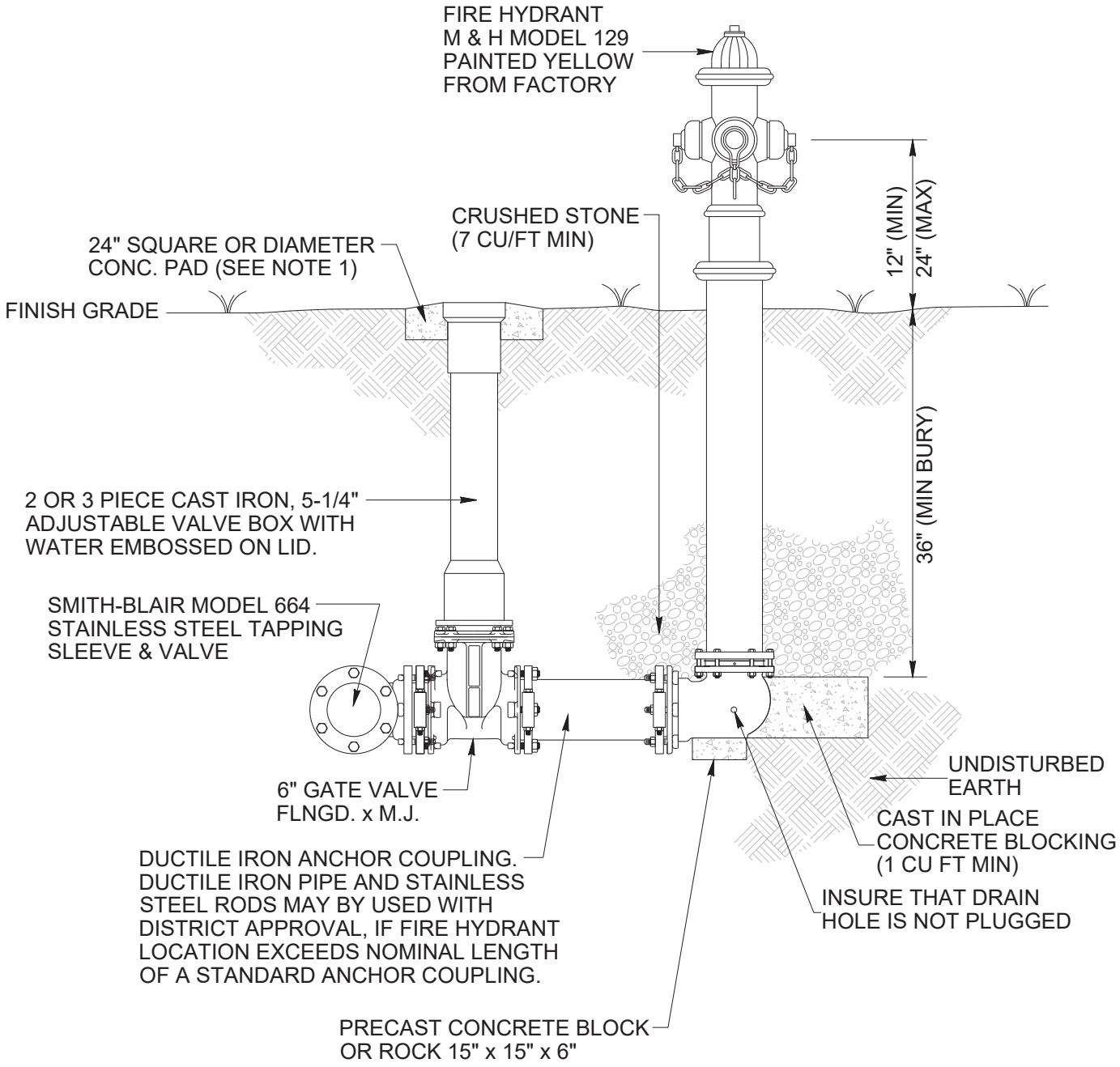
FIRE HYDRANT SETTING DETAIL

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-005
DATE: 04/2025

NOTES:

1. CONCRETE PAD SHALL BE POURED IN PLACE. PRECAST NOT ACCEPTABLE.
2. OPERATING NUT, OPENING DIRECTION, CAP NUTS, THREAD AND CONNECTIONS MUST BE APPROVED IN WRITING BY THE OWNER AS CONFORMING TO HIS STANDARDS.



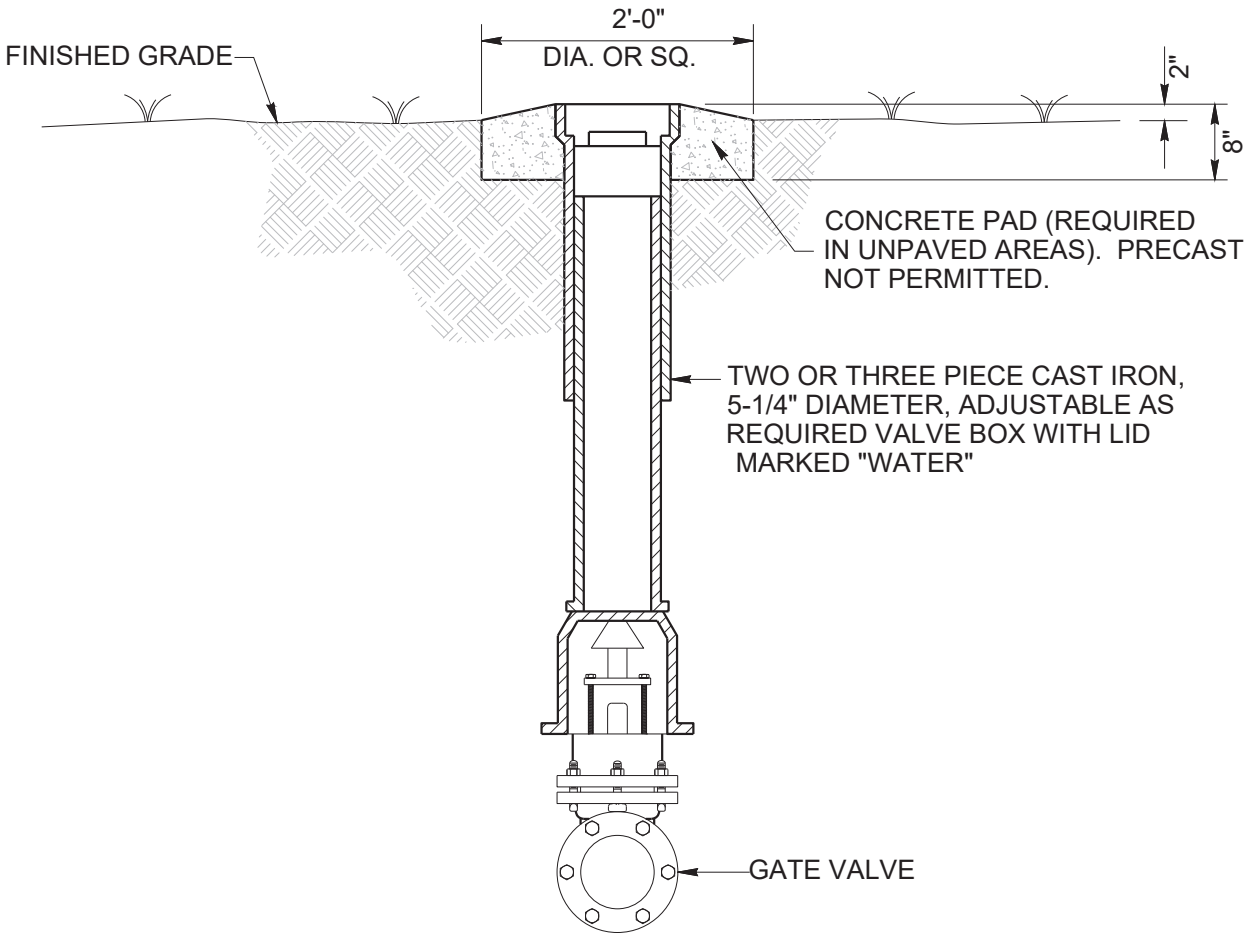
REVISIONS	DATE

FIRE HYDRANT SETTING DETAIL ON EXISTING WATERLINE

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-005A
DATE: 04/2025

NOTE:
CONCRETE PAD SHALL
BE POURED IN PLACE.

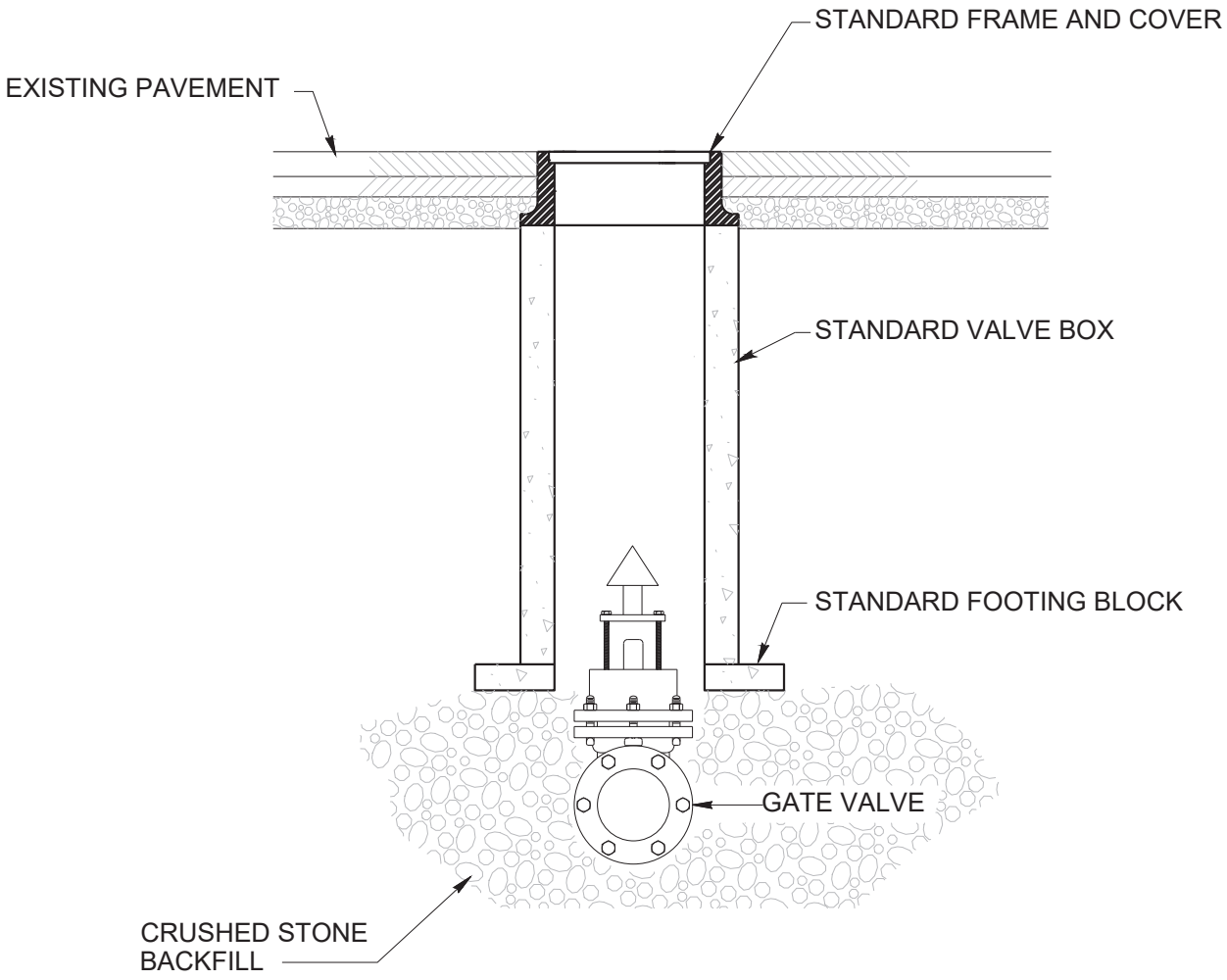


REVISIONS	DATE

VALVE BOX SETTING DETAIL OUTSIDE PAVEMENT

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-006A
DATE: 04/2025

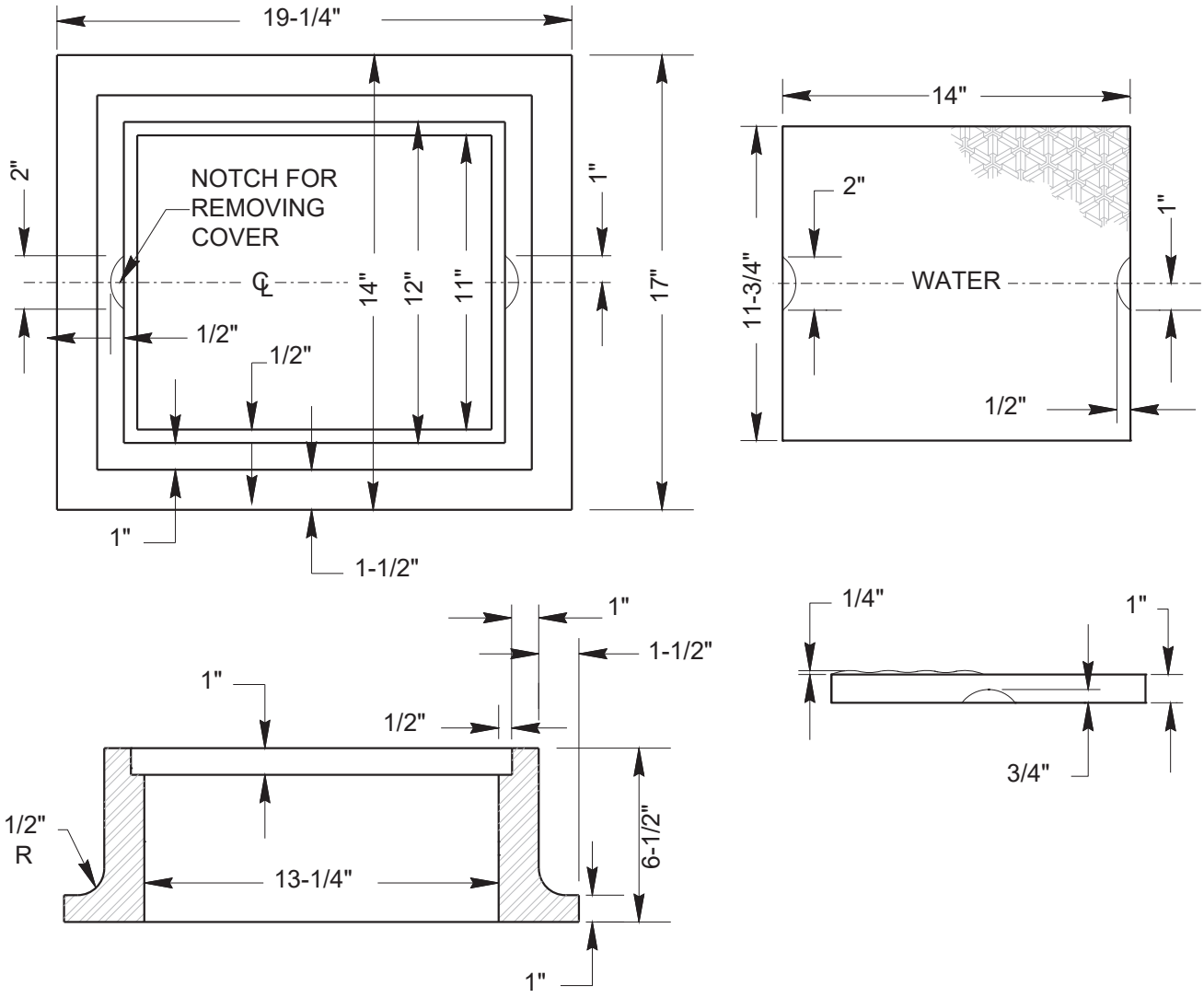


REVISIONS	DATE

VALVE BOX SETTING DETAIL
INSIDE PAVEMENT

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-006B
DATE: 04/2025



NOTES:

1. NO OPEN SAND CASTINGS, CASTINGS ARE TO BE MADE OF CAST IRON IN ACCORDANCE WITH CURRENT SPECIFICATIONS. COVER MUST FIT EVENLY ON RABBIT OF FRAME IN ORDER TO EQUALLY DISTRIBUTE WEIGHT OF COVER OVER FRAME MINIMUM WEIGHT OF FRAME 150 LBS. MINIMUM WEIGHT OF COVER 45 LBS.

