DeKalb County
GEORGIA

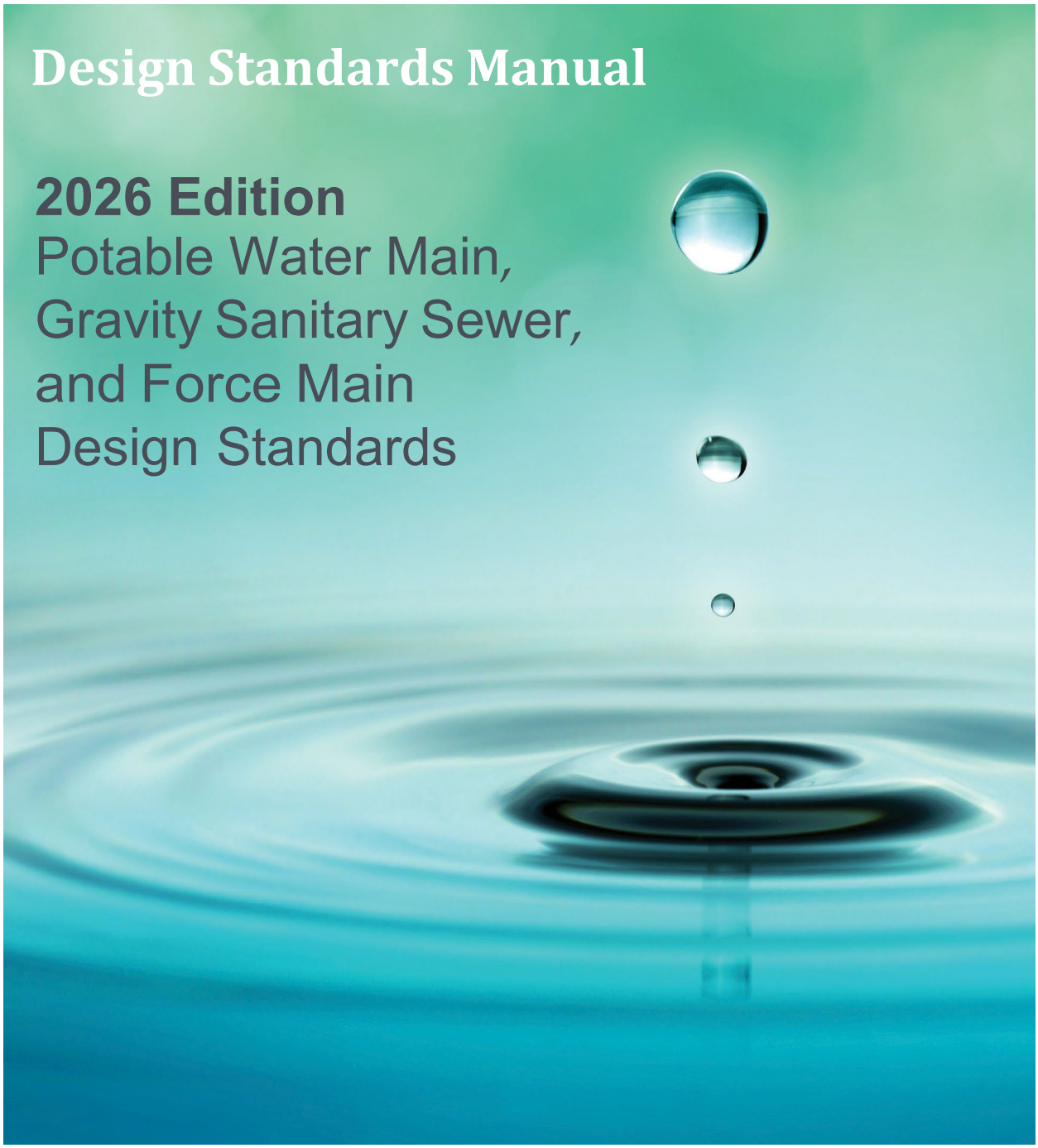
WATER Matters

Department of Watershed Management

Design Standards Manual

2026 Edition

Potable Water Main,
Gravity Sanitary Sewer,
and Force Main
Design Standards



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List of Acronyms and Abbreviations

Abbreviation	Description
A & E	Architectural and Engineering
AACE	Association for the Advancement of Cost Consulting International
AAR	Amend and Resubmit
AASHTO	American Association of State Highway and Transportation Officials
AWWTP	Advanced Wastewater Treatment Plant
BCI	Building Cost Index (as published by *Engineering New Record*, ENR)
BIM	Building Information Modeling
BOC	DeKalb County Board of Commissioners
BoDR	Basis of Design Report
CADD	Computer-Aided Drafting and Design
CAR	Corrective Action Request
CC	Construction Contractor
CCI	Construction Cost Index (as published by *ENR*)
CD	Consent Decree
CIP	Capital Improvement Projects
CM	Construction Manager
CO	Change Order
COA	City of Atlanta
COR	Change Order Request
COTL	Communications and Outreach Task (or team) Leader
COUNTY	DeKalb County, Georgia
COW	DeKalb County Committee of the Whole
CPI	Consumer Price Index
CPM	Critical Path Method
CQP	Construction Quality Plan
CR	Change Request
CSI	Construction Specifications Institute
DB	Design-Build
DBB	Design-Bid-Build
DBC	Design-Build Contractor
DC	Design Consultant
DCDWM	DeKalb County Department of Watershed Management
DD	Deputy Director
DIR	Daily Inspection Report
DOT	Department of Transportation
DQA	Deliverable Quality Assurance
DQP	Design Quality Plan
DSDC	Design Services During Construction
DTO	Draft Task Order
DWD	DeKalb Workforce Development
DWM	Department of Watershed Management
DWM P&C	Procurement & Contracting

Abbreviation	Description
DWM PA	DWM Program Administrator
DWM PM	DWM Project Manager
DWO	Draft Work Order
EAC	Estimate of Completion
ECMS	Engineering and Construction Management Services
EHS	Environmental Health and Safety
ENR	*Engineering News Record*
EOR	Engineer of Record
EPA	United States Environmental Protection Agency
EPD	Georgia Department of Natural Resources Environmental Protection Division
EPRI	Electric Power Research Institute
ESA	Environmental Site Assessment
ETC	Estimate to Complete
FO	Field Order
GDOT	Georgia Department of Transportation
GIS	Geographic Information System
GMP	Guaranteed Maximum Price
GPS	Global Positioning System
GUPS	Georgia Utility Permitting System
GSA	General Services Administration
H&S	Health & Safety
ICT	Incident Communications Team
ICTL	Incident Communications Team Leader
IGA	Intergovernmental Agreement
IT	Information Technology
ITB	Invitation to Bid
ITL	Independent Testing Laboratory
KPI	Key Performance Indicator
LAC	Land Acquisition Consultant
LCC	Lifecycle Cost
LCCA	Lifecycle Cost Analysis
LCI	Labor Cost Index
LEP	Limited English Proficiency
LSBE	Local Small Business Enterprise
M&TE	Measuring and Test Equipment
MCI	Materials Cost Index (as published by *ENR*)
MCN	Make Corrections Noted
Mg/L	Milligrams per Liter
mgd	Million Gallons per Day
MOT	Maintenance of Traffic
MRF	Mobilization Request Form
MSA	Master Service Agreement
NCR	Non-Conformance Report
NET	No Exceptions Taken
NOA	Notice of Award

Abbreviation	Description
NTP	Notice to Proceed
OCIP	Owner Controlled Insurance Program
O&M	Operations and Maintenance
OSARP	Optimum Stockage Requirements Analysis Program
OPCC	Opinion of Probable Construction Cost
P&C	Procurement and Contracting
P&ID	Process & Instrumentation Drawing
P6	Oracle Primavera P6
PA	DWM Program Administrator
PASARP	Priority Assessment and Rehabilitation Program
PCM	Program Controls Manager
PCO	Public Communications and Outreach
PDR	Public Document Repository
PgM	Program Manager
PIF	Project Initiation Form
PIP	Public Involvement Plan
PIR	Project Initiation Report
PLT	Program Leadership team
PM	Project Manager
PMCM	Program Management and Construction Management
PMI	Project Management Institute
PMIS	Project Management Information System
PMO	Program Management Office
PMP	Program Management Plan
PMS	Program Master Schedule
PMT	Program Management Team
PMT PM	PMT Project Manager
PMT RTL	PMT Risk Task Lead
PO	Purchase Order
PPM	Program Procedure Manual
PR	Public Relations
PRA	Public Relations Administrator
PRM	Project Relations Manager
Program	DWM CIP Program
PSF	Project Fact Sheet
QA	Quality Assurance
QC	Quality Control
QMP	Quality Management Plan
QMS	Quality Management System
Report	Cost Estimate Report
RFD	Request for Deviation
RFI	Request for Information
RFP	Request for Proposal
ROW	Right-of-Way
SCP	Strategic Communications Plan
SOW	Scope of Work

Abbreviation	Description
SSO	Sanitary Sewer Overflow
SWC	Statewide Contracts
T&E	Threatened and Endangered
TBL	Triple Bottom Line
TCC	Total Construction Cost
TCP	Traffic Control Plan
TO	Task Order
TPB	Total Programmatic Budget
UCD	Unilateral Change Directive
USACE	United States Army Corps of Engineers
WBS	Work Breakdown Structure
WO	Work Order
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

SECTION I
PURPOSE STATEMENT

The *Potable Water Main, Gravity Sanitary Sewer, and Force Main Design Standards* (DCDWM Pipeline Design Standards) consists of current policies and procedures of the DeKalb County (**County**) Department of Watershed Management (**DCDWM**). Included herein are design criteria, construction requirements, inspection and acceptance procedures, Standard details, and other pertinent information. These revised Standards become effective on **May 2026** and replace the previous versions and revisions.

The *DCDWM Pipeline Design Standards* were created to provide design information for all **DCDWM** pipeline projects (capital or private development). These Design Standards provide design guidance, standard details and other information necessary to construct water and sewer system improvements that meet the requirements set by **DCDWM**.

Project design shall follow the most current version of the *DCDWM Pipeline Design Standards*; changes, revisions, additions, and/or corrections can be made by **DCDWM** at any time without prior notification. The **Engineer** is responsible for ensuring that the project meets the latest requirements of these Design Standards.

The *DCDWM Pump Station Design Standards* are not included within this document (under separate cover).

For DC DWM capital projects there are additional SOPs related to tree replacements, geotechnical investigations and other related detailed design issues. The DWM PM will provide necessary SOPs applicable to those projects.

All designs will be done using sound engineering, construction management, and operation practices. Sound engineering practices may include, but are not limited to appropriate, provisions of the Handbook: Sewer System Infrastructure Analysis and Rehabilitation, EPA/625/6-91/030,1991; Existing Sewer Evaluation and Rehabilitation, WEF MOP FD-6, 2010, Computer Tools for Sanitary Sewer System Capacity Analysis and Planning, EPA/600/ R-07/111, October 2007; and the Pumping Systems chapter of the most current version of the Water Environment Federation's Manual of Practice FD-4, Design of Wastewater and Stormwater Pumping Stations.

SECTION II
POTABLE WATER DESIGN STANDARDS

A. General Drawing Requirements

1. General

AutoCAD electronic files shall follow the format and requirements for DCDWM (latest version).

The plan set shall also include a legend depicting symbols used in the drawings, general notes pertinent to **DCDWM** requirements, and **DCDWM** standard details used within the plan set.

Refer to applicable 2026 DCDWM technical specifications for additional detailed requirements and standards.

2. Information Required

The title block presented on each sheet shall be complete and include professional seal of **Engineer** with signature (at the 100% design phase).

A cover sheet shall be submitted including: a drawing index, location map with north arrow, and also include an approval block for **DCDPS** signature.

a) Plan View Requirements:

- Plan view shall have a scale of not more than fifty (50) feet to the inch (1" = 50').
- The view shall show location, size, and material of construction of the proposed pipelines within the project area.
- Proposed water mains shall be shown on the plans as solid lines with size, material, and pipe class called out. For example, "12" DIP Class 350."
- The plan view shall also show the hydrants, valves, meters, blow-off valves, fittings, etc.
- Plan view sheets shall include a north arrow. **The north arrow should be orientated "up" or "left" to facilitate comparison with GIS data views.**
- A table shall be provided in the plans identifying the coordinates for each water meter to be installed on the project. Water meters shall be located close to existing property lines wherever possible.
- The preferred projection system to be used shall be verified with the **County**, in writing. An example is provided in **Table 2.1**.

Table 2.1 Water Meter Coordinates Example			
Lot #	**Water Meter #**	**Northing**	**Easting**
5	108	672910	476292
6	109	543198	354328

- The plans shall identify the lots served by the new distribution mains within the plats or subdivisions under the project scope of work.
- Existing utilities shall be shown to the extent known, given records available to the **Engineer**.
- Existing utilities shall be shown as dashed lines. Construction details shall note that the buried utilities are to be field located prior to construction.
- Plans shall show the tie-in point(s) of the proposed system to the existing **DCDWM** system with details of each connection on inset type maps on the appropriate plan sheet.
- Plans shall include typical construction details of the tie-ins to existing pipelines; typical trench cross-sections, including bedding, backfill, and compaction requirements; fire hydrant; thrust restraint or blocking; and service connection details. Potable water main standard details are provided in **Appendix A**.

b) Profile View Requirements:

Generally, profiles are not required for plan submittals on water mains smaller than sixteen (16) inches in diameter; however, special project considerations may require profiles for a portion of the project.

- Profiles are required for water mains sixteen (16) inches and larger.
- Profiles or crossing details with a vertical scale of not more than ten (10) feet to the inch shall be considered where pipeline projects encounter areas of numerous utilities that cannot be easily relocated, such as storm and sanitary sewers, and that have potential conflicts with the proposed water main(s).
- Profiles shall also be provided for pipelines proposed through a streambed or crossing Georgia Department of Transportation (GDOT) right-of-way.

Where a GDOT utility permit is required, the location of the connection to **DCDWM** utilities is subject to change, if so required by GDOT.

B. Design Criteria

1. Location

DCDWM's standard location for water main placement shall be as follows:

- For subdivisions, the proposed water main shall be located on the north side of east-west streets, and on the east side of north-south streets. Deviation from this requirement must be approved by DCDWM
- For existing **County** roads, the proposed water main shall generally be located five (5) feet inside the right-of-way. For existing GDOT roads, the proposed water main shall be located five (5) feet inside the right-of-way or as permitted by GDOT. Unusual circumstances, such as embankments, obstructions, other utilities, etc., may warrant deviation.
- For private developments/subdivisions, the proposed water main shall be located four (4) feet from the back of the curb or as directed by the **County**.
- For non-subdivision streets, the proposed water main shall be located on that side of the road as determined by any existing lines to be tied into at the beginning and/or end of the project.
    - For non-subdivision streets, the location may also be determined by existing rights-of-way, or lack thereof. Water mains shall be installed within deeded rights-of-way. Installations within "prescriptive" easements are not permitted.
    - For non-subdivision streets, locations on the same side of the road as gas lines are to be avoided. On projects where any existing gas lines have "active" cathodic protection for corrosion prevention, the proposed water main shall be installed on the opposite side of the road, and may require additional protective measures, as specified by **DCDWM**.
    - For non-subdivision streets where none of the above governs, the proposed water main shall be located on the side of the road that has the fewest conflicts (i.e., rock outcroppings, trees, side roads, fences, structures, involved landscaping, embankments, prescriptive easements, etc.). NOTE: The water main location shall maintain ten (10) feet of horizontal separation from existing parallel sanitary sewer mains, and a minimum eighteen (18) inches vertical separation from any existing perpendicular crossing of sanitary sewer mains unless provided with special protection, as approved by **DCDWM**.

2. Size

Unless otherwise specified by **DCDWM**, water mains serving single-family residential developments shall have a minimum diameter of eight (8) inches. Water mains serving commercial, industrial or high-density residential areas shall have a minimum diameter of twelve (12) inches. Contact **DCDPS/DCLDP** for additional requirements that may apply for development-related projects. **DCDWM** will provide sizing requirements for transmission main projects.

3. Depth of Pipe Burial

Water mains outside of paved areas and under paved areas shall have a minimum cover of four (4) feet. **DCDWM** may require cover greater than four (4) feet for pipes, or other protective measures, under roads with heavy vehicular loads and traffic.

4. Special Design Considerations

a) Freeze Protection

Protection from freezing shall be provided for pipes above ground (such as bridge crossings).

b) Thrust Restraint

Pipe thrust restraints shall be considered for pipelines above ground as well. Information regarding thrust restraint is provided in Appendix E and one calculator for restrained length requirements can be found at the Ductile Iron Research Association (https://dipra.org/technical-resources/calculators/thrust-restraint-calculator). Engineer shall reflect existing soils and proposed design conditions using the ***actual expected system pressure for that location with a 1.5 safety factor*** in their calculations. Alternative calculation approaches should be compared by the Engineer to the DIPRA calculator prior to submittal to DWM (include DIPRA calculations in the submittal information) for review and approval.

5. Separation from Non-Potable Conveyance Systems

a) Horizontal and Vertical Separations

Potable water mains shall maintain a ten- (10-) foot horizontal and eighteen- (18-) inch minimum vertical clearance from non-potable pipelines (i.e., sanitary sewers, reclaimed water piping, etc.). If the water main is **below** the non-potable pipeline, DCDWM may require protective measures in addition to the 18-inch vertical clearance. Measurement shall be from outside of pipe to outside of pipe. If site conditions do not allow such minimum separations, **DCDWM** may allow deviation on a case-by-case basis, if supported by data from the **Engineer**. The supporting data shall be submitted to **DCDWM** for approval. If it is impossible to obtain proper horizontal and vertical separation as described above, both the water and non-potable line shall be constructed of DIP meeting **DCDWM** Standards. Each line shall be pressure-tested to two hundred (200) pounds per square inch (PSI) minimum to confirm watertightness.

b) Crossings

Water mains crossing over or under non-potable lines shall be laid to provide a minimum vertical distance of eighteen (18) inches between the outside of the water main and the outside of the non-potable line. If site conditions do not allow such minimum separations, **DCDWM** may allow deviation on a case-by-case basis, if supported by data from the **Engineer**. The supporting data shall be submitted to **DCDWM** for approval. The crossing shall be arranged so that the non-potable line joints shall be equidistant and as far as possible from the water main joints. Where a water main crosses under a non-potable line, adequate structural support shall be provided for the non-potable line to maintain line and grade.

When it is impossible to obtain the proper vertical separation as stipulated above, one of the following methods shall be specified and approval from the **County** obtained.

- Each line shall be designed and constructed equal to water pipe minimum standards and shall be pressure-tested to a minimum of two hundred (200) PSI to confirm watertightness.
- Either the water main or the non-potable line shall be encased in a water-tight casing pipe or concrete encasement that extends ten (10) feet on both sides of the crossing, measured perpendicular to the water main. The casing pipe shall meet the minimum depth and material requirements of the steel casing for jack and bore crossings.

6. Separation from Other Potential Sources of Contamination

Installation of water mains near other potential sources of contamination or any other facility, where the failure of the facility would subject the water main to toxic chemical or pathogenic contamination, shall be thoroughly evaluated by the **Engineer** on a case-by-case basis. Other potential sources of contamination include sites such as (abandoned) underground hydrocarbon storage tank sites, storage ponds, land disposal sites for wastewater or industrial process water containing toxic materials or pathogenic organisms, and solid waste disposal sites.

If a pipeline needs to be laid in an area with contaminated soil, certain precautions shall be taken. Research has shown that certain pipe materials and elastomers (such as those used in jointing gaskets and packing glands) may be susceptible to permeation by lower-molecular-weight organic solvents or petroleum products. The **Engineer** shall consult with **DCDWM**, the manufacturer, and the Georgia Department of Natural Resources Environmental Protection Division (EPD) before selecting materials for use in that area.

7. Cross-Connection Control Protection

a) Purpose

The purpose of the cross-connection control program is to protect the quality of water delivered to the customer (at the service connection), from contamination through cross-connections with other non-potable water or other liquids conveyed through piping.

b) Requirements

Under the authority of Section 25-27 and 25-34 of the DeKalb County Code, a backflow prevention assembly shall be installed on each connection to the **DCDWM** water distribution system to protect against the possibility of a contaminated backflow into the **DCDWM** water system. Existing services, new development and construction projects shall have backflow prevention assembly(ies) installed on domestic, commercial, fire line, irrigation services, and other services as required.

The **County** shall reserve the right to choose which type of backflow prevention assembl(ies) shall be approved for commercial customers. There are three (3) types of basic backflow assemblies that may be approved for commercial properties within the **County**:

- Water connections to facilities with low hazard potential—such as, general office buildings, and stores—require the installation of Double-Check Valve (DC) Assembly. **Table 2.2** and **Appendix A** provide more information.

- For water connections to dedicated fire line leads and/or dedicated fire line systems, the installation of a Double-Check Detector Assembly (DCDA) is required. **Table 2.2** below and **Appendix A** provide more information.

- Water connections to facilities with high hazard potential— such as animal clinics, animal grooming shops, car wash facilities, medical and dental buildings, and irrigation systems—require the installation of Reduced Pressure Principle (RPP) assemblies. **Table 2.2** below and **Appendix A** provide more information.

Table 2.2 **Standard Detail Table** (Details in **Appendix A**)		
Low Hazard	W-014, Sizes ¾" - 2" (DC)	W-010, Sizes 2 ½" - 12" (DC)
Dedicated Fire Line	W-009, Sizes 2 ½" - 9" (DCDA)	W-013, Sizes 2 ½" – 12" (RPDA)
High Hazard	W-011, Sizes ¾" - 2" (RPP)	W-012, Sizes 2 ½" - 12" (RPP)

The two lists below indicate the specific facilities that require DC and RPP, respectively.

Typical facilities that may require DC as a minimum:

1. Restaurants without carbonators
2. Schools and colleges without laboratories
3. Daycare centers
4. Mobile home parks
5. Shopping centers (consult with the **DWM's** Backflow Prevention Section at **(404) 687-4075**)
6. General office building
7. Retail stores
8. Other general facilities

Typical facilities that may require RPP as a minimum:

1. Aircraft and missile plants
2. Animal clinics, animal grooming shops
3. Automotive repair with steam and/or acid cleaning equipment or solvent facilities
4. Auxiliary water systems (interconnected)
5. Canneries, packinghouses, and reduction plants
6. Car wash facilities
7. Centralized heating and air conditioning plants
8. Chemical plants
9. Chemically treated potable or non-potable water systems
10. Civil works (government-owned or -operated facilities not open for inspection by **DCDWM**).
11. Commercial laundries
12. Dye works
13. Film processing laboratories or laboratories using contaminating materials
14. Holding tank disposal stations
15. Hospitals and mortuaries
16. Medical and dental buildings
17. Irrigation systems
18. Restaurants with carbonators
19. Pools, baptismal pool, spas, and decorative fountains
20. Manufacturing, processing, and fabricating plants using contaminating materials
21. Motion picture studios
22. Oil and gas production facilities
23. Plating plants
24. Power plants
25. Radioactive materials processing
26. Restricted, classified or other closed facilities
27. Rubber plants
28. Sand and gravel plants
29. Sewage and storm drainage facilities
30. Shopping centers (consult with the **DWM's** Backflow Prevention Section at **(404) 687-4075**)

31. Any premises where a cross-connection is maintained
32. Water trucks, hydraulic sewer cleaning equipment, any connection to a fire hydrant with a **DWM** rented meter (**call the Utility Customer Operations Office at (404) 371-2697**)
33. Facilities not listed above: DWM may require either DC or RPP at their discretion.

8. Appurtenant Design Considerations

a) Valve Placement

Valves on distribution mains with diameters of twelve (12) inches or less shall be located with a maximum spacing of one thousand (1,000) feet. Generally, four (4) valves are installed on every cross. New lines or connections to existing lines with tee fittings should include 3 valves (one on each branch).

Valves on transmission mains shall be located with a maximum spacing of three thousand feet (3000) feet unless otherwise approved by DCDWM as shown in Appendix A. Note permanent access ports will be required on both sides of valves on transmission mains.

b) Air Release Valves

High points of distribution or transmission lines require air release valves. The air release valve installation is presented in **Appendix A.** If approved by DCDWM, a connected fire hydrant assembly may be provided in lieu of an air release structure at the high point.

c) Fire Hydrants, Fire Lines, Flushing Valves, and Blow-offs

Fire hydrants shall be spaced every five hundred (500) feet in rural areas, every four (400) feet in residential areas, and every three hundred (300) feet in commercial areas, or as determined by the DeKalb County Fire Marshall.

Every fourth hydrant along a transmission main corridor shall be connected to the transmission main color marking per NFPA 291 added to bonnet of the specific hydrants.

If a fire hydrant is placed on a branch water line at a distance exceeding one hundred (100) feet from the point of tap on the water main, then a backflow prevention device will be required along with the requirement flush new water lines, remove air, and pass hydrostatic pressure and sterilization tests per **DCDWM** Standards.

Each fire hydrant shall be installed using a fire hydrant tee and six- (6-) inch isolation valve and shall be identified on the plan. Blow-offs or hydrants shall be installed at low points and dead ends in the distribution system to allow for sufficient flushing and proper disinfection of the water main. They shall be designed to achieve a minimum velocity of

two and one half (2.5) feet per second (fps) in the main for scouring purposes. The Typical Blow-off assembly is provided in **Appendix A**.

Where possible, place a fire hydrant near the end of each main. Where this is not feasible due to spacing requirements, provide a one- (1-) inch blow-off on mains of eight (8) inches in diameter mains and a two- (2-) inch blow-off on mains that are twelve (12) inches and larger, for use in flushing (see **Appendix A**).. Blow-off assemblies shall be installed with freeze protection.

A backflow prevention assembly shall be installed on the fire lines.

All existing fire hydrants on mains to be abandoned as part of the submitted project shall be labeled as follows: "Existing fire hydrant to be salvaged and returned by **Contractor** to **DCDWM** Roadhaven Facility."

d) Angle, Curb, or Meter Stops

Separate, angle, curb, or meter stops for each service connection shall be installed. The service and meter installation Standard Details are provided in **Appendix A.**

e) Private Fire Lines

Privately owned fire lines are subject to review and approval by **DCDWM** and shall meet the minimums of the latest NFPA 24 fire line codes. The Fire Marshall shall approve the size and flow requirements for the fire line. **DCDWM** shall determine the tapping fee and the fire line fee, including inspection of the construction. Private fire lines shall be constructed of DIP, as specified in Section II.D.2.

f) Meter Locations

All meters shall be located in green space. Meters shall not be located within driveways, sidewalks, or other paved areas. A three- (3-) foot-by-three- (3-) foot area of green space shall be allotted for each water meter to allow for the proper maintenance or replacement of meters. Meters for condominiums and individually metered high-rise apartments shall be placed into a meter bank. The **Engineer** shall follow the water meter location Standard Detail in **Appendix A.**

g) Vaults

Vaults shall have only one (1) line entering and leaving the structure. For example, fire and domestic or irrigation services shall be located in separate vaults. Vaults shall be designed and stamped by a Professional Engineer registered in the State of Georgia and shall be submitted for approval by the **DCDWM**.

9. Design of Water Mains within GDOT Right-of-Way

If any portion of a proposed project enters a State of Georgia controlled right-of-way, then a GDOT permit application is required. Engineer shall submit to

DCDWM the required materials as required for submittal through the GUPS system. The Georgia Department of Transportation Permitting Checklist is available at http://www.dot.ga.gov/.

GDOT requires the GDOT permit application to be submitted through the GUPS. The Engineer shall not submit the GDOT permit directly through the Georgia Utilities Permitting System (GUPS). The Engineer shall provide all necessary information, as stated in the previous paragraph. DCDWM will then review the information and provide comments (if necessary). Once the necessary information has been approved, DCDWM will submit the GDOT permit application through the GUPS. All Work, including furnishing materials for installing, relocating, and adjusting water distribution systems, shall be in accordance with the latest edition of GDOT Standard Specifications Section 670 – Water Distribution System and Section 847 - Miscellaneous Pipe details are available at http://tomcat2.dot.state.ga.us.

Note that:

- The minimum cover over water mains shall be four (4) feet.
- Traffic control shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), latest edition.
- Trench restoration within GDOT right-of-way shall be in accordance with GDOT Standard Detail 1401 Pavement Patching Details, available at http://tomcat2.dot.state.ga.us.
- All bore and jack pits shall be a minimum of ten (10) feet from the outside edge of pavement. Plans shall show casing size and carrier pipe size within the approach slab for bridge crossings. Details of how the carrier pipes shall be launched into and secured in the casing pipes shall also be shown on the plans.
- Fire hydrants shall be relocated to within five (5) feet of the right-of-way, per GDOT requirements.
- A note shall be added to the plans, stating: “Backflow prevention devices on private property shall be relocated by GDOT’s **Contractor** at no expense to DeKalb County” (if applicable).
- In GDOT *Section 2.5.H. Service Lines* - Because it is in the interest of both the customer and Utility to have these connections, service lines are permitted on right-of-way as close to perpendicular as possible with the transmission facility with the exception that metering devices, vaults or pressure reducing mechanisms shall be located off the right-of-way. Any longitudinal installations of service lines shall be reviewed by the District Utilities Engineer on a case-by-case basis. This does not apply to installations serving a highway purpose.

C. Construction Materials

1. General

The materials used for water main construction shall meet American Water Works Association (AWWA) Specifications. In the event of any corrosive soil conditions, the **Engineer** shall make recommendations for additional corrosion protection for the pipeline, valves and fittings.

2. Ductile Iron Pipe

a) Note that transmission main pipe materials are discussed in the DCDWM technical specification. Material applicability depends on pipeline size but for pipes 48 inches and smaller Ductile Iron Pipe is DCDWM standard unless otherwise requested by DCDWM.

b) Push-On Joint

All push-on DIP shall be manufactured in accordance with and meeting the latest requirements of AWWA C151/A21.51. Ductile iron fittings shall be manufactured in accordance with and meeting the latest requirements of AWWA C110/A21.10. Ductile iron joints shall be manufactured in accordance with and meeting the latest requirements of AWWA C111/A21.11. Pipe shall generally be designed for Type 1 laying conditions with four (4) feet of cover; however, exceptional conditions may be indicated on the approved plans and specifications, and these shall take precedence.

Wall thickness of pipe shall be as specified under **Section II.D.2.d.**

c) Mechanical Joint

All mechanical joint DIP shall be manufactured in accordance with and meeting the latest requirements of AWWA C151/A21.51.

Wall thickness of pipe shall be as specified under **Section II.D.2.d.**

The mechanical joint herein specified for mechanical joint DIP and fittings shall meet the latest requirements of AWWA C110/A21.10 with joints meeting the latest requirements of AWWA C111/A21.11.

All nuts, bolts, and washers shall be in accordance with ASME/ANSI B1.1, unified inch screw threads, class 2A, external and class B, internal, low-carbon steel conforming to American Society for Testing and Materials (ASTM) A307 (60,000 PSI tensile strength). Corrosion protection of the fasteners shall be zinc-coated (hot dip) in accordance with ASTM A153, Class C and D, coated thickness grade.

All buried nuts and bolts shall be wrapped with Denso profiling mastic and wrapped in polyethylene sheeting with a minimum thickness 84 mils.

d) Flanged Pipe (Non-Buried Applications)

All flanged DIP shall be manufactured in accordance with and meeting the latest requirements of AWWA C151/A21.51 with joints meeting the latest requirements of AWWA C115/A21.15.

Wall thickness of pipe shall be as specified under **Section II.D.2.d.**

All flanged ductile iron fittings shall be manufactured in accordance with the latest requirements of AWWA C110, three hundred and fifty (350) PSI working pressure. Design of flanged ductile iron fittings shall be as directed, indicated, or noted on the approved drawings. In general, the **Contractor** shall use flanged fittings with long-radius elbows except where space limitations prohibit use of same. Design of special flanged fittings, including wall castings, shall conform to dimensions and details as directed, indicated, or noted on the approved drawings.

All nuts, bolts, and washers shall be in accordance with ASME/ANSI B1.1, unified inch screw threads, Class 2A, external and Class B, internal, low-carbon steel conforming to ASTM A307 (60,000 PSI tensile strength). Corrosion protection of the fasteners shall be zinc-coated (hot dip) in accordance with ASTM A153, Class C and D, coated thickness grade.

All buried nuts and bolts shall be wrapped with Denso profiling mastic and wrapped in polyethylene sheeting with a minimum thickness 84 mils.

e) Pipe Wall Thickness

DIP with push-on or mechanical joints shall have the minimum wall thickness shown in **Table 2.3.**

Table 2.3
Minimum Pipe Wall Thickness

Pipe Diameter (inches)	Pipe Class	Minimum Wall Thickness (inches)
4	51	0.26
6	51	0.28
8	51	0.30
10	51	0.32
12	51	0.34
14	51	0.36
16	51	0.37
18	51	0.38
20	51	0.39
24	51	0.41
30	51	0.43
36	51	0.48
42	51	0.53
48	51	0.58
54	51	0.65

NOTE: **Table 2.3** is based off American Cast Iron Pipe Company Ductile Iron product specifications. The table shows Special Thickness Class fifty-one (51). Each pipe size shall be Special Class 51 minimum.

All DIP with flanged joints shall be a minimum of Special Thickness Class fifty-three (53), minimum wall thickness, as shown in **Table 2.4**.

Table 2.4
Minimum Wall Thickness for Ductile Iron Pipe with Flanged Joints

Pipe Diameter (inches)	Pipe Class	Minimum Wall Thickness (inches)
4	53	0.32
6	53	0.34
8	53	0.36
10	53	0.38
12	53	0.40
14	53	0.42
16	53	0.43
18	53	0.44
20	53	0.45
24	53	0.47
30	53	0.51
36	53	0.58
42	53	0.65
48	53	0.72
54	53	0.81

NOTE: Pipe class and thickness of DIP larger than fifty-four (54) inches in diameter shall be taken into special consideration and shall require approval by **DCDWM**.

f) Service Materials

Service materials shall be constructed of copper pipe with fittings and appurtenances in accordance with the following:

Fittings shall meet the no lead (NL) designation. Copper service lines installed within GDOT right-of way shall be a minimum of one (1) inch in diameter.

(1) Copper Tubing and Fittings

Copper pipe (or tubing) shall be minimum three-quarter (¾) inch and be manufactured and furnished in accordance with the latest requirements of ASTM B88, Type “K.” Fittings shall be of the compression “pack-joint” coupling type greater than 1,” Fittings 1” and less shall be flared.

(2) Appurtenances

Appurtenances such as corporation stops, curb stops, and adaptors for copper service lines, shall meet the latest requirements of ASTM B62 for bronze construction and AWWA C-800 for threads. Fittings shall meet the NL designation.

1. Nut, Piggy-Back – ¾-inch Ford #C02-43 only; 1-inch Ford #C02-54 only.
2. Union, three-piece – ¾-inch Cop x Cop, Mueller #H-15400, Ford #C22-33, or James Jones J-1528 only. 1" Cop x Cop, Ford #C22-44, Mueller H-15400, Hays #5615, and James Jones J-1528 only.
3. Adaptor, ¾-inch, M.I.P. x Cop, Mueller H-15425, Ford #C28-33, or James Jones J-1531 only.
4. Adaptor, ¾-inch, F.I.P. x Cop, Mueller H-15450, Ford #C21-33, or James Jones J-1535 only.
5. Copper Adaptor, 1-inch, M.I.P. x Cop, Ford #C28-44, Mueller H-15425, or James Jones J-1531 only.
6. Copper Adaptor, 1-inch, F.I.P. x Cop, Ford #C21-44, Mueller H-15450, or James Jones J-1535 only.
7. Flare, copper, quarter bend, ¾-inch Ford #L02-33, Mueller #H-15069 only.
8. Flare, copper, quarter bend, 1-inch Ford #L02-44.
9. Stop, ball valve curb, ¾-inch Flair Inlet, ¾-inch F.I.P. outlet, 3/4-inch full port and a lock wing, Ford #B21-233W, A.Y. McDonald 6102-W, or James Jones J-1901 only.
10. Stop, ball valve curb, 1-inch Flair Inlet, 1-inch F.I.P. outlet, ¾-inch full port and a lock wing, Ford #B21-344W only.
11. Stop, ¾-inch corporation, CC x Copper, Ford #F-600-3, Mueller #H-15000, or James Jones J-1500 only.
12. Stop, 1-inch corporation, CC x Copper, Ford #F-600-4, Mueller #H-15000-1-inch, or James Jones J-1500 only.
13. Stop, 1½-inch corporation, CC x MIP, Mueller #H-10003, McDonald 3121, or James Jones J-89.
14. Copper, flare "Y" branch 1-inch x ¾-inch, Ford Y22-243 only.
15. Couplings 1 ½-inch Ford C44-66, or James Jones J-2609 only.

(3) Small Rough Brass Fittings

Small rough brass fittings are to be in accordance with the latest edition of the American National Standards Institute (ANSI) B16.15, and with Federal Specifications WW-P-460 and A-A-59617, domestic only. This includes the brass elbows, nipples, ells, tees, reducers, couplings, plugs, hex bushings for screwed fittings, and hex bushings.

(4) Bronze Fittings

Bronze fittings shall be in accordance with AWWA C800 latest edition and ASTM B62 latest edition specifications.

1. Gate valve with non-rising stem, bronze, solid wedge disc, and full flow FIP x FIP, one and one-half (1½) inch; heavy pattern solid bronze

construction; with solid bronze hand wheel, oversize approximate 17/32-inch shaft (stem) diameter, packing providing field adjustment; double discs moveable in body, allowing debris to slip under disc as closure occurs; to be American-made with approximately 85-5-5-5 bronze, hydraulically tested individually in both open and closed positions, prior to shipment; equal to James Jones Company Model J-372, one and one-half (1½) inch.

2. Gate valve with non-rising stem, bronze, solid wedge disc and full flow FIP x FIP, two (2) inches; heavy pattern solid bronze construction; with solid bronze hand wheel, oversize approximate five-eighths- (5/8-) inch shaft (stem) diameter, packing providing field adjustment; double discs moveable in body allowing debris to slip under disc as closure occurs; to be American made with approximately 85-5-5-5 bronze, hydraulically tested individually in both open and closed positions, prior to shipment; equal to James Jones Company Model J-372, two (2) inches.

Follow Standard Details in **Appendix A**, for water service installation on cul-de-sacs. Typical water main stub-out installation is provided in **Appendix A**.

g) Valves

(1) Valve Boxes

All valves that are to be buried in the ground shall be provided with a valve box and cover. Where the depth of cover is more than five (5) feet, the **Engineer** shall design suitable, valve stem extensions and guides that have been approved by **DCDWM** Placement of Valve covers and disc markers are illustrated in **Appendix A.**

(2) Valve Concrete Markers

Valve markers shall be furnished and installed with each valve on the proposed project, with the exception of fire hydrant branch valves. The markers shall be Class A concrete of GDOT specifications, four (4) inches square by four (4) feet long and shall be of the same construction as that of highway right-of-way markers. The top one (1) foot and six (6) inches of the valve marker shall be displayed above ground. The words "Water Valve" shall be cast vertically into the marker beginning two (2) inches from the top of the marker. There shall also be a one (1) inch brass plug cast into the marker one (1) inch below the letter "e" of the word "Valve," with the distance, in feet, from the valve marker to the valve box. Distance shall be stamped on the brass plug in the field by the **Contractor** after installation. The markers shall be located as close to the right-of-way line opposite the valve as is possible, with the brass plug facing the valve. The marker shall be located to avoid damage by traffic.

(3) Valve Cover with Marker Discs

Valve boxes installed in non-paved areas shall be installed with a twenty-four- (24-) inch-by-twenty-four- (24) inch concrete collar. For valves

sixteen (16) inches and larger, a three- (3) inch diameter brass identification marker shall be installed with the concrete collar. The brass identification marker shall be stamped with valve size, type of valve, type of service, direction of opening, and number of turns to open. An example of a valve concrete collar with brass identification marker is shown in in **Appendix A.**

Valves sixteen (16) inches and larger installed in paved areas shall be installed with a three (3) inch diameter brass identification marker nine (9) inches (centerline to centerline) from the valve box. The brass identification marker shall be set with grout onto a four- (4-) inch-by-four- (4-) inch-by-eighteen- (18-) inch concrete column prior to installation next to the valve box. The brass identification marker shall not be cast or grouted directly onto the paved area. The brass identification marker shall be stamped with valve size, type of valve, type of service, direction of opening, and number of turns to open. An example of a brass identification marker installation in a paved area is provided in **Appendix A.**

(4) Valves

DCDWM shall have the discretion to determine the type of valve to be installed.

Some waters can promote galvanic corrosion and some soils can also be aggressive towards certain valve materials. The **Engineer** shall therefore select materials and corrosion protection systems that shall ensure the long-term integrity of the valves and fittings used. This applies for both above ground and buried applications. If necessary, the **Engineer** shall do additional tests to confirm the status of the water and soil before an application is submitted for approval to the **County**.

1. Gate Valves (24” pipes and smaller)

   Gate valves shall conform to AWWA C500 (latest edition) for double-disc gate valves, or AWWA C509 (latest edition) for resilient-seated gate valves, and shall be as manufactured by American Flow Control, U.S. Pipe, Mueller, Clow, or approved equal.

   Gate valves shall be hand-operated, non-rising stem, with cast or ductile iron bodies, and adapted for joints as indicated in the approved design drawings, or as directed.

   Bolting materials of the valve shall only be zinc-coated (hot dip) in accordance with ASTM A153, Class C and D, coated thickness grade or Stainless Steel 304 (the latter shall be used only if no galvanic corrosion is promoted).

   All gate valves shall open by turning the operating nut to the left (counterclockwise).

Gate valves shall be used for all sizes. Greater than ten (10) inches shall use resilient seated gate valves. Gate valves shall be submitted to the **DCDWM** for approval prior to installation. Vaults can be required at the discretion of DCDWM.

The valve ends shall be with mechanical joints. Fasteners shall be as specified under Section II.D.2.b above. Torque values for the bolts shall be as prescribed by the valve manufacturer and in combination with the specific gaskets that are used.

All buried nuts and bolts shall be wrapped with Denso profiling mastic and wrapped in polyethylene sheeting with a minimum thickness of 84 mils.

For gate valve installation, see Standard Detail in **Appendix A.**

Butterfly Valves may be used on pipelines equal to or greater than 24" pipelines.

Butterfly valves shall conform to the requirements of AWWA C504 (latest edition), and shall be as manufactured by American Flow Control, Henry Pratt, Allis-Chalmers, or approved equal.

All butterfly valves shall be installed within a vault designed and stamped by a Professional Engineer registered in the State of Georgia and shall be submitted for approval by the **County**. Butterfly valves shall be hand-operated with cast or ductile iron bodies and adapted for joints as indicated in the approved design drawings, or as directed by the **County**.

All butterfly valves shall open by turning the operating nut to the left (counterclockwise).

Final valve type will be considered on a case by case basis and as ***directed and approved by DCDWM.***

h) Fittings and Appurtenances

(1) Ductile Iron Fittings

Fittings shall be ductile iron and shall conform to the requirements of AWWA C110 or AWWA C153, latest editions, with a minimum rated working pressure of three hundred and fifty (350) PSI.

(2) Tapping Sleeves

All tapping sleeves shall comply with the latest ANSI Standard, two hundred (200) PSI minimum working pressure. Tapping sleeves shall be cast iron or ductile iron with mechanical joint ends as manufactured by American Flow Control, Mueller, or approved equal. Fabricated split steel tapping sleeves of the full-circle variety, as manufactured by Rockwell, JCM, or equal, may be used with the approval of **DCDWM**. When tapping

an existing asbestos-concrete pipe, a stainless-steel tapping sleeve, as manufactured by Ford, or approved equal, that contains a full gasketed surface within the sleeve body, shall be used due to variances in the manufactured OD of the asbestos-concrete pipe. Outlets shall be sized to permit a tap to be made using a full-size shell cutter.

All buried nuts and bolts shall be wrapped with Denso profiling mastic and wrapped in polyethylene sheeting with a minimum thickness 84 mils.

(3) Tapping Saddles

All tapping saddles shall be AWWA standard-approved with flanged connections. Tapping saddles shall be used only on DIP that is twenty-four (24) inches or larger. The use of service saddles is not allowed for tapping services or mains.

i) Fire Hydrants

Fire hydrants shall be manufactured in full compliance with the AWWA Standard for Dry-Barrel Fire Hydrants, AWWA C502 (latest edition), and as herein amended. Fire hydrants shall have an internal check valve flapper. Fire hydrants shall only be installed after being submitted and receiving approval from **DCDWM.** Only the following fire hydrants are approved by the **County**: American Darling B84B, M & Style, Mueller, Clow, US Pipe, or Waterous.

Type – Three- (3-) way, post-type, dry-top traffic model with compression main valve opening against and closing in the direction of normal water flow.

Size - Internal main valve diameter shall be a minimum of five and one-quarter (5¼) inches.

Identification - Each hydrant shall have the name of the manufacturer, the year made, and the nominal valve size in legible, raised letters cast on the barrel or bonnet.

Dry Top Bonnet - Each hydrant shall be constructed with a moisture-proof lubricant chamber that encloses the operating threads and provides automatic lubrication of the threads and bearing surfaces each time the hydrant is operated. This assembly shall be composed of a top "O" ring serving as a dirt and moisture barrier and a lower "O" ring that serves as a pressure seal.

Operating Nut - The operating nut shall be **DCDWM** standard four- (4-) sided nut and shall open by turning left (counter-clockwise). Nozzle caps shall come with heavy duty, non-kinking chains. Chains shall be securely affixed to the hydrant barrel and permit free turning of the nozzle caps and four- (4-) sided operating nut.

Traffic Design - The fire hydrant barrel sections shall be set to an elevation that does not exceed six (6) inches above grade at the flange connection. This is to ensure breakaway if impact occurs.

The main valve rod sections shall be connected at the ground line by a frangible coupling. The standpipe and ground line safety construction shall be such that the hydrant nozzles can be rotated to any desired position without disassembling or removing the top operating components and top section of the hydrant standpipe.

Main Valve - The main valve shall be made of synthetic rubber and formed to fit the valve seat accurately.

Main Valve Seat - The main valve seat shall be of bronze and its assembly into the hydrant shall involve bronze-to-bronze thread engagement. Two "C" ring seals shall be provided as a positive pressure seal between the bronze seat ring and the shoe. The valve assembly pressure seals shall be obtained without the employment of torque compressed gaskets. The hydrants shall be designed to allow the removal of the operating parts through the hydrant barrel by means of a single disassembly wrench without excavating.

Drain - The drain mechanism shall be designed to operate automatically with the operation of the main valve and shall allow momentary flushing of the drain ports. A minimum of two (2) internal and two (2) external bronze lined drain ports shall be required in the main valve assembly to drain the hydrant barrel.

Inlet Connection - The cast iron inlet elbow shall have a six- (6-) inch mechanical joint connection complete with accessories.

Extensions - Barrel extension sections shall be available in six- (6-) inch increments, complete with rod, extension coupling, and the necessary flanges, gaskets, and bolts so that the hydrant can be extended without excavating.

Nozzles - No lead shall be allowed in nozzle construction as a component of the metallic content.

Testing - Fire hydrants shall be tested in strict accordance with AWWA C502 (latest edition) at the point of manufacture. Certificates of Compliance shall be provided to **DCDWM** upon request.

Painting - Iron parts of the hydrant both inside and outside shall be painted in accordance with the latest requirements of AWWA C502. The final coat of the outside surfaces of the barrel above grade shall be composed of two field coats of Tnemec Series 2H, Hi-Build Tnemec-Glass or **County** approved equal. The top bonnet, including the lip and the nozzle caps, shall be painted the appropriate color as approved by **DCDWM**. Caps and weather covers shall have reflecting properties.

3. Bedding

A. Water

Bedding materials shall be in accordance with GDOT Standard Specification

Section 812, Type I or II Foundation Backfill.

Bedding requirements specified herein shall apply to potable water mains only. They are to be considered minimum bedding requirements and as such, do not relieve the **Contractor** of the responsibility to provide any additional bedding necessary for proper construction.

Bedding material shall be shown for the full width of the trench bottom.

4. Tapping of Existing Mains

Connections to existing pipelines shall generally be made by the use of tapping sleeves and valves, except as specifically indicated on the approved drawings to be otherwise, or as may be directed by **DCDWM**. Tapping of existing water mains shall be at the discretion of the **County**. Some existing lines shall not be allowed to receive taps or tie-in connections.

These requirements are based on County Ordinance Chapter 14, Article III, Division 4, Part B Section 14-313, amended by adding: The design shall include necessary improvements to the water system, including extensions along the entire roadway frontage of the development - adopted 28th day of July 1992.

In certain instances, it may be specified or desirable to tap a "dry" line. In this circumstance, a tapping sleeve and valve shall be required, and the tap accomplished using a standard "tapping machine." Under no circumstances shall any party be permitted to "burn" a hole in the main using oxyacetylene tools.

D. Testing

1. Pressure and Leakage

Pipes, fittings, and appurtenances shall be laid in such a manner as to leave joints watertight. After the pipe is laid, each section, as may be determined or defined by **DCDWM**, shall be properly and adequately flushed, the air removed, and then tested under a hydrostatic pressure of two hundred (200) PSI as measured at the lowest elevation of the test section. Where static pressure exceeds one hundred (100) PSI, the test pressure, as measured at the lowest elevation of the test section shall be equal to one hundred and fifty percent (150%) of the normal working pressure or one hundred percent (100%) of the pipe's rated pressure, whichever is less. If elevation differentials, within a test section, vary by more than forty-five (45) feet, then the section shall be broken into shorter lengths by the insertion of additional valves. ***The Engineer shall consider the above requirements in the design process.***

SECTION III
Gravity Sanitary Sewer Standards

A. Drawing Requirements

1. Information Required

The title block presented on each sheet shall be complete; and professional seal of **Engineer** with signature (100% submittal).

A cover sheet shall be included with a drawing index. The cover sheet shall also include an approval block for **DCDPS** signature. Cover sheet shall include a location map with north arrow.

a) Plan View

Plan view shall have a scale of not more than fifty (50) feet to the inch [1" = 50']. Show the location, size and material of construction for the proposed pipelines within the project area. The proposed gravity sanitary sewer lines shall be shown on the plans as solid lines with size, material, use, and pipe class called out; for example "8-inch DIP (SS)-Class 350" or other site-specific approved DCDWM pipe material. Plans shall show the location of the gravity sanitary sewer lines and manholes including the deflection angle at each manhole. Manholes shall be numbered on the plans. Plans shall also show any lift stations adjoining the gravity sanitary sewer system. Pump Station and Force Main Standards are located in Section IV of these Design Standards. Proposed and existing easements shall be shown. Service connections with cleanouts (one per lot) shall be shown on the plans, including distance to the nearest manhole and length of service line. Tables shall be provided in the plans identifying the following gravity sanitary sewer information. Example information is shown in **Tables 3.1** and **3.2.**

Table 3.1
Example Gravity Sanitary Sewer Schedule

MH #	Rim Elev. (ft.)	Invert Elev. Out (ft.)	Invert Elev. In (ft.)	Pipe Length (ft.)	Pipe Dia. Material and Class	Slope %
SS1	1024.62	1017.62	1017.82	250	8" PVC-SDR26	1.8
SS2	1027.56	1022.32	1022.52			

Table 3.2
Example Gravity Sanitary Sewer Stub Location

Lot #	Sewer Stub #	Northing	Easting
23	182	672908	476298
24	183	543206	354320

Plans shall show the other buried existing or proposed utilities, including storm and gravity sanitary sewers, drywells, potable water mains, buried telephone, natural gas, power, and cable TV lines, within the project area that are

concurrent with proposed gravity sanitary sewer construction. Existing utilities shall be shown to the extent known, given records available to the **Engineer**. Existing utilities shall be shown as dashed lines. Construction detail notes will specify that the buried utilities shall be field located prior to construction.

Plans shall show the tie-in point(s) of the proposed gravity sanitary sewer system to the **DCDWM** existing system. Plans shall include typical construction details of the tie-ins to existing pipelines and structures; typical trench cross-sections including bedding, backfill, and compaction requirements; manhole; and service connection details. Gravity Sanitary Sewer standard details are provided in **Appendix B**.

The project benchmarks shall also be shown and referenced to state plane coordinates.

Each plan sheet should have a north arrow that faces "up" or "left" to facilitate DWM cross checks with GIS views.

b) Profile View

Profiles shall show each manhole, sanitary sewer line, lift station, utility crossings etc. as referenced on the plan view. Profile shall list the slope, service line distance to sanitary sewer line, pipe utility use and material, size of pipe and bedding materials. Manholes shall be referenced by station and manhole number, including rim elevations and inverts to the nearest 0.00'. Profile information shall also include any outside drop connection design information. Profiles shall have a vertical scale of not more than ten (10) feet to the inch.

Manholes in profile view shall show (to vertical scale) all connecting pipes and list sizes and Invert Elevations at the top (90deg left orientation).

B. Gravity Sanitary Sewer Design Criteria

1. Location

a) Gravity Sanitary Sewer Design Distance

The **DCDWM** standard location for gravity sanitary sewers shall be as follows:

(1) Sanitary sewers shall be designed with straight alignments between manholes. Curvilinear sanitary sewers are not permitted.

(2) Sanitary sewer lines shall be located as near the center of the street as practical.

(3) Shall be located a minimum of four (4) feet from the curb under the pavement.

(4) Shall be located within the public right-of-way or recorded easement

(5) Shall provide a minimum of ten (10) feet of horizontal clearance from any building, structure, water main or other utility, when practical.

(6) Maximum distance between manholes for sanitary sewer lines under twenty-four (24) inches: four hundred (400) feet.

(7) Maximum distance between manholes for sanitary sewer lines twenty-four (24) inches or over: eight hundred (800) feet.

(8) No lateral shall cross property lines without a recorded easement.

(9) Crowns shall be matched on sewer lines at the minimum.

b) Easement

"Onsite" easements are those easements falling within the boundaries of the current phase of the project. For subdivisions, these are shown on the plat and are dedicated through the process of recording the final plat.

"Offsite" easements are those easements falling outside the boundaries of the current phase of the project. Offsite easements that will be included in later phases of the same project and that cross property owned by and titled to the exact same entity as the one developing a subdivision may be dedicated by the final plat of the current phase of the project.

Offsite easements shall be submitted to and approved by **DCDWM** prior to issuance of offsite construction permits by **DCDWM**. Easements, either offsite for projects or onsite for commercial projects, shall be submitted and approved prior to final inspection.

Conditional easements or easements with special stipulations shall not be granted to or assigned to **DCDWM**.

Separate easement documents with plats and legal descriptions are required for each property when obtaining easements.

Construction of offsite lines shall not begin until the offsite easements are acquired and submitted to **DCDWM**. Construction of onsite lines, prior to acquiring offsite easements, is at the **Developer**'s own risk.

A property can be condemned for easements only if the sanitary sewer line to be installed is a gravity line eight (8) inches in diameter, or larger, or if a force main from a **DCDWM** pump station is to be dedicated to **DCDWM**.

No permanent structures or trees are allowed in DCDWM sewer easements.

Sanitary sewer lines shall be centered within the required permanent easement. Exceptions can be approved by **DCDWM** but shall only be approved in special circumstances and when **DCDWM** determines that future repairs and maintenance can be accomplished without unreasonable difficulty.

Minimum temporary easement widths for gravity sanitary sewer lines shall be as listed in **Table 3.3**. Note the Engineer will recommend temporary construction easement width as part of their 100% design submittal (at latest). ***The Engineer of Record will make the final recommendation for temporary easement width.***

Table 3.3
Minimum Temporary Easement Widths per Main Diameter

Main Diameter	Cover Depth	Minimum Easement Width
15" and less	<8 ft.	20 ft.
15" and less	8-16 ft.	20 ft.
15" and less	16 ft. – 22 ft.	25 ft.
15" and less	23 ft. – 30 ft.	30 ft.
16" to 30"	<16 ft.	25 ft.
16" to 30"	16 ft. – 22 ft.	30 ft.
16" to 30"	23 ft. – 30 ft.	40 ft.
Greater than 30"	Any	50 ft.

Permanent easements shall be minimum twenty (20) feet in width; **DCDWM** retains the right to require a wider easement to be provided.

A plat (8-1/2" x 14" maximum) that shows the boundary of the easement area and a written legal description that can be followed on a submitted site plan shall be attached to each easement document. Plats must include all existing and proposed easements to ensure official recording captures all pertinent information.

2. Size

a) General: Gravity Sanitary Sewer Lines

Gravity sanitary sewer lines shall be sized to accommodate the peak design flow subject to the following limitations:

(1) The d/D ratio for gravity sewer pipes shall not be greater than 0.8 at the peak flow condition.

(2) The minimum size for a sanitary sewer collection line is eight (8) inches. The minimum size for a sanitary sewer service line is six (6) inches.

b) Design Basis: Gravity Sanitary Sewer Line

Gravity sanitary sewer systems shall be designed on the basis of per capita flows for the design period in conjunction with a peaking factor or approved alternative methods. Design calculations for trunk and interceptor sewers shall be submitted to **DCDWM** for approval. Larger systems shall have dynamic hydraulic modeling performed to validate proposed designs. Replacement mains or rehabilitations of existing mains shall be designed based on measured flows with projections for the design period as applicable. Documentation of the alternative method shall be provided upon request. "Source: Recommended Standards for Wastewater Facilities" (10-States Standards – latest edition).

(1) Average Daily Flow:

The average daily flow (ADF) that a site will generate is calculated based on the particular use of the site. **Table 3.4** shows sanitary flow generation factors, in gallons per day (GPD), which can be used to estimate sanitary flows from proposed and existing developments.

Table 3.4
Sanitary Flow Contributions from Site-Specific Sources*

Facility	Gallons per Day (GPD)
Airports, Railroads, Bus Terminals	5/Passenger + 10/Employee
Stadiums, Racetracks, Assembly Halls	5/Seat
Bar/Lounge	30/Seat
Barber Shop/Beauty Salon	125/Chair +20/Employee
Bath House for Swimming Pool	10/Swimmer
Boarding Houses	75/Resident
Bowling Alley	75/Lane+20/Employee
Car Wash (non-recycling)	75/Car
Church	5/Sanctuary Seat
Campgrounds without Sewer Connections	100/Space
Campgrounds with Sewer Connections	150/Space
Country Club	25/Member
Day Camp	20/Person
Day Care Center	15/Person
Dental Office	20/Employee + 100/Chair
Fitness Center/Spa	50/Person
Food Service Restaurants Open 24 Hours/day	70/Seat + 25/Employee
Food Service Restaurants Open Less than 24 Hours/day	45/Seat + 25/Employee
Food Service Catering	50/100-square feet (sf) Floor Space
Funeral Home	300/Embalming + 100/Employee
Grocery Store	200/1000 sf Floor Space
Hospital	300/Bed + 100/Resident Staff
Hotel/Motel	100/Room
Laundry	500/Machine
Medical Offices	200/Exam Room
Nursing Home	150/Bed + 100/Resident Staff
Prison	125/Bed + 20/Employee
Resident Camps	60/Person
Residential Homes	150/Bedroom
Retail Stores	Larger of 400/Restroom or 100/Fixture
Schools – Day, Toilets Only	12/Person
Schools – Day, Toilets, Cafeteria	16/Person
Schools – Day, Toilets, Cafeteria, Gym	20/Person
Service Station	20/Person
Shopping Center/Mall	100/1000-sf Enclosure Space
Theaters	5/Seat

Veterinary Office	100/Run + 10/Cage + 20/Employee
*Flow Estimating Factors based on EPD *Large Community Design Guidance.*	

(2) Peak Flow:

Generally, the sewers shall be designed to carry at least the peak hourly flow when operating at capacity. Peak hourly flow shall be the design ADF in conjunction with a peaking factor. The peaking factor formula to be used is:

$$PF = \frac{18 + (P)^{0.5}}{4 + (P)^{0.5}}$$

Where P is the population in thousands. The above equation yields a peaking factor that is intended to cover normal infiltration and inflow for a well-maintained sewer system and/or those built with modern materials and construction methods. The peaking factor shall not be less than two and one-half (2.5). Where P is not known or cannot be reasonably assumed, PE (population equivalence) can be used. PE is Q (flow in gpm) divided by one hundred (100) gpcd for new systems and one hundred and twenty-five (125) gpcd for existing systems. “Source: Recommended Standards for Wastewater Facilities, 2014 Edition”.

(3) Infiltration/Inflow (I/I):

Use of the per-capita flows and the peaking factor is intended to cover normal I/I for systems built with modern construction techniques. However, an additional allowance shall be made for I/I with existing conditions such as high groundwater, older systems, or a number of illicit connections. I/I for existing systems shall be made from actual flow data to the greatest extent possible. The Engineer shall design modifications and upgrades to the DCDWM sewer system such that future I&I entry paths are minimized.

3. Depth of Pipe Burial

PVC pipes shall have a minimum depth of cover of four (4) feet and a maximum depth of cover of fifteen (15) feet in un-paved areas. DIP is the only pipe material allowed under road right-of-way at any depth.

The minimum depth of cover over a sanitary sewer line in un-paved areas shall be four (4) feet for DIP. Cover less than four (4) feet in unpaved areas requires the use of DIP in a steel casing and shall be approved only when site conditions dictate.

Any sanitary sewer line within 10 feet of the top of embankment and parallel to a creek or stream shall be designed such that the top of the proposed pipe is at least one (1) foot below the bottom of the creek bed. The elevation of the creek bed shall be indicated on the plans. Each sewer line meeting the above situation shall be reviewed for approval by **DCDWM**. Refer to Section III.C.5.a, Sanitary Sewer Installation near Water Bodies and Wetlands, for design information pertinent to sanitary sewer installation near creeks, streams, and wetlands.

4. Slope of Gravity Sanitary Sewer

a) Minimum Slope and Velocities

Gravity sanitary sewers shall be designed and constructed to provide minimum velocities as shown in **Table 3.5**, based on Manning's formula, flowing full, and using an "n" value of 0.012. The minimum slopes required to maintain the minimum velocity are also shown in the table below. Slopes shall be uniform from manhole to manhole**.** Existing field conditions may require slope modification with **DCDWM** approval.

Table 3.5
Gravity Sanitary Sewer Minimum Slope

Pipe Size, Inches	Minimum Design Slope, %
6	1.0
8	0.8
10	0.6
12	0.5
15	0.205
18	0.170
21	0.146
24	0.127
27	0.115
30	0.102
36	0.085
42	0.073
48	0.064
54	0.058
60	0.051

b) Maximum Slope 15.0%

c) Slope for Bore and Jack Installations

Whenever possible, designs for bore and jack installations shall include a drop in the upstream manhole of not less than six (6) inches and shall allow a slope through the bore three (3) times as steep as the recommended minimum slope for that size pipe.

5. Special Design Considerations

a) Sanitary Sewer Installation near Water Bodies and Wetlands

(1) Any sanitary sewer line adjacent to a creek or lake shall be indicated on the plans. Submerged creek crossings shall be made only when absolutely necessary and shall be encased meeting the bore and jack casing requirements. The casing with the carrier shall be constructed nearly perpendicular to the creek. Creek crossings that require open cut are subject to the minimum Georgia Soil and Water Conservation Commission (GSWCC) requirements for stabilization. A stabilization plan shall be designed by a Registered Professional meeting GSWCC requirements and submitted to the **County** for approval. Sanitary sewer lines shall be designed to cause minimum impact to waters of the United States. In certain cases, aerial or

partially submerged sewer crossings may be required to meet project objectives. See **Appendix D** for requirements associated with creek, stream, and lake crossings.

(2) All gravity sanitary sewer designs shall comply with U.S. Army Corp of Engineers (USACE) regulations pertaining to construction in wetlands and nationwide permits. When applicable, plans shall show jurisdictional wetland boundaries.

(3) Flotation calculations shall be provided for sanitary sewers and the relative appurtenances when high water tables are present. Enough weight shall be added to the manhole to prevent flotation, such as a thicker slab, wall, or anti-flotation collar.

b) High-Velocity Protection

To minimize erosion of the pipe, the maximum velocity (at d/D = 0.8) shall be eleven (11) feet per second.

Sanitary sewers on ten percent (15%) slopes or greater shall be anchored securely with concrete, or equal and will be approved by DCDWM on a case-by-case basis.

Anchors shall be spaced as follows:

(1) Not over thirty-six (36) feet center to center on grades ten (15) percent and up to twenty-five (25) percent;

(2) Slopes steeper than the above may be considered by DCDWM on a case-by-case basis.

6. Separation from Potable Water Sources

a) Horizontal and Vertical Separations

Gravity sanitary sewer lines shall maintain a ten- (10-) foot horizontal and eighteen- (18-) inch vertical clearance from potable water mains. Measurement shall be from outside of pipe to outside of pipe. If site conditions do not allow such minimum separations, **DCDWM** may allow deviation on a case-by-case basis, if supported by data from the **Engineer**. The supporting data shall be submitted to **DCDWM** for approval.

If it is impossible to obtain proper horizontal and vertical separation as described above, both the gravity sanitary sewer line and potable water main shall be constructed of DIP meeting **DCDWM** Standards and shall be pressure-tested to two hundred (200) PSI to confirm watertightness prior to backfilling.

b) Crossings

Gravity sanitary sewer lines crossing over or under potable lines shall be laid to provide a minimum vertical distance of eighteen (18) inches between the outside of the water main and the outside of the non-potable line. If site conditions do not allow such minimum separations, **DCDWM** may allow deviation on a case-by-

case basis, if supported by data from the **Engineer**. The supporting data shall be submitted to **DCDWM** for approval. The crossing shall be arranged so that the non-potable line joints shall be equidistant and as far as possible from the water main joints. Where a water main crosses under a non-potable line, adequate structural support shall be provided for the non-potable line to maintain line and grade.

When it is impossible to obtain the proper vertical separation as stipulated above, one of the following methods shall be specified and approval from the **County** shall be required:

i. Each line shall be designed and constructed equal to water pipe minimum standards and each line shall be pressure-tested to two hundred (200) PSI minimum to ensure water tightness.

ii. Either the water main or the non-potable line shall be encased in a watertight casing pipe or concrete encasement that extends ten (10) feet on both sides of the crossing, measured perpendicular to the water main. The casing pipe shall meet the minimum depth and material requirements of the steel casing for bore and jack crossings. The casing pipe shall meet the material requirements of steel casing for bore and jack crossings. Refer to Section VI.A.10, for bore and jack casing requirements.

7. Appurtenance Design Consideration

a) Gravity Sanitary Sewer Stubs

One six- (6-) inch sewer service stub shall be provided for each building or property. A stub is defined to be that section of pipe going from the main line sewer to the edge of the right-of-way or easement. Sewer service tie-ins shall be to the main sewer line. No tie-ins to the stack of any cleanout shall be allowed.

One six- (6-) inch cleanout shall be installed at the property line, edge of right-of-way, or edge of easement, see Standard Details in **Appendix B.**

b) Gravity Sanitary Sewer Laterals

The sanitary sewer lateral line located on private property shall remain in private ownership. Its maintenance shall be the responsibility of the property owner. There is no maximum length limitation for privately maintained lateral lines.

8. Design of Gravity Sanitary Sewer within GDOT Right-of-Way

If any portion of a proposed project enters a State of Georgia controlled right-of-way, then a GDOT permit application is required. The Georgia Department of Transportation Permitting Checklist is provided on their website (**www.dot.ga.gov**).

GDOT requires the GDOT permit application to be submitted through the GUPS. **The Engineer is not to submit the GDOT permit directly through the Georgia Utilities Permitting System (GUPS).** The Developer/Contractor shall provide all necessary information, as stated in the previous paragraph. DCDWM will then review the information and provide comments (if necessary). Once the necessary

information has been approved, DCDWM will submit the GDOT permit application through the GUPS. Traffic control shall be in accordance with the MUTCD, latest edition.

All bore and jack operations shall be approved by GDOT. Bore and jack pits shall be a minimum of ten (10) feet from outside edge of pavement. Plans shall show casing size and carrier pipe size within the approach slab for bridge crossings.

The documents necessary for said application shall be provided by the Engineer to DCDWM.

C. Gravity Sanitary Sewer Construction Materials

1. General

Sanitary sewers crossing storm sewers shall extend at least ten (10) feet (measured from face of pipe) on either side of the storm sewer. Contractor shall adhere to sanitary sewers crossing storm sewers shall be Pressure Class 350 DIP and shall extend at least ten (10) feet (measured from face of pipe) on either side of the storm sewer.

Sanitary sewer design shall be done in a manner to protect lines, sanitary sewers, or structures from adverse adjacent facility impacts.

The **Engineer** shall provide a design and Contract Documents that allow for the flow of the sanitary sewers, drains, or creeks interrupted during the progress of the Work and shall restore same to a preconstruction condition.

2. Acceptable Materials

Gravity Sanitary Sewer Lines ***(refer to DWM standard specifications for detailed requirements for new trunk sewer lines).***

Gravity sanitary sewer lines shall be provided as shown in Table 2.1 unless otherwise approved by DCDWM. PVC sewer pipe shall not be located under or in the influence of existing/proposed pavement surfaces.

The material selected shall be adapted to local conditions, such as, characteristics of industrial wastes, possibility of septicity, soil characteristics, exceptionally heavy external loadings, abrasion, and similar problems.

All sanitary sewers shall be designed to prevent damage from superimposed loads. Proper allowance for loads on the sanitary sewer because of the width and depth of a trench shall be made. When standard strength sanitary sewer pipe is not sufficient, the additional strength needed may be obtained by using extra-strength pipe or by special construction, such as improving bedding conditions or encasing the pipe in concrete.

Sanitary sewer pipe and fittings shall be marked in accordance with the latest ASTM/ANSI designations. As a minimum, marking for pipe shall include Manufacturer's name or trademark, nominal pipe size, specification designation and date of manufacture. Pipe markings shall appear at intervals of five (5) feet

or less on pipe barrel. The pipe shall conform to the applicable specifications as follows.

Pipe Material	Notes and Size Ranges	Approved Areas
PVC C-900	***Pressure rated PVC*** only will be considered Sizes vary from smallest trunks to 48"	Will be allowed in ***EASEMENT*** **areas only (20' maximum depth – ground to I.E.)**
Reinforced Concrete Pipe (RCP)	H2S concrete admixture REQUIRED Sizes range from 18" to very large (144) but 24" is the most commonly available smallest size. Smaller ones are special order	Will be allowed in any area (with proper design for application and depth). Ok for GDOT and DDOT roads – note GDOT specs dominate if in their ROW
DIP	Size ranges small to 60" effectively Protecto epoxy or H2S admixture in cement lining REQUIRED	Will be allowed in any area and one of two options for aerial crossings.
FRP	Size ranges from small to 144"	Will be allowed in any area (except GDOT crossings)

(1) Ductile Iron (DIP) and Fittings:

- DIP with Protecto coating or an approved equal shall be required by **DCDWM** on a case-by-case during the design phase.
- Pipe shall be either push-on or mechanical joint type conforming to the latest requirements of the latest revision of ANSI Standard Specifications

A21.50/A21.51, Pressure Class 350 Ductile Iron, unless otherwise specified herein.

- Provide fittings with a body thickness and radii of curvature conforming to the latest ANSI Standard Specification A21.10 and joints in accordance with the latest ANSI Standard Specification A21.11.
- Whenever connections are made between DIP and pipe of other materials, use of an approved type of transition gasket or coupling is required.
- All pipe and fittings shall be bituminous coated at the point of manufacture in accordance with the latest revision of ANSI A21.51.

(2) Polyvinyl Chloride (PVC) Pipe and Fittings (if approved):

- Pipe and fittings up to fifteen (15) inches in diameter shall be made in accordance with latest revision of ASTM D3034 for Type PSM PVC (SDR26).
- Pipe and fittings eighteen (18) inches and greater shall be made in accordance with the latest revision of ASTM F679 for Type PS46 PVC, unless otherwise specified herein.
- Elastomeric gasket joints shall utilize rubber gaskets conforming to the latest revision of ASTM F477 and shall be used exclusively on the Work.
- Standard pipe lengths not greater than thirteen (13) feet shall be used on the Work.
- PVC laterals shall have tracer wire to be traced by electronic means. This can be achieved by placing twelve- (12-) gauge wire over the pipe in the trench and connecting it to the manhole frame. The tracer wire shall terminate at the cleanout, located in the right-of-way.

(3) Steel (***Casing for Bore and Jack Only. Please refer to Section VI***):

(4) Aerial Lines (if approved by DCDWM). Refer to Section 5 for additional information.

Ductile iron pipe shall be used for installations.

Piers shall be placed at every joint directly behind the bell or as directed by **DCDWM**. Whenever possible, pipe joints shall not be exposed.

Precautions against freezing, such as insulation and increased slope, shall be provided. Expansion jointing shall be provided between above ground and below ground sanitary sewers. Where buried sanitary sewers change to aerial sanitary sewers, special construction techniques shall be used to minimize frost heaving.

Provide aerial crossing detail drawings and pipe specifications on plans for review by **DCDWM**. The bottom of the pipe shall be placed no lower than the elevation of the fifty- (50-) year flood. Aerial lines shall be designed to avoid or minimize stream blockage during normal high-water events.

(5) Sewer Lateral Lines (pipe system from building to sewer service stub)

See Section III.C.7.b for design considerations related to sanitary sewer lateral lines.

- Residential:

  Minimum Size: six (6) inches (on private property only – 6" minimum size in easements or ROW).

  A maximum of one lateral system per building is permitted.

- Commercial/Industrial:

  Minimum Size: six (6) inches; size shall be evaluated on a case-by-case basis by **DCDWM.**

  Minimum slope: one percent (1%): one-eighth (1/8) inch per foot.

  Test Manhole: shall be located on lateral system, in non-paved area where possible, and shall be on private property (see Section III.E.d for Test Manholes).

  A maximum of one (1) lateral system per building or unit.

  Service lines shall be installed to the same standards as an eight- (8-) inch sewer line including bedding requirements.

  For strip type retail centers, eight- (8-) inch lateral sewers shall be located at least thirty (30) feet away from the building to allow food service establishments space to install an exterior grease trap. Grease trap details are provided per Standard Details in **Appendix B**.

D. Sanitary Sewer Manhole Design Criteria

1. Manhole

The **DCDWM** standard location for gravity sanitary manholes shall be as follows:

- Manholes shall be a minimum of four (4) feet from the curb line at the pavement.
- Manholes shall be within the public right-of-way.
- Manholes shall have a minimum of four (4) feet of clearance from drainage culverts and other underground utilities.
- Manholes outside of the right-of-way shall be centered within the recorded sanitary sewer easement.

a) Diameter: Manhole

The minimum inside diameter of manholes shall be forty-eight (48) inches. **Table 3.6** provides the sizing of manholes for inside drop pipe diameters. Manhole sizes shall be submitted for approval by the County. Manholes are

mandatory when connecting significant industries to the system and shall be of adequate size to provide for monitoring and sampling equipment; see Section III.C.7.e Test Manhole.

MH Diameter (Feet)	Inside Drop
5	≤16 inches
*6	≤24 inches
*7	≤36 inches
*8	≤48 inches

NOTE:

The * refers to the manholes that may use a precast transition slab structure on top of the base section and then set riser sections to the correct grade elevation. The structure shall meet H-20 loading at a minimum. Design loading calculations shall be submitted to the **County** for approval.

For depths greater than twenty (20) feet, incoming pipe larger than twenty-four (24) inches in diameter, or where penetration locations require, the manhole shall be sixty (60) inches or greater in diameter.

Manholes with more than one (1) drop pipe (inside) shall be submitted for review and the size of the manhole shall be at the discretion of the **County.**

b) Drop Connection

An inside drop connection, or pipe, shall be provided for any size sanitary sewer line entering a manhole at an elevation of more than two (2) feet above the manhole invert. Drop connections shall be avoided for new gravity sanitary sewer systems; however, they may be unavoidable when connecting to existing structures (see Construction Details **Appendix B**).

Manholes with drop connection pipes shall be indicated on the construction plans, profile section. The County shall determine whether an inside drop shall be approved and the size of manhole to be installed.

The inside drop pipe shall be constructed of schedule 80 PVC materials.

All outside ninety- (90-) degree elbows shall have thrust block poured below the elbow.

Outside drops shall be permitted on a case-by-case basis as approved by the **County**.

c) Doghouse Manholes

Doghouse manholes are to be utilized for connection to existing twelve- (12-) inch or larger sanitary sewer lines and may be authorized by the DCDWM for existing high flow conditions. See Construction Detail in **Appendix B**.

d) Test Manhole

At the discretion of **DCDWM** test manholes may be required for commercial and industrial buildings. And if required they shall be installed at locations to be approved by **DCDWM**.

Test manholes shall be required for commercial and industrial buildings and installed at locations to be approved by **DCDWM**.

Test manholes shall generally be of the same design and construction as other manholes and shall have six- (6-) inch minimum sanitary sewer lines into and out of the manhole.

Test manhole covers shall be bolt-down style with rubber gaskets.

Inverts of test manholes for certain industrial users may require modification for flow measuring capability as determined by **DCDWM** and/or EPD.

Neither inside drops nor outside drops shall be permitted at test manholes.

An elevation drop of 0.2 feet shall be maintained through manhole invert.

(1) Depths

- Minimum Depth: four (4) feet, unless approved by DCDWM.
- Maximum Depth: ten (10) feet, unless approved by DCDWM.

(2) Placement

- On building lateral between service stub and where two (2) or more building laterals combine into one (1) pipe.
- Locate in non-paved area when possible.
- Within property limits of said building.

e) Watertight Manhole Covers

Watertight manhole covers shall be used wherever the manholes are constructed within the one hundred- (100-) year flood plain**.** Watertight manhole lids shall be bolted down.

- ***Gravity Sanitary Sewer Manholes***
  Manholes shall be precast reinforced concrete construction made in conformance with the latest edition of ANSI/ASTM C478. The minimum wall thickness for a four- (4-) foot-diameter manhole is five (5) inches.

- ***Resilient Connector (Rubber Boot)***
  All pipes entering a manhole shall be sealed by a resilient connection (rubber boot) meeting the latest revision of ASTM C923 such as A-Lok, Z-

Lok or Korn- Seal. The material is to be ethylene propylene diene monomer (EPDM) rubber with a stainless steel band.

- ***Concrete***
  There shall be two classes of concrete: Class A for formed, reinforced cast-in-place structures and Class B for unreinforced concrete thrust blocks, concrete cradles, concrete encasement, concrete fill and similar uses. Class A Concrete shall have a compressive strength of three thousand five hundred (3,500), four thousand (4,000), or four thousand five hundred (4,500) PSI. Class B Concrete shall have a compressive strength of two thousand five hundred (2,500) or three thousand (3,000) PSI. Concrete design mixes to be utilized shall be submitted for

2. Sanitary Manhole Installation

Standard sanitary sewer manholes shall be pre-cast reinforced concrete structures. A cast-in-place monolithic base may be allowed in certain locations if approved by **DCDWM**. Manholes shall be placed on a twelve- (12-) inch minimum cushion of compacted No. 57 stone. The standard precast sanitary manhole is provided in Standard Detail in **Appendix B.**

The use of Polymer MH's will be determined by **DCDWM** as needed by location during design phase. New trunk sewer projects should include polymer manholes as these systems tend to have the most H2S corrosion impacts.

Follow the requirements for sanitary manhole abandonment presented in Standard Detail in **Appendix B**, as needed.

a) Foundations

Foundations of manholes for sanitary sewers shall be Class "A" concrete. The bottom of the foundation shall be at least eight (8) inches thick and shall extend at least six (6) inches past the outside of the manhole as directed by **DCDWM**.

b) Precast Barrel and Base Section

Barrel joints shall be tongue and groove and shall meet the latest revision of ASTM C443 for O-ring gaskets; see Standard Detail in **Appendix B**. Barrel joints shall be installed to allow no infiltration into the manhole. Care shall be exercised during the handling of the precast units to avoid disturbing or damaging the gasket and to attain proper alignment of the joints. Pre-formed flexible joint sealants shall not be used on sanitary sewer manholes. Joints and lift holes shall be grouted smooth with non-shrink cement grout on the inside and outside.

All MH's during installation shall be wrapped with Gator wrap or an approved equal. In precast manhole construction, combination of joint lengths shall be selected to minimize the number of individual segments required to provide the total depth specified. Long joints shall be used in the bottom with shorter segments utilized for the top adjustments. The inside diameter of the manhole shall be as called out on the plans.

Manholes may be installed with a stub for future use. The stub shall be one (1) full joint of DIP with mechanical joint plug.

c) Manhole Cone

Manhole cones shall be concentric and precast concrete. The top elevation on any manhole greater than three (3) feet above the finished grade shall have a flat top precast concrete with a bolt down type ERGO casting or equal (refer to **Appendix B** for standard details). Note manhole structures with castings located below the 100-year floodplain shall use hinged sealed covers as shown in **Appendix B**. The top elevation of manhole frames shall be adjusted to grade in areas such as streets, alleys, and parking lots or where indicated on the plans. A maximum adjustment of up to twelve (12) inches shall be allowed. Precast concrete adjusting rings may be used with the approval of the **County**.

Adjustments greater than twelve (12) inches shall be made by changing precast riser sections.

The top of the wall of the manholes shall be leveled off with mortar so as to form a flat surface upon which the manhole frame is to rest.

d) Pipe Penetrations

Openings in precast bases to receive sanitary sewer pipes shall be cast at the factory at the required locations, size and height. Openings cored into manholes in the field shall be permitted only with a design, stamped by a Professional Engineer registered in the State of Georgia, with calculations showing after the core is made the structural strength shall be able to handle the proposed loading. At that time a written approval shall be given to proceed by **DCDWM**. Cores shall require a resilient connector that shall be submitted for approval by the **County**. Construction Inspector shall first inspect and then approve location and extent of cores in manholes.

Resilient connectors, or rubber boots, shall be cast into the manhole by the precast Manufacturer. Rubber boot shall be secured to pipe by stainless steel clamp and bolt assembly conforming to the requirements of ASTM C923 and ASTM A167, most current edition. Stainless steel elements of the rubber boot shall be totally non-magnetic Series 304 stainless steel, except the worm screw for tightening the steel band around the pipe that shall be Series 305 stainless steel. The rubber boot shall be installed per the Manufacturer's directions.

New pipe entry shall be at no less than a ninety- (90-) degree angle from direction of flow of existing manhole, unless the minimum inside drop is equal to the diameter of the lower pipe.

Upper pipe connections shall not enter manhole at barrel joint.

Pipes entering the manhole base shall be designed flush with the inside wall of the manhole.

Where sanitary sewer line is to be extended in the future, the manhole shall be furnished with a flexible sleeve and one joint of DIP with the upper end plugged.

e) Inverts (Channels) and Benches

The flow invert, or channel, straight through a manhole shall be made to conform as closely as possible in shape and slope to that of the connecting sanitary sewers. Rowlock (brick) or precast inverts are required. Crushed stone filler may be utilized under the bench, or table. Earth filler shall not be allowed. Minimum drop across manhole invert shall be two-tenths (0.2) of a foot to prevent solids deposition. Drops of one-tenth (0.1) of a foot across inverts shall only be permitted when site topography will not allow drops of two-tenths (0.2) of a foot.

The invert walls shall be formed, or shaped, to the full height of the crown of the outlet sanitary sewer in such a manner as to not obstruct maintenance, inspection, or flow in the sanitary sewers. When changing line sizes, the crowns (top insides) of the pipe shall be matched unless otherwise approved by **DCDWM**. New invert channels at tie-in manholes shall meet existing invert channel in a manner that provides proper hydraulic flow. Inverts formed with half pipe are not allowed. The invert of the manholes shall be shaped and smooth so that no projections will exist, and flow channels will be formed in the inverts so that the manhole shall be self-cleaning and have smooth flow transitions. Inverts shall be free of areas where solids may be deposited.

Where curved flow inverts are specified in manholes, including branch inlets, slopes shall be increased as required to maintain acceptable velocities. Inverts shall be constructed with the same radius as the outflow pipe; see Standard Detail in **Appendix B**.

A bench shall be provided on each side of the manhole inverts. The bench shall be sloped to provide a minimum three- (3-) inch fall from the top of the bench to the crown (top inside) of the pipe or one-half (1/2) inch per foot, whichever is greater. No lateral sewer, service connection, or drop connection shall discharge onto the surface of the bench. The bench shall be constructed of aggregate-mix cement with smooth, veneer finish and troweled smooth from manhole wall to invert.

f) Steps

Manhole steps shall not be installed on new manholes of any size or in any location.

g) Frames and Covers

Manhole frames and covers within paved areas shall meet the latest revision of ASTM A48, Class 35B. Covers are to be solid with exception of pick hole(s) located at the cover's circumference, not protruding through the cover. Cast iron frames and covers shall be matched for proper fit. The cast iron frame for the manhole cover shall be set at the required elevation and properly anchored to the precast manhole. Refer to Standard Details in **Appendix B** for manhole frame and cover requirements in paved areas. With **DWM's** approval, the **Contractor** may use an ERGO type ring and cover. Approved manufacturers are ERGO by EJ - americas.ejco.com/hinged-manhole-cover or approved equal. Composite MH frames and covers (bolt down and capable of H20 loading), ATG – Aqua Technology Group or approved equal. www.Aquatechnologygroug.com, shall only be used with the approval of **DCDWM.**

During the design phase DCDWM will determine if chimney seals will be required. Where there is evidence of leakage in existing manhole chimneys, chimney seals may be used with DCDW approval.

Where manholes are constructed in non-paved areas, the top surface of the frame and cover shall have bolt-down lids with a watertight gasket. Locked manhole covers may be desirable in isolated easement locations or where vandalism may be a problem. Manholes in wooded or un-maintained easement areas shall be a minimum of twenty-four (24) inches above ground level and a maximum height of four (4) feet above the grade. Manholes located within the one hundred- (100-) year flood plain shall contain manhole frames that are bolted to the concentric cone to stabilize the manhole adjustment rings. In these cases, the manhole adjustment rings shall contain pre-drilled holes for the bolts from the pre-cast manufacturer. Manhole concrete rings shall be secured to each other. This is essential in flood plain areas where the slide and tilt of precast rings is likely to occur due to buoyancy. Provide anti-flotation collars in flood plain locations. If the manhole top elevation is to be three (3) feet or higher above grade a flat top manhole shall be required to allow for safe and easy access. Height above grade for manholes on sloped ground in un-maintained areas shall be measured on the uphill side of the manhole. Manholes in maintained grass areas may be flush with the ground. Refer to Standard Detail in **Appendix B** for manhole frame and cover requirements in non-paved areas.

Top of cover shall be factory imprinted to read **"DeKalb Sewer** as shown in Appendix B.

The frames shall be properly set in place in a full bed of mortar and adjusted such that the top of the frame conforms to the finished surfaces when located in streets, public highways and paved areas. In other locations, they shall conform to such elevations as are required. All frames and covers are to be set to provide access to the manhole.

h) Receiving Manhole: From Force Mains

A polymer concrete manhole shall be used. If the manhole is existing, the receiving manhole shall be coated with two (2) coats of three (3) mills coal tar epoxy on the exterior surfaces, and three (3) mm of forty percent (40%) fiberglass and sixty percent (60%) resin spray liner or precast lined three (3) mm of HDPE stud liner, or an approved epoxy meeting manufacturer's requirements. Precast section joints/seams shall be wrapped with eight- (8-) inch joint wrap. Surface preparation, thickness, mixing, and application shall be in accordance with the manufacturer's instructions. Ventilation and odor control shall be installed and implemented. If coatings are to be used instead of a polymer concrete manhole they shall be submitted for approval to the **DCDWM.** Polymer manhole structures are recommended at the discharge location of force mains.

SECTION IV

SANITARY FORCE MAIN STANDARDS

A. Design Criteria

1. Service Area Map (Force Main Basis of Design & Sizing)

The potential service area of the pump station shall be clearly delineated on an area map. The service area shall include the area that can reasonably flow by gravity to the pump station site based on topography. The service area map shall also identify any areas being served by existing sewer facilities.

2. Force Main Design within GDOT Right-of-Way

If any portion of a proposed project enters a State of Georgia controlled right-of-way, then a GDOT permit application is required. The Georgia Department of Transportation Permitting Checklist is provided on their website (www.dot.ga.gov)

GDOT requires the GDOT permit application to be submitted through the GUPS. The **Engineer** shall not submit the GDOT permit directly through the Georgia Utilities Permitting System (GUPS). The **Engineer** shall provide all necessary information, as stated in the previous paragraph. **DCDWM** will then review the information and provide comments (if necessary). Once the necessary information has been approved, **DCDWM** will submit the GDOT permit application through the GUPS. Requirements include, but are not limited to:

- **Engineer** shall refer to the GDOT Utility Accommodation Policy and Standards Manual, most current edition, for policies regarding construction of utilities within the public highway right-of-way.
- Traffic control shall be in accordance with the MUTCD, latest edition.
- Bore and jack pits shall be a minimum of ten (10) feet from the outside edge of pavement. Plans shall show casing size and carrier pipe size within the approach slab for bridge crossings.
- The documents necessary for said application shall be provided by the Engineer. Calculation of Sanitary Flows

3. Calculation of Sanitary Flows and Headlosses

Flow calculations shall be presented in the Pump Station Design Calculations Form ***(see DWM Pump Station Design Manual for additional details)***.

Determination of design sanitary flows shall be based on wastewater flows expected to become tributary to the pump station for the entire development at build-out. The sanitary flows shall be identified as onsite sanitary flows and off-site sanitary flows. Onsite sanitary flows are those generated directly from the project site. The force main serving the pump station shall be sized according to the flows such that pipeline velocities achieve a minimum of 2 feet per second but not exceed 7 feet per second. Please refer to the DCDWM Pump Station Design

Manual for details related to siting, sizing and coordination with natural features.

a) Friction Headloss

The friction headloss is the head of water that shall be supplied by the pump to overcome the frictional losses in the pipe. It is a function of pipe length, diameter, flow rate, and the friction coefficient (C factor).

The design shall use the Hazen-Williams formula to calculate the friction headloss:

$$h_f = L\frac{10.44\ Q^{1.852}}{C^{1.852}D^{4.8655}}$$

Where
h_f is the friction headloss, in feet
L is the force main pipe length, in feet
Q is the flow rate, in GPM
C is the friction coefficient, dimensionless
D is the force main pipe diameter, in inches

Because the friction coefficient of the force main will change over time, system head curves shall be generated and evaluated for present (low friction) and future (high friction) conditions. The C factors indicated below shall be the only values allowed for these calculations. Friction headloss shall be analyzed for the following conditions:

a. The initial operating condition (C=130)

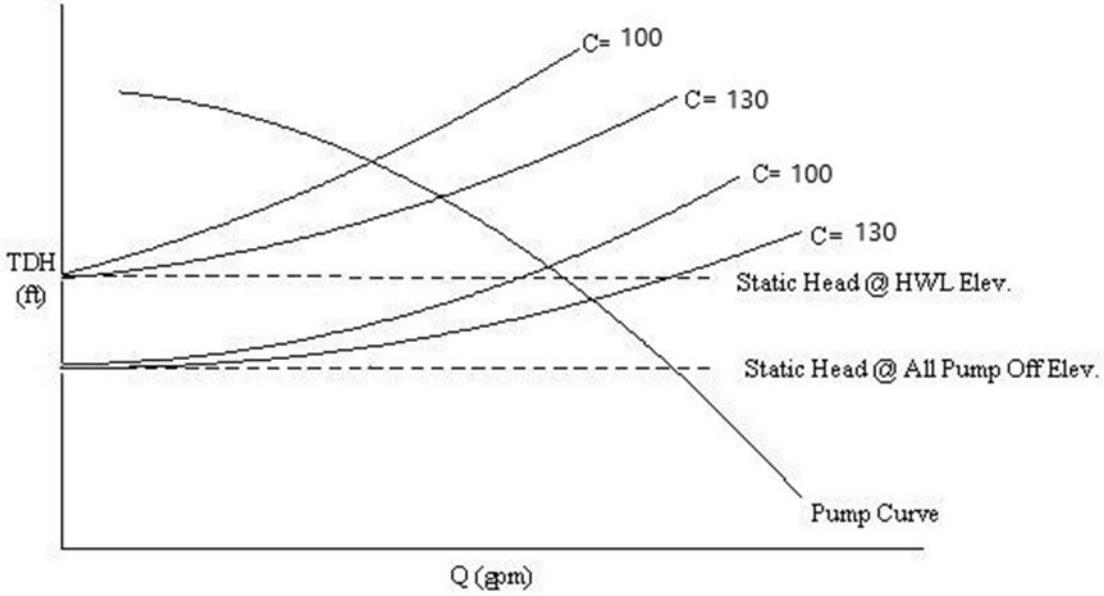
b. The system after it has aged (C=100)

This ensures that when selecting a pump, the operating range will be efficient throughout the lifetime of the pumping system.

4. System Head Curve

Add both static headloss conditions to each of the friction headloss conditions to arrive at four (4) separate system head curves. The pump selected shall be able to operate well under all four (4) pressure conditions. **Figure 4.1** illustrates example system and pump curves:

Figure 4.1
Example System and Pump Curves



The system head curves can be plotted using the force main discharge (Q) on the x-axis and the corresponding TDH values for each static head and friction headloss condition on the y-axis. These curves define the energy required to pump sanitary flows through the discharge system and should reflect the force main velocity ranges (2 feet per second minimum to 7 feet per second maximum)

B. *General Drawing Requirements*

1. Horizontal and Vertical Separations

Potable water mains shall maintain a ten- (10-) foot horizontal and eighteen- (18-) inch vertical clearance from non-potable pipelines (i.e., sanitary sewers, reclaimed water piping, etc.). Measurement shall be from outside of pipe to outside of pipe. If site conditions do not allow such minimum separations, **DCDWM** may allow deviation on a case-by-case basis, if supported by data from the **Engineer**. The supporting data shall be submitted to **DCDWM** for approval. If it is impossible to obtain proper horizontal and vertical separation as described above, both the water and non-potable line shall be constructed of DIP meeting **DCDWM** Standards. Each line shall be pressure-tested to two hundred (200) pounds per square inch (PSI) minimum to confirm water-tightness.

The title block presented on each sheet shall be complete and include professional seal of **Engineer** with signature (at the 100% design phase).

A cover sheet shall be submitted including: a drawing index, location map with north arrow, and also include an approval block for **DCDPS** signature.

2. Plan View Requirements

   - Plan view shall have a scale of not more than fifty (50) feet to the inch (1" = 50').
   - The view shall show location, size, and material of construction of the proposed pipelines within the project area.
   - The proposed water mains shall be shown on the plans as solid lines with size, material, and pipe class called out. For example, " ."
   - The plan view shall also show the air/vacuum release valves, isolation valves, , blow-off valves, etc.
   - Plan view sheets shall include a north arrow. ***The north arrow should be orientated "up" or "left" to facilitate comparison with GIS data views.***
   - Existing utilities shall be shown to the extent known, given records available to the **Engineer**.
   - Existing utilities shall be shown as dashed lines. Construction details shall note that the buried utilities are to be field-located prior to construction.
   - Plans shall show the tie-in point(s) of the proposed system to the existing **DCDWM** system with details of each connection on the appropriate plan sheet.

3. Profile View Requirements:

   Profiles are required for plan submittals on force mains regardless of size.

   - Force mains should be designed with continuous slope ("up" or "down" as applicable) towards both flushing connections and air/vacuum release valves to ensure air is not entrained after pipeline is put into service.
   - Profiles or crossing details with a vertical scale of not more than ten (10) feet to the inch shall be considered where pipeline projects encounter areas of numerous utilities that cannot be easily located, such as storm and sanitary sewers, and that have potential conflicts with the proposed water main(s).
   - Profiles shall also be provided for pipelines proposed through a streambed or crossing Georgia Department of Transportation (GDOT)

C. Acceptable Materials

1. General Requirements

The force main pipe materials shall be rated for 150% of anticipated working pressure..

D. Piping

1. Pipe Sizing

a. Diameter

1. Pipe diameter shall be sized to achieve a flow velocity between two (2.0) and six (7.0) fps. When current design flows cannot achieve this for earlier phases of operation (e.g. before full development), the Engineer shall design the pump station such that the minimum 2 fps flushing velocity is attained once per day (e.g. PLC to hold flows for specific duration to allow additional pumps to run and flush the force main).

2. Force Main

a. Materials

1. Force mains shall be constructed of DIP with same epoxy requirements as DIP gravity sewers. The DIP, appurtenances, and fittings shall conform to the latest requirements of ANSI/AWWA C151/A21.51, “Ductile Iron Pipe, and Centrifugally Cast in Metal Molds for Water or Other Liquids.” The pipes, valves, and fittings shall be epoxy lined.

2. The thickness and pressure class of DIP required for the installation and operating conditions during the expected service life of the force main shall be determined in accordance with the latest requirements of ANSI/AWWA C150/A21.50, “Thickness Design of Ductile Iron Pipe.” The pipe class shall be 350 psi class.

3. Fittings for DIP shall conform to the latest requirements of ANSI/AWWA C110/A21.10, “Ductile-Iron and Gray-Iron Fittings, 3 In. through 48 In. for Water and Other Liquids” or ANSI/AWWA C153/A21.53, “Ductile Iron Compact Fittings, 3 In. through 24 In. and 54 In. through 66 In., for Water Service.”

4. DIP forcemains shall have mechanical or gasket push-on type joints. If exposed, force mains of DIP shall have flanged joints. Restrained joint DIP may be used for anchoring purposes.

   - Gaskets shall be manufactured of vulcanized natural or synthetic rubber in accordance with the latest requirements of ANSI/AWWA C111/A21.11, “Rubber Gasket Joints for Ductile Iron and Gray- Iron Pressure Pipe and Fittings.”
   - Flanged DI pipe shall conform to the latest requirements of ANSI/AWWA C115/A21.15, “Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges.”

5. Consideration shall be given to the existence of or the potential for development of corrosive environments within and outside the force main. Sources of corrosion may include: acidic soils, septic wastewater, and air entrainment within the force main. Where corrosion is deemed to be a serious problem, DIP shall be provided with cathodic protection or an internal/external encasement, lining, or coating appropriate for the

pipe material and situation. Such encasements, linings, and coatings shall be manufactured or applied in accordance with the appropriate ANSI and AWWA Standards. Engineer shall design the force main with poly-wrap in areas where stray currents (e.g. rectifiers for pipeline companies are located)

6. A corrosion-resistant lining shall be used on all force main piping. Lining shall be Protecto 401 ceramic epoxy or approved equal.

3. Design Considerations (future maintenance)

a. A self-cleaning velocity of at least two (2.0) fps shall be provided throughout the length of the force main. This will re-suspend any solids that may have settled out. However, if the length of force main exceeds five thousand (5,000) feet, the **Engineer** shall design the following to further prevent the accumulation of solids:

- Drain or blow-off valves shall be installed at all low points in the force main. Such valves shall be connected to an available entry point into the wastewater collection system, provided with a connection for a vacuum pumper truck.
- Flushing ports along the length of the force main as well as a water supply of sufficient quantity and pressure shall be installed. Such ports shall be connected to an available entry point into the wastewater collection system, provided with a connection for a vacuum pumper truck, or designed with some other method to prevent an intentional discharge of wastewater during their operation. Pigging device launching and retrieval stations shall be of a size sufficient to clean the inside diameter of the force main.

4. Slope

No segments of the force main can have zero (0) slopes, to limit the accumulation of gasses. Low points shall also be avoided to prevent the accumulation of solids. High points shall have air release combination valves as determined by specifics of the design requirements.

5. Receiving Manhole

a. ***The receiving manhole shall be a polymer concrete manhole.*** If it is an existing manhole, other methods shall be reviewed for approval by **DCDWM**. The receiving manhole shall have a four- (4-) inch vent with an approved activated carbon filter canister attachment to control odor.

6. Anchorage

a. Pipe under pressure shall be adequately anchored to resist thrusts that may develop at bends, tees, plugs, and at any other location where a change in flow direction occurs.

b. Such anchoring shall be provided through the use of restrained joint pipe

shall also be used, and calculations shall be submitted to **DCDWM** by the **Engineer.**

c. Self-restrained joints or joints restrained with tie rods and clamps shall both be acceptable. In both cases, component parts shall either be manufactured of corrosion-resistant materials or coated liberally with a corrosion-retarding product.

d. Anchoring devices shall be designed to withstand force main pressures of at least twenty-five percent (25%) greater than the maximum pump shut-off head, plus an allowance for water hammer and an appropriate factor of safety.

7. Valves and Appurtenances

1. Plug Valves
   a. Materials and Installation
      - Plug valves shall be non-lubricated, eccentric type, resilient seated type with flanged joint ends, conforming to the latest revision of ANSI/AWWA C517-05. Plug valves shall be manufactured by DeZurik, or approved equal. Plug valves shall be installed with the below specified actuator type, with the valve seat in the correct orientation with respect to flow direction. Valves shall open by turning to the left, (counter-clockwise), when viewed from the stem.

      - The buried valves shall have mechanical joint ends conforming to ANSI/AWWA C111/A21.11, and all exposed valves measuring four (4) inches in diameter and larger shall have Class 125 flat-face flanged ends, at a minimum, conforming to ANSI B16.1 or ANSI/AWWA C110/A21.10.

      - The valve port area for valves twenty (20) inches and smaller shall be a minimum of eighty percent (80%) of the full pipe area. The valve port area for valves twenty four (24) inches and larger shall be a minimum of seventy percent (70%) of the full pipe area. Valve pressure ratings, body flanges, and wall thicknesses shall be in full conformance with ANSI B16.1, latest revision. Valves shall seal leak-tight against full-rated pressure in both directions. Valve seats shall be tested to provide leak tight shut off to one hundred and seventy five (175) PSI for valves through twelve (12) inches, with pressure in either direction. In addition, a hydrostatic shell test shall be performed with the plug open to a pressure twice that of rating specified above to demonstrate overall pressure integrity of the valve body. For valves measuring fourteen (14) inches or more in diameter, the pressure shall be 150 psig bodies.

      - For specific installation locations where the TDH plus the surge pressure exceeds the minimum pressure ratings above, Class 250 flat-face flanged ends and a four hundred 400 PSI for three- (3-) inch to twelve- (12-) inch valves) or three hundred (300) PSI for fourteen-

(14-) inch and greater valves body shall be provided. Plug valves with one hundred seventy five (175) PSI bodies and Class 125 flat-face flanges shall have the following face-to-face dimensions.

Nominal Valve Diameter (inches)	Lay Length (inches)
4	9.0
6	10.5
8	11.5
10	13.0
12	14.0

- Valve bodies shall be constructed of high-strength cast iron conforming to ASTM A126 Class B or ductile iron, confirming to ASTM A536, Grade 64-45-12, latest revisions. Valve seats shall be formed by cast bodies with raised eccentric seats which have a corrosion-resistant welded-on overlay of not less than ninety percent (90%) pure nickel on all surfaces contacting the plug face or valve seats shall be replaceable 316 stainless steel seats. Valve seats shall be in accordance with AWWA C504 and AWWA C507, latest revisions. Seats composed of thermosetting epoxy or fusion bonded nylon shall not be acceptable. Screwed-in seats shall not be acceptable.

- Valves shall be furnished with resilient faced plugs with neoprene facing, suitable for use with wastewater; plug facings composed of natural rubber, Viton, or Nitrile are not acceptable. Valves shall be furnished with replaceable, permanently lubricated, stainless steel or fiberglass backed woven Teflon fiber, sleeve-type bearings in the upper and lower plug journals. Plug stem bearings shall comply with AWWA C504 and C507, latest revisions. Valves shall be bolted bonnet design. Valve shaft seals shall be in accordance with AWWA C504 and AWWA C507, latest revisions. The exposed valve nuts, bolts, springs, washers, and the like shall be Type 316 stainless steel. Installation shall be per manufacturer's recommendations.

- Radial shaft bearings shall be permanently lubricated, sleeve-type, sintered, oil-impregnated bearings composed of either Type 316 stainless steel in accordance with ASTM A-743, Grade CF-8M, or oil-impregnated bronze in accordance with ASTM B-127. Non-metallic radial thrust bearings shall NOT be acceptable. Thrust bearings/washers shall be composed of Type 316 stainless steel, Teflon, Nylon 11, or Nylatron. Shaft seals shall be either the U-cup type or multiple V-ring type and shall be composed of either EPDM or Neoprene; shaft seals shall be self-adjusting and repackable without removing the bonnet or actuator from the valve or removing the valve from the line. Plug valve and connecting pipe shall have the capability

e. Interior Valve Lining

- The interior ferrous surfaces of the plug valve that will have contact with wastewater, except the valve seating surfaces, shall be coated with a factory-applied, fusion-bonded, or thermosetting epoxy coating in accordance with AWWA C550, latest revision. Coating shall be free of holidays (missed or unpainted areas), with a minimum thickness of twelve (12) mils dry film thickness (DFT). Surfaces shall be clean, dry, and free from rust, oil, and grease before coating.

2. Plug Valve Actuators

a. Plug valves installed in valve vaults shall have mechanical gear actuators with hand wheel operators designed for submerged service.

- Plug valves buried underground shall have gear actuators with a two- (2-) inch-square nut operator designed for buried and submerged service. The plug valves shall have electrical operators for valves above twelve (12) inches, manufactured by Rotork, Limit Tork or approved equal by **DCDWM**.

b. Actuator shall clearly indicate valve position for above ground and valve vault installations and an adjustable stop shall be provided to set closing torque. Actuator shall be capable of withstanding an over-torque without damage up to three hundred (300) foot-pounds for hand wheel operators, or up to four hundred and fifty (450) foot-pounds for two- (2-) inch nut operators. Actuator mounting brackets for submerged service shall be totally enclosed and shall have gasket seals. The exposed valve nuts, bolts, springs, washers, and the like shall be Type 316 stainless steel.

3. Isolation Valves

a. Materials and Installation

- On force mains exceeding five thousand (5,000) feet, isolation valves shall be installed to facilitate future repairs. Valves shall be provided at a maximum spacing of every two thousand five hundred (2,500) feet and as directed by the **DCDWM**.

- The isolation valves shall have electrical operators for valves above twelve (12) inches, manufactured by Rotork, Limit Tork or approved equal by **DCDWM** if power is available. Manually operated plug valves shall be used for force main isolation where power is not available.

- The isolation valves shall be located inside a standard valve box with a valve marker. The valve marker shall clearly denote “Sanitary Sewer Force Main.”

- The isolation valve shall be located outside the fenced pump station area, minimum five (5) feet, from the fence.

- Isolation valves shall be plug valves.

4. Air Release/Vacuum Valves
   a. Materials and Installation
      - Air release/vacuum valves (combination valves) exhaust pockets of air in the force main accumulated during operation of the pump station and to exhaust or admit air during the filling or draining of the force main.

      - Acceptable automatic air release/vacuum valve manufacturers are Val-Matic Valve & Manufacturing Corporation, DeZurik/APCO, ARI or approved equal by the **DCDWM**.

      - Provide automatic air release/vacuum valves with flood protection in areas within the one hundred- (100-) year floodplain or any areas where flooding is anticipated to occur.

      - Automatic air valves/vacuum valves shall be of the quick-opening, slow-closing type to prevent the development of hydraulic surge conditions.

      - Automatic air release/vacuum valves shall be provided at all high points to prevent air locking of the force main and at locations along the force main where sub-atmospheric pressures or column separation may occur. The route of the force main shall be such that the number of air release/ vacuum valves shall be minimized to the greatest extent possible. At the **County's** discretion the force main bury depth shall be varied up to a maximum of ten (10) feet where deemed necessary to eliminate air release valves. One spare air release/ vacuum valve shall be provided for every five (5) air release/vacuum valves installed. A minimum of one (1) spare valve shall be provided per force main.

      - The air release/vacuum valves shall be located inside a concrete vault/manhole. The vault shall be appropriately sized for the installation and maintenance of the air release/vacuum valve and shall conform to these Design Standards. Approved air release/vacuum valve installation procedures are provided in **Appendix C**. Air release valve manholes shall be installed such that the air release valve can be worked on and removed without the need to pull off the top of the manhole.

      - The valves shall have an extended valve body, two- (2-) inch cleanout, one- (1-) inch drain with stainless steel ball valve, one half- (½-) inch outlet with stainless steel ball valve with hose connection, and a minimum two- (2-) inch inlet.

E. *Testing*

1. Pressure and Leakage Testing

a. Force mains shall be subject to a test pressure equal to one hundred fifty percent (150%) of the total dynamic head for a minimum of two (2) hours. The test shall be performed using potable water. No leakage shall be allowed. The entire test shall be witnessed and approved by **DCDWM** prior to startup. The Engineer shall include appropriate connections as needed to accomplish the above testing.

SECTION V
CREEK CROSSINGS - SANITARY SEWER, AND FORCE MAINS

A. Overview

Creek crossings or stream crossings primarily consist of two types:

- ***Aerial Crossings:*** Pipe is visible and usually a few to several feet above the creek bed, or attached to a roadway bridge.

- ***Buried Crossing***: Pipe is under the creek bed and in some instances, the top of the existing pipe or casing may be visible during low flow conditions occurring during summer months.

- ***Standard Details***: Please refer to standards in **Appendix D** for Creek Crossing details.

Sewer systems shall be designed to minimize the number of creek crossings. While designing creek crossings, use the proposed future creek bed elevation, and employ construction methods that would be minimally invasive to the stream. For example, the **Contractor** shall use rock cutting trenchers instead of explosives for sewers in rocky strata.

Collection system capacity and water quality can be jeopardized by damage to sewers at creek crossings.

1. Environmental and Buffer Requirements

A minimum buffer separation shall be maintained between sewers, force mains, and streams/surface water bodies classified as nutrient sensitive streams or watershed buffers (from normal high water). See also within these Design Standards for other requirements regarding minimum separation with streams, lakes and impoundments.

Before crossing streams or ditches, working within one hundred (100) feet of a private or public water supply sources or fifty (50) feet of non-water supply ponds, lakes, creeks or rivers**,** the **Engineer** shall verify whether the line is exempt and, if not, obtain a permit to encroach into a watershed or nutrient-sensitive river basin buffer. Unless otherwise permitted, water, sewer, or force mains crossing a stream, river, pond, or lake buffer are to be as nearly perpendicular as possible. The crossing is considered perpendicular if it intersects the stream or surface water between an angle of seventy five (75) and one hundred and five (105) degrees). The **Engineer** shall not design crossings such that disturbing more than forty (40) linear (longitudinal) feet of a riparian buffer is avoided. The proposed design shall identify and adequately address the protection of the drinking water supply wells, sources, intake structures, and others, up to a distance of one hundred (100) feet of the sewer line installation. The **Contractor** shall adhere to the following best management practices in Zone 1, the lower thirty (30) feet beside the stream or surface water, during design/construction.

- Woody vegetation shall be cleared by hand. No grading allowed.

- Stumps shall remain except in trench where trees are cut. Disturbance to roots in buffer zone shall be minimized.
- The trench shall be backfilled with the excavated soil immediately following installation.
- Fertilizer shall not be used except for the one-time application to reestablish vegetation.
- Removal of woody vegetation shall be minimized with respect to the amount of disturbed area and the time the disturbed area remains disturbed.
- Measures shall be taken to ensure diffuse flow of water through the buffer after construction.
- In wetland areas, crane mats shall be used to minimize soil disturbance.
- Topsoil shall be separated from excavated material, so that the original topsoil is replaced over the excavated area.

2. Wetlands

The Professional Engineer registered in the State of Georgia whose seal appears on the drawings shall certify the following:

- The National Wetlands Inventory maps have been consulted.
- The appropriate plan sheet does/does not indicate areas of USACE Jurisdictional Wetlands as shown on the maps. If jurisdictional wetlands are indicated, the **Engineer** shall obtain a Federal Wetlands Alteration (Section 404) permit prior to initiating construction activity and/or any land disturbance of the protected wetlands.

3. Landscaping

Trees and bushes shall not be planted near the collection system pipes and structures to prevent roots from entering the pipes causing blockages and cracked pipes. Planting for stabilizing disturbed areas shall be required to restore the area to its original or better condition. The specifications shall define the entity responsible for developing a grassing and planting and stream restoration plan for review and approval by the **County**.

4. Siltation and Erosion

Construction methods that shall minimize siltation and erosion shall be employed. The **Engineer** shall include in the project specifications the method(s) to be employed in the construction of sewers in or near streams. Such methods shall provide adequate control of siltation and erosion by limiting unnecessary excavation, uprooting trees and vegetation, dumping of soil or debris, pumping silt-laden water into the stream, changing course of stream without encroachment permit, leaving cofferdams in streams, and leaving behind temporary equipment. Specifications shall require cleanup, grading, seeding, sodding, and planting or total restoration of disturbed areas commence immediately to meet local and state standards.

5. Sewers In Relation To Storm Drainage Infrastructure

No sanitary sewer shall be located in a detention basin or other drainage structure.

Sanitary sewer pipe and manholes shall not be located in or underneath the dam or dike of the detention basin, or located anywhere within twenty (20) feet horizontally of the projected maximum high water line of the detention basin.

6. Aerial Crossings for Sanitary Gravity Sewers and Force Mains

The aerial crossing shall be designed with minimal infringement on the floodway, typically by spanning the waterways. See **Table 5.1** below.

- **Large/wide creeks** - Piers and anchor collars or with pipes in a casing spanning over piers.
- **Medium-sized creeks** - Piers and anchor collars of I-beam anchored to stream banks with pipe resting on top of the I-beam.
- **Small creeks** - Pipe spanning creeks and anchored to concrete collars at the bank.

Table 5.1
Creek Crossing Design Guidance

Type	Span	Requirements
Large Width	>40 Feet	Submit Detailed Design
Medium Width	18 To 40 Feet	Submit Design if Span > 30 Feet
Narrow Width	<18 Feet	Use **County** Details
Note: Use reinforced cement concrete for piers and anchor collars.		

Methods of support/carriage of pipe other than the ones described above, requires review and approval of **DCDWM**. Visual impact shall be minimal after regrowth of vegetation. The pipe shall be adequately supported, protected from damage and freezing, accessible for maintenance, repair or replacement, and non-obstructive to flow line of surface water. The bottom of the pipe shall be placed no lower than the elevation of the fifty- (50-) year flood.

The **Engineer** shall provide detail design drawings and pipe specifications for each crossing for review by **DCDWM**. Site conditions may dictate more stringent requirements than shown in the Standard Construction Details. The **Engineer** shall delineate on the plans flood elevations for the ten- (10-), twenty five- (25-), fifty- (50-) and one hundred- (100-) year flood events as defined by **DCDWM**. The design plans and structural details shall be signed, sealed, and dated by a Georgia Registered Professional Engineer.

Creek crossings for gravity sanitary sewer and force mains, unless otherwise approved by **DCDWM**, shall be constructed of epoxy-lined DIP with flexible restrained joints. **DCDWM** reserves the rights to approve seamless or straight seam steel pipes that need to be lined inside and coated outside in a manner similar to epoxy-lined DIP. Spiral-welded steel pipes are not allowed by **DCDWM**. Pipes crossing wetlands and low-flow creeks shall have at least two (2) supports at each joint, with one support near the bell.

Interior Lining *of* the EDIP for gravity sanitary sewer and force main shall have a completely covered inner surface of the pipe from bell to spigot. The lining shall be virgin polyethylene complying with ANSI/ASTM D1248 and be a minimum of forty

(40) mils in thickness as manufactured by American Cast Iron Pipe Company (ACIPCO) polybond lining, or U.S. Pipe Protecto 401 ceramic epoxy lining or Warren epoxy, epoxy-lined DIP, with lining defects such as cracking or holes in the lining shall not be installed and shall be removed from the site immediately to avoid a Stop Work Order. Field repair of epoxy is not permitted.

Exterior Coating

Gravity Sewer Pipe six (6) to twelve (12) inches shall be Pressure Class 350 in accordance with ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51.

Gravity Sewer Pipe sixteen (16) inches and Larger shall be a minimum of Pressure Class 250 in accordance with ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51. Loading and depths may require greater pressure classes of pipe.

Flanged Ductile Iron Pipe and Fittings shall be four (4) inches and larger. Flanged pipe shall be a minimum of Class 53 per AWWA C115. Flanged pipe, fittings, and appurtenances are for above ground use, inside vault, or lift wet well only. Flanged pipe shall be shop-fabricated, face drilled, lined and exterior coated by the manufacturer or the manufacturers lining company. Fabrication or lining of flanged pipe on site is not permitted. Complete shop drawings of the pipe, fittings, and appurtenances shall be submitted to **DCDWM** for approval before delivery to the site.

Pipe Joints **-** Proper joint technology, such as flanged, restrained, or mechanical; adequate supports to prevent excessive deflection and flexion; or a combination shall be provided for aerial pipe crossings. Pipe supports shall be designed to withstand the hydrodynamic effects of the stream flow pressure using the following formula:

$P = 2.5KV^2$

Where

2.5 = Safety factor against overturning

P = Pressure, psf

V = Velocity of water, fps

K = 4/3 for square ends, 1/2 for angle ends when angle is < 30°, and 2/3 for circular piers.

Expansion jointing shall be provided between above ground and below ground sewers. When buried sewers change to aerial sewers, special construction techniques shall be used to minimize heaving. Special construction details, submitted to the **County** for approval, also shall be required between above ground and below ground sewer transition to account for seismic and sudden unexpected forces arising due to erosion of stream banks.

Impact of Flood Waters

If it is probable that the aerial pipe could be submerged by the stream flow, the effects of flow pressure on the pipe shall be taken into account when computing pier-

overturning moments. For aerial crossings, the impact of flood waters and debris shall be considered in the design calculations.

The following criteria shall be used in design calculations:

- Pipe crossing shall be anchored in the bank in such a way that if the pipe supports are lost, the pipe system shall not separate, and shall be restrained by the anchor blocking of appropriate size in the bank. Anchor blocking structural computations and details shall be provided.
- Pipe joint stability calculations and details shall be provided.
- Pipe joints shall be flexible restrained joints.
- For wide stream crossings, steel pipe of appropriate thickness shall be used, with interior lining and external coating as mentioned above for epoxy-lined DIP. Design computations and details shall be provided.

Casing Pipe – Aerial crossings shall be a restrained carrier pipe inside a high-strength steel casing pipe. The minimum steel casing pipe for aerial crossings shall be 0.33 inch thick.

Freeze Protection – Precautions against freezing, such as insulation and increased slope, shall be provided. Expansion jointing shall be provided between above ground and below ground sewers. Where buried sewers transition to aerial sewers, special construction techniques shall be used to minimize frost heaving.

Concrete Collar Anchors – Concrete collars for casing anchoring shall be designed for each application by a Georgia Registered Professional Engineer. The collars shall be a minimum of four thousand (4,000) PSI reinforced concrete, minimum twelve (12) inches thick and four (4) feet square. Anchors shall have minimum reinforcing steel of #5 @ 12 E.W. The collars shall be installed eighteen (18) inches from end of casing pipe. Collars shall be secured to the casing. The collar shall not cover the casing to carrier end seals or be used as a pipe transition.

Concrete Piers – Piers for aerial crossings shall be designed for each location by a Georgia Registered Professional Engineer. Placement of the piers shall be approved by **DCDWM**. The piers shall be a minimum of five thousand (5,000) PSI concrete, minimum of two (2) feet square and well anchored into the bed rock or have sufficient depth as directed by the Geotechnical Engineer. Piers shall have a minimum reinforcing steel of #5 @ 12 E.W., and E.F. The top of the pier shall have an adjustable bracket or cylindrical cradle anchored in the concrete to secure the casing pipe. Anchors, cradles and exposed brackets shall be stainless steel and epoxy coated (minimum forty, 40, mils) to resist corrosion. Cushion material shall be placed between the pipe, clamps, and support. The invert elevation of the pipe from upstream to downstream piers shall match the design elevations.

Design Computations – Pipe supporting structures shall be designed to prevent frost heaving, overturning or settlement. Provide calculations for the aerial pipe crossings and supporting structures that are subject to hydrodynamic forces. Calculations are to provide for a minimum factor of safety of two and a half (2.5) against overturning and one and a half (1.5) for uplift due to buoyancy. Calculations shall also address applicable seismic and other unexpected loads.

Structures – The sewer interceptors, manholes, or other structures shall be located so they do not interfere with free discharge of flood flows of the stream. Portions of manholes above grade subject to hydrodynamic forces of flooding shall be designed to be watertight and be able to resist the flood forces with a safety factor of two and a half (2.5), as mentioned above for pipes and piers. Frames and covers shall be bolt-down watertight frames and covers. Manhole rims shall be twenty four (24) inches above the one hundred- (100-) year base flood elevation.

Buoyancy and Flotation – Buoyancy shall be considered and flotation of the manholes, piers, anchors or any other structure shall be prevented with appropriate construction where high groundwater or flooded conditions are anticipated. For design purposes, the **Engineer** shall assume water to top of manhole and that the manhole is empty. The factor of safety for uplift is one and a half (1.5) for pipes and structures.

Anti-Seepage Collars – Wetland Areas – In areas where the sewer trench has the potential to drain wetlands, anti-seepage collars shall be installed. In these areas, a USACE 404 Wetland Permit and/or a NCDENR 401 Water Quality Permit may be required. Trench water shall not be diverted or pumped into the sanitary sewer system.

7. Buried Crossings for Sanitary Gravity Sewers and Force Mains

The buried crossing is to be designed with a steel casing and epoxy-lined DIP carrier pipe, and shall be as near perpendicular to the stream as possible, and shall be free from change in grade. Gravity sewers crossing creeks shall be placed below the streambed such that there is a minimum of two (2) feet bury below the streambed and minimum one (1) foot of cover over the casing. If the minimum two (2) feet bury depth cannot be attained, either encase the sewer in concrete or design the sewer as an aerial crossing as per above-mentioned criteria. Aerial sewers shall only be allowed when it can be demonstrated that no other practical alternative exists. The design and material requirements for aerial crossings also apply for buried crossings. The sewer shall be designed and constructed such that it remains watertight (exhibit zero infiltration), and free from changes in alignment or grade due to anticipated hydraulic loads, erosion, impact, etc., and tested per **DCDWM** Standards. Sewers shall remain fully operational during the one hundred- (100-) year flood event. Sewers and associated appurtenances located along the creeks shall be protected against the normal range of high and low water flow conditions, including the one hundred- (100-) year flood event.

Bedding and Backfill – Special care shall be taken to provide a firm base for pipe bedding. The plans shall specify that the soft organic material within the creek banks shall be replaced with select imported backfill. Install concrete blocks under each bell and spigot joint when pipe is encased in concrete. In addition, a layer of four- (4-) inch to eight- (8-) inch cobbles shall be placed on top surface of trench area for the full width of the creek. Additional material used to backfill the trench shall be stone, coarse aggregate, washed gravel, or other material that will not readily erode, cause siltation, damage pipe during placement, or corrode the pipe.

Special design requirements shall be employed to prevent stream flow from sinking at the crossing and following the pipe bedding. This can be accomplished with an in-trench impounding structure of compacted clay or other acceptable impermeable

material that will match with the native stream bed.

Check Dams - To prevent French drain effect of the sewer or any other pipe crossing the creek, the Engineer shall design check dams upstream in the pipe conduit trench. Check dams shall be separate from any concrete encasement or steel casing.

Clay Plug - A clay plug shall be required at the downstream side of the crossing. The plug shall be a minimum of (four) 4 feet in length, shall extend the full width of the trench, and shall extend twelve (12) inches above and below the pipe.

Buried Pipe Cover Depth – The top of sewers entering or crossing streams shall be at a sufficient depth below natural bottom of the streambed to protect the sewer line. The following requirements shall be met:

- One (1) foot of minimum cover where the sewer is located in rock.
- Three (3) feet of cover in other material, unless the pipe is encased in concrete or in a steel casing.
- More than three (3) feet cover is required in major rivers, creeks or streams as determined by **DWM**.
- Minimum seven (7) feet cover is required in shifting creeks or stream channels.
- In paved stream channels, the top of sewer pipe shall be placed at least eighteen (18) inches below the bottom of the channel base.

Less cover may be approved by the **County** only if the proposed sewer crossing shall not interfere with future modifications to the stream channel. Justification for less cover shall be submitted in writing to **DCDWM** for review and approval.

B. Force Main Creek Crossings

1. Force mains shall be routed such that the number of stream crossings is minimized. When a stream crossing is required by the design, the crossing shall be as nearly perpendicular to the stream flow as possible.

2. DIP with joints equivalent to water main standards or a watertight ferrous encasement pipe shall be used to construct force mains that cross streams.

3. Force main bedding, haunching, and backfill shall be appropriate for the installation location and pipe material. However, the ability of the bedding and backfill material to readily erode, cause siltation, damage the force main during installation, and corrode the force main after installation shall also be considered.

4. Aerial stream crossings shall require special permission from **DCDWM**. Only DIP with flanged joints, in conjunction with adequate supports, shall be used for aerial stream crossings.
   a. Supports for aerial stream crossings shall be designed to prevent frost heave, overturning, and settlement.
   b. The force main shall be adequately protected from freezing and heaving.

c. The impact of floodwaters and debris shall be considered during the design of aerial crossings. The bottom of the force main pipes shall be placed no lower than the elevation of the twenty five- (25-) year flood stage of the stream.

SECTION VI
GENERAL UTILITY STANDARDS

A. General Construction Requirements

1. Locating Existing Utilities

On February 3, 2009, the Georgia Public Service Commission (PSC) approved the adoption of new utility rules 515-9-4-.02 and 515-9-4-.13 under the Georgia Utility Facility Protection Act. These new rules define Large Projects and describe the procedures to be taken should a project meet the specifications of a Large Project. DeKalb **County** has a Damage Prevention Program in place to eliminate damage to **DCDWM** utilities, investigate damage claims, and educate potential excavators about safe digging practices. **DeKalb County** requires that the projects submitted for approval by **DCDWM** that meet the criteria set by the PSC for a Large Project follow the procedures set out by the Georgia Utility Facility Protection Act.

Furthermore, **DCDWM** requires that if the project submitted for approval meets the criteria for Large Project status, a utility-locating schedule be submitted with the plans to be approved. This schedule shall describe in detail the **DCDWM** utilities that need to be located and at what phase of the project's completion this field location shall take place. This schedule shall be an individual document in the submittal and shall be submitted at the same time as the project documents. It shall be clearly labeled as the "Locating Schedule for Project Name," where "Project Name" is the name of the project submitted for approval.

2. Maintenance of Traffic

The **Engineer** shall consider the impacts of the proposed design on the ability of the Contractor to obtain the necessary road opening permits from the County Department of Public Works Transportation Division

When a water main, sanitary sewer line, or force main is to be installed within the travel way of a County- or GDOT-controlled road, a traffic control plan (TCP) shall be required. The TCP, with the construction plans, shall be submitted to the reviewing agency for review and approval. The following roadway features shall be shown on the TCP:

- Pavement width
- Pavement type
- Speed limit
- Traffic lane designation
- Pavement markings
- Traffic signs/signals
- Side streets/intersection location

to be pigged without the use of special equipment.

- Plug valves and operators shall be installed according to the manufacturer's recommendations for conveying fluids with high solids concentrations. For horizontal installations, the plug valve shall be installed so that the plug face is pointing upwards when the valve is open and the plug face is facing the pump when the valve is closed. For vertical installations, the plug valve shall be installed so that the plug face is pointing to the side when the valve is open and the plug face is pointing upwards when the valve is closed. The plug valves shall be installed horizontally with right angle operators pointing up to allow operation from grade.

a. Above ground valves six (6) inches in diameter and smaller shall have manual lever operators, unless otherwise approved by **DCDWM** and specified or noted on the Drawings.

b. Above ground valves eight (8) inches in diameter and larger shall be manually hand wheel operated through totally enclosed worm gear actuators, unless otherwise approved by **DCDWM** and specified or shown on the Drawings. Manual operators for plug valves mounted above six (6) feet from the operating floor shall be equipped with worm gear chain wheel actuators. The buried valves shall be provided with totally enclosed worm gear actuators, two- (2-) inch-square AWWA operating nuts, and valve boxes. Buried valve operators shall be extended to within six (6) inches of grade. The valves shall be provided with mechanical travel stops for the open and closed positions and shall rotate ninety (90) degrees from fully open to fully shut. Gear actuators shall be designed to produce the required operating torque with a maximum rim pull of eighty (80) pounds on a hand wheel/chain wheel and with a maximum input of one hundred fifty (150) foot-pounds on two- (2-) inch operating nuts. Actuator components between the input and the open and closed position stops shall be designed to withstand, without damage, a rim pull of two hundred (200) pounds for hand wheels / chain wheels and an input torque of three hundred (300) foot-pounds for two-(2-) inch operating nuts.

c. Valves shall be either directly cast with or provided with a corrosion-resistant nameplate, stating, at a minimum, the valve serial number, manufacturer, size, maximum shutoff pressure, and design pressure rating. The seat end shall be clearly indicated on the valve exterior relative to half of the body containing the plug/seat interface.

d. The internal and external ferrous components and surfaces of the valves, with the exception of stainless steel and finished or bearing surfaces, shall be shop painted with two (2) coats, ten (10) mils minimum dry film thickness, of the manufacturer's premium epoxy for corrosion resistance. Damaged surfaces shall be repaired in accordance with the manufacturer's recommendations.

A TCP shall include the following:

- Legend
- Work hour restrictions
- Construction sequence/phasing
- Work zone designation
- Sign placement
- Taper length
- Traffic movement designation
- Drum/cone/barricade/barrier placement
- Flagging requirement/location
- Uniformed police officer requirement/location

The following agency shall be contacted when preparing a TCP:

- DeKalb County Department of Public Works Transportation Division, at (770) 492-5206.

The following publications govern the design and installation of TCPs and devices:

- *MUTCD* (latest edition)
- *GDOT Standard Specifications for Roads and Structures* (latest edition)
- *GDOT Roadway Design Manual* (latest edition)

DCDWM shall obtain the road opening permits required by GDOT with the application and supporting information provided by the Engineer.

Highway utilities and traffic controls are to be maintained, and Work shall conform to the rules and regulations of the authorities, including the use of standard signs.

3. Rock Excavation

Rock Excavation (refer to latest version DWM Technical Specifications)

1. Where rock is encountered within excavation for structures, it shall be excavated to the lines and grades indicated on the County approved drawings or as otherwise directed by the **DCDWM**.

2. Disposal of Rock: The **Contractor,** in a lawful manner shall dispose of rock, off site, that is surplus or not approved by **DCDWM** as suitable for use as riprap or backfill.

Blasting

1. Rock blasting shall be completed in accordance with DCDWM technical specifications (latest edition).

4. Restrained Joint Pipe

Table 6.1 below shows the acceptable restrained joint options. Above ground piping shall be designed using restrained joint piping with expansion and contraction considerations and shall be approved by the **County**.

Table 6.1
Acceptable Restrained Joints

Diameter (inches)	ACIPCO	U.S. Pipe	McWayne	Generic
4 - 12	Fast-Grip Flex Ring	Field Lok TR Flex	Push-On Restrained Joint Type A	MJ with Retainer Gland
16 - 24	Fast-Grip Flex Ring	Field Lok TR Flex	Push-On Restrained Joint Type A	MJ with Retainer Gland
30 - 36	Flex Ring	TR Flex	Push-On Restrained Joint Type B	MJ with Retainer Gland
42 - 48	Lok-Ring	TR Flex	N/A	MJ with Retainer Gland
54 - 64	Lok-Ring	TR Flex	N/A	N/A

a. Cathodic Protection

Cathodic protection of DIP shall be considered whenever corrosive soils or stray current could occur from MARTA, Atlanta Gas Light (AGL), or other facilities or utilities.

5. Bore and Jack

a. General

Working drawings shall show the proposed size and location of bore and jack pits together with the sheeting and shoring to be used. In addition, such drawings shall include large-scale plan and profile of the proposed installation and affected structures if requested by **DCDWM**.

b. Casing Pipe

Casing pipe shall be new and unused pipe. The casing shall be made from steel plate having minimum yield strength of thirty-five thousand (35,000) PSI. The steel plate shall also meet the chemical requirements of ASTM A36, latest edition. At the discretion of the **County**, the outside of the casing pipe shall be coated with coal tar epoxy having a minimum dry film thickness of sixteen (16) mils. Surface preparation shall be SSPC-SP-10. Epoxy shall have a minimum solids content of sixty-five percent (65%) by volume and shall be air or airless spray applied; minimum drying time shall be seven (7) days. Brushing shall be permitted in small areas only. Coating and recoating shall be done in strict accordance with the manufacturer's recommendations. Epoxy shall be Tnemec, Carboline, or Valspar.

The thicknesses of casing shown below are minimum thicknesses. Actual thicknesses shall be determined by the casing installer, based on its evaluation

of the required forces to be exerted on the casing when jacking. Any buckling of the casing due to jacking forces shall be repaired at no additional cost to **DCDWM**.

The diameters of casings listed below are the minimum to be used. Larger casings, with **DCDWM** approval, may be provided at no additional cost to **DCDWM**, for whatever reasons the **Contractor** may decide, whether casing size availability, line and grade tolerances, soil conditions, or other factors. Casing and pipe support installation requirements are provided in in **Appendix B**.

c. Steel:

- Steel pipe shall be used for bore and jack casing.
- Pipe shall conform to the latest revisions of ASTM A134 or ASTM A139 with a minimum yield of thirty-five thousand (35,000) PSI. Alloy shall be in accordance with the latest edition of ASTM A36.
- Casing pipe may be uncoated and unlined with approval by the **County**.

d. Casing Sizes

Under railroads, the **Contractor** shall provide uncoated casings, unless otherwise required. The **Contractor** shall supply casing in accordance with the encroachment permits that are issued. **Table 6.2** shows the minimum casing sizes.

Table 6.2
Minimum Casing Sizes Under Railroads or Highways

Pipe Diameter (inches)	Casing Diameter (inches)	Wall Thickness (inches)	
		Coated	Uncoated
6	16	.250	0.282
8	18	.250	0.313
10	20	.281	0.344
12	22	.312	0.375
14	24	.344	0.407
16	30	.406	0.469
18	30	.406	0.469
20	32	.438	0.501
24	36	.469	0.532
30	42	.500	0.563
36	48	.625	0.688
42	54	.750	0.813

e. Casing Spacers

Casing spacers shall meet one of the following requirements:

Casing spacers shall be flanged, bolt-on style with a two-section stainless steel shell lined with a PVC liner, minimum 0.09-inch-thick having a hardness of eighty-five (85) to ninety (90) durometer, minimum fourteen- (14-) gauge band and ten- (10-) gauge risers, with two- (2-) inch-wide glass reinforced polyester insulating skids. Runners shall be attached to stainless steel risers that shall be properly welded to the shell. The height of the runners and risers shall be manufactured such that the pipe does not float within the casing. Casing spacers shall be as manufactured by Cascade Waterworks Manufacturing Company, Pipeline Seal and Insulator, Inc., or Advanced Products and Systems, Inc.

6. Abandonment of Pipelines

- Prior to approval of plans that include abandonment of pipeline the Operations Management of Water and/or Sewer shall also review plans. All lines that are proposed for abandonment shall be approved by the **DCDWM**. The **Contracto**r shall submit a schedule and detail methods to be used on each pipeline to be abandoned.

7. Flowable Fill

Reference www.dot.ga.gov - in the search engine bar type in - Section 600.

The contractor shall follow the minimum requirements of GDOT Section 600 and shall submit a design mix to **DCDWM** for approval.

B. Restoration of Pavements, Sidewalks, and Curbs

Standard Details shall be followed for the repair of concrete and asphaltic concrete surfaces.

1. Materials

Materials to be used in the repair and restoration of pavements, drives, sidewalks, and curbs, shall be first quality and shall meet specifications. Materials removed while accomplishing the Work shall be disposed by the **Contractor** meeting all Federal, State and County laws. No existing material shall be reused in the Work unless pre-approved by DCDWM. Concrete shall be Class B plain concrete with a twenty eight- (28-) day compressive strength of three thousand (3,000) PSI minimum, unless otherwise specified in the drawings or specifications.

2. Pavement Restoration

All roadway restoration shall be done in accordance with the lawful requirements of the authorities within whose jurisdiction such pavement is located. Highway utilities and traffic controls are to be maintained and Work shall conform to the rules and regulations of the authorities, including the use of standard signs.

The concrete base course shall extend the full width of the trench cut plus a minimum of twelve (12) inches on either side of the trench. The existing pavement shall be neatly sawed along both sides of the ditch. The concrete used shall be Class A or B Concrete. Once the concrete base course has properly set, the concrete surface shall be cleaned and a minimum of two (2) inches thick asphaltic concrete

pavement shall be laid to match the level of the adjacent pavement, see Standard Details resurfacing requirements.

At any time that an existing road is cut longitudinally for a distance greater than one hundred (100) feet, the concrete shall be poured flush with existing pavements and the street shall be resurfaced curb to curb.

3. Roadway Permits

The **Contractor** shall be responsible for obtaining the road opening permits from the DeKalb County Department of Public Works Transportation Division at **(770) 492-5206**, including providing any required restoration bonds.

DCDWM shall obtain the road opening permits required by the GDOT. The **Contractor** is not permitted to make any type of cuts on roadways requiring a permit from GDOT until such time as the permit is provided and prominently displayed onsite.

4. Record Drawings

Record drawings (as-builts) shall be submitted to DCDWM before any project can receive final approval and/or Certificates of Occupancy. To avoid delays in the approval process of developments/subdivisions, as-built drawings should be submitted as soon as the water main installation, sewer main installation and pump station/force main installation are complete to allow sufficient time for review.

Record drawings shall be sharp, clear, clean, legible, and submitted on twenty-four (24) inch by thirty-six (36) inch plain paper and the electronic files shall be submitted on a USB 3.0 Flash Drive. The AutoCAD files shall follow the DCDWM format and requirements. The files shall also contain x, y, and z coordinates for the appurtenances using the County's approved coordinate plane for final as-constructed utility improvements.

Record drawings shall include a site plan and any supplemental or shop drawings as required by DCDWM.

One (1) complete set of record drawings and one (1) copy of the electronic files shall be submitted by the Developer or Developer's Engineer to DCDWM for review and approval. Four (4) sets of record drawings shall be submitted to DCDPS after final approval. For DWM capital projects, the Engineer of Record for each project shall provide these documents to DC DWM (through DWM Project Manager)

Record drawings shall be stamped, dated, and signed by a Professional Engineer or Land Surveyor registered in the State of Georgia.

5. Survey Standards for DeKalb Watershed Management

As-builts for all water and wastewater projects shall include all new and existing infrastructures directly adjacent to the project area. This includes, but not limited to, fire hydrants, water valves, water mains, water meters, tees, tap sleeves, bends, reducers, and plugs. Sewer infrastructure shall include manholes, sewer mains, force mains, air valves, clean-outs and all features in and around sanitary sewer lift stations.

The primary survey strategy will implement a GPS methodology. The consultant shall use the Real Time Kinematic Method (RTK) or Rapid Static Method (RSM) and equipment adequate to produce horizontal, vertical, and elevation coordinates (x, y, and z) that will be consistent with DWM methods (centimeter survey grade accuracy).

If is determined that a number of features cannot be located directly by GPS due to obstructions, a secondary survey will be employed to capture obscured points.

The secondary strategy should consist of surveying using conventional methods. Establishing a transit and back sight using GPS, establishing a traverse loop, maintaining a minimum of 1:10,000 closure for the traverse, and side shots being collected by occupying the traverse points. Side shots should be enough to adequately survey the required features and/or other relevant features. After data collection is complete, standard survey procedure dictates that the files will be downloaded into a coordinate geometry (COGO) package for any translation or rotation that might be required. The specifications for the datum and coordinate will be the Georgia West State Plane coordinate system. The horizontal datum will be the North American Datum (NAD83) and the vertical datum will be the North American Vertical Datum (NAVD88).

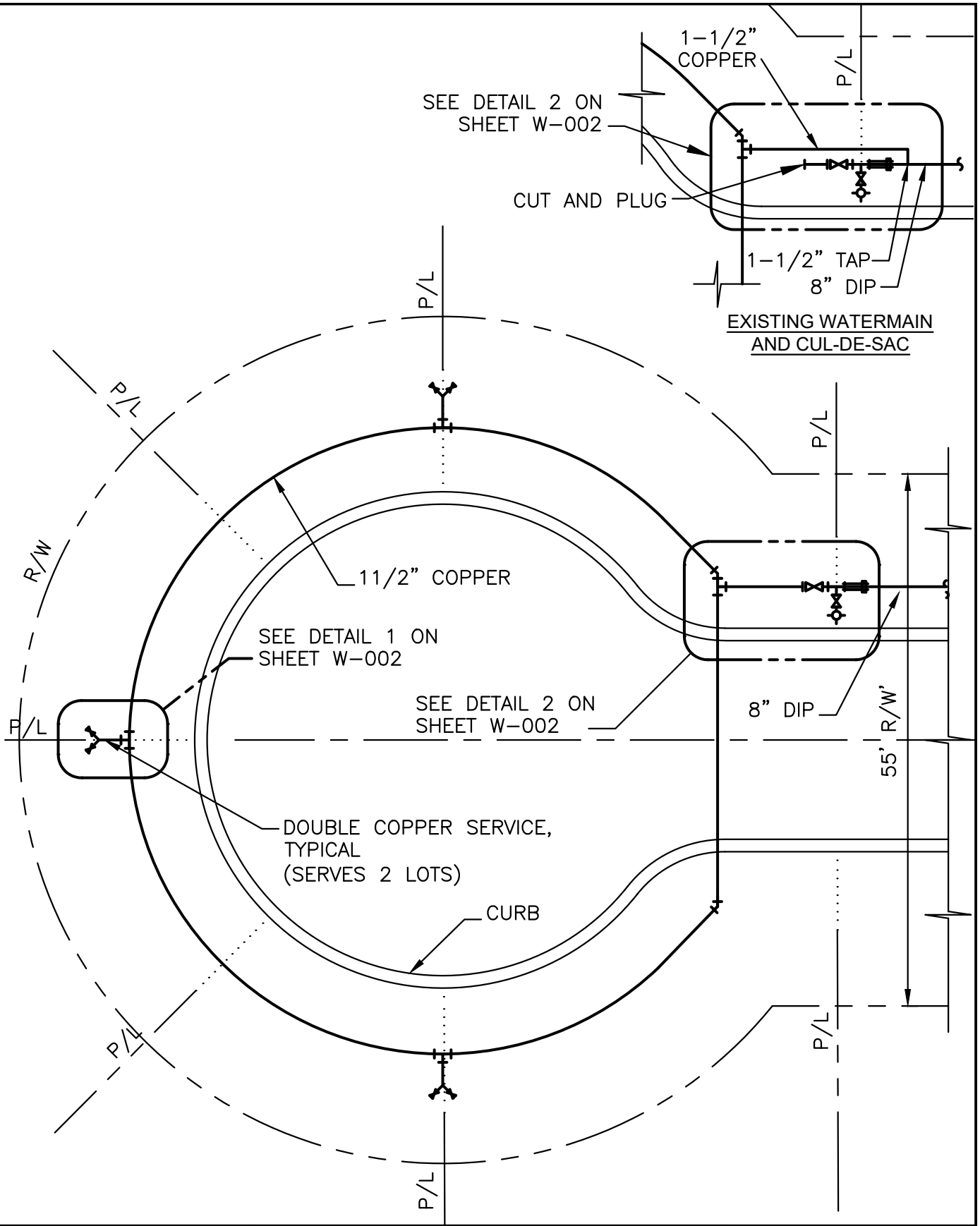
APPENDIX A
POTABLE WATER MAIN DESIGN STANDARDS

Department of Watershed Management
Standard Details List – Potable Water

Standard Details List – Potable Water	
Detail Number	**TITLE**
W-001	New Water Main New Cul-de-Sac Existing Water main and Cul-de-Sac
W-001.1	Water Main Eyebrow
W-002	Water Main Cul-de-Sac Details 1 & 2
W-003	Water Main Y-Branch Detail
W-004	Typical Fire Hydrant Detail Tap Installation
W-005	Maximum Allowable Offsets and Deflections
W-006	Typical Stub-Out
W-007	Typical Gate Valve Installation
W-008	Typical Service Line Installation
W-009	DCDA BFP Installation Non Hazardous Fire Line Installation
W-010	DC BFP Installation, 2-1/2 Inches and Larger
W-011	RPP BFP Installation 3/4” to 2”
W-012	RPP BFP Installation 2-1/2 Inches and Larger
W-013	RPDA BFP Installation 2-1/2 Inches and Larger
W-014	DC BFP Installation 3/4 Inch to 2 Inch
W-015	Temporary Disinfection Jumper Installation Detail
W-016	Intersection Detail Valve Locations
W-017	Typical Blow-off Detail
W-018	Repair Sleeve Detail
W-019	Air Release Valve Installation Detail
W-020	Water Meter Locations Detail
W-021	Residential Water Meter Installation Detail
W-022	Temporary Water Sample Station Detail
W-023	Valve Cover and Marker Disc
W-024	End of Water Line Plug & Sleeve Assembly

Department of Watershed Management
Standard Details List – General Details

Standard Details List – General Details	
Detail Number	**TITLE**
G-004	Backfill and Allowable Trench Widths Detail
G-005	Typical Patch and Resurfacing Detail
G-006	Typical Asphalt Pavement Patch
G-007	Steel Plate Installation Urban and Residential
G-008	Thrust Restraint (200 psi) Tie-Rod Installation Detail
G-009	Casting and Pipe Support Installation Detail
G-010	Typical Tunnel Section



DeKalb County GEORGIA

STANDARD DETAILS

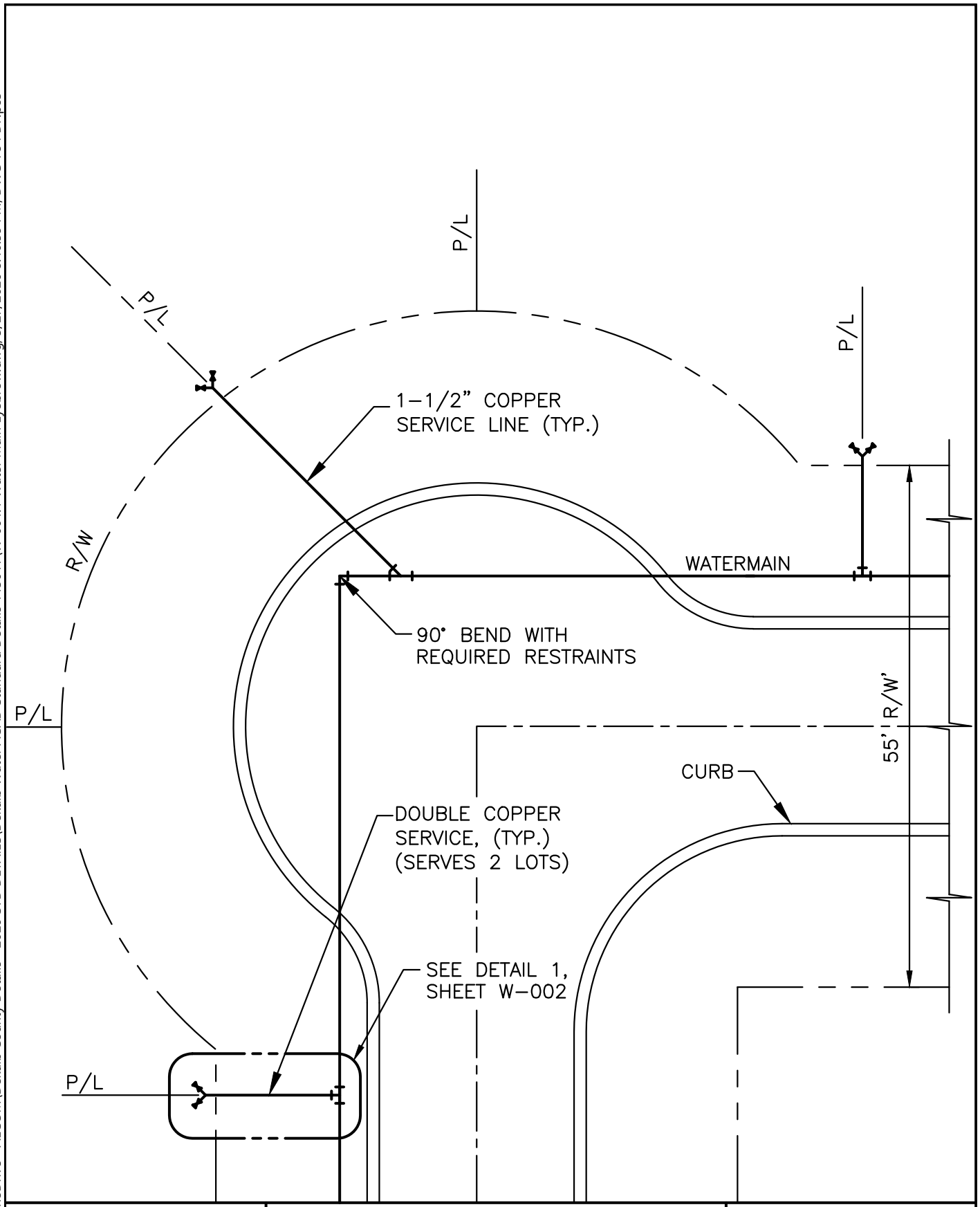
New Water Main
New Cul-de-Sac
Existing Watermain and Cul-de-Sac

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-001



DeKalb County
GEORGIA

STANDARD DETAILS

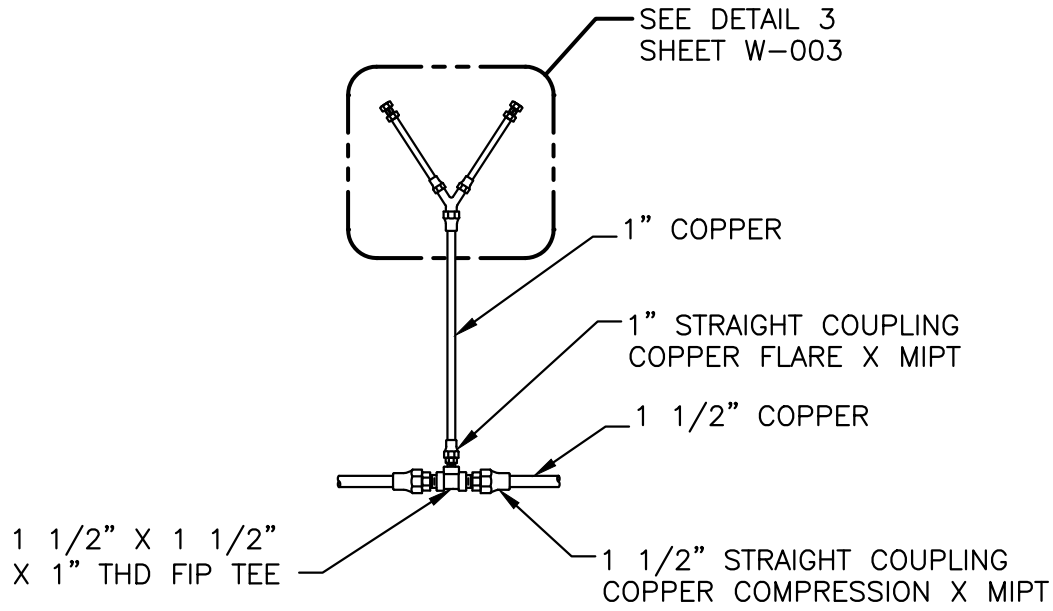
Water Main Eyebrow

NOT TO SCALE

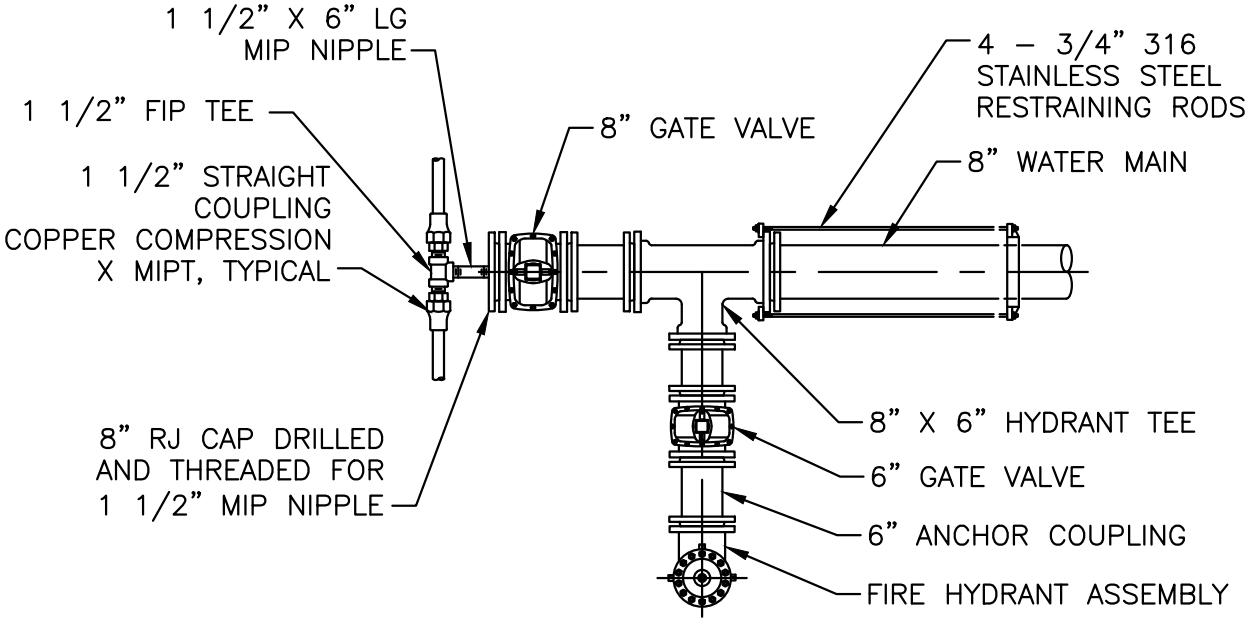
05/26

WATER Matters

DETAIL NO. W-001.1



DETAIL 1



DETAIL 2

ALL JOINTS WILL BE RESTRAINED (MEGA LUGS OR EQUAL)
AS REQUIRED BY ENGINEERS CALCULATIONS

DeKalb County
GEORGIA

STANDARD DETAILS

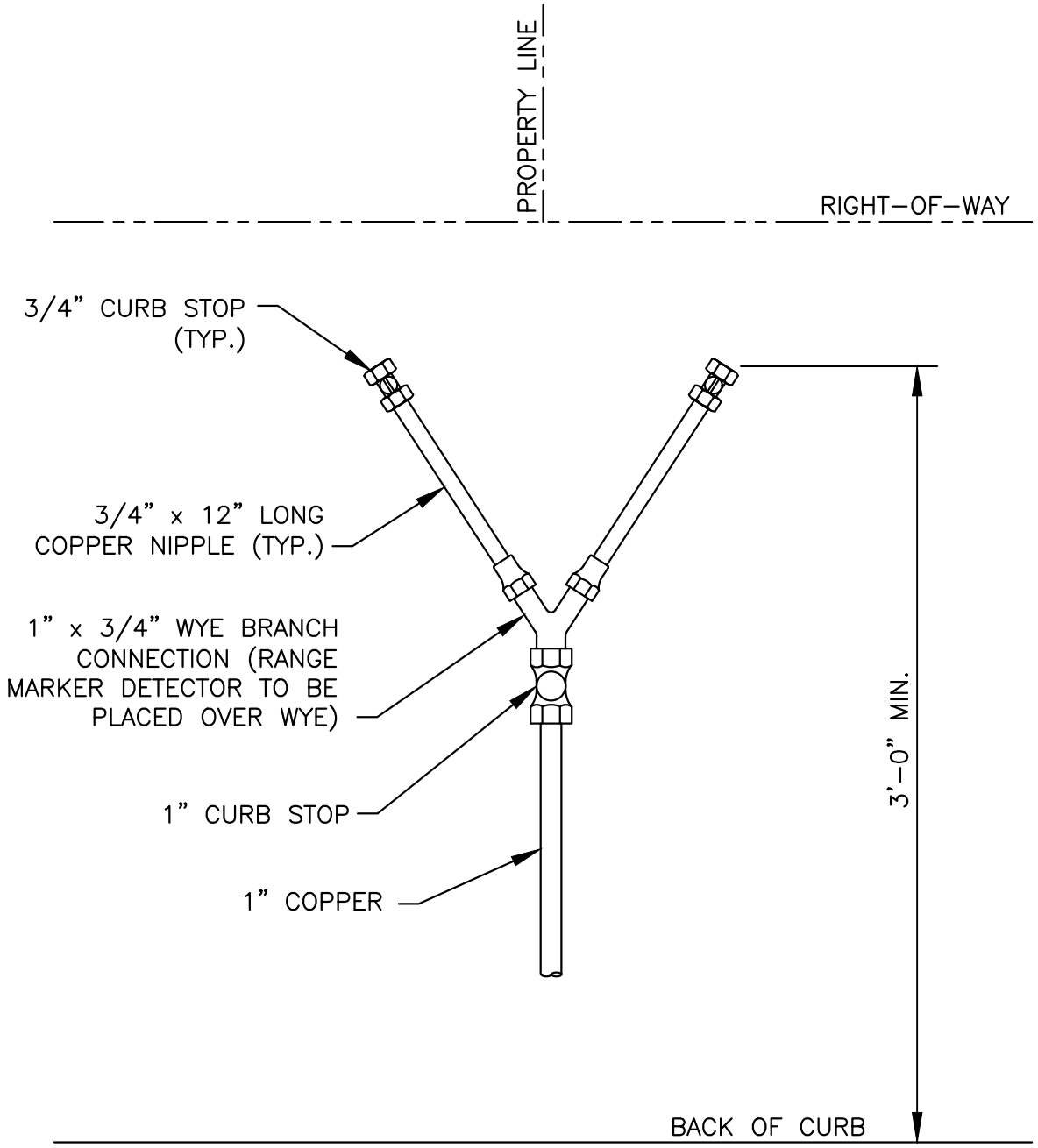
Water Main Cul-de-Sac
Details 1 & 2

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-002



DeKalb County
GEORGIA

STANDARD DETAILS

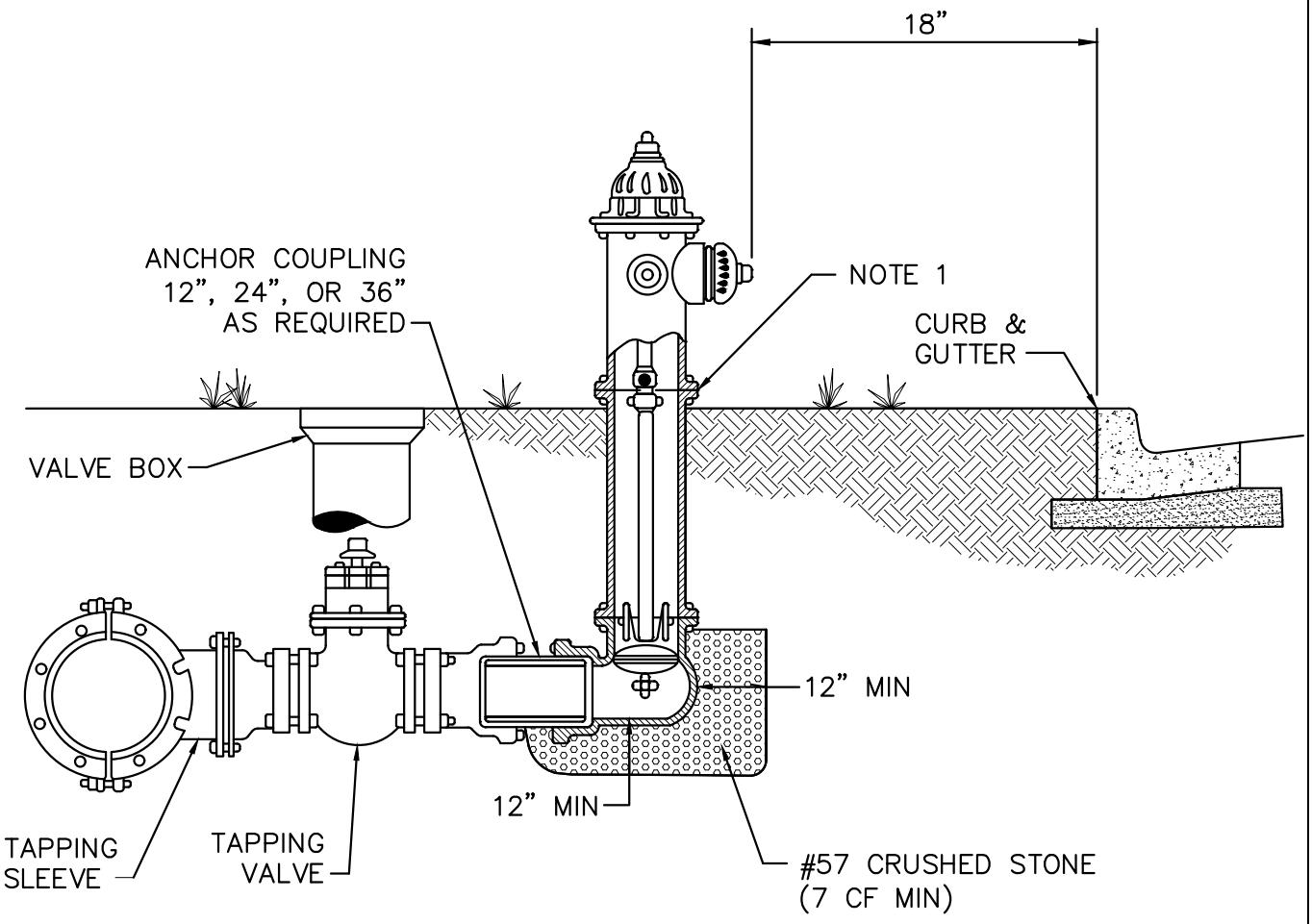
Water Main
Y-Branch Detail

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-003



NOTES:

1. BREAKAWAY FLANGE NOT GREATER THAN 6" ABOVE FINAL GRADE
2. JOINT RESTRAINT TO BE PROVIDED AS NECESSARY PER DESIGN STANDARD

DeKalb County
GEORGIA

STANDARD DETAILS

Typical Fire Hydrant Detail
Tap Installation

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-004

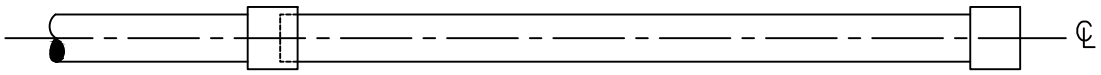


FIG. 1 COMPLETED JOINT
BEFORE OFFSET

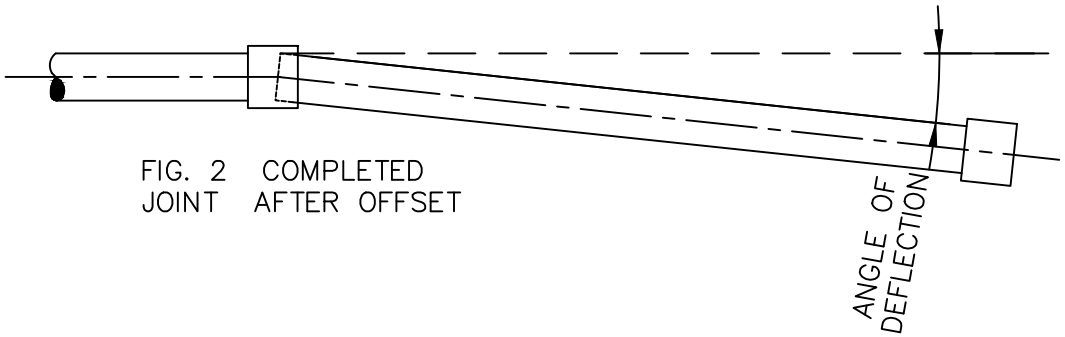


FIG. 2 COMPLETED
JOINT AFTER OFFSET

NOTES:

1. ALL JOINTS MUST BE ASSEMBLED AS SHOWN IN FIG. 1 BEFORE MAKING DEFLECTION.
2. ALL DEFLECTION ANGLES SHALL BE LESS THAN THE PIPE MANUFACTURERS MAXIMUM.

DeKalb County
GEORGIA

STANDARD DETAILS

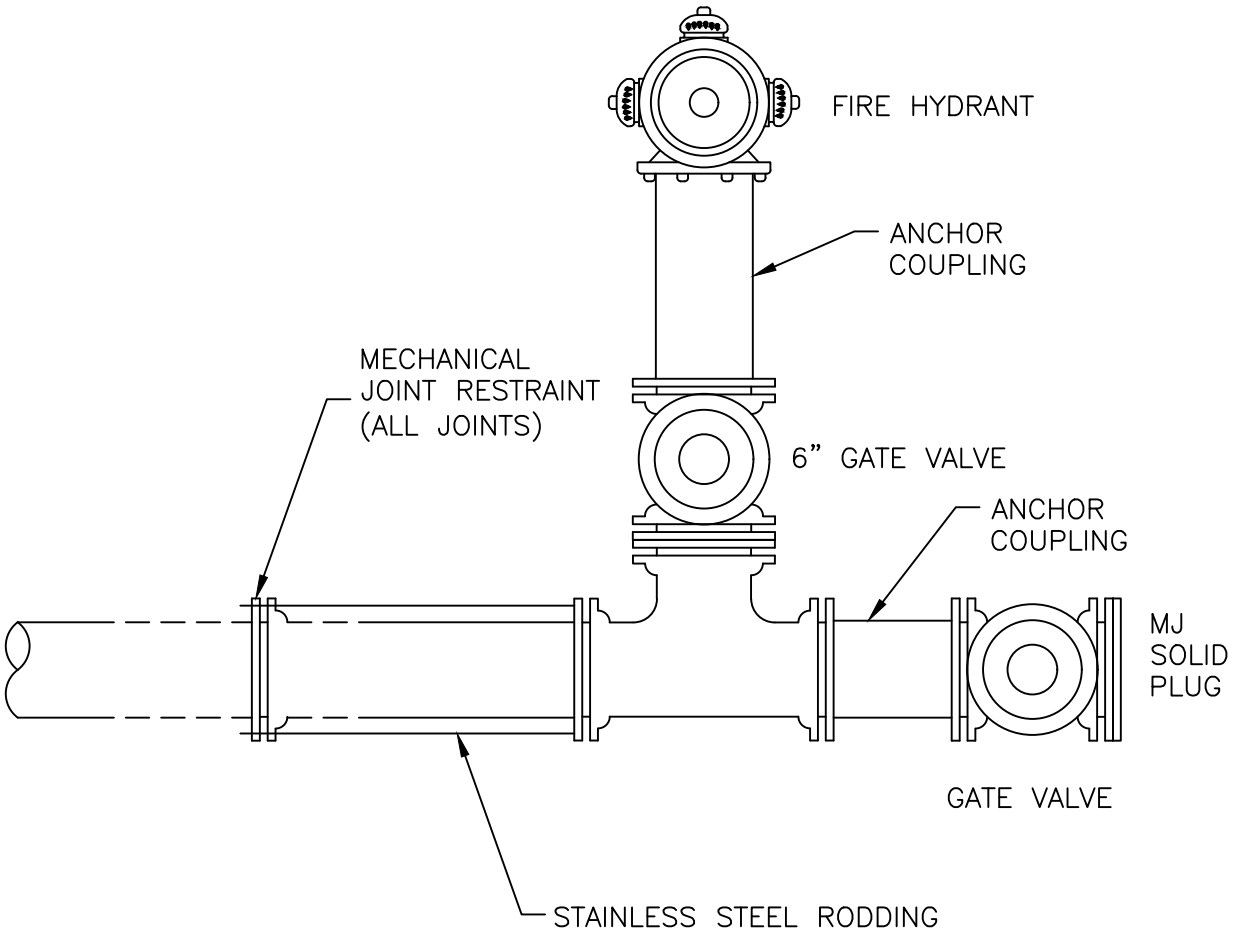
Maximum Allowable Offsets and Deflections

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-005



DeKalb County GEORGIA

STANDARD DETAILS

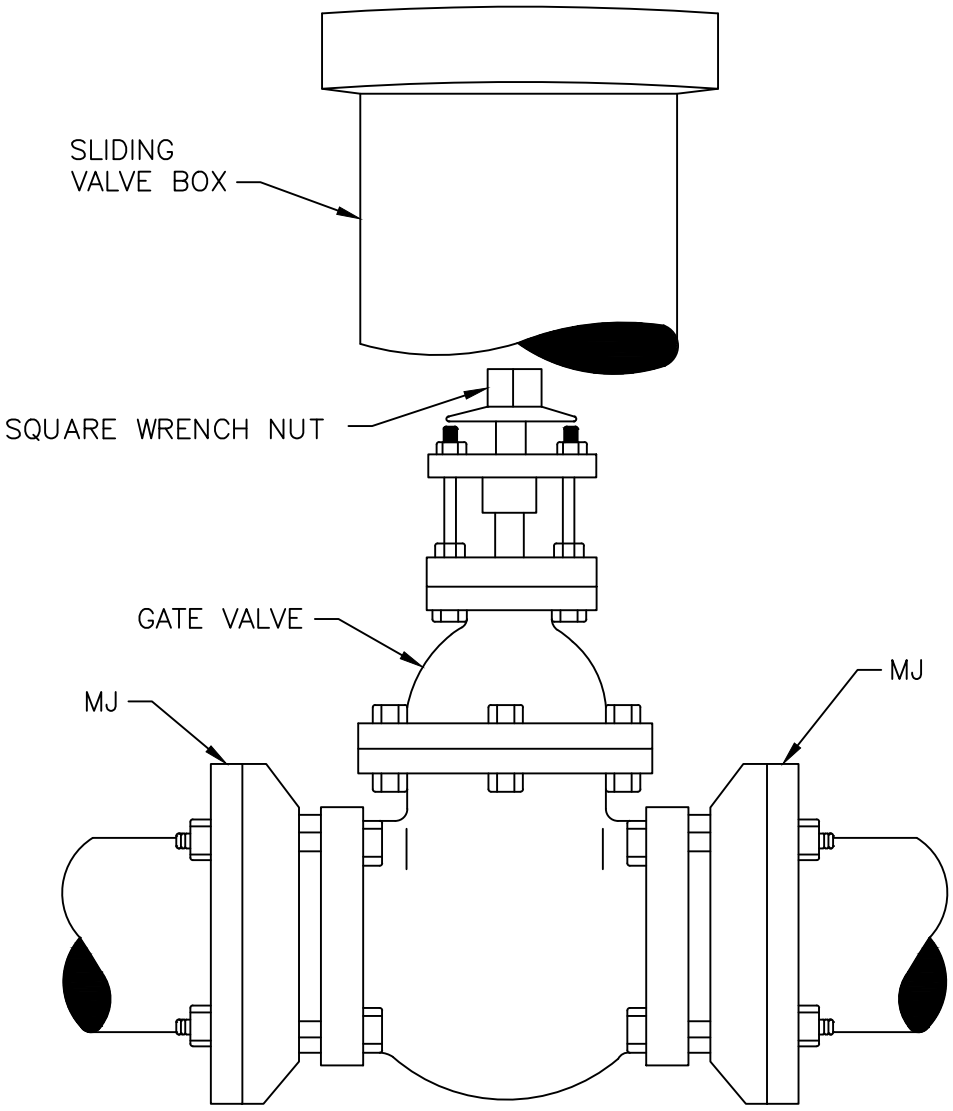
Typical Stub-Out

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-006



DeKalb County
GEORGIA

STANDARD DETAILS

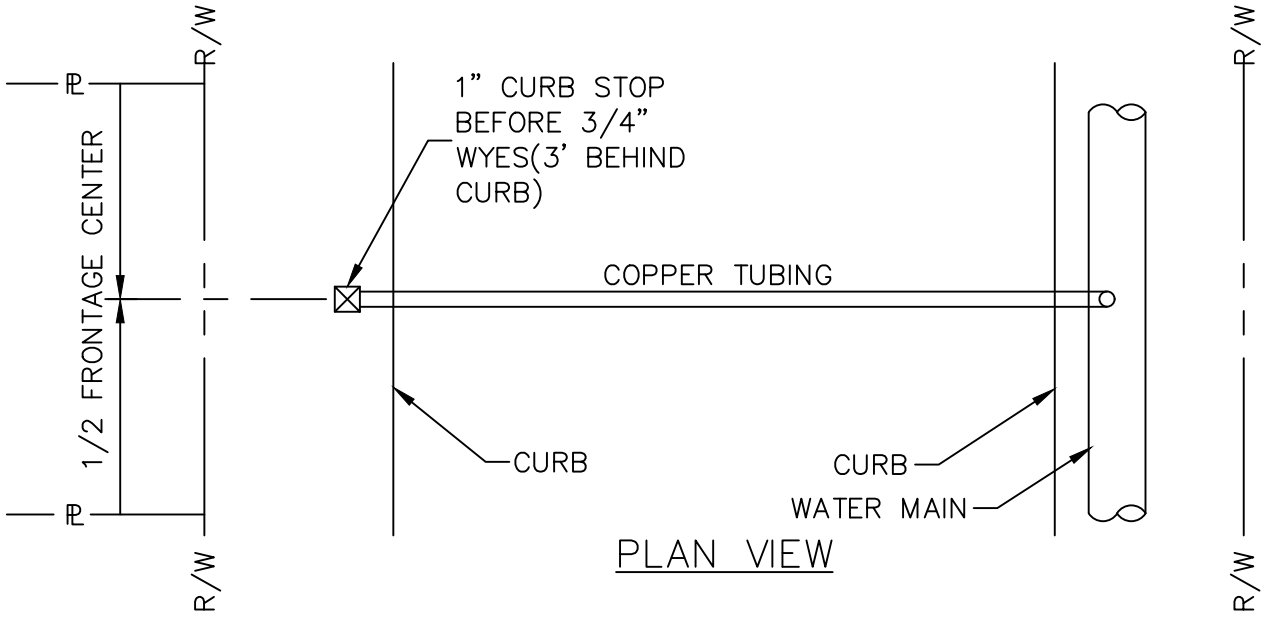
Typical Gate Valve Installation

NOT TO SCALE

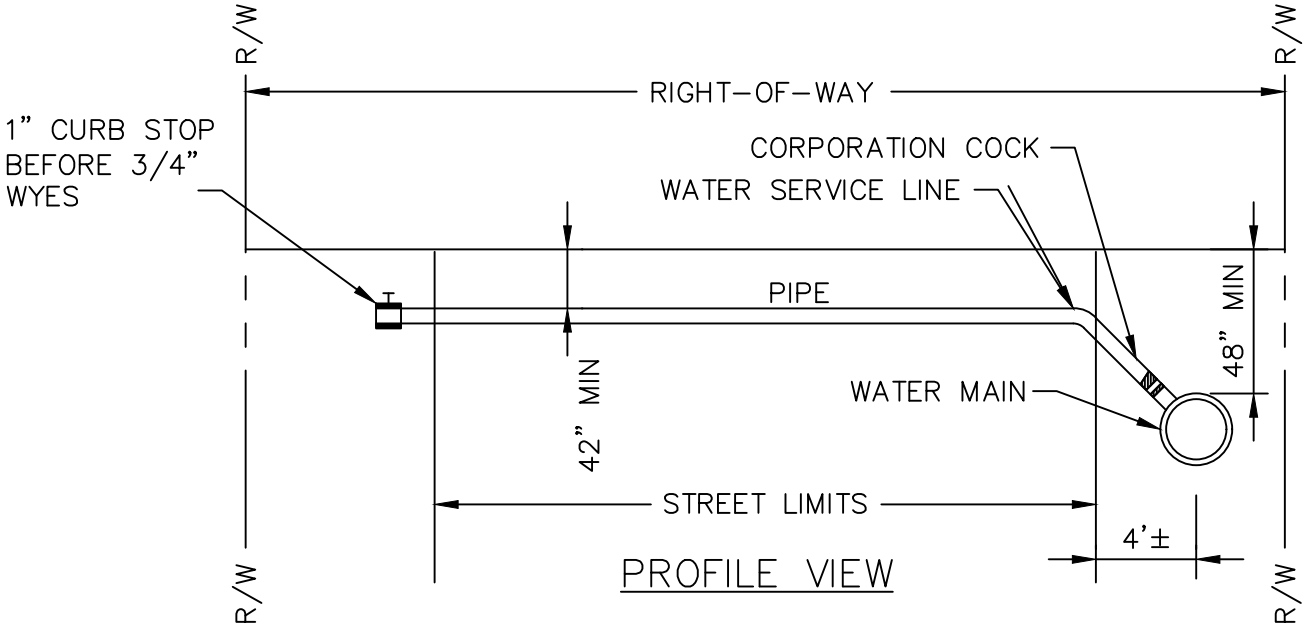
05/26

WATER Matters

DETAIL NO. W-007



PLAN VIEW



PROFILE VIEW

NOTES:

1. SERVICE LINES 1 INCH AND SMALLER SHALL BE INSTALLED USING COPPER TUBING WITH FLARE X MIPT.

2. LARGER SERVICE LINE MATERIAL SHALL BE AS SPECIFIED ON THE DRAWING, AND REQUIRES COUNTY APPROVAL.

DeKalb County
GEORGIA

STANDARD DETAILS

Typical Service Line Installation

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-008

MINIMUM CONTAINMENT PROTECTION REQUIREMENT
NEW CONSTRUCTION AND RETROFIT INSTALLATIONS NONHAZARDOUS
DEDICATED FIRELINE SERVICE CONNECTION
SERVICE SIZE: 2 1/2" AND ABOVE
DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)

SPECIFICATION: THE CUSTOMER/OWNER SHALL FURNISH AND INSTALL A DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) BACKFLOW PREVENTION ASSEMBLY (BFP) IN A SIZE TO MATCH THAT OF THE REQUIRED FIRELINE SERVICE CONNECTION. THE BFP ASSEMBLY SHALL HAVE A METER ½ TO ¾" BY-PASS LINE AS SHOWN ON THE ILLUSTRATION. THE DCDA BFP SHALL BE PROVIDED WITH A RESILIENT SEATED OUTSIDