Invitation for Bid No. 2025-019

Sewer Repair & Rehabilitation Excavation Repairs

Due Date: June 5, 2025
Time: 2:00 PM Local Time
Submittal Location: Union County Government Center
Procurement Department
500 N. Main Street, Suite 709
Monroe, NC 28112

Non-Mandatory Pre-Bid Conference

Date: May 22, 2025
Time: 10:00 AM Local Time
Location: Union County Operations Center, Training Room
4600 Goldmine Road, Monroe, NC 28110

Procurement Contact:

Corey Brooks, CLGPO
Senior Procurement Specialist
704.283.3683
corey.brooks@unioncountync.gov

Contents

1 NOTICE OF ADVERTISEMENT

Union County, North Carolina
IFB No. 2025-019
Sewer Repair & Rehabilitation Excavation Services

Sealed bids for Sewer Repair & Rehabilitation Services will be received by the Union County Procurement Department *until* **2:00 PM** local time on **June 5, 2025,** at the Union County Government Center, 500 North Main Street, Suite 709, Monroe, NC 28112 at which time the bids will be opened and read. **Late bids will not be accepted**.

If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "**BID ENCLOSED – 2025-019**" and shall be addressed to Union County Procurement Department, Attn: Corey Brooks, 500 North Main Street, Suite 709, Monroe, NC 28112.

Union County, North Carolina, through Union County Water/Wastewater Operations, is soliciting bids from qualified companies for Sewer Repair & Rehabilitation Excavation Services as described in this solicitation.

This solicitation may be examined at the Union County Government Center, Procurement and Contract Management Department, 500 North Main Street, Suite 709, Monroe, NC 28112, Monday through Friday between the hours of 8:00 am and 5:00 pm. Copies of the solicitation may be obtained from the locations listed below free of charge:

1. Download the Solicitation Documents from the Union County website: https://www.unioncountync.gov/departments/bids-procurement/current-bids

2. Download the Solicitation Documents from the State of North Carolina eVP website: https://evp.nc.gov/solicitations/ (Search County of Union)

A Non-Mandatory, Pre-Bid Conference will be held on **May 22, 2025, at 10:00 AM Local Time** at the **Union County Operations Center Training Room, 4600 Goldmine Road, Monroe, NC 28110**. Representatives from Union County Water/Wastewater will be on-hand to give a brief overview of the project and to answer questions. Attendance at this meeting is strongly encouraged.

All questions about the meaning or intent of the Bidding Documents are to be submitted in writing to the Procurement contact person listed on the cover page (corey.brooks@unioncountync.gov). Deadline for questions is **May 23, 2025, at 5:00 PM** local time.

Bidders must have a license to do work as a General Contractor with a Public Utilities Classification in the State of North Carolina, as set forth under Article 1 chapter 87 of the North Carolina General statutes.

Bidders are required to comply with the non-collusion requirements set forth in the Bidding Documents.

The County reserves the right to reject any and/or all bids, including, without limitation, nonconforming, nonresponsive, unbalanced, or conditional bids. The County also reserves the right to waive informalities and request clarification as needed.

Union County encourages good faith effort outreach to Minority Businesses (HUB Certified) and Small Businesses.

2 BID SUBMISSION

2.1 BID SUBMISSION DEADLINE

Sealed bids are to be received by the Union County Procurement Department for Sewer Repair & Rehabilitation until **June 5, 2025, at 2:00 PM Local Time** at the Union County Government Center, 500 North Main Street, Suite 709, Monroe, NC 28112 at which time the bids will be opened and read. **Late bids will not be accepted.**

2.2 BID DELIVERY REQUIREMENTS

All Bids must be in a sealed box or opaque envelope plainly marked as follows:

[Name of Firm Submitting Bid]
IFB No. 2025-019
Sewer Repair & Rehabilitation Excavation Services
Attention: Corey Brooks

Your company name and the solicitation number must be visible on the delivery box/envelope. Ship, Mail, or Hand Deliver to the following address:

Union County Government Center
Procurement Department
500 North Main Street, Suite 709
Monroe, NC 28112
Attention: Corey Brooks

Electronic (email) or facsimile submissions will not be accepted.

There is no expressed or implied obligation for Union County to reimburse firms for any expenses incurred in preparing Bids in response to this request.

Union County reserves the right to reject any or all Bids, to waive technicalities and to make such selection deemed in its best interest. Union County, at its sole discretion, reserves the right to supplement, amend, substitute or otherwise modify this IFB at any time, to cancel this IFB with or without the substitution of another IFB, and to issue additional request for information.

2.3 NON-MANDATORY PRE-BID CONFERENCE

A Non-Mandatory Pre-Bid Conference will be held on May 22, 2025 at 10:00 AM Local Time at the Union County Operations Center Training Room, 4600 Goldmine Road, Monroe, NC 28110. Representatives from Union County Water/Wastewater will be on-hand to give a brief overview of the project and to answer questions. Although attendance at this meeting is not mandatory, it is strongly encouraged.

2.4 BID QUESTIONS

Bid questions will be due on or before **May 23, 2025, at 5:00 PM** local time. The primary purpose of this is to provide participating Bidders with the opportunity to ask questions, in writing, related to the IFB.

Submit questions by email to Corey Brooks at corey.brooks@unioncountync.gov by the deadline shown above. (Do not send questions in a graph or Excel sheet format.) *The email subject line should be identified as follows: IFB 2025-019 Sewer Repair & Rehabilitation Excavation Services.* All questions and answers may be posted as addenda on the County Website and the North Carolina eVP Website as indicated on the Advertisement Page of this solicitation.

2.5 BID ADDENDUM

Union County may modify the IFB prior to the date fixed for submission of Bids by the issuance of an addendum. Should an Offeror find discrepancies or omissions in this IFB, or any other documents provided by Union County, the Offeror should immediately notify the County of such potential discrepancy in writing via email as noted above.

Any addenda to these documents shall be issued in writing. No oral statements, explanations, or commitments by anyone shall be of effect unless incorporated in the written addenda. Receipt of Addenda shall be acknowledged by the Offeror on Appendix C – Addendum and Anti-Collusion Form.

2.6 COMMUNICATION

All communications, any modifications, clarifications, amendments, questions, responses or any other matters related to the IFB must be made only through the Procurement Contact noted on the cover of this solicitation. A violation of this provision is cause for the County to reject a Company's bid. No contact regarding this document with other County employees is permitted and may be grounds for disqualification**.**

3 PURPOSE

3.1 COUNTY

Union County, North Carolina (population 254,070) is located in the central, southern piedmont. The County provides its citizens with a full array of services that include public safety, water/wastewater utilities and sanitation, human services, cultural and recreational activities, and general government administration.

3.2 INTRODUCTION

Union County, through Union County Water, is soliciting bids from qualified contractors to provide repair of sewer system defects, including manholes and service laterals, installing new sewers and manholes to replace existing sewers and manholes, restoration and other miscellaneous sewer system repair work.

The purpose of this Contract is to provide the Owner with a Contractor to repair, rehab and replace existing sanitary sewers, manholes and service laterals. This Contract will

be used to repair sewer system defects that are allowing substantial rainwater and ground water (inflow and infiltration) to enter the sewer system as well as to repair significant structural defects that are causing re-occurring maintenance issues.

The scope and quantity of work will be dependent on the need for the work as determined by the Owner and Engineer based on the scope of work items outlined in the bid form, and may range from a single point repair to complete replacement from manhole to manhole.

Work will be identified throughout the Contract and issued to the Contractor in the form of a Work Order or Project. Work will be issued to the Contractor throughout the contract. The required work may be located anywhere within Union County Water & Wastewater Operations (UCWW) service area, including sewer easement areas, yards, residential roads, parking lots, along NCDOT right-of-way, highways, city/town streets, etc.

The Contractor shall perform the Work complete, in place, and ready for continuous service, and shall include repairs, replacements and restoration required as a result of damages caused during this construction.

The Contractor shall furnish and install all materials which are reasonably and properly inferable and necessary for the proper completion of the Work, whether specifically indicated in the Contract Documents or not.

The Contractor shall comply with all municipal, county, state, federal, and other codes which are applicable to the proposed construction work.

The Contractor must maintain sewer service at all times to all commercial and industrial users in the areas of work. Service to residences may only be interrupted intermittently for short durations (less than 8 hours) and all such outages must be coordinated with the property owner or tenant in advance.

Excavations shall not remain open overnight, without the permission of the Engineer. Excavations within NCDOT Right-of-Ways shall not remain open overnight.

No guarantees will be made of size, amount, or quantity of any specified work orders/projects.

Any contract that is awarded shall be for a period of one (1) year commencing with the Notice of Award. The amount of each contract for each Work Order shall not exceed a total of One Hundred Fifty Thousand and No/100 Dollars ($150,000.00). Work under a contract shall be assigned on an as-needed basis to be determined by Union County in its sole and absolute discretion. Contract award does not authorize a notice to proceed. Should a contract be activated, Union County will issue a work order/task order which sets forth the services to be performed, as well as a Notice to Proceed for said services. No work is guaranteed under any contract.

4 INSTRUCTIONS

4.1 COMMUNICATION

All communications, any modifications, clarifications, amendments, questions, responses or any other matters related to the IFB must be made only through the Procurement Contact noted on the cover of this solicitation. A violation of this provision is cause for the County to reject a Company's bid. No contact regarding this document with other County employees is permitted and may be grounds for disqualification.

4.2 BIDDERS ACKNOWLEDGEMENT

The Bid will remain subject to acceptance for 120 days after the Bid Opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

4.3 DUPLICATE BID

No more than one (1) bid from any Bidder will be considered by the County. In the event multiple bids are submitted in violation of this provision, the County will have the right to determine which bid will be considered, or at its sole option, reject all such multiple bids.

4.4 BID SECURITY

- A Bid must be accompanied by Bid security made payable to Owner in an amount of five (5%) percent of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents).

- The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within ten (10) days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited.

- The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or one (1) day more than the period for which Bids are subject to acceptance, whereupon Bid security furnished by such Bidders will be released.

- Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

4.5 BID SIGNATURES

An authorized company official must sign Bids. Each signature represents binding commitment upon the Bidder to provide the goods and/or services offered to the County if the Bidder is determined to be the lowest responsive, responsible Bidder.

4.6 BIDDERS RESPONSIBILITIES

The Bidder must be capable, either as a firm or a team, of providing all parts as described herein. Exclusion of any parts or services for this Bid may serve as cause for rejection.

The successful Bidder will be responsible for all work in this solicitation whether it is provided or performed by the successful Bidder or subcontractor(s). Further, the County will consider the successful Bidder to be the sole point of contact with regard to contractual matters, including payment of any and all charges resulting from the cost of any contract.

4.7 EXAMINATION OF CONDIITIONS AND CONTRACT DOCUMENTS

It is understood and mutually agreed that by submitting a bid the Bidder acknowledges that all documents have been carefully examined pertaining to the Work; the location, accessibility, and general character of the site of the Work utility facilities within and adjacent to the site; and has satisfied himself as to the nature of the Work; sequences or procedures of construction (if any); the condition of existing structures; the conformation of the ground; the character, quality, and quantity of the material to be encountered; the subsurface conditions (including type and depth of rock and soil layers); the character of the equipment, machinery, plant and any other facilities needed preliminary to and during prosecution of the Work; the general and local conditions; federal, state, and local laws and regulations; the construction hazards; and all other matters, including, but not limited to, the labor situation which can in any way affect the Work under the Contract; and including all safety measures required by the Occupational Safety and Health Act of 1970 and all rules and regulations issued pursuant thereto. It is further mutually agreed that by submitting a proposal the Bidder acknowledges that he has satisfied himself as to the feasibility and meaning of the specifications and other Contract Documents for the construction of the Work and that all the terms, conditions, and stipulations contained therein are accepted; and is prepared to Work in cooperation with other Contractors performing Work on the site. The owner does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

The Contractor performing excavation Work shall be responsible for locating underground utilities prior to excavation. The utility locations shown in the Plans are approximate and for information only. The Contractor may obtain the services of a commercial utilities locator and/or call the various utility companies who may have lines in the area.

5 SCOPE OF WORK

5.1 INTENT

The intent of this Contract is to assign work to the Contractor on an as-needed basis. No guarantees will be made of size, amount, or quantity of any specified work orders/projects. The Contractor shall furnish all labor, materials, equipment, tools, services, supervision and incidentals required to complete the work as directed by the Engineer and specified herein.

The Work includes, but is not necessarily limited to, the following:

1. Maintenance of flow in existing sewers
2. Point repairs to sewer services and/or sewer mains
3. Installation of new sewer services and/or sewer mains
4. Installation and/or repair of manholes
5. Traffic Control when approved by the Engineer based on the location of the manhole to be rehabilitated

The work may include, but not be limited to, performing point repairs for major sewer defects, replacing service laterals via excavation from the main sewer to the edge of the property line or road right-of-way, sewer replacement via open cut, and manhole replacements.

Satisfactory cleanup and restoration operations, as determined by the Owner and Engineer, must be underway at a given site before Contractor will be allowed to start construction on another site.

The Owner reserves the right to terminate the Contract at any time during the Contract Period for any reason including, but not limited to, poor performance, poor quality of work, safety violations, slow or non-compliance with the Contract requirements, lack of regard for local and State agencies and the public, and failure to address punch-list issues that arise.

5.2 COMPLAINT RESOLUTION PLAN

The Contractor must provide a supervisor to be available by phone 24 hours a day, 7 days a week to answer emergency calls related to the Contractor's work and job sites.

The Contractor must respond immediately when called with emergency situations involving job site safety; unsafe traffic control; ingress/egress concerns or other potentially dangerous situations caused by the Contractor's work.

Non-emergency complaints regarding the contractor's work/workmanship must be responded to within 24 hours.

5.3 GUARANTEE

The Contractor shall guarantee all materials and workmanship for a period of one (1) year from the date of acceptance by Union County and shall replace any portions that fail because of faulty materials or workmanship at no additional cost. Items repaired under the provisions shall have an extended warranty period of twelve (12) months from the date of repair of the item.

5.4 CONTRACTOR'S CAPABILITES

The Contractor shall furnish personnel and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will ensure the completion of the work within the time stipulated in the Agreement. If at any time such personnel appears to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the

Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

When necessary to notify the property owner or tenant of any impact of construction activity, entry onto the land shall only be made by a Foreman, or more senior person, of the Contractor. All Foreman, and those ranking above Foreman, shall carry laminated photo identification cards bearing their name, position, Contractor name, and local day time and after hours phone number of the Contractor. This identification shall be produced, whether or not requested, anytime a Foreman or more senior person enters private land to communicate with the property owner or tenant.

5.5 TRAFFIC CONTROL

The Contractor shall furnish, install, operate and maintain equipment, services, and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow during construction.

All traffic control shall be in strict accordance with the requirements of the North Carolina Department of Transportation (NCDOT), and agency with jurisdiction over the road. Signs and signing procedures in roads shall conform fully to all applicable Federal, State, and Local codes.

The Contractor shall follow NCDOT's Guidelines for Transportation Management Plan Development, NCDOT's current edition of the "North Carolina Supplement to the MUTCD, Part VI and the State Policy and Procedure for Traffic Control Through Construction Work Zones" or other specific guidance from the agency having jurisdiction over the road.

The Contractor shall remove temporary equipment and facilities when no longer required and restore grounds to the original or to specified conditions.

Night work and weekend work may be permitted by the NCDOT or agency with jurisdiction if requested by the Contractor.

The Contractor shall notify all property owners at least 72 hours in advance of any work which will interfere with access to their residence or place of business.

No roads shall be closed for construction activities. At least one lane of traffic will be safely maintained at all times when construction is in progress. Access to businesses and residences along the roads shall be maintained at all times. All lanes will be open when work is suspended for one hour or longer. The Contractor is in no way relieved of liability for maintaining safe conditions regardless of approval of his work by others and is expected to conduct operations expeditiously to reduce the effect on vehicular traffic. All standards of the governing agency shall be strictly followed.

All traffic control measures (cones, flaggers, signs, etc.) shall be considered incidental to the work and all costs associated with such traffic control shall be included in the various Bid Items – no separate payment will be made.

Traffic control shall be included in each unit bid price in accordance with Section 4.15 Work Areas. This would include NCDOT functional classifications of "collector" and "local". Traffic control required for a NCDOT classification higher than "collector" will be addressed with the County as necessary and would be paid for separately. Approval from the County for these exceptions will be required prior to commencing work.

5.6 CARE AND PROTECTION OF PROPERTY

The Contractor shall be responsible for the preservation of all public and private property and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Engineer.

All sidewalks which are disturbed by the Contractor's operations shall be restored to their original condition by the use of similar or comparable materials. All curbing shall be restored by the Contractor in a condition equal to the original construction and in accordance with the best modern practice. Full lengths of curbing shall be replaced.

Along the location of this work all fences, walks, and other physical features except trees, bushes, and shrubbery shall be protected and restored in a thoroughly workmanlike manner by the Contractor. Fences and other features removed by the Contractor shall be replaced in the location indicated by the Engineer as soon as conditions permit. Any fencing that is located within or crosses Union County Water's water or sewer easements and/or right-of-ways shall have access gates installed as required by UCW. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be re-graded and restored to their original condition by sodding the area with an in-kind grass.

Trees within the project easements or those close to the project easements shall be boxed or otherwise protected against injury by the Contractor. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the Engineer. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.

All work associated with restoration services and/or repair to public/private property shall be included in the unit price schedule. No additional line item will be paid for these services.

5.7 MAINTENANCE OF FLOW

When bypass pumping is required, the Contractor shall supply pumps, conduits, power, and other equipment to divert the flow of sewage or drainage around the section in which work is to be performed. The bypass system shall be of sufficient capacity to handle existing flows plus additional flows that may occur during a rain event.

The Contractor shall submit to the Engineer, for approval, a detailed written plan of all methods of flow maintenance ten (10) days in advance of flow interruption. The Contractor

shall prepare a specific, detailed description of the proposed pumping system (Bypass Pumping Plan). The Bypass Pumping Plan shall be submitted and approved prior to the mobilization of any of the equipment included in the Bypass Pumping Plan. The Bypass Pumping Plan shall outline all provisions and precautions to be taken by the Contractor regarding handling of existing wastewater flows. This Bypass Pumping Plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials, and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified herein. All procedures for maintaining flows must meet the approval of the Owner and Engineer. No construction shall begin until all provisions and requirements have been reviewed and accepted by the Engineer.

Flows from private, commercial and industrial users shall be handled by the Contractor during rehabilitation of the sewer system without interruption.

The Contractor shall be required to repair at his own expense any damage to public or private property caused by his operations. Should damage of any kind occur to the existing drains or sewers, the Contractor shall at his own expense make repairs to the satisfaction of the Engineer.

The Contractor shall not be permitted to overflow, bypass, pump or by any other means convey drainage to any land, street, storm drain or water course.

Any and all flow maintenance activities shall in no way impede traffic flow. Traffic flow must be maintained at all times.

The Contractor shall immediately notify the Owner should a sanitary sewer overflow occur and take the necessary action to recover, remove and mitigate in an approved manner the spillage to the satisfaction of the Owner and/or other governmental agency. If sewage is spilled onto public or private property, the Contractor shall cleanup and disinfect the spillage to the satisfaction of the Owner and/or other governmental agency.

The Contractor is responsible for costs, including fines, for maintaining flow in sewers.

5.8 CONTRACTOR'S RESPONSIBILITY TO SUPPLY MATERIALS AND PERFORM WORK AT HIS EXPENSE

An attempt has been made while writing this Specification to state the Contractor's responsibilities for supplying materials and performing work under this Contract. All supply of materials and performance of work stated or implied to be the Contractor's responsibility shall be supplied and/or performed by the Contractor and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Schedule of Prices.

5.9 PUBLIC NOTIFICATION

The Owner will notify all residences, property owners, and businesses within the project areas prior to the start of work on the project. Ten (10) days before the start of work in each

area, the Contractor shall place a notice at the front door of each residence in that area advising the homeowners of the current schedule and advising of the Contractor's emergency telephone number. The Contractor shall coordinate and cooperate with the Owner on the most appropriate way to notify businesses in the area. The text of the notices shall be approved by the Owner in advance.

5.10 DISPOSAL OF MATERIALS

Remove from the site and properly dispose of all solids or semi-solids recovered during the cleaning operation.

Contractor shall comply with all applicable Federal, State, and local laws and regulations concerning waste material disposal.

5.11 TEMPORARY WATER SERVICE

The Contractor shall obtain prior approval from Union County Water before using the local public water supply and shall comply with all Federal, State, and local laws and regulations concerning water drawn from a public water supply. The Contractor shall provide an approved backflow prevention device and a flow metering device for the purposes of measuring the quantity of water used by the Contractor. The quantity of water used throughout this contract must be submitted to the Owner, not later than monthly, totalized in gallons used. Water will be provided free of charge. Waste of water by the Contractor shall be sufficient cause for withdrawing the privilege of unrestricted water use. Hydrants shall only be operated under the supervision of Union County Water & Wastewater Operations (UCWW) personnel

5.12 PROJECT IMPLEMENTATION

As mentioned previously herein, the intent of this Contract is that work will be assigned to the Contractor on an as-need basis until the Contract amount is expended. It will be the goal of the Owner to expend the entire Contract amount (minus the contingency) within one year.

The Contractor shall complete each Work Order in the order it is issued unless higher priority work is subsequently issued that must take precedence and/or unless otherwise approved by the Engineer. A Work Order shall be complete including complete restoration and final inspection before beginning another Work Order unless specifically approved by the Engineer. The Contractor shall diligently perform the work once the work has started on a Work Order and shall not stop work until the Work Order is completed unless specifically approved by the Engineer.

If inclement weather requires temporary suspension of work, the Contractor shall not be paid any additional money due to the project suspension or delays or for additional mobilization requirements. The Contractor should expect and plan work accordingly for times of bad weather.

The Contractor shall generally proceed with work on each Work Order as follows:

1) The Contractor shall perform the work as approved and required by the Engineer in accordance with the Specifications.

2) The Engineer will forward requirements for any manhole rehabilitation to the Contractor, either along with the approval for the main sewer rehabilitation or at some time during the completion of the main sewer work. Manhole work may also be issued on a stand-alone basis as the only required work. The required manhole rehabilitation work may include any of the various bid items.

3) The Contractor shall completely restore all areas impacted by the work.

5.13 WORK AREAS

The work will be performed in unpaved areas (lawn and easement areas) and in paved areas. The unit prices bid shall include all costs associated with working in each work area, including accessing the sewers and manholes, restoring the areas disturbed by the work, performing the work, traffic control, etc. Several of the Bid Items separate the work into unpaved areas and paved areas. Unpaved areas include grassed areas such as lawns, yards and easements. Paved areas include all paved areas, all concrete areas, and all gravel areas.

Add-on Bid Items for cleaning and televising sewers and for installing CIPP in easement areas are also provided. The add-on payment will be made if either the upstream or downstream manhole of the sewer segment is in an easement area. Easement areas are defined as non-landscaped areas (areas that are not mowed or landscaped) and wooded areas. Yards (front and back yards) that are routinely mowed and are landscaped are not considered easement areas, and the add-on payment does not apply for working in such yards. The Engineer's decision on what constitutes an easement area shall be final.

5.14 WORK HOURS

Normal work hours shall be 8:00 am to 5:00 pm, Monday through Friday, except for holidays. A normal work week shall be defined as 40 hours. It is anticipated that work in residential areas and easement areas will be completed during the normal work hours.

Any requests to work at times different from those specified or requests to work longer than the normal 40-hour work week shall be made in writing by the Contractor to the Engineer. Requests shall be made at a minimum of 72 hours prior to the requested change. The Engineer will review such requests and issue a decision on the request. The Engineer's decision shall be final, and no additional money shall be due the Contractor based on the final decision. The Contractor shall not assume that overtime work will be allowed.

If weekend work is required or agreed to by the Engineer, the Contractor shall work the specified weekend (6 hour minimum workday), unless work is prevented due to bad weather. Should the Contractor choose not to work the specified weekend due to reasons other than bad weather, then the Engineer may not allow the Contractor to work the following weekend. This restriction will not be grounds for delay, additional costs, or changes in work.

Should bad weather prevent the Contractor from working the specified weekend, then the Contractor may work the following weekend, provided that a proper request is made by the Contractor and the Engineer approves the request, as specified.

5.15 PRE-CONSTRUCTION VIDEO INSPECTION AND PHOTOGRAPHY

The Contractor shall be responsible for performing video inspections and taking photographs of all project areas prior to performing any work as he deems necessary. The purpose of the inspections and photographs shall be to document the pre-construction conditions for comparison with the final restoration work. If the Contractor fails to make such inspections and photographs and the Owner or Engineer receive a complaint on the final restoration, the Contractor shall be responsible for additional restoration at no additional cost to the Owner as necessary to completely resolve the complaint.

5.16 PROPERTY OWNER RELEASES

The Contractor will contain his work activities within the public road right-of-ways and public utility easements as shown on the plans. Any contractor activities outside these easements and right-of-ways will be considered work on private property. Work on private property may require the contractor to obtain from the impacted property owner, a release that holds the County harmless against claim for damages resulting from the contractor's activities on private property. Any specific work or service performed by the contractor on behalf of the property owner shall be noted in the release document. The release shall be signed and dated by the legal owner of the property and shall be witnessed and dated by the Contractor's representative. The contractor is responsible for retaining the original release. The Contractor shall provide a copy of the release to the Engineer prior to request for payment on the subject project.

6 PROJECT(S) SUMMARY

Reference the following for detailed information:

Section 01015 – Control of Work

Section 01300 – Submittals

Section 01380 – Photographs and Videos

Section 01510 – Maintenance of Flow in Existing Sewers and Drains

Section 01570 – Traffic Control

Section 02221 – Trenching, Backfilling, and Compacting for Utilities

Section 02513 – Asphaltic Concrete Vehicular Paving

Section 02515 – Precast Concrete Structures

Section 02985 – Seeding, Sodding, and Landscaping

Section 03002 – Concrete

Section 15060 – Pipe and Pipe Fittings: Basic Requirements

Section 15062 – Pipe: Ductile

Section 15064 – Pipe: Plastic

Section 330130 – CCTV Inspection of Sanitary Sewers

Union County Water and Sewer Standard Specifications and Details, latest revision

A general summary of some potential work to be performed under this Contract is as follows:

6.1 MAIN GRAVITY SEWER REPAIR/REPLACEMENT/REHABILITATION

Gravity sewer main repairs may range from point repairs to repair major defects to complete replacement of the sewer main. Point repairs and sewer replacement/rehab work will vary in length.

6.2 SEWER SERVE LATERAL REPAIR/REPLACEMENT/REHABILITATION

Sewer service lateral repairs may range from point repairs to repair major defects to complete replacement of the sewer service lateral. Point repairs and sewer replacement/rehab work will vary in length.

6.3 MANHOLE REPAIR/REPLACEMENT

The manhole repair work may range from the replacement of a riser or cone section to complete replacement of the complete manhole.

The Contractor shall furnish all labor, materials, equipment and incidentals required to rehabilitate manholes as specified herein. Rehabilitation work for each manhole may not be shown on the drawings and will be identified in the field by the Engineer or Engineers representative.

6.4 ACCEPTANCE TESTING

After the various types of rehabilitation, repair, or replacement have been completed, the work shall be visually inspected by the Contractor in the presence of the Engineer for compliance with these specifications and the manufacturer's recommendations. The Engineer and Owner shall also inspect the work during the 1-year warranty period. Any leakage or defects in the work shall be corrected by the Contractor at no additional cost to the Owner.

A. Sewer main replacements shall be visually inspected, deflection tested, and exfiltration air tested.
    1. Visual Test: Pipe shall be flushed with clean water to remove any dirt or foreign materials. Manhole inverts shall be swept or flushed as necessary. Each section of pipe shall then be looked at by the Engineer to determine if the grade is uniform, alignment is true, and that no joints are offset.

2. Deflection Test: Deflection test shall be performed by passing a rigid mandrel through the pipe. The mandrel shall have an outside diameter of 5% less than the average pipe inside diameter as shown in the manufacturer's certified submittals. The mandrel shall have a minimum length of 24 inches or full diameter. The mandrel and all accessories necessary to pull it shall be furnished by the Contractor.

3. Exfiltration Test: Conduct test by the low pressure air test method. Test shall be based on time required for pressure to drop from 3.5 PSIG to 2.5 PSIG. Allowable time for pressure drop shall be 1.2 minutes for each 100 feet of 8-inch pipe. Time shall be increased by 0.3 minutes for each pipe size thru 18 inches. The Contractor shall furnish all equipment and supplies for exfiltration testing. Exfiltration testing may be waived at the direction of the Engineer when the ground water table is above the top of the pipeline.

B. Service lateral replacements shall be visually inspected and exfiltration air tested.
   1. Visual Test: Pipe shall be flushed with clean water to remove any dirt or foreign materials. Manhole inverts shall be swept or flushed as necessary. Each section of pipe shall then be looked at by the Engineer to determine if the grade is uniform, alignment is true, and that no joints are offset.

   2. Exfiltration Test: Conduct test by the low pressure air test method. Test shall be based on time required for pressure to drop from 3.5 PSIG to 2.5 PSIG. Allowable time for pressure drop shall be 1.2 minutes for each 100 feet of 8-inch pipe. Time shall be increased by 0.3 minutes for each pipe size thru 18 inches. The Contractor shall furnish all equipment and supplies for exfiltration testing. Exfiltration testing may be waived at the direction of the Engineer when the ground water table is above the top of the pipeline.

C. Manholes shall be vacuum testing.

   1. Contractor shall be required to test 100% of the manholes rehabilitated in the project. The vacuum testing shall be conducted in conformance with ASTM C1244-02. All detected defects shall be immediately repaired and the manhole retested until passing.

A vacuum of 10 inches of mercury shall be drawn and vacuum pump shut off. With the valves closed, the time shall be measured for which it takes the vacuum to drop to 9 inches of mercury. The manhole shall be approved as passing the test if the time is greater than the values shown below:

Depth (ft.)	Manhole Diameter (in.)		
	48 inches	60 inches	72 inches
Less than 10 ft.	60 sec.	75 sec.	90 sec.
10 – 15 ft.	75 sec.	90 sec.	105 sec.
15 – 20 ft.	90 sec.	105 sec.	120 sec.

If the manhole fails the initial test, necessary repairs shall be made with an approved material. Retesting shall continue until the manhole satisfactorily passes the test. All tests shall be performed in the presence of the Owner and/or Engineer.

The Contractor will furnish all personnel, facilities, and equipment necessary to conduct the testing. Testing of the manholes shall not be paid for directly but shall be included in the contract unit price.

Refer to section 16 Appendix H – Reference Documents to see Union County Water & Wastewater Operations (UCWW) Specification and Details

7 PAY ITEM DESCRIPTIONS

Pay items have been set up in the Bid for all work that is permanent and measurable. The bid for each pay item shall include the cost of all new material, labor, equipment, and all else required to complete that pay item as specified. Payment for work will only be made after the work is complete and has been inspected and approved by the Engineer and/or Owner.

The Bid includes the following abbreviations:

- LF = linear foot
- VF = vertical foot
- EA = each

7.1 POINT REPAIRS TO GRAVITY SEWER MAINS & SERVICE LATERALS

This item includes all materials, equipment, and work required to perform point repairs to existing sewers. Bid Items are included for existing 4” or 6” laterals and 8”, 10” and 12” main sewers at various depths. Bid Items are included for a per point repair payment for performing point repairs on main sewers up to 12 feet in length and payment per linear foot for each foot over 12 feet. When a point repair exceeds 12 feet in length, the Contractor shall be paid for the first 12 feet of the point repair under the per point repair Bid Item and then on a linear foot basis for each foot over 12 feet. The work shall be performed as specified and in accordance with the details.

The bid items include backfilling with the excavated soil and all required restoration of grassed areas disturbed by the work. Restoration of asphalt pavement, concrete, curbs and gutters, and graveled areas shall be paid separately.

This item further includes payment for excavation, removal and off-site disposal of sewer pipe, installation of new sewer, connections to existing manholes and sewers, bedding, backfilling, compaction, bypass sewage pumping during construction, accessing sewers and manholes as specified, traffic control, coordination with and location of existing utilities, erosion control, and all other incidental items for which separate payment is not provided under other Bid Items. This item also includes television inspection after the point repairs are completed to confirm proper installation.

Reconnection of existing laterals and services shall be considered as incidental and included in the per point repair bid price of an 8”, 10”, or 12” mainline point repair.

Payment will be made for each point repair at the installed depth. Payment will be made on the basis of the unit price bid in the Bid Form.

Payment will not be made for any length outside of the required point repair length as defined by the Engineer unless approved by the Engineer prior to performing the point repair. In addition, no payment will be made for additional repairs located outside of the defined length that are required as a result of the Contractor’s work on the defined point repair.

7.2 NEW SEWER MAIN FROM MANHOLE TO MANHOLE

This item includes all materials, equipment, and work required to replace existing sewer mains from manhole to manhole as specified and in accordance with UCW’s standard specifications and details. This includes Bid Items for 8”, 10” and 12” sewers at varying depths. The Engineer will define the existing and new sewer sizes. The depth will be determined in the field.

This item includes payment for excavation, removal and off-site disposal of existing sewer pipe and manhole materials, surveying services to install the new sewers, installation of new sewer, reconnection of services, watertight connections to existing manholes and new manholes, stone stabilization, bedding, backfilling with excavated soil and compaction, product testing and low pressure air testing, mandrel testing, bypass sewage pumping during construction where required, accessing sewers and manholes as specified, traffic control, coordination with and location of existing utilities, and for all other incidental items for which separate payment is not provided under other bid items. This item shall also include complete restoration of grassed areas disturbed by the work. Other restoration shall be paid under separate bid items. In addition, this item includes cleaning and televising the new sewers after the new sewer is installed and prior to requesting payment.

Included in this Item is payment to substitute ductile iron pipe (pressure class 350), as specified and as directed by the Engineer. Payment will be made on a linear foot basis in addition to the unit price bid for sanitary sewer PVC pipe above.

Pipe replacement will be measured in place on a linear foot basis to the nearest foot along the horizontal centerline of the pipe with no deductions for manholes and will be from center of manhole to center of manhole.

Reconnection of existing laterals and services shall be considered as incidental and included in the linear foot bid price.

Payment will be made on the basis of the unit price bid in the Bid Form.

7.3 NEW 4-FOOT DIAMETER PRECAST CONCRETE MANHOLES

This item includes all materials, equipment, and work required to install new 4-foot-diameter pre-cast concrete manholes with solid or watertight covers as specified. The Bid includes payment for installation of manholes up to 6 feet deep and for each vertical foot of manhole over 6 feet installed.

This item includes payment for excavation, removal and off-site disposal of existing soil, sewer pipe and manhole (when replacing existing manholes or junction boxes), complete installation of new manhole including solid or watertight frame and cover, connecting existing sewers to new manholes with a minimum of 10 feet of new pipe for each connecting sewer and connecting the new pipe to the existing sewer with approved fittings, bedding, backfilling and compaction, installing concrete benching and forming invert channel, surveying services as required, bypass sewage pumping during construction, accessing sewers and manholes as specified, traffic control, compliance with required working hours, coordination with and location of existing utilities, erosion control, complete restoration of disturbed areas including pavement, and all other incidental items for which separate payment is not provided under other bid items.

Payment will be made for each manhole installed based on the unit price bid. Bid items include replacing existing manholes and installing a new manhole where one does not currently exist.

7.4 REMOVAL OF MANHOLE CHIMNEY/CONE SECTIONS & INSTALLATION OF NEW PRE-CAST CONCRETE MANHOLE RISER/CONE

This item includes all materials, equipment, and work required to remove existing manhole chimney or cone sections and to install new precast concrete cone and riser sections to the specified height or required elevation.

The unit prices bid for removing existing manhole chimney or cone sections and installing new precast concrete riser sections shall include any required height of new riser sections and shall include all costs associated with accessing the manholes, excavation, removal and off-site disposal of existing manhole materials, complete installation of new manhole riser sections including connecting to the existing manhole walls and encasing the connection with a concrete collar, bedding, backfilling with excavated soil and compaction, surveying services as required, bypass sewage pumping during construction as required, traffic control, coordination with and location of existing utilities, erosion control, complete restoration of disturbed grassed areas, and all other incidental items for which separate payment is not provided under other bid items.

Payment will be made for removal of existing manhole chimney or sections per each manhole with sections and/or cone removed at the unit price in the Bid Form.

Payment will be made on a per vertical foot basis of new riser section installed at the unit price bid in the Bid Form.

Payment will be made for each new cone section installed at the unit price bid in the Bid Form. The unit prices bid shall include all costs associated with providing and installing

the cone sections with solid or watertight covers and making a watertight connection with the new riser sections.

7.5 NEW VENT PIPES ON MANHOLES

This item includes all materials, equipment, and work required to install new steel vent pipes at manholes as specified in UCW standards and specifications. The required vent height will be determined by the Engineer. New vent pipes may be specified on new or existing manholes.

This item includes core-drilling the manhole and installing the vent pipe per UCW standards and specifications, accessing manholes as specified, coordination with and location of existing utilities, and for all other incidental items for which separate payment is not provided under other bid items.

Payment will be made for each vertical foot of new vent pipe installed measured from the bottom of the vent pipe to the vent pipe opening at the unit price bid in the Bid Form.

7.6 CLEANOUT REPAIRS

This item includes all new materials, labor, and equipment necessary to replace damaged cleanout caps, adapters, inserts, etc.

Payment for this Item will be made for the respective quantity as determined at the unit price bid in the Bid Form. Measurement for this Item will be made on a per cleanout basis as the number of existing cleanouts having such repair work performed.

7.7 MISCELLANEOUS RESTORATION

Asphalt Pavement Restoration: This item includes furnishing all new materials, equipment and labor for saw-cutting, removing, disposing and replacing all pavement including roadways and driveways as specified and as directed by the Engineer. Pavement shall be replaced to match existing pavement and in accordance with any and all jurisdictional requirements.

Damage to existing asphalt outside the specified area shall be repaired as directed by NCDOT or as directed by the Engineer but shall not be considered for payment. Separate payment will not be made for asphalt pavement restoration where it is noted as included in the unit price for the associated line item.

Payment will be on a square yard basis as measured on a horizontal plane in accordance with the unit price bid in the Bid Form.

Restoration of Concrete Driveways and Walkways: This item includes furnishing all new materials, equipment and labor for saw-cutting, removing, disposing and replacing concrete driveways and walkways as specified and as directed by the Engineer. Concrete shall be replaced to match existing conditions. Bid Items are provided for 4-inch-thick and 6-inch-thick concrete with welded wire reinforcing. Fiber-reinforced concrete may be considered as an alternate.

The Engineer shall define the limits for concrete restoration prior to starting the required work. Damage to existing concrete outside the area specified by the Engineer shall be repaired as directed by the Engineer but shall not be considered for payment. Separate payment will not be made for concrete restoration where it is noted as included in the unit price for the associated line item.

Payment will be on a square yard basis as measured on a horizontal plane in accordance with the unit price bid in the Bid Form.

Restoration of Concrete Curb and Gutter: This item includes furnishing all new materials, equipment and labor for saw-cutting, removing, disposing and replacing concrete curb and gutters to match existing, as specified and as directed by the Engineer, complete in place. Also included in this item is all excavating, forming, vibrating, curing, expansion joint material, and all else required to construct the necessary curb and gutters.

The Engineer shall define the limits for curb and gutter restoration prior to starting the required work. Damage to parallel curb and gutter outside the area specified by the Engineer shall be repaired as specified but will not be considered for payment. Separate payment will not be made for curb and gutter restoration where it is noted as included in the unit price for the associated line item.

Payment will be made for each linear foot of new curb and gutter installed at the unit price bid in the Bid Form.

Sod Restoration: This item includes furnishing all equipment, new materials and labor required to remove, dispose and replace sod for the entire width disturbed, of same type as existing, or to install new sod, complete in place, as specified and as directed by the Engineer.

The Engineer shall define the limits for sod restoration prior to starting the required work. Damage to existing sodded or grassed areas outside the area specified by the Engineer shall be repaired as directed by the Engineer but shall not be considered for payment. Separate payment will not be made for sod restoration where it is noted as included in the unit price for the associated line item.

Payment will be on a square yard basis as measured on a horizontal plane in accordance with the unit price bid in the Bid Form.

Restoration of Gravel Areas: This item includes furnishing all new materials, equipment and labor for providing, installing, leveling and grading stone to restore gravel areas disturbed by the work to equal or exceed preconstruction conditions as specified and as directed by the Engineer. Gravel shall match existing gravel.

The Engineer shall define the limits for gravel restoration prior to starting the required work. Damage to existing gravel outside the area specified by the Engineer shall be repaired as directed by the Engineer but shall not be considered for payment. Separate

payment will not be made for gravel restoration where it is noted as included in the unit price for the associated line item.

Payment will be made for each square yard of stone installed and graded at the unit price bid in the Bid Form.

Imported Backfill Material: This item includes all equipment, materials, and labor required for furnishing imported backfill material when native trench material is judged unsuitable in accordance with the specifications or as directed by the Engineer. Backfill material shall be obtained from an approved source and quantity used shall be as directed and approved by the Engineer. This item shall also include removing and disposing off-site of any soil deemed unsuitable for backfill.

Payment will be made at the unit price bid per cubic yard for "Imported Backfill Material". Payment will only be made when native material is unsuitable and stockpiles of suitable material from previous trench excavations have been exhausted and use has been directed by the Engineer.

Payment shall be made for each cubic yard installed at the unit price bid in the Bid Form.

7.8 BYPASS PUMPING USING 6-INCH PUMPS

This item includes the cost to provide, operate and maintain 6-inch pumps for bypassing existing wastewater flow while performing the work where required and where approved by the Engineer. All other bypass pumping with pumps smaller than 6-inch pumps shall be considered incidental to the work and all costs associated with such pumping shall be included in the various Bid Items – no separate payment will be made. The Engineer must approve the use of 6-inch pumps prior to performing the work if the Contractor plans on requesting payment for the pumps. If 6-inch pumps are used without approval, no payment will be made. If pumps smaller than 6 inches can handle the wastewater flow, no payment will be made for 6-inch pumps. No separate payment will be made for bypass pumping where it is included in the associated line item.

Payment will be made for 6-inch bypass pumps on a per day basis (per pump) at the unit price bid in the Proposal.

7.9 4-INCH & 6-INCH SEWER TAPS

This item includes all materials, equipment, and work required to install 4-inch or 6-inch sewer connections to existing 8-inch, 10-inch, or 12-inch sewer mains at varying depths.

This item includes payment for excavation, installation of new sewer tap, stone stabilization, bedding, backfilling with excavated soil and compaction, bypass sewage pumping during construction where required, accessing sewers and manholes as specified, traffic control, coordination with and location of existing utilities, and for all other incidental items for which separate payment is not provided under other bid items. This item shall also include complete restoration of grassed areas disturbed by the work. Other restoration shall be paid under separate bid items.

Payment for this Item will be made for the respective quantity as determined at the unit price bid in the Bid Form. Measurement for this Item will be made on a per sewer tap basis.

7.10 MOBILIZATION

This item is for the costs incurred prior to beginning work on this contract, including permits, licenses, fees, insurance, bonds, equipment mobilization, signage, etc.

Payment will be limited to 2% of the subtotal of the individual Project Work Order prior to contingency. One half of the amount will be paid with the first pay application and the remainder paid with the second pay application.

Payment will be made according to the lump sum amount.

7.11 CONTINGENCY ALLOWANCE

This item is a five percent (5%) contingency allowance to be included in the individual Project Work Order. This allowance shall be used only upon issuance of a written work order by the Engineer. Any unused portion of the allowance remaining at the completion of the contract shall revert to the County as a credit. The County reserves the right to delete the allowance from the contract prior to award. Should an amount other than 5% of the subtotal be entered in the item specified, the County reserves the right to correct this amount of the correct figure. Payment will be made on a lump sum or unit price basis.

7.12 ATTACH TO BID

7.12.1 REFERENCES

Bidders shall provide 3 references for similar projects to include:

- Company Name
- Contact Name and Title
- Direct Phone Number
- Email Address

7.12.2 SUBCONTRACTOR LIST

If subcontractors are to be used on this project, please provide the following:

- Company Name
- Contact Name and Title
- Address
- Direct Phone Number
- Email Address

7.13 DEVIATIONS

Any deviations from specifications and requirements herein must be clearly pointed out by bidder. Otherwise it will be considered that products offered will be in strict compliance with these specifications and requirements, and successful bidder will be held responsible therefor. Deviations must be explained in detail on an attached sheet.

However, no implication is made by Union County that deviations will be acceptable. Bidder is advised that the response (or lack thereof) on this question does not take precedence over specific responses or non-responses provided elsewhere in this bid.

8 EVALUATION OF BIDS AND AWARD PROCEDURES

8.1 BID INFORMATION

Bids must be made in strict conformance using the Invitation for Bid (IFB) forms provided herein. All blank spaces for bids must be filled in properly. Numbers must be written in ink or typewritten, and the completed forms shall be without erasures, lineation, or alterations. In accepting the bid, the County will assume that no alterations have been made, and if they appear afterward, they shall not be binding on the County.

All Bid Documents shall be signed by an individual who is authorized to contractually bind the company. The signature must indicate the title or position the individual holds in the agency or firm. Agencies or firms which sign contracts with the name of the agency or firm must provide the name of a corporate officer or executive director for signature validation by the County. **All unsigned Bids will be disqualified.** In submitting a Bid, Offeror affirms all statements contained in the bid are true and accurate.

8.2 TERMS OF SUBMISSION

All material received from a person or company ("Respondent") in response to this solicitation shall become the property of Union County and will not be returned to the Respondent. Any and all costs incurred by a Respondent in preparing, submitting, or presenting submissions are the Respondent's sole responsibility and Union County shall not reimburse the Respondent. All responses to this solicitation will be considered a public record and subject to disclosure under applicable public records law.

Any material in a response which the Respondent considers a trade secret and exempt from disclosure as a public record under applicable law, including N.C.G.S. §§ 132-1.2 and 66-152, must be properly designated as a trade secret. In order to properly designate such material, the Respondent must: (i) submit any trade secret materials in a separate envelope, or file, from all other submitted material, being clearly marked as "Trade Secret – Confidential and Proprietary Information," and (ii) stamp the same trade secret/confidentiality designation on each page of the materials therein which contain trade secrets.

To the extent consistent with public records law, Union County will make reasonable efforts to maintain the confidential nature of trade secrets, as determined by Union County and subject to the conditions set forth herein. Respondent understands and agrees by submitting a response to this solicitation, that if a request is made to review or produce a copy of any information in the Respondent's materials which was properly labeled by the Respondent as a trade secret, Union County will notify the Respondent of the request and the date that such materials will be released to the requestor unless the Respondent obtains a court order enjoining that disclosure. If the Respondent fails to obtain the court order enjoining disclosure prior to that date, Respondent understands and agrees that Union County will release the requested information to the requestor on that date.

Furthermore, the Respondent also agrees to indemnify and hold harmless Union County and each of its officers, employees, and agents from all costs, damages, and expenses incurred in connection with refusing to disclose any material that has been designated as a trade secret by Respondent.

8.3 AWARD

The award shall be made to the lowest responsive, responsible bidder, taking into consideration quality, performance, and the time specified in the bid for the performance of the contract

The term of this contract shall be for two (2) years with three (3) one-year renewal options at the County's discretion. The award is for a fixed, firm unit price during the initial two (2) year term where product needs are based upon indefinite quantities, and where orders will be based on actual needs that may exceed or be less than projections. All expenditures under a unit price contract are contingent upon appropriations having been made by Union County Board of Commissioners. Price adjustments may be negotiated at the time of renewal, based on the applicable Consumer Price Index adjustment over the preceding twelve months.

Union County shall review the terms and conditions and confirm performance under this contract has been satisfactory. However, the County reserves the right to terminate the contract or to allow the contract period to elapse.

A Bid may be rejected if it is incomplete. Union County may reject any or all Bids and may waive any immaterial deviation in a Bid.

More than one Bid from an individual, firm, partnership, corporation or association under the same or different names, will not be considered.

The award document may incorporate, by reference, all the requirements, terms and conditions of the solicitation and the Bidder's Bid as negotiated.

The County shall have a period of 120 days after opening of Bids in which to award the contract. A Contract shall serve as the agreement for the purpose of this award. Contents of the Bid shall become contractual obligations if a contract ensues. Failure of the Bidder to honor these obligations may result in cancellation of the award.

8.4 APPLICATION OF NORTH CAROLINA GENERAL STATUTES

The General Statutes of North Carolina regarding purchasing and competitive bidding (G.S. § 143-129) are made a part herein and will govern the bidding process as applicable.

9 GENERAL CONDITIONS AND REQUIREMENTS

9.1 MINIMUM REQUIREMENTS FOR BIDDERS

Bids shall be considered only from companies normally engaged in providing the type of installations specified in this solicitation. Union County, in its discretion, shall determine whether the evidence of responsibility and ability to perform is satisfactory.

The Bidder should have previous experience in the performance of projects of a similar nature to ensure timely and efficient completion of this project.

The individual/firm warrants that he/she is fully qualified, with adequate personnel and experience, to undertake the services required. The Offeror shall also certify that insurance coverage that meets or exceeds industry standards for this type of work will be in force to mitigate risk during performance under the contract.

9.2 TERMS AND CONDITIONS

All payroll taxes, liability and worker's compensation are the sole responsibility of the Offeror. The Offeror understands that an employer/employee relationship does not exist under this contract.

The County reserves the right to reject any and all bids, the right to waive informalities, and the right to disregard nonconforming or conditional bids or counter bids. It is the intention of Union County to execute a final, binding Contract with the successful Offeror which incorporates terms and conditions no less onerous than those appropriate to the engagement of a licensed contracting firm in connection with a project of this magnitude.

All bids submitted in response to this request shall become the property of Union County and as such, may be subject to public review.

9.3 TAXES

Contractor shall be responsible for paying all taxes, fees, assessments and premiums of any kind payable on it employees and operations. Contractor shall substantiate, on demand by Union County, that all taxes and other charges are being properly paid.

Pursuant to N.C.G.S 105-164.14, Union County is eligible for sales and use tax refunds on all material which become a permanent part of the construction. Contractor agrees to provide Union County such documentation as may be necessary to meet the requirements of the North Carolina Department of Revenue regarding requests for refund of sales and use taxes. Such requirements include those described in the North Carolina Department of Revenue Sales and Use Tax Technical Bulletins 18-2(F) outlined below:

To substantiate a refund claim for sales or use taxes paid on purchases of building materials, supplies, fixtures, and equipment by a contractor, Union County must secure from a contractor certified statements setting forth the specific required information. A "certified statement" is s statement signed by a Contractor's Union, a corporate officer of a contractor, or an employee of a contractor who is authorized to provide information set forth in the statement. The certified statement must include all of the following information:

a. The date the property was purchased;
b. The type of property purchased;
c. The cost of property purchased and the amount of sales and use taxed paid thereon;
d. The vendor from whom the property was purchased;
e. The project for which the property was purchased;

f. If the property was purchased in the State of North Carolina, the county to which it was delivered, or, if the property was not purchased in the State of North Carolina, the county in which the property was used;
g. The invoice number of the purchase.

In the event Contractor makes several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total amount of the invoices, and the State and local sales and use taxes paid thereon. Such statement must also include the cost of any tangible personal property withdrawn from Contractor's warehouse stock and the amount of State and local sales or use tax paid thereon by Contractor. Any local sales or use taxes included in Contractor's statements must be shown separately from the State sales or use taxes. Contractor's statements must not contain sales or use taxes paid on purchases of tangible personal property purchased by Contractor for use in performing the Contract which does not annex to, affix to or in some manner become a part of the building or structure that is owned or leased by a governmental agency and is being erected, altered or repaired for use by a governmental entity as defined by N.C.G.S. § 105-164.14(c).

Examples of property on which sales or use tax has been paid by Contractor and which shall not be included in Contractor's certified statement are scaffolding, forms for concrete, fuel for the operation of machinery and equipment, tools, equipment, equipment repair parts and equipment rentals. Similar certified statements by Subcontractors must be obtained by Contractor and furnished to Union.

Contractor shall submit notarized sales tax certificates which meet the requirements detailed above with each Application for Payment. Payment will not be made until the sales tax certificate(s) have been submitted to Union. Union is the recipient of sales tax refunds, and no such funds shall be provided to Contractor, or claim made by Contractor.

A sample tax form is provided in Appendix E.

9.4 IFB EXPENSES

Expenses for developing the bids are entirely the responsibility of the vendor and shall not be chargeable in any way to the County.

9.5 CERTIFICATION

In response to the IFB Request, the Contractor certifies the following:

- This bid is signed by an authorized representative of the firm;
- It can obtain insurance certificates as required within ten (10) calendar days after notice of award;
- All labor costs, direct and indirect, have been determined and included in the proposed cost; and
- The potential Contractor has read and understands the conditions set forth in this solicitation.

9.6 FINANCIAL INFORMATION

The Bidder must have the following financial information readily available and have the ability to provide it to the County, without exception, within twenty-four (24) hours upon request during the bid certification process:

1. Annual audited financial reports for the past five (5) fiscal years;
2. Credit reports, credit bulletins, bank and vendor references, and any other
3. published statements by agencies that have been issued or published about the entity within the past five (5) years;
4. Indicate whether the Company (and/or predecessor, guarantor, or subcontractor) has declared bankruptcy within the last five (5) years;
5. Provide a description of the financial impact of any past or pending legal proceedings and judgments that could materially affect the Bidder's financial position or ability to provide service to the County.

9.7 MATERIALS APPROVAL

All products or materials required for the successful completion of the Scope of Work must be approved by the Union County Project Manager.

9.8 CONTRACTUAL OBLIGATIONS

The contents of this Bid and the commitments set forth in the Bid shall be considered contractual obligations if a contract ensues. Failure to accept these obligations may result in cancellation of the award. All legally required terms and conditions shall be incorporated into final contract agreements with the selected Service

9.9 COMPLIANCE WITH LAWS

Seller represents and warrants that the performance of this order and the furnishing of goods or services required shall be in accordance with the applicable standards, provisions and stipulations of all pertinent Federal, State or County laws, rules, regulations, resolutions and ordinances including but not limited to the Fair Labor Standards Act, the Equal Employment Opportunity rules and regulations and the Occupational Safety and Health Acts.

9.10 SUBCONTRACTOR DISCLOSURE

A single Company may propose the entire solution. If the Bid by any Company requires the use of sub-contractors, partners, and/or third-party products or services, this must be clearly stated in the Bid. The Company submitting the Bid shall remain solely responsible for the performance of all work, including work that is done by sub-contractors.

A contractor whose Bid is accepted shall not substitute any person as subcontractor in the place of the subcontractor listed in the original bid, except (a) if the listed subcontractor's bid is later determined by the contractor to be non-responsible or nonresponsive or the listed subcontractor refuses to enter into a contract for the complete performance of the bid work, or (b) with the approval of the awarding authority for good cause shown by the contractor. The terms, conditions, and requirements of each contract between Contractor and a subcontractor performing work under a subdivision or branch of work listed in this subsection shall incorporate by reference the terms, conditions, and requirements of the

Contract between Contractor and Owner. Failure to include this list of subcontractors may cause a Bid to be rejected as nonresponsive by Owner.

If Owner, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.

Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

9.11 EXCEPTION TO THE IFB

An "exception" is defined as the Service Provider's inability or unwillingness to meet a term, condition, specification, or requirement in the manner specified in the IFB. All exceptions taken must be identified and explained in writing and must specifically reference the relevant section(s) of this IFB. Other than exceptions that are stated in compliance with this Section, each Bid shall be deemed to agree to comply with all terms, conditions, specifications, and requirements of this IFB. If the Service Provider provides an alternate solution when taking an exception to a requirement, the benefits of this alternate solution and impact, if any, on any part of the remainder of the Service Provider's solution, must be described in detail.

9.12 MODIFICATION OR WITHDRAWAL OF BID

Prior to the scheduled closing time for receiving bids, any Contractor may withdraw his bid. After the scheduled closing time for receiving bids, no bid may be withdrawn for 90 days. Only written requests for the modification or correction of a previously submitted bid that are addressed in the same manner as bids and are received by the County prior to the closing time for receiving bids will be accepted. The bid will be corrected in accordance with such written requests, provided that any such written request is in a sealed envelope that is plainly marked "Modification of Bid." Oral, telephone or fax modifications or corrections will not be recognized or considered.

9.13 CONTRACT COMMENCEMENT

Commencement of a contract shall not begin prior to all necessary County approvals, including County Commission approval where required, and receipt of a County Purchase Order. Commencement of a contract without these approvals is solely at the Bidder's own risk and is likely to result in no payment for services performed or goods received.

9.14 DISPUTES

In case of any doubt or differences of opinion as to the services to be furnished hereunder, the decision of the County shall be final and binding upon both parties.

9.15 EQUAL EMPLOYMENT OPPORTUNITY

All Companies will be required to follow Federal Equal Employment Opportunity (EEO) policies. Union County will affirmatively assure that on any project constructed pursuant

to this advertisement, equal employment opportunity will be offered to all persons without regard to race, color, creed, religion, national origin, sex, and marital status, status with regard to public assistance, membership or activity in a local commission, disability, sexual orientation, or age.

9.16 MINORITY BUSINESSES (MBE) OR DISADVANTAGED BUSINESSES (DBE)

It is the policy of Union County that Minority Businesses (MBEs), Disadvantaged Business Enterprises (DBEs) and other small businesses shall have the opportunity to compete fairly in contracts financed in whole or in part with public funds. Consistent with this policy, Union County will not allow any person or business to be excluded from participation in, denied the benefits of, or otherwise be discriminated against in connection with the award and performance of any contract because of sex, race, religion, or national origin.

9.17 LICENSES

The successful Firm(s) shall have and maintain a valid and appropriate business license (if applicable), meet all local, state, and federal codes, and have current all required local, state, and federal licenses.

9.18 E-VERIFY

E-Verify is the federal program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program, used to verify the work authorization of newly hired employees pursuant to federal law. Offeror/Firm shall ensure that Firm and any Subcontractor performing work under this contract: (i) uses E-Verify if required to do so; and (ii) otherwise complies with applicable law.

9.19 DRUG-FREE WORKPLACE

During the performance of this project, the Contractor agrees to provide a drug-free workplace for his employees; post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the workplace and specify the actions that will be taken against employees for violations of such prohibition; and state in all solicitations or advertisements for employees placed by or on behalf of the firm that the Firm maintains a drug-free workplace.

For the purposes of this section, “drug-free workplace” means a site for the performance of work done in connection with a specific contract awarded to a Contractor/Firm in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the Request.

9.20 INSURANCE

One or more of the following insurance limits may be required if it is applicable to the project. The County reserves the right to require additional insurance depending on the nature of the agreement.

At Contractor's sole expense, Contractor shall procure and maintain the following minimum insurances with insurers authorized to do business in North Carolina and rated A-VII or better by A.M. Best, or as otherwise authorized by the Union County Risk Manager.

A. WORKERS' COMPENSATION
(for any agreement unless otherwise waived by the Risk Manager)
Statutory limits (where contractor has three or more employees) covering all employees, including Employer's Liability with limits of:

$500,000	Each Accident
$500,000	Disease - Each Employee
$500,000	Disease - Policy Limit

B. COMMERCIAL GENERAL LIABILITY
(for any agreement unless otherwise waived by the Risk Manager)
Covering Ongoing and Completed Operations involved in this Agreement.

$2,000,000	General Aggregate
$2,000,000	Products/Completed Operations Aggregate
$1,000,000	Each Occurrence
$1,000,000	Personal and Advertising Injury Limit
$5,000	Medical Expense Limit

C. COMMERCIAL AUTOMOBILE LIABILITY
(for any agreement involving the use of a contractor vehicle while conducting services associated with the agreement)

$1,000,000 Combined Single Limit - Any Auto

D. PROFESSIONAL LIABILITY
(for any agreement providing professional service such as engineering, architecture, surveying, consulting services, etc.)

$1,000,000 Claims Made

Contractor shall provide evidence of continuation or renewal of Professional Liability Insurance for a period of two (2) years following termination of the Agreement.

E. POLLUTION LIABILITY INSURANCE
(for any agreement involving the clean-up or transportation of pollutants)

$1,000,000 Claims Made

Contractor shall provide evidence of continuation or renewal of Pollution Liability Insurance for a period of two (2) years following termination of the Agreement.

F. NETWORK SECURITY & PRIVACY LIABILITY (CYBER)
(for any agreement involving software applications)

$1,000,000 Claims Made

Contractor shall provide evidence of continuation or renewal of Technology Errors & Omissions Insurance for a period of two (2) years following termination of the Agreement.

G. Builder's Risk
(for any agreement involving above ground construction projects)
Amount of Contract

ADDITIONAL INSURANCE REQUIREMENTS

A. The Contractor's General Liability policy shall be endorsed, specifically or generally, to include the following as Additional Insured:
UNION COUNTY, ITS OFFICERS, AGENTS AND EMPLOYEES ARE INCLUDED AS ADDITIONAL INSURED WITH RESPECTS TO THE GENERAL LIABILITY INSURANCE POLICY.

Additional Insured status for Completed Operations shall extend for a period of not less than three (3) years from the date of final payment.

B. Before commencement of any work or event, Contractor shall provide a Certificate of Insurance in satisfactory form as evidence of the insurances required above.

C. Contractor shall have no right of recovery or subrogation against Union County (including its officers, agents and employees).

D. It is the intention of the parties that the insurance policies afforded by contractor shall protect both parties and be primary and non-contributory coverage for any and all losses covered by the above-described insurance.

E. Union County shall have no liability with respect to Contractor's personal property whether insured or not insured. Any deductible or self-insured retention is the sole responsibility of Contractor.

F. Notwithstanding the notification requirements of the Insurer, Contractor hereby agrees to notify County's Risk Manager at 500 N. Main Street # 130, Monroe, NC 28112, within two (2) days of the cancellation or substantive change of any insurance policy set out herein. Union, in its sole discretion, may deem failure to provide such notice as a breach of this Agreement.

G. The Certificate of Insurance should note in the Description of Operations the following:

Department: _____
Contract #: _____

H. Insurance procured by Contractor shall not reduce nor limit Contractor's contractual obligation to indemnify, save harmless and defend Union County for claims made or suits brought which result from or are in connection with the performance of this Agreement.

I. Certificate Holder shall be listed as follows:

Union County
Attention: Union County Risk Manager
500 N. Main Street
Monroe, NC 28112

J. If Contractor is authorized to assign or subcontract any of its rights or duties hereunder and in fact does so, Contractor shall ensure that the assignee or subcontractor satisfies all requirements of this Agreement, including, but not limited to, maintenance of the required insurances coverage and provision of certificate(s) of insurance and additional insured endorsement(s), in proper form prior to commencement of services.

9.21 INDEMNIFICATION

Contractor agrees to protect, defend, indemnify and hold Union County, its officers, employees and agents free and harmless from and against any and all losses, penalties, damages, settlements, costs, charges, professional fees or other expenses or liabilities of every kind and character arising out of or relating to any and all claims, liens, demands, obligations, actions, proceedings, or causes of action of every kind in connection with or arising out of this agreement and/or the performance hereof that are due, in whole or in part, to the negligence of the Contractor, its officers, employees, subcontractors or agents. Contractor further agrees to investigate, handle, respond to, provide defense for, and defend the same at its sole expense and agrees to bear all other costs and expenses related thereto.

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10 APPENDIX A – BID FORM

IFB No. 2025-019 Sewer Repair & Rehabilitation Excavation Repairs

SUBMIT WITH BID

Company Name: _____

Unit prices quoted and accepted shall be firm throughout the term of the awarded contract. Unit prices shall be applied, as appropriate, to compute the total value in the scope of the work all in accordance with the Contract Documents. Bidder acknowledges that quantities are approximate only and are given as the basis for comparison of Bids. The Owner may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient. An increase or decrease in the quantity of any item will not be regarded as sufficient grounds for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work. The quantities shown on the Bid Form are for the base bid only. It is the responsibility of the Contractor to apportion the cost of unit price items to the base bid listed using information in the Contract Documents. The cost for all unit price items shall be included within the base bid.

Bidder agrees to perform all work described in the Bidding Documents for the unit prices set forth in the Bid tabulation. Work may be required to be performed at night, weekends, or on holidays and no separate bid prices will distinguish for the time of work.

Each Bidder must acknowledge that subcontractors are only to be used with the express written permission of Union County.

Contractors shall be responsible for always providing the minimum required personnel and equipment during the project as indicated in each bid item. If the Contractor is unable to meet the minimum requirements, the bid item will not be paid at the approved rate. The rate may be paid at a proportional amount based on the percentage of equipment/personnel actually provided.

The pricing shall include all costs to the Contractor including, without limitation, fuel, travel, transport, hauling, permits, overhead, profit, taxes, insurance, lube, and service requirements, etc.

Provide the following information:

Copy of General Contractor's License: _____

Secretary of State ID Number _____

Attachments to this Bid:

The following items are submitted and made a condition of this Bid:

- List of Proposed Subcontractors.
- List of Proposed Suppliers.

ITEM				DESCRIPTION	QUANTITY		UNIT PRICE
1				**POINT REPAIRS TO EXISTING GRAVITY SEWER MAINS & SERVICE LATERALS**			
	A.			REPAIR TO EXISTING 4" OR 6" SERVICE LATERALS USING PVC PIPE			
		1)		0 TO 10 FEET DEEP			
			(a)	0 TO 6 FEET LONG	1	EA	$
			(b)	EACH ADDITIONAL FOOT OVER 6 FEET, (ADD TO ITEM l(a) ABOVE)	1	LF	$
			(c)	ADDITIONAL COST PER FOOT TO USE PRESSURE CLASS 350 DIP (ADD TO ITEMS l(a)AND l(b)ABOVE)	1	LF	$
	B.			REPAIR TO EXIST 8 INCH DIAMETER SEWERS			
		1)		0 TO 5 FEET DEEP			
			(a)	0 TO 12 FEET LONG	1	EA	$
			(b)	EACH ADDITIONAL FOOT OVER 12 FEET, (ADD TO ITEM 1(a) ABOVE)	1	LF	$
		2)		5.1 TO 10 FEET DEEP			
			(a)	0 TO 12 FEET LONG	1	EA	$
			(b)	EACH ADDITIONAL FOOT OVER 12 FEET, (ADD TO ITEM 2(a) ABOVE)	1	LF	$
		3)		10.1 TO 15 FEET DEEP			
			(a)	0 TO 12 FEET LONG	1	EA	$
			(b)	EACH ADDITIONAL FOOT OVER 12 FEET, (ADD TO ITEM 3(a) ABOVE)	1	LF	$
		4)		15.1 TO 20 FEET DEEP			
			(a)	0 TO 12 FEET LONG	1	EA	$
			(b)	EACH ADDITIONAL FOOT OVER 12 FEET, (ADD TO ITEM 4(a) ABOVE)	1	LF	$
	C.			REPAIR TO EXIST 10 INCH OR 12 INCH DIAMETER SEWERS			
		1)		0 TO 5 FEET DEEP			
			(a)	0 TO 12 FEET LONG	1	EA	$
			(b)	EACH ADDITIONAL FOOT OVER 12 FEET, (ADD TO ITEM 1(a) ABOVE)	1	LF	$
		2)		5.1 TO 10 FEET DEEP			
			(a)	0 TO 12 FEET LONG	1	EA	$
			(b)	EACH ADDITIONAL FOOT OVER 12 FEET, (ADD TO ITEM 2(a) ABOVE)	1	LF	$
		3)		10.1 TO 15 FEET DEEP			
			(a)	0 TO 12 FEET LONG	1	EA	$
			(b)	EACH ADDITIONAL FOOT OVER 12 FEET, (ADD TO ITEM 3(a) ABOVE)	1	LF	$
		4)		15.1 TO 20 FEET DEEP			
			(a)	0 TO 12 FEET LONG	1	EA	$
			(b)	EACH ADDITIONAL FOOT OVER 12 FEET, (ADD TO ITEM 4(a) ABOVE)	1	LF	$
2				**NEW SEWER MAIN TO REPLACE EXISTING SEWER MAIN FROM MANHOLE TO MANHOLE.**			
	A			NEW 8 INCH PVC SANITARY SEWER PIPE			
		1)		0 TO 5 FEET DEEP	1	LF	$
		2)		5.1 TO l0 FEET DEEP	1	LF	$
		3)		10.1 TO 15 FEET DEEP	1	LF	$
		4)		15.1 TO 20 FEET DEEP	1	LF	$

		5)		SUBSTITUTE DUCTILE IRON PIPE (PRESSURE CLASS 350) (ADD TO A(l-4) ABOVE)	1	LF	$
	B.			NEW 10 INCH AND 12 INCH PVC SANITARY SEWER PIPE			
		1)		0 TO 5 FEET DEEP	1	LF	$
		2)		5.1 TO 10 FEET DEEP	1	LF	$
		3)		10.1 TO 15 FEET DEEP	1	LF	$
		4)		15.1 TO 20 FEET DEEP	1	LF	$
		5)		SUBSTITUTE DUCTILE IRON PIPE (PRESSURE CLASS 350) (ADD TO B(l-4) ABOVE)	1	LF	$
3				**NEW 4 FOOT DIAMETER PRECAST CONCRETE MANHOLES WITH A CONE SECTION TOP, UP TO 6 FEET IN DEPTH.**			
	A			WITH 24-INCH SOLID COVER	1	EA	$
	B.			WITH 24-INCH CAM-LOCK WATERTIGHT COVER	1	EA	$
	C.			EACH ADDITIONAL VERTICAL FOOT OVER 6 FEET (ADD ON TO ITEMS (A) AND (B) ABOVE)	1	VF	$
4				**REMOVE EXISTING 4 FOOT DIAMETER MANHOLE CHIMNEY OR CONE SECTIONS AND INSTALL NEW PRECAST CONCRETE MANHOLE RISER AND CONE SECTIONS.**			
	A			REMOVE AND DISPOSE OF EXISTING 4 FOOT DIAMETER MANHOLE CHIMNEY OR CONE SECTIONS	1	EA	$
	B.			INSTALL NEW 4-FOOT-DIAMETER RISER SECTIONS.	1	VF	$
	C.			INSTALL 3-FOOT-TALL CONE SECTIONW/FRAME AND COVER.			
		1)		WITH 24-INCH DIAMETER SOLID COVER	1	EA	$
		2)		WITH 24-INCH DIAMETER CAM-LOCK WATERTIGHT COVER	1	EA	$
5				**INSTALL NEW VENT PIPES ON MANHOLES**	1	**VF**	$
6				**CLEANOUT REPAIRS CONSISITNG OF REPLACING CLEANOUT CAPS, ADAPTERS, INSERTS, ETC.**	1	**EA**	**$**
7				**FOR PERFORMING MISCELLANEOUS RESTORATION WORK, AS SPECIFIED, COMPLETE IN PLACE, EXCEPT RESTORATION OF GRASSED AREAS VIA SEEDING AND MULCHING WHICH IS CONSIDERED INCIDENTAL TO THE WORK WITH COSTS INCLUDED IN THE OTHER BID ITEMS AND EXCEPT FOR PAVEMENT RESTORATION WHERE SUCH RESTORATION IS SPECIFICALLY INCLUDED IN OTHER BID ITEMS**			
	A			SAWCUT, REMOVE AND REPLACE ASPHALT PAVEMENT	1	SY	**$**
	B.			SAWCUT, REMOVE AND REPLACE CONCRETE WALKS AND DRIVES			
		1)		4-INCH CONCRETE WITH WELDED WIRE FABRIC REINFORCING	1	SY	**$**
		2)		6-INCH CONCRETE WITH WELDED WIRE FABRIC REINFORCING	1	SY	**$**
	C.			SAWCUT, REMOVE AND REPLACE CONCRETE CURBS AND GUTTERS	1	LF	**$**
	D.			INSTALL SOD FOR GRASS RESTORATION	1	SY	**$**
	E.			INSTALL STONE FOR RESTORING GRAVEL AREAS	1	SY	**$**

	F.			IMPORTING AND INSTALLING SUITABLE BACKFILL MATERIAL, COST INCLUDES REMOVAL AND OFF-SITE DISPOSAL OF ALL UNSUITABLE MATERIAL	1	CY	**$**
8				**BYPASS PUMPING USING 6-INCH PUMPS, COST PER DAY PER 6-INCH PUMP**	1	**EA**	**$**
9				**FOR INSTALLING NEW 4"/6" SEWER TAPS TO EXISTING 8", 10" OR 12" SEWER MAINS.**			
	A.			INSTALL 6-INCH CASTING FOR 4" SEWER TAP	1	LF	**$**
	B.			0 TO 5 FEET DEEP	1	EA	$
	C.			5.1 TO l0 FEET DEEP	1	EA	$
	D.			10.1 TO 15 FEET DEEP	1	EA	$
	E.			15.1 TO 20 FEET DEEP	1	EA	$
				BID TOTAL (ITEMS 1-9)			
*				**MOBILIZATION WILL BE COMPENSATED AT 2% OF THE SUB-TOTAL OF THE INDIVIDUAL PROJECT WORK ASSIGNMENT**			
**				**CONTINGENCY ALLOWANCE WILL BE 5% OF THE SUB-TOTAL OF THE INDIVIDUAL PROJECT WORK ASSIGNMENT**			

11 APPENDIX B – BID SUBMISSION FORM

IFB No. 2025-019 Sewer Repair & Rehabilitation Excavation Repairs

SUBMIT WITH BID

This Bid is submitted by:

Company Legal Name: _____

Representative Name: _____

Representative Signature: _____

Representative Title: _____

Address: _____

City/State/Zip: _____

Email Address: _____

Phone Number: _____

Website Address: _____

It is understood that Union County reserves the right to reject any and all Bids, to make awards according to the best interest of the County, to waive formalities, technicalities, to recover and re-bid this project. Bid is valid for 120 calendar days from the bid due date and is submitted by an executive of the company that has authority to contract with Union County, NC.

Name: _____

Title: _____

Signature: _____

Date: _____

12 APPENDIX C – ADDENDUM AND ANTI-COLLUSION FORM

IFB No. 2025-019 Sewer Repair & Rehabilitation Excavation Repairs

SUBMIT WITH BID

Please acknowledge receipt of all addenda by including this form with your Bid. Any questions or changes received will be posted as an addendum on www.co.union.nc.us and/or www.ips.state.nc.us. It is your responsibility to check for this information.

Addendum No.	Date Downloaded

I certify that this Bid is made in good faith and without collusion with any other offeror or officer or employee of Union County.

Company Name: _____

Name: _____

Title: _____

Email Address: _____

Signature: _____

Date: _____

13 APPENDIX D – BID SECURITY SAMPLE

IFB No. 2025-019 Sewer Repair & Rehabilitation Excavation Repairs

An Executed Bid Security must be submitted with Bid. Refer to Section 4.4 for instructions.

SAMPLE BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:

BID

Bid Due Date:
Description *(Project Name and Include Location)*:

BOND

Bond Number:
Date *(Not earlier than Bid due date)*:
Penal sum _____ $ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

14 APPENDIX E – PERFORMANCE AND PAYMENT BOND SAMPLE

IFB No. 2025-019 Sewer Repair & Rehabilitation Excavation Repairs

Do Not Submit with Bid

Bonds shall be in a form substantially consistent with this sample.

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*: **UNION COUNTY**
500 N. Main Street, Suite 600
Monroe, North Carolina, 28112

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within

two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

SAMPLE PAYMENT BOND

CONTRACTOR *(name and address)*: SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*: **UNION COUNTY**
500 N. Main Street, Suite 600
Monroe, North Carolina 28112

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*: Jesse Helms Park Playground Equipment (IFB 2024-071)

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

   5.1 Claimants who do not have a direct contract with the Contractor,

      5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

      5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

   5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

   7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

   7.2 Pay or arrange for payment of any undisputed amounts.

   7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or

(2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default**: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

15 APPENDIX F – TEMPLATE CONTRACT

IFB No. 2025-019 Sewer Repair & Rehabilitation Excavation Repairs

Do Not Submit with Bid

-----For informational purposes only. -----

STATE OF NORTH CAROLINA

AGREEMENT

COUNTY OF UNION

1. AGREEMENT. This agreement ("Agreement") is entered into on _____, by and between UNION COUNTY, a political subdivision of the State of North Carolina ("Union"), and [Contractor's full legal name], ("Contractor"), whose business address is _____.

2. INDEPENDENT CONTRACTOR. Contractor shall be an independent contractor in all its activities pursuant to this Agreement. Neither Contractor nor any of its employees are to be considered Union's employee or agent for any purpose including, but not limited to, the accrual of any employee benefits. Contractor is not authorized to represent Union or otherwise bind Union in any dealings between Contractor and third parties. Any employees furnished by Contractor under this Agreement shall be deemed to be Contractor's employees exclusively.

3. SCOPE OF THE WORK. Contractor shall furnish all labor, equipment, tools, materials, supplies, transportation, tests and supervision required to complete in a workmanlike manner the work described in the [*Scope of Services or if attaching the full IFB, state the IFB # and the IFB title*], which is attached hereto and incorporated herein by reference ("Work"). Union is not financially committed by this agreement to purchase any minimum amount of services.

4. PERIOD OF PERFORMANCE. This Agreement shall commence as of the date first written above and shall continue until the earlier of the completion and acceptance of the Work or _____ [*total maximum time period from execution of the Agreement*]. Contractor shall promptly commence Work and shall achieve [substantial or final (*whichever is used in the solicitation/bid form*)] completion of the Work within _____ (___) days from Contractor's receipt of notice to proceed from Union.

5. PAYMENT FOR WORK. Union shall pay Contractor [*state the lump sum or hourly rate or unit pricing*] for Work, as set forth in the Contractor's bid, which is attached hereto and incorporated herein by reference. Payment for work satisfactorily completed shall be made within thirty (30) days of receipt of invoice by Union's finance office. Contractor shall submit documentation supporting its entitlement to payment as required by Union, and Union shall have no obligation to pay Contractor unless and until Union has received such documentation. All payments shall be conditioned upon appropriation by the Union County Board of Commissioners of sufficient funds for each request for services.

6. LICENSING REQUIREMENTS. Contractor represents and warrants that it is and shall remain properly licensed at all times in the performance of Work.

7. PERMITS AND LICENSES. Unless otherwise agreed in writing in advance by Union, Contractor shall obtain and pay for all licenses and permits that are required for it to perform Work.

8. COMPLIANCE WITH LAWS/COMPLIANCE WITH RULES AND POLICIES OF UNION. In performing the services pursuant to this Agreement, Contractor shall comply with all laws, rules, regulations, ordinances, codes, standards, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction. Contractor also shall comply with all rules and policies of Union.

9. INSURANCE. Contractor shall comply with the insurance requirements set forth in Exhibit A, attached and incorporated herein by reference.

No workers' compensation insurance shall be obtained by Union concerning Contractor or the employees of Contractor. Contractor shall comply with the workers' compensation law concerning Contractor and the employees of Contractor.

10. TAXES. Contractor shall be responsible for paying all taxes, fees, assessments and premiums of any kind payable on its employees and operations. Contractor shall substantiate, on demand by Union, that all taxes and other charges are being properly paid.

Pursuant to N.C.G.S. § 105-164.14, Union is eligible for sales and use tax refunds on all materials which become a permanent part of the construction. Contractor agrees to provide Union such documentation as may be necessary to meet the requirements of the North Carolina Department of Revenue regarding requests for refund of sales and use taxes. Such requirements include those described in the North Carolina Department of Revenue Sales and Use Tax Technical Bulletins § 18-2(F), outlined below:

> To substantiate a refund claim for sales or use taxes paid on purchases of building materials, supplies, fixtures, and equipment by a contractor, Union must secure from a contractor certified statements setting forth the specific required information. A "certified statement" is a statement signed by a contractor's Union, a corporate officer of a contractor, or an employee of a contractor who is authorized to provide information set forth in the statement. The certified statement must include all of the following information:
>
> a. The date the property was purchased;
>
> b. The type of property purchased;
>
> c. The cost of property purchased and the amount of sales and use taxed paid thereon;
>
> d. The vendor from whom the property was purchased;
>
> e. The project for which the property was purchased;
>
> f. If the property was purchased in the State of North Carolina, the county to which it was delivered, or, if the property was not purchased in the State of North Carolina, the county in which the property was used; and
>
> g. The invoice number of the purchase.
>
> In the event Contractor makes several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total

amount of the invoices, and the State and local sales and use taxes paid thereon. Such statement must also include the cost of any tangible personal property withdrawn from Contractor's warehouse stock and the amount of State and local sales or use tax paid thereon by Contractor. Any local sales or use taxes included in Contractor's statements must be shown separately from the State sales or use taxes. Contractor's statements must not contain sales or use taxes paid on purchases of tangible personal property purchased by Contractor for use in performing the Contract which does not annex to, affix to or in some manner become a part of the building or structure that is owned or leased by a governmental agency and is being erected, altered or repaired for use by a governmental entity as defined by N.C.G.S. § 105-164.14(c). Examples of property on which sales or use tax has been paid by Contractor and which shall not be included in Contractor's certified statement are scaffolding, forms for concrete, fuel for the operation of machinery and equipment, tools, equipment, equipment repair parts and equipment rentals. Similar certified statements by Subcontractors must be obtained by Contractor and furnished to Union.

Contractor shall submit notarized sales tax certificates which meet the requirements detailed above with each Application for Payment. Payment will not be made until the sales tax certificate(s) have been submitted to Union. Union is the recipient of sales tax refunds and no such funds shall be provided to Contractor, or claim made by Contractor therefor.

11. WARRANTY OF WORK. Contractor warrants that all Work shall be new, unless otherwise agreed in this Agreement, and of good quality and performed in a good and workmanlike manner. Contractor shall, at its own expense, at the request of Union, promptly replace or repair any defective or deficient Work for a period of one year after completion of Work. The express warranty contained in this section shall not diminish any of Union's rights against Contractor with respect to the time within which proceedings may be commenced to establish Contractor's liability with respect to Contractor's obligations other than specifically to correct Work.

12. SAFETY. Contractor shall establish and enforce safe working procedures at all times during its performance of Work in accordance with all federal, state and local laws, ordinances, rules and regulations pertaining to safety.

13. AGE LIMITS. No employee of Contractor under the age of 18 shall be permitted on property owned or leased by Union.

14. CLEANUP. Contractor shall keep its work areas clean of debris and excess materials, and at the end of each day will leave its work areas in broom-clean condition. If Contractor fails to clean up as required herein, Union may clean up and deduct the cost from Contractor's payment.

15. LIABILITY. Contractor agrees to protect, defend, indemnify and hold Union County, its officers, employees and agents free and harmless from and against any and all losses, penalties, damages, settlements, costs, charges, professional fees or other expenses or liabilities of every kind and character arising out of or relating to any and all claims, liens, demands,

obligations, actions, proceedings, or causes of action of every kind in connection with or arising out of this agreement and/or the performance hereof that are due, in whole or in part, to the negligence of the Contractor, its officers, employees, subcontractors or agents. Contractor further agrees to investigate, handle, respond to, provide defense for, and defend the same at its sole expense and agrees to bear all other costs and expenses related thereto.

16. [*Include this section only if required by the IFB. If not required by IFB, delete this section and insert the word "RESERVED" in its place.*] PERFORMANCE AND PAYMENT BONDS. Contractor shall furnish to Union performance and payment bonds, each in an amount at least equal to the lump sum stated in Section 5 herein, as security for the faithful performance and payment of all of Contractor's obligations under this Agreement. The bonds shall remain in effect until one year after the date when final payment becomes due.

17. [*Include this section only if required by the IFB. If not required by IFB, delete this section and insert the word "RESERVED" in its place.*] LIQUIDATED DAMAGES. Contractor and Union recognize that time is of the essence and that Union will suffer financial loss if the Work is not completed within the times specified in Section 4 herein. The parties also recognize the delays, expense, and difficulties involved in proving in a legal proceeding the actual loss suffered by Union if the Work is not completed on time. Accordingly, instead of requiring any such proof, Union and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Union _____ for each day that expires after the time specified in Section 4 herein for substantial completion until the Work is substantially complete.

18. DEFAULT/TERMINATION. If Contractor fails or refuses to supply sufficient and properly skilled labor, equipment or materials, or fails in any respect to diligently prosecute Work, or otherwise is in default or breach of any term of this Agreement, Union may terminate this Agreement upon 24 hours' written notice. In the event of such termination, Contractor immediately will stop work and remove its employees from Union's property. Union may complete the Work in whatever way it determines best, and at completion of the Work shall pay Contractor for the value of the Work performed by Contractor (excluding profit) but unpaid prior to the termination, less any costs incurred by Union to correct any deficiencies or defects attributable to Contractor's work.

19. TERMINATION FOR CONVENIENCE. Union may terminate this Agreement at any time upon three (3) days' written notice to Contractor. Such termination shall be effective in the manner specified in such written notice. Upon a termination for convenience, Union shall pay Contractor for Work performed to the date of termination. Contractor shall accept such payment in full and final payment and shall make no claim of any kind against Union, including but not limited to any claim for any additional payment.

20. ASSIGNMENT. Neither this Agreement, nor any payments to be earned pursuant to this Agreement, may be assigned by Contractor without the prior written consent of Union.

21. NO WAIVER. Union's not insisting upon strict compliance with any of the provisions of this Agreement, or not exercising any of its options provided herein, shall not be

construed as a waiver of its right thereafter to require such compliance or to exercise any such options.

22. E-VERIFY. E-Verify is the federal program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program, used to verify the work authorization of newly hired employees pursuant to federal law. Contractor shall ensure that Contractor and any subcontractor performing work under this Agreement: (i) uses E-Verify if required to do so by North Carolina law; and (ii) otherwise complies with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes. A breach of this provision by Contractor will be considered a breach of this Agreement, which entitles Union to terminate this Agreement, without penalty, upon notice to Contractor.

23. ENTIRE AGREEMENT. This Agreement represents the entire agreement of the parties, and may not be modified except in writing signed by both parties.

24. GOVERNING LAW. This Agreement shall be construed and enforced in accordance with the laws of the State of North Carolina. The parties to this agreement confer exclusive jurisdiction of all disputes arising hereunder upon the General Courts of Justice of Union County, North Carolina.

25. AUTHORITY. Each signatory below warrants that it has the corporate or other organizational power and authority to execute, deliver and perform this Agreement. Each signatory further warrants that the execution, delivery and performance by it of the Agreement has been duly authorized and approved by all requisite action of the party's management and appropriate governing body.

IN WITNESS WHEREOF, the parties hereto, acting under authority of their respective governing bodies, have hereunto set their hands and seals and caused this Agreement to be duly executed, this the day and year first above written.

UNION COUNTY	[CONTRACTOR'S FULL LEGAL NAME]
By: _____ (SEAL) Brian W. Matthews, County Manager	By: _____ (SEAL)
	This instrument has been preaudited in the manner required by The Local Government Budget and Fiscal Control Act.
Approved as to Legal Form _____	_____ Deputy Finance Officer

EXHIBIT A

INSURANCE REQUIREMENTS

I. At Contractor's sole expense, Contractor shall procure and maintain the following minimum insurances with insurers authorized to do business in North Carolina and rated A-VII or better by A.M. Best, or as otherwise authorized by the Union County Risk Manager.

A. WORKERS' COMPENSATION
Statutory (coverage for three or more employees) limits covering all employees, including Employer's Liability with limits of:

$500,000	Each Accident
$500,000	Disease - Each Employee
$500,000	Disease - Policy Limit

B. COMMERCIAL GENERAL LIABILITY
Covering Ongoing and Completed Operations involved in this Agreement.

$2,000,000	General Aggregate
$2,000,000	Products/Completed Operations Aggregate
$1,000,000	Each Occurrence
$1,000,000	Personal and Advertising Injury Limit

C. COMMERCIAL AUTOMOBILE LIABILITY

$1,000,000	Combined Single Limit - Any Auto

D. PROFESSIONAL LIABILITY

$1,000,000	Claims Made

Contractor shall provide evidence of continuation or renewal of Professional Liability Insurance for a period of two (2) years following termination of the Agreement.

E. POLLUTION LIABILITY INSURANCE

$1,000,000	Claims Made

Contractor shall provide evidence of continuation or renewal of Pollution Liability Insurance for a period of two (2) years following termination of the Agreement.

F. NETWORK SECURITY & PRIVACY LIABILITY (CYBER)

$1,000,000 Claims Made
$3,000,000 Aggregate Limit

Contractor shall provide evidence of continuation or renewal of Technology Errors & Omissions Insurance for a period of two (2) years following termination of the Agreement.

G. ABUSE AND MOLESTATION INSURANCE

$300,000 Per Claim
$300,000 Aggregate Limit

II. ADDITIONAL INSURANCE REQUIREMENTS

A. The Contractor's General Liability policy shall be endorsed, specifically or generally, to include the following as Additional Insured:

UNION COUNTY, ITS OFFICERS, AGENTS AND EMPLOYEES ARE INCLUDED AS ADDITIONAL INSURED WITH RESPECTS TO THE GENERAL LIABILITY INSURANCE POLICY.

Additional Insured status for Completed Operations shall extend for a period of not less than three (3) years from the date of final payment.

B. Before commencement of any work or event, Contractor shall provide a Certificate of Insurance in satisfactory form as evidence of the insurances required above.

C. Contractor shall have no right of recovery or subrogation against Union County (including its officers, agents and employees).

D. It is the intention of the parties that the insurance policies afforded by contractor shall protect both parties and be primary and non-contributory coverage for any and all losses covered by the above-described insurance.

E. Union County shall have no liability with respect to Contractor's personal property whether insured or not insured. Any deductible or self-insured retention is the sole responsibility of Contractor.

F. Notwithstanding the notification requirements of the Insurer, Contractor hereby agrees to notify County's Risk Manager at 500 North Main Street, Monroe, NC 28112, within two (2) days of the cancellation or substantive change of any insurance policy set out herein. Union, in its sole discretion, may deem failure to provide such notice as a breach of this Agreement.

G. The Certificate of Insurance should note in the Description of Operations the following:

Department: _____
Contract #: _____

H. Insurance procured by Contractor shall not reduce nor limit Contractor's contractual obligation to indemnify, save harmless and defend Union County for claims made or suits brought which result from or are in connection with the performance of this Agreement.

I. Certificate Holder shall be listed as follows:

Union County
Attention: Risk Manager
500 North Main Street
Monroe, NC 28112

J. If Contractor is authorized to assign or subcontract any of its rights or duties hereunder and in fact does so, Contractor shall ensure that the assignee or subcontractor satisfies all requirements of this Agreement, including, but not limited to, maintenance of the required insurances coverage and provision of certificate(s) of insurance and additional insured endorsement(s), in proper form prior to commencement of services.

16 APPENDIX G – REFERENCE DOCUMENTS

IFB No. 2025-019 Sewer Repair & Rehabilitation Excavation Repairs

Do Not Submit with Bid

-----For informational purposes only. -----

The Contractor shall comply with all municipal, county, state, federal, and other codes which are applicable to the proposed construction work, including Union County Water's Water and Sewer specifications and all referenced documents and details outlined as part of this contract.

Reference the following for detailed information:

Section 01015 – Control of Work

Section 01300 – Submittals

Section 01380 – Photographs and Videos

Section 01510 – Maintenance of Flow in Existing Sewers and Drains

Section 01570 – Traffic Control

Section 02221 – Trenching, Backfilling, and Compacting for Utilities

Section 02513 – Asphaltic Concrete Vehicular Paving

Section 02515 – Precast Concrete Structures

Section 02985 – Seeding, Sodding, and Landscaping

Section 03002 – Concrete

Section 15060 – Pipe and Pipe Fittings: Basic Requirements

Section 15062 – Pipe: Ductile

Section 15064 – Pipe: Plastic

Section 330130 – CCTV Inspection of Sanitary Sewers

Union County Water and Sewer Standard Specifications and Details, latest revision

SECTION 01015

CONTROL OF WORK

PART 1 GENERAL

1.01 CONTRACTOR'S CAPABILITIES

A. The Contractor shall furnish personnel and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Agreement. If at any time such personnel appears to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

1.02 PRIVATE LAND

A. The Contractor shall not enter or occupy private land outside of existing easements, except by written permission of the Owner.

B. When necessary to notify the property owner or tenant of any impact of construction activity, entry onto the land shall only be made by a Foreman, or more senior person, of the Contractor. All Foreman, and those ranking above Foreman, shall carry laminated photo identification cards bearing their name, position, Contractor name, and local day time and after hours phone number of the Contractor. This identification shall be produced, whether or not requested, anytime a Foreman or more senior person enters private land to communicate with the property owner or tenant.

C. The Contractor will contain his work activities within the public road right-of-ways and public utility easements as shown on the plans. Any contractor activities outside these easements and right-of-ways will be considered work on private property. Work on private property may require the contractor to obtain from the impacted property owner, a release that holds the County harmless against claim for damages resulting from the contractor's activities on private property. Any specific work or service performed by the contractor on behalf of the property owner shall be noted in the release document. The release shall be signed and dated by the legal owner of the property and shall be witnessed and dated by the Contractor's representative. The contractor is responsible for retaining the original release. The Contractor shall provide a copy of the release to the Engineer prior to request for payment on the subject project.

1.03 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor, shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access to private property during construction shall be removed when no longer required. The length of open trench will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as

limiting the length of open trench and prohibiting stacking excavated material in the street. All open excavations within State secondary road rights-of-way shall not remain open overnight. At the discretion of the Engineer, excavation in other areas shall be closed at the end of each work day.

B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be well lighted at night where such obstacles are readily accessible to the public.

1.04 TEST PITS

A. Test pits for the purpose of locating all known and unknown underground utilities or structures in advance of the construction shall be excavated and backfilled by the Contractor at no additional cost. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer.

1.05 MAINTENANCE OF TRAFFIC

A. Unless Contractor obtains written permission to close a road from an agency with jurisdiction over the road in question, all excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic hazards, he shall repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the agency with jurisdiction over the road. The Contractor is in no way relieved of liability for maintaining safe conditions regardless of approval of his work by others.

B. Detours around construction will be subject to the approval of the agency with jurisdiction over the road. The Contractor shall make all necessary traffic control submittals to the agency with jurisdiction for review and approval. Where detours are permitted, the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the Contractor shall expedite construction operations, and periods when traffic is being detoured will be strictly controlled by the agency with jurisdiction over the road. The Contractor is in no way relieved of liability for maintaining safe conditions because detours are approved by others.

C. The Contractor shall take precautions to prevent injury to the public due to open trenches. At the Contractor's expense, night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. The Contractor shall be fully responsible for damage or injuries whether or not police protection has been provided.

D. Signs and signing procedures in roads shall conform fully to all applicable Federal, State, and Local codes.

1.06 CARE AND PROTECTION OF PROPERTY

A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Engineer.

B. All sidewalks which are disturbed by the Contractor's operations shall be restored to their original condition by the use of similar or comparable materials. All curbing shall be restored by the Contractor in a condition equal to the original construction and in accordance with the best modern practice. Full lengths of curbing shall be replaced.

C. Along the location of this work all fences, walks, and other physical features except trees, bushes, and shrubbery shall be protected and restored in a thoroughly workmanlike manner by the Contractor. Fences and other features removed by the Contractor shall be replaced in the location indicated by the Engineer as soon as conditions permit. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be re-graded and restored to their original condition by sodding the area with an in-kind grass.

D. Trees within the project easements at the request of the Engineer or those close to the project easements shall be boxed or otherwise protected against injury by the Contractor. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the Engineer. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.

E. The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Schedule of Prices.

1.07 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, known or unknown, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by him at his expense.

B. Protection and temporary removal and replacement of existing utilities and structures as described in this section shall be a part of the work under the Contract and all costs in connection therewith shall be included in the unit prices established in the Proposal, or as extra work under the General Conditions.

C. If, in the opinion of the Engineer, permanent relocation of a utility owned by the municipality is required and the relocation is not already noted on the Drawings, he may direct the Contractor in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work under the General Conditions. If relocation of a privately owned utility is required, the municipality will notify the Utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the municipality and Utility, and shall have no claim for delay due to such relocation. The Contractor shall notify public utility companies in writing at least 72 hours (excluding Saturdays, Sundays, and legal holidays) before excavating in any public way.

1.08 MAINTENANCE OF FLOW

A. The Contractor shall at his own cost, provide for the flow of sewers, drains, and water courses interrupted during the progress of the work, and shall immediately cart away and remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow. See Section 01510 for additional requirements relative to maintaining sanitary sewer flow.

1.09 COOPERATION WITHIN THIS CONTRACT

A. All firms or persons authorized to perform any work under this Contract shall cooperate with the Contractor and his subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.

1.10 CLEANUP

A. During the course of the work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operation, and shall leave the entire site of the work in a neat and orderly condition.

1.11 CONTRACTOR'S RESPONSIBILITY TO SUPPLY MATERIALS AND PERFORM WORK AT HIS EXPENSE

A. An attempt has been made while writing this Specification to state the Contractor's responsibilities for supplying materials and performing work under this Contract. All supply of materials and performance of work stated or implied to be the Contractor's responsibility shall be supplied and/or performed by the Contractor and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Schedule of Prices.

1.12 PUBLIC NOTIFICATION

A. The Owner will notify all residences, property owners, and businesses within the project areas prior to the start of work on the project. Ten (10) days before the start of work in each area the Contractor shall place a notice at the front door of each residence in that area advising the homeowners of the current schedule and advising of the Contractor's emergency telephone number. The Contractor shall coordinate and cooperate with the Owner on the most appropriate way to notify businesses in the area. The text of the notices shall be approved by the Owner in advance.

1.13 DISPOSAL OF MATERIALS

A. Remove from the site and properly dispose of all solids or semi-solids recovered during the cleaning operation.

B. Contractor shall comply with all applicable Federal, State, and local laws and regulations concerning waste material disposal.

1.14 TEMPORARY WATER SERVICE

A. The Contractor shall obtain prior approval from Union County Water before using the local public water supply and shall comply with all Federal, State, and local laws and regulations concerning water drawn from a public water supply. The Contractor shall provide an approved backflow prevention device and may be provided with a flow metering device for the purposes of measuring the quantity of water used by the Contractor. Water will be provided free of charge. Waste of water by the Contractor shall be sufficient cause for withdrawing the privilege of unrestricted water use. Hydrants shall only be operated under the supervision of Union County Water personnel.

1.15 COMPLAINT RESOLUTION

A. The Contractor must provide a supervisor to be available by phone 24-hours a day, 7-days a week to answer calls related to the Contractor's work and job site.

B. The Contractor shall respond immediately when called with emergency situations involving their work.

C. Non-emergency complaints regarding the Contractor's work/workmanship shall be responded to within 24-hours.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

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SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals: Shop Drawings, Product Data, Samples, Construction Schedules, and Submittal Schedules as defined in the General Conditions. Detailed submittal requirements are specified in the technical specifications sections.

B. All submittals shall be clearly identified by reference to Specification Section, Paragraph, Drawing No. or Detail as applicable. Submittals shall be clear and legible and of sufficient size for sufficient presentation of data.

1.02 SHOP DRAWINGS, WORKING DRAWINGS, PRODUCT DATA, SAMPLES, PRECONSTRUCTION VIDEO

A. Shop Drawings

1. Shop drawings include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shopwork manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications, as applicable to the Work.

2. All shop drawings submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

3. The Contractor shall check all subcontractors shop drawings regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the Drawings and Specifications. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission thereof.

4. All details on shop drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted for approval.

B. Product Data

1. Product data as specified in individual Sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing and printed product warranties, as applicable to the Work.

C. Working Drawings

1. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's plans for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, pedestrian bridges, temporary traffic and signage plans, forming and false work; and for such other work as may be required for construction but does not become an integral part of the Project.

2. Working drawings shall be prepared and sealed by a registered Professional Engineer, currently licensed to practice in the State of North Carolina. The Contractor shall submit a letter of certification from the Professional Engineer stating that he/she has prepared the designs and has verified that the materials/ equipment have been installed as designed. No working drawings or calculations/computations relating to the working drawings shall be submitted to the Engineer unless specifically requested in writing.

D. Samples

1. Samples specified in individual Sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the Work.

E. Pre-Construction Audio/Video Taping

1. Submit pre- and post-construction video photography taping per Section 01380.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall review shop drawings, product data and samples, including those by subcontractors, prior to submission to determine and verify the following:

1. Field measurements

2. Field construction criteria

3. Catalog numbers and similar data

4. Conformance with the Specifications

B. Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor: "Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements." Shop drawings and product data sheets 11-in x 17-in and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the Resident Project Representative a copy of each submittal transmittal sheet for shop drawings, product data and samples at the time of submittal of said drawings, product data and samples to the Engineer.

C. Each submittal shall be transmitted by a standard transmittal sheet which shall fully describe the transmitted data and include a listing of all items within the submittal.

D. The Contractor shall utilize a 10-character submittal identification numbering system in the following manner:

1. The first character shall be a D, S, P, M, or R, which represents Shop/Working Drawing and other Product Data (D), Sample (S), Preliminary Submittal (P), Operating/Maintenance Manual (M), or Request for Information (R).

2. The next five digits shall be the applicable Specification Section Number.

3. The next three digits shall be the numbers 001-999 to sequentially number each initial separate item or drawing submitted under each specific Section number.

4. The last character shall be a letter, A-Z, indicating the submission, or resubmission of the same Drawing, i.e., "A=1st submission, B=2nd submission, C=3d submission, etc. A typical submittal number would be as follows:

D-03300-008-B

D	=	Shop Drawing
03300	=	Specification Section for Concrete
008	=	The eighth initial submittal under this specification section
B	=	The second submission (first resubmission) of that particular shop drawing

E. Notify the Engineer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

F. The review and approval of shop drawings, samples or product data by the Engineer shall not relieve the Contractor from his/her responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefor.

G. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

H. Project work, materials, fabrication, and installation shall conform with approved shop drawings, applicable samples, and product data.

1.04 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other contractor.

B. Each submittal, appropriately coded, will be returned within 30 calendar days following receipt of submittal by the Engineer.

C. Number of submittals required:

1. Shop Drawings shall be submitted electronically via email or FTP to the Engineer.

2. Product Data shall be submitted electronically via email or FTP to the Engineer.

D. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.

2. The Project title and number.

3. Contractor identification.

4. The names of:

a. Contractor
b. Supplier
c. Manufacturer

5. Identification of the product, with the specification section number, page and paragraph(s).

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the Work or materials.

8. Applicable standards, such as ASTM or Federal Specification numbers.

9. Contractor certification statement and identification of deviations from Contract Documents.

10. Identification of revisions on resubmittals.

11. An 8-in x 3-in blank space for Contractor and Engineer stamps.

E. Facsimiles or copies of facsimiles will not be accepted as submittals.

F. After review of shop and working drawings, Engineer will transmit an electronic copy of the submittal to the Contractor.

1.05 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

A. The review of shop drawings, data, and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed:

1. as permitting any departure from the Contract requirements;

2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;

3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.

B. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.

C. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

D. Submittals will be returned to the Contractor under one of the following codes.

Code 1 - "APPROVED" is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.

Code 2 - "APPROVED AS NOTED". This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

Code 3 - "APPROVED AS NOTED/CONFIRM". This combination of codes is assigned when a confirmation of the notations and comments IS required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the confirmation.

Code 4 - "APPROVED AS NOTED/RESUBMIT". This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the resubmittal.

Code 5 - “NOT APPROVED" is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.

Code 6 - "COMMENTS ATTACHED" is assigned where there are comments attached to the returned submittal which provide additional data to aid the Contractor.

Code 7 - "RECEIPT ACKNOWLEDGED" is assigned to acknowledge receipt of a submittal that is not subject to the Engineer’s review and approval, and is being filed for informational purposes only. This code is generally used in acknowledging receipt of means and methods of construction work plans, field conformance test reports, and health and safety plans.

Codes 1 through 5 designate the status of the reviewed submittal with Codes 6 showing there has been an attachment of additional data. Code 7 will be used as may be necessary.

E. Resubmittals will be handled in the same manner as the initial submittals. On resubmittals, the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Engineer, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type of revision that is not in accordance to the Contract Documents as may be required by the Engineer.

F. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and will be considered "Not Approved" until resubmitted. The Engineer may, at his/her option, provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

G. Repetitive Review

1. Shop drawings and other submittals will be reviewed no more than twice at the Owner's expense. All subsequent reviews will be performed at times convenient to the Engineer and at the Contractor's expense, based on the Engineer's then prevailing rates. The Contractor shall reimburse the Owner for all such fees invoiced to the Owner by the Engineer. Submittals are required until approved.
2. Any need for more than one resubmission, or any other delay in obtaining Engineer's review of submittals, will not entitle Contractor to extension of the Contract Time.

H. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least seven working days prior to release for manufacture.

I. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

J. Request For Information (RFI) shall be submitted on a standard form provided by the Engineer. RFI's shall indicate their importance to the timely completion of the project. RFI's will be processed as a shop drawing with 30 days allowed for review time.

1.06 DISTRIBUTION

A. Distribute reproductions of approved shop drawings and copies of approved product data and samples, where required, to the job site file and elsewhere as directed by the Engineer. Number of copies shall be as directed by the Engineer but shall not exceed 4.

1.07 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

A. If specifically required in other Sections of these Specifications, the Contractor shall submit a P.E. Certification for each item required, in the form attached to this Section, completely filled in and stamped.

1.08 GENERAL PROCEDURES FOR SUBMITTALS

A. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections, of the Specifications, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

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P.E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a Professional Engineer registered in the State of North Carolina and that he/she has been employed by (Name of Contractor) _____ to design _____ _____ in accordance with Specification Section _____ for the (Name of Project) _____ _____. The undersigned further certifies that he/she has performed the design of the _____ _____, that said design is in conformance with all applicable local, state and federal codes, rules, and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the (Insert Name of Owner) _____ _____

or Owner's representative with five working days following written request therefor by the Owner.

_____
P.E. Name

_____
Signature

_____
Address

_____
Contractor's Name

_____
Signature

_____
Title

_____
Address

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SECTION 01380

PHOTOGRAPHS AND VIDEOS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor materials, equipment, and incidentals required to videotape and photograph the project area, as directed by the Engineer and as specified herein, prior to, during and after construction work.

1.02 COST OF PHOTOGRAPHY

A. The cost of the photography shall be a subsidiary obligation of the Contractor, and no separate payment will be made.

1.03 AUDIO/VIDEO DVDS

A. DVD recordings shall not be made more than 5 days prior to construction or after completion. All DVDs and written records shall be immediately submitted to and become the property of the Owner.

PART 2 PRODUCTS

2.01 AUDIO/VISUAL RECORDING

A. The audio/video recording shall be of professional quality, DVD format.

B. The audio-visual system and the procedures employed in its use shall be such as to produce a finished product that will meet professional standards. The video portion of the recording shall produce bright, sharp, clear pictures with accurate colors and shall be free from distortion or any other form of picture imperfection. All video recordings shall by electronic means display on the screen the time of day, the month, day and year of the recording. This time and date information must be continuously and simultaneously generated with the actual recording. The audio portion of the recording shall be of high clarity and be free from distortion. Professional, quality equipment shall be used in the recording firm's studio.

2.02 PHOTOGRAPHS

A. Color photographs shall be taken on digital media with a minimum of eight mega-pixel resolution.

B. Files shall indicate the date, name of contract, and the location where the photograph was taken.

C. Images shall not be compressed.

PART 3 EXECUTION

3.01 VIDEO RECORDING

A. The recordings shall contain coverage of all visible features within the construction zone of influence. These features shall include, but not be limited to, all roadways, pavement, retention ponds, railroad tracks, curbs, driveways, sidewalks, culverts, head-walls, retaining walls, landscaping, trees, fences, visible utilities, structures and all buildings. Panning, zoom-in and zoom-out rates shall be sufficiently controlled to maintain a clear view of the subjects.

B. In general the views will comprise a 360° panorama every 100 feet of sewer length, at every manhole, and designated close-up views.

3.02 PHOTOGRAPHS

A. Photograph areas that could be impacted by construction activities including, but not limited to, material staging, ingress/egress, utility structures, buildings, and other visible features.

B. One (1) digital copy of each photograph shall be delivered to the Owner.

END OF SECTION

SECTION 01510

MAINTENANCE OF FLOW IN EXISTING SEWERS AND DRAINS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to maintain wastewater and storm drainage flow in all public and private pipes, including individual service connections, during construction.

B. Construct and maintain all temporary bypass sewers and drains and be responsible for all bypass pumping of sewage and drainage that may be required to prevent backing up of sewage and to allow proper inspection, rehabilitation, testing, or drainage during pipe replacement and/or rehabilitation. There shall be no spillage during the by-pass pumping. If spillage occurs, the Contractor shall immediately remove and dispose of all offensive matter spilled during the by-pass pumping at his own expense.

1.02 SUBMITTALS

A. The Contractor shall submit to the Engineer, for approval, a detailed written plan of all methods of flow maintenance ten (10) days in advance of flow interruption. All procedures for maintaining flows must meet the approval of the Owner and Engineer.

B. The Contractor shall prepare a specific, detailed description of the proposed pumping system (Bypass Pumping Plan). The Bypass Pumping Plan shall be submitted and approved prior to the mobilization of any of the equipment included in the Bypass Pumping Plan. The Bypass Pumping Plan shall outline all provisions and precautions to be taken by the Contractor regarding handling of existing wastewater flows. This Bypass Pumping Plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials, and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified herein. No construction shall begin until all provisions and requirements have been reviewed and accepted by the Engineer. The plan shall include but not be limited to the following details:

1. Staging areas for pumps.

2. Sewer plugging method and types of plugs.

3. Size and location of manholes or access points for suction and discharge hose or piping.

4. Size of pipeline or conveyance system to be bypassed.

5. Number, size, material, location and method of installation of suction piping.

6. Number, size, material, location and method of installation of discharge piping.

7. Bypass pump sizes, capacities, and number of each size to be provided on site including primary all primary and secondary pumping units.

8. Any temporary pipe supports and anchoring requirements.

9. Access plans to all bypass pumping locations indicated on the drawings.

10. Emergency plan for adverse weather and flooding for the cleaning phase and the lining phase of the work.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 MAINTENANCE OF FLOW IN EXISTING SEWERS AND DRAINS

A. When bypass pumping is required the Contractor shall supply pumps, conduits, power, and other equipment to divert the flow of sewage or drainage around the section in which work is to be performed. The by-pass system shall be of sufficient capacity to handle existing flows plus additional flows that may occur during a rain event.

B. Flows from private, commercial and industrial users shall be handled by the Contractor during rehabilitation of the sewer system without interruption.

C. The Contractor shall be required to repair at his own expense any damage to public or private property caused by his operations.

D. Should damage of any kind occur to the existing drains or sewers, the Contractor shall at his own expense make repairs to the satisfaction of the Engineer.

E. The Contractor shall not be permitted to overflow, bypass, pump or by any other means convey drainage to any land, street, storm drain or water course.

F. Any and all flow maintenance activities shall in no way impede traffic flow. Traffic flow must be maintained at all times.

G. The Contractor shall immediately notify the Owner should a sanitary sewer overflow occur and take the necessary action to recover, remove and mitigate in an approved manner the spillage to the satisfaction of the Owner and/or other governmental agency. If sewage is spilled onto public or private property, the Contractor shall washdown; cleanup and disinfect the spillage to the satisfaction of the Owner and/or other governmental agency.

H. The Contractor is responsible for costs, including fines, for maintaining flow in sewers.

END OF SECTION

SECTION 01570

TRAFFIC CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish, install, operate and maintain equipment, services and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow during construction.

B. All traffic control shall be in strict accordance with the requirements of the North Carolina Department of Transportation (NCDOT), and agency with jurisdiction over the road.

C. The Contractor shall prepare a Traffic Management Plan (TMP). The TMP will follow NCDOT's Guidelines for Transportation Management Plan Development, NCDOT's current edition of the "North Carolina Supplement to the MUTCD, Part VI and the State Policy and Procedure for Traffic Control Through Construction Work Zones" or other specific guidance from the agency having jurisdiction over the road.

1.02 SUBMITTALS

A. The Contractor shall submit to the NCDOT or agency with jurisdiction a detailed traffic control plan, including all temporary changes in traffic patterns, detailed drawings of the required traffic control equipment, a list of street or road closures and detours, etc. for each location of work. The traffic control plans must be approved by the NCDOT or agency with jurisdiction before any work will be allowed. The Contractor shall submit the traffic control plan for each work area at least 30 days prior to working in the area to provide time for review and comments from the NCDOT or agency with jurisdiction. Work shall also be coordinated with the Police Department, Fire Department, and other public safety agencies.

B. The Contractor shall submit to the NCDOT or agency with jurisdiction a notification that construction will be commencing within their right of way. The notification should be submitted in writing at least 30 days prior to commencing work in the respective agencies right of way.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 TRAFFIC CONTROL

A. The Contractor shall fully implement the traffic control plan as approved by the NCDOT or agency with jurisdiction. The traffic control devices shall be in place prior to performing any work within the roads. The Contractor shall maintain all traffic control equipment and monitor the traffic control measures. The traffic control measures shall be modified as deemed necessary by the Contractor, the NCDOT or agency with jurisdiction. The Contractor shall fully cooperate with the NCDOT or agency with jurisdiction officials during inspections of the traffic control measures. The Contractor shall remove temporary equipment and facilities when no longer required and restore grounds to the original or to specified conditions.

B. Night work and weekend work may be permitted by the NCDOT or agency with jurisdiction if requested by the Contractor. The NCDOT or agency with jurisdiction may restrict work in thoroughfares as necessary.

C. The Contractor shall notify all property owners at least 72 hours in advance of any work which will interfere with access to their residence or place of business.

D. No road shall be closed to traffic without the prior consent of the Engineer, the agency responsible for the road and the local Police Department. All standards of the governing agency shall be strictly followed.

3.02 CONSTRUCTION PARKING CONTROL

A. The Contractor shall control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, or construction operations.

B. The Contractor shall monitor parking of construction personnel's private vehicles, maintain free vehicular access to and through parking areas and prohibit parking on or adjacent to access roads or in not-designated areas.

END OF SECTION

SECTION 02221

TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 — GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavation, trenching, backfilling and compacting for all underground utilities.
   2. Surface drainage conduits and piping.
   3. All related utility and process appurtenances.

B. Related Sections include but are not necessarily limited to:
   1. Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
   2. Division 1 - General Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Association of State Highway & Transportation Officials (AASHTO):
      a. T99, The Moisture-Density Relations of Soils Using a 5.5 LB Rammer and a 12 IN Drop.
      b. T180, Moisture-Density Relations of Soils Using a 10 LB Rammer and an 18 IN Drop.
   2. American Society for Testing and Materials (ASTM):
      a. C33, Concrete Aggregates.
      b. D698, The Moisture-Density Relations of Soils Using a 5.5 LB Rammer and a 12 IN Drop. D698 is "Standard Proctor."
      c. D1557, The Moisture-Density Relation of Soils Using a10 LB Rammer and an 18 IN Drop. D1557 is "Modified Proctor."
      d. D2487, Classification of Soils for Engineering Purposes.
      e. D4253, Maximum Index Density of Soils Using a Vibratory Table.
      f. D4254, Minimum Index Density of Soils and Calculation of Relative Density.
   3. U.S. Department of Labor – Occupational Safety and Health Administration (OSHA):
      a. 29 CFR 1926, Subpart P – Excavations.

B. Qualifications:
   1. Contractor may commission an independent soils laboratory to conduct in place moisture density tests for backfilling to assure that all work complies with this Specification. Costs will be reimbursed using the Cash Allowance for Materials Testing item in the Bid Form and as described in Section 01025.

1.3 DEFINITIONS

A. Excavation:
   1. All excavation will be defined as unclassified.

1.4 SUBMITTALS

A. See Section 01300.

B. Product technical data including:
   1. Acknowledgement that products submitted meet requirements of standards referenced.
   2. Manufacturer’s installation instructions.

C. Trench Safety Plan and/or trench shoring drawings including current certification of trench shields (trench boxes) if employed.

D. Submit respective pipe or conduit manufacturer's data regarding methods of installation and general recommendations.

E. Submit sieve analysis reports on all granular materials.

1.5 PROJECT CONDITIONS

A. Avoid overloading or surcharge a sufficient distance back from edge of excavation to prevent slides or caving. Maintain and trim excavated materials in such manner to be as little inconvenience as possible to public and adjoining property owners.

B. Provide full access to public and private premises and fire hydrants, at street crossings, sidewalks and other points as designated by Owner to prevent serious interruption of travel.

C. Protect and maintain bench marks, monuments or other established points and reference points and if disturbed or destroyed, replace items to full satisfaction of Owner and controlling agency.

D. Verify location of existing underground utilities.

E. Take necessary precautions to protect existing utilities from damage due to construction activity. Repair damages to utility items at Contractor expense. Assess no cost to Owner, Engineer, or auxiliary party for any damages.

PART 2 — PRODUCTS

2.1 MATERIALS

A. Trench Backfill Material:
   1. Excavated material removed from trench subject to the following requirements:
      a. As approved by Engineer.
      b. Free of rock cobbles, roots, sod, or other organic matter, and frozen material.
      c. Moisture content at time of placement: 3 percent plus/minus of optimum moisture content as specified in accordance with ASTM D1557.

B. Bedding Materials:
   1. Granular bedding materials:
      a. ASTM C33, gradation 67 (3/4 IN to No. 4 sieve) defined below:

Sieve Size	1 IN	3/4 IN	3/8 IN	No. 4	No. 20
Percent Passing by Weight	100	90-100	20-55	0-10	0

         1) Well-graded crushed stone.
   2. Subgrade stabilization materials: Provide #67 clean, washed crushed stone, where required.
   3. Select backfill material:
      a. Select material Class II, Type I, per Section 01016 of NCDOT Standard Specifications for Roads and Structures.

PART 3 — EXECUTION

3.1 GENERAL

A. Remove and dispose of unsuitable materials as directed by Soils Engineer to site provided by Contractor.

3.2 EXCAVATION

A. Unclassified Excavation:
   1. Remove rock excavation, clay, silt, gravel, hard pan, loose shale, and loose stone to complete and satisfactory installation of the utility. All rock excavation will be considered unclassified. No additional payment will be made for rock excavation. The unit price bid for pipe will include all excavation, trenching, and backfilling with the exception of subgrade stabilization material as approved by Owner/Engineer.

B. Trench Excavation:
   1. Excavate trenches by open cut method to depth shown on Drawings and necessary to accommodate work.
   2. Open trenches:
      a. No more than 100 FT of trench shall be open at any one time.
      b. Field adjust limitations as weather conditions dictate.
      c. No trenches shall be left open overnight.
   3. Observe following trenching criteria:
      a. Trench size:
         1) Excavation width to accommodate free working space.
         2) Maximum trench width at top of pipe or conduit may not exceed outside diameter of utility service by more than the following dimensions:

OVERALL DIAMETER OF UTILITY SERVICE	EXCESS DIMENSION
33 IN and less	18 IN
More than 33 IN	24 IN

         3) Cut trench walls vertically from bottom of trench to 1 FT above top of pipe, conduit, or utility service.
         4) Keep trenches free of water. Include cost of dewatering in appropriate unit price bid item. There will be no separate payment for dewatering.
         5) Brace and sheet trenches in full compliance with OSHA requirements and all applicable codes and as required to protect existing roadways and utilities.

3.3 PREPARATION OF FOUNDATION FOR PIPE LAYING

A. A continuous and uniform bedding shall be provided in the trench for all buried pipe. All pipe bedding shall be #67 stone unless noted otherwise.

B. Over-Excavation:
   1. Backfill with #67 stone granular bedding material as option.

C. Rock Excavation:
   1. Remove rock excavation and dispose of to a site approved by the Owner. Rock excavation shall be carried 6 IN below the invert of the pipe. Pipe shall then be bedded as shown on the Drawings and trenches brought back to grade with suitable materials, properly compacted.
   2. When the use of explosives are necessary for the prosecution of the Work, the Contractor shall exercise the utmost care not to endanger life or property. The

Contractor shall be responsible for any and all damage or injury to persons or property resulting from the use of explosives.

3. All explosives shall be stored in a secure manner, in compliance with all laws, and all such storage places shall be marked clearly "DANGEROUS EXPLOSIVES." The Contractor shall notify each public utility company having facilities in close proximity to the site of the work of his intention to use explosives. The notice shall be given sufficiently in advance to enable the utility companies to take whatever action they may consider necessary to protect the property from injury. The Contractor shall also give the Engineer, all occupants of adjacent property, and all other Contractor's working in or near the project notice of his intention to use explosives.
4. Blasting will be done only by experienced men utilizing methods presented in the latest edition of Blaster's Handbook and extreme care and precaution will be used to prevent injury to workmen and to existing pipe, buildings, or other structures either below or above the surface of the ground.

D. Dewatering:
   1. The Contractor shall at all times provide and maintain ample means and equipment with which to remove and properly dispose of any and all water entering the excavation or other parts of the Work and keep all excavations dry until such time as pipe laying and grading is complete and structures to be built therein are completed.
   2. No water shall be allowed to rise around the pipe in unbackfilled trenches. All water pumped or drained from the work shall be disposed of in such a manner as to prevent siltation and erosion to adjacent property or other construction.

E. Shoring and Shielding:
   1. The Contractor shall comply with OSHA trenching and excavation regulations as revised in Subpart P of Part 1926 in the Federal Register. Shoring and/or shielding systems shall be used as specified in Subpart P to prevent caving of trench banks and to provide a safe excavation.
   2. The Contractor will be responsible for excavation safety and shall designate his "competent person" (as defined in Subpart P) for the determination of proper shielding/shoring systems.

F. Subgrade Stabilization:
   1. Stabilize the subgrade when directed by the Owner.
   2. Observe the following requirements when unstable trench bottom materials are encountered.
      a. Notify Owner when unstable materials are encountered:
         1) Define by drawing station locations and limits
      b. Remove unstable trench bottom caused by Contractor failure to dewater, rainfall, or Contractor operations:
         1) Replace with subgrade stabilization with no additional compensation.

3.4 BACKFILLING METHODS

A. Compact Trench Backfill:
   1. Perform in accordance with the following:
      a. Place backfill in lift thicknesses capable of being compacted to densities specified.
      b. Observe specific manufacturer's recommendations regarding backfilling and compaction.
      c. Avoid displacing joints and appurtenances or causing any horizontal or vertical misalignment, separation, or distortion.

B. Ensure all spaces beneath pipe are filled and compacted.

C. Stones, other than crushed bedding, shall not come in contact with the pipe and shall not be within 6 IN of the pipe.

D. Water flushing for consolidation is not permitted.

3.5 COMPACTION

A. General:
   1. Place and assure bedding, backfill, and fill materials achieve an equal or "higher" degree of compaction than undisturbed materials adjacent to the work.
   2. In no case shall degree of compaction below "Minimum Compaction" specified be accepted.

B. Compaction Requirements: Unless noted otherwise on the Drawings or more stringently by other sections of these Specifications, comply with the following trench compaction criteria:

MINIMUM COMPACTIONS		
LOCATION	SOIL TYPE	DENSITY
1. Carefully compacted backfill:		
a. All applicable areas	Cohesive Soils	95 percent of maximum dry density by ASTM D698
	Cohesionless soils	75 percent of maximum relative density by ASTM D4253 and D4254

MINIMUM COMPACTIONS		
LOCATION	SOIL TYPE	DENSITY
2. Common trench backfill:		
a. Under pavements roadways surfaces, within highway right-of-ways	Cohesive Soils	95 percent of maximum dry density by ASTM D698
	Cohesionless soils	75 percent of maximum relative density by ASTM D4253 and D4254
b. Under turfed, sodded, plant seeded, non-traffic areas	Cohesive Soils	90 percent of maximum dry density by ASTM D698
	Cohesionless soils	75 percent of maximum relative density by ASTM D4253 and D4254

3.6 USE OF EXPLOSIVES

A. Blasting with any type of explosive shall only be conducted with proper permits, approvals, and experienced personnel.

B. The use of explosives shall be limited to the magnitude and location of the charge that will not cause damage to adjacent existing construction and utilities through shock vibrations or other stress loadings. Provide adequate blanket protection to ensure that there will not be fragments of rock or other debris flying through the air when discharging explosives. Contractor to employ personnel certified by Union County to execute blasting operations if the County requires such certification. Any damage to existing construction or other features caused by blasting operations to be repaired and paid for by Contractor.
   1. Explosive permits shall be obtained from the County as per County requirements.

C. Where explosives and blasting are used, comply with all laws and ordinances of municipal, state, and federal agencies relating to the use of explosives. Use qualified personnel for blasting and take proper precautions to protect persons, property, or the work from damage or injury from blast or explosion. Conduct preblast survey in the company of the Engineer to aid in determining any damage caused by blasting.

D. Contractor shall submit a detailed blasting procedure prior to blasting operations including, but not limited to, blasting consultant, blasting plan, blasting procedures, and blast monitoring.

3.7 FIELD QUALITY CONTROL

A. Testing:
   1. In-place moisture-density tests will be performed by a Soils Engineer employed by the Owner except as noted herein.
   2. Costs of "Passing" tests paid by Owner from Bid Allowance.
   3. Perform additional tests as directed until compaction meets or exceeds requirements.
   4. Cost associated with "Failing" tests shall be paid by Contractor.
   5. Reference to Engineer in this section will imply Soils Engineer when employed by Owner and directed by Engineer to undertake necessary inspections as approvals as necessary.
   6. Assure Owner has immediate access for testing of all soils related work.
   7. Ensure excavations are safe for testing personnel.

END OF SECTION

SECTION 02513

ASPHALTIC CONCRETE VEHICULAR PAVING

PART 1 — GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Asphaltic concrete vehicular paving.

B. Related Sections include but are not necessarily limited to:
   1. Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
   2. Division 1 - General Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. Construction standards: NCDOT Standard Specifications for Roads and Structures, as amended to date.

B. Miscellaneous:
   1. Should conflicts arise between standard specifications of government agencies mentioned herein and Contract Documents, Contract Documents shall govern.

1.3 SUBMITTALS

A. Shop Drawings:
   1. Product technical data including:
      a. Acknowledgment that products submitted meet requirements of standards referenced.
      b. Manufacturer's installation instructions.
   2. Asphalt design mix.

PART 2 — PRODUCTS

2.1 MATERIALS

A. Bituminous Concrete and Asphalt Tack Coat:
   1. In accordance with the referenced NCDOT Specifications.

B. Aggregate Base Course:
   1. In accordance with the referenced NCDOT Specifications.

PART 3 — EXECUTION

3.1 INSTALLATION

A. Subgrade Preparation:
   1. Prepare using methods, procedures, and equipment necessary in accordance with Section 00500 of the referenced State specification and as shown on the Drawings.
   2. Following compaction, trim and roll to cross section. Check with approved grading template.
   3. Density tests will be performed by Owner-selected testing laboratory as directed by Engineer on subgrade to determine that subgrade complies with the specifications. Failing tests and corrective action will be paid for by the Contractor at his own expense.

B. Construct to line, grade and section as shown on the Drawings and in accordance with referenced State specifications:
   1. Proofroll subgrade prior to placing base course.
   2. Repair subgrade as required.
   3. On properly compacted subgrade, install compacted layer of aggregate base course.
   4. On properly prepared aggregate base course, install compacted layers of bituminous concrete.

C. Install aggregate layer of aggregate base course in accordance with Section 520 of the referenced State specifications.

D. Perform milling of asphalt pavement operations per Division 6 to the limits shown in the plans. Sweep and clean milled areas. Remove milled materials from the site.

E. Apply tack coat to all exposed areas to be resurfaced, including milled areas and all vertical saw-cut areas. Install asphaltic concrete paving per Division 6, asphalt bases and pavements of the referenced State specifications.

F. Tolerance of Finished Grade:
   1. 0.10 FT from required elevations.

G. Eliminate areas where ponding occurs.

H. Opening to Traffic:
   1. Contractor shall install barricades or other items to prevent traffic and/or disturbances to pavement.
   2. Opening to traffic shall occur only after Engineer approval of construction and only as directed by Engineer.

END OF SECTION

SECTION 02515

PRECAST CONCRETE STRUCTURES

PART 1 — GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Precast concrete manhole structures and appurtenant items.
   2. Miscellaneous precast structures.

B. Related Sections include but are not necessarily limited to:
   1. Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
   2. Division 1 - General Requirements.
   3. Section 02221 - Trenching, Backfilling, and Compacting for Utilities.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Society for Testing and Materials (ASTM):
      a. A48, Gray Iron Castings (Class 35 Minimum).
      b. C150, Portland Cement.
      c. C478, Precast Reinforced Concrete Manhole Sections.
      d. C923, Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
   2. Occupational, Health and Safety Administration (OSHA).

1.3 SUBMITTALS

A. Shop Drawings:
   1. See Section 01340 – Shop Drawings, Product Data & Samples; Operations and Maintenance Manuals and Miscellaneous Submittals.
   2. Product technical data including:
      a. Acknowledgment that products submitted meet requirements of standards referenced.
      b. Manufacturer's installation instructions.
   3. Fabrication and/or layout drawings:
      a. Include detailed diagrams of manholes showing typical components and dimensions.
      b. Itemize, on separate schedule, sectional breakdown of each manhole structure with all components and refer to drawing identification number or notation.
      c. Indicate knockout elevations for all piping entering each manhole.

PART 2 — PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
   1. Precast Manholes:
      a. Tindall.
      b. D&M.
      c. Or approved equal.
   2. Manhole rings, covers and frames:
      a. Neenah Foundry.
      b. Deeter Foundry.

c. East Jordan
d. US Foundry
e. Vulcan Foundry
f. Or approved equal.

3. Black mastic joint compound:
   a. Kalktite 340.
   b. Tufflex.
   c. Plastico.
   d. Or approved equal.
4. Premolded joint compound:
   a. Ram Nec.
   b. Kent Seal.
   c. Or approved equal.
5. Fibered asphalt compound:
   a. Sonneborn Hydrocide 700B Semi-Mastic.
   b. Or approved equal.
6. Flexible connections:
   a. Kor-N-Seal.
   b. A-Lok Products.
   c. Press-Seal Corporation.
   d. Or approved equal.

B. Submit request for substitutions in accordance with Section 01640.

2.2 MANHOLE STRUCTURE COMPONENTS

A. Manhole Components:
   1. Compressive Strength: 4,000 psi
   2. Reinforcement: ASTM C478.
   3. Minimum wall thickness: 5 IN.
   4. Minimum base thickness: 8 IN.
   5. Provide the following components for each manhole structure:
      a. Precast bottom section(s). Bottom sections shall be cast monolithically without joints between the base slab and walls that make up the bottom section.
      b. Precast barrel section(s).
      c. Precast eccentric cone where cover is 4 feet or greater. Precast flat top where cover is less than 4 feet. Top sections shall be cast monolithically without joints between the top slab and walls that make up the top section. Unless dimensioned or specifically noted on Drawings, provide manholes with minimum 48 IN inside dimensions.
   6. Manholes shall not include steps.

B. Standard Type Frames and Cover:
   1. Cast or ductile iron frame and covers: ASTM A48, Class 35 (minimum).
   2. Use only cast or ductile iron of best quality, free from imperfections and blow holes.
   3. Furnish frame and cover of heavy-duty construction to match manhole frame and cover details' requirements on the Drawings.
   4. Machine all horizontal surfaces.
   5. Furnish unit with ventilated lids except where watertight sealed manhole frames and lids are installed. Letter covers "SANITARY SEWER".
   6. Ensure minimum clear opening of 24 IN DIA.

C. Special Coatings and Joint Treatment:
   1. Joints of precast sections:

a. Resilient O-ring gaskets manufactured from natural or synthetic materials complying with ASTM C923, of suitable cross section and size to meet specified infiltration or exfiltration requirements.
b. Install 6-inch wide butyl rubber sealant wrap meeting ASTM C-877 on the exterior of the manhole at each joint

PART 3 — EXECUTION

3.1 MANHOLE CONSTRUCTION

A. General:
1. Ensure accurate vertical placement and leveling prior to placement of interior grout. Provide vertical alignment tolerance of maximum 1 IN horizontal to 10 FT vertical.

B. Build each manhole to dimensions shown on the Drawings and at such elevation that pipe sections built into wall of manhole will be true extensions of line of pipe.

C. For all horizontal mating surfaces between concrete to concrete and concrete to metal, install resilient O-ring type gaskets.

D. Install 6-inch wide butyl rubber sealant wrap meeting ASTM C-877 on the exterior of the manhole at each joint

E. Seal all pipe penetrations in manhole. Form pipe openings smooth and well-shaped. After installation, seal cracks with non-shrink grout. After grout cures, wire brush smooth and apply two coats emulsified fibered asphalt compound to minimum wet thickness of 1/8 IN to ensure complete seal.

F. Set and adjust manhole to match finished pavement or finished grade elevation.

3.2 SETTING MANHOLES

A. Unless otherwise noted, all precast structures shall be placed on compacted stone bed with a minimum thickness of 6 IN.

B. Manholes shall be set plumb and level at elevations shown in the approved design drawings. If manholes are in the street, they shall be a minimum of 2.5 feet from the edge of the curb as measured from the outside wall of the manhole. A maximum of two 4-inch-thick grade rings using butyl seal between joints will be permitted for final adjustment of ring and cover. Provide and install barrel risers equal to the manhole diameter for vertical adjustments of 12 inches or more.

3.3 MANHOLE TESTING

A. After each manhole is installed and all pipes are connected, the manhole shall be vacuum tested. All pipes entering the manhole shall be plugged and braced. The contractor shall furnish all labor, and equipment necessary to perform testing.

B. A vacuum of 10 inches of mercury shall be created on the inside of the manhole. At the vacuum of 10 inches of mercury, the pump shall be stopped, and the time shall be measured for the vacuum to drop to 9 inches. Failure of the test shall be any amount of time less than the following

4-foot Diameter Manhole = 60 seconds
5-foot Diameter Manhole = 75 seconds
6-foot Diameter Manhole = 90 seconds

C. Upon test failure, the contractor shall repair all leaks and retest the manhole until the test has passed.

END OF SECTION

SECTION 02985

SEEDING, SODDING AND LANDSCAPING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section Includes:

1. Seeding, sodding and landscape planting:
   a. Soil preparation.
   b. Lawn-type seeding
   c. Plants and planting.
   d. Maintenance and new transplanted materials.
   e. Pruning and repairing existing trees.
   f. Replacement of dead or impaired materials at the end of the first growing season.

1.02 QUALITY ASSURANCE

A. Referenced Standards

1. American Standard for Nursery (ASNS)
2. American Society for Testing Materials (ASTM):
   a. D997, Drop Test for Loaded Cylindrical Containers.
   b. D2028, Standard Specification for Cutback Asphalt.
3. Standard Methods of the Association of Official Agricultural Chemists.
4. United States Department of Agriculture, (USDA):
   a. Federal Seed Act

1.03 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01300 shop drawings, product data, and installation methods. Submittals shall include but are not limited to the following:

1. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of the standards.
   b. Manufacturer's installation instructions.
   c. Signed copies of the vendor's statement of seed mixture requirements. stating botanical and common name, place of origin, strain, percentage of purity, percentage of germination, and amount of Pure Live Seed (PLS) per bag.
   d. Type of herbicide to be used during the first growing season to contain annual weeds and application rate.
   e. Source and location of sod, plants, and plant material.

1.04 SEQUENCING AND SCHEDULING

A. Installation Schedule:

Show schedule of when lawn type and other grass areas are anticipated to be planted. Indicate planting schedules in relation to schedule for irrigation system installation, finish grading and top soiling. Indicate anticipated dates Engineer will be required to review installation for initial acceptance and final acceptance

PART 2 PRODUCTS

2.01 MATERIALS

A. Seed Quality:

Seed quality shall be fresh clean, new-crop seed labeled in accordance with U.S. Department of Agriculture Rules and Regulations under Federal Seed Act in effect on date of bidding. Provide seed of species, proportions, and minimum percentages of purity, germination, and maximum percentage of weed seed as specified. Approval of all seed for use shall be based on the accumulative total of Pure Live Seed (PLS) specified for each phase of work system shall be a monolithic calcium aluminate cementitious liner system suitable for use as a trowel- or spray-applied monolithic surfacing in sewer manholes.

B. Lawn-Type Seed Mixture:

1. Residential:

BOTANICAL AND COMMON NAME	PERCENT BY WEIGHT (PLS)	MINIMUM PERCENT GERMINATION	MINIMUM PERCENT PURITY
Fescue, Tall, Kentucky 31	70	85	98
Rye Grain	30	90	95

2. Non-Residential (no Fescue):

Annual Rye (August 15 to March 31). Seed at typical rate but should be no more than 20 percent of total mix.

Millet (April 1 to August 15).

Big Bluestem Andropogon gerardii (January 1 to December 31; April 1 to June 1 preferred). Seed rate of 3 LB/AC of PLS.

Indiangrass Sorghastrum nutans (January 1 to December 31; April 1 to June 1 preferred). Seed rate of 3 LB/AC of PLS.

Planting depth should be 1/4 to 1/2 IN below a compact soil surface and then covered with light layer of mulch.

Native grass seed must be obtained as pounds of PLS.

3. Temporary Seed:

A temporary grass cover shall be provided immediately after grading in all disturbed areas that will have permanent grass cover. Provide fresh, clean, new crop seed labels in accordance with U.S. Department of Agriculture Rules and Regulations under Federal Seed Act in effect on date of bidding. Provide seed of grass species or mixtures and seed rates suitable to season of year from the following:

SEASON	SPECIES	SEEDING RATE (LBS/AC)
Late Winter-Spring (January 1 to May 1)	Annual Lespedeza Rye (Grain)	50 120
Summer (May 1 to August 15)	Millet (Brown Top)	40
Late Summer-Late Fall (August 15 to December 31)	Rye Grain	120

C. Lawn-Type Seed Mixture:

Mulch For Seeded Areas shall be clean, seed-free, threshed straw of oats, wheat, barley, rye, beans, peanuts, or other locally available mulch material, which does not contain an excessive quantity of matured seeds of noxious weeds or other species that will grow or be detrimental to seeding, or provide a menace to surrounding land. Do not use material which is fresh or excessively brittle, or which is decomposed and will smother or retard growth of grass.

D. Fertilizer:

Commercial fertilizer meeting applicable requirements of state and federal law. Cyanic compound of hydrated lime not permitted in mixed fertilizers:

E. For lawn-type seeding and sod: 10-10-10 analysis.

F. Limestone: Agricultural grade ground limestone containing not less than 88 percent of combined calcium and magnesium carbonates, 100 percent passing a 10-mesh sieve, 90 percent passing a 20-mesh sieve, and 60 percent passing a 100-mesh sieve.

G. Water:

Water free from substances harmful to grass or sod growth. Provide water from source approved prior to use**.**

PART 3 EXECUTION

3.01 SOIL PREPARATION

A. General:

1. Limit preparation to areas which will be planted soon after.
2. Provide facilities to protect and safeguard all persons on or about premises.
3. Protect existing trees designated to remain.
4. Verify location and existence of all underground utilities. Take necessary precaution to protect existing utilities from damage due to construction activity. Repair all damages to utility items at sole expense.
5. Provide facilities such as protective fences and/or watchmen to protect work from vandalism. Contractor to be responsible for vandalism until acceptance of work in whole or in part.

B. Preparation for Lawn-Type Seeding, Sprigging, Plugging or Sodding:

1. Loosen surface to minimum depth of 4 IN. Remove stones over 1-inch in any dimension and sticks, roots, rubbish, and other extraneous matter.
2. Prior to applying fertilizer, loosen areas to be seeded with a double disc or other suitable device if the soil has become hard or compacted.
3. Correct any surface irregularities in order to prevent pocket or low areas which will allow water to stand.
4. Distribute fertilizer uniformly over areas to be seeded:
5. For lawn-type seeding: 30 LBS per 1000 SF.
6. For pasture seeding: 200 LBS per acre.
7. Incorporate fertilizer into soil to a depth of at least 2 IN by disking, harrowing, or other approved methods.
8. Remove stones or other substances from surface which will interfere with turf development or subsequent mowing operations.
9. Grade lawn areas to a smooth, even surface with a loose, uniformly fine texture. Roll and rake, remove ridges and fill depressions, as required to meet finish grades.
10. Limit fine grading to areas which can be planted soon after preparation.
11. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and before planting.

3.02 INSTALLATION

A. Lawn-Type and Pasture Seeding:

1. Do not use seed which is wet, moldy, or otherwise damaged.
2. Perform seeding work from April 20 to May 15 for spring planting, and August 1 to September 15 for fall planting, unless otherwise approved by Engineer.
3. Employ satisfactory methods of sowing using mechanical power-driven drills or seeders, or mechanical hand seeders, or other approved equipment.
4. Distribute seed evenly over entire area at rate of application not less than 4 LBS (PLS) of seed per 1000 SF, 50 percent sown in one direction, remainder at right angles to first sowing.

5. Stop work when work extends beyond most favorable planting season for species designated, or when satisfactory results cannot be obtained because of drought, high winds excessive moisture, or other factors. Resume work only when favorable conditions develop.
6. Lightly rake seed into soil followed by light rolling or culti-packing.
7. Immediately protect seeded areas against erosion by mulching.
8. Spread mulch in continuous blanket using 1½ tons per acre to a depth of 4 or 5 straws.
9. Protect seeded slopes against erosion with erosion netting or other methods approved by Engineer. Protect seeded areas against traffic or other use by erecting barricades and placing warning signs.
10. Immediately following spreading mulch, anchor mulch using a rolling coulter or a wheat land packer having wheels with V-shaped edges to force mulch into soil surface, or apply evenly distributed emulsified asphalt at rate of 10-13 GAL/1000 SF. SS-1 emulsion in accordance with ASTM D997 or RC-1 cutback asphalt in accordance with ASTM D2028 are acceptable. If mulch and asphalt are applied in one treatment, use SS-1 emulsion with penetration test range between 150-200. Use appropriate shields to protect adjacent site improvements.

3.03 MAINTENANCE AND REPLACEMENT

A. General

1. Begin maintenance of planted areas immediately after each portion is planted and continue until final acceptance or for a specific time period as stated below, whichever is the longer.
2. Provide and maintain temporary piping, hoses, and watering equipment as required to convey water from water sources and to keep planted areas uniformly moist as required for proper growth.

B. Protection of new materials:

1. Provide barricades, coverings or other types of protection necessary to prevent damage to existing improvements indicated to remain. Repair and pay for all damaged items.
2. Replace unacceptable materials with materials and methods identical to the original specifications unless otherwise approved by the Engineer.

C. Seeded or Sodded Lawns:

1. Maintain seeded lawns: 90 days, minimum, after installation and review of entire project area to be planted.
2. Maintenance period begins at completion of planting or installation of entire area to be seeded or sodded.
3. Engineer will review seeded or sodded lawn area after installation for initial acceptance.
4. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, re-grading, and replanting as required to establish a smooth, uniform lawn, free of weeds and eroded or bare areas.
5. Lay out temporary lawn watering system and arrange watering schedule to avoid walking over muddy and newly seeded areas. Use equipment and water to prevent puddling and water erosion and displacement of seed or mulch.

6. Mow lawns as soon as there is enough top growth to cut with mower set at recommended height for principal species planted. Repeat mowing as required to maintain height. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Time initial and subsequent mowing as required to maintain a height of 1½ to 2 IN. Do not mow lower than 1½ inches.
7. Re-mulch with new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose. Anchor as required to prevent displacement.
8. Unacceptable plantings are those areas that do not meet the quality of the specified material, produce the specified results, or were not installed to the specified methods.
9. Replant bare areas using same materials specified.
10. Engineer will review final acceptability of installed areas at end of maintenance period.
11. Maintain repaired areas until remainder of maintenance period or approved by Engineer, whichever is the longer period.

END OF SECTION

SECTION 03002

CONCRETE

PART 1 — GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cast-in-place concrete and grout.
   2. Concrete mixes, proportioning, and source quality control for precast concrete.

B. Related Sections include but are not necessarily limited to:
   1. Division 0 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
   2. Division 1 – General Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Concrete Institute (ACI):
      a. SP-19, Cement and Concrete Terminology.
      b. 211.1, Standard Practice for Selecting Proportions for Normal and Heavyweight Concrete.
      c. 214, Recommended Practice for Evaluation of Compression Test Results of Field Concrete.
      d. 304, Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete.
      e. 305R, Hot Weather Concreting.
      f. 306R, Cold Weather Concreting.
      g. 318, Building Code Requirements for Reinforced Concrete.
      h. 347, Guide to Formwork for Concrete.
   2. American Society for Testing and Materials (ASTM):
      a. A82, Standard Specifications for Cold Drawn Steel Wire for Concrete Reinforcement.
      b. A185, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
      c. A497, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
      d. A615, Standard Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement Including Supplementary Requirements S1.
      e. A775, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
      f. C31, Standard Method of Making and Curing Concrete Test Specimens in the Field.
      g. C33, Standard Specification for Concrete Aggregates.
      h. C39, Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens.
      i. C94, Standard Specification for Ready Mixed Concrete.
      j. C138, Standard Method of Test for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
      k. C143, Standard Method of Test for Slump of Portland Cement Concrete.
      l. C150, Standard Specification for Portland Cement.
      m. C157, Test Method for Length Change of Hardened Hydraulic Cement Mortar and Concrete.
      n. C171, Standard Specification for Sheet Materials for Curing Concrete.
      o. C172, Standard Method of Sampling Fresh Concrete.

p. C173, Standard Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method.
q. C192, Standard Method of Making and Curing Concrete Test Specimens in the Laboratory.
r. C231, Standard Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method.
s. C260, Standard Specification for Air Entraining Admixtures for Concrete.
t. C289, Test Method for Potential Reactivity of Aggregates (Chemical Method).
u. C309, Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete.
v. C330, Standard Specification for Lightweight Aggregates for Structural Concrete.
w. C494, Standard Specification for Chemical Admixtures for Concrete.
x. C496, Standard Method of Test for Splitting Tensile Strength of Cylindrical Concrete Specimens.
y. C567, Standard Method of Test for Unit Weight of Structural Lightweight Concrete.
z. C595, Specification for Blended Hydraulic Cements.
aa. C618, Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
bb. D1056, Specification for Flexible Cellular Materials Sponge or Expanded Rubber.
cc. E329, Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

3. Federal Specification (FS):
   a. TT-S-227b, Sealer Compound; Rubber Base, Two Component.
   b. LLL-B-810B, Building Board, (Hardboard) Hard Pressed, Vegetable Fiber.
4. Corps of Engineers: Specification CRD-C572 Polyvinyl Waterstops.

B. Quality Control:
   1. Concrete testing agency:
      a. Owner:
         1) Select testing agency and pay for field testing of concrete and other cement-containing products by or for the Contractor for incorporation into the Work per the Contract Documents.
            a) Payment for items as described under “Contractor” paragraph below shall not be made by Owner.
      b. Contractor:
         1) Retain and pay for the services of a testing agency to perform testing services for the following:
            a) Testing of materials and mixes proposed by the Contractor for compliance with the Contract Documents and retesting the event of changes.
            b) Additional testing or retesting of materials or concrete or other cement-containing products occasioned by their failure, by test or inspection, to meet requirements of the Contract Documents.
            c) Strength testing on any concrete to which water has been added at the job site.
            d) In-place testing of concrete as may be required by the Engineer when strength of structure is considered potentially deficient.
            e) Other testing services needed or required by the Contractor, such as field curing of test specimens and testing of specimens for determining when forms, form shoring, or re-shoring may be removed.
   2. Do not begin concrete production until proposed concrete mix design has been approved by Engineer.
      a. Approval of concrete mix design by Engineer does not relieve Contractor of his responsibility to provide concrete that meets the requirements of this Specification.

3. Adjust concrete mix designs when material characteristics, job conditions, weather, strength test results or other circumstances warrant.
    a. Do not use revised concrete mixes until submitted to and approved by Engineer.

C. Qualifications: Ready mixed concrete batch plant certified by National Ready Mixed Concrete Association (NRMCA).

1.3 DEFINITIONS

A. Per ACI SP-19 except as modified herein:
1. Concrete fill: Non-structural concrete.
2. Concrete Testing Agency: Testing agency employed to perform materials evaluation, design of concrete mixes or testing of concrete placed during construction.
3. Exposed concrete: Exposed to view after construction is complete.
4. Indicated: Indicated by Contract Documents.
5. Lean concrete: Concrete with low cement content.
6. Nonexposed concrete: Not exposed to view after construction is complete.
7. Required: Required by Contract Documents.
8. Specified strength: Specified compressive strength at 28 days.
9. Submitted: Submitted to Engineer.

1.4 SUBMITTALS

A. See Section 01340 – Shop Drawings, Product Data & Samples; Operation and Maintenance Manuals; and Miscellaneous Submittals.

B. Shop Drawings:
1. Concrete mix designs proposed for use. Concrete mix design submittal to include the following information:
    a. Sieve analysis and source of fine and coarse aggregates.
    b. Test for aggregate organic impurities.
    c. Test for deleterious aggregate per ASTM C289.
    d. Proportioning of all materials.
    e. Type of cement with mill certificate for cement.
    f. Type of fly ash with certificate of conformance to specification requirements.
    g. Slump.
    h. Air content.
    i. Brand, type, ASTM designation, and quantity of each admixture proposed for use.
    j. 28-day cylinder compressive test results of trial mixes per ACI 318 and as indicated herein.
    k. Standard deviation value for concrete production facility.
2. Manufacturer and type of joint filler, joint sealant, curing agent and chemical floor hardener.
3. Manufacturer and type of bonding and patching mortar and bonding adhesive used at construction joints.
4. Manufacturer and type of nonshrink grout and the cure/seal compound required for the nonshrink grout.
5. Reinforcing steel: Show grade, sizes, number, configuration, spacing, location and all fabrication and placement details.
    a. In sufficient detail to permit installation of reinforcing without having to make reference to Contract Drawings.
    b. Obtain approval of shop drawings by Engineer before fabrication.
    c. Mill certificates.
6. Strength test results of in place concrete including slump, air content and concrete temperature.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage of Material:
   1. Cement and fly ash:
      a. Store in moisture-proof, weather-tight enclosures.
      b. Do not use if caked or lumpy.
   2. Aggregate:
      a. Store to prevent segregation and contamination with other sizes or foreign materials.
      b. Obtain samples for testing from aggregates at point of batching.
      c. Do not use frozen or partially frozen aggregates.
      d. Do not use bottom 6 IN of stockpiles in contact with ground.
      e. Allow sand to drain until moisture content is uniform prior to use.
   3. Admixtures:
      a. Protect from contamination, evaporation, freezing, or damage.
      b. Maintain within temperature range recommended by manufacturer.
      c. Completely mix solutions and suspensions prior to use.
   4. Reinforcing steel:
      a. Support and store all rebars above ground.

B. Delivery:
   1. Concrete:
      a. Prepare a delivery ticket for each load for ready-mixed concrete.
      b. Truck operator shall hand ticket to Engineer at the time of delivery.
      c. Ticket to show:
         1) Mix identification mark.
         2) Quantity delivered.
         3) Amount of each material in batch.
         4) Outdoor temp in the shade.
         5) Time at which cement was added.
         6) Numerical sequence of the delivery.
         7) Amount of water added.
   2. Reinforcing steel: Ship to job site with attached plastic or metal tags with permanent mark numbers.
      a. Mark numbers to match shop drawing mark number.

PART 2 — PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
   1. Nonshrink, nonmetallic grout:
      a. Sika "SikaGrout 212."
      b. Master Builders "Masterflow 713."
      c. Or equal.
   2. Epoxy grout:
      a. Master Builders "Brutem MPG."
      b. Euclid Chemical Company, "High Strength Grout."
      c. Or equal.
   3. Expansion joint fillers:
      a. Rubatex Corp.
      b. Williams Products, Inc.
      c. Or equal.
   4. Strip-type waterstops:
      a. Greenstreak Plastics Products.

b. Henry.
c. Adeka.

2.2 MATERIALS

A. Portland Cement: Conform to ASTM C150 Type II.

B. Fly Ash:
1. ASTM C618, Class F.
2. Nonstaining.
3. Hardened concrete containing fly ash to be uniform light gray color.
4. Maximum loss on ignition: 3 percent for air-entrained concrete, 6% otherwise
5. Compatible with other concrete ingredients.
6. Obtain proposed fly ash from a source approved by the State Highway Department in the state where the Project is located for use in concrete for bridges.
7. Do not use for precast concrete.

C. Admixtures:
1. Air entraining admixtures: ASTM C260.
2. Water reducing, retarding, and accelerating admixtures:
a. ASTM C494 Type A through E.
b. Conform to provisions of ACI 212.1R and ACI 212.2R.
c. Do not use retarding or accelerating admixtures unless specifically approved in writing by Engineer and at no cost to Owner.
d. Follow manufacturer's instructions.
e. Use chloride free admixtures only.
3. Maximum total water soluble chloride ion content contributed from all ingredients of concrete including water, aggregates, cementitious materials and admixtures by weight percent of cement:
a. 0.10 all other concrete.
4. Do not use calcium chloride.
5. Pozzolanic admixtures: ASTM C618.
6. Provide admixtures of same type, manufacturer and quantity as used in establishing required concrete proportions in the mix design.

D. Water: Potable, clean, free of oils, acids and organic matter.

E. Aggregates:
1. Normal weight concrete: ASTM C33, except as modified below.
2. Fine aggregate: Clean natural sand.
a. No manufactured or artificial sand.
3. Coarse aggregate: Crushed rock, natural gravel, or other inert granular material.
a. Maximum amount of clay or shale particles: 1 percent.
4. Gradation of coarse aggregate:
a. Lean concrete and concrete topping: Size #7.
b. All other concrete: Size #57 or #67.
5. Coarse aggregate for lightweight concrete: ASTM C330.
a. Maximum size: 3/4 IN.

F. Concrete Grout:
1. Non-shrink nonmetallic grout:
a. Nonmetallic, noncorrosive, nonstaining, premixed with only water to be added.
b. Grout to produce a positive but controlled expansion.
c. Mass expansion not to be created by gas liberation.
d. Minimum compressive strength of nonshrink grout at 28 days: 6500 psi.
2. Epoxy grout:
a. 3-component epoxy resin system.

1) Two liquid epoxy components.
2) One inert aggregate filler component.

b. Each component packaged separately for mixing at job site.

G. Reinforcing Steel:
1. Reinforcing bars: ASTM A615, Grade 60.
2. Welded wire fabric: ASTM A185.
a. Minimum yield strength: 60,000 psi.

H. Forms:
1. Prefabricated or job built.
2. Plywood: PS1, waterproof, resin bonded, exterior-type Douglas Fir.
a. Face adjacent to concrete Grade B or better.
3. Fiberboard: Fed Specification LLL-B-810, Type IX, tempered, waterproof, screen back, concrete form hardboard.
4. Lumber: Straight; uniform width and thickness; and free from knots, offsets, holes, dents, and other surface defects.
5. Chamfer strips: Clear white pine, surface against concrete planed.
6. Form ties: Removable end, permanently embedded body type with cones on outer ends not requiring auxiliary spreaders.
a. Cone diameter: 3/4 IN minimum to 1 IN maximum.
b. Embedded portion 1 IN minimum back from concrete face.
c. If not provided with threaded ends, constructed for breaking off ends without damage to concrete.
7. Form release: Nonstaining and shall not prevent bonding of future finishes to concrete surface.

I. Waterstops, Bulb Type:
1. Materials:
a. Virgin polyvinyl chloride compound not containing any scrap or reclaimed materials or pigment.
b. Corps of Engineers Specification CRD-C572.
2. In all other joints:
a. 6 IN wide x 3/8 IN thick bulb type.
b. Similar to Greenstreak Plastics Products Style #705.
c. Manufactured solely for the purpose of preventing water from traveling through construction joints.

J. Waterstops, Preformed – Strip Type:
1. Non-swelling Type.
a. Manufactured solely for the purpose of preventing water from traveling through construction joints.
b. Non-swelling type only.

K. Chairs, Runners, Bolsters, Spacers, and Hangers:
1. Stainless steel, epoxy coated, or plastic coated metal.
a. Plastic coated: Rebar support tips in contact with the forms only.

L. Vapor Barrier: Clear 6-mil thick polyethylene conforming to ASTM C171.

M. Membrane Curing Compound: ASTM C309, Type I-D.
1. Resin based, dissipates upon exposure to UV light.
2. Curing compound shall not prevent bonding of any future coverings, coatings or finishes.
3. Curing compounds used in water treatment plant construction to be nontoxic and taste and odor free.

N. Expansion Joint Filler:
   1. In contact with water: Closed cell neoprene:
      a. ASTM D1056, Class SC (oil resistant and medium swell) of 2 to 5 psi compression deflection (Grade SCE41).
   2. Exterior driveways, curbs, and sidewalks:
      a. Asphalt expansion joint filler.
      b. ASTM D994.
   3. Other use:
      a. Fiber expansion joint filler.
      b. ASTM D1751.

2.3 CONCRETE MIXES

A. General:
   1. All concrete to be ready mixed concrete conforming to ASTM C94.
   2. Provide concrete of specified quality capable of being placed without segregation and, when cured, of developing all properties required.
   3. All concrete to be normal weight concrete.
   4. All concrete shall contain flyash.

B. Strength:
   1. Provide specified strength and type of concrete for each use in structure(s) as follows:

TYPE	WEIGHT	SPECIFIED STRENGTH
Concrete Fill	Normal Weight	3000 psi
Lean Concrete	Normal Weight	3000 psi
Precast Concrete	Normal Weight and Lightweight	4000 psi
All Other Concrete	Normal Weight	4000 psi
**Minimum 28-day compressive strength.*		

C. Air Entrainment: Provide air entrainment in all concrete resulting in a total air content percent by volume as follows:

MAXIMUM AGGREGATE SIZE	TOTAL AIR CONTENT PERCENT
1 IN or 3/4 IN	5 to 7
1/2 IN	6 to 8

   1. Air content to be measured in accordance with ASTM C231, ASTM C173, or ASTM C138.

D. Slump: 4 IN maximum, 1 IN minimum.
   1. Measured at point of discharge of the concrete into the concrete construction member.
   2. Concrete of lower than maximum slump may be used provided it can be properly placed and consolidated.
   3. Pumped concrete:
      a. Provide additional water at batch plant to allow for slump loss due to pumping.
      b. Provide only enough additional water so that slump of concrete at discharge end of pump hose does not exceed maximum slump specified above.

4. Determine slump per ASTM C143.

E. Selection of Proportions:
1. General – Proportion ingredients to:
   a. Produce proper workability, durability, strength, and other required properties.
   b. Prevent segregation and collection of excessive free water on surface.
2. Minimum cement contents and maximum water cement ratios for concrete to be as follows:

SPECIFIED STRENGTH	MINIMUM CEMENT, LB/CY			MAXIMUM WATER CEMENT RATIO BY WEIGHT
	MAXIMUM, 1/2	AGGREGATE, 3/4	SIZE, IN 1	
3000	---	517	517	0.45
4000	564	564	564	0.42
5000	---	686	665	0.40

3. Substitution of fly ash:
   a. Maximum of 25 percent by weight of cement at rate of 1 LB fly ash for 1 LB of cement.
4. Sand cement grout:
   a. Three parts sand.
   b. One part Portland cement.
   c. Entrained air: Six percent plus or minus one percent.
   d. Sufficient water for required workability.
   e. Minimum 28-day compressive strength: 3,000 psi.
5. Submit mix design data as required by this specification section.
6. Normal weight concrete: Proportion mixture to provide desired characteristics using one of methods described below:
   a. Method 1 (Trial Mix): Per ACI 318, Chapter 5, except as modified herein.
      1) Air content within range specified above.
      2) Record and report temperature of trial mixes.
      3) Proportion trial mixes per ACI 211.1.
   b. Method 2 (Field Experience): Per ACI 318, Chapter 5, except as modified herein:
      1) Field test records must be acceptable to Engineer to use this method.
      2) Test records shall represent materials, proportions and conditions similar to those specified.
7. Required average strength to exceed the specified 28-day compressive strength by the amount determined or calculated in accordance with the requirements of paragraph 5.3 of ACI 318 using the standard deviation of the proposed concrete production facility as described in paragraph 5.3.1 of ACI 318.

F. Allowable Shrinkage: 0.048 percent per ASTM C157.

PART 3 — EXECUTION

3.1 FORMING AND PLACING CONCRETE

A. General:
1. Contractor is responsible for design and erection of Form work.
2. Construct Form work so that concrete members and structures are of correct size, shape, alignment, elevation and position.
   a. Allowable tolerances: As recommended in ACI 347.
3. Provide slabs and beams of minimum indicated depth when sloping foundation base slabs or elevated floor slabs to drains.

a. For slabs on grade, slope top of subgrade to provide floor slabs of minimum uniform indicated depth.
b. Do not place floor drains through beams.

B. Openings: Provide openings in Form work to accommodate work of other trades.
1. Accurately place and securely support items built into forms.

C. Chamfer Strips: Place 3/4 IN chamfer strips in forms to produce 3/4 IN wide beveled edges on permanently exposed corners of members.

D. Reinforcement:
1. Position, support, and secure reinforcement against displacement.
2. Locate and support with chairs, runners, bolsters, spacers and hangers, as required.
3. Set wire ties so ends do not touch forms and are directed into concrete, not toward exposed concrete surfaces.
4. Lap splice lengths: ACI 318 Class B top bar tension splices unless indicated otherwise on the Drawings.
5. Extend reinforcement to within 2 IN of concrete perimeter edges.
a. If perimeter edge is earth formed, extend reinforcement to within 3 IN of the edge.
6. Unless otherwise indicated, provide minimum concrete cover as follows:
a. Concrete deposited against earth: 3 IN.
b. Formed surfaces exposed to weather or in contact with earth: 2 IN for reinforcing bars #6 or larger; 1½ IN for reinforcing bars less than #6.
c. Formed surfaces exposed to or located above any liquid: 2 IN.
d. Interior surfaces: 1½ IN for beams, girders and columns; 3/4 IN or bar diameter, whichever is greater, for slabs, walls and joists.
7. Do not weld reinforcing bars.
8. Welded wire fabric:
a. Install welded wire fabric in maximum practical sizes.
b. Splice sides and ends with a splice lap length measured between outermost cross wires of each fabric sheet not less than:
1) One spacing of cross wires plus 2 IN.
2) 1.5 x development length.
3) 6 IN.
c. Development length: ACI 318 basic development length for the specified fabric yield strength.

E. Construction, Expansion, and Contraction Joints:
1. Provide at locations indicated.
2. Locate wall vertical construction joints at 30 FT maximum centers and wall horizontal construction joints at 10 FT maximum centers.
3. Locate construction joints in floor slabs and foundation base slabs so that concrete placements are approximately square and do not exceed 2500 SF.
4. Locate construction joints in columns and walls:
a. At the underside of beams, girders, haunches, drop panels, column capitals, and at floor panels.
b. Haunches, drop panels, and column capitals are considered part of the supported floor or roof and shall be placed monolithically therewith.
c. Column based need not be placed monolithically with the floor below.
5. Locate construction joints in beams and girders:
a. At the middle of the span, unless a beam intersects a girder at that point.
b. If the middle of the span is at an intersection of a beam and girder, offset the joint in the girder a distance equal to twice the beam width.
c. Provide satisfactory means for transferring shear and other forces through the construction joint.
6. Locate construction joints in suspends slabs:

a. At or near the center of span in flat slab or T-beam construction.
b. Do not locate a joint between a slab and a concrete beam or girder unless so indicated on Drawings.

7. In pan-formed joists:
   a. At or near span center when perpendicular to the joists.
   b. Centered in the slab, midway between joists, when parallel to the joists.
8. Install construction joints in beams, slabs, and girders perpendicular to the planes of their surfaces.
9. At least 48 HRS shall elapse between placing of adjoining concrete construction.
10. Thoroughly clean and remove all laitance and loose and foreign particles from construction joints.
11. Before new concrete is placed, coat all construction joints with an approved bonding adhesive used and applied in accordance with manufacturer's instructions.

F. Embedments:
1. Set and build in anchorage devices and other embedded items required for other work that is attached to, or supported by concrete.
2. Use setting diagrams, templates, and instructions for locating and setting.

G. Preparation:
1. Clean and adjust forms prior to concrete placement.
2. Tighten forms to prevent mortar leakage.
3. Coat form surfaces with form release agents prior to placing reinforcing bars in forms.

H. Placing Concrete:
1. Place concrete in compliance with ACI 304 and 304.2R.
2. Place in a continuous operation within planned joints or sections.
3. Begin placement when work of other trades affecting concrete is completed.
4. Place concrete by methods which prevent aggregate segregation.
5. Do not allow concrete to free fall more than 4 FT.
6. Where free fall of concrete will exceed 4 FT, place concrete by means of tremie pipe or chute.

I. Consolidation:
1. Consolidate all concrete using mechanical vibrators supplemented with hand rodding and tamping, so that concrete is worked around reinforcement and embedded items into all parts of forms.

J. Protection:
1. Protect concrete from physical damage or reduced strength due to weather extremes.
2. In cold weather comply with ACI 306R except as modified herein.
   a. Do not place concrete on frozen ground or in contact with forms or reinforcing bars coated with frost, ice or snow.
   b. Minimum concrete temperature at the time of mixing:

OUTDOOR TEMPERATURE AT PLACEMENT (IN SHADE)	CONCRETE TEMPERATURE AT MIXING
Below 30°F	70°F
Between 30 to 45°F	60°F
Above 45°F	50°F

   c. Do not place heated concrete that is warmer than 80°F.
   d. If freezing temperatures are expected during curing, maintain the concrete temperature at or above 50°F for 7 days or 70°F for 3 days.

e. Do not allow concrete to cool suddenly.

3. In hot weather, comply with ACI 305R except as modified herein:
   a. At air temperature of 90°F and above, keep concrete as cool as possible during placement and curing.
   b. Do not allow concrete temperature to exceed 90°F at placement.
   c. Prevent plastic shrinkage cracking due to rapid evaporation of moisture.
   d. Do not place concrete when the actual or anticipated evaporation rate equals or exceeds 0.2 LBS/SF/HR as determined from ACI 305R, Figure 2.1.5.

K. Curing:
1. Begin curing concrete as soon as free water has disappeared from exposed surfaces.
2. Cure concrete by use of moisture retaining cover, burlap kept continuously wet, or by membrane-curing compound.
3. Provide protection as required to prevent damage to concrete and to prevent moisture loss from concrete during curing period.
4. Provide curing for minimum of 7 days.
5. Form materials left in place may be considered as curing materials for surfaces in contact with the form materials except in periods of hot weather.
6. In hot weather, follow curing procedures outlined in ACI 305R.
7. In cold weather, follow curing procedures outlined in ACI 306R.
8. If forms are removed before 7 days have elapsed, finish curing of formed surfaces by one of above methods for the remainder of the curing period.
9. Curing vertical surfaces with a curing compound: Cover vertical surfaces with a minimum of two coats of the curing compound.
   a. Allow the preceding coat to completely dry prior to applying the next coat.
   b. Apply the first coat of curing compound immediately after form removal.
   c. Vertical surface at the time of receiving the first coat shall be damp with no free water on the surface.
   d. A vertical surface is defined as any surface steeper than 1 vertical to 4 horizontal.

3.2 CONCRETE FINISHES

A. Tolerances:
1. Class A: 1 /8 IN in 10 FT.
2. Class B: 1/4 IN in 10 FT.

B. Surfaces Exposed to View:
1. Provide a smooth finish for exposed concrete surfaces and surfaces that are:
   a. To be covered with a coating or covering material applied directly to concrete.
   b. Scheduled for grout cleaned finish.
2. Remove fins and projections, and patch voids, air pockets, and honeycomb areas with cement grout.
3. Fill tie holes with nonshrink nonmetallic grout.

C. Surfaces Not Exposed to View:
1. Patch voids, air pockets and honeycomb areas with cement grout.
2. Fill tie holes with nonshrink nonmetallic grout.

D. Grout Cleaned Finish:
1. Mix a part Portland cement and 1½ parts fine sand with sufficient bonding agent/water mixture to produce a grout with the consistency of thick paint.
   a. White Portland cement shall be substituted for gray Portland cement to produce a color that matches color of surrounding concrete as determined by trial patch for areas not to be painted.
2. Wet surface of concrete to prevent absorption of water by grout and uniformly apply grout with brushes or spray gun.

3. Immediately scrub the surface with a cork float or stone to coat and fill air bubbles and holes.
4. While grout is still plastic, remove all excess grout by working surface with rubber float, sack or other approved means.
5. After the surface whitens from drying, rub vigorously with clean burlap.
6. Keep final finish damp for a minimum of 36 HRS after final rubbing.

E. Slab Float Finish:
1. After concrete has been placed, consolidated, struck off, and leveled, do no further work until ready for floating.
2. Begin floating when water sheen has disappeared and surface has stiffened sufficiently to permit operation.
3. During or after first floating, check planeness of entire surface with a 10 FT straightedge applied at not less than two different angles.
4. Cut down all high spots and fill all low spots during this procedure to produce a surface within Class B tolerance throughout.
5. Refloat slab immediately to a uniform sandy texture.

F. Troweled Finish:
1. Float finish surface.
2. Next power trowel, and finally hand trowel.
3. Produce a smooth surface which is relatively free of defects with first hand troweling.
4. Perform additional trowelings by hand after surface has hardened sufficiently.
5. Final trowel when a ringing sound is produced as trowel is moved over surface.
6. Thoroughly consolidate surface by hand troweling.
7. Leave finished surface essentially free of trowel marks, uniform in texture and appearance and plane to a Class A tolerance.
8. On surfaces intended to support floor coverings remove any defects of sufficient magnitude that would show through floor covering by grinding.

G. Broom Finish: Immediately after concrete has received a float finish as specified, give it a transverse scored texture by drawing a broom across surface.

3.3 GROUT

A. Preparation:
1. Nonshrinking nonmetallic grout:
a. Clean concrete surface to receive grout.
b. Saturate concrete with water for 24 HRS prior to grouting.
2. Rock anchors:
a. Clean rock anchors of all loose material.
b. Orient hook or bends in anchor bars to clear anchor bolts, reinforcements, and other embedments to be installed later.
3. Epoxy grout: Apply only to clean, dry, sound surface.

B. Application:
1. Nonshrinking nonmetallic grout:
a. Mix in a mechanical mixer.
b. Use no more water than necessary to produce flowable grout.
c. Place in accordance with manufacturer's instructions.
d. Completely fill all spaces and cavities below the bottom of base plates.
e. Provide forms where base plates and bed plates do not confine grout.
f. Where exposed to view, finish grout edges smooth.
g. Except where a slope is indicated on Drawings, finish edges flush at the baseplate, bed plate, member, or piece of equipment.

h. Protect against rapid moisture loss by covering with wet rags or polyethylene sheets.
i. Wet cure grout for 7 days, minimum.

2. Rock anchors:
   a. See Item 1 above.
   b. If rodded:
      1) Fill each hole so that it overflows when anchor bar is inserted.
      2) Force anchor bars into place.
   c. If pressure placed, set anchor bar before grouting.
   d. Take special care to avoid any movement of anchors that have been placed.
3. Epoxy grout:
   a. Mix and place in accordance with manufacturer's instructions.
   b. Completely fill all cavities and spaces around dowels and anchors without voids.
   c. Obtain manufacturer's field technical assistance as required to ensure proper placement.

3.4 FIELD QUALITY CONTROL

A. Owner will employ and pay for services of a concrete testing laboratory to perform testing of concrete placed during construction.
   1. Contractor to cooperate with Owner in obtaining and testing samples.

B. Tests during Construction:
   1. Strength test – procedure:
      a. Three cylinders, 4 IN DIA x 8 IN high, will be taken from each sample per ASTM C172 and C31.
      b. Cylinders will be tested per ASTM C39:
         1) One at 7 days.
         2) Two at 28 days.
   2. Strength test – frequency:
      a. Not less than one test each day concrete placed.
      b. Not less than one test for each 50 CY or major fraction thereof placed in one day.
      c. Not less than one test for each type of concrete poured.
      d. Not less than one test for each concrete structure exceeding 2 CY volume.
   3. Slump test: Per ASTM C143.
      a. Determined for each strength test sample.
      b. Additional slump tests may be taken.
   4. Air content: Per ASTM C231, C173, and C138.
      a. Determined for each strength test sample.
   5. Temperature: Determined for each strength test sample.
   6. Unit weight of lightweight concrete:
      a. Determined for each strength test sample.
      b. Sample taken at point of discharge of fresh concrete.

C. Evaluation of Tests:
   1. Strength test results: Average of 28-day strength of two cylinders from each sample.
      a. If one cylinder manifests evidence of improper sampling, molding, handling, curing or testing, strength of remaining cylinder will be test result.
      b. If both cylinders show any of above defects, test will be discarded.

D. Acceptance of Concrete:
   1. Strength level of each type of concrete shall be considered satisfactory if both of the following requirements are met:
      a. Average of all sets of three consecutive strength tests equals or exceeds the required specified 28-day compressive strength.

b. No individual strength test falls below the required specified 28-day compressive strength by more than 500 psi.

2. If tests fail to indicate satisfactory strength, perform additional tests and/or corrective measures as directed by Engineer at no costs to Owner.

3.5 SCHEDULES

A. Form Types:
   1. Surfaces exposed to view:
      a. Prefabricated plywood panel forms, job-built plywood forms, or forms lined with plywood or fiberboard.
      b. Laid out in a regular and uniform pattern with long dimensions vertical and joints aligned.
      c. Produce finished surfaces free from offsets, ridges, waves, and concave or convex areas.
      d. Construct forms sufficiently tight to prevent leakage of mortar.
   2. Surfaces normally submerged or not normally exposed to view:
      a. Wood or steel forms sufficiently tight to prevent leakage of mortar.
   3. Other types of forms may be used:
      a. For surfaces not restricted to plywood or lined forms.
      b. As backing for form lining.

B. Grout:
   1. Nonshrinking nonmetallic grout: General use.
   2. Epoxy grout:
      a. Grouting of dowels and anchor bolts into existing concrete.
      b. Other uses indicated on Drawings.
   3. Sand cement grout: Keyways of precast members.

C. Concrete:
   1. Precast concrete: Where indicated on Drawings.
   2. Lean concrete: Duct banks, suggest normal 4000 psi concrete be used here and where indicated on Drawings.
   3. Concrete fill: Where indicated on Drawings.
   4. Lightweight concrete: Where indicated on Drawings.
   5. Concrete pan fill: Stair and landings where indicated on Drawings.
   6. Normal weight concrete: All other locations.

D. Concrete Finishes:
   1. Grout cleaned finish: Where indicated on Drawings.
   2. Slab finishes:
      a. Use following finishes as applicable, unless otherwise indicated:
         1) Floated finish: Surfaces intended to receive roofing, concrete topping, lean concrete, concrete fill and waterproofing.
         2) Troweled finish: Interior floor slabs, exposed roof slabs and base slabs of structures, equipment bases, and column bases.
         3) Broom finish: Driveways, sidewalks, and ramps.

END OF SECTION

SECTION 15060

PIPE AND PIPE FITTINGS: BASIC REQUIREMENTS

PART 1 — GENERAL

1.1 SUMMARY

A. The Contractor shall furnish labor, materials, tools, equipment, and perform work and services necessary for or incidental to the furnishing and installation, complete, of piping with full observation of proper construction techniques, handling, testing procedures, attachments, supports, disinfection, and miscellaneous as shown on the Drawings and as specified, in accordance with provisions of the Contract Documents, and completely coordinated with work of other trades.

B. Work required within the project consists of, but is not necessarily limited to, the following piping systems:
   1. Sanitary sewer piping.

C. Furnish piping systems with specific material selections included in any schedules within these specifications and in accordance with notations or schedules on the Drawings.

D. All such work may not be specifically shown or specified, supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure, complete, and compatible installation shall be furnished and installed as part of this work.

1.2 QUALITY STANDARDS

A. Minimum Bury:
   1. Unless otherwise shown on the Drawings, provide a minimum of 3 FT earth cover over exterior buried piping systems and appurtenances conveying wastewater.

B. Specifications Reference: Verify Drawings for pipe designations and descriptions.

C. Subject to compliance with these specifications and other special instructions given on the Drawings, refer to the following specifications sections:
   1. Section 02221 – Trenching, Backfill, Compacting, and Pipeline Undercrossings.
   2. Section 15062 – Pipe: Ductile Iron.
   3. Section 15064 – Pipe: Plastic.

D. All pipe, fittings, packing, and jointing materials shall conform to Section C of the AWWA Standards.

E. Comply with rules, regulations, and policies of the North Carolina Department of Environment Quality (NCDEQ)..

1.3 SUBMITTALS

A. See Section 01340.

B. Certification that pipe and fittings furnished meet with applicable standards specified.

C. Manufacturer’s detailed information about pipe furnished. This information shall include, but not be limited to, pipe dimensions, composition of pipe, type of joints, fittings, gaskets, and recommendations for handling, storing, and installing pipe.

D. When work is complete, submit “Construction Record Drawings” of pipe systems in project including project items and pre-existing items. Identify complete location,

elevation, description of piping systems. Relate pipe systems to identified structures and appurtenances.

E. Written verification of required pressure, leakage, and vacuum tests.

PART 2 — PRODUCTS

2.1 GENERAL PIPING SYSTEMS

A. Refer to Section 15062 and Section 15064 for ductile iron pipe/fittings and PVC pipe/fittings requirements.

2.2 ACCESSORIES

A. Tracer Wire (all buried piping):
   1. Provide a 14 GA insulated stranded wire to be installed taped to the top centerline of the pipe and extended to ground level at valves, air release valves and/or all possible extrusions to ground level. Color shall be green.

PART 3 — EXECUTION

3.1 DELIVERY AND STORAGE

A. Inspect materials thoroughly upon arrival. Examine materials for damage. Remove damaged or rejected materials from site.

B. Observe manufacturer's directions for delivery and storage of materials and accessories.

C. Each joint shall be redundantly chocked at each end to prevent movement or rolling.

D. Vehicular traffic shall not be unduly inconvenienced in placing a material along the streets or rights-of-way.

E. Comply with North Carolina Department of Transportation requirements for storing pipe and fittings within highway rights-of-way.

3.2 HANDLING OF PIPE

A. Protect pipe coating during handling using methods recommended by manufacturer. Use of bare cables, chains, hooks, metal bars or narrow skids in contact with coated pipe is not permitted.

B. Prevent damage to pipe during transit. Repair abrasions, scars, and blemishes. If repair of satisfactory quality cannot be achieved, replace damaged material immediately.

C. Erect piping to accurate lines and grades and support as required on Drawings or described in specifications. When temporary supports are used, ensure that sufficient rigidity is provided to prevent shifting or distortion of pipe. Install expansion devices as necessary to allow expansion and contraction movements.

3.3 CONNECTIONS WITH EXISTING PIPING

A. Where connection between new work and existing work is made, use suitable and proper fittings to suit conditions encountered. Make connections in thorough and workmanlike manner. Perform connections with existing piping at time and under conditions which will least interfere with service to customers affected by such operation. Undertake connections in fashion which will disturb system as little as possible.

B. Provide suitable equipment and facilities to dewater, drain, and dispose of liquid removed without damage to adjacent property.

C. Once tie-in is initiated, work continuously until complete and tested.

3.4 LAYING PIPE IN TRENCH

A. All pipe shall be laid at the grade and alignment shown in the Drawings. Pipe shall be laid with the bell upgrade. All pipe shall be bedded according to the standard details or as described herein.
   1. Class C bedding shall be minimum bedding for any pipe. Bedding shall consist of angular bedding material conforming to ASTM D448 Size #67. Bedding shall be placed a minimum of 4 inches below pipe plus one half of the pipe diameter for the full trench width.
   2. Class B bedding shall consist of angular bedding material conforming to ASTM D448 Size #67. Bedding shall be placed a minimum of 4 inches below the pipe and continuing to 2 inches above the pipe for the full width of the trench. Class B bedding shall be used any time groundwater is encountered in the trench or where solid rock is excavated.

B. Excavate and backfill trench in accordance with Section 02221.

C. Clean each pipe length thoroughly and inspect for compliance to specifications. Grade trench bottom and excavate for pipe bell and lay pipe on trench bottom. Install gasket or joint material according to manufacturer's directions after joints have been thoroughly cleaned and examined.

D. Lay pipe in only suitable weather with good trench conditions. Never lay pipe in water except where approved by Engineer or intended for water crossing.

E. Seal open end of line with watertight plug if pipe laying is stopped. Remove water in trench before removal of plug.

F. Lining Up Push-On Joint Piping:
   1. Lay piping on route lines as shown on the Drawings.

3.5 EMBEDMENT REQUIREMENTS

A. Ensure that piping is adequately supported. Provide pipe bedding incorporated in Section 02221.

3.6 FIELD QUALITY CONTROL

A. Pipe Testing - General:
   1. Utilize pressures, media, and pressure test durations as specified herein.
   2. Isolate equipment which may be damaged by the specified pressure test conditions.
   3. Perform pressure test using calibrated pressure gages and calibrated volumetric measuring equipment to determine leakage rates.
      a. Select each gage so that the specified test pressure falls within the upper half of the gage's range.
      b. Notify the Owner/Engineer 24 HRS prior to each test.
   4. Acknowledge satisfactory performance of tests and inspections in writing to Engineer prior to final acceptance.
   5. Bear the cost of all testing and inspecting, locating and remedying of leaks and any necessary retesting and re-examination.

B. Testing – All pipelines shall be subject to visual, deflection, infiltration, and exfiltration tests. The tests will be performed as follows:
   1. Visual Test – Pipe shall be flushed with clean water to remove any dirt or foreign materials. Manhole inverts shall be swept or flushed as necessary. Each section of

pipe shall then be looked at by the Engineer to determine if the grade is uniform, alignment is true, and that no joints are offset.

2. Deflection Test – Deflection test shall be performed by passing a rigid mandrel through the pipe. The mandrel shall have an outside diameter of 5% less than the average pipe inside diameter as shown in the manufacturer's certified submittals. The mandrel shall have a minimum length of 24 inches or full diameter. The mandrel and all accessories necessary to pull it shall be furnished by the contractor.
3. Infiltration Test – Conduct test by placing a weir in the pipe. Maximum length of pipe to be tested for infiltration in any one test shall be 2,000 feet. Inflow shall not exceed 100 gallons per day per inch-mile diameter of pipe. The weir shall be furnished by the contractor.
4. Exfiltration Test – Conduct test by the low pressure air test method. Test shall be based on time required for pressure to drop from 3.5 PSIG to 2.5 PSIG. Allowable time for pressure drop shall be 1.2 minutes for each 100 feet of 8-inch pipe. Time shall be increased by 0.3 minutes for each pipe size thru 18 inches. The contractor shall furnish all equipment and supplies for exfiltration testing. Exfiltration testing may be waived at the direction of the Engineer when the ground water table is above the top of the pipeline.

C. Cleaning:
1. Clean interior of piping systems thoroughly before installing.
2. Maintain pipe in clean condition during installation.
3. Before jointing piping, thoroughly clean and wipe joint contact surfaces and then properly dress and make joint.
4. Immediately prior to pressure testing, clean and remove grease, metal cuttings, dirt, or other foreign materials which may have entered the system.
5. At completion of work and prior to final acceptance, thoroughly flush all lines installed under these specifications.

3.7 LOCATION OF BURIED OBSTACLES

A. Contractor shall maintain a record of exact location of buried utilities encountered and any below grade structures. Reference items to definitive reference point locations such as found property corners, entrances to buildings, existing structure lines, fire hydrants, and related fixed structures. Include such information as location, elevation, coverage, supports, and additional pertinent replacement servicing, or adjacent construction around any buried facility.

B. Incorporate information on "As-Recorded" Drawings.

3.8 RELATION OF WATER MAINS TO SEWERS

A. Lateral Separation of Sewer and Water Mains:
1. Sewer mains shall be laid at least 10 FT laterally from existing or proposed water mains unless location conditions or barriers prevent a 10 FT lateral separation in which case:
   a. The water main exists in a separate trench with the elevation of the bottom of the water main at least 18 IN above the top of the sewer; OR
   b. The water main exists in the same trench as the sewer with the water main located at one side on a bench of undisturbed earth and with the elevation of the bottom of the water main at least 18 IN above the top of the sewer.

B. Crossing a Sewer Main under a Water Main:
1. Whenever it is necessary for a sewer main to cross under a water main, the water main shall be relocated at such elevation that the bottom of the water main is at least 18 IN above the top of the sewer unless local conditions or barriers prevent an 18 IN vertical

separation in which case both the water main and sewer shall be constructed of ductile iron pipe for distance of 10 FT on each side of the point crossing.

C. Crossing a Sewer Main Over a Water Main:

1. Whenever it is necessary for a sewer main to cross over a water main, both the water main and the sewer shall be constructed of ductile iron pipe for a distance of 10 FT on each side of the point of crossing. A section of water main pipe shall be centered at the point of crossing.

END OF SECTION

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SECTION 15062

PIPE: DUCTILE

PART 1 — GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Ductile iron piping, fittings, and appurtenances.

B. Related Sections include but are not necessarily limited to:
   1. Division 0 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
   2. Division 1 – General Requirements.
   3. Section 15060 – Pipe and Pipe Fittings: Basic Requirements.

1.2 QUALITY ASSURANCE

A. See Section 15060 – Pipe and Pipe Fittings: Basic Requirements

B. Referenced Standards:
   1. American Society for Testing and Materials (ASTM):
      a. ASTM A-746.
      b. B695, Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
      c. D1330, Rubber Sheet Gaskets.
   2. American Water Works Association (AWWA):
      a. AWWA C-151.
      b. AWWA C151/A21.51, Ductile Iron Pipe, Centrifugally Cast.
      c. AWWA C151/A21.51, Push-on Joints and Restrained Joints.
      d. AWWA C111/A21.11, Rubber Gasket Joints for Ductile Iron.
      e. AWWA C116, Protective Fusion-Bonded Epoxy Coatings
      f. AWWA A21.4/C104, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.

1.3 SUBMITTALS

A. Shop Drawings:
   1. See Sections 01340 and 15060.
   2. Certification of factory hydrostatic testing.
   3. If mechanical coupling system is used, submit piping, fittings, and appurtenant items which will be utilized to meet system requirements.

PART 2 — PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. DIP Manufacturers requirements:
   1. The manufacturer shall have a minimum of 5 YRS experience successfully manufacturing and furnishing all sizes of pipe fittings and joint types involved on this project.
   2. All pipe specified in this section shall be manufactured in the United States of America.

B. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Ductile Iron Pipe:
    a. American.
    b. US Pipe.
    c. McWane.
2. Restrained joints:
    a. American (Flex-Ring or Lok-Ring).
    b. US Pipe (HDSS).
    c. McWane (TR-Flex).
    d. Megalugs (by EBAA or equal) will be allowed only where specifically approved by the Engineer and Owner.
3. Restrained Joint Gaskets
    a. American (Fast Grip)
    b. US Pipe (Field Lok)
    c. McWane (Sure Stop 350)
4. Transition coupling:
    a. Omni Coupling System 441.
    b. HARCO B&B Adapters.
    c. Or approved equal.

C. Submit requests for substitution in accordance with Section 01640 – Product Substitution.

2.2 MATERIALS

A. Ductile Iron Pipe:
1. PC 350.
2. ASTM A-746.
3. AWWA C151A21.51.

B. Fittings and Flanges:
1. ANSI/AWWA C110A21.10.
2. ANSI/AWWA C115A21.15.
3. ANSI/AWWA C153A21.21.53.
4. Flanges drilled and faced per ANSI B16.1 for both 125 and 250 psi applications.

C. Nuts and Bolts:
1. Hot-dipped zinc galvanized, ASTM A307, Grade B.
2. Heads, dimensions and threading per ANSI B1.1.

D. Gaskets:
1. AWWA C111/A21.11
2. Gaskets shall be synthetic rubber:
    a. Styrene Butadiene Copolymer (SBR).
    b. Nitrile Rubber (NBR) for use in or near contaminated soil.

E. If mechanical coupling system is used, utilize pipe thickness and grade in accordance with AWWA C606.

F. Polyethylene Encasement: See AWWA C105. Use where specified on the Drawings.

G. See Piping Specification Schedules in Section 15060 – Pipe and Pipe Fittings: Basic Requirements.

2.3 LININGS AND COATINGS

A. All ductile iron pipe and fittings shall have fusion-bonded, epoxy-lined interior coating in accordance with AWWA C116. Interior of pipe to receive 40 mils nominal dry film thickness.
1. Tnemec Perma-Shield PL Series 431.

2. Approved equal.

B. Exterior coating on buried pipe shall be a bituminous coating per AWWA C151.

2.4 SOURCE QUALITY CONTROL

A. Factory Test:
1. Subject pipe to hydrostatic test of not less than 500 psi with the pipe under the full test pressure for at least 10 seconds.

PART 3 — EXECUTION

3.1 INSTALLATION

A. Joining Method – Push-On Mechanical (Gland-Type) Joints:
1. Install in accordance with ANSI/AWWA C111/A21.11.
2. Assemble mechanical joints carefully according to manufacturer's recommendations.
3. If effective sealing is not obtained, disassemble, thoroughly clean, and reassemble the joint.
4. Do not overstress bolts.
5. Where piping utilizes mechanical joints with tie rods, align joint holes to permit installation of harness bolts.

B. Joining Method – Push-On Joints:
1. Install in accordance with ANSI/AWWA C115/A21.15.
2. Assemble push-on joints in accordance with manufacturer's directions.
3. Bevel and lubricate spigot end of pipe to facilitate assembly without damage to gasket. Use lubricant that is non-toxic, does not support the growth of bacteria, has no deteriorating effects on the gasket material, and imparts no taste or odor to water in pipe.
4. Assure the gasket groove is thoroughly clean.
5. For cold weather installation, warm gasket prior to placement in bell.
6. Taper of bevel shall be approximately 30 degrees with centerline of pipe and approximately 1/4 IN back.

C. Joining Method – Mechanical Coupling Joint:
1. Arrange piping so that pipe ends are in full contact.
2. Groove and shoulder ends of piping in accordance with manufacturer's recommendations.
3. Provide coupling and grooving technique assuring a connection which passes pressure testing requirements.

D. Cutting:
1. Do not damage interior lining material during cutting.
2. Use abrasive wheel cutters or saws.
3. Make square cuts.
4. Bevel and free cut ends of sharp edges after cutting.

E. All pipe shall be laid at the grade and alignment shown in the Drawings. Pipe shall be laid with the bell upgrade. All pipe shall be bedded according to the standard details or as described herein.
1. Class C bedding shall be minimum bedding for any pipe. Bedding shall consist of angular bedding material conforming to ASTM D448 Size #67. Bedding shall be placed a minimum of 4 inches below pipe plus one half of the pipe diameter for the full trench width.
2. Class B bedding shall consist of angular bedding material conforming to ASTM D448 Size #67. Bedding shall be placed a minimum of 4 inches below the pipe and

continuing to 2 inches above the pipe for the full width of the trench. Class B bedding shall be used any time groundwater is encountered in the trench or where solid rock is excavated.

F. Install buried piping in accordance with Section 15060 – Pipe and Pipe Fittings: Basic Requirements.

G. Install restrained joint systems where specified in Section 15060 – Pipe and Pipe Fittings: Basic Requirements under specific piping system or as shown on the Drawings.

3.2 FIELD QUALITY CONTROL

A. Test piping systems in accordance with Section 15060 – Pipe and Pipe Fittings: Basic Requirements.

END OF SECTION

SECTION 15064

PIPE: PLASTIC

PART 1 — GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Plastic pipe.

B. Related Sections include but are not necessarily limited to:
   1. Division 0 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
   2. Division 1 – General Requirements.
   3. Section 15060 – Pipe and Pipe Fittings: Basic Requirements.

1.2 QUALITY ASSURANCE

A. See Section 15060 – Pipe and Pipe Fittings: Basic Requirements.

B. Referenced Standards:
   1. American Society for Testing and Materials (ASTM):
      a. PVC (polyvinyl chloride) materials:
         1) D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
         2) D3030, Standard Test Method for Volatile Matter (Including Water) of Vinyl Chloride Resins
         3) D2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
         4) D2444, Standard Practice for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
         5) D2152, Standard Test Method for Adequacy of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
         6) D2241, (PVC) Plastic Pipe (SDR-PR and Class T).
         7) D3139, Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
   2. American Water Works Association (AWWA):
      a. PVC (polyvinyl chloride) materials:
         1) C605, Underground installation of polyvinyl chloride (PVC) pressure pipe and fittings.

1.3 SUBMITTALS

A. See Sections 01340 and 15060.

PART 2 — PRODUCTS

2.1 SMOOTH WALLED PVC PIPE

A. Materials: Furnish materials in full compliance with following requirements:
   1. Pipe shall conform to the requirements of ASTM D1784 for rigid polyvinyl chloride and chlorinated polyvinyl chloride compounds and ASTM D3030 for polyvinyl chloride sewer pipe and fittings.
   2. Pipe shall be manufactured from PVC resins having a minimum cell classification of 1245B or 1245C as defined by ASTM D1784.

3. Pipe thickness shall be based on depth. For pipe placed at a depth of 10 feet or less, DR-35 shall be used. For pipe placed at a depth greater than 10 feet, DR-26 shall be used.
4. Pipe joints shall be bell/ring type conforming to ASTM D1869 for extended pipe with integrally molded bell.
5. Pipe length shall be 13 feet.
6. Pipe shall be first class product with smooth interior and exterior surfaces.
7. Pipe minimum stiffness at 5% deflection shall resist a minimum loading of 46 psi for all sizes when tested in accordance with ASTM D2412.
8. Impact shall be tested according to ASTM D2444 using a 20 pound weight.
9. Extrusion quality shall be tested in accordance with ASTM D2152.
10. Each joint of pipe shall be marked with the following information: manufacturer's name, nominal size, cell classification, ASTM designation, "NSF" approvals, pipe thickness class, ANS date code.
11. Joints for PVC pipe shall be bell/ring type with a pressure rating not less than pipe pressure rating meeting performance requirements of ASTM D3139.
12. Pipe shall be green in color.

B. Fittings:
1. Ductile iron fittings shall be in accordance with ANSI/AWWA A21.10/C110. Fittings shall have fusion-bonded, epoxy-lined interior coating in accordance with AWWA C116. Interior of pipe to receive 40 mils nominal dry film thickness.
   a. Tnemec Perma-Shield PL Series 431.
2. PVC fittings shall be identical in manufacture, material, and quality of the type of pipe they are being used with.

C. Transition couplings:
1. Omni Coupling System 441
2. Harco B&B Adapters
3. Or approved equal.

D. Uniformity:
1. Ensure that all piping and fittings are integrated into components of the finished system. Utilize products of a single manufacturer.

PART 3 — EXECUTION

3.1 INSTALLATION

A. All pipe shall be laid at the grade and alignment shown in the Drawings. Pipe shall be laid with the bell upgrade. All pipe shall be bedded according to the standard details or as described herein.
1. Class C bedding shall be minimum bedding for any pipe. Bedding shall consist of angular bedding material conforming to ASTM D448 Size #67. Bedding shall be placed a minimum of 4 inches below pipe plus one half of the pipe diameter for the full trench width.
2. Class B bedding shall consist of angular bedding material conforming to ASTM D448 Size #67. Bedding shall be placed a minimum of 4 inches below the pipe and continuing to 2 inches above the pipe for the full width of the trench. Class B bedding shall be used any time groundwater is encountered in the trench or where solid rock is excavated.

B. Cutting:
1. Do not damage interior lining material during cutting.
2. Use abrasive wheel cutters or saws.
3. Make square cuts.

4. Bevel and free cut ends of sharp edges after cutting.

C. Install buried piping in accordance with Section 15060 – Pipe and Pipe Fittings: Basic Requirements.

D. Trenching, Backfilling, and Compaction:
   1. Follow Section 02221

E. Seeding, Sodding, and Landscaping:
   1. Follow Section 02930.

F. Install restrained joint systems where specified in Section 15060 – Pipe and Pipe Fittings: Basic Requirements under specific piping system or as shown on the Drawings.

3.2 FIELD QUALITY CONTROL

A. Test piping systems in accordance with Section 15060 – Pipe and Pipe Fittings: Basic Requirements.

END OF SECTION

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SECTION 33 01 30

CCTV INSPECTION OF SANITARY SEWERS

PART 1 GENERAL

1.01 SUMMARY

A. The Work covered by this section includes furnishing all labor, competent certified technicians, equipment, tools, accessories, materials and incidentals required to perform closed-circuit television (CCTV) inspection of all sanitary sewer lines from manhole to manhole and all service laterals from right-of-way boundary to the mainline/manhole connection. All manholes shall be inspected utilizing a 360-degree image of the interior of the manhole. This specification requires that the pipelines be inspected utilizing the NASSCO Pipeline Assessment and Certification Program (PACP) inspection standards and closed-circuit television techniques, and manholes be inspected utilizing the NASSCO Manhole Assessment and Certification Program (MACP) rating system. This process has been developed to identify and locate any sewer line and/or manhole defects, determine corrective action and perform/document post-correction inspection. All costs associated with CCTV inspection are the responsibility of the Developer/Contractor.

1.02 QUALITY ASSURANCE

A. Referenced Standards: Where materials and methods are indicated in these specifications as being in conformance with a standard specification, it shall refer to the latest edition of the specifications and shall include all interim revisions. Listing a standard specification without further reference indicates the particular material or method shall conform to such listed specification.

1. National Association of Sewer Service Companies (NASSCO):

    a. Pipeline Assessment and Certification Program (PACP®) Reference Manual.
    b. Recommended Specifications for Sewer Collection System Rehabilitation Standard, latest edition.

B. Perform according to NASSCO PACP & MACP standards.

C. QUALIFICATIONS

1. CCTV operator shall be NASSCO PACP & MACP certified.

2. The CCTV operator shall have a minimum 5 years of CCTV experience and shall have completed a minimum of 250,000 linear feet of both CCTV equipment operations and NASSCO PACP & MACP coding.

1.03 SUBMITTALS

A. Procedures: Section 13 00 00

B. CCTV Operator Qualifications:

1. Prior to performing CCTV work, submit CCTV Operator’s qualifications meeting the requirements of Part 1.02 for approval.

C. CCTV Pipeline Video:

1. Submit a digital copy via Union County's file transfer platform of completed narrated color CCTV video identified by project name, Union County project number, NCDEQ permit number, date of inspection, and CCTV operator. Union County will provide credentials and instructions for accessing the file transfer platform upon notification that the CCTV video file(s) are ready to be transmitted to Union County for review.

2. Video shall display, at a minimum, the project name, Union County project number, date of inspection, pipe segment number, upstream/downstream manhole numbers or lateral lot number corresponding to the numbers shown on the project drawings, pipe diameter, pipe material, direction of camera movement, footage counter, and CCTV operator.

D. Manhole 360-degree Images:

1. Submit a digital copy via Union County's file transfer platform of completed 360-degree images of the interior of all manholes via Union County's file transfer platform identified by project name, Union County project number, NCDEQ permit number, date of inspection, and CCTV operator. Union County will provide credentials and instructions for accessing the file transfer platform upon notification that the manhole image file(s) are ready to be transmitted to Union County for review.

2. Images shall display, at a minimum, the project name, Union County project number, date of inspection, manhole number, and CCTV operator.

E. Inspection Logs:

1. Submit inspection logs for each section of sewer line, service lateral, and manhole.

2. Sewer line inspection logs shall be in PACP version 7 format with the following information:

    a. Project name
    b. Union County project number
    c. NCDEQ permit number
    d. Date of inspection
    e. Pipe segment number
    f. Pipe rating
    g. Upstream and downstream manhole numbers corresponding to the manhole numbers shown on the project drawings (sewer mains)
    h. Lateral lot number corresponding to the lot numbers shown on the project drawings (service laterals)
    i. Pipe diameter
    j. Pipe material
    k. Direction of camera movement
    l. CCTV operator information
    m. Stationing, based on distance from start manhole, and location by clock position of service connections
    n. Stationing, based on distance from start manhole and description:
        i. Obstructions
        ii. Structural defects
        iii. Longitudinal and/or circumferential cracking
        iv. Open and/or offset joints
        v. Ovality
        vi. Leakage or evidence thereof
        vii. Break in connections

viii. Protruding connections
ix. Mineral deposits
x. Roots
xi. Previous repairs
xii. Sags
xiii. Any other abnormalities with respect to the sanitary sewer pipe condition

3. Manhole inspection logs shall be in MACP version 7 format with the following information:

a. Project name
b. Union County project number
c. NCDEQ permit number
d. Date of inspection
e. Manhole number
f. Manhole rating
g. Manhole chimney, cone, wall, and bench material
h. Manhole frame and cover type and material
i. Manhole lining material, if applicable
j. Pipe material, diameter, and position
k. CCTV operator information
l. Defect description:
   i. Structural defects (crack, fracture, broken, hole, deformed, collapsed, joint, surface damage, buckling, lining failure, weld failure, point repair, brick work)
   ii. Operational & Maintenance defects (deposits, roots, infiltration, obstructions, vermin, grout test & seal)

PART 2 - PRODUCTS

2.01 TELEVISION INSPECTION EQUIPMENT

A. Furnish all labor, materials, machinery, equipment and incidentals required to perform the CCTV inspection of all sewer lines from manhole to manhole and all service laterals from right-of-way to sewer main/manhole connection.

B. Ensure equipment utilized for CCTV of main lines and service laterals is capable of passing through offset joints up to 1 inch minimum.

C. The camera used for the inspection shall be one specifically designed and constructed for such inspection. Adjustable light source shall be suitable to provide an even distribution of lighting for the camera to allow a clear color picture of the entire periphery of the pipe. The camera shall be capable panning 360° and tilting 270° to facilitate the inspection of all laterals and defects, with optimum picture quality provided by focus and iris adjustment. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 700-line resolution color picture. The camera shall be operative in 100 percent humidity conditions. Camera shall be operative in a hazardous and corrosive environment. The camera shall be capable of zooming at least 10:1 for looking further down the pipe or up into the laterals.

D. The camera, television monitor, and other components of the video system shall be capable of producing picture quality to the satisfaction of Union County.

E. The television inspection equipment shall have an accurate footage counter that shall display on the monitor the exact distance of the camera from the centerline of the starting manhole. Calibrate the camera footage with above ground tape measure and simultaneous CCTV footage counter.

F. The television inspection equipment shall have an accurate inclinometer that shall display the pipe slope on the screen.

G. The CCTV equipment shall include PACP version 7 compliant software and databases referenced in these specifications.

2.02 MANHOLE INSPECTION EQUIPMENT

A. Furnish all labor, materials, machinery, equipment and incidentals required to take 360-degree images of the interior of manholes.

B. The camera used for the inspection shall be one specifically designed and constructed for such inspection. Light source shall be suitable to provide an even distribution of lighting for the camera to allow a clear color picture of the entire interior of the manhole. Camera shall be operative in a hazardous and corrosive environment.

C. The camera and other components of the imaging system shall be capable of producing picture quality to the satisfaction of Union County.

D. The CCTV equipment shall include MACP version 7 compliant software and databases referenced in these specifications.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify location of sewer lines and manholes to be inspected based on the approved project drawings.

3.02 PREPARATION

A. Clean pipeline and manholes to remove sludge, dirt, sand, stone, grease, and other materials to ensure clear view of interior conditions.

B. Debris:

1. Intercept flushed debris at next downstream manhole using weir or screening device.
2. Remove and properly dispose of debris off Site.

3.03 CCTV PIPELINE INSPECTION

A. Perform all CCTV inspection using personnel meeting qualifications listed in Section 1.02 of this specification.

B. Move the camera through the line at a uniform speed less than or equal to 20 feet per minute, stopping when necessary to permit proper documentation of the construction features and pipe condition. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line.

C. When manually operated winches are used to pull the television camera through the line, use telephones or other suitable means of communication set up between the two manholes of the section being inspected to ensure good communications between members of the crew.

D. Adjust the camera height such that the camera lens is always centered in the pipe being televised. Prior to starting the camera down the line, a tape measure shall be placed at the pipe opening at the upstream manhole to clearly show/verify, on-screen, the pipe diameter of the section of pipe to be televised during the subsequent inspection.

E. Video shall include overlay/text display. Each inspection start shall include overlay display of section details:

1. Project name
2. Union County project number
3. Date of inspection
4. Pipe segment number
5. Upstream/downstream manhole numbers or lateral lot number corresponding to the numbers shown on the project drawings
6. Pipe diameter
7. Pipe material
8. Direction of camera movement
9. Footage counter
10. Inclinometer pipe slope reading
11. CCTV operator

F. A constant display of the project name, start Manhole ID / end Manhole ID, date and distance shall appear on screen. CCTV operator shall move or remove overlay display accordingly so it does not interfere with the inspection review of a particular observation/defect. As an observation/defect is noted, a descriptive text display shall appear for a minimum of 4 seconds.

G. A full 360-degree view of the pipe shall be visible during CCTV inspection.

H. Provide lighting system adequate for good quality video. A reflector in front of the camera may be required to enhance lighting in black pipe.

I. The camera shall be stopped at all service laterals and pan such an angle that an internal view of the service lateral is available. Digital photographs shall be made of any service lateral or deficiency observed in the sewer line and the photograph itself shall contain a brief description of the issue. The descriptions shall also be noted in the inspection condition record within the database. Where other pipe deficiencies are noted, stop the camera to observe the condition, record information and take digital photographs. All digital photos shall be cataloged in the CCTV database and linked to the specific length along the inspection via linkage to the defect record in the database.

J. The CCTV operator shall lateral launch or otherwise provide CCTV video (e.g. push-camera) to inspect conditions of all service laterals conveying to manholes or pipes. The CCTV operator shall, at minimum, obtain video and provide assessment of service lateral conditions to the property line or existing cleanout.

K. Provide a complete television inspection for the upstream and downstream manholes. The CCTV operator shall pan and zoom up the manhole from the invert for each manhole and obtain the best possible image of the manhole including cone and corbel sections and for each pipe connection within each manhole. The CCTV operator shall zoom in on each pipe connection so the photos capture each pipe connection’s size, location, and approximate elevation.

3.04 MANHOLE INSPECTION

A. Perform all manhole inspection using personnel meeting qualifications listed in Section 1.02 of this specification.

B. Images shall include overlay/text display. Each inspection start shall include overlay display of manhole details:

1. Project name
2. Union County project number
3. Date of inspection
4. Manhole number
5. CCTV operator

C. The scanner shall collect a 360-degree image of the interior of the manhole and shall create a point cloud of the manhole interior that can be used to accurately measure the manhole features.

3.05 INSPECTION LOGS

A. All inspections shall use software that is capable of providing complete survey reports in compliance with version 7 of NASSCO PACP/MACP software utilized by Union County.

B. All NASSCO PACP/MACP mandatory fields and any additional available fields requested by Union County or his representative shall be populated during the inspections**.** All reports and/or submittals shall adhere to NASSCO PACP/MACP Standards.

C. Submit inspection logs for each section of sewer line and service lateral.

1. Sewer line inspection logs shall be in PACP version 7 format with the following information:

a. Project name
b. Union County project number
c. NCDEQ permit number
d. Date of inspection
e. Pipe segment number
f. Pipe rating
g. Upstream and downstream manhole numbers corresponding to the manhole numbers shown on the project drawings (sewer mains)
h. Lateral lot number corresponding to the lot numbers shown on the project drawings (service laterals)
i. Pipe diameter
j. Pipe material
k. Direction of camera movement
l. CCTV operator information
m. Inclinometer pipe slope reading
n. Stationing, based on distance from start manhole, and location by clock position of service connections
o. Stationing, based on distance from start manhole and description:
    i. Obstructions
    ii. Structural defects
    iii. Longitudinal and/or circumferential cracking
    iv. Open and/or offset joints
    v. Ovality
    vi. Leakage or evidence thereof
    vii. Break in connections
    viii. Protruding connections
    ix. Mineral deposits
    x. Roots
    xi. Previous repairs
    xii. Sags

xiii. Any other abnormalities with respect to the sanitary sewer pipe condition

2. Manhole inspection logs shall be in MACP version 7 format with the following information:

a. Project name
b. Union County project number
c. NCDEQ permit number
d. Date of inspection
e. Manhole number
f. Manhole rating
g. Manhole chimney, cone, wall, and bench material
h. Manhole frame and cover type and material
i. Manhole lining material, if applicable
j. Pipe material, diameter, and position
k. CCTV operator information
l. Defect description:
   i. Structural defects (crack, fracture, broken, hole, deformed, collapsed, joint, surface damage, buckling, lining failure, weld failure, point repair, brick work)
   ii. Operational & Maintenance defects (deposits, roots, infiltration, obstructions, vermin, grout test & seal)

3.06 INSPECTION SUBMITTALS

A. CCTV operator shall submit one copy of digital videos, digital photographs, evaluation reports, and databases in NASSCO PACP/MACP version 7 format via Union County's electronic file transfer platform.

B. If digital videos are of such poor quality that Union County is unable to evaluate the condition of the sanitary sewer main and service laterals, CCTV operator shall be required to re-televise the sanitary sewer and provide new digital videos of good quality prior to acceptance.

C. All digital videos and data shall become the property of Union County.

D. All reports and/or submittals shall adhere to NASSCO PACP/MACP Standards.

E. Inspection log databases, video files, digital photographs and supporting documentation (PDF, spreadsheets), etc. shall be placed in separate folders on Union County's file transfer platform. Separate subfolders shall not be used to separate video files, etc. under the main folder. All videos, digital photographs, etc. of the same file type should be placed in a single folder in order to provide a single location to access the data.

F. The CCTV and 360-degree imaging equipment/software shall be capable of producing digital still images of all defects in JPEG (.jpg) image format. Provide digital still images of each defect, with a minimum of one independent photo file per defect, construction features and service connections to clearly depict it. More images may be necessary depending upon the condition of the pipe/manhole. The digital images shall have a minimum size/resolution of 620 x 480. The screen captures or digital images shall include an onscreen display with date, sewer main/manhole reach number, footage, and type of defect PACP/MACP Code. The filename of each JPEG (.jpg) shall be in accordance with these specifications.

G. The inspection log database shall be provided with the filename in the following format using upper case letters:

1234_YYYYMMDD.MDB

Where 1234= Union County Project ID, and YYYYMMDD = 8-digit date.

H. The CCTV inspection videos shall be provided with the filename in the following format:

1234_56789_YYYYMMDD.MPG

Where 1234 = Union County Project ID, 56789 = pipe asset ID, and YYYYMMDD = 8-digit date.

I. Digital still images of the pipeline defects shall be provided with the file name based on the video / data file name of the sewer reach in which the image was taken. The name shall be recorded as follows:

1234_56789_HSV_37 _2_YYYYMMDD.jpg

Where 1234 is the Union County project ID, 56789 is the pipe asset ID, HSV is a PACP defect code, 37 is the footage count for the defect location along the pipe, 2 is the sequential defect photo number along the pipe, and YYYYMMDD is the 8-digit date of the inspection.

J. The manhole 360-degree inspection images shall be provided with the filename in the following format:

1234_56789_YYYYMMDD.MPG

Where 1234 = Union County Project ID, 56789 = manhole asset ID, and YYYYMMDD = 8-digit date.

K. Digital still images of the manhole defects shall be provided with the file name based on the video / data file name of the sewer reach in which the image was taken. The name shall be recorded as follows:

1234_56789_SAV_5 _2_YYYYMMDD.jpg

Where 1234 is the Union County project ID, 56789 is the manhole asset ID, SAV is a MACP defect code, 5 is the footage from the top of the manhole of the defect location, 2 is the sequential defect photo number along the manhole, and YYYYMMDD is the 8-digit date of the inspection.

L. Digital files of all field data collection forms should be delivered in PDF format and shall have file names that include the same unique identifier as the database submittal so that they can easily be related to the database and digital photograph/video submittals, if a naming convention is not specified.

3.07 ACCEPTANCE

A. Any of the following observations shall be considered defects:

1. Pipeline:
    a. Obstructions
    b. Any bellies in a joint of pipe will be cause for rejection of the pipe segment
    c. Ovality
    d. Structural defects
    e. Joint separations
    f. Offset joints

g. Chips in pipe ends
h. Cracked or damaged pipe or evidence of the presence of an external object bearing upon the pipe (rocks, roots, etc.)
i. Break in connections and/or protruding connections
j. Infiltration
k. Roots
l. Debris or other foreign objects inside of pipe.
m. Other obvious deficiencies when compared to Approved Plans, Permits, and/or Minimum Standards.

2. Manhole:
   a. Structural defects (crack, fracture, broken, hole, deformed, collapsed, joint, surface damage, buckling, lining failure, weld failure, point repair, brick work)
   b. Operational & Maintenance defects (deposits, roots, infiltration, obstructions, vermin, grout test & seal)
   c. Other obvious deficiencies when compared to Approved Plans, Permits, and/or Minimum Standards.

B. The Developer shall be notified in writing of any deficiencies revealed by the CCTV inspection that will require repair. After repairs have been made, the line segment(s) shall be re-inspected at the Developer's expense. The CCTV inspection video shall be submitted to Union County for review upon completion of discrepancies.

C. Correction of any and all deficiencies must be corrected prior to acceptance of the project.

END OF SECTION

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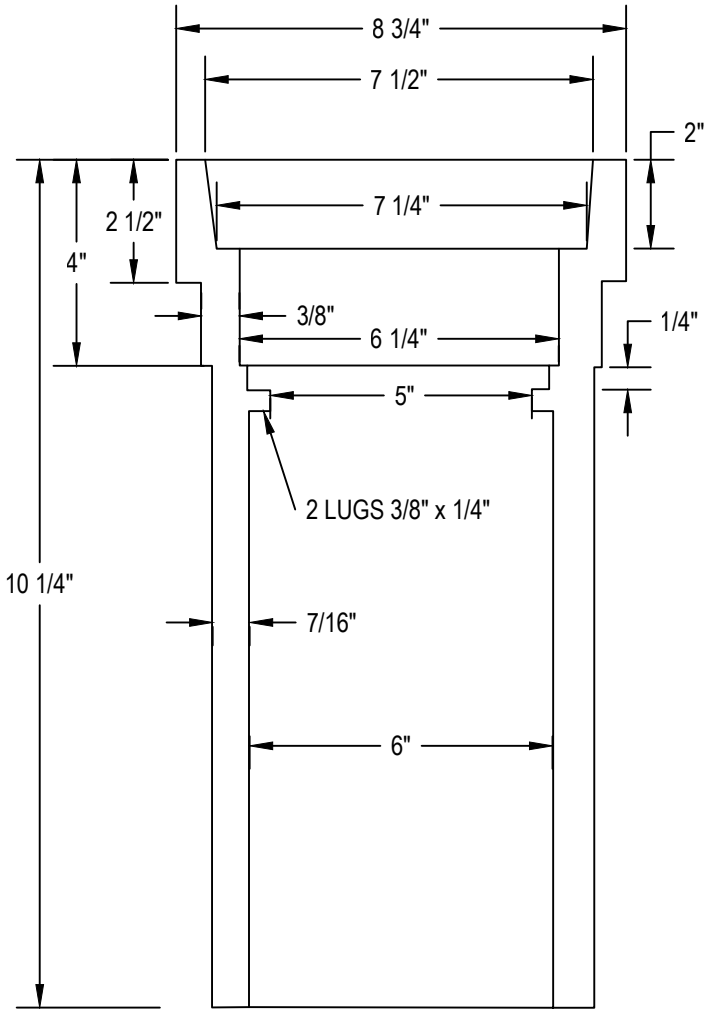
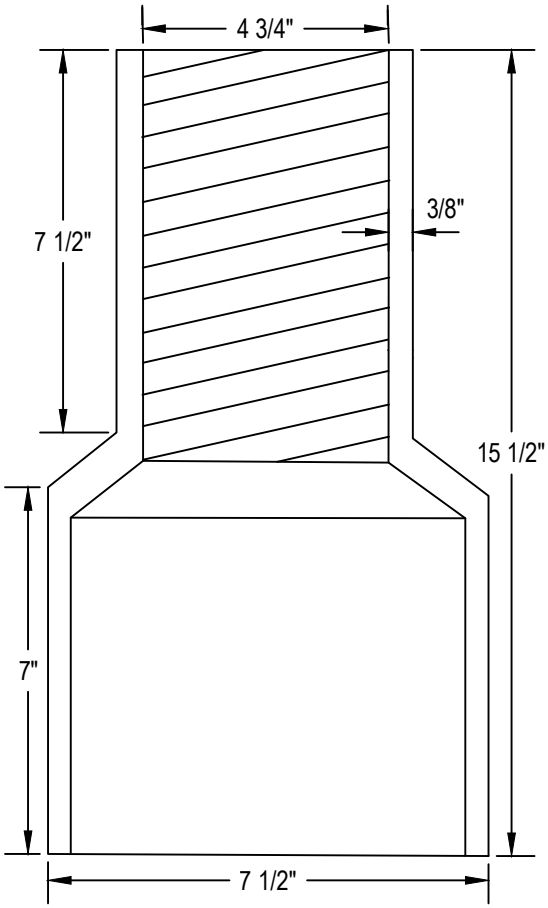
UNION COUNTY WATER STANDARD DETAILS		Rev. 09/13/2024
NUMBER	TABLE OF CONTENTS	REVISION DATE
1	Valve Box	09/13/24
1A	Valve Box Installation	09/13/24
1B	Dummy Valve Box	10/04/11
2	2" Blow-off	11/07/23
2A	Long Mainline Future Extension with Blow-off	09/13/24
2B	Short Mainline Future Extension with Blow-off	09/13/24
3	Fire Hydrant	09/13/24
4	Air Release	09/13/24
5	Service Connection	09/13/24
6	Meter Installation for ¾" and 1" Meters	09/13/24
6A	Meter Box Lid for ¾" and 1" Meters	02/06/20
7	8" or 6" x 2 Reducer	10/04/11
7A	Hydrant Tee x 2" Reducer	10/04/11
8	Pipe Bedding	11/17/06
8A	Sewer Bedding	09/13/24
8B	Water Trench	09/13/24
9	Ring & Cover	09/09/11
9A	Ring & Cover for Sealed Manhole	09/25/12
10	Manhole	09/13/24
10A	Cleanout Manhole	07/29/08
10B	Outside Drop Manhole	09/13/24
11	Sewer Lateral Detail	02/19/14
12	Reinforced Concrete Piers	11/17/06
13	Aerial Creek Crossing	11/17/06
14	Pipe Encasement	11/17/06
15	Pavement Replacement	11/17/14
16	Thrust Block	11/17/06
17	Thrust Block Specifications	11/17/06
18	Tapping Sleeve	09/13/24
19	2" Short Side Service for 1 ½" or 2" Meters	09/13/24
20	2" Long Side Service for 1 ½ " or 2" Meters	05/22/13
21	Anti-Seep Collar	11/17/06
22	Water Connection Detail	12/12/19
23	Bypass Emergency Connection for Wet Well	09/27/07
24A	Reduced Pressure Zone Assembly (3/4" - 2")	12/13/13
24B	Reduced Pressure Detector Assembly	01/02/14
25	Jumper Connection	09/02/10
25A	Direct Tap Jumper Connection (Short Side)	09/02/10
25B	Direct Tap Jumper Connection (Long Side)	09/02/10
26	Grease Interceptor	10/23/07
27	Water Relocation Detail	09/13/24
27A	Water Relocation Detail for Large Water Mains	03/08/11
27B	Water Relocation Detail for Small Water Mains	03/08/11
28	Meter and Vault – 3" or Larger	10/22/14
29	Standard 1 ½" & 2" Meter Installation & Vault	06/13/14
30	Irrigation and Dual Meter Tap	12/10/19
31	Water Main Under Storm Drain Crossing	09/13/24
32	Maximum Slope Across Water or Sewer Easement	03/02/18

NOTES:

1. 2” GATE VALVES SHALL BE AWWA C515 COMPLIANT
2. 2” GATE VALVES SHALL BE NSF 61 COMPLIANT
3. 3” OR LARGER GATE VALVES SHALL BE AWWA C500 AND C509 COMPLIANT



TOP



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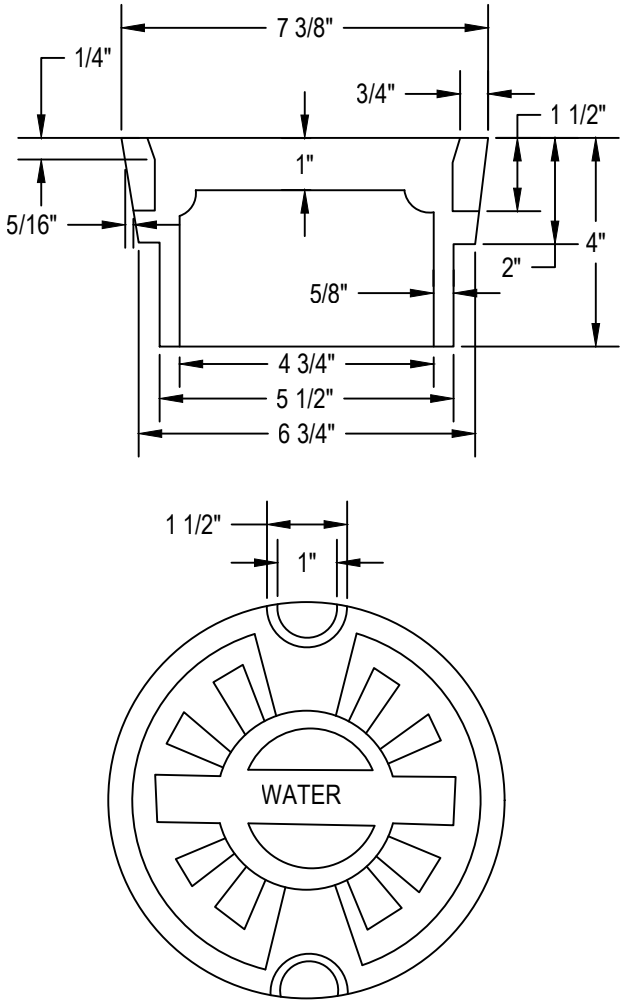
(SCREW TYPE)

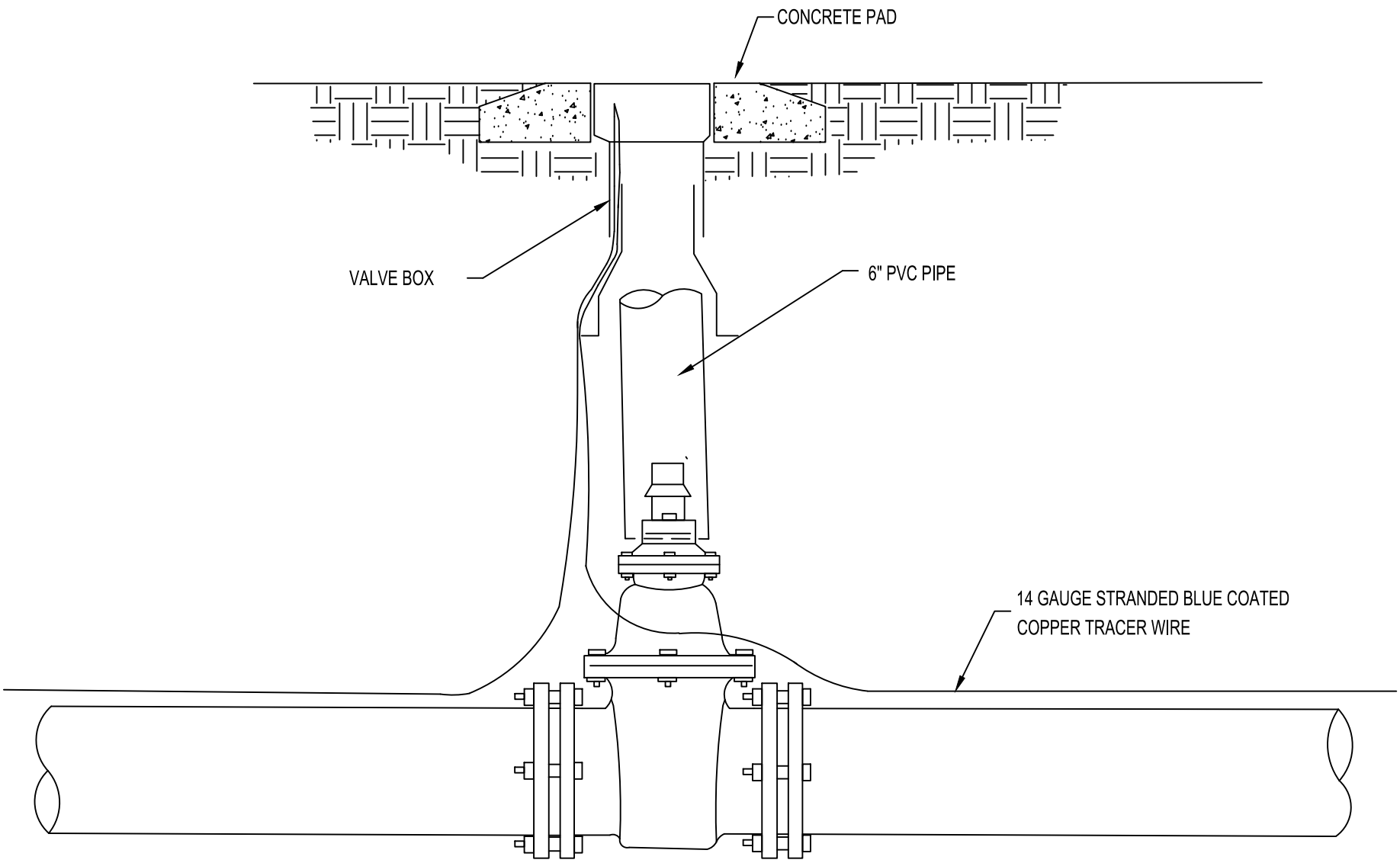


COVER

UNION COUNTY WATER	STANDARD DETAIL VALVE BOX	SCALE: N.T.S. DATE: 09-13-24	1

NOTES:

1. A 27" DIAMETER CONCRETE PAD SHALL BE PLACED AROUND EACH VALVE BOX
2. MINIMUM 18" SEPARATION BETWEEN GV AND MECHANICAL JOINT FITTINGS



UNION COUNTY WATER

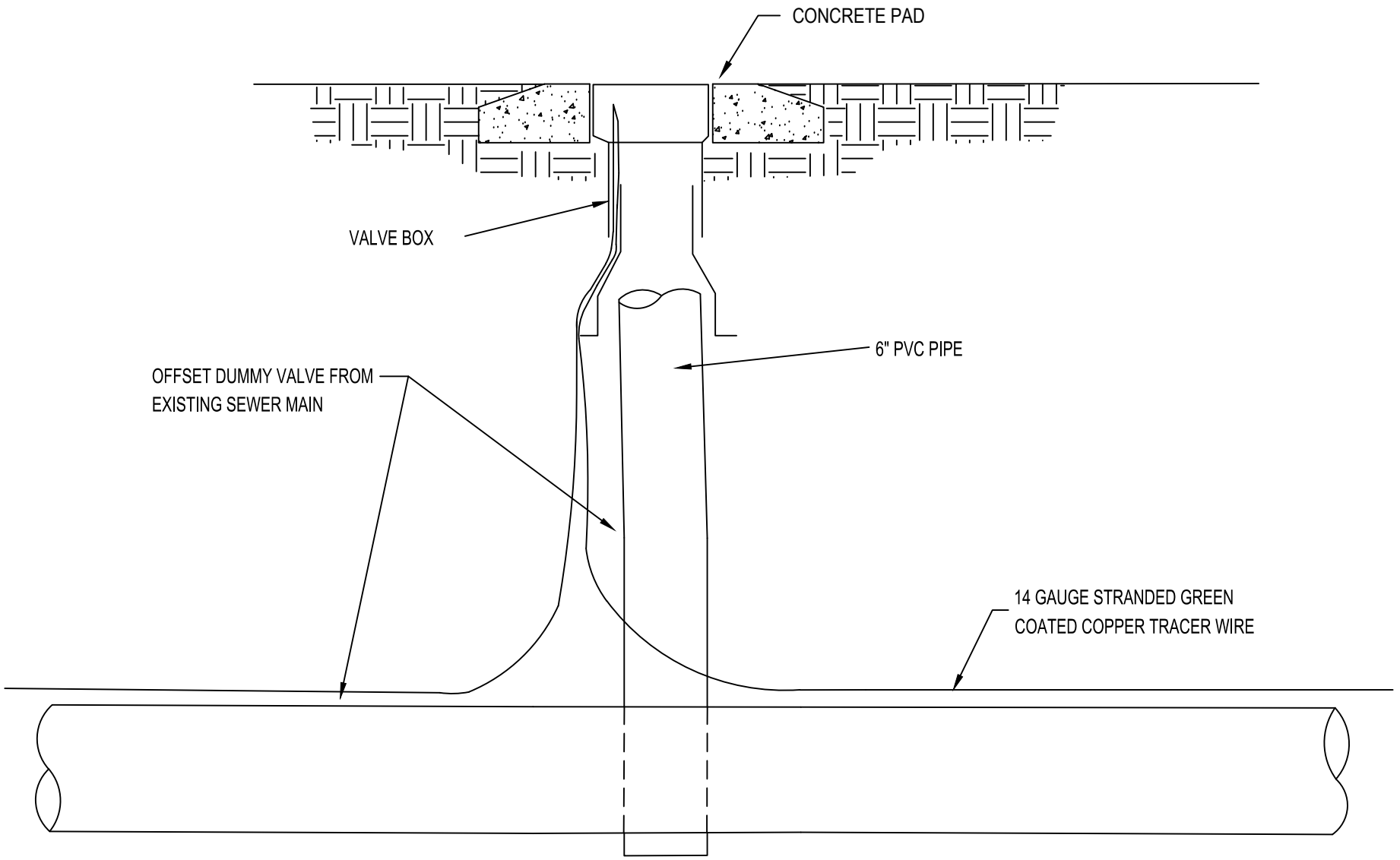
STANDARD DETAIL

VALVE BOX INSTALLATION

SCALE: N.T.S.

DATE: 09-13-24

1A



UNION COUNTY WATER

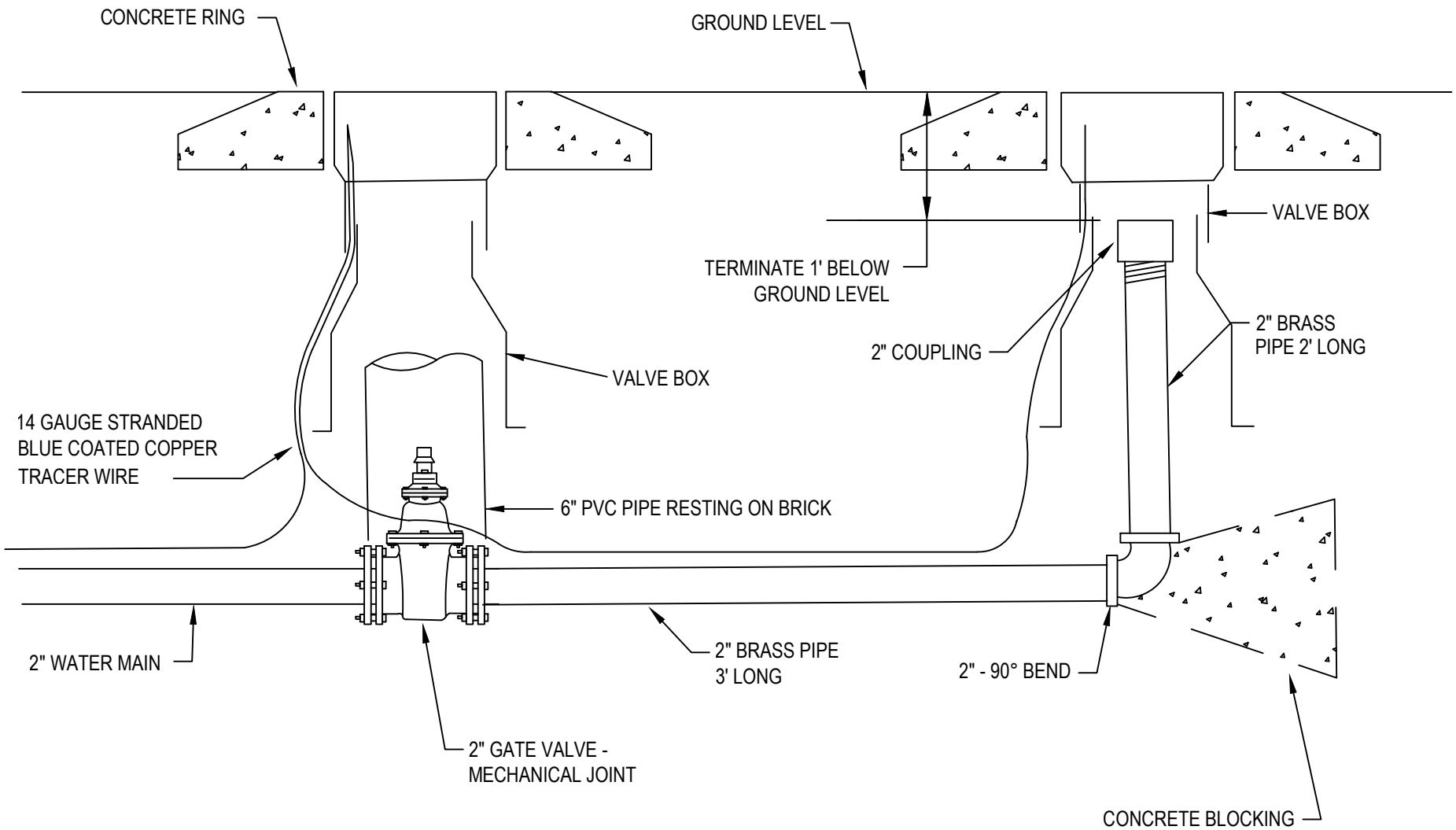
STANDARD DETAIL

DUMMY VALVE BOX

SCALE: N.T.S.

DATE: 10-04-11

1B



UNION COUNTY WATER

STANDARD DETAIL

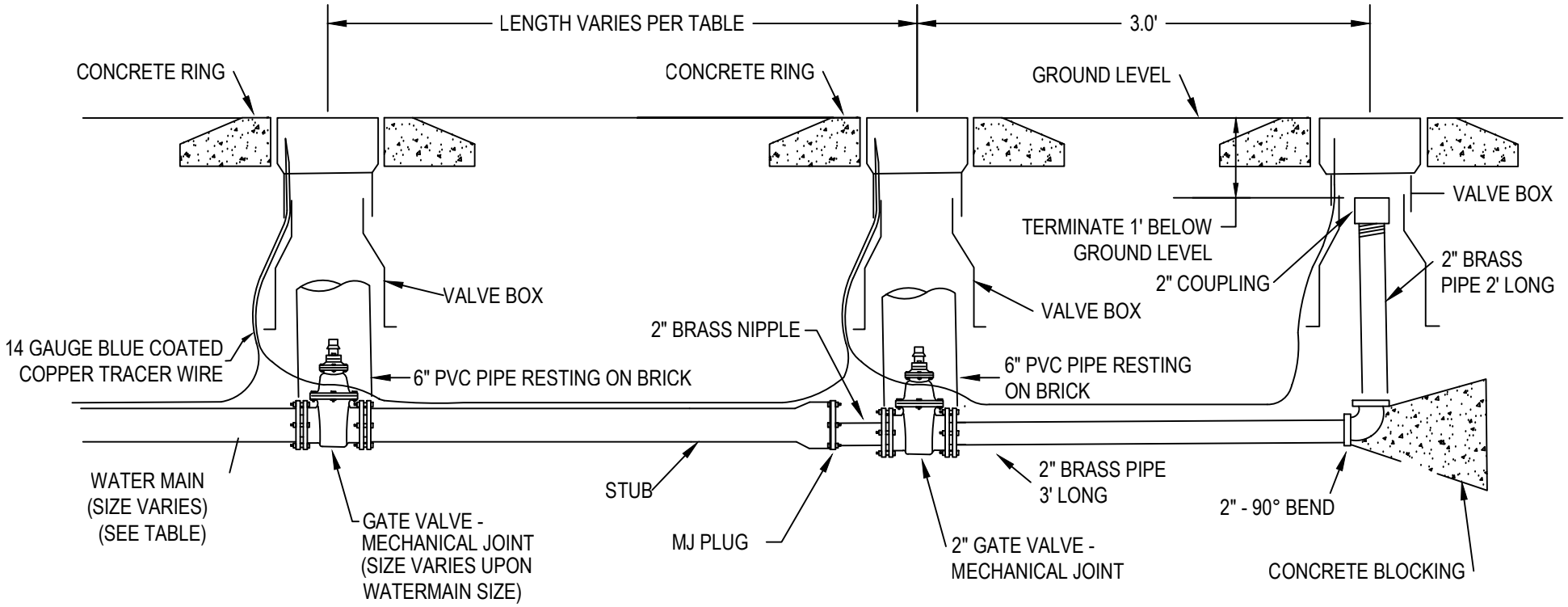
2" BLOW OFF

SCALE: N.T.S.

DATE: 11-07-23

2

TABLE	
SIZE OF PIPE	LENGTH OF PIPE
6"	40'
8"	40'
12" AND LARGER	BY ENGINEER



UNION COUNTY WATER

STANDARD DETAIL

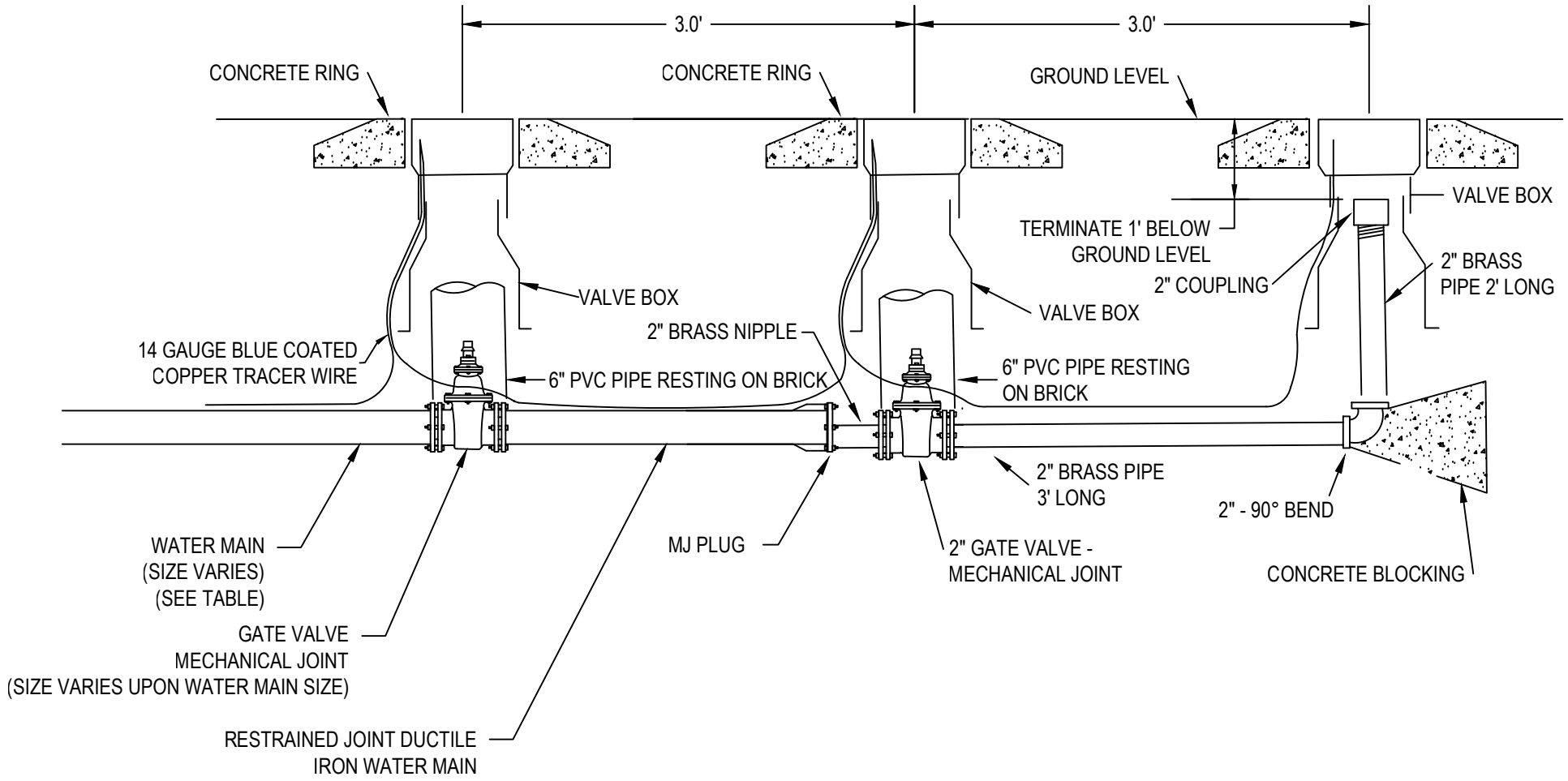
LONG MAIN LINE FUTURE EXTENSION WITH BLOW OFF

SCALE: N.T.S.

DATE: 09-13-24

2A

TABLE	
SIZE OF PIPE	LENGTH OF PIPE
6"	54'
8"	54'
12" AND LARGER	BY ENGINEER



UNION COUNTY WATER

STANDARD DETAIL

SHORT MAIN LINE FUTURE EXTENSION WITH BLOW OFF

SCALE: N.T.S.

DATE: 09-13-24

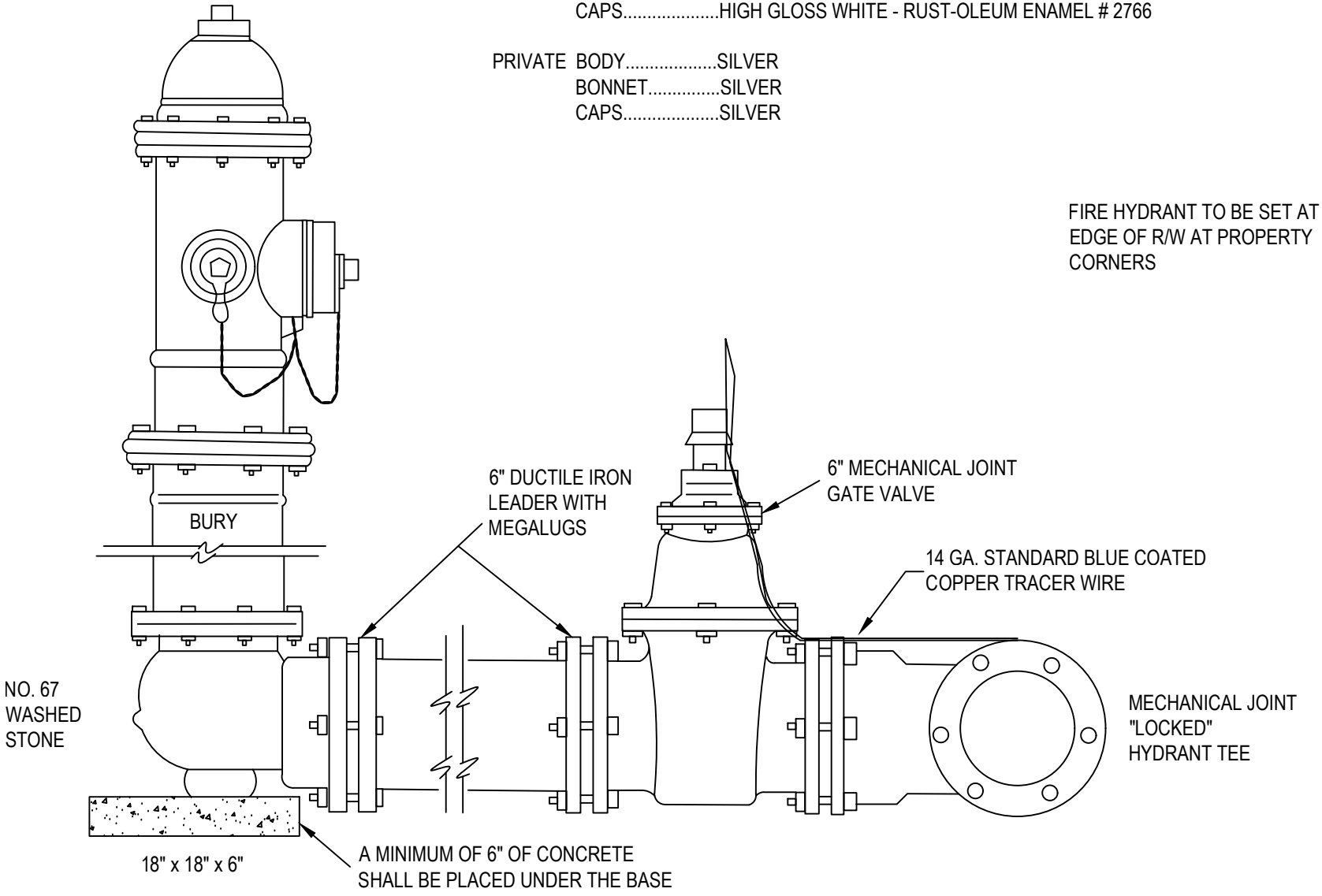
2B

PAINT COLORS

PUBLIC BODY.....FIRE HYDRANT RED - RUST-OLEUM ENAMEL # 1210 FIRE HYDRANT RED
BONNET.....HIGH GLOSS WHITE - RUST-OLEUM ENAMEL # 2766
CAPS.....HIGH GLOSS WHITE - RUST-OLEUM ENAMEL # 2766

PRIVATE BODY.....SILVER
BONNET.....SILVER
CAPS.....SILVER

FIRE HYDRANT TO BE SET AT EDGE OF R/W AT PROPERTY CORNERS



UNION COUNTY WATER

STANDARD DETAIL

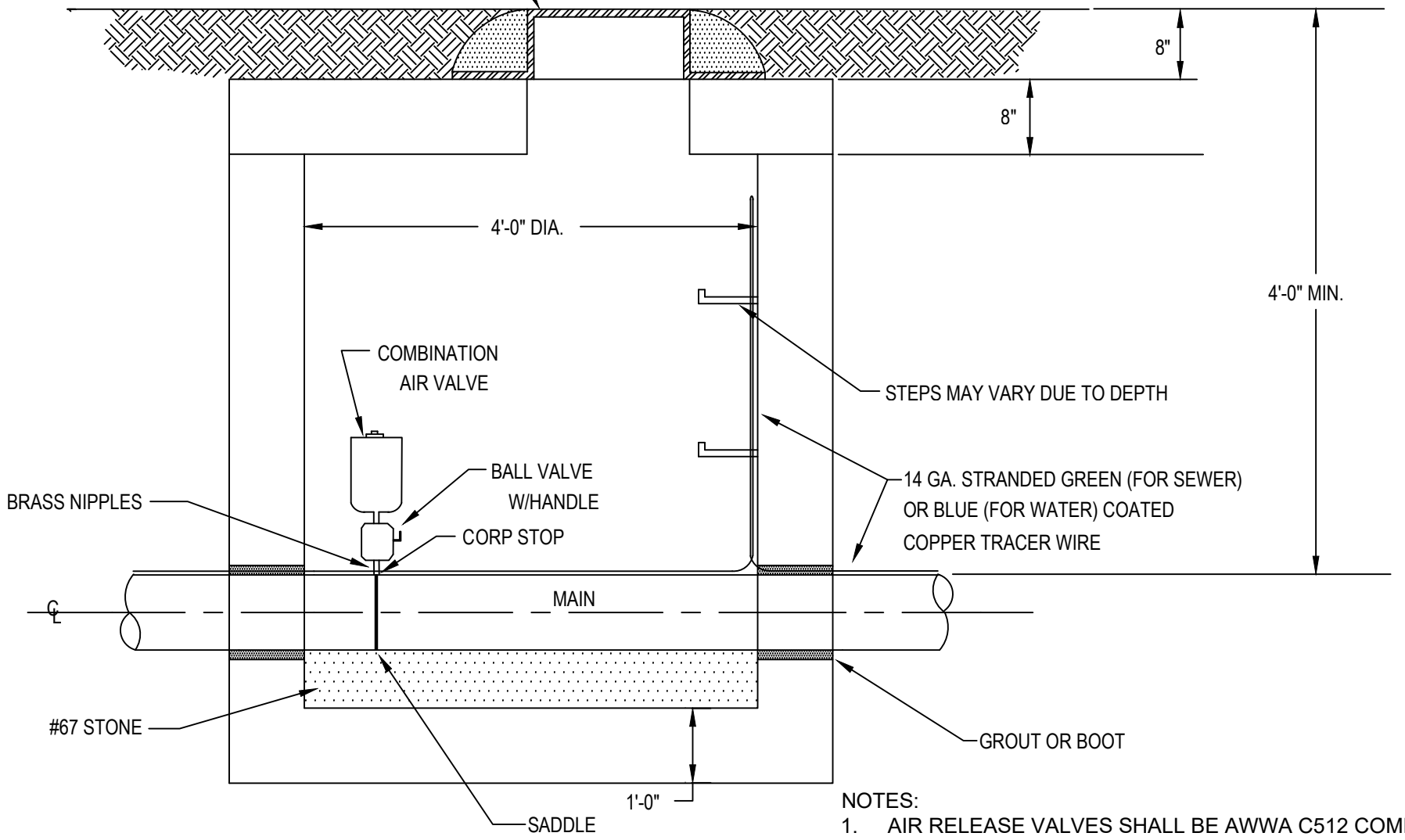
FIRE HYDRANT INSTALLATION

SCALE: N.T.S.

DATE: 09-13-24

3

APPROVED VALVES	WATER		SEWER
	1"	2"	2"
APCO	No. 50	No. 200	VENT-O-MAT
CRISPIN	No. 10	No. 20	VENT-O-MAT
VAL-MATIC	No. 25	No. 50	VENT-O-MAT



NOTES:

1. AIR RELEASE VALVES SHALL BE AWWA C512 COMPLIANT

.

UNION COUNTY WATER

STANDARD DETAIL

AIR RELEASE

SCALE: N.T.S.

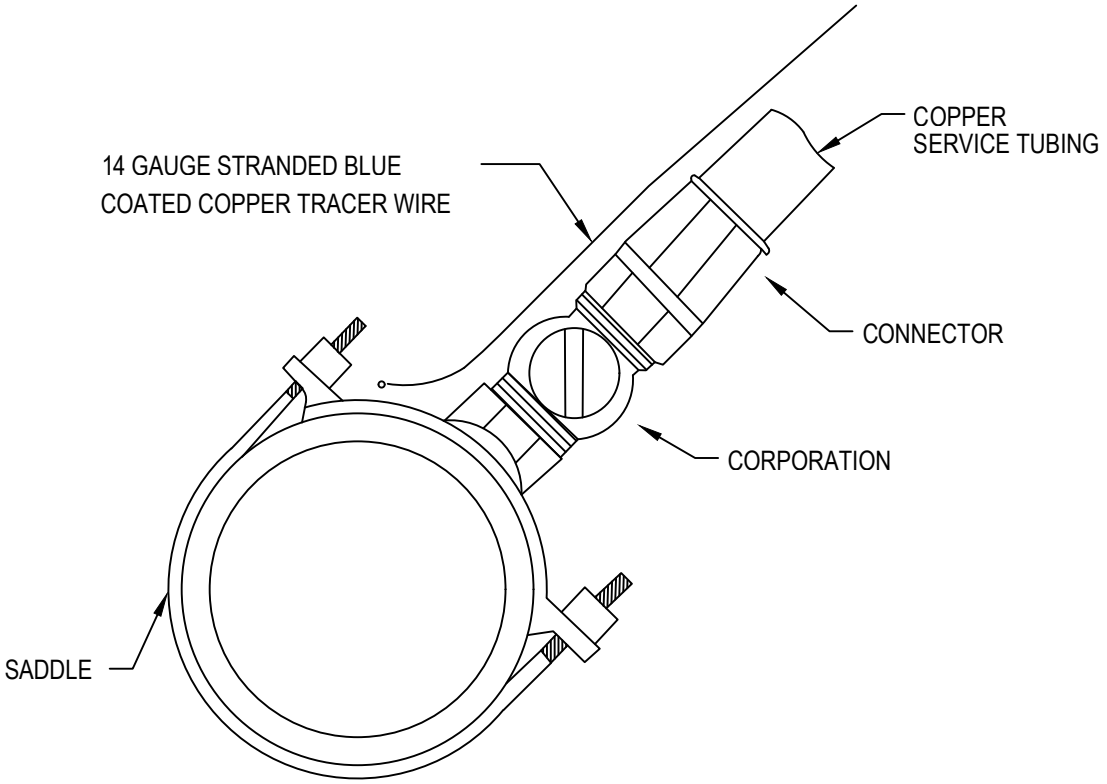
DATE: 09-13-24

4

NOTE:

1. ROMAC 101N SHALL REPLACE MUELLER FOR PIPE DIAMETER UP TO 8"
2. SMITH BLAIR 317, FORD FC 202 OR ROMAC 202N SHALL REPLACE MUELLER FOR PIPE DIA. 12" AND UP
3. SERVICE SADDLES SHALL HAVE TWO FLAT STRAPS (PER UCW SPECIFICATION SECTION 5, 5.01, B)
4. EXISTING SERVICES BEING CONNECTED TO NEW LINES SHALL BE ONE CONTINUOUS ROLL OF COPPER
5. MINIMUM 18-INCH SEPARATION BETWEEN SERVICE CONNECTION AND MECHANICAL JOINT FITTINGS

APPROVED SERVICE HARDWARE			
		MUELLER	FORD
SADDLE	2" PVC	H-13420	S70
	UP TO 8"	SEE NOTE	FC 101
BALL CORPORATION		B-25008	FB1000G
YOKE		H-5020	Y 502
ANGLE BALL VALVE		B-24273	BA94-323WG
CHECK VALVE		H-14247-A	HHS91-323
CONNECTORS	COPPER	STYLE 110	GRIP JOINT
EXPANSION CONNECTION			EC 23



UNION COUNTY WATER

STANDARD DETAIL

SERVICE CONNECTION

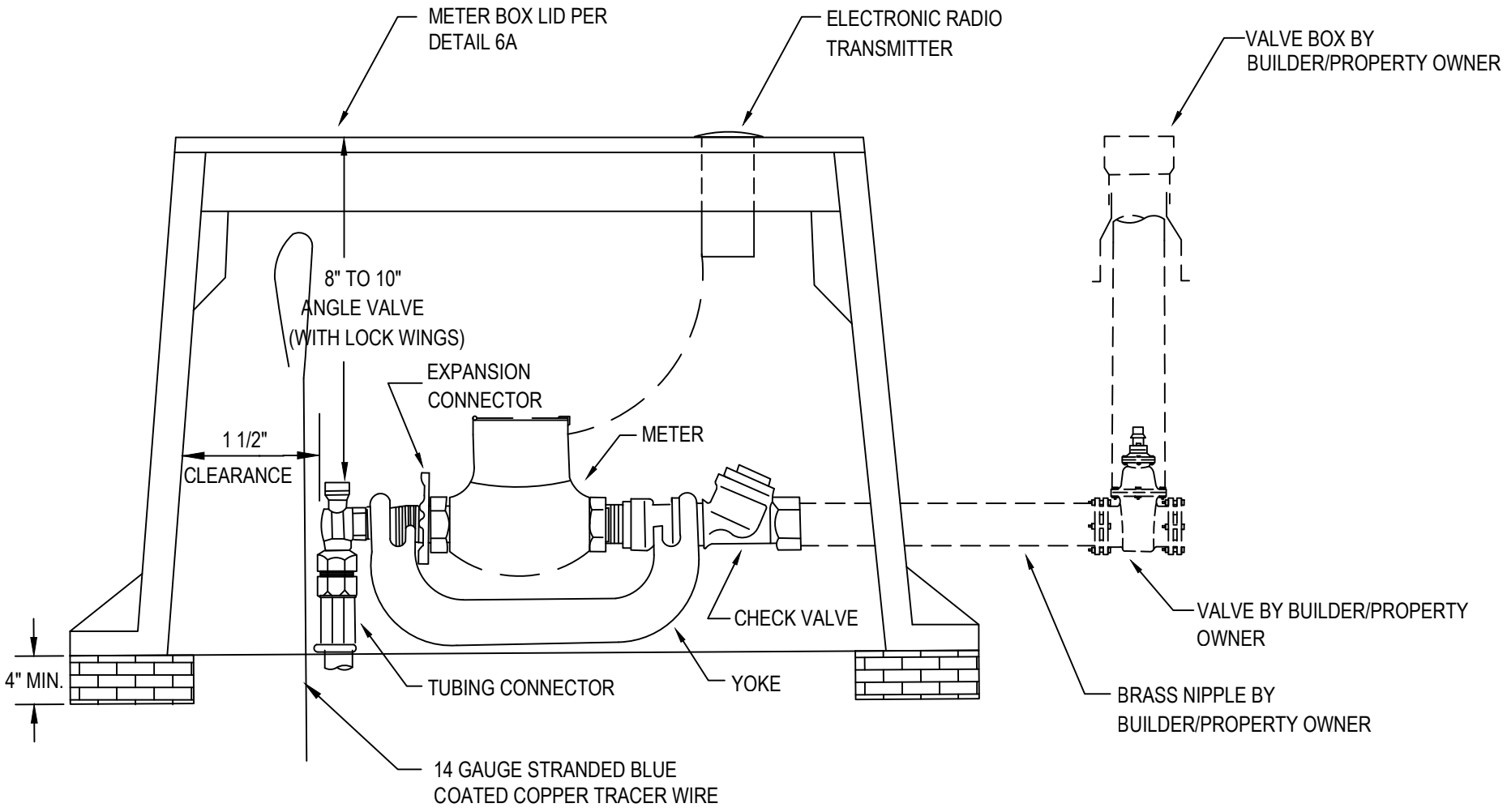
SCALE: N.T.S.

DATE: 09-13-24

5

GENERAL NOTES

1. BUILDER/PROPERTY OWNER TO INSTALL NIPPLE, VALVE AND VALVE BOX BEFORE METER WILL BE SET.
2. FOR SUBDIVISION WITH SIDEWALKS EXTEND COPPER TUBING AFTER THE METER BOX 2 FT BEYOND PROPOSED SIDEWALK
3. CONTRACTOR SHALL USE ONE CONTINUOUS ROLL OF COPPER FROM TAP TO METER. NO SPLICING IS PERMITTED
4. METER AND ERT BY UNION COUNTY AT PREVAILING RATE



UNION COUNTY WATER

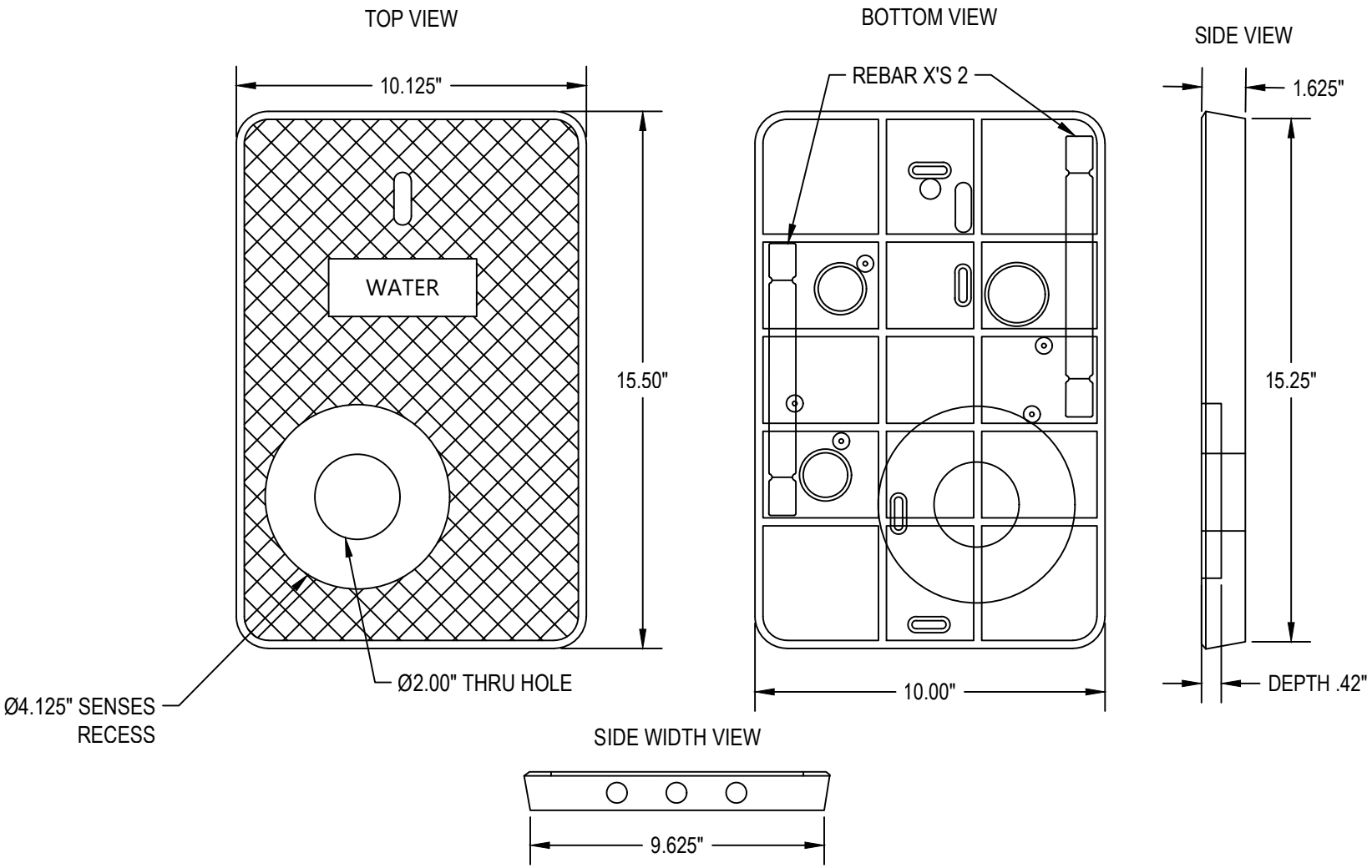
STANDARD DETAIL

METER INSTALLATION FOR ¾" AND 1" METERS

SCALE: N.T.S.

DATE: 09-13-24

6



UNION COUNTY WATER

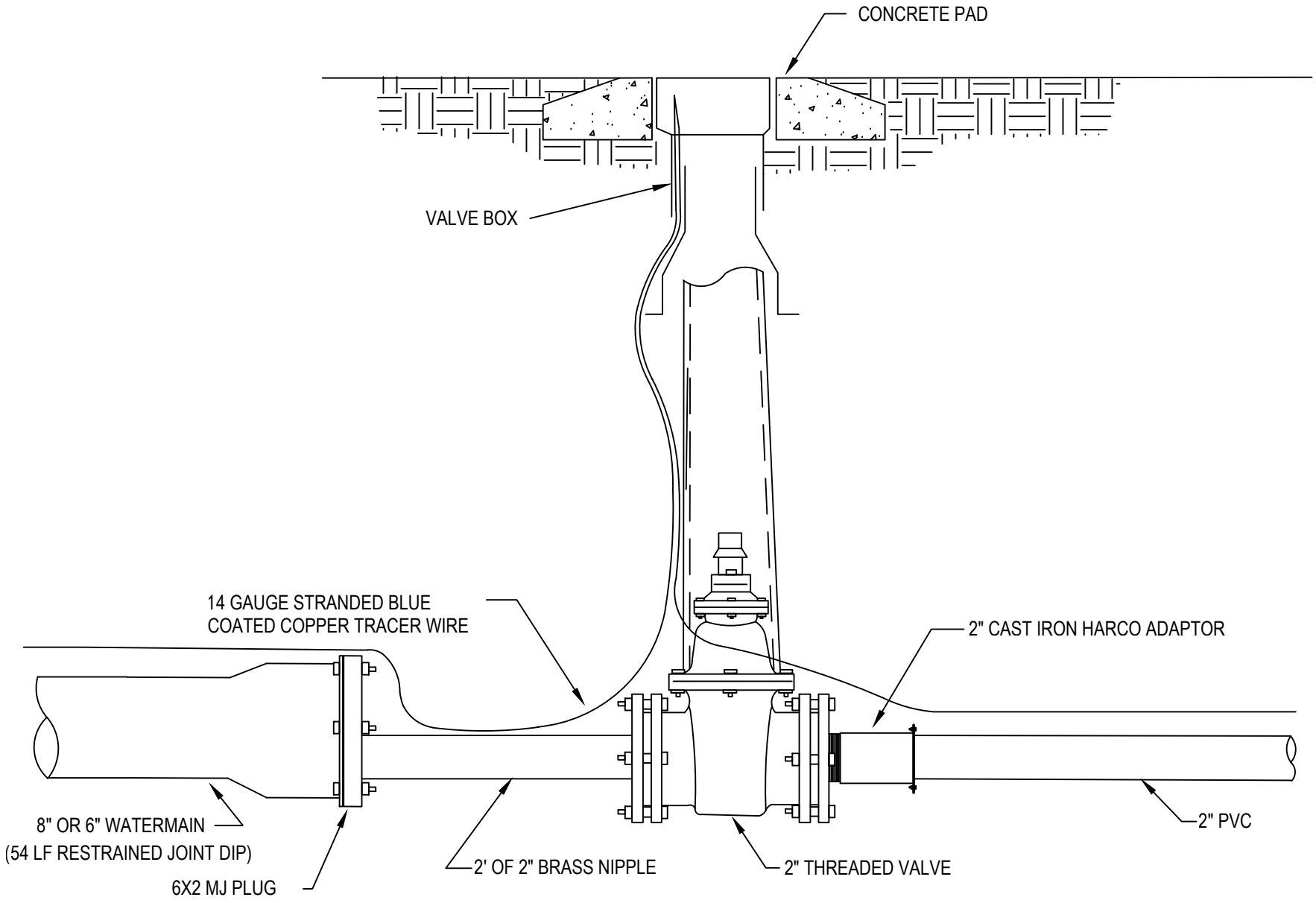
STANDARD DETAIL

METER BOX LID FOR ¾" AND 1" METERS

SCALE: N.T.S.

DATE: 02/06/20

6A



UNION COUNTY WATER

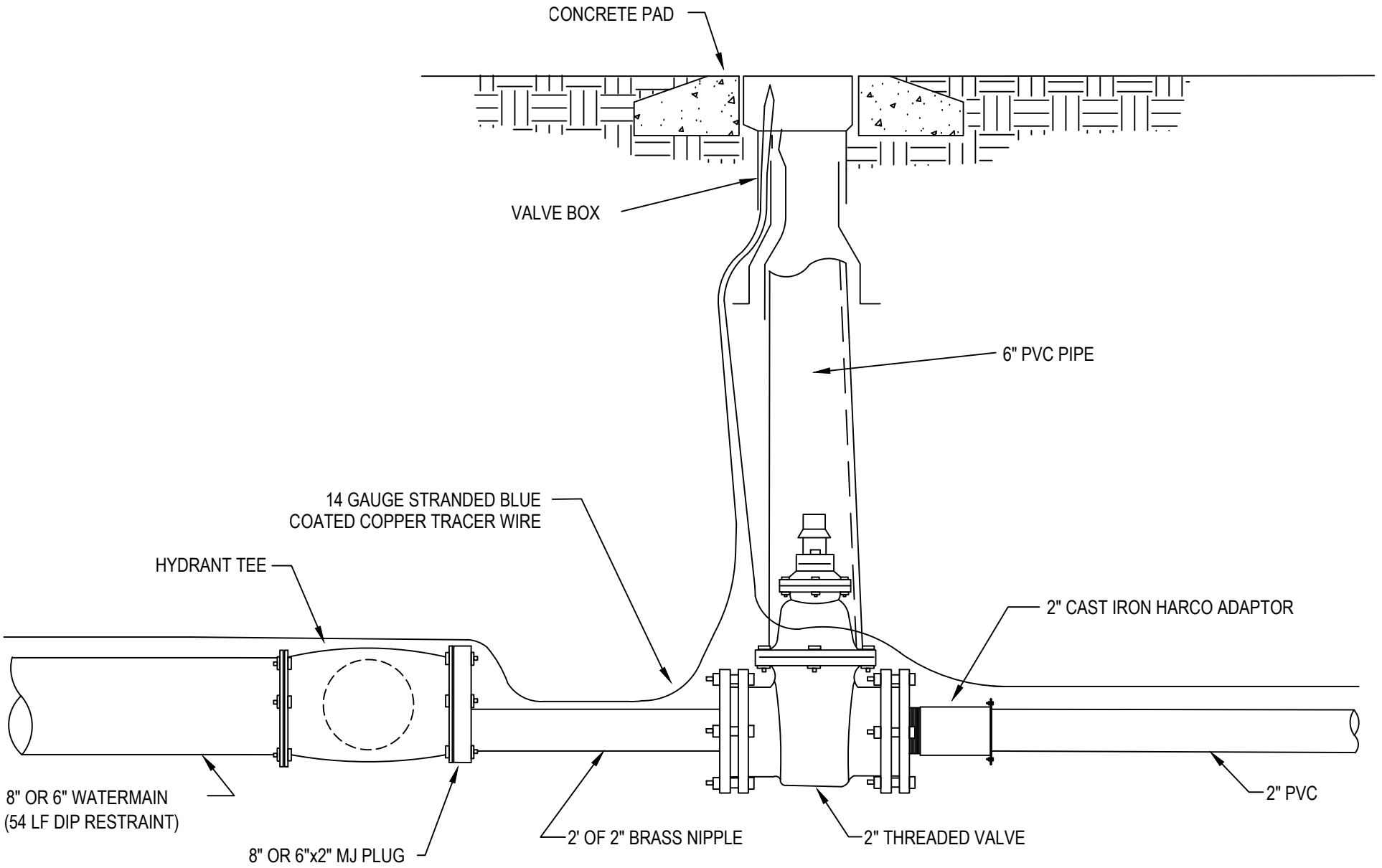
STANDARD DETAIL

8" OR 6" x 2" REDUCER

SCALE: N.T.S.

DATE: 10-04-11

7



UNION COUNTY WATER

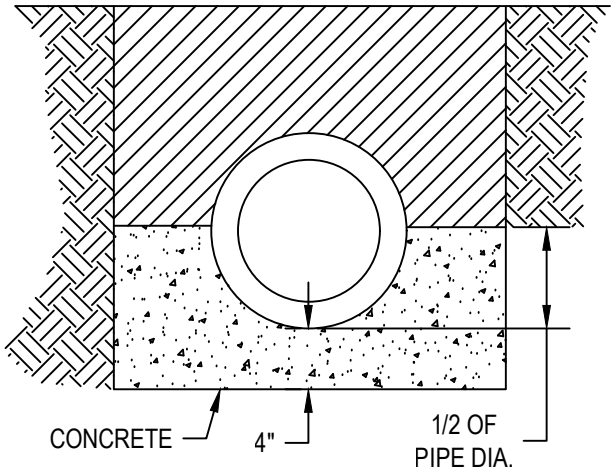
STANDARD DETAIL

HYDRANT TEE x 2" REDUCER

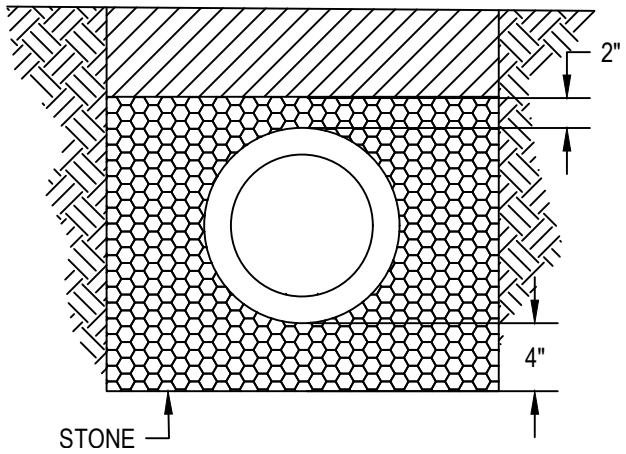
SCALE: N.T.S.

DATE: 10-04-11

7A



CLASS A



CLASS B

NOTES:
ALL CONCRETE = 3000 PSI
ALL STONE = N.C.D.O.T. NO. 67

UNION COUNTY WATER

STANDARD DETAIL

PIPE BEDDING

SCALE: N.T.S.

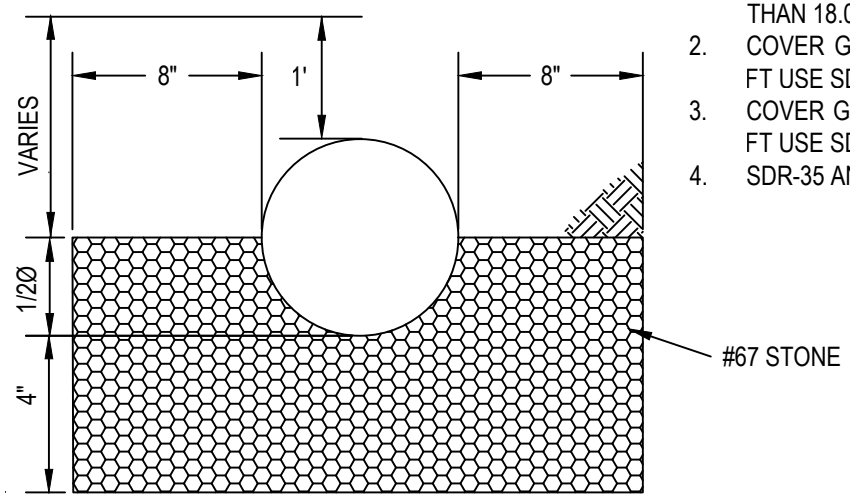
DATE: 11-17-06

8

NOTES

1. CAREFULLY COMACTED BACK FILL 1 FT ABOVE PIPE
2. NO STONES LARGER THAN # 67 SONE SHALL BE USED IN SELECT BACKFILL
3. 14 GA. STANDARD BLUE COATED COPPER TRACER WIRE STALL BE INSTALLED MANHOLE TO MANHOLE
4. MINIMUM PIPE SLOPE IS 0.50%

GRAVITY SEWER - BEDDING DETAIL



REQUIRED MATERIAL FOR DEPTH OF BURY:

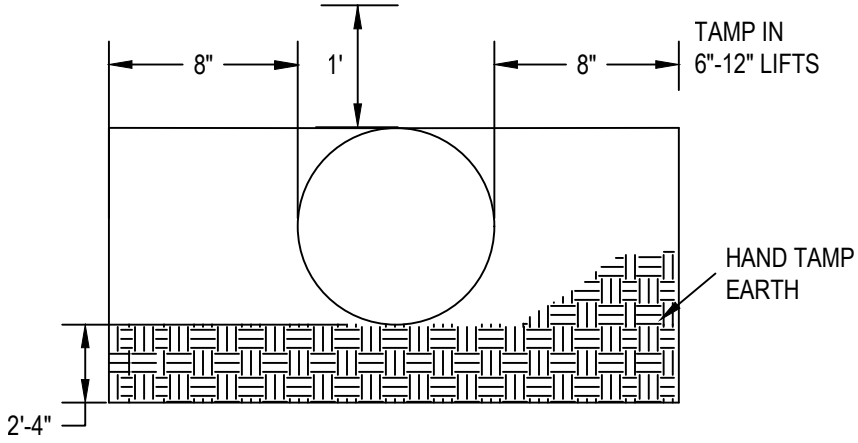
1. COVER GREATER LESS THAN 3.0 FT OR GREATER THAN 18.0 FT USE DUCTILE IRON PIPE
2. COVER GREATER THAN 3.0 FT BUT LESS THAN 10.0 FT USE SDR-35
3. COVER GREATER THAN 10.0 FT BUT LESS THAN 18.0 FT USE SDR-26
4. SDR-35 AND SDR-26 REQUIRED CELL CLASS 12454

CLASS C

GRAVITY SEWER MINIMUM COVER IS 3.0' AND MAXIMUM COVER IS 14.0' UNLESS PRIOR APPROVAL IS GRANTED BY UCW

NOTES

1. CAREFULLY COMACTED BACK FILL 1 FT ABOVE PIPE
2. 14 GA. STANDARD BLUE COATED COPPER TRACER WIRE STALL BE INSTALLED VALVE BOX TO VALVE BOX
4. PIPE 8-IN AND LESSER MINIMUM RESTRAINED JOINT DIP LENGTH 54 LF.
5. PIPE 12-IN AND LARGER LENGTH TO BE DETERMINED BY ENGINEER. MINIMUM LENGTH OF RESTRAINT JOINT DIP 54 LF FINAL



FORCE MAIN

FORCE MAIN MINIMUM COVER IS 3.0' AND MAXIMUM COVER IS 5.0' UNLESS PRIOR APPROVAL IS GRANTED BY UCW

UNION COUNTY WATER

STANDARD DETAIL

SEWER BEDDING

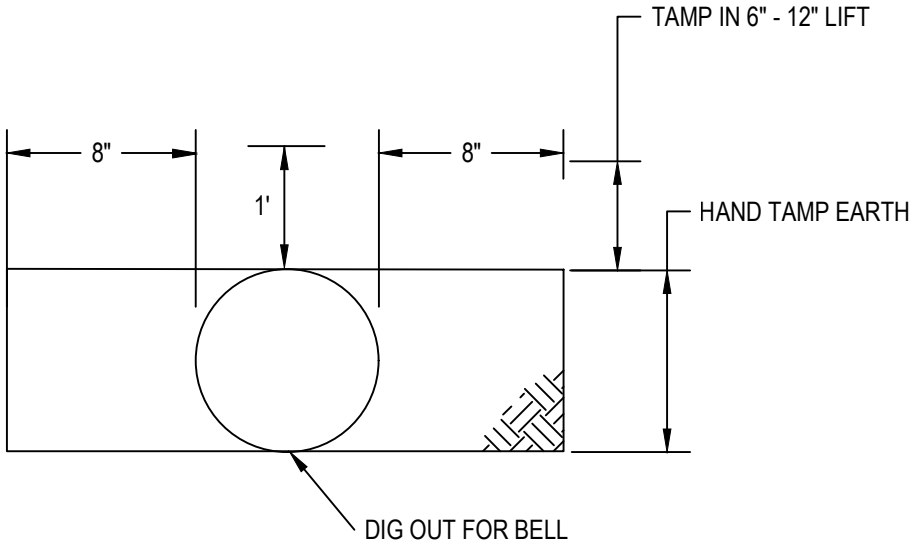
SCALE: N.T.S.

DATE: 09-13-24

8A

NOTES

1. 2" PVC SDR 21
2. 6"-8" PVC SDR 18
3. 12" OR LARGER DIP
4. CAREFULLY COMACTED BACK FILL 1 FT ABOVE PIPE
5. NO STONES LARGER THAN # 67 SONE SHALL BE USED IN SELECT BACKFILL
6. 14 GA. STANDARD BLUE COATED COPPER TRACER WIRE STALL BE INSTALLED VALVE TO VALVE
7. PIPE 8-IN AND LESSER MINIMUM RESTRAINED JOINT DIP LENGTH 54 LF.
8. PIPE 12-IN AND LARGER MINIMUM LENGTH OF RESTRAINT JOINT DIP 54 LF FINAL LENGTH TO BE DETERMINED BY ENGINEER.



WATER MAIN MINIMUM COVER IS 3.0' AND MAXIMUM COVER IS 6.0' UNLESS PRIOR APPROVAL IS GRANTED BY UCW

UNION COUNTY WATER

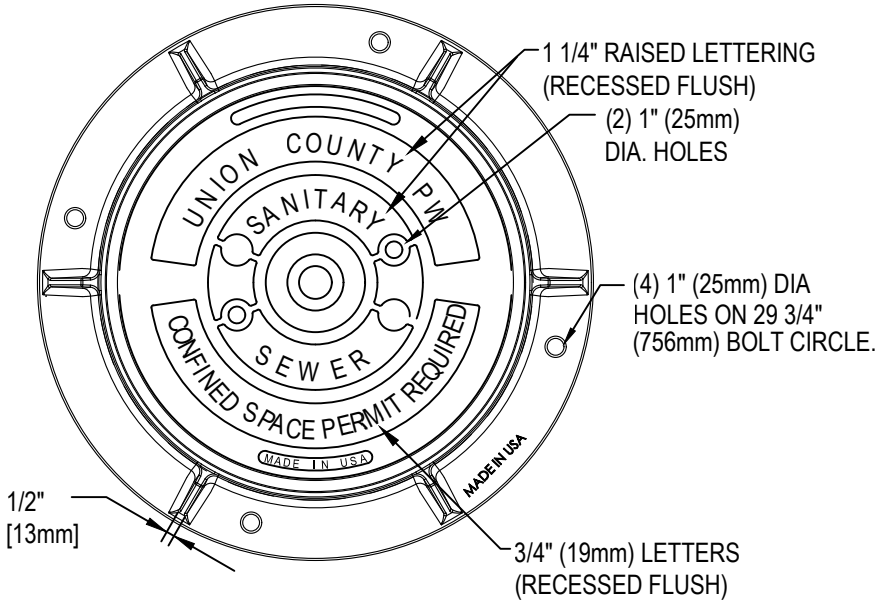
STANDARD DETAIL

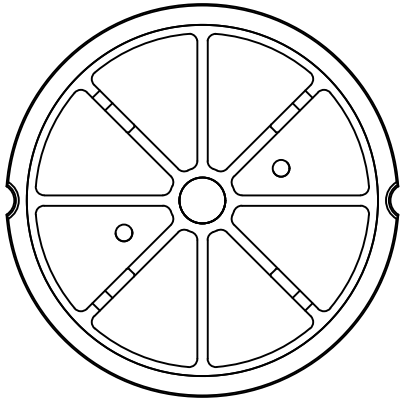
WATER TRENCH

SCALE: N.T.S.

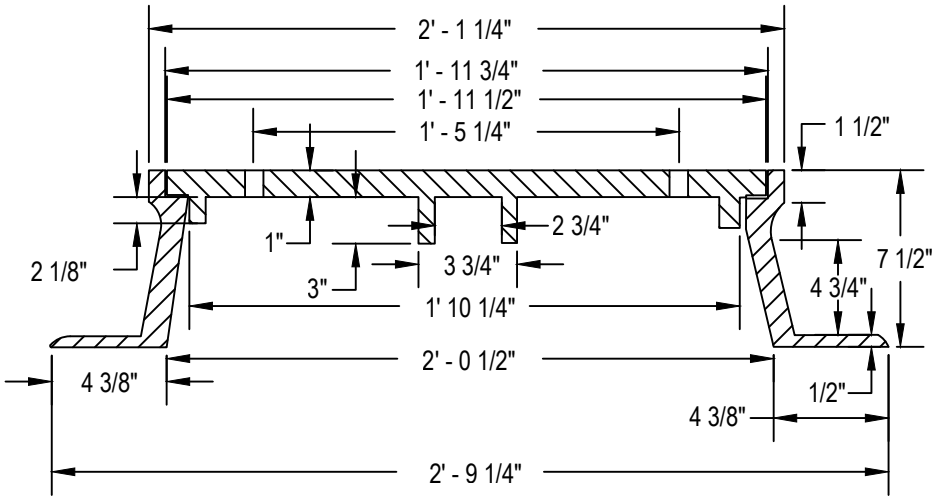
DATE: 09-13-24

8B





BOTTOM VIEW



(U.S. FOUNDRY - 669, VULCAN - 1384 OR EQUAL)

NOTES:

1. ALL CASTINGS TO BE FREE FROM SAND HOLES. NO PLUGGING ALLOWED.
2. MACHINE ALL CONTACT SURFACES BETWEEN RING AND COVER.
3. PROVIDE TWO VENT HOLES IN COVER, 1" DIA. TAPERED TO 1-1/8" ON REVERSE SIDE.
4. MINIMUM WEIGHTS: COVER - 120 LBS. RING - 190 LBS.
5. ALL MANHOLE RINGS OUT OF ROAD RIGHT OF WAY SHALL BE BOLTED INTO MANHOLE WITH 5/8" DIAMETER KWIK BOLT STUD ANCHOR SYSTEM. HILTI BRAND OR APPROVED EQUAL.

UNION COUNTY WATER

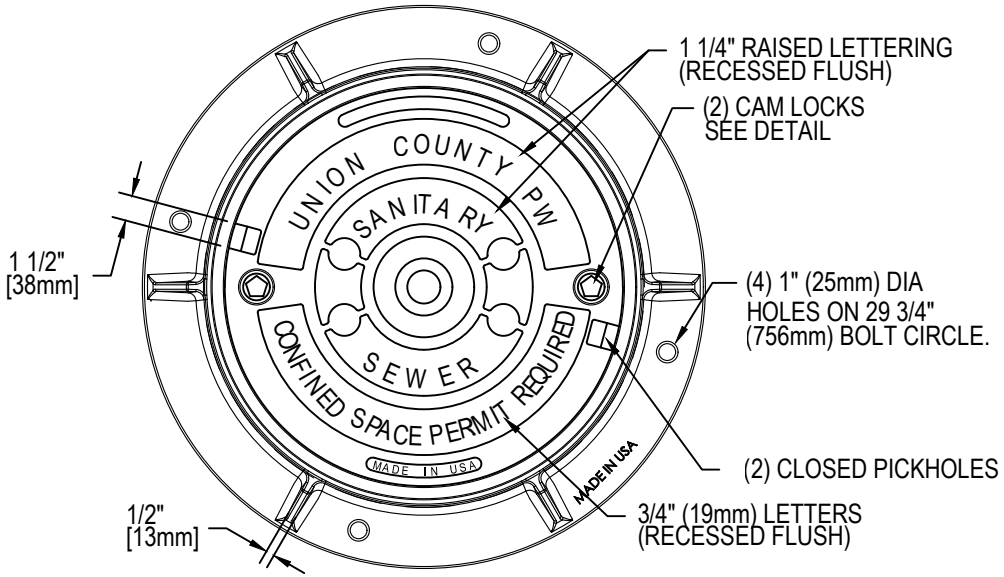
STANDARD DETAIL

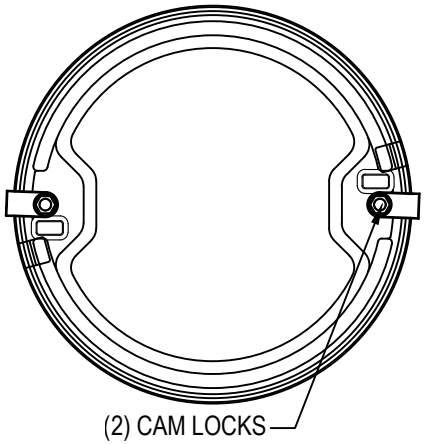
RING AND COVER

SCALE: N.T.S.

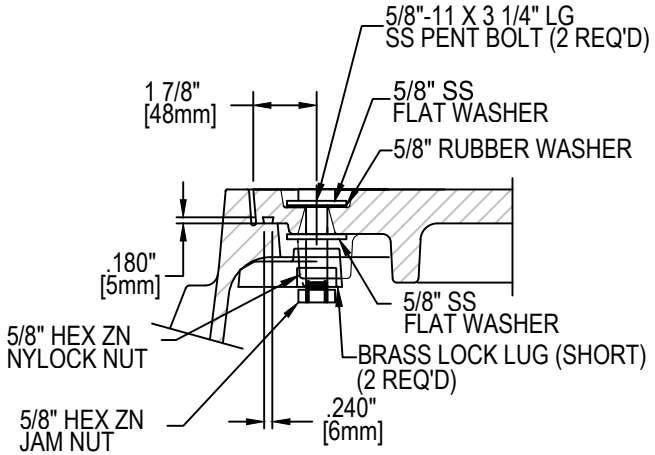
DATE: 09-09-11

9

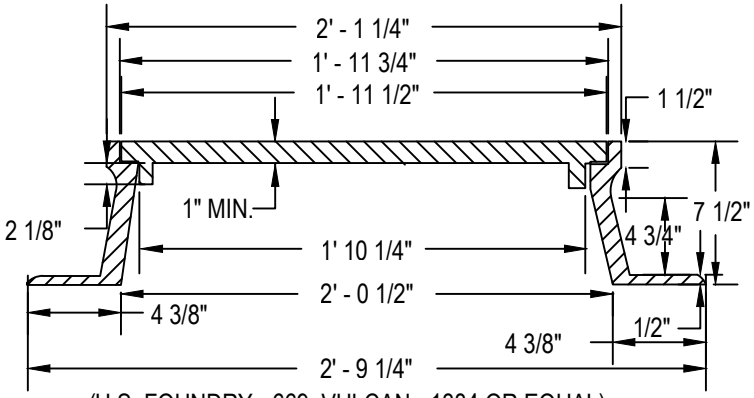




BOTTOM VIEW



CAM & GASKET GROOVE
DETAIL



(U.S. FOUNDRY - 669, VULCAN - 1384 OR EQUAL)

NOTES:

1. ALL CASTINGS TO BE FREE FROM SAND HOLES. NO PLUGGING ALLOWED.
2. MACHINE ALL CONTACT SURFACES BETWEEN RING AND COVER.
3. PROVIDE 2 CLOSED PICKHOLES
4. MINIMUM WEIGHTS: COVER - 95 LBS. RING - 190 LBS.
5. ALL MANHOLE RINGS OUT OF ROAD RIGHT OF WAY SHALL BE BOLTED INTO MANHOLE WITH 5/8" DIAMETER KWIK BOLT STUD ANCHOR SYSTEM. HILTI BRAND OR APPROVED EQUAL.

UNION COUNTY WATER

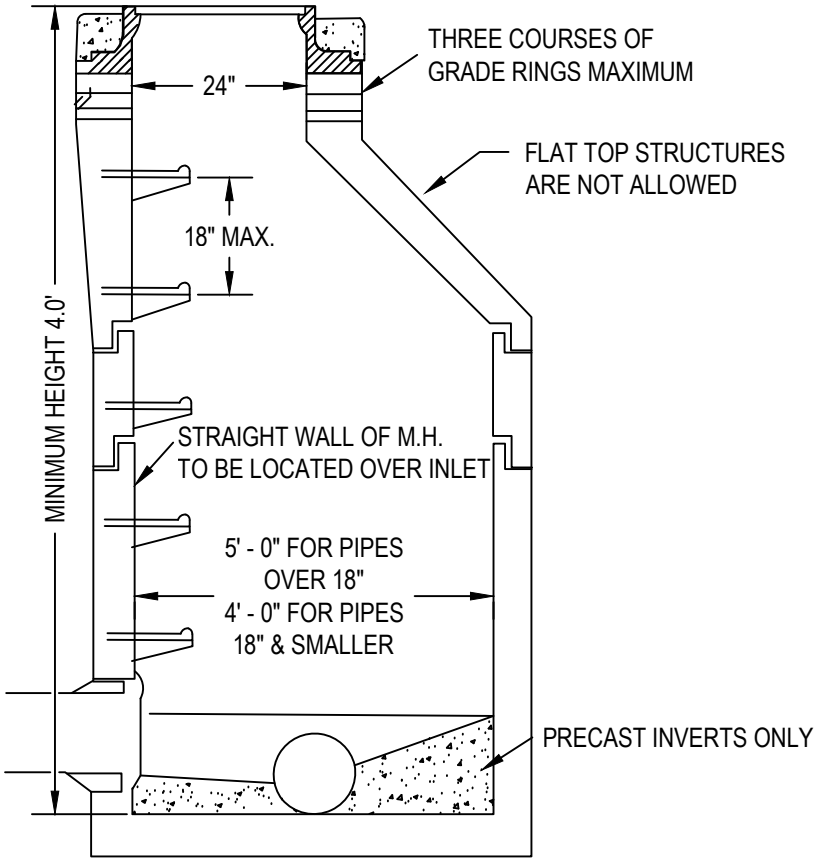
STANDARD DETAIL

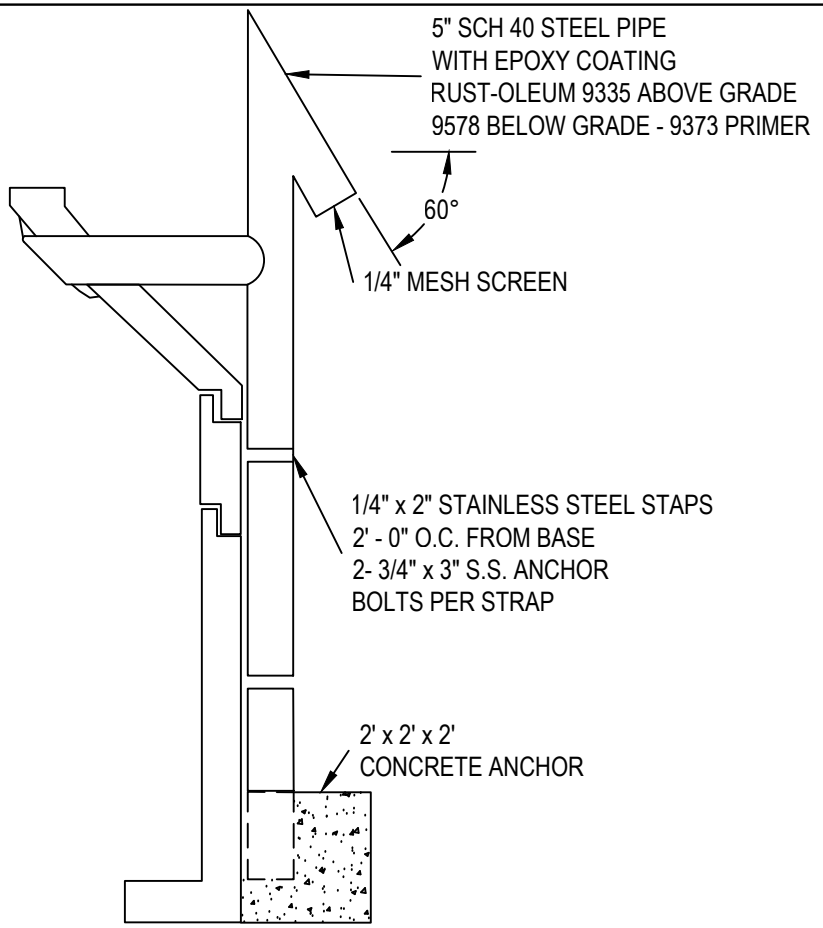
RING AND COVER FOR SEALED MANHOLES

SCALE: N.T.S.

DATE: 09-25-12

9A





NOTES:

1. 1 ROLL OF MASTIC AND A 6" EXTERNAL JOINT/SEAM WRAP INSTALLED ON EACH MANHOLE SECTION
2. MANHOLE VACUUM TESTING - AFTER EACH MANHOLE IS INSTALLED AND ALL PIPES ARE CONNECTED, BUT BEFORE BACKFILLING, THE MANHOLE SHALL BE VACUUM TESTED. ALL PIPES ENTERING THE MANHOLE SHALL BE PLUGGED AND BRACED. THE CONTRACTOR SHALL FURNISH ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO PERFORM THE TESTING. A VACUUM OF 10 INCHES OF MERCURY SHALL BE CREATED ON THE INSIDE OF THE MANHOLE. AT THE VACUUM OF 10 INCHES OF MERCURY, THE PUMP SHALL BE STOPPED AND THE TIME SHALL BE MEASURED FOR THE VACUUM TO DROP TO 9 INCHES. FAILURE OF THE TEST SHALL BE ANY AMOUNT OF TIME LESS THAN THE FOLLOWING.
   4 FT. DIAMETER MANHOLE = 60 SECONDS — 7 FT. DIAMETER MANHOLE = 105 SECONDS
   5 FT. DIAMETER MANHOLE = 75 SECONDS — 8 FT. DIAMETER MANHOLE = 120 SECONDS
   6 FT. DIAMETER MANHOLE = 90 SECONDS — 10 FT. DIAMETER MANHOLE = 150 SECONDS
   UPON TEST FAILURE, THE CONTRACTOR SHALL REPAIR ALL LEAKS AND RETEST THE MANHOLE UNTIL THE TEST HAS PASSED.
3. 0.20' INSIDE DROP REQUIRED
4. INSTALL MANHOLE RIM AT 0.10' ABOVE GRADE IN LANDSCAPED AREAS AND WHILE ADJACENT TO RIGHTS-OF-WAY
5. INSTALL MANHOLE RIM AT 2.0' ABOVE GRADE IN SEWER EASEMENTS THAT ARE NOT LANDSCAPED.

UNION COUNTY WATER

STANDARD DETAIL

MANHOLE

SCALE: N.T.S.

DATE: 09-13-24

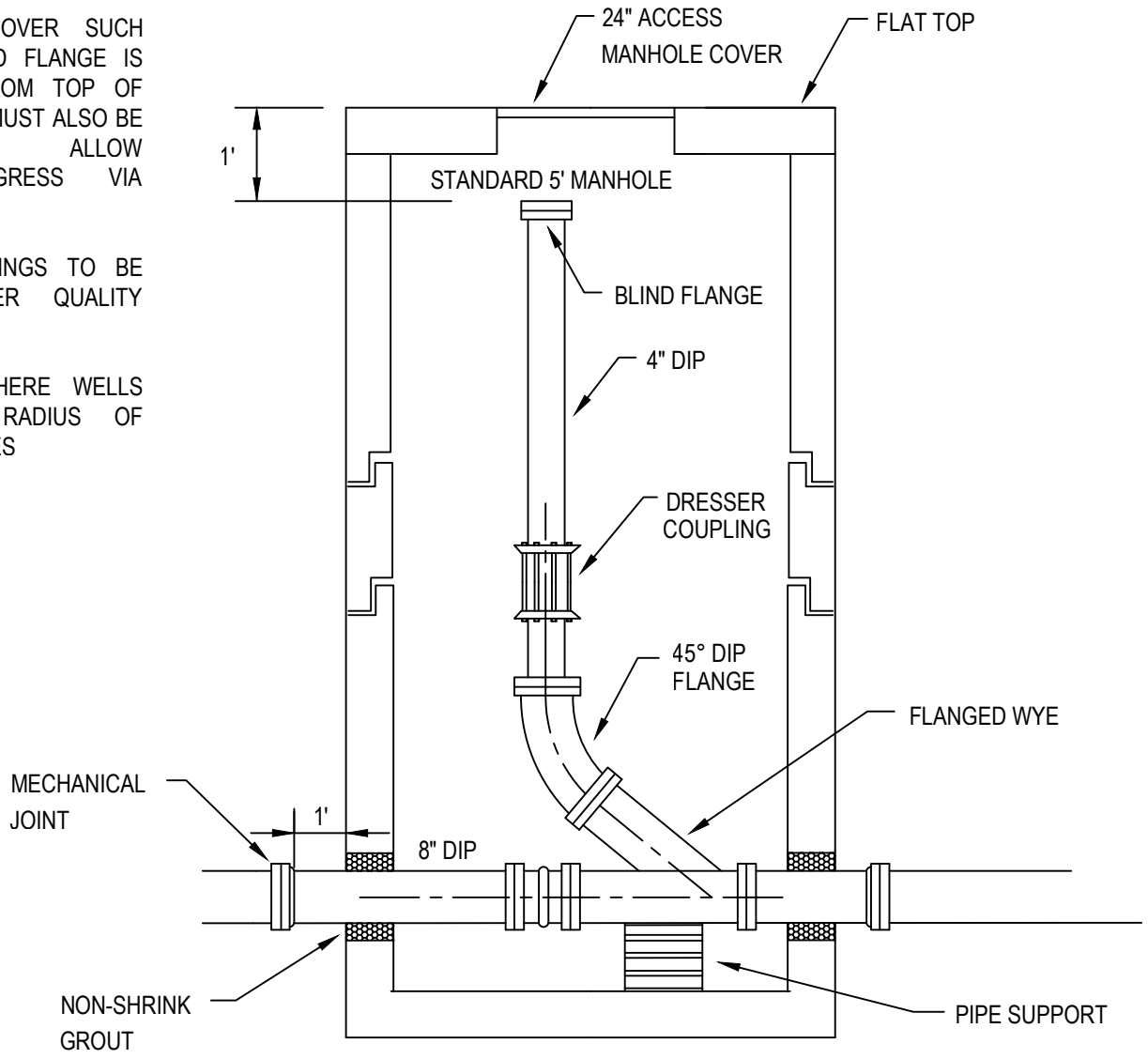
10

NOTES:

1. LOCATE ACCESS COVER SUCH THAT THE BLIND FLANGE IS ACCESSIBLE FROM TOP OF MANHOLE. COVER MUST ALSO BE IN A POSITION TO ALLOW MANHOLE INGRESS/EGRESS VIA MANHOLE STEPS.

2. ALL PIPE AND FITTINGS TO BE TESTED TO WATER QUALITY STANDARDS.

3. FOR USE ONLY WHERE WELLS ARE WITHIN 100 FEET RADIUS OF SEWER LINE/MANHOLES



UNION COUNTY WATER

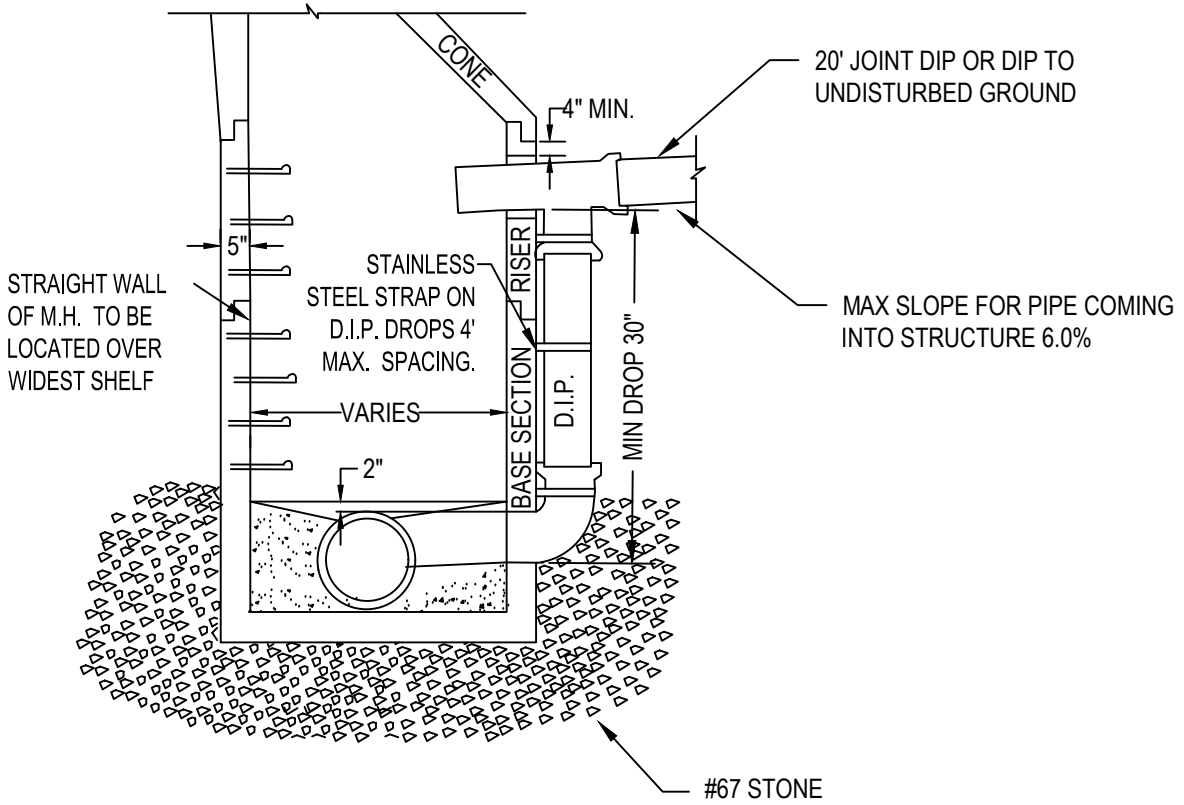
STANDARD DETAIL

CLEANOUT MANHOLE

SCALE: N.T.S.

DATE: 07-29-08

10A



GENERAL NOTES

1. CARE MUST BE TAKEN TO FORM A SMOOTH FINISHED TROUGH FROM ENTRANCE PIPES TO EXIT PIPE, AND IN CURVED MANHOLES THE TROUGH MUST BE A SMOOTH CIRCULAR ARC TANGENT TO THE INSIDE WALLS OF THE PIPES AT THEIR ENDS.
2. THE SLOPE OF THE OUTSIDE DROP TROUGH SHALL BE 1/4" PER FOOT.
3. ALL PIPE OPENINGS TO BE NO GREATER THAN 3" LARGER THAN O.D. OF PIPE AND ADDITIONALLY REINFORCED WITH A MINIMUM OF 0.20 SQ. IN. OF STEEL AT 90 DEGREES. PIPE TO BE CENTERED IN OPENINGS. ADDITIONAL REINFORCING NOT REQUIRED FOR CORED OPENINGS.
4. OUTSIDE DROP SHALL NOT ENTER MANHOLE IN CONE SECTION.
5. MATCH DROP INFLUENT CROWN TO CROWN WITH EFFLUENT PIPE.
6. 0.20' INSIDE DROP REQUIRED
7. INSTALL MANHOLE RIM AT 0.10' ABOVE GRADE IN LANDSCAPED AREAS AND WHILE ADJACENT TO RIGHTS-OF-WAY
8. INSTALL MANHOLE RIM AT 2.0' ABOVE GRADE IN SEWER EASEMENTS THAT ARE NOT LANDSCAPED.

UNION COUNTY WATER

STANDARD DETAIL

OUTSIDE DROP MANHOLE

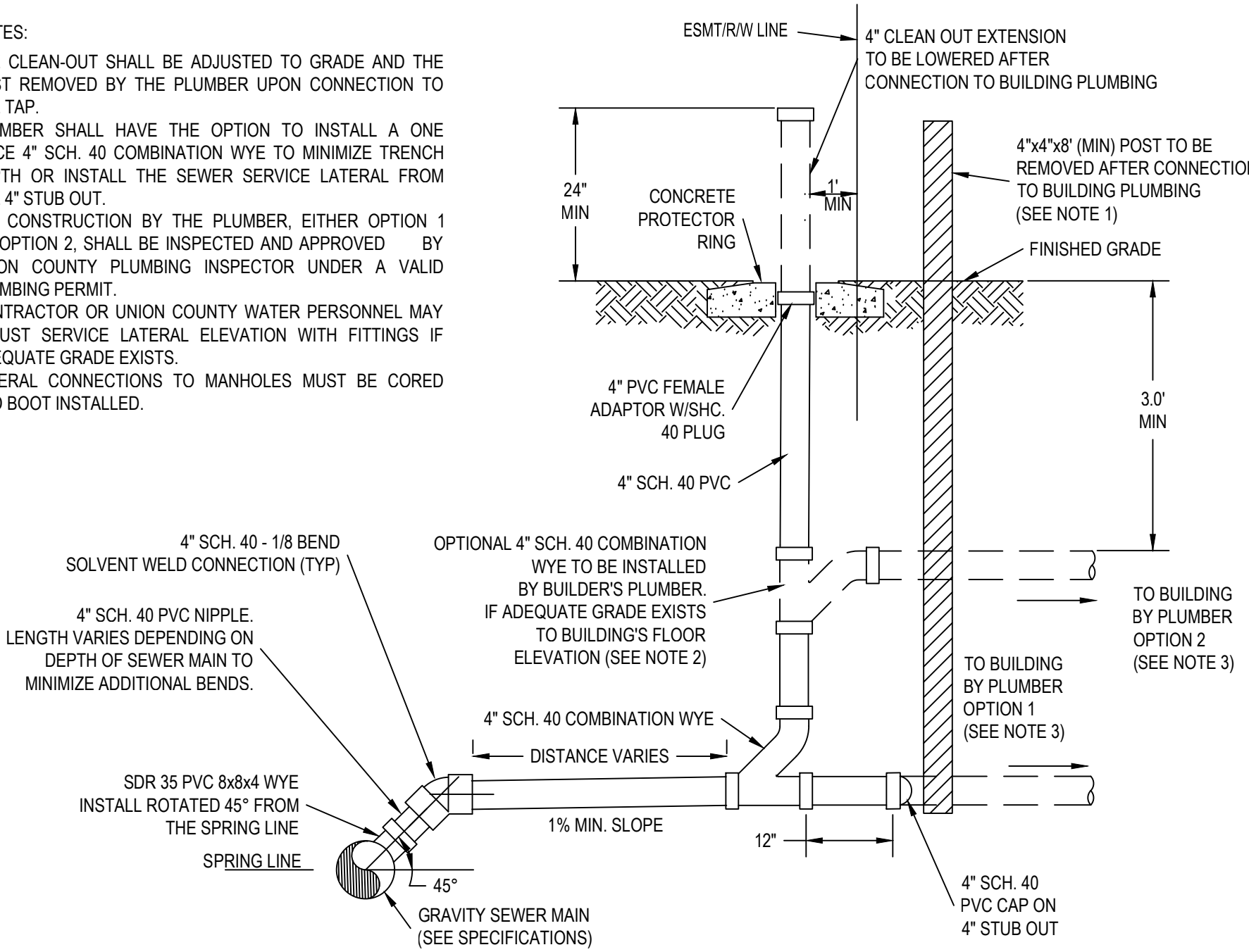
SCALE: N.T.S.

DATE: 09-13-24

10B

NOTES:

1. THE CLEAN-OUT SHALL BE ADJUSTED TO GRADE AND THE POST REMOVED BY THE PLUMBER UPON CONNECTION TO THE TAP.
2. PLUMBER SHALL HAVE THE OPTION TO INSTALL A ONE PIECE 4" SCH. 40 COMBINATION WYE TO MINIMIZE TRENCH DEPTH OR INSTALL THE SEWER SERVICE LATERAL FROM THE 4" STUB OUT.
3. ALL CONSTRUCTION BY THE PLUMBER, EITHER OPTION 1 OR OPTION 2, SHALL BE INSPECTED AND APPROVED BY UNION COUNTY PLUMBING INSPECTOR UNDER A VALID PLUMBING PERMIT.
4. CONTRACTOR OR UNION COUNTY WATER PERSONNEL MAY ADJUST SERVICE LATERAL ELEVATION WITH FITTINGS IF ADEQUATE GRADE EXISTS.
5. LATERAL CONNECTIONS TO MANHOLES MUST BE CORED AND BOOT INSTALLED.



UNION COUNTY WATER

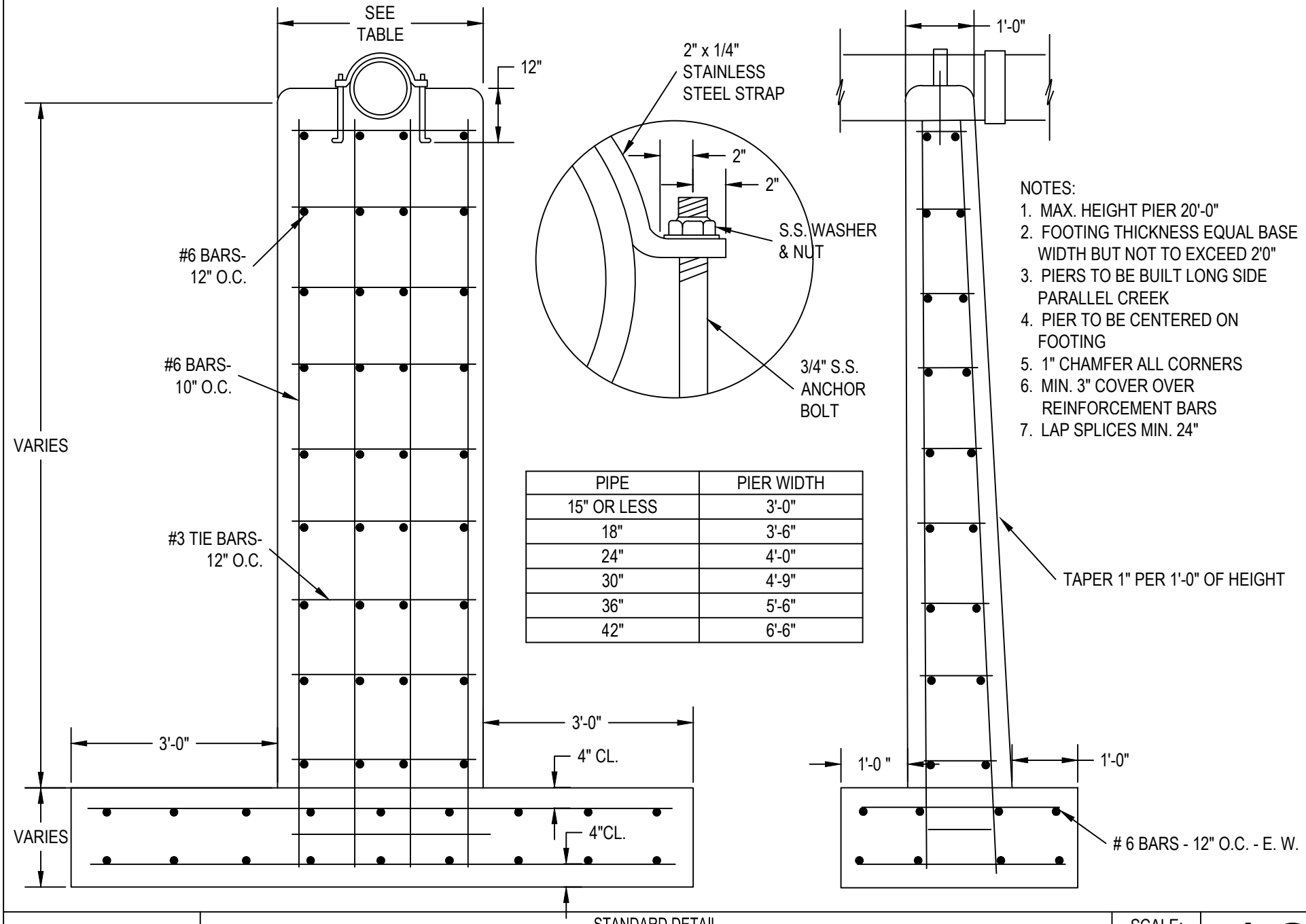
STANDARD DETAIL

SEWER LATERAL

SCALE: N.T.S.

DATE: 02-19-14

11



NOTES:

1. MAX. HEIGHT PIER 20'-0"
2. FOOTING THICKNESS EQUAL BASE WIDTH BUT NOT TO EXCEED 2'0"
3. PIERS TO BE BUILT LONG SIDE PARALLEL CREEK
4. PIER TO BE CENTERED ON FOOTING
5. 1" CHAMFER ALL CORNERS
6. MIN. 3" COVER OVER REINFORCEMENT BARS
7. LAP SPLICES MIN. 24"

PIPE	PIER WIDTH
15" OR LESS	3'-0"
18"	3'-6"
24"	4'-0"
30"	4'-9"
36"	5'-6"
42"	6'-6"

UNION COUNTY WATER

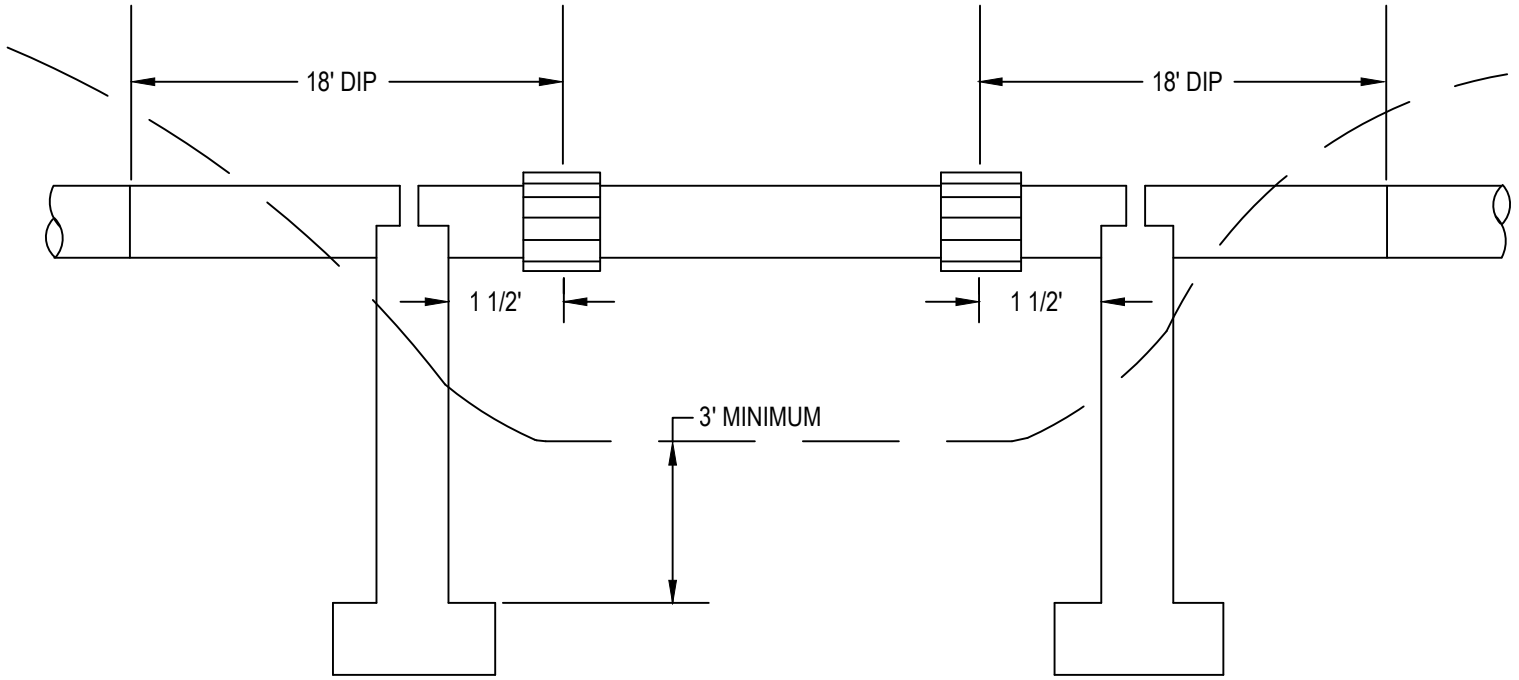
STANDARD DETAIL

REINFORCED CONCRETE PIERS

SCALE: N.T.S.

DATE: 11-17-06

12



NOTES:

1. AERIAL CREEK CROSSING REQUIRE PRIOR APPROVAL FROM UCW
2. TRANSITION COUPLINGS FROM STEELTO DUCTILE IRON PIPE TO BE ROCKWELL STYLE 441 OR EQUAL
3. DUCTILE IRON PIPE TO BE CLASS 52
4. STEEL PIPE TO BE ASTM A53, TYPE S, GRADE B MIN. THICKNESS = 0.250"
5. COATING:
   - (A) SURFACE PREP. SSPC-SP-6
   - (B) PRIMER-RUST-OLEUM 9373 2 MILLS D.F.T.
   - (C) INTERMEDIATE-RUST-OLEUM 9391-2 MILS D.F.T.
   - (D) FINISH-RUST-OLEUM 9582 2 COATS 6 MILS D.F.T.EACH

UNION COUNTY WATER

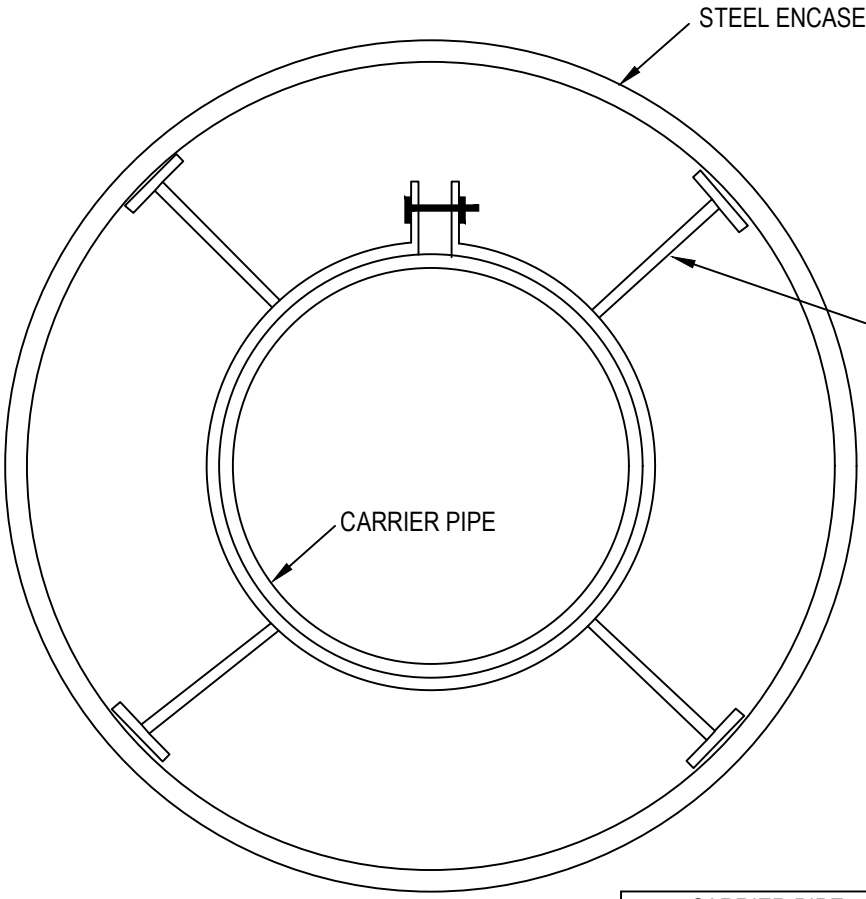
STANDARD DETAIL

AERIAL CREEK CROSSING

SCALE: N.T.S.

DATE: 11-17-06

13



SPIDER SUPPORT AND SPACER AVAILABLE FROM SPIDER MANUFACTURING, INC. INSTALL PER UNION COUNTY INSPECTOR AND PER MANUFACTURERS SPECIFICATIONS.

CONTRACTOR RESPONSIBLE FOR INSPECTING MATERIALS AND WELDS TO INSURE ALL SPIDERS WILL FUNCTION PROPERLY.

CARRIER PIPE	CASING PIPE I.D.	WALL THICKNESS
4"	8"	0.188"
6"	12"	0.188"
8"	16"	0.250"
10"	16"	0.250"
12"	20"	0.281"
16"	24"	0.344"
24"	30"	0.406"
30"	42"	0.500"
36"	48"	0.500"

NOTES:

1. NO PIPE SHALL BE SUPPORTED BY BELL.
2. END SECTIONS LESS THAN 4' MAY BE UNSUPPORTED.
3. WALL THICKNESS AS PER TABLE UNLESS OTHERWISE SHOWN ON PLAN.
4. MASONRY SEAL AT ENDS -- 2" x 4" WEEP HOLE AT LOW END
5. ALL PRESSURE PIPES TO HAVE TRACING WIRE IN ALL CASING BORES.

UNION COUNTY WATER

STANDARD DETAIL

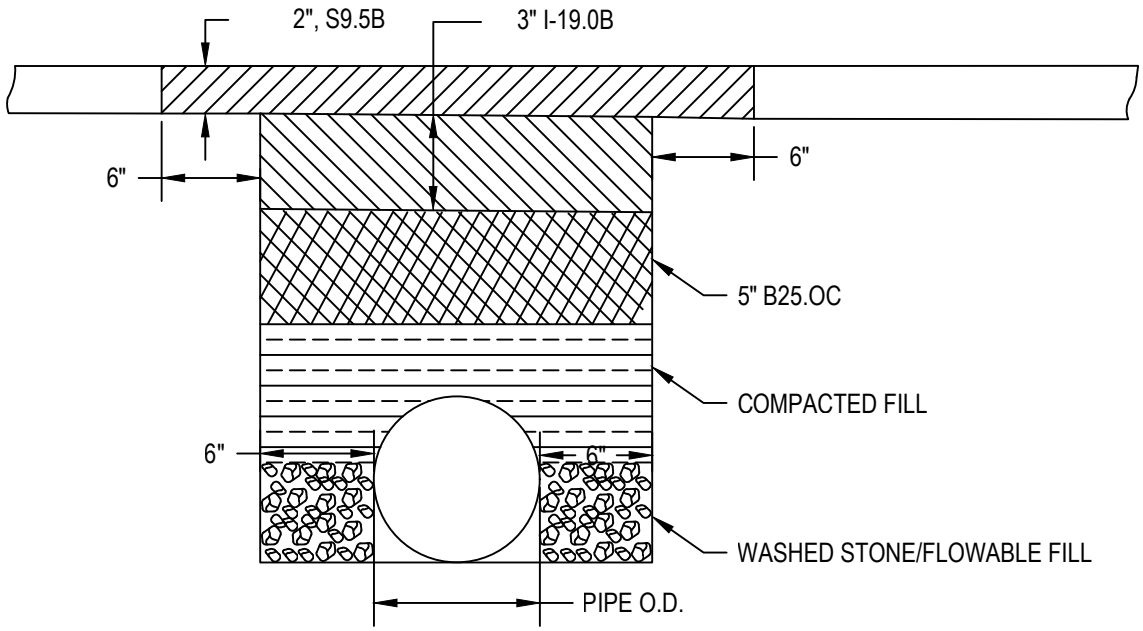
PIPE ENCASEMENT

SCALE: N.T.S.

DATE: 11-17-06

14

NOTE:
FOR CONCRETE PAVEMENT SUBSTITUTE 3500 PSI
CONCRETE TO MATCH EXISTING THICKNESS FOR
I-2 ASPHALT 4" ABC STONE FOR H BASE.



UNION COUNTY WATER

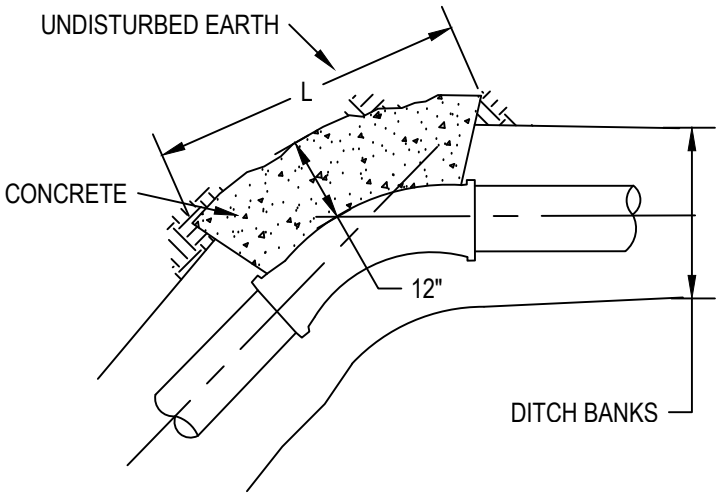
STANDARD DETAIL

PAVEMENT REPLACEMENT

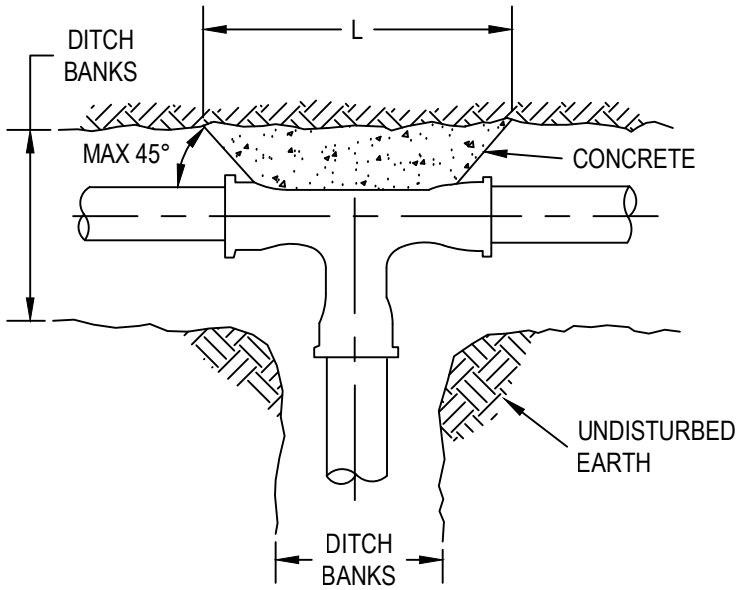
SCALE: N.T.S.

DATE: 11-07-14

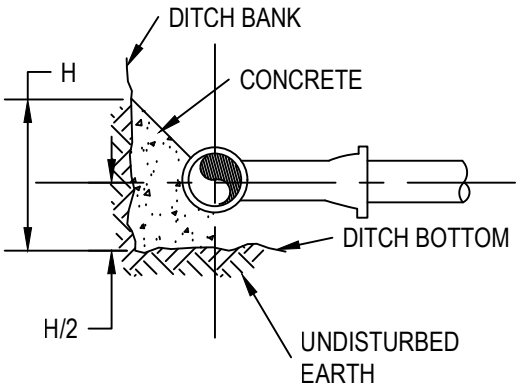
15



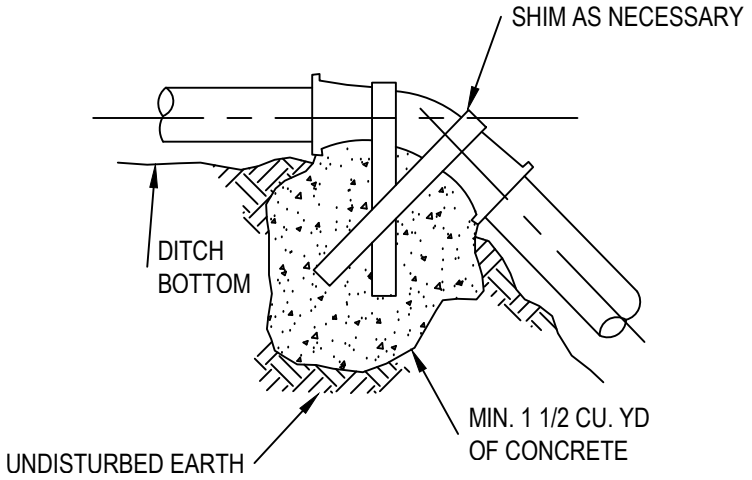
PLAN 45° BENDS
ALSO 90°, 22 1/2°, 11 1/2°



PLAN TEE



ELEVATION AT FITTINGS



VERTICAL BEND

UNION COUNTY WATER

STANDARD DETAIL

THRUST BLOCK

SCALE: N.T.S.

DATE: 11-17-06

16

ANCHORAGE SCHEDULE											
PIPE SIZE	11 1/4° BEND		22 1/2° BEND		45° BEND		90° BEND		TEE		TEST PRESSURE (P.S.I.)
	L	H	L	H	L	H	L	H	L	H	
6"	1'3"	1'0"	2'3"	1'0"	2'6"	1'6"	2'9"	1'6"	2'0"	1'6"	200
	1'6"	1'3"	2'3"	1'6"	3'0"	1'6"	4'0"	1'6"	3'0"	1'6"	300
8"	1'6"	1'6"	2'6"	1'9"	3'0"	2'0"	3'9"	2'0"	2'6"	2'0"	200
	2'0"	1'6"	3'0"	2'0"	3'9"	2'3"	4'6"	2'6"	3'6"	2'3"	300
12"	2'6"	1'9"	4'0"	2'3"	4'3"	3'0"	5'0"	3'3"	4'0"	3'0"	200
	3'6"	2'0"	5'3"	2'6"	6'0"	3'3"	7'0"	3'6"	5'0"	3'6"	300
14"	3'0"	1'0"	4'0"	3'0"	4'6"	3'9"	6'0"	3'9"	4'6"	3'6"	200
	4'0"	2'6"	5'3"	3'6"	6'0"	4'3"	6'6"	5'0"	5'0"	5'0"	300
16"	3'0"	2'9"	4'6"	3'6"	5'0"	4'6"	7'0"	4'3"	5'0"	4'0"	200
	4'0"	3'0"	6'3"	3'9"	6'5"	5'3"	8'0"	5'3"	7'6"	4'0"	300

NOTES:

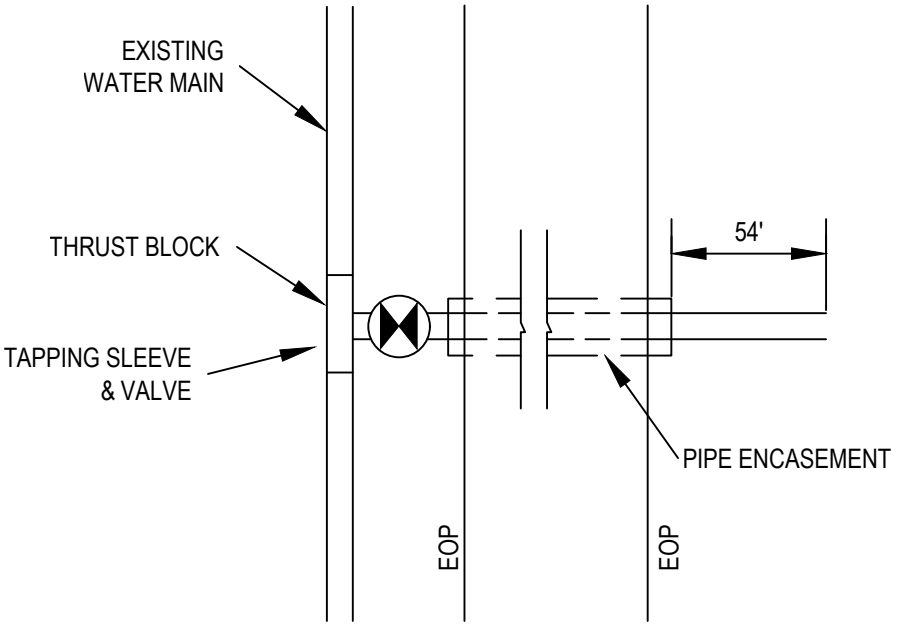
1. THRUST BLOCK DIMENSIONS BASED ON SOIL BEARING CAPACITY OF 2000 P.S.F. AND A WATER TEST PRESSURE OF 150 P.S.I. SIZES OF THRUST BLOCKS MAY BE REVISED BY THE ENGINEER WHERE BEARING CAPACITY OF SOIL VARIES.

2. PROVIDE TAR PAPER JOINT BETWEEN CONCRETE THRUST BLOCK AND PORTION OF PIPE BEING ANCHORED.

3. ALL CONCRETE THRUST BLOCKS SHALL BE 2500 P.S.I. CONCRETE.

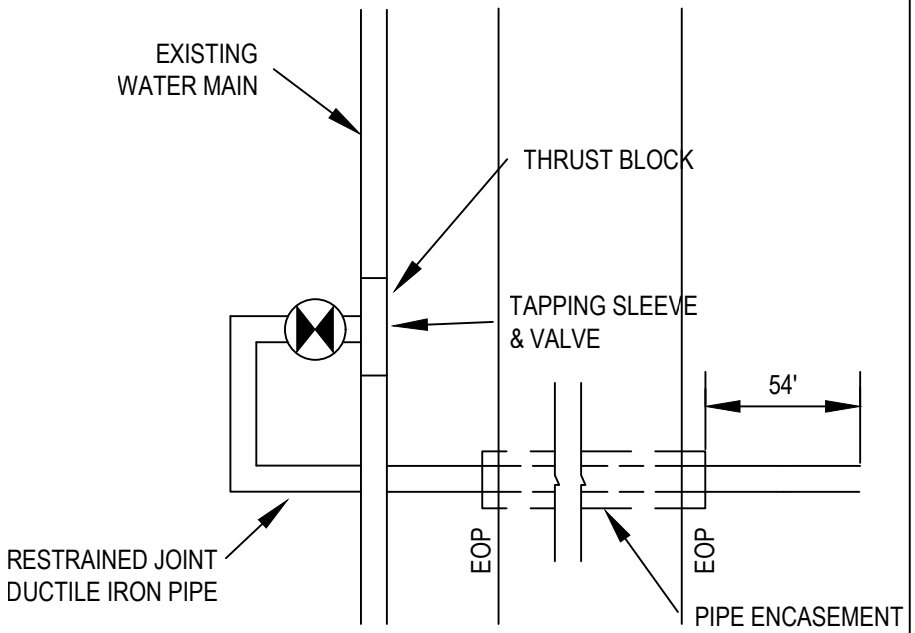
4. MAXIMUM VERTICAL DEFLECTION SHALL BE 22 1/2°.

5. JOINTS SHALL REMAIN FREE OF CONCRETE FOR INSPECTION, REPAIR OR REPLACEMENT OF JOINTS.



OPTION "A"

FRONT SIDE TAP



OPTION "B"

BACK SIDE TAP

NOTES:

1. OPTION "A" OR "B" WILL BE REQUIRED, DEPENDING ON THE AMOUNT OF SPACE AVAILABLE, TO BE FIELD VERIFIED.
2. RESTRAINED JOINT DUCTILE IRON PIPE REQUIRED FROM VALVE TO 54 LF BEYOND CASING.

UNION COUNTY WATER

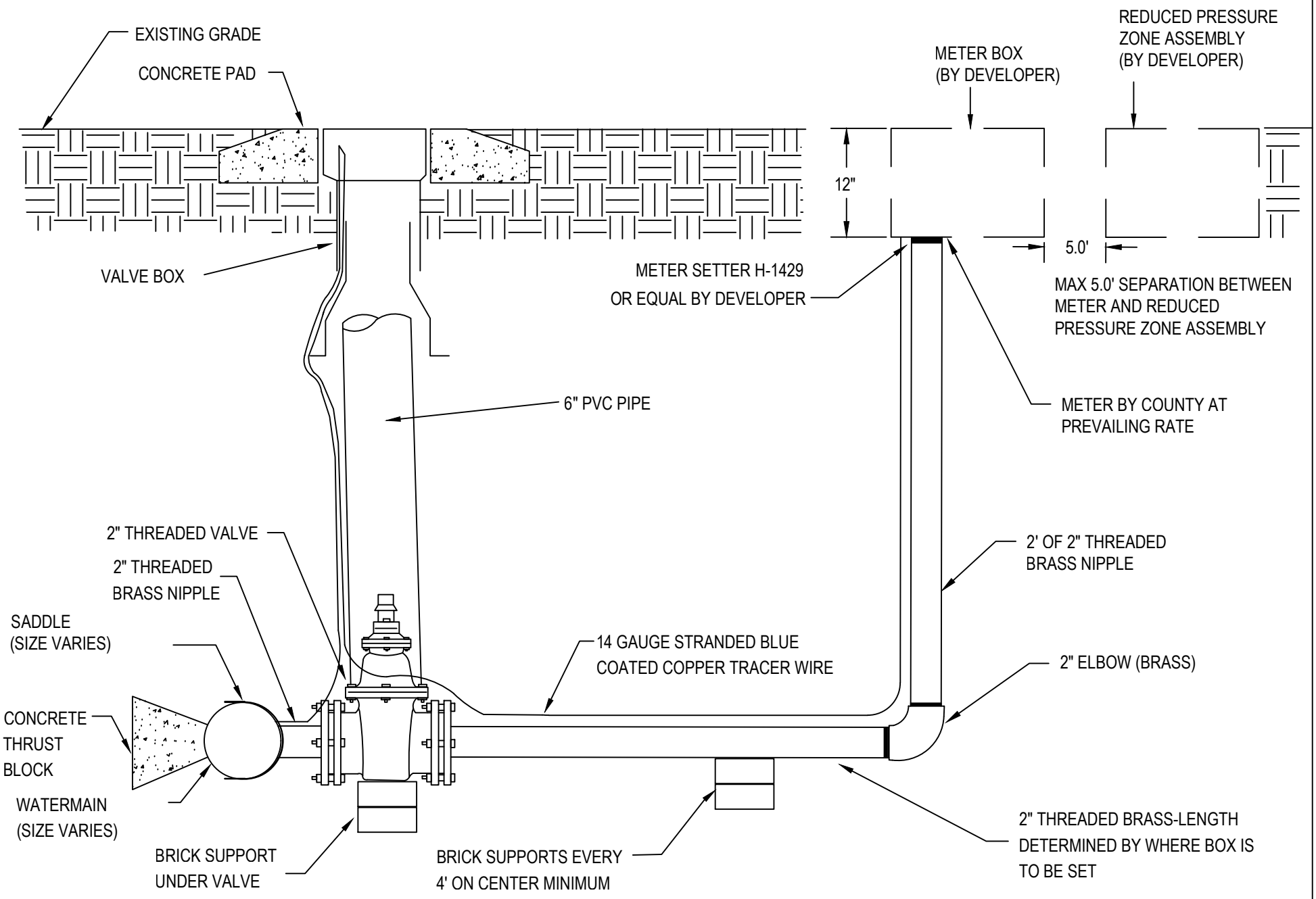
STANDARD DETAIL

TAPPING SLEEVE

SCALE: N.T.S.

DATE: 09-13-24

18



UNION COUNTY WATER

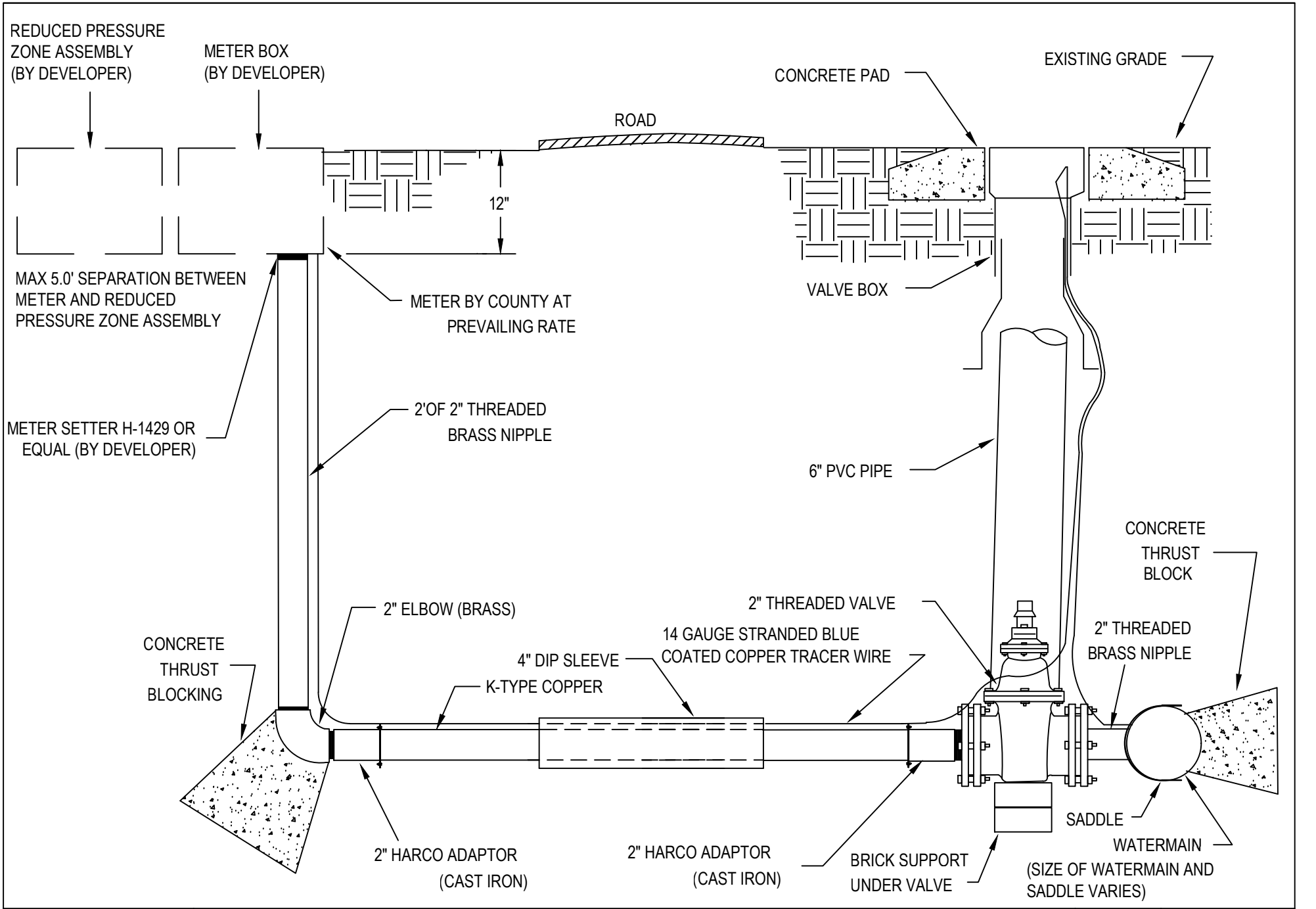
STANDARD DETAIL

2" SHORT SIDE SERVICE FOR 1 ½ OR 2" METERS

SCALE: N.T.S.

DATE: 09-13-24

19



UNION COUNTY WATER

STANDARD DETAIL

2" LONG SIDE SERVICE FOR 1 ½ OR 2" METERS

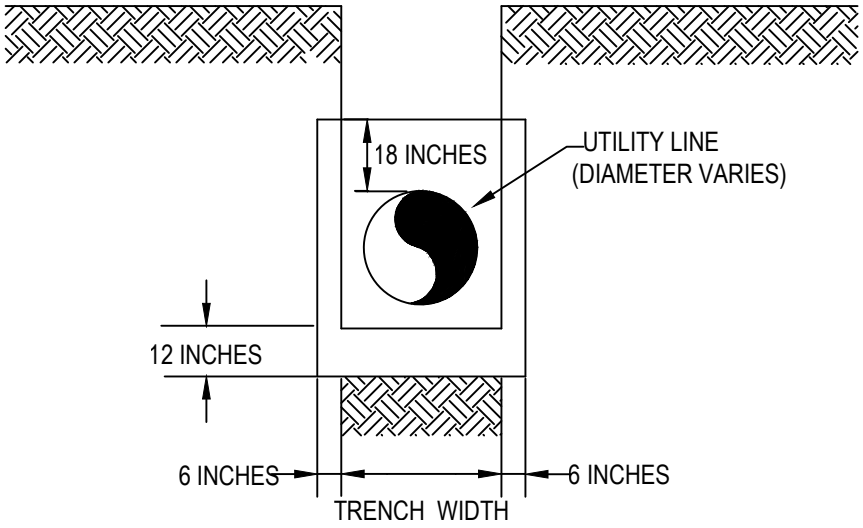
SCALE: N.T.S.

DATE: 09-13-24

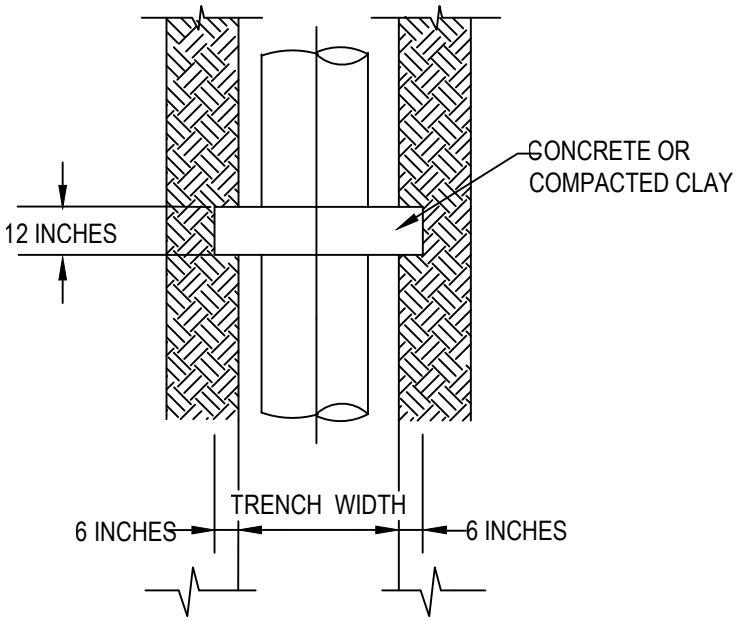
20

ANTI-SEEP COLLARS MAY BE CONSTRUCTED WITH CLASS B CONCRETE OR COMPACTED CLAY. THE COMPACTED CLAY SHALL HAVE A SPECIFIC DISCHARGE OF 1 X 10-5CM/SEC OR LESS. THE FOLLOWING SPECIFICATIONS APPLY TO CLASS B CONCRETE:

A. MINIMUM CEMENT CONTENT, SACKS PER CUBIC YARD WITH ROUNDED COURSE AGGREGATE 5.0
B. MINIMUM CEMENT CONTENT, SACKS PER CUBIC YARD WITH ANGULAR COURSE AGGREGATE 5.5
C. MAXIMUM WATER-CEMENT RATIO GALLONS PER SACK 6.8
D. SLUMP RANGE 2" TO 4"
E. MINIMUM STRENGTH - 28 DAY PSI 2,500



SECTION



PLAN

NOT TO EXCEED 40 FEET

UNION COUNTY WATER

STANDARD DETAIL

ANTI-SEEP COLLAR

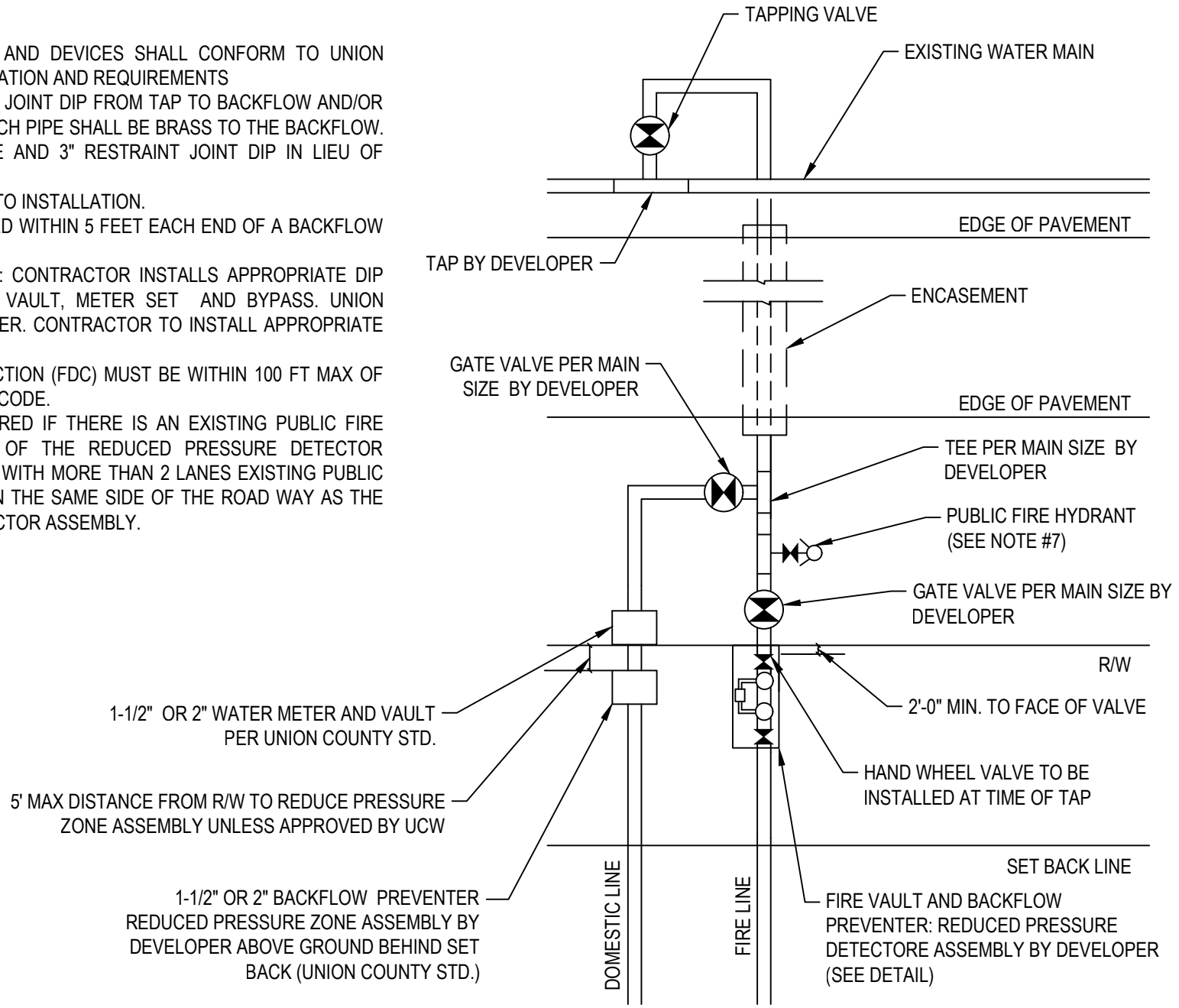
SCALE: N.T.S.

DATE: 11-17-06

21

NOTES:

1. INSTALLATION, MATERIALS AND DEVICES SHALL CONFORM TO UNION COUNTY WATER'S SPECIFICATION AND REQUIREMENTS
2. ALL PIPE TO BE RESTRAINT JOINT DIP FROM TAP TO BACKFLOW AND/OR FIRE VAULT.THE 1-1/2 & 2 INCH PIPE SHALL BE BRASS TO THE BACKFLOW. ALTERNATE (3 INCH VALVE AND 3" RESTRAINT JOINT DIP IN LIEU OF BRASS)
3. FEES MUST BE PAID PRIOR TO INSTALLATION.
4. NO PVC PIPE SHALL BE USED WITHIN 5 FEET EACH END OF A BACKFLOW PREVENTER.
5. METERS 3 INCH & LARGER: CONTRACTOR INSTALLS APPROPRIATE DIP LINE THROUGH, SUPPLIES VAULT, METER SET AND BYPASS. UNION COUNTY WILL INSTALL METER. CONTRACTOR TO INSTALL APPROPRIATE SIZE RPZ.
6. FIRE DEPARTMENT CONNECTION (FDC) MUST BE WITHIN 100 FT MAX OF PUBLIC HYDRANT PER FIRE CODE.
7. FIRE HYDRANT NOT REQUIRED IF THERE IS AN EXISTING PUBLIC FIRE HYDRANT WITHIN 500 LF OF THE REDUCED PRESSURE DETECTOR ASSEMBLY. FOR ROADWAY WITH MORE THAN 2 LANES EXISTING PUBLIC FIRE HYDRANT MUST BE ON THE SAME SIDE OF THE ROAD WAY AS THE REDUCED PRESSURE DETECTOR ASSEMBLY.



UNION COUNTY WATER

STANDARD DETAIL

WATER CONNECTION

SCALE: N.T.S.

DATE: 02-19-14

22

EMERGENGY CONNECTION

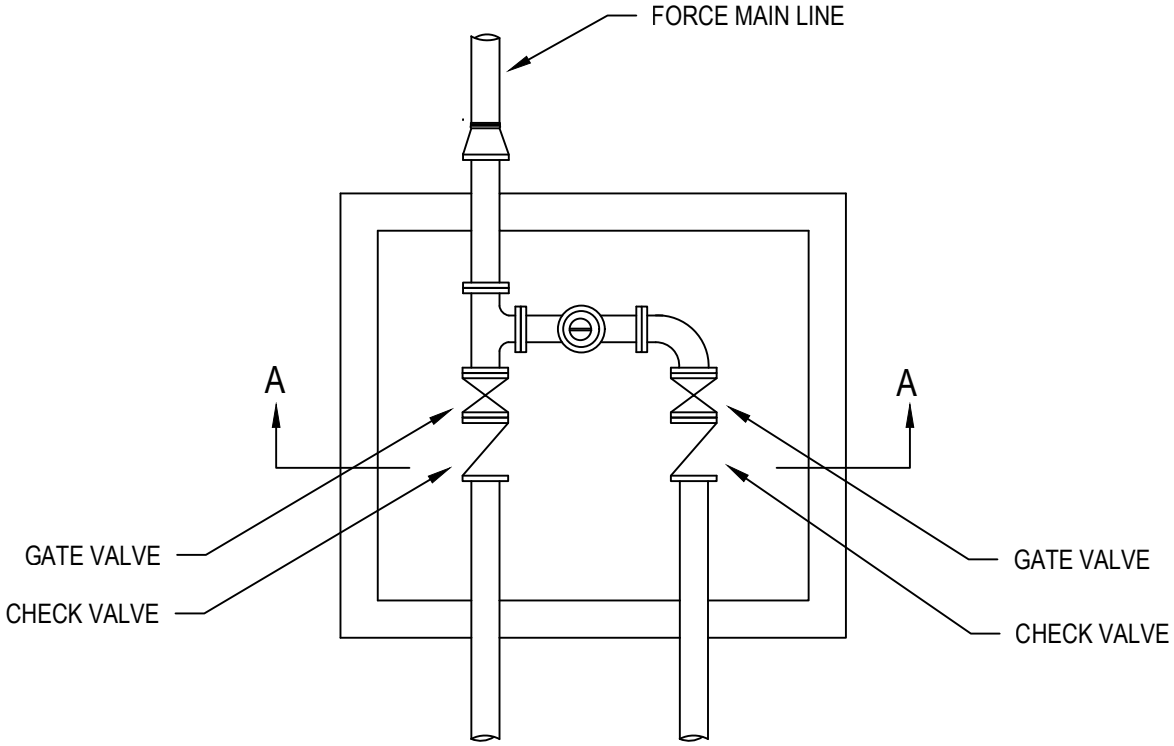
1 EA. FLANGE TEE

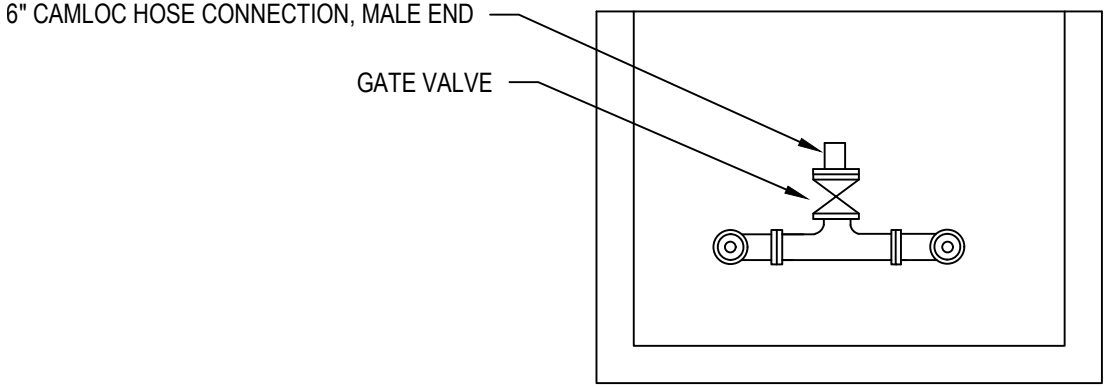
1 EA. FLANGE GATE VALVE

1 EA. COMPANION FLANGE (9"x4")

1 EA. 6" MALE1PT. x 6" MALE CAMLOC HOSE CONN.

4 EA. FLANGE ACCESSORY SETS





"A-A"

UNION COUNTY WATER

STANDARD DETAIL

BYPASS EMERGENCY CONNECTION FOR WET WELL

SCALE: N.T.S.

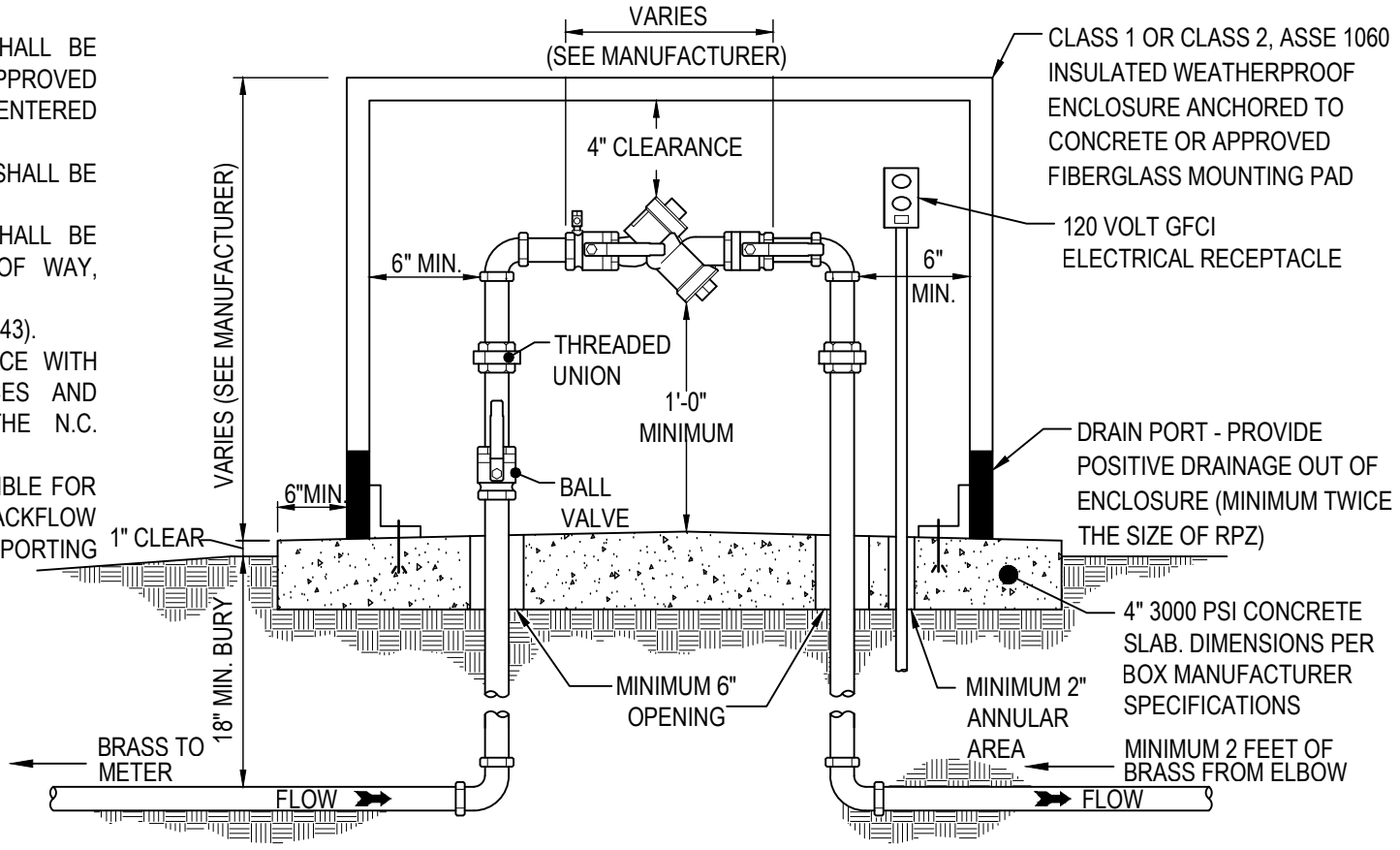
DATE: 09-27-07

23

NOTES

1. RPZ SHALL BE INSTALLED FOR CUSTOMER APPLICATIONS APPROVED BY UNION COUNTY WATER.
2. REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY SHALL COMPLY WITH ASSE 1013 & AWWA C511 (FEBCO 825Y, WILKINS MODEL 975XL, HERSEY MODEL FRPII OR EQUAL).
3. OWNER SHALL PROVIDE WRITTEN CERTIFICATION TO THE COUNTY THAT THE RPZ HAS BEEN TESTED BY A CERTIFIED BACKFLOW PREVENTION TECHNICIAN AFTER INSTALLATION.
4. BACKFLOW PREVENTION ASSEMBLY SHALL BE CENTERED ON CONCRETE OR APPROVED FIBERGLASS MOUNTING PAD AND CENTERED WITHIN ENCLOSURE.
5. REDUCER PRESSURE ZONE ASSEMBLY SHALL BE ABOVE GROUND ONLY.
6. BACKFLOW PREVENTION ASSEMBLY SHALL BE INSTALLED OUTSIDE OF THE RIGHT OF WAY, MAXIMUM OF 5 FEET.
7. PIPE MATERIAL SHALL BE BRASS (ASTM B43).
8. INSTALLATION SHALL BE IN COMPLIANCE WITH ALL APPLICABLE COUNTY ORDINANCES AND SPECIFICATIONS IN ADDITION TO THE N.C. PLUMBING CODE.
9. PROPERTY OWNER SHALL BE RESPONSIBLE FOR MAINTENANCE AND OPERATION OF BACKFLOW ASSEMBLY AND COMPLIANCE WITH REPORTING AND TESTING REQUIREMENTS.

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY



UNION COUNTY WATER

STANDARD DETAIL

REDUCED PRESSURE ZONE ASSEMBLY

(¾" - 2")

SCALE: N.T.S.

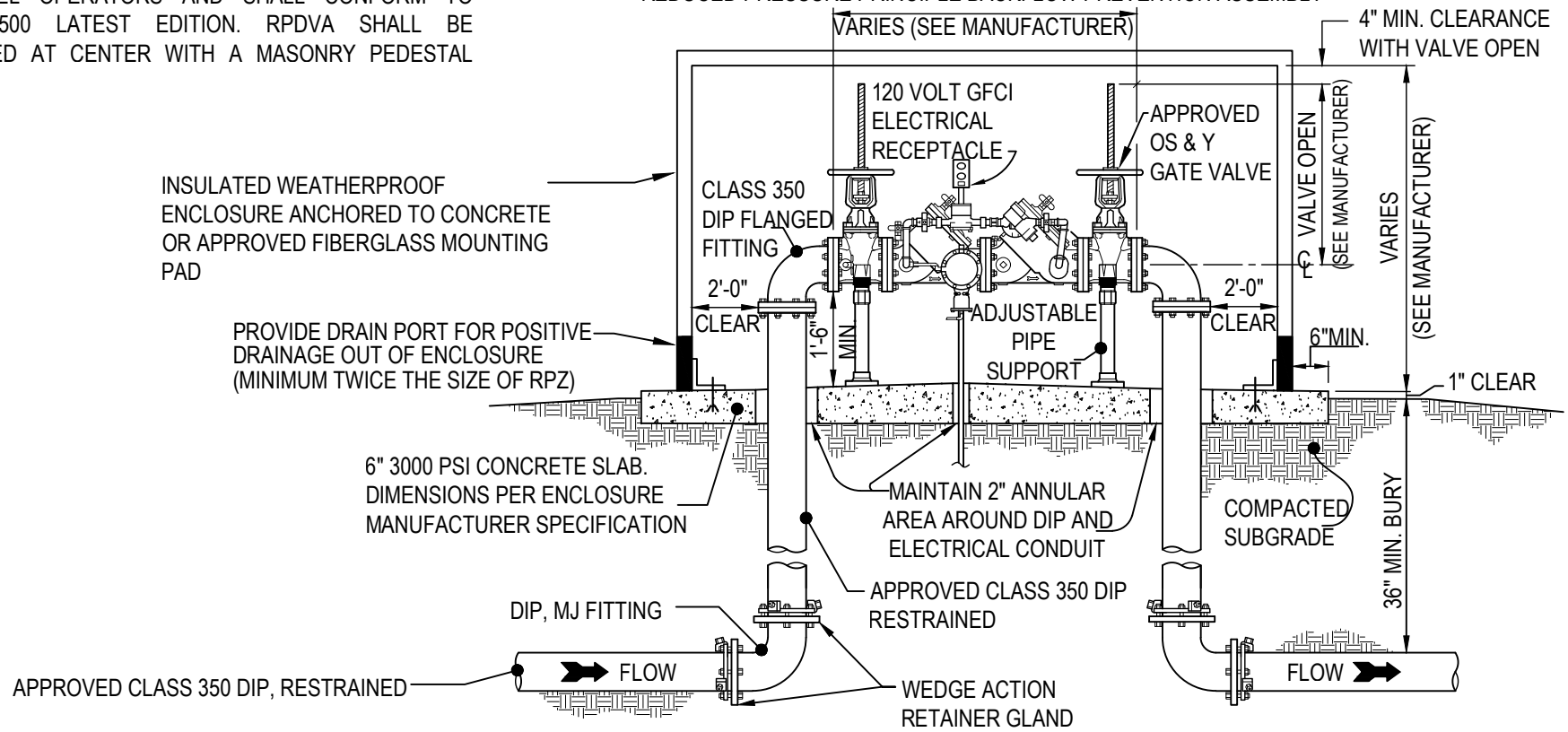
DATE: 02-19-14

24A

NOTES:

1. RPDA SHALL BE INSTALLED FOR CUSTOMER APPLICATIONS APPROVED BY UNION COUNTY WATER
2. REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY SHALL COMPLY WITH ASSE 1047 & AWWA C511 (1) FEBCO 826YD, (2) WILKINS MODEL 375ADA, (3) AMES SERIES 5000 CIV. OR EQUAL
3. OWNER SHALL PROVIDE WRITTEN CERTIFICATION TO THE COUNTY THAT THE RPDVA =HAS BEEN TESTED BY A CERTIFIED BACKFLOW PREVENTION TECHNICIAN AFTER INSTALLATION.
4. COUNTY APPROVED 3"-10" RPDVA INCLUDES SHUTOFF VALVES AS PART OF THE ASSEMBLY. SHUT OFF VALVES SHALL BE OS&Y RESILIENT SEAT GATE VALVES WITH HANDWHEEL OPERATORS AND SHALL CONFORM TO AWWA C500 LATEST EDITION. RPDVA SHALL BE SUPPORTED AT CENTER WITH A MASONRY PEDESTAL ADEQUATE TO MAINTAIN THE WEIGHT OF THE STRUCTURE AND PLUS AN ADDITIONAL 1,000 POUND LOAD.
5. REDUCED PRESSURE DETECTOR ASSEMBLY SHALL BE ABOVE GROUND ONLY.
6. BACKFLOW PREVENTION ASSEMBLY SHALL BE INSTALLED OUTSIDE OF THE RIGHT OF WAY, MAXIMUM OF 5 FEET.
7. PROPERTY OWNER SHALL BE RESPONSIBLE FOR MAINTENANCE AND OPERATION OF BACKFLOW ASSEMBLY AND COMPLIANCE WITH REPORTING AND TESTING REQUIREMENTS.
8. 3/4" BYPASS DETECTOR AMI METER: SENSUS SRII WITH SMARTPOINT MODULE.

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY



UNION COUNTY WATER

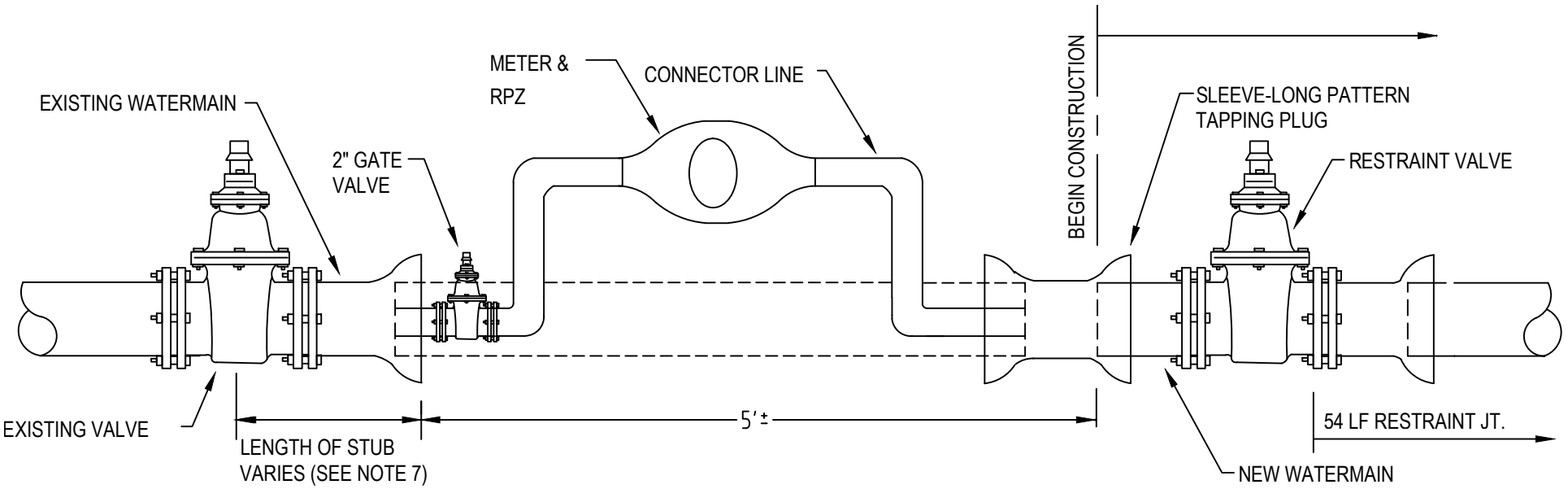
STANDARD DETAIL

REDUCED PRESSURE DETECTOR ASSEMBLY

SCALE: N.T.S.

DATE: 01-02-14

24B



NOTES:

1. INSTALL CONNECTOR LINE FROM EXISTING BLOW OFF ASSEMBLY TO NEW MAIN FOR FILLING, TESTING AND STERILIZING NEW MAIN.
2. CONNECTOR LINE TO BE ASSEMBLED WITH RPZ AND METER BY CONTRACTOR AND TO BE OPERATED AND INDEPENDENT OF EXISTING MAIN.
3. BLOCKING ON EXISTING LINE NOT TO BE DISTURBED.
4. FINAL CONNECTION TO EXISTING MAIN TO BE MADE ONLY AFTER TOTAL PROJECT IS ACCEPTED BY UNION COUNTY WATER.
5. VALVES ON EXISTING SYSTEM TO BE OPERATED BY UCW FORCES ONLY.
6. ONLY ONE CONNECTION WILL BE ALLOWED BETWEEN THE EXISTING SYSTEM AND THE NEW CONSTRUCTION UNTIL TESTING AND DISINFECTION IS COMPLETE.
7. 6" OR 8" DIAMETER PIPE= 40 LF OF STUB, 12" OR 16" DIAMETER PIPE= 72 LF OF STUB

UNION COUNTY WATER

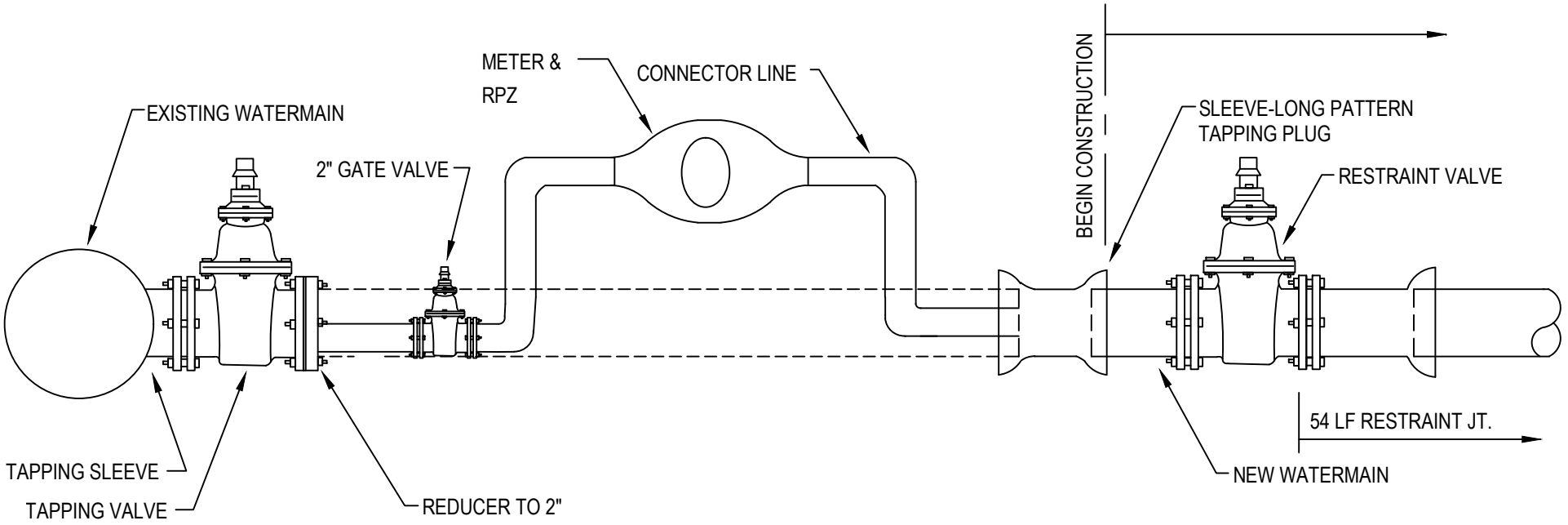
STANDARD DETAIL

JUMPER CONNECTION

SCALE: N.T.S.

DATE: 09-02-10

25



NOTES:

1. INSTALL CONNECTOR LINE FROM TAPPING VALVE TO NEW MAIN FOR FILLING, TESTING AND STERILIZING NEW MAIN.
2. CONNECTOR LINE TO BE ASSEMBLED WITH RPZ AND METER BY CONTRACTOR AND TO BE OPERATED AND INDEPENDENT OF EXISTING MAIN.
3. FINAL CONNECTION TO EXISTING MAIN TO BE MADE ONLY AFTER TOTAL PROJECT IS ACCEPTED BY UNION COUNTY WATER.
4. VALVES ON EXISTING SYSTEM TO BE OPERATED BY UCW FORCES ONLY.
5. ONLY ONE CONNECTION WILL BE ALLOWED BETWEEN THE EXISTING SYSTEM AND THE NEW CONSTRUCTION UNTIL TESTING AND DISINFECTION IS COMPLETE.

UNION COUNTY WATER

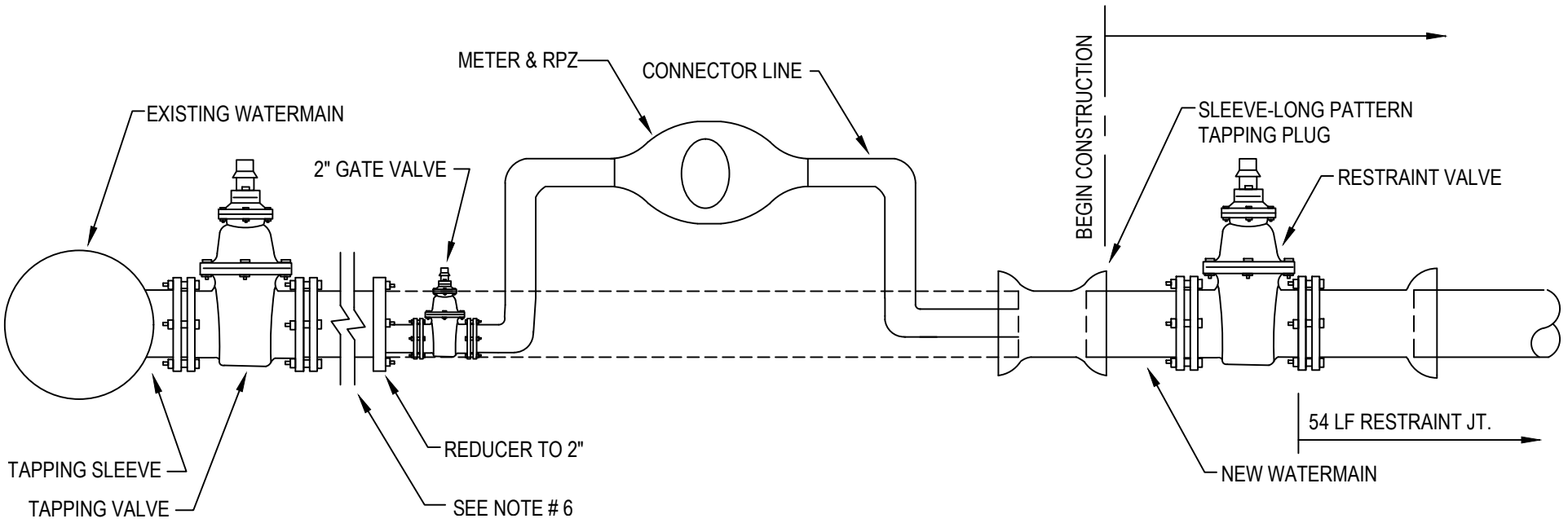
STANDARD DETAIL

DIRECT TAP JUMPER CONNECTION (SHORT SIDE)

SCALE: N.T.S.

DATE: 09-02-10

25A



NOTES:

1. INSTALL CONNECTOR LINE FROM TAPPING VALVE TO NEW MAIN FOR FILLING, TESTING AND STERILIZING NEW MAIN.
2. CONNECTOR LINE TO BE ASSEMBLED WITH RPZ AND METER BY CONTRACTOR AND TO BE OPERATED AND INDEPENDENT OF EXISTING MAIN.
3. FINAL CONNECTION TO EXISTING MAIN TO BE MADE ONLY AFTER TOTAL PROJECT IS ACCEPTED BY UNION COUNTY PUBLIC WORKS.
4. VALVES ON EXISTING SYSTEM TO BE OPERATED BY UCW FORCES ONLY.
5. ONLY ONE CONNECTION WILL BE ALLOWED BETWEEN THE EXISTING SYSTEM AND THE NEW CONSTRUCTION UNTIL TESTING AND DISINFECTION IS COMPLETE.
6. MAXIMUM LENGTH OF PIPE NOT TO EXCEED 100'.

UNION COUNTY WATER

STANDARD DETAIL

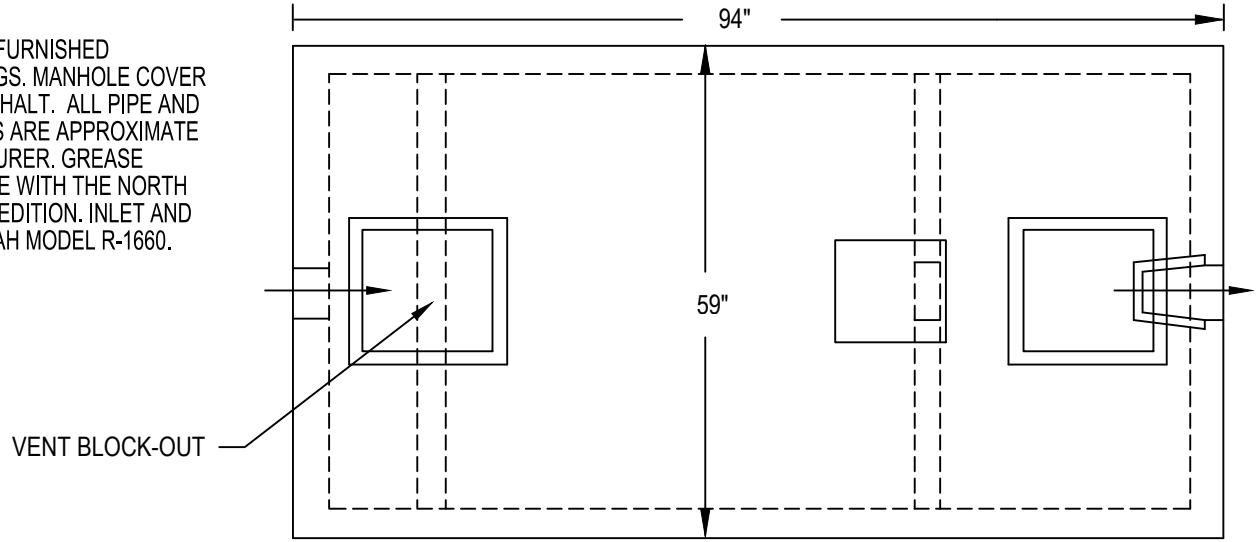
DIRECT TAP JUMPER CONNECTION (LONG SIDE)

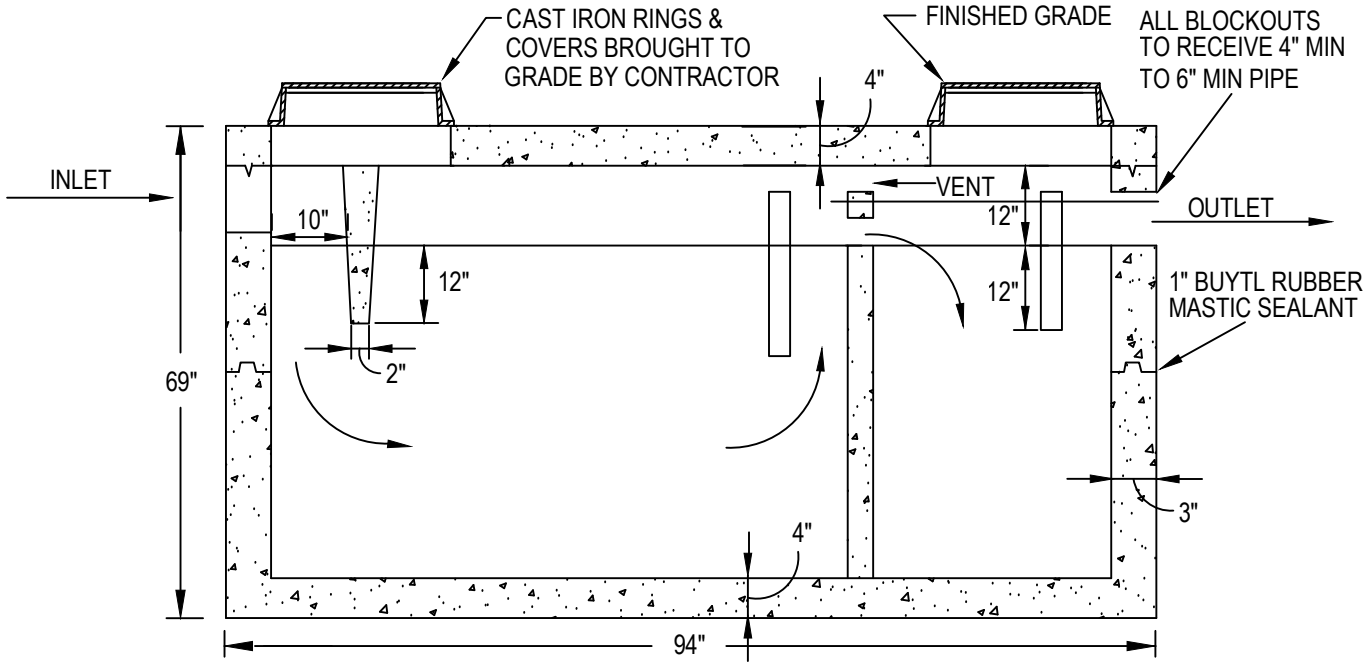
SCALE: N.T.S.

DATE: 09-02-10

25B

1,000 GALLON MINIMUM GREASE INTERCEPTOR FURNISHED COMPLETE WITH CAST IRON MANHOLE AND RINGS. MANHOLE COVER SHALL BE FLUSH WITH FINISHED GRADE OR ASPHALT. ALL PIPE AND FITTINGS SHALL BE CAST IRON. ALL DIMENSIONS ARE APPROXIMATE ONLY AND SHALL BE VERIFIED WITH MANUFACTURER. GREASE INTERCEPTOR TO BE DESIGNED IN ACCORDANCE WITH THE NORTH CAROLINA STANDARD PLUMBING CODE LATEST EDITION. INLET AND DISCHARGE SHALL HAVE TEES EQUAL TO NEENAH MODEL R-1660.





UNION COUNTY WATER

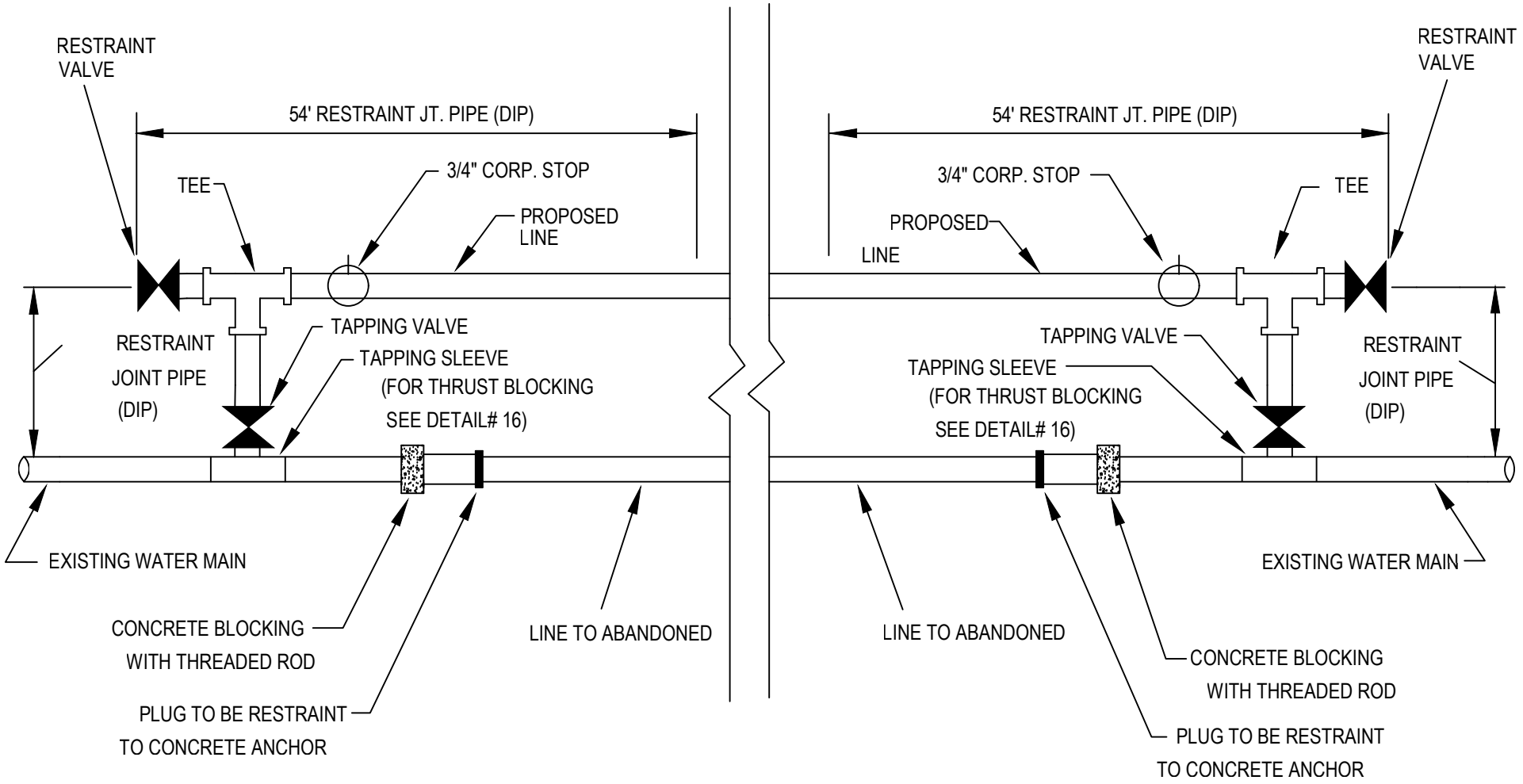
STANDARD DETAIL

GREASE INTERCEPTOR

SCALE: N.T.S.

DATE: 10-23-07

26



NOTE:
1. ALL WATERMAINS ALONG EXISTING DOT ROADS MUST BE A MINIMUM DISTANCE OF A 1'+ 1/1 RATIO OFF EDGE OF PAVEMENT OR BACK OF CURB.

UNION COUNTY WATER

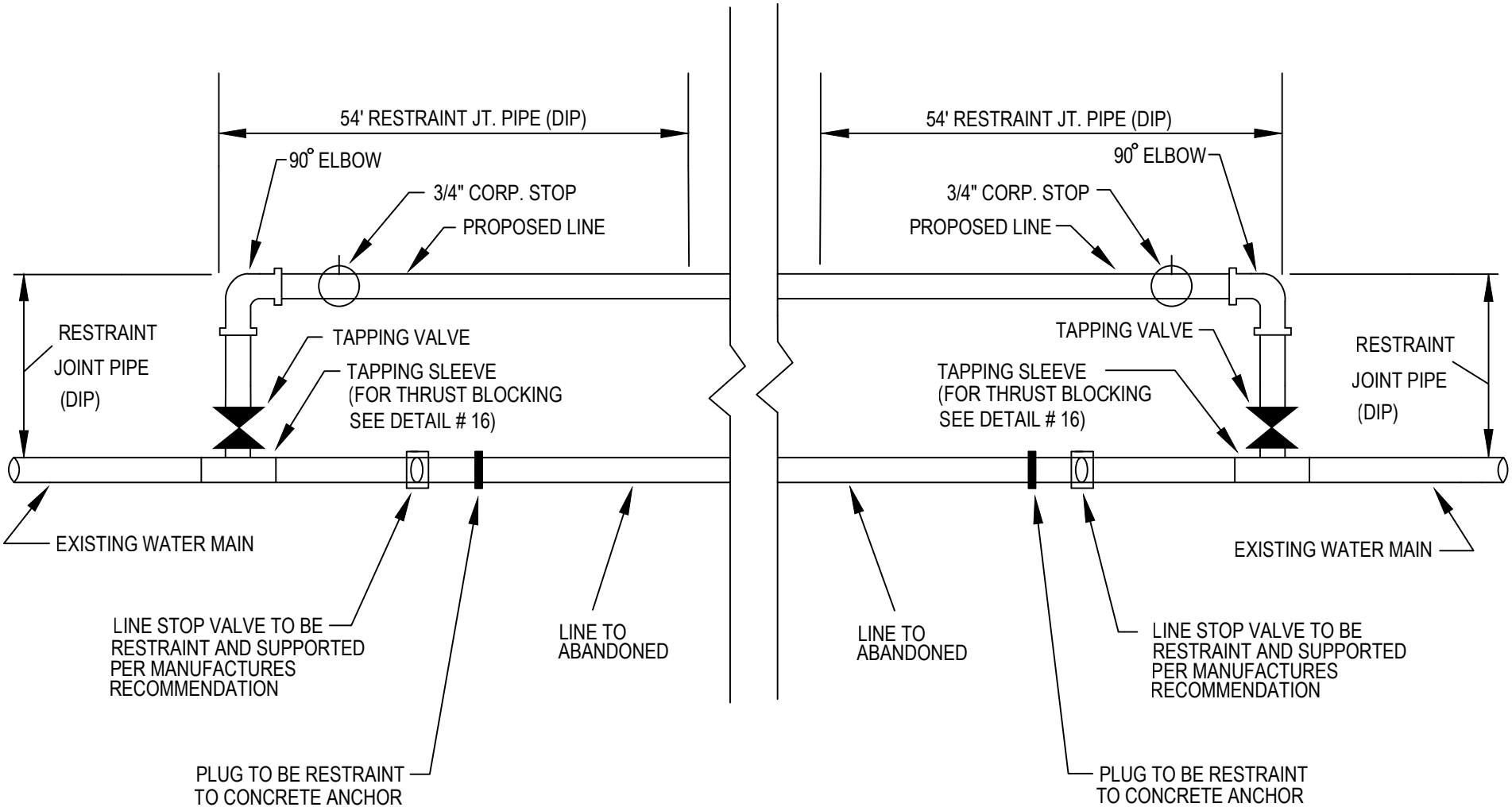
STANDARD DETAIL

WATERMAIN RELOCATION DETAIL

SCALE: N.T.S.

DATE: 04-03-08

27



NOTE:

1. ALL WATERMAINS ALONG EXISTING DOT ROADS MUST BE A MINIMUM DISTANCE OF A 1'+ 1/1 RATIO OFF EDGE OF PAVEMENT OR BACK OF CURB.

UNION COUNTY WATER

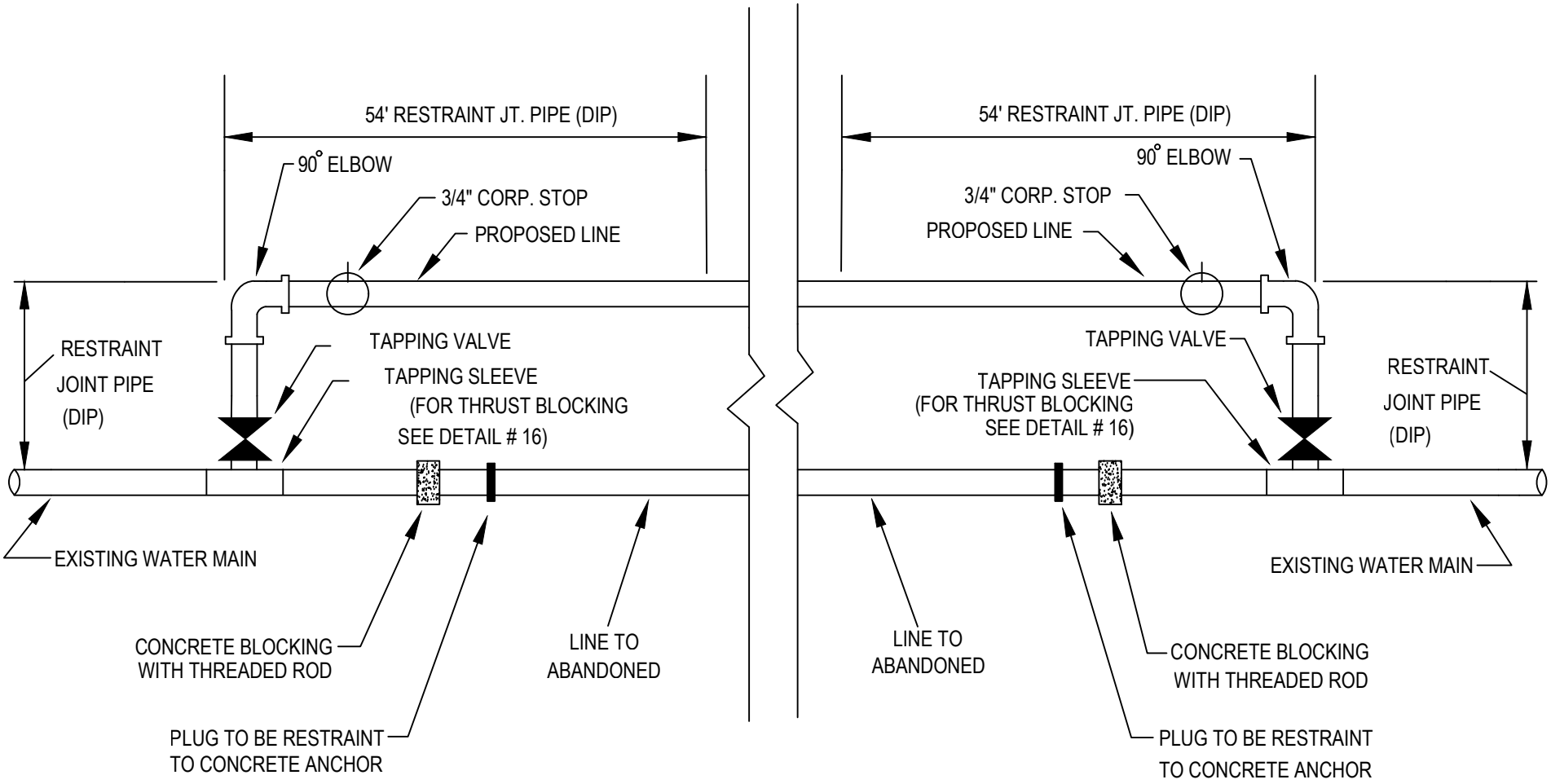
STANDARD DETAIL

LARGE WATERMAIN RELOCATION DETAIL

SCALE: N.T.S.

DATE: 03-08-11

27A



NOTE:

1. ALL WATERMAINS ALONG EXISTING DOT ROADS MUST BE A MINIMUM DISTANCE OF A 1'+ 1/1 RATIO OFF EDGE OF PAVEMENT OR BACK OF CURB.

UNION COUNTY WATER

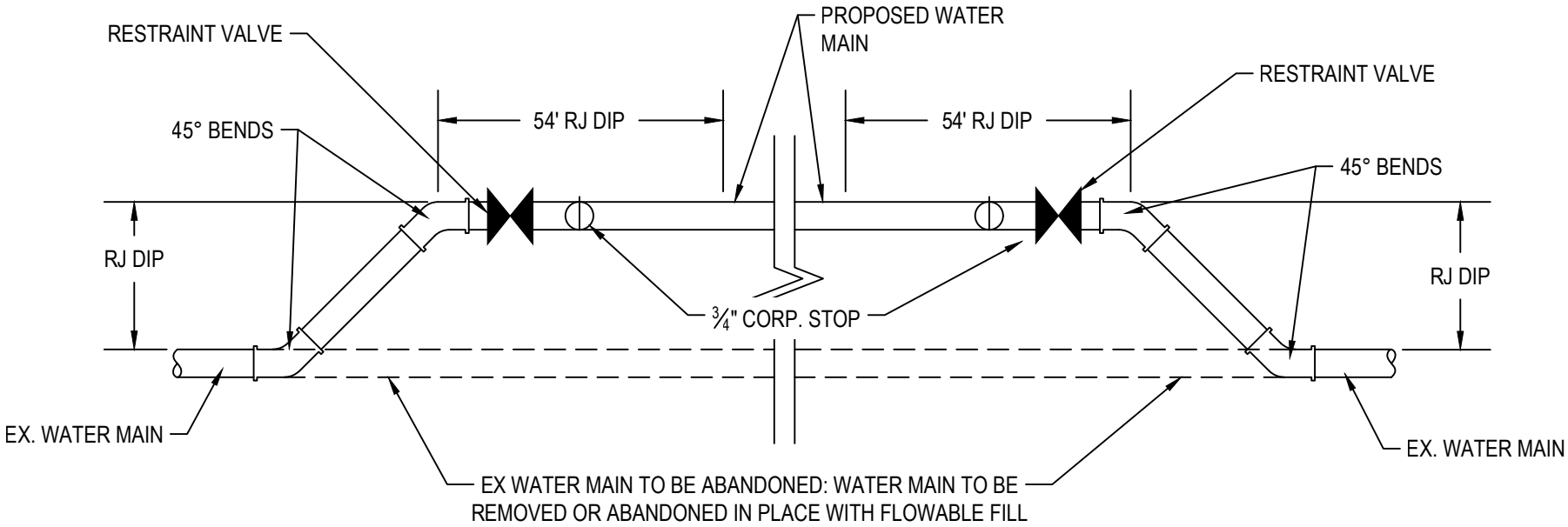
STANDARD DETAIL

SMALL WATERMAIN RELOCATION DETAIL

SCALE: N.T.S.

DATE: 03-08-11

27B



NOTE:
1. ALL WATERMAINS ALONG EXISTING DOT ROADS MUST BE A MINIMUM DISTANCE OF A 1'+ 1/1 RATIO OFF EDGE OF PAVEMENT OR BACK OF CURB.
2. CONNECTION MUST BE MADE AT FACTORY ENDS IF EXISTING WATER MAIN IS ASBESTOS CONCRETE

UNION COUNTY WATER

STANDARD DETAIL

LARGE WATER RELOCATION DETAIL

SCALE: N.T.S.

DATE: 09-13-24

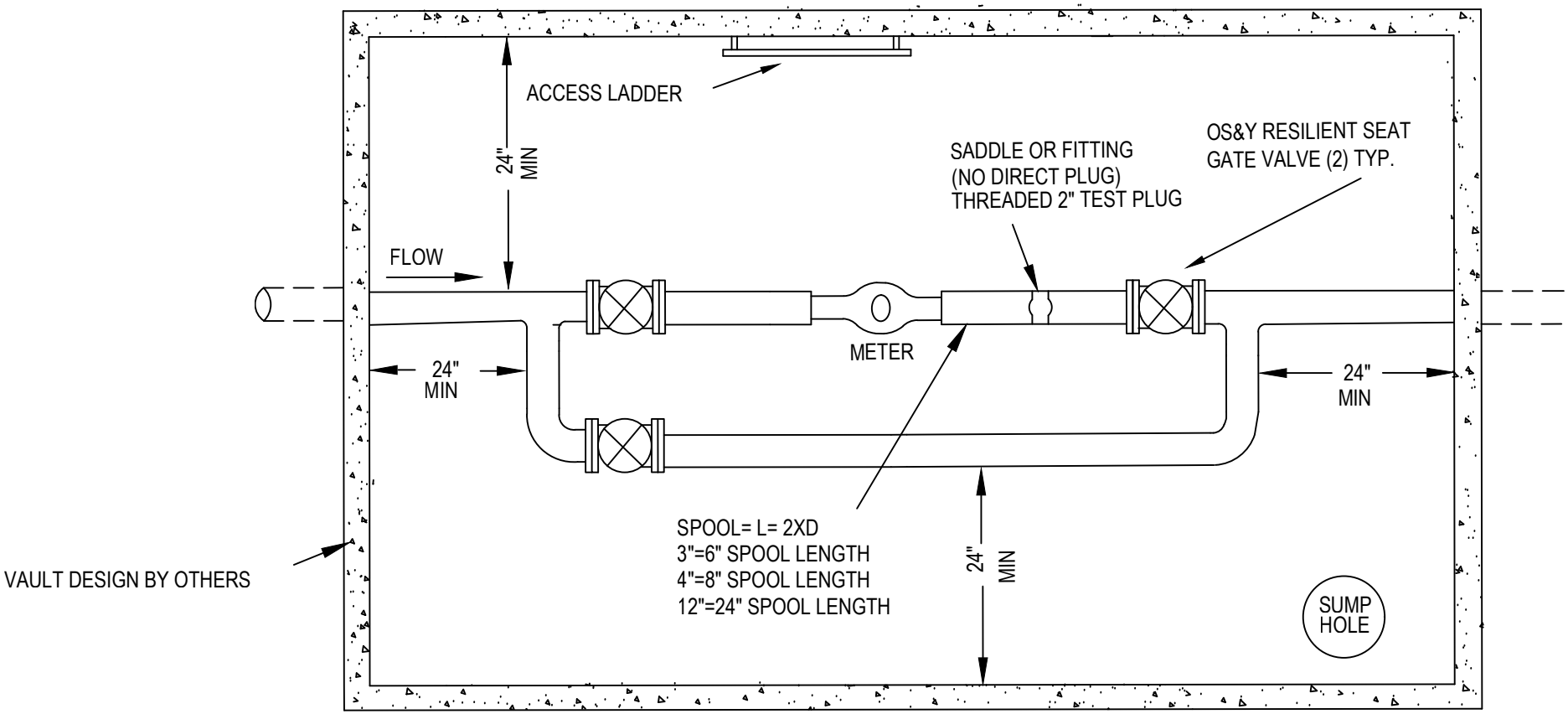
27C

NOTES:

1. PIPING AND FITTINGS SHALL BE DUCTILE IRON (AWWA C151) CLASS 350 AND SHALL BE RESTRAINED JOINT OR FLANGED AS INDICATED ON THE DETAIL. RESTRAINED JOINTS SHALL BE MEGA-LUG RESTRAINED OR AN APPROVED EQUAL.
2. ALL VAULTS SHALL BE 3800 PSI CONCRETE AND CAPABLE OF WITHSTANDING 150 PSF LOADING IN NON TRAFFIC AREAS.
3. ACCESS HATCHES SHALL BE ALUMINUM 150 PSF WITH LOCKABLE COVER DEVICE. MANUFACTURER SHALL BE BILCO, HALIDAY OR APPROVED EQUAL.
4. INSTALL VAULT AT EDGE OF RIGHT OF WAY. DO NOT PLACE IN PAVEMENT.
5. PIPING TO BE A MINIMUM OF 18" OFF OF FLOOR.
6. DEVELOPER MUST CONTACT UCW CUSTOMER SERVICE TO PAY METER COST & INSTALLATION FEES AND SCHEDULE THE WATER METER INSTALLATION
7. BYPASS PIPE EQUAL TO METER SIZE

METER DIMENSIONS

Model	Octave			
NOMINAL SIZE	3"	4"	6"	8"
L- LENGTH	12"	14"	18"	20"
B- WIDTH	7 1/2"	9"	11"	13 1/2"
H- HEIGHT	8 1/2"	9 7/8"	10 7/8"	12 7/8"



UNION COUNTY WATER

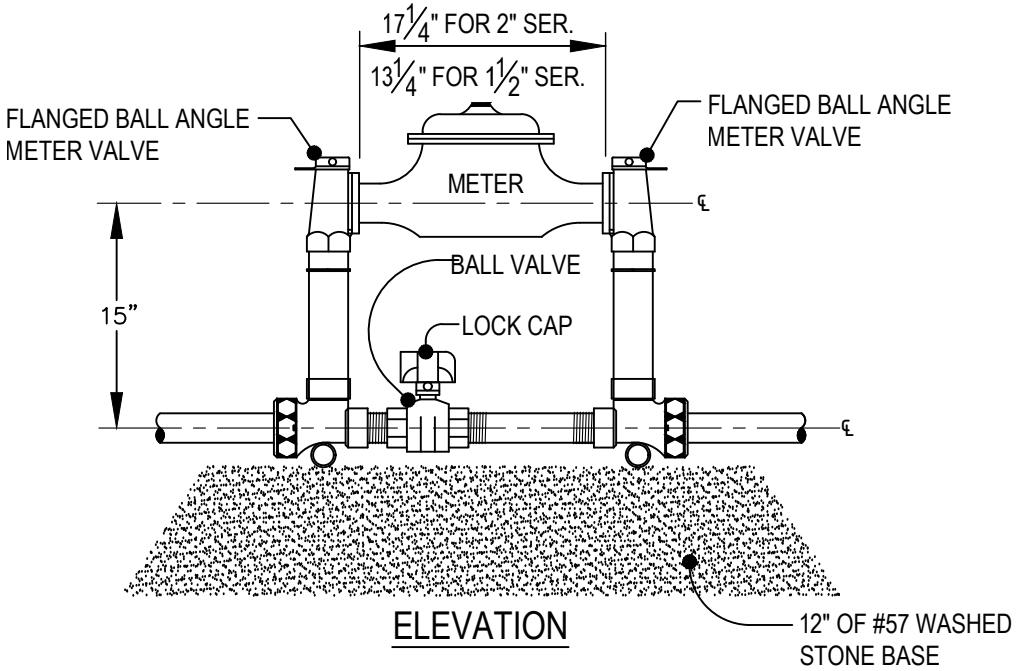
STANDARD DETAIL

METER AND VAULT - 3" OR LARGER

SCALE: N.T.S.

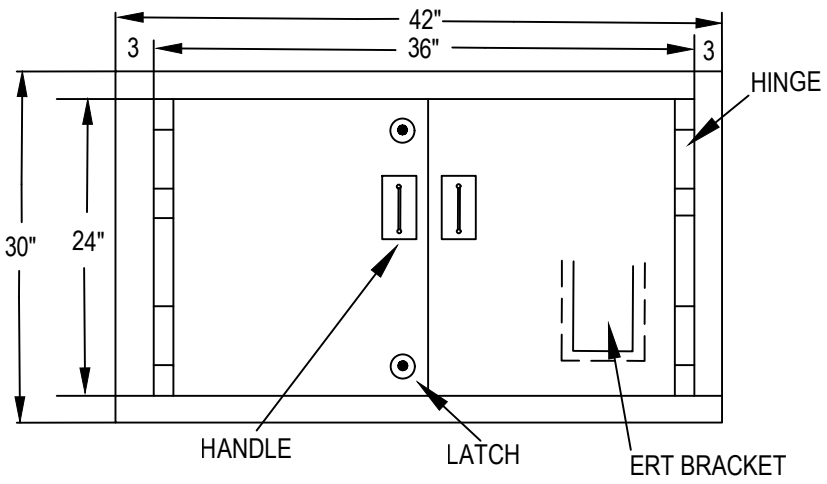
DATE: 10-22-14

28

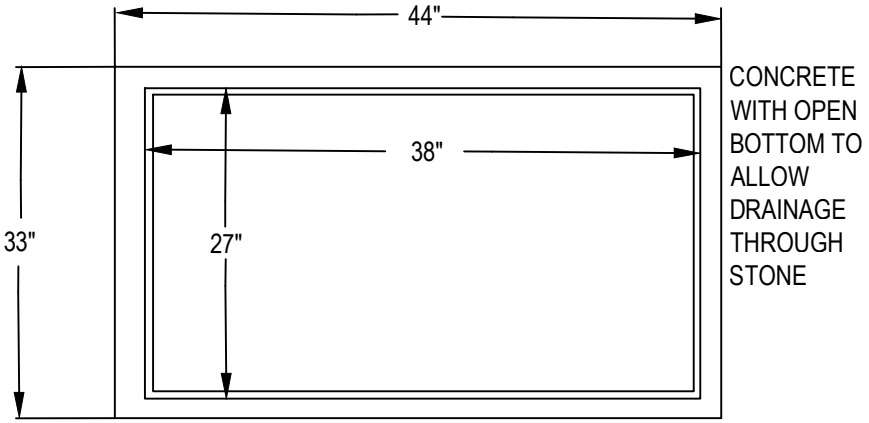


ELEVATION

HS-20 TRAFFIC RATED STEEL 2'X3',FRAME & COVER



METER VAULT



TOP VIEW

NOTES:

1. PIPING TO BE BRASS AND COPPER TUBING. METER INLET AND OUTLET TO BE EQUIPPED WITH FLANGED BALL ANGLE METER.
2. CUSTOM SETTERS SHALL BE EQUIPPED WITH STANDARD LOW BYPASS WITH BALL VALVE AND PADLOCK WINGS.
3. CUSTOM SETTERS SHALL BE AS MANUFACTURED BY MUELLER, FORD, ANY MCDONALD, OR APPROVED EQUAL.
4. CUSTOM SETTER SHALL BE INSTALLED SUCH THAT METER REGISTER IS LOCATED 5 TO 8 INCHES BELOW METER BOX COVER.
5. METER BY COUNTY AT PREVAILING RATE.

UNION COUNTY WATER

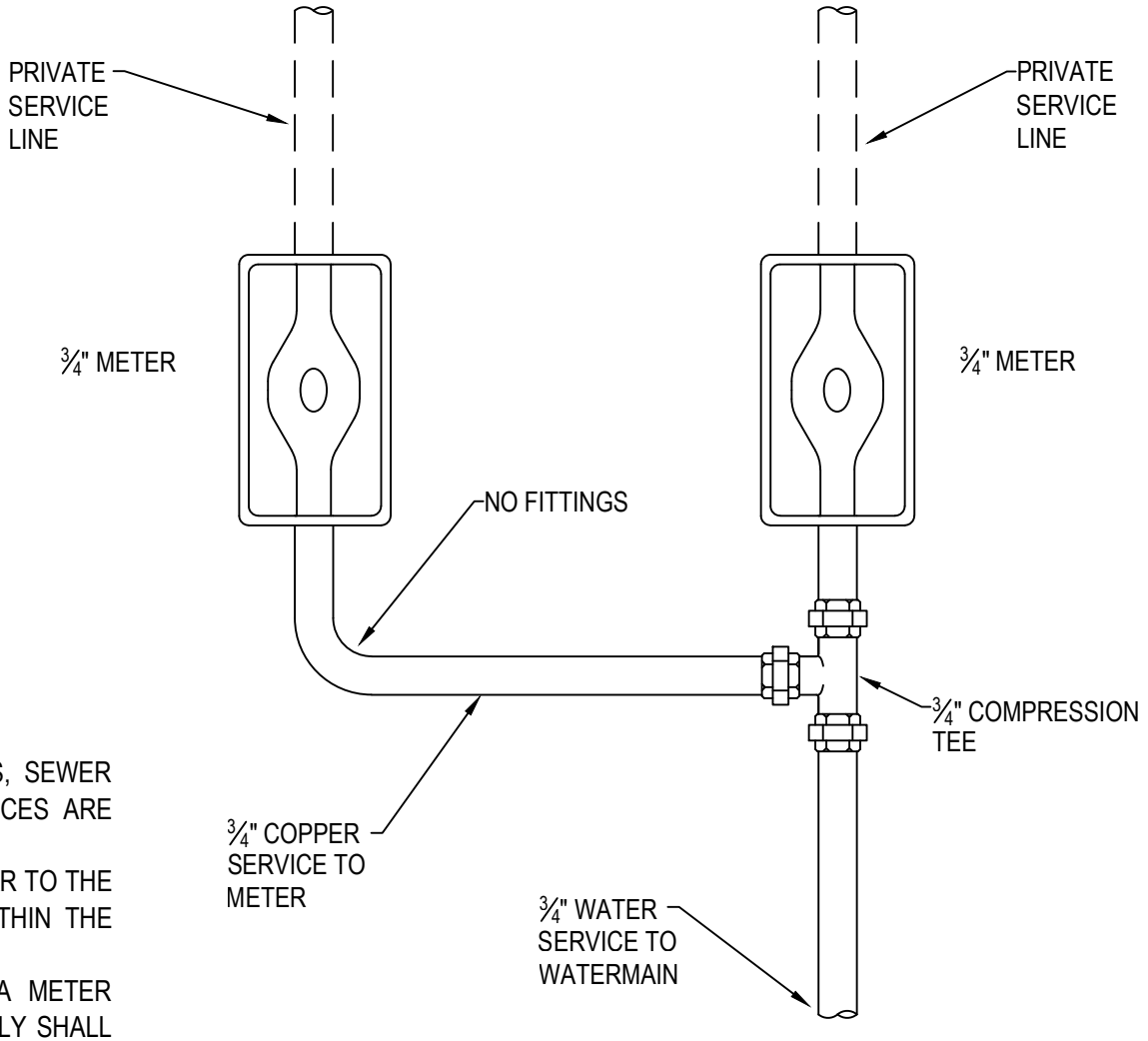
STANDARD DETAIL

STANDARD 1.5" AND 2" METER INSTALLATION & VAULT

SCALE: N.T.S.

DATE: 06-13-14

29



NOTES:

1. METERS WILL NOT BE SET IF WATER METER BOXES, SEWER CLEAN-OUTS, VALVE BOXES OR THEIR APPURTENANCES ARE DAMAGED OR IMPROPERLY POSITIONED.
2. WATER METERS ARE TO BE INSTALLED PERPENDICULAR TO THE ROAD AND WITHIN THE ROAD RIGHT-OF-WAY OR WITHIN THE LIMITS OF A PROPOSED UTILITY EASEMENT.
3. IF THE IRRIGATION LINE IS TO BE UTILIZED AND A METER SET,THE APPROPRIATE REDUCED PRESSURE ASSEMBLY SHALL BE INSTALLED BY THE CONTRACTOR PER UCPW DETAIL 24A.
4. THE PLUMBER/BUILDER IS RESPONSIBLE FOR LABELING IRRIGATION AND DOMESTIC METERS AT TIME OF THEIR CONNECTION

UNION COUNTY WATER

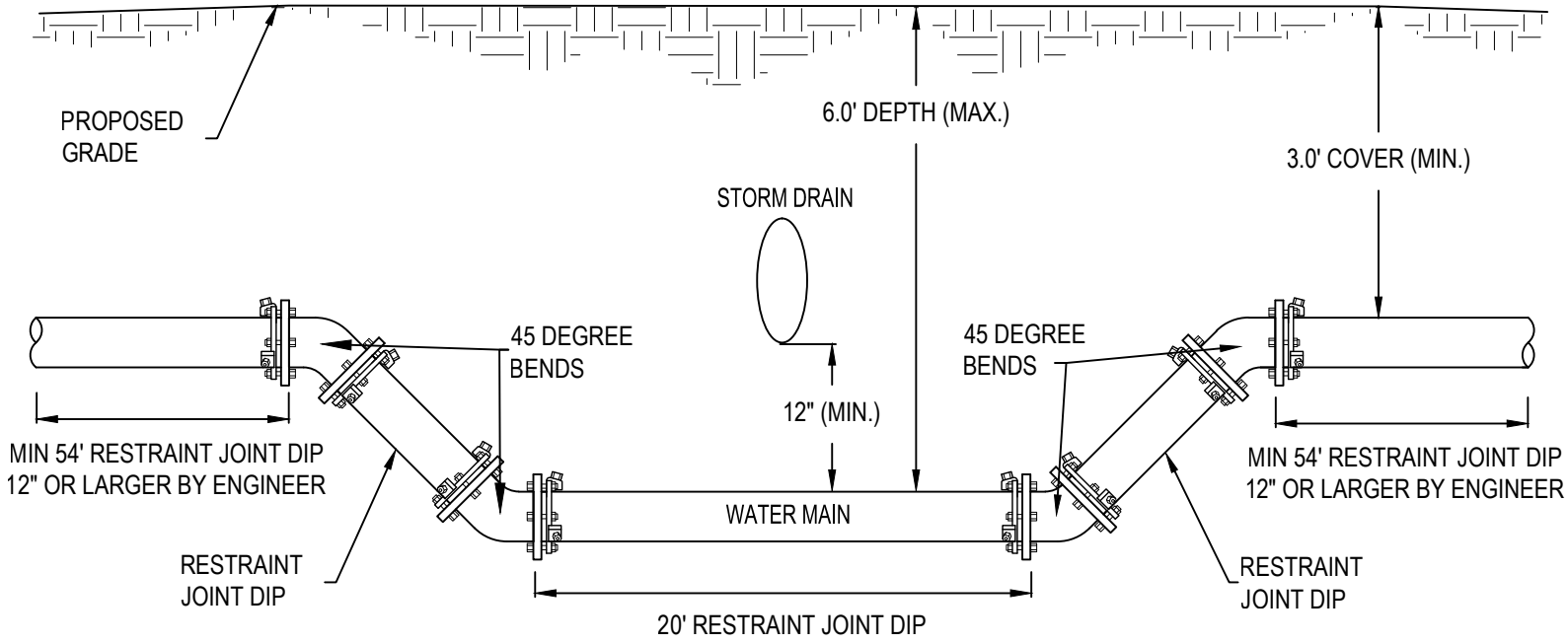
STANDARD DETAIL

IRRIGATION AND DUAL METER TAP

SCALE: N.T.S.

DATE: 12-10-19

30



UNION COUNTY WATER

STANDARD DETAIL

WATERMAIN UNDER STORM DRAIN CROSSING

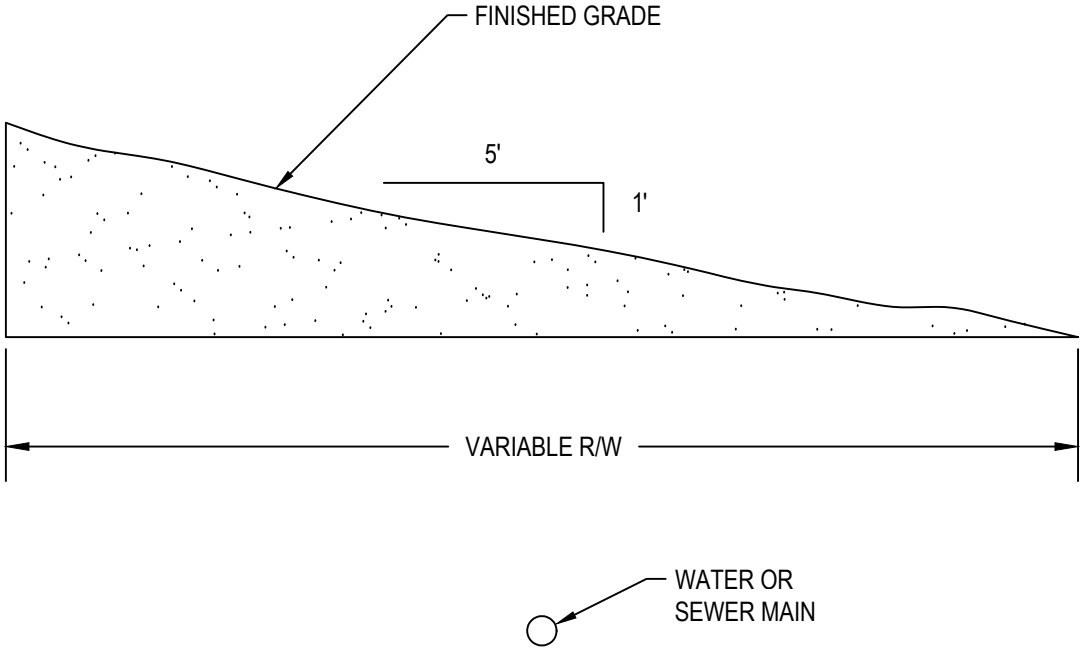
SCALE: N.T.S.

DATE: 09-13-24

31

NOTE:

1. MAXIMUM GROUND SLOPE OF 5' TO 1' IN ANY DIRECTION INSIDE WATER OR SEWER EASEMENTS.
2. SLOPE GREATER THAN 5' TO 1' MUST HAVE PRIOR APPROVAL FROM UNION COUNTY WATER.



UNION COUNTY WATER

STANDARD DETAIL

MAXIMUM SLOPE ACROSS WATER OR SEWER EASEMENT

SCALE: N.T.S.

DATE: 03-02-18

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