2. CASTINGS WITHOUT PICK HOLES ON FRAME AND LID WILL NOT BE PERMITTED.

3. WORDING ON LID SHALL BE PLACED PERPENDICULAR TO WATER LINE.

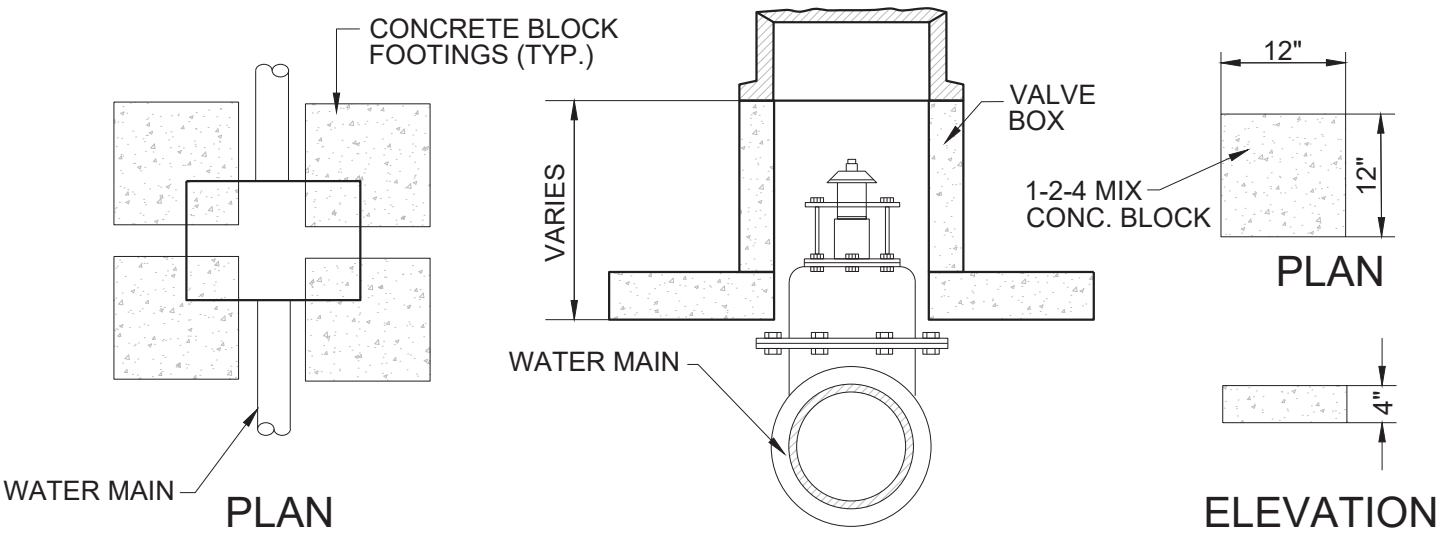
4. VALVE BOX ADJUSTMENT SHALL BE ACHIEVED BY USE OF PRECAST ADJUSTMENT PIECES OR FIELD - CUT PRECAST PIECES. BRICK AND MORTAR ADJUSTMENT NOT PERMITTED, WITHOUT APPROVAL OF THE UTILITY DISTRICT.

REVISIONS	DATE

CAST IRON VALVE BOX FRAME AND COVER IN PAVEMENT

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-006C
DATE: 04/2025

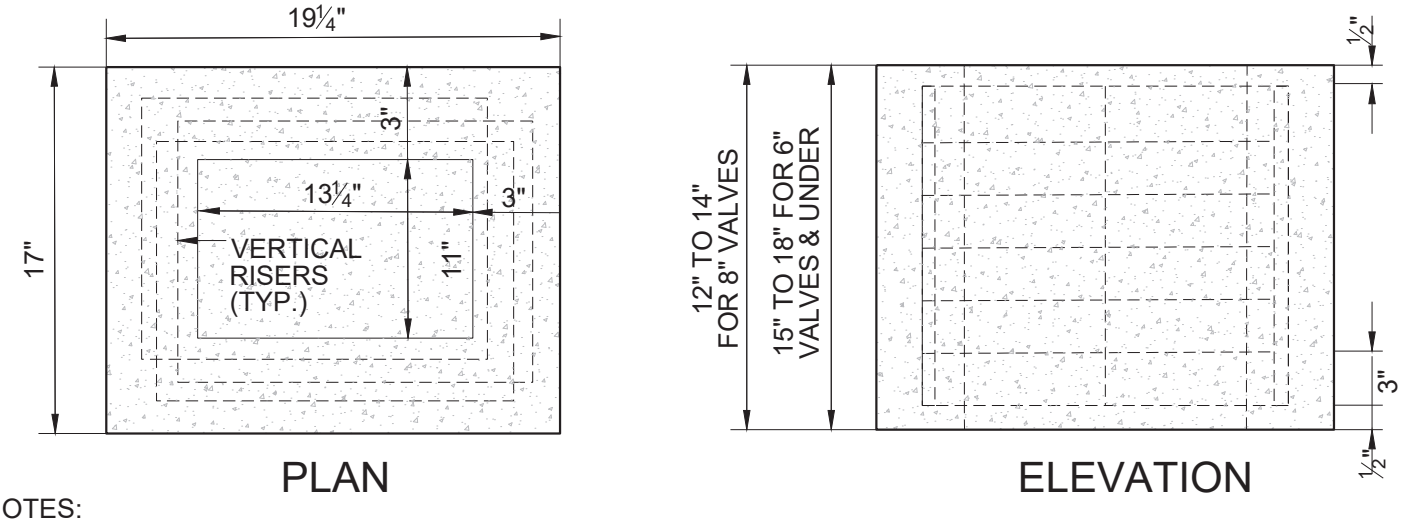


NOTES:

1. FOUR (4) CONCRETE BLOCKS OR THE SIZE AND SHAPE SHOWN ARE TO BE PLACED UNDER EACH VALVE BOX, ONE UNDER EACH CORNER.

2. NO REINFORCING STEEL IN FOOTING. CONCRETE MIX 1 PART CEMENT, 2 PARTS SAND AND 4 PARTS No. 2 CRUSHED STONE OR GRAVEL. VOLUME FOR ONE BLOCK = 0.333 CU. FT. WEIGHT OF ONE BLOCK = APPROX. 50 LBS. FOR ALL FOUR BLOCKS. WEIGHT = 200 LBS. BEARING AREA ON SOIL = 576 SQ. IN.

3. VALVE BOX ADJUSTMENT SHALL BE ACHIEVED BY USE OF PRECAST ADJUSTMENT PIECES OR FIELD - CUT PRECAST PIECES. BRICK AND MORTAR ADJUSTMENT NOT PERMITTED WITHOUT APPROVAL OF THE UTILITY DISTRICT.



NOTES:

1. REINFORCING TO BE ¼" STEEL REINFORCING RODS PLACED HORIZONTALLY IN SQUARES 16-1/4" x 14" AND TO STAGGERED APPROX. AS SHOWN ON THE PLAN VIEW, ONE FOR EVERY 3" OF HEIGHT IN BOX. VERTICAL RISERS ARE TO BE 1" SHORTER THAN THE HEIGHT OF THE BOX AND SHALL BE PLACED IN EACH CORNER OF THE BOX USING 8" RISERS TO THE BOX. TOTAL LENGTH OF REINFORCING ROD FOR EACH BOX IS APPROX. 47 FEET.

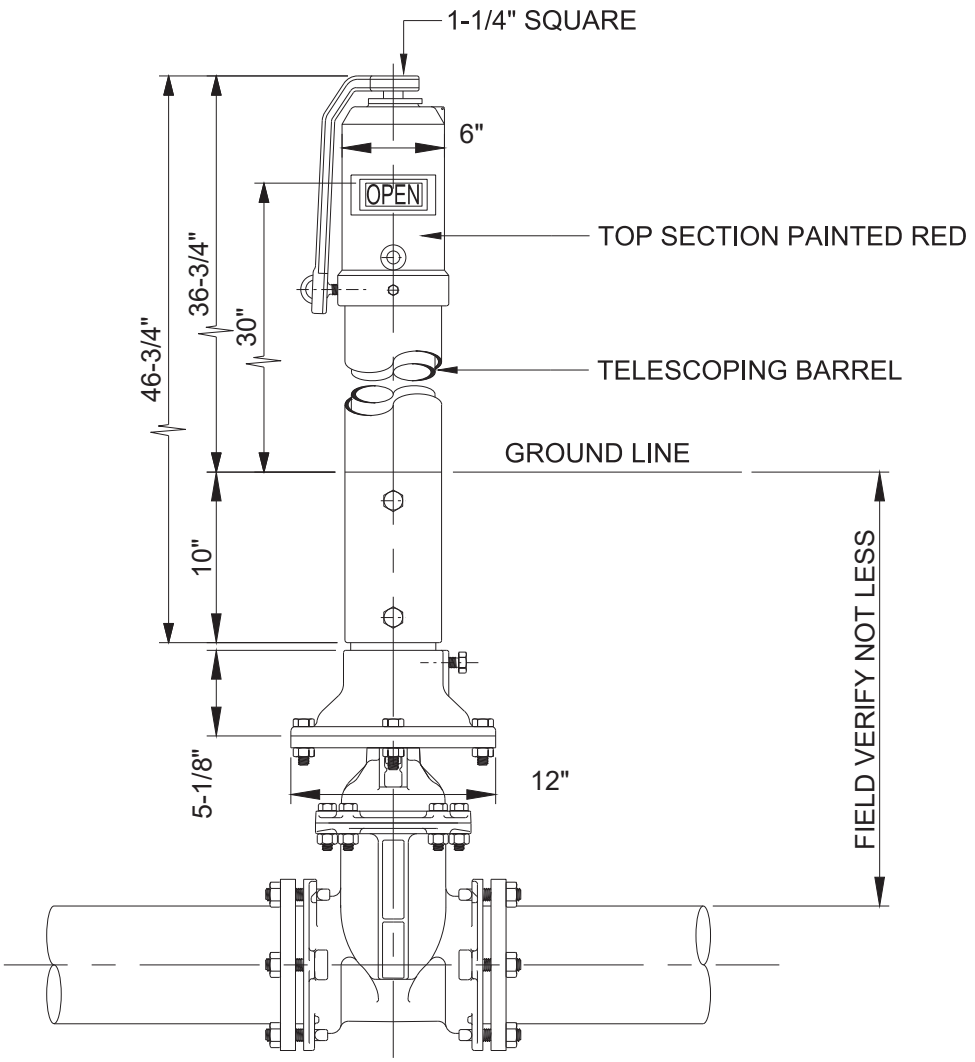
2. CONCRETE MIXTURE TO BE 1 PART CEMENT, 2 PARTS SAND AND 4 PARTS No. 2 CRUSHED STONE OR GRAVEL. TOTAL VOLUME OF MIXTURE FOR EACH BOX IS APPROX. 2 CUBIC FEET.

REVISIONS	DATE

STANDARD CONCRETE VALVE BOX IN PAVEMENT

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-006D
DATE: 04/2025



FIELD ADJUSTMENT INSTRUCTIONS

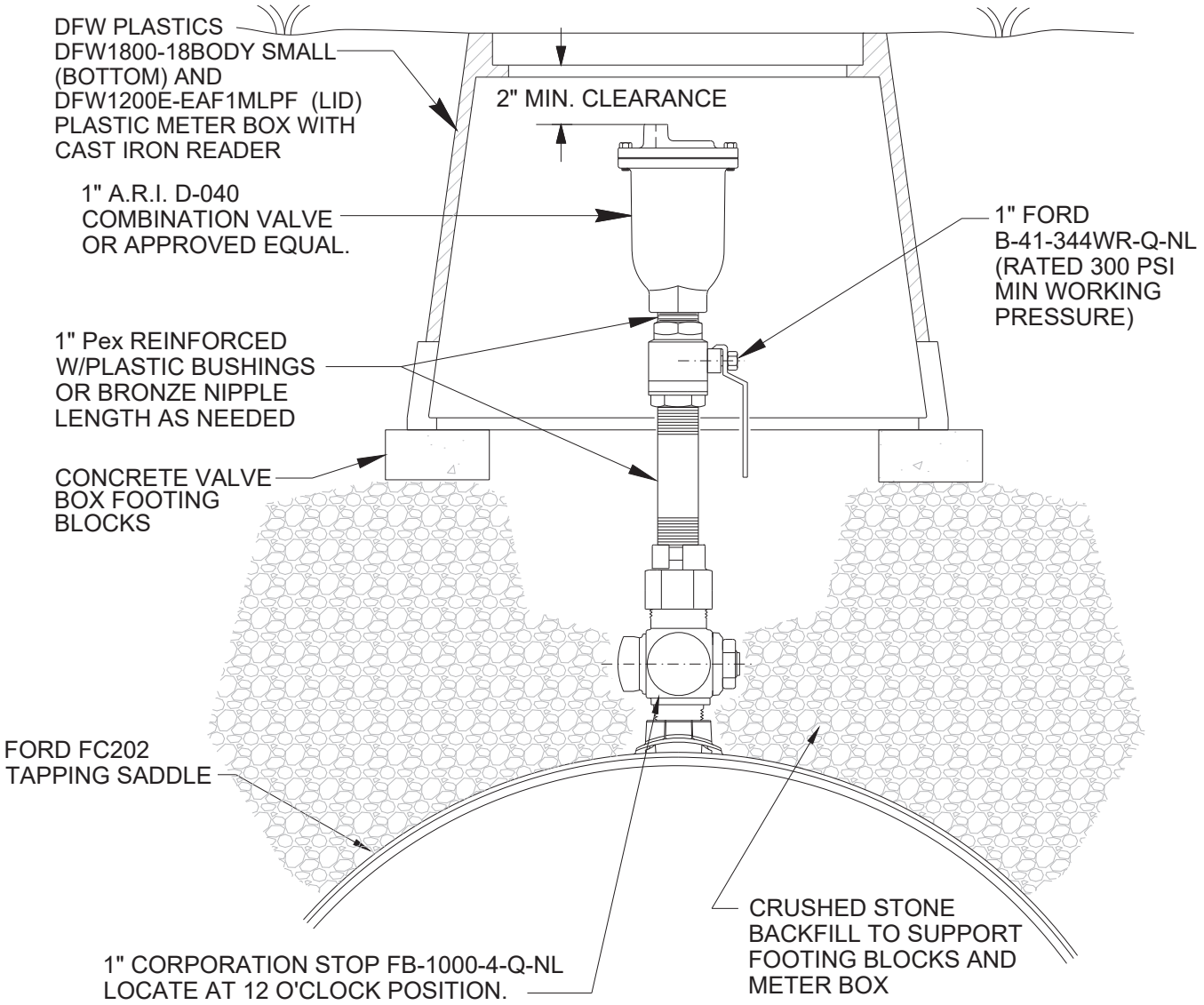
1. REMOVE THE TOP SECTION FROM THE TOP OF THE INDICATOR POST ASSEMBLY.
2. LOOSEN THE TELESCOPING BARREL SCREWS AND ADJUST BARREL TO THE GROUND LINE.
3. CUT THE 1" SQUARE STEM AT A DISTANCE OF 9" ABOVE THE TOP OF THE BARREL END.
4. SET THE "OPEN" AND "SHUT" TARGETS FOR THE APPROPRIATE VALVE SIZE.
5. REATTACH THE TOP SECTION TO THE TOP OF THE INDICATOR POST ASSEMBLY.

REVISIONS	DATE

INDICATOR POST TELESCOPING BARREL UL/FM

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-007
DATE: 04/2025



NOTES

1. ARV TO BE PLACED AT HIGH POINT IN PROFILE OR AS DIRECTED BY LUD.
2. BOX SHALL BE DFW PLASTICS DFW1800-18BODY SMALL (BOTTOM) AND DFW1200E-EAF1MLPF (LID) PLASTIC METER BOX WITH CAST IRON LID
3. IF PIPE IS LOCATED IN TRAFFIC AREAS, THEN THE ARV ASSEMBLY SHALL BE INSTALLED OUTSIDE TRAFFIC AREAS AND 1" OR 2" PEXa PIPE SHALL BE RUN TO THE TAP ON THE WATER LINE. 1" OR 2" LINE SHALL BE INSTALLED TO MAINTAIN AN UPHILL GRADIENT TO THE ARV. NO DIPS OR SAGS ARE ALLOWED.

REVISIONS	DATE

1" AUTOMATIC AIR RELEASE VALVE WITH BOX

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

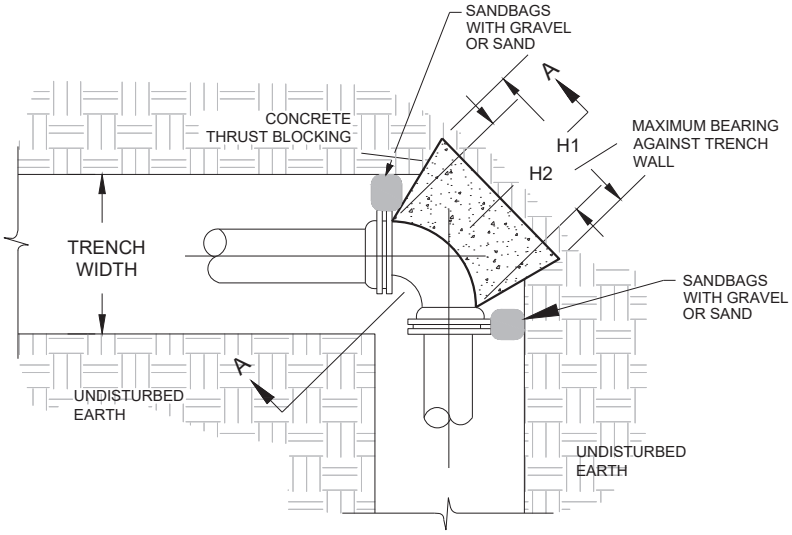
DRAWING NUMBER
WD-008
DATE: 04/2025

TABLE OF DIMENSIONS FOR CONCRETE BLOCKING

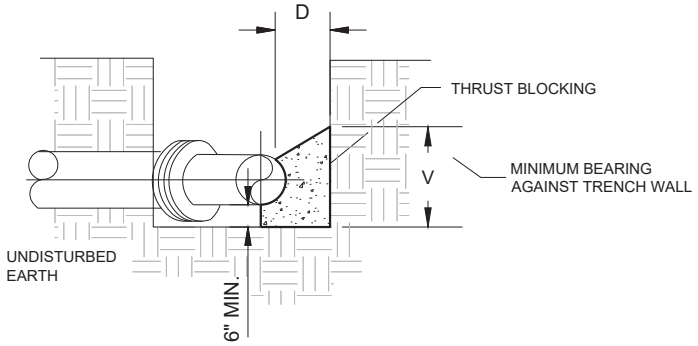
TEES, CROSSES & PLUGS					90° BENDS					45° BENDS					22-1/2° BENDS					11-1/4°D BENDS					PIPE SIZE
H1	H2	V	D	C.F.	H1	H2	V	D	CF	H1	H2	V	D	C.F.	H1	H2	V	D	C.F.	H1	H2	V	D	C.F.	2" - 2-1/4"
18"	10"	12"	18"	1.90	18"	10"	12"	18"	1.90	18"	6"	12"	18"	1.50	18"	6"	12"	18"	1.50	18"	6"	12"	18"	1.50	3" - 4"
24"	12"	12"	18"	2.25	24"	12"	12"	18"	2.24	18"	8"	12"	18"	1.60	18"	8"	12"	18"	1.60	18"	8"	12"	18"	1.60	6"
24"	16"	18"	18"	3.50	30"	16"	18"	18"	4.05	24"	10"	16"	18"	3.20	24"	10"	16"	18"	3.20	24"	10"	16"	18"	3.20	8"
36"	18"	18"	18"	5.05	39"	18"	24"	18"	7.30	30"	12"	18"	18"	3.95	24"	12"	18"	18"	3.45	24"	12"	16"	18"	3.40	10"
48"	24"	18"	24"	7.15	54"	32"	24"	18"	10.25	36"	18"	21"	18"	4.60	24"	18"	21"	18"	4.60	24"	18"	21"	18"	4.60	12"
54"	30"	24"	24"	13.40	54"	32"	36"	24"	18.15	42"	18"	24"	24"	9.60	24"	18"	24"	24"	6.60	24"	18"	21"	24"	6.10	14"
60"	32"	30"	24"	17.90	60"	40"	42"	24"	25.00	44"	24"	30"	24"	13.20	30"	24"	24"	24"	9.20	27"	21"	24"	24"	7.90	16"
66"	34"	36"	24"	22.50	69"	48"	48"	24"	29.00	48"	30"	36"	24"	17.00	36"	30"	27"	24"	11.80	27"	21"	27"	24"	9.10	18"
66"	36"	40"	24"	27.50	69"	48"	48"	24"	33.00	48"	30"	36"	24"	17.00	36"	30"	29"	24"	13.00	27"	24"	29"	24"	11.00	20"
	38"		24"			48"		24"			40"		24"			36"		24"		30"	27"		28"		24"
	42"		24"			60"		24"			48"		24"			42"		24"			29"		32"		36"
	58"		24"			96"		24"			72"		24"			72"		24"					36"		

NOTES:

1. DIMENSIONS ARE CONTROLLED BY DIAMETER OF BRANCH MAIN.
2. IF RESTRAINED JOINT PIPE AND FITTINGS ARE USED ON NEW INSTALLATION CONCRETE THRUST BLOCKS ARE NOT REQUIRED.
3. ALL TAPPING TEES REQUIRE A CONCRETE THRUST BLOCK.



HORIZONTAL BENDS



SECTION A-A

REVISIONS	DATE

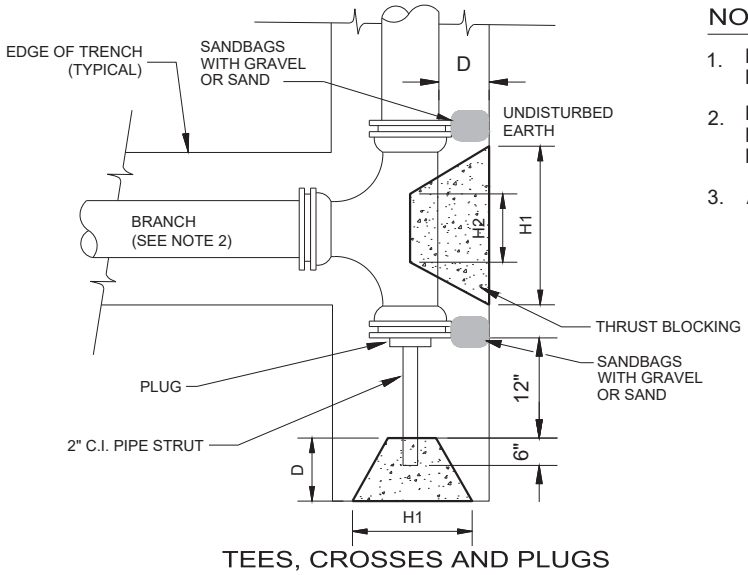
CONCRETE THRUST BLOCK DETAILS
SHEET 1 OF 2

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-009A
DATE: 04/2025

TABLE OF DIMENSIONS FOR CONCRETE BLOCKING

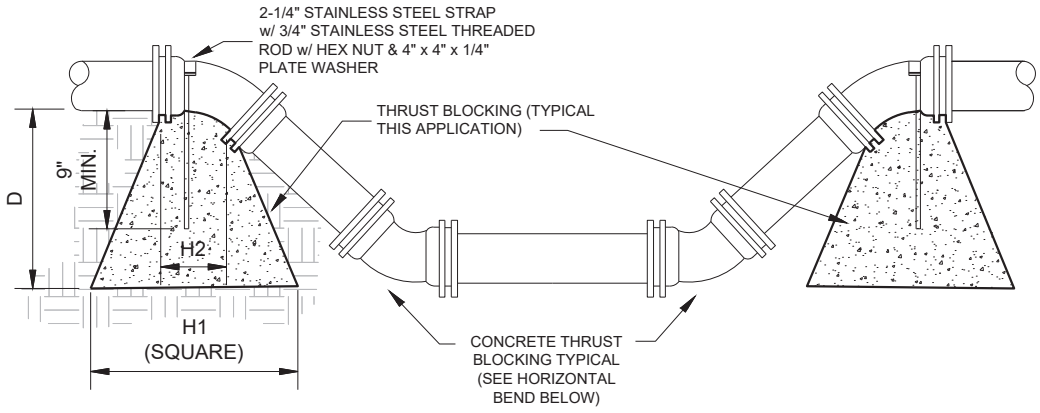
TEES, CROSSES & PLUGS					90° BENDS					45° BENDS					22-1/2° BENDS					11-1/4° BENDS					PIPE SIZE
H1	H2	V	D	C.F.	H1	H2	V	D	CF	H1	H2	V	D	C.F.	H1	H2	V	D	C.F.	H1	H2	V	D	C.F.	2" - 2-1/4"
18"	10"	12"	18"	1.90	18"	10"	12"	18"	1.90	18"	6"	12"	18"	1.50	18"	6"	12"	18"	1.50	18"	6"	12"	18"	1.50	3" - 4"
24"	12"	12"	18"	2.25	24"	12"	12"	18"	2.24	18"	8"	12"	18"	1.60	18"	8"	12"	18"	1.60	18"	8"	12"	18"	1.60	6"
24"	16"	18"	18"	3.50	30"	16"	18"	18"	4.05	24"	10"	16"	18"	3.20	24"	10"	16"	18"	3.20	24"	10"	16"	18"	3.20	8"
36"	18"	18"	18"	5.05	39"	18"	24"	18"	7.30	30"	12"	18"	18"	3.95	24"	12"	18"	18"	3.45	24"	12"	16"	18"	3.40	10"
48"	24"	18"	24"	7.15	54"	32"	24"	18"	10.25	36"	18"	21"	18"	4.60	24"	18"	21"	18"	4.60	24"	18"	21"	18"	4.60	12"
54"	30"	24"	24"	13.40	54"	32"	36"	24"	18.15	42"	18"	24"	24"	9.60	24"	18"	24"	24"	6.60	24"	18"	21"	24"	6.10	14"
60"	32"	30"	24"	17.90	60"	40"	42"	24"	25.00	44"	24"	30"	24"	13.20	30"	24"	24"	24"	9.20	27"	21"	24"	24"	7.90	16"
66"	34"	36"	24"	22.50	69"	48"	48"	24"	29.00	48"	30"	36"	24"	17.00	36"	30"	27"	24"	11.80	27"	21"	27"	24"	9.10	18"
66"	36"	40"	24"	27.50	69"	48"	48"	24"	33.00	48"	30"	36"	24"	17.00	36"	30"	29"	24"	13.00	27"	24"	29"	24"	11.00	20"
	38"		24"			48"		24"			40"		24"			36"		24"		30"	27"		28"		24"
	42"		24"			60"		24"			48"		24"			42"		24"			29"		32"		36"
	58"		24"			96"		24"			72"		24"			72"		24"					36"		



TEES, CROSSES AND PLUGS

NOTES:

1. DIMENSIONS ARE CONTROLLED BY DIAMETER OF BRANCH MAIN.
2. IF RESTRAINED JOINT PIPE AND FITTINGS ARE USED ON NEW INSTALLATION CONCRETE THRUST BLOCKS ARE NOT REQUIRED.
3. ALL TAPPING TEES REQUIRE A CONCRETE THRUST BLOCK.



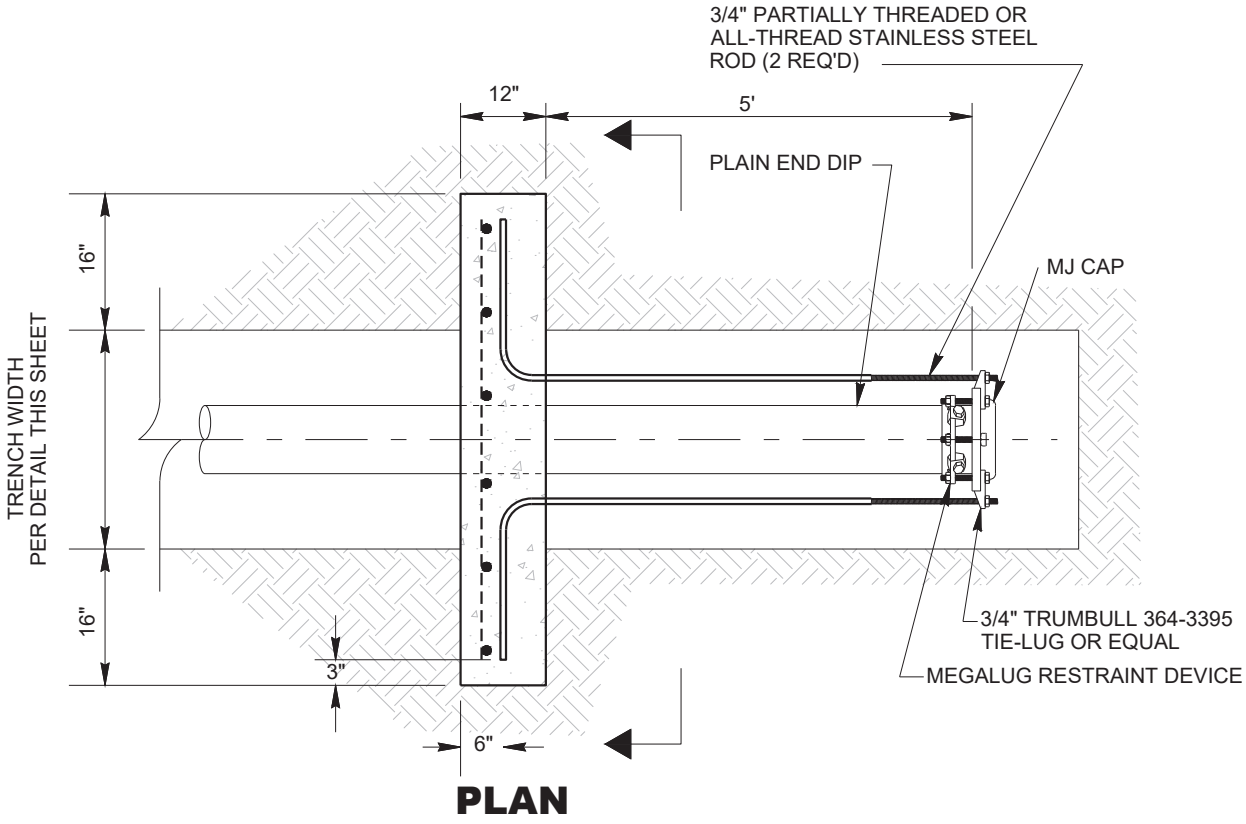
VERTICAL BENDS

REVISIONS	DATE

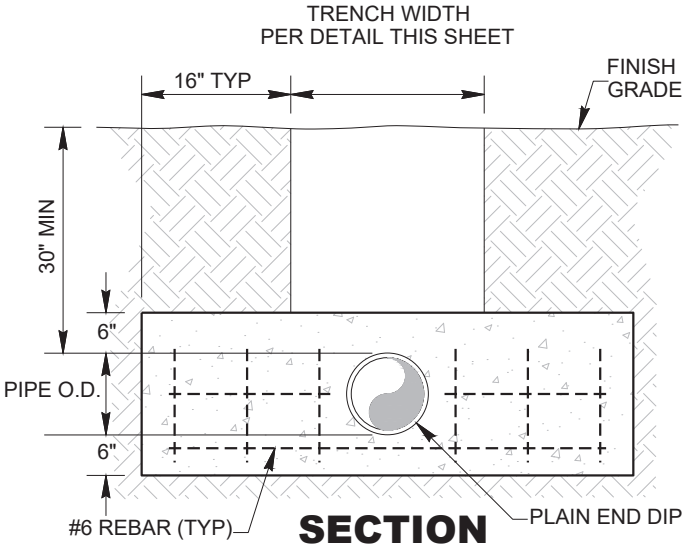
CONCRETE THRUST BLOCK DETAILS
SHEET 2 OF 2

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-009B
DATE: 04/2025



PLAN



SECTION

NOTES:

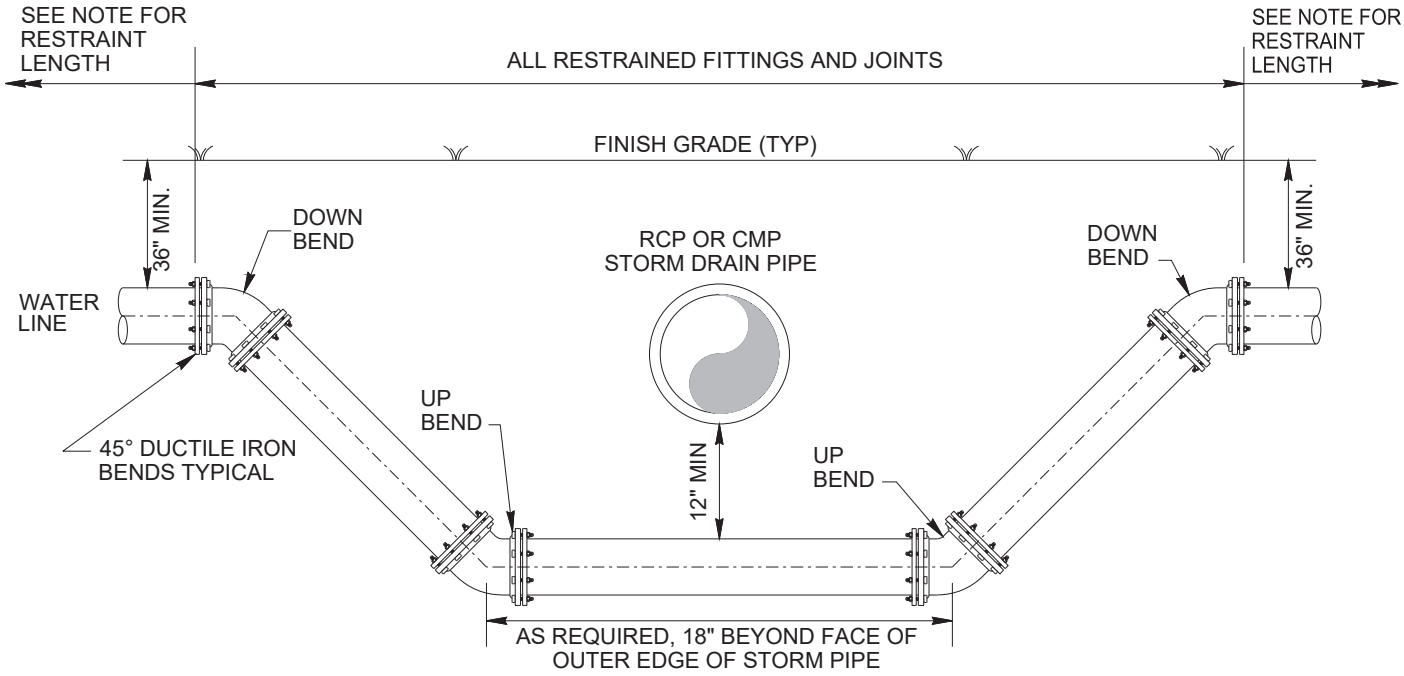
1. ANCHOR BLOCK CONCRETE SHALL BE 4000 PSI
2. ALL STEEL RODS, BOLTS, TIES, ETC. IN CONTACT WITH SOIL SHALL BE COATED WITH COAL TAR COATING SYSTEM SIMILAR TO TNEMEC HB TNEMECOL OR EQUAL OR BE STAINLESS STEEL.
3. CONCRETE SHALL BE POURED AGAINST UNDISTURBED EARTH
4. DIMENSIONS ARE BASED ON 2000 P.S.F. SOIL BEARING CAPACITY PRESSURE AND 6000 LB. REINFORCING BAR TENSILE STRENGTH

REVISIONS	DATE

REVERSE THRUST BLOCK DETAIL

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-010
DATE: 04/2025



NOTES:

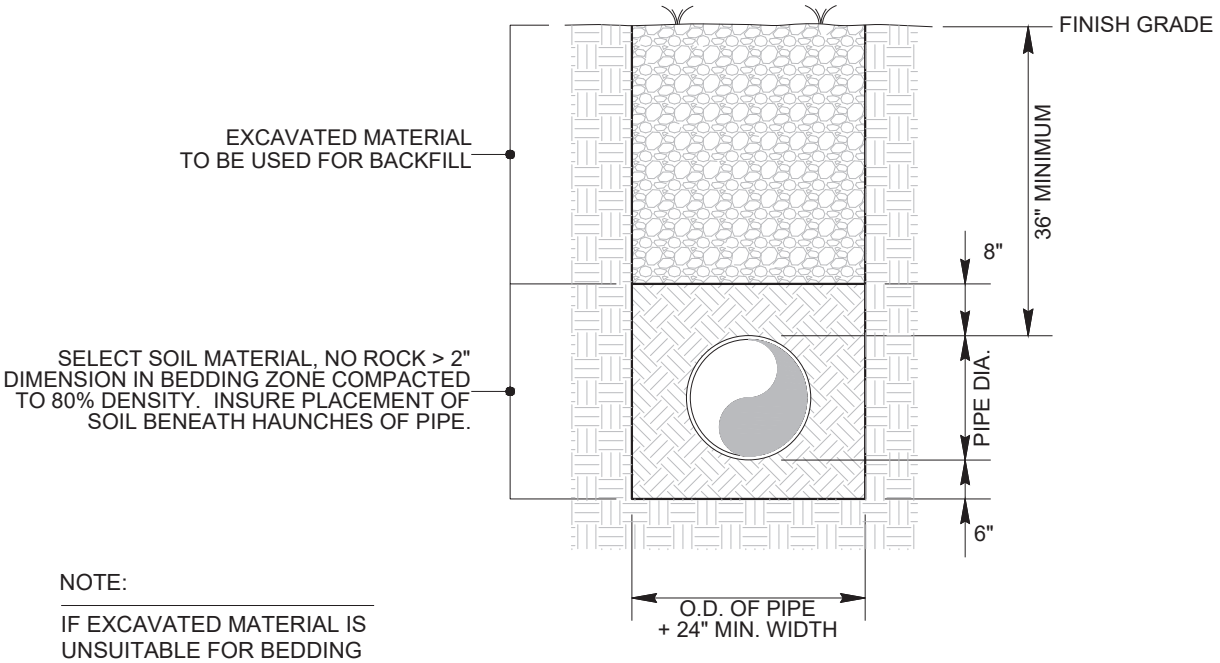
1. BENDS TO HAVE MECHANICAL RESTRAINT DEVICES (MEGA-LUG OR EQUAL). PIPE JOINTS TO HAVE GRIPPER RESTRAINT GASKETS FOR LENGTHS AS SPECIFIED ON DESIGN DRAWINGS.

REVISIONS	DATE

STORM PIPE CROSSING DETAIL

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

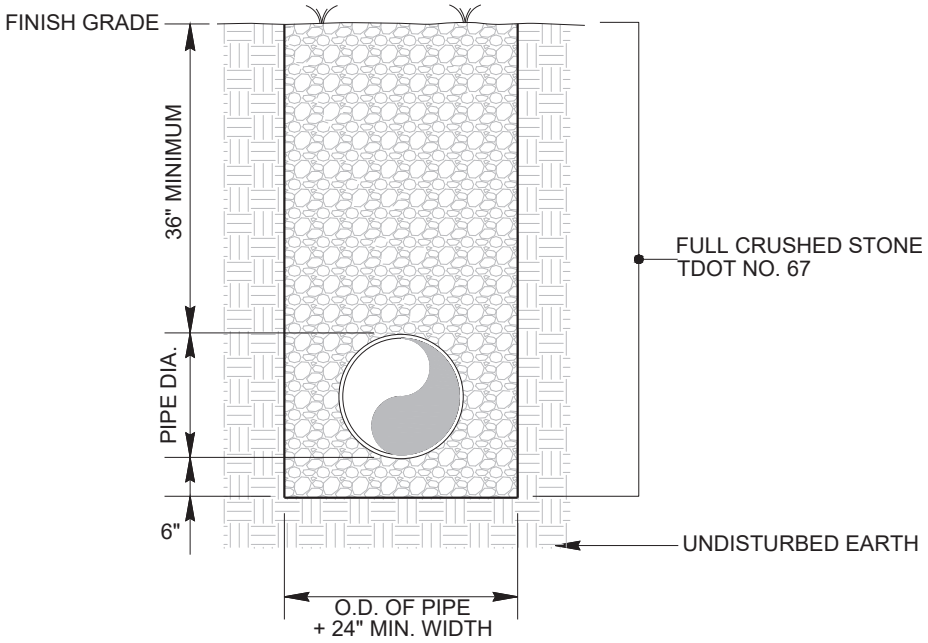
DRAWING NUMBER
WD-011
DATE: 04/2025



NOTE:

IF EXCAVATED MATERIAL IS UNSUITABLE FOR BEDDING ZONE, CONTRACTOR SHALL IMPORT GOOD BEDDING MATERIAL TO MEET STATED REQUIREMENTS,

PIPE IN EASEMENT AREAS



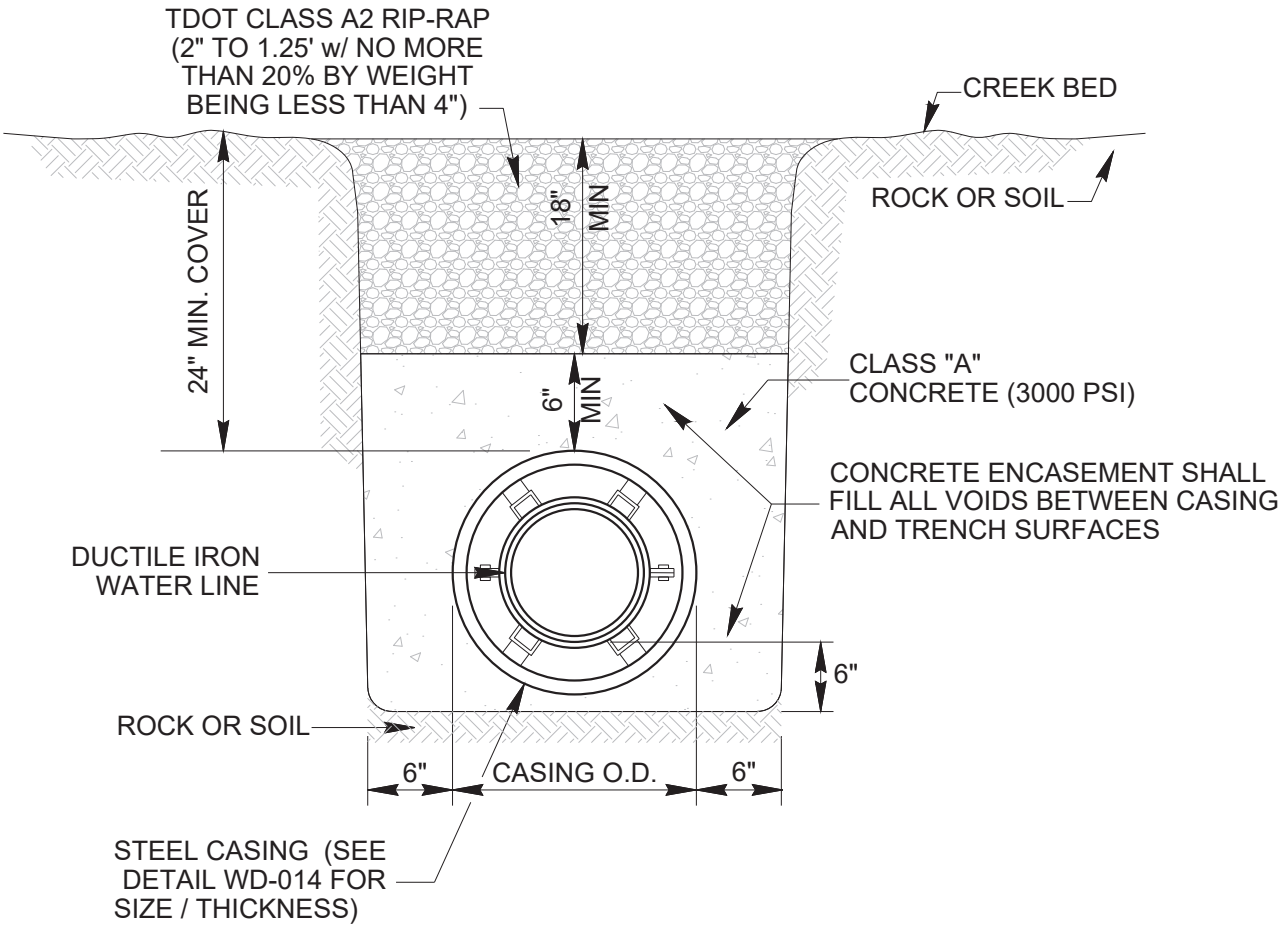
PIPE IN PAVED AREAS, ROADWAYS, OR PARKING AREAS

REVISIONS	DATE

TRENCH DETAILS

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-012
DATE: 04/2025

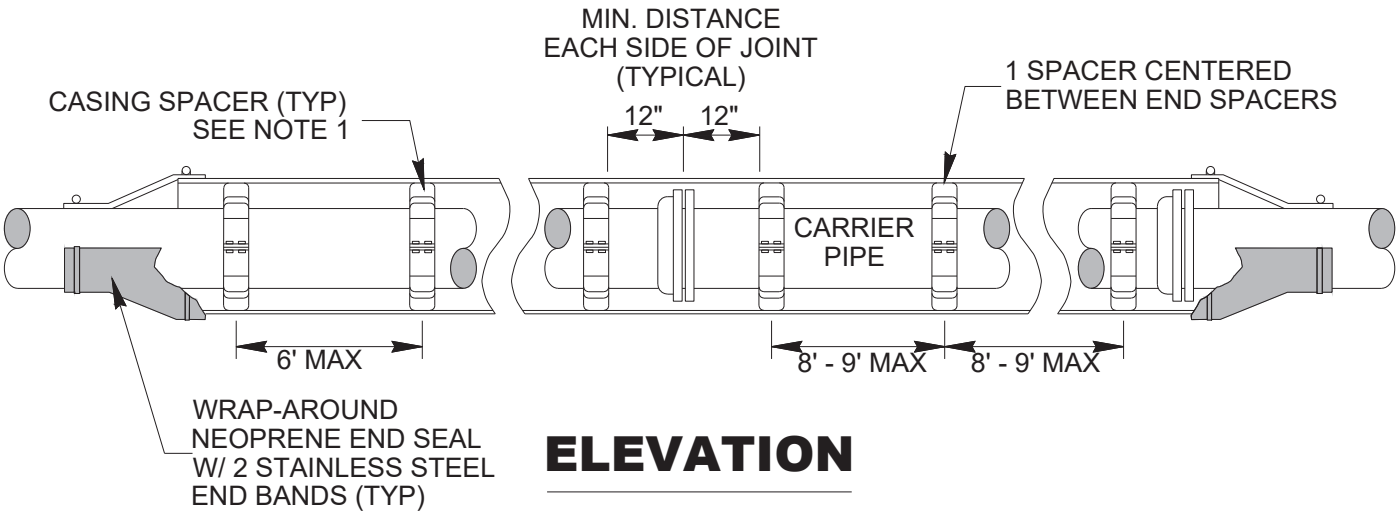


REVISIONS	DATE

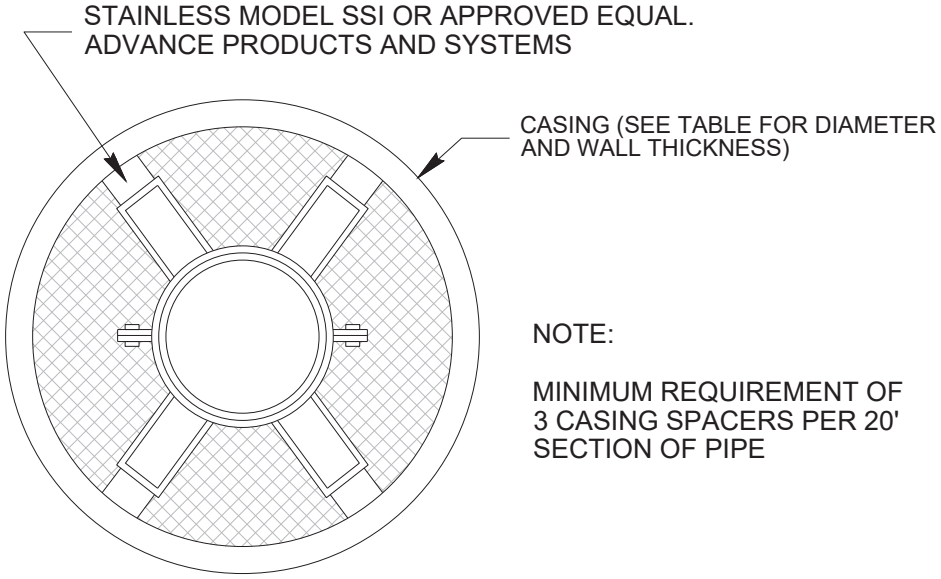
WATERLINE STREAM CROSSING

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-013
DATE: 04/2025



ELEVATION



NOTE:

MINIMUM REQUIREMENT OF
3 CASING SPACERS PER 20'
SECTION OF PIPE

SECTION

CARRIER PIPE DIAMETER	CASING PIPE DIAMETER	NOMINAL WALL THICKNESS
4"	8"	0.25"
6"	12"	0.25'
8"	16"	0.312"
10"	20"	0.375"
12"	22"	0.375"

NOTE:
CASING FOR BORE APPLICATIONS SHALL BE BITUMINOUS ASPHALT COATED.

REVISIONS	DATE

CASING AND CASING SPACER DETAIL

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-014
DATE: 04/2025

REVISIONS	DATE

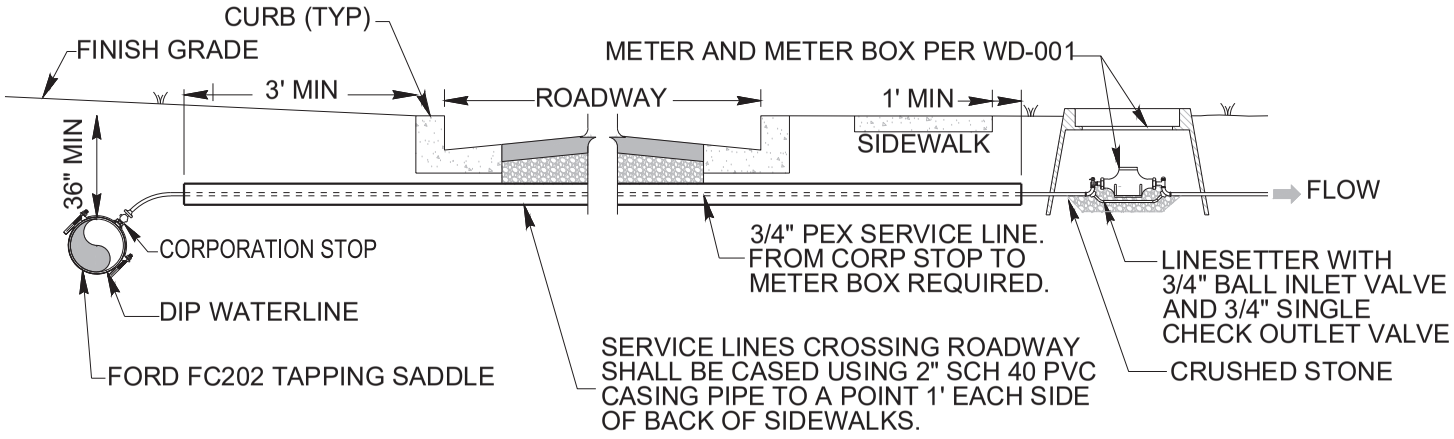
WATER SERICE CASING DETAIL

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

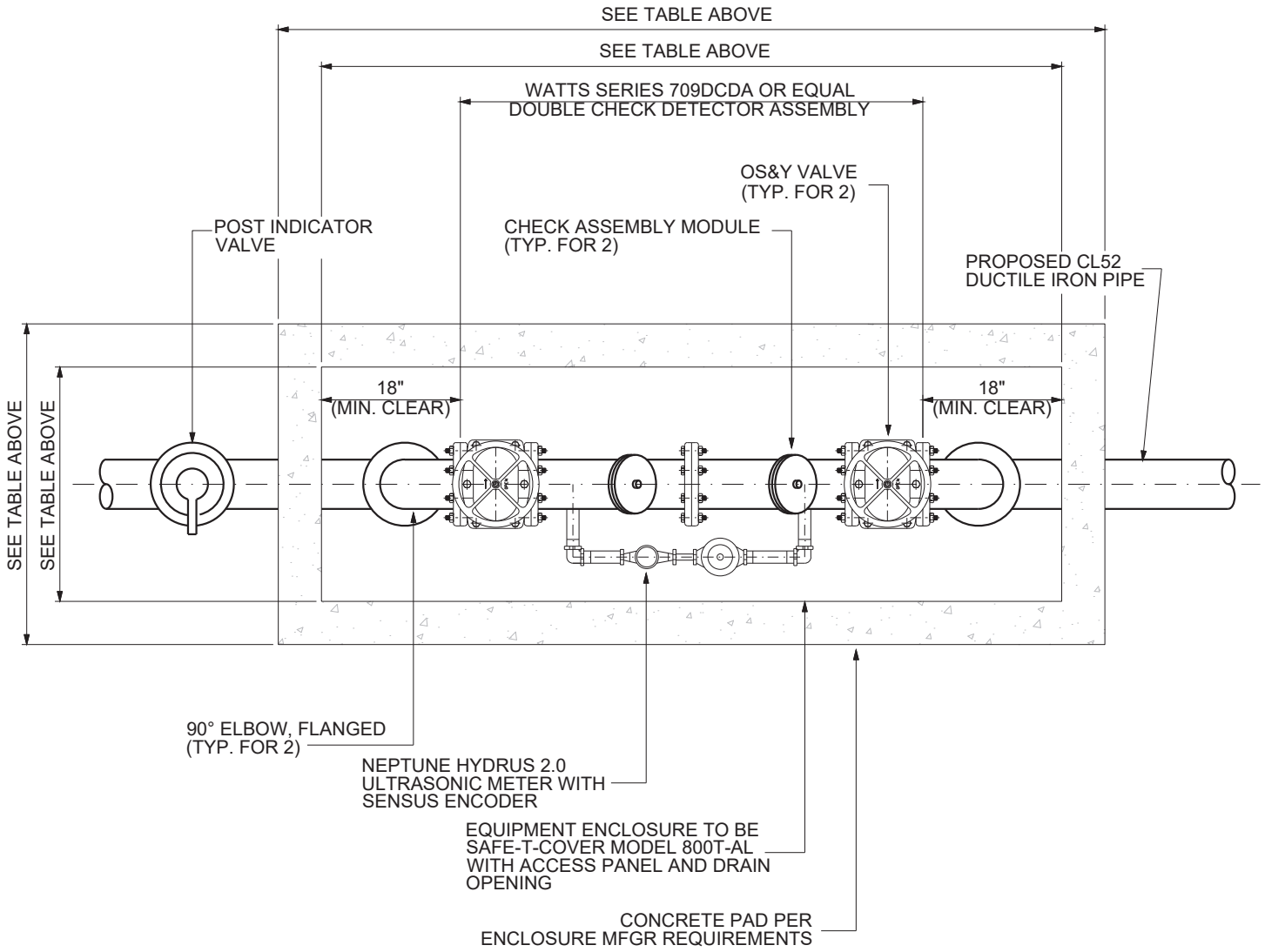
DRAWING NUMBER
WD-015
DATE: 04/2025

NOTES:

1. WATER MAIN CASING MUST EXTEND FROM TOE OF SLOPE TO TOE OF SLOPE.
2. DITCH CROSSING - CASING MUST BE MINIMUM 24" BELOW BOTTOM OF DITCH.
3. ALL 2" CASING PIPE NEEDS TO BE DUCT TAPED ON THE ENDS.
4. 2" CASING SHOULD RUN FROM 2' OFF WATER MAIN TO 2' OFF METER BOX, BUT UNDER NO CIRCUMSTANCES END UNDER THE ROAD, SIDEWALK OR ANY OTHER SURFACE BARRIER.
5. CASING SHALL EXTEND A MIN. OF 3 FT BEHIND CURB IF THERE IS NO SIDEWALK.



ENCLOSURE AND CONCRETE PAD DIMENSIONS					
	ENCLOSURE			CONCRETE PAD	
MODEL	LENGTH	WIDTH	HEIGHT	LENGTH	WIDTH
400T	7'-2"	2'-2"	4'-6"	8'-4"	3'-4"
600T	8'-4"	3'-0"	5'-4"	9'-6"	4'-2"
800T	10'-0"	3'-2"	6'-8"	11'-2"	4'-4"



NOTE:
1. DCDA BACKFLOW PREVENTOR DEVICES ARE ALLOWED ONLY ON SERVICES THAT FEED A CLASS 1-3 FIRE LINE.

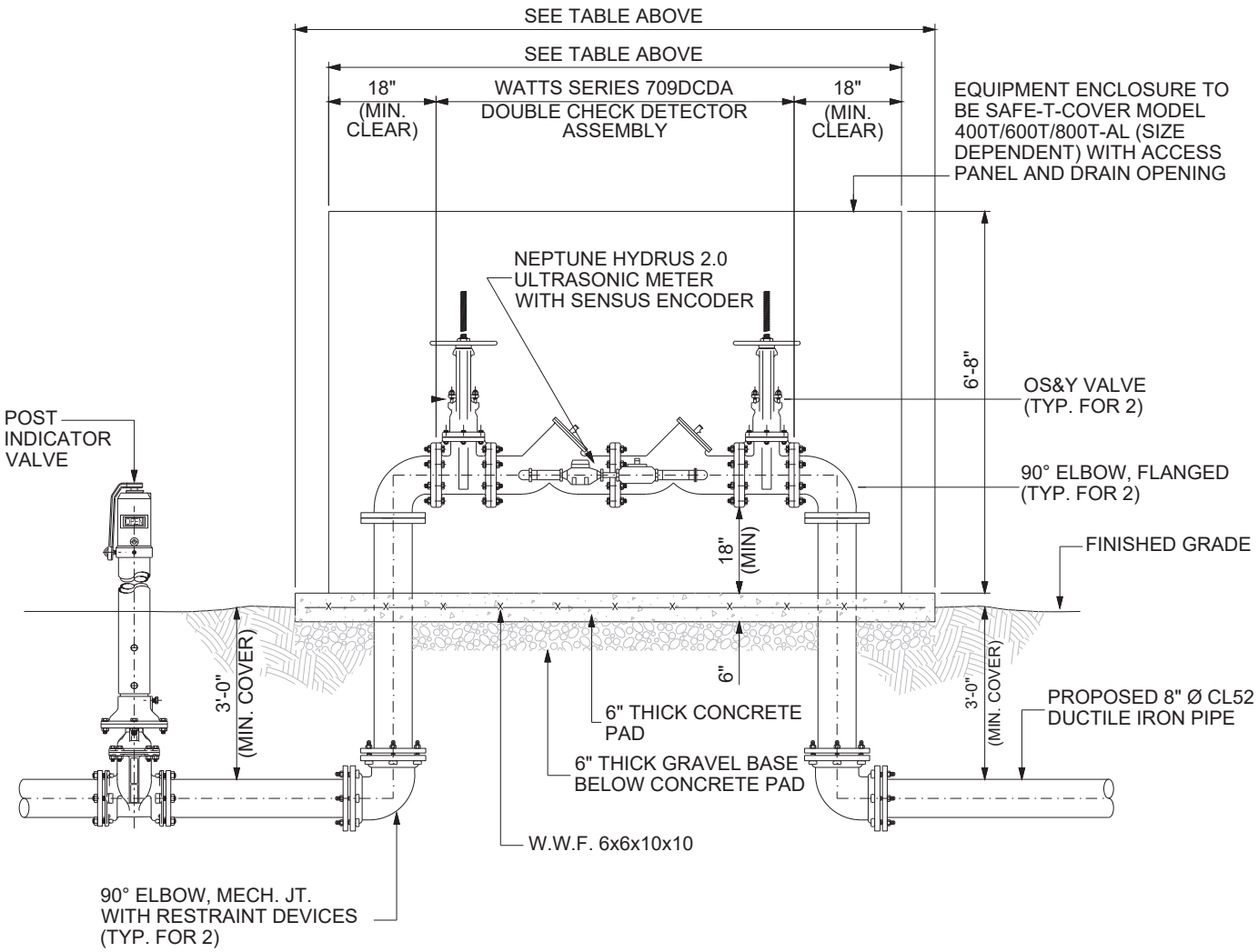
REVISIONS	DATE

DOUBLE CHECK DETECTOR BACKFLOW ASSEMBLY WITH COVER (PLAN)

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-016A
DATE: 04/2025

ENCLOSURE AND CONCRETE PAD DIMENSIONS					
	ENCLOSURE			CONCRETE PAD	
MODEL	LENGTH	WIDTH	HEIGHT	LENGTH	WIDTH
400T	7'-2"	2'-2"	4'-6"	8'-4"	3'-4"
600T	8'-4"	3'-0"	5'-4"	9'-6"	4'-2"
800T	10'-0"	3'-2"	6'-8"	11'-2"	4'-4"



NOTE:

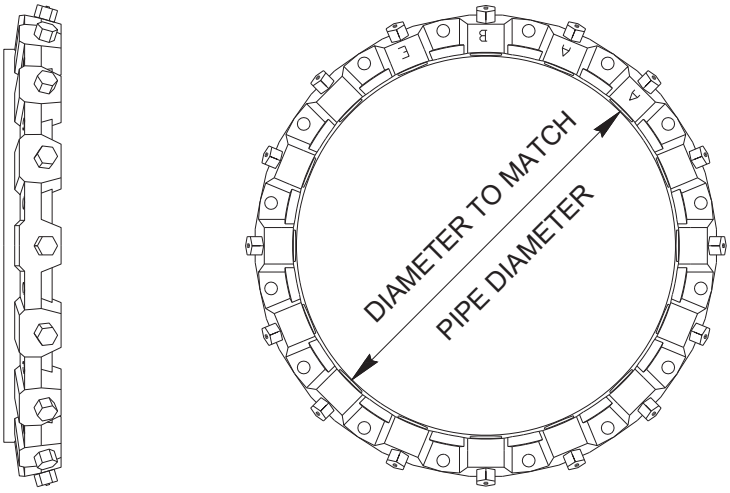
1. PROVIDE ADEQUATE SUPPORTS UNDER DEVICE AS NECESSARY IN ORDER TO PREVENT SAGGING.
2. DCDA BACKFLOW PREVENTOR DEVICES ARE ALLOWED ONLY ON SERVICES THAT FEED A CLASS 1-3 FIRE LINE.

REVISIONS	DATE

DOUBLE CHECK DETECTOR BACKFLOW ASSEMBLY WITH COVER (SECTION)

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-016B
DATE: 04/2025



NOTES AND REQUIREMENTS:

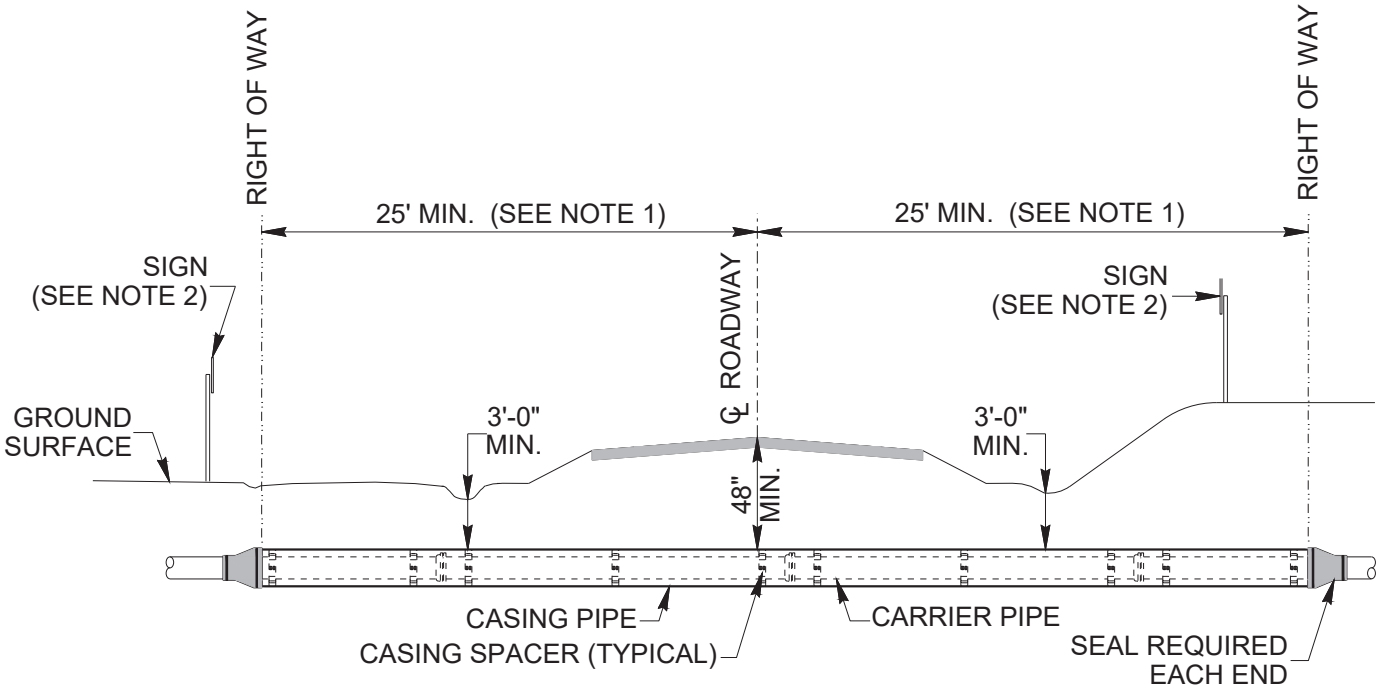
1. CERTIFIED FOR USE ON DUCTILE IRON PIPE
2. UNDERWRITER LABORATORY LISTED
3. 250 PSI RATING
4. 1100 SERIES MEGALUG EBAA IRON OR EQUAL
5. INSTALL PER MANUFACTURER INSTRUCTIONS
6. INSTALL AT EACH FITTING (HORIZONTAL AND VERTICAL)

REVISIONS	DATE

MEGALUG DETAIL

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-017
DATE: 04/2025



WATER LINES

NOTES:

1. CASING SHALL EXTEND TO THE GREATER OF THE FOLLOWING DISTANCES:
   - A. 2' BEYOND TOE OF SLOPE
   - B. 5' BEYOND CENTERLINE OF DITCH
   - C. OUTSIDE EDGES OF RIGHT OF WAY
2. SIGN TO INDICATE LOCATION OF PIPE LINE AT R.O.W. LINE, KIND, OWNERSHIP, AND DEPTH OF PIPE LINE.
3. SEE DETAIL WD-14 FOR CASING SPACERS AND CASING DETAIL.

REVISIONS	DATE

PIPE LINE CROSSING UNDER ROADWAY (FOR WATERLINES)

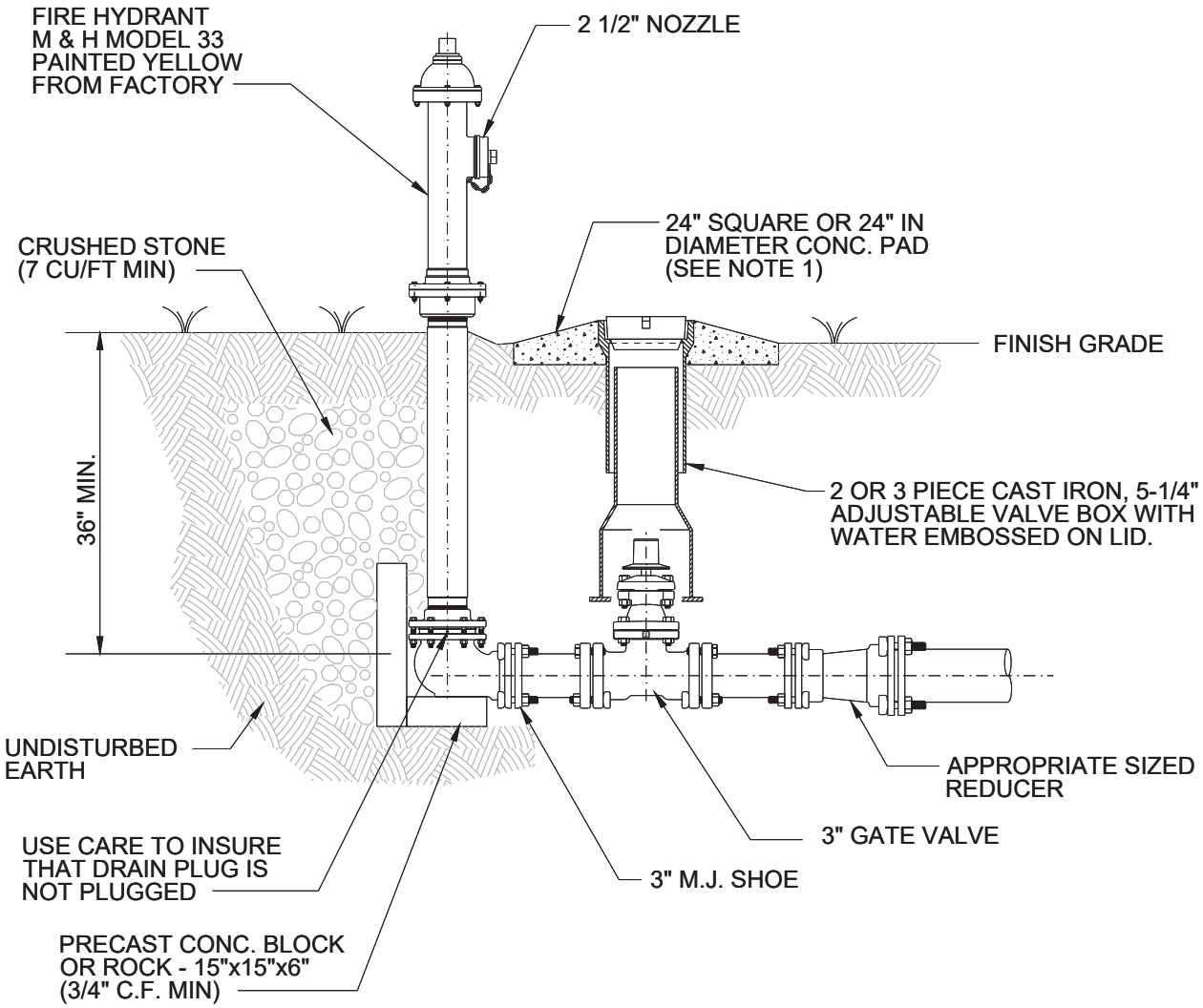
LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-018
DATE: 04/2025

NOTES:

1. CONCRETE PAD SHALL BE POURED IN PLACE. PRECAST NOT ACCEPTABLE.

2. OPERATING NUT, OPENING DIRECTION, CAP NUTS, THREAD AND CONNECTIONS MUST BE APPROVED IN WRITING BY THE OWNER AS CONFORMING TO HIS STANDARDS.

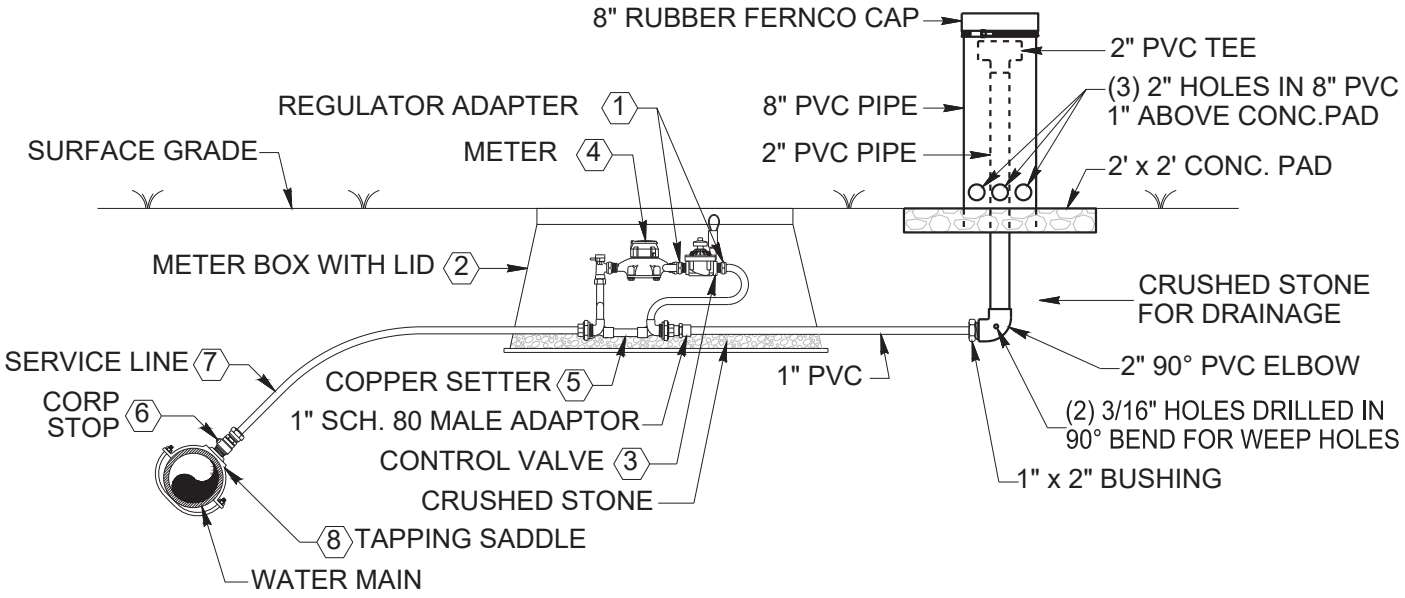


REVISIONS	DATE

POST HYDRANT SETTING DETAIL

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-019
DATE: 04/2025



COMPONENT LISTING

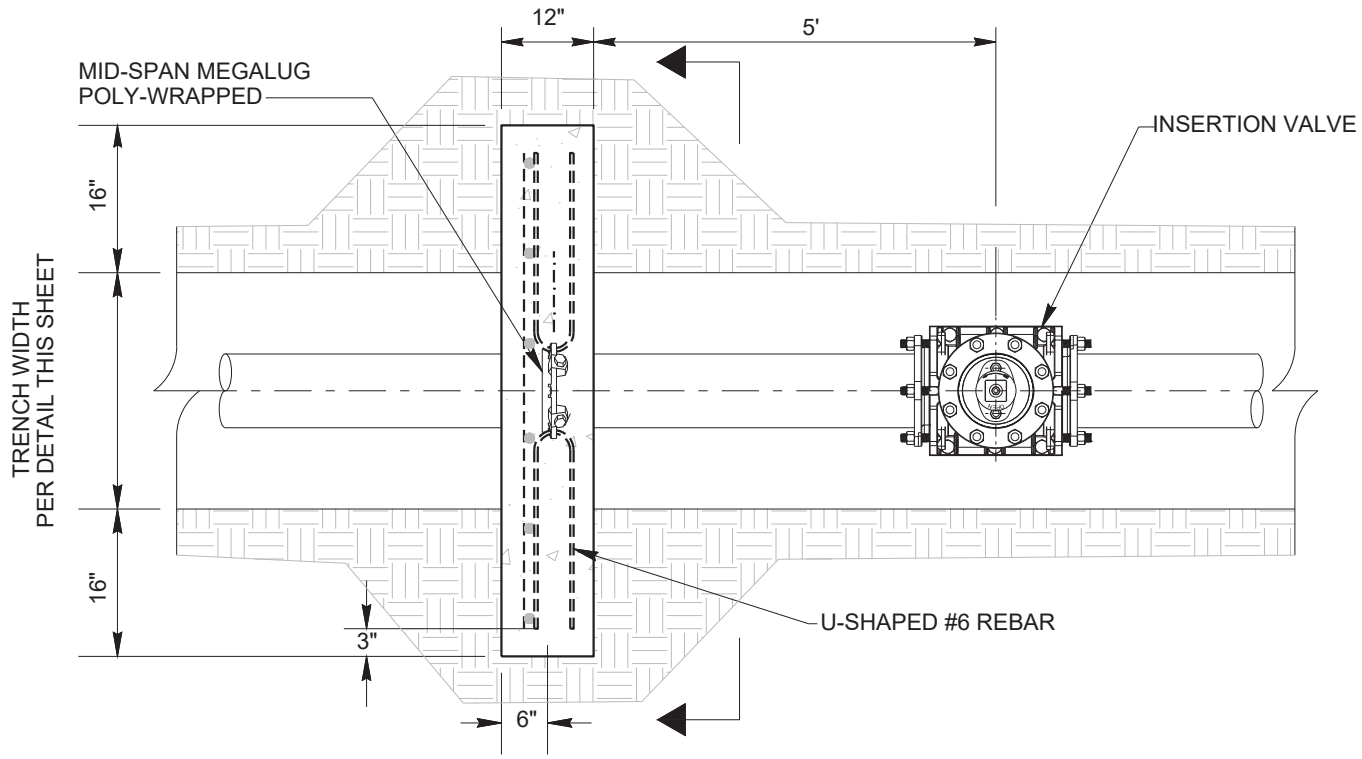
NO.	DESCRIPTION	MFGR OR CATALOG NO.
1	REGULATOR ADAPTER	FORD RA-4-NL
2	METER BOX	CARSON 1730-18 WITH CARSON PLASTIC LID WITH FLIP READER
3	CONTROL VALVE	1" HUNTER ICV-101-G (1" GLOBE VALVE, NPT THREADS, 220 PSI RATED) WITH HUNTER NODE-100 TIMING NODE
4	METER	HYDRUS 2.0 ULTRASONIC METER WITH ITRON ANTENNA LID ADAPTER
5	COPPER SETTER	FORD 2-TVBH74-12WR-41-44-Q-NL
6	CORPORATION STOP	FORD FB-1000
7	1" SERVICE LINE	1" REHAU MUNICIPEX
8	TAPPING SADDLE	CLASS 200 PVC PIPE: FORD S-70, C900 PVC PIPE: S-90, DI PIPE: FORD FC-202

REVISIONS	DATE

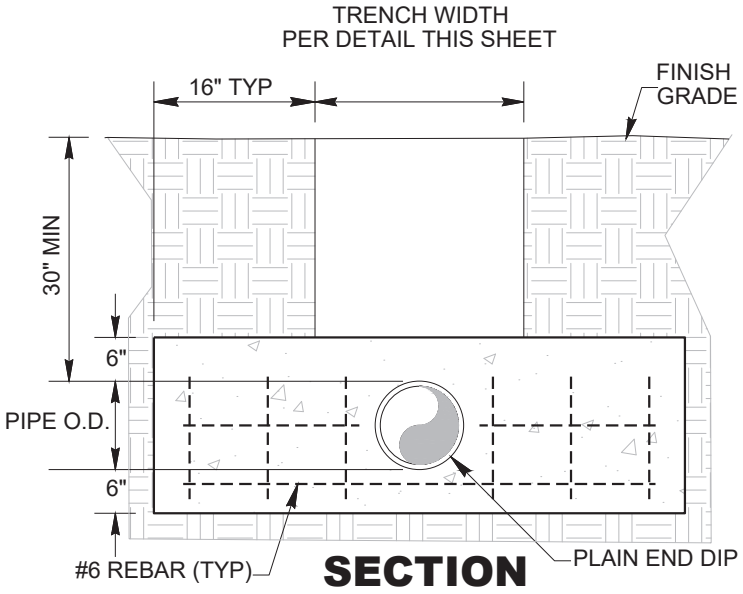
AUTO FLUSHER DETAIL

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-020
DATE: 04/2025



PLAN



SECTION

NOTES:

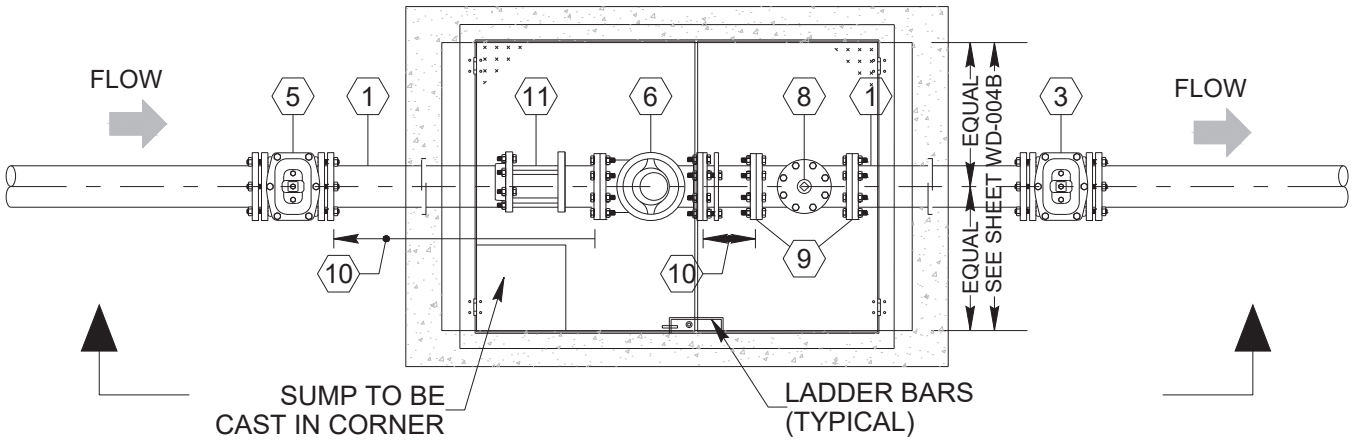
1. ANCHOR BLOCK CONCRETE SHALL BE 4000 PSI
2. ALL STEEL RODS, BOLTS, TIES, ETC. IN CONTACT WITH SOIL SHALL BE COATED WITH COAL TAR COATING SYSTEM SIMILAR TO TNEMEC HB TNEMECOL OR EQUAL OR BE STAINLESS STEEL.
3. CONCRETE SHALL BE POURED AGAINST UNDISTURBED EARTH
4. DIMENSIONS ARE BASED ON 2000 P.S.F. SOIL BEARING CAPACITY PRESSURE AND 6000 LB. REINFORCING BAR TENSILE STRENGTH

REVISIONS	DATE

INSERTION VALVE THRUST BLOCKING DETAIL

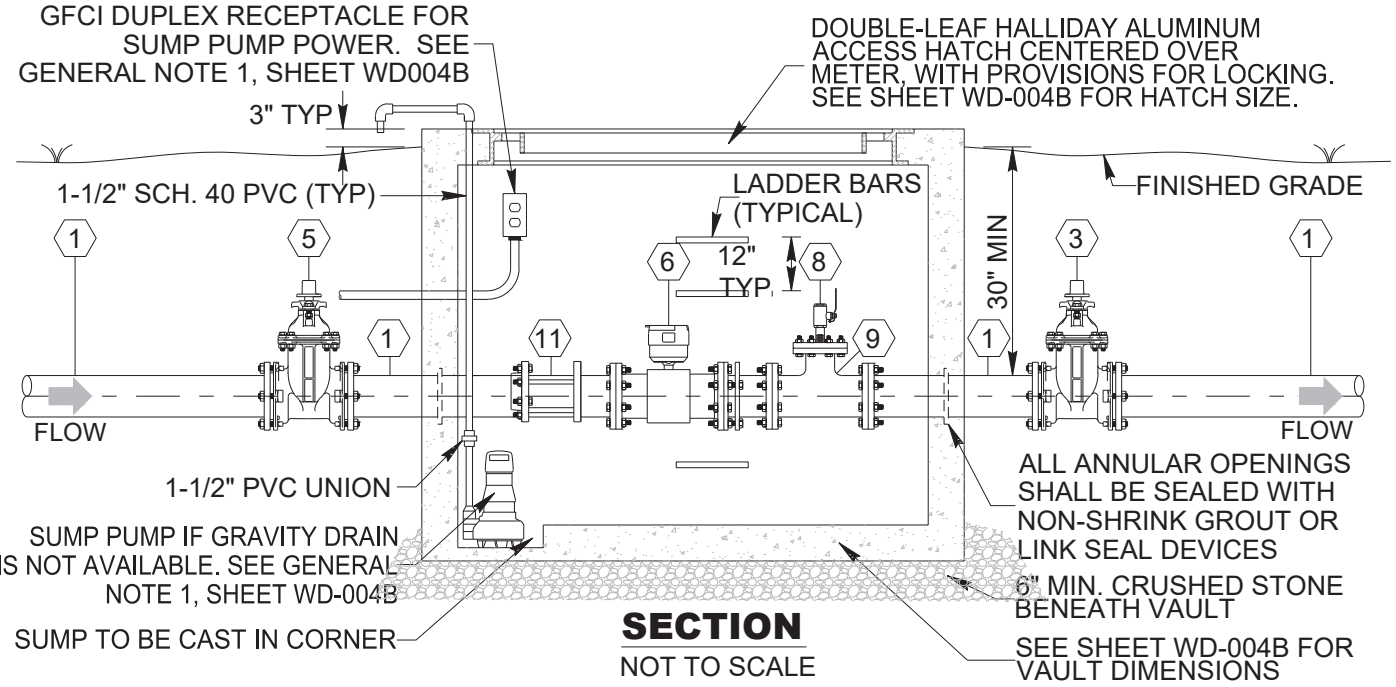
LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-021
DATE: 04/2025



PLAN

NOT TO SCALE



SECTION

NOT TO SCALE

BACKFLOW PREVENTER NOTE:

ALL METERS MUST HAVE REDUCED PRESSURE BACKFLOW PREVENTER PER L.U.D. REQUIREMENTS INSTALLED DOWNSTREAM OF THE METER. BACKFLOW PREVENTERS MAY BE INSTALLED WITHIN BUILDINGS IN A HORIZONTAL POSITION IF DESIRED, AS LONG AS THEY ARE WITHIN 100' OF THE METER. OUTDOOR BACKFLOW PREVENTERS MUST BE INSTALLED ABOVEGROUND IN HEATED ENCLOSURES MOUNTED ON CONCRETE PADS PER THE MANUFACTURER'S REQUIREMENTS.

NO CONNECTIONS ARE ALLOWED TO PUBLIC WATER LINE BETWEEN THE METER AND THE BACKFLOW PREVENTER.

REVISIONS	DATE

VARIOUS FIRE METER ASSEMBLY PLAN AND SECTION

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER

WD-022A

DATE: 04/2025

DEVICE AND FITTING SCHEDULE

NO.	DESCRIPTION
1	CL. 52 DIP
3	GATE VALVE WITH VALVE BOX
4	90° DI MJ BEND
5	POST INDICATOR VALVE
6	ELSTER EVOQ4 FULL FLOW RADIO READ METER ASSEMBLY, COMPLETE.
7	FLANGED COUPLING ADAPTER / DISMANTLING JOINT
8	2" TAP W/ 2" BALL VALVE FOR METER TESTING PURPOSES
9	4" BRANCH DI FLANGED TEE WITH 4" BLIND FLANGE TAPPED FOR 2" COPPER
10	THE METER SHOULD BE INSTALLED SUCH THAT 5 PIPE DIAMETERS OF STRAIGHT PIPE THE SAME SIZE OF THE METER UPSTREAM AND 3 PIPE DIAMETERS THE SAME SIZE AS THE METER DOWNSTREAM TO PREVENT TURBULENT JETTING
11	EPOXY COATED DISMANTLING JOINT

1. ALL FITTINGS AND VALVES TO INCLUDE MECHANICAL RESTRAINT DEVICES.
2. ALL FITTINGS, DEVICES, AND VALVES SHALL BE SAME NOMINAL SIZE AS METER (I.E. 6" PIPE FOR 6" METER, 8" PIPE FOR 8" METER, ETC.)

GENERAL NOTES:

1. THE CONCRETE VAULT FOR THE MASTER METER ASSEMBLY SHALL BE 6'x8'x6' A CAST IN PLACE WITH A 72" x 48" ACCESS HATCH. IF A POSITIVE, ADEQUATELY SIZED DRAIN TO DAYLIGHT CANNOT BE PROVIDED DIRECTLY FROM THE VAULT, A SUMP SHALL BE CAST INTO THE BASE OF THE VAULT, AND THE VAULT INSTALLATION SHALL BE COMPLETE WITH A SUMP PUMP SET AS REQUIRED, WITH PIPED DISCHARGE TO DAYLIGHT AT AN APPROVED LOCATION. SUMP PUMP SHALL BE A ZOELLER MODEL 63 (OR APPROVED EQUAL). 0.3 HP, 110 VAC, 1Ø, AUTOMATIC, 10' UL LISTED CORD WITH 3-WIRE GROUNDED PLUG, 1-1/2" DISCHARGE, 14 GPM @ 20' HEAD.
2. IT SHALL BE THE OWNER'S / DEVELOPER'S RESPONSIBILITY TO MEET AND PROVIDE ANY AND ALL POWER REQUIREMENTS ASSOCIATED WITH THE SUMP PUMP IN THE MASTER METER VAULT, IF APPLICABLE. AT A MINIMUM A GFCI DUPLEX RECEPTACLE ON A 20 AMP DEDICATED CIRCUIT MOUNTED IN A WEATHERPROOF ENCLOSURE WITH WHILE-IN-USE COVER SHALL BE PROVIDED FOR THE SUMP PUMP. IN NO CASE SHALL THE LAGUARDO UTILITY DISTRICT BE RESPONSIBLE FOR PROVIDING POWER TO THESE INSTALLATIONS.

SEE SHEET WD-004A FOR VAULT PLAN AND SECTION

3. COORDINATE ALL WORK AS SHOWN HEREON WITH THE LAGUARDO UTILITY DISTRICT, INCLUDING CONNECTIONS TO EXISTING OR PROPOSED LINES AND THE CONSTRUCTION OF THE PUBLIC IMPROVEMENTS, IF APPLICABLE.
4. FOR THE PUBLIC PORTION OF THE PROPOSED FIRE LINE, ALL PIPING SHALL BE NEW DUCTILE IRON PIPE, AWWA THICKNESS CLASS 52, AND ALL MECHANICAL JOINT FITTINGS SHALL BE NEW DUCTILE IRON FITTINGS WITH MEGA-LUG GLANDS.
5. ALL VALVES WITH MECHANICAL JOINTS SHALL HAVE MEGA LUG GLANDS.
6. FOR CLARITY, PIPING AND METER SUPPORTS HAVE NOT BEEN SHOWN HEREON. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR FURNISHING AND INSTALLING ALL REQUIRED SUPPORTS.
7. THE TAP FOR METER TESTING PURPOSES (ITEM 8 AT LEFT) SHALL INCLUDE A 2" TAP AND CORPORATION STOP WITH A 2"x6" BRASS SPOOL PIECE, THREADED ON BOTH ENDS TO FACILITATE CONNECTION OF THE METER TESTING APPARATUS. COORDINATE WITH THE LAGUARDO UTILITY DISTRICT.
8. THE INTERNAL TO THE CONCRETE METER VAULT SHALL HAVE AN INTEGRAL DISMANTLING JOINT, SMITH-BLAIR MODEL 975. FOR CLARITY THE DISMANTLING JOINT HAS NOT BEEN SHOWN HEREON.

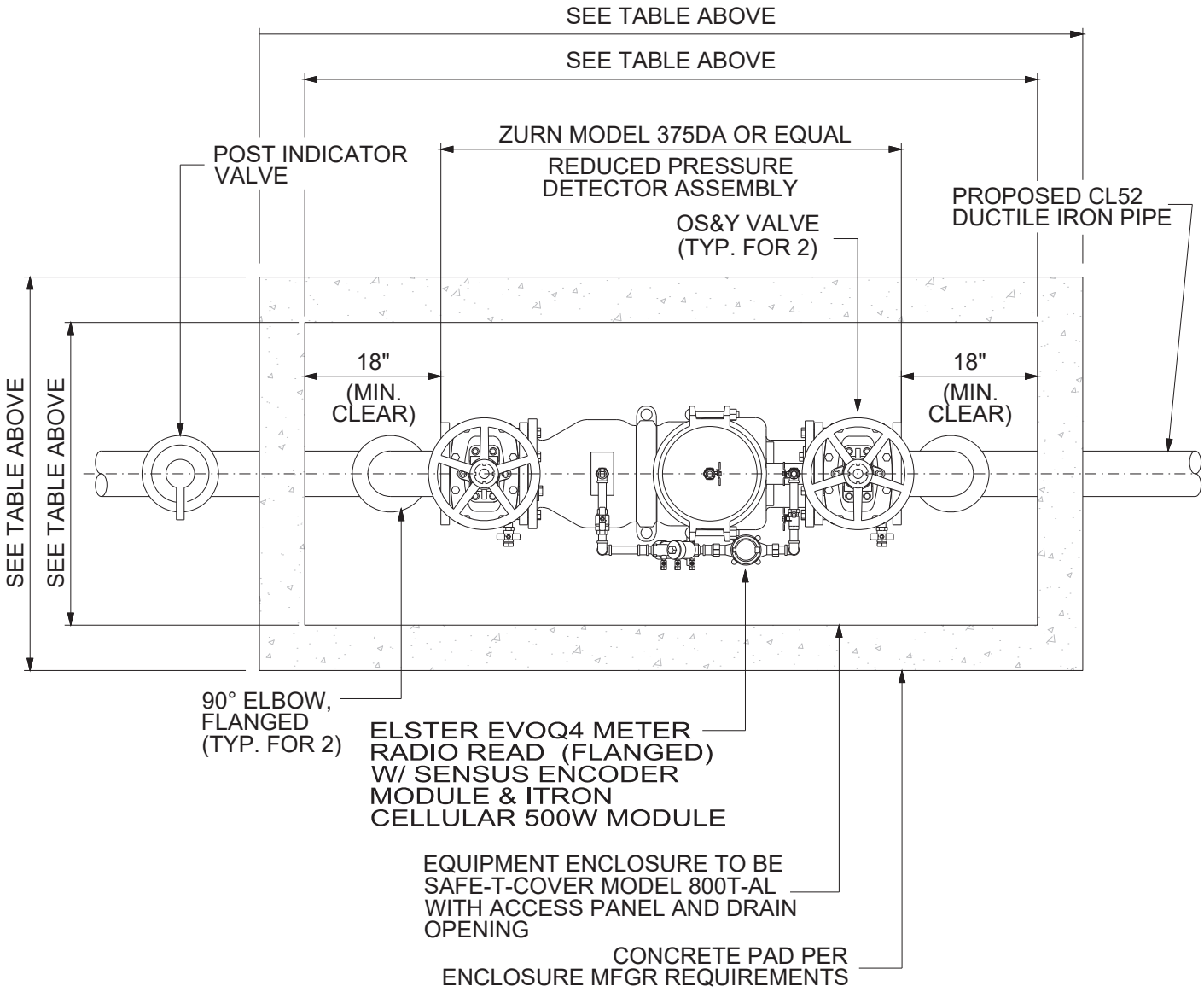
REVISIONS	DATE

VARIOUS FIRE METER ASSEMBLY GENERAL NOTES AND DEVICE LISTING

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-022B
DATE: 04/2025

ENCLOSURE AND CONCRETE PAD DIMENSIONS					
	ENCLOSURE			CONCRETE PAD	
SIZE	LENGTH	WIDTH	HEIGHT	LENGTH	WIDTH
6"	6'-9"	3'-0"	5'-4"	7'-9"	4'-0"
8"	8'-1"	3'-4"	5'-4"	9'-1"	4'-4"
10"	8'-4"	3'-4"	5'-4"	9'-4"	4'-4"



NOTE:
1. DCDA BACKFLOW PREVENTOR DEVICES ARE ALLOWED ONLY ON SERVICES THAT FEED A CLASS 1-3 FIRE LINE.

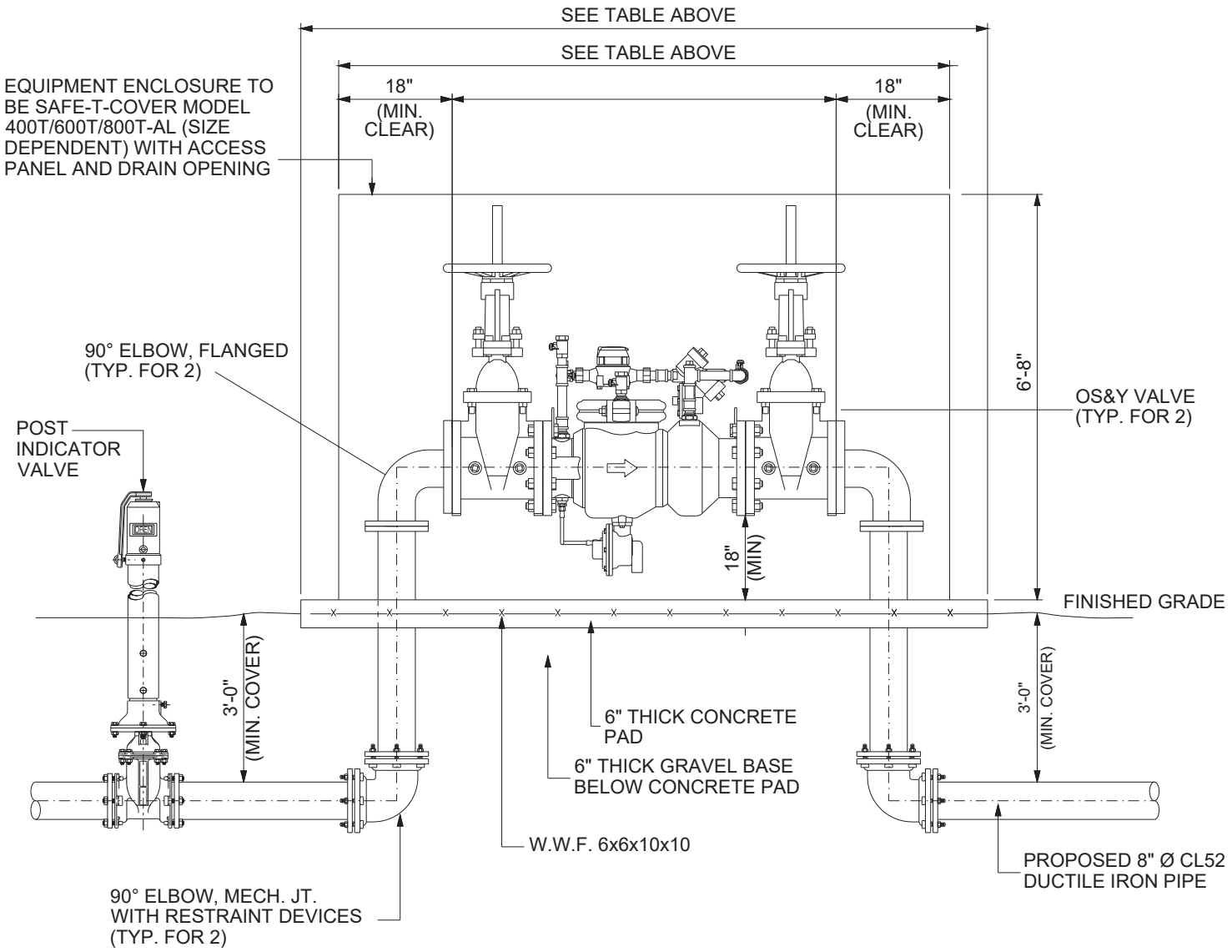
REVISIONS	DATE

REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY (PLAN)

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-23A
DATE: 04/2025

ENCLOSURE AND CONCRETE PAD DIMENSIONS					
	ENCLOSURE			CONCRETE PAD	
SIZE	LENGTH	WIDTH	HEIGHT	LENGTH	WIDTH
6"	6'-9"	3'-0"	5'-4"	7'-9"	4'-0"
8"	8'-1"	3'-4"	5'-4"	9'-1"	4'-4"
10"	8'-4"	3'-4"	5'-4"	9'-4"	4'-4"



NOTE:

1. PROVIDE ADEQUATE SUPPORTS UNDER DEVICE AS NECESSARY IN ORDER TO PREVENT SAGGING.
2. DCDA BACKFLOW PREVENTOR DEVICES ARE ALLOWED ONLY ON SERVICES THAT FEED A CLASS 1-3 FIRE LINE.

REVISIONS	DATE

REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY (SECTION)

LaGuardo UTILITY DISTRICT
LEBANON, TENNESSEE

DRAWING NUMBER
WD-023B
DATE: 04/2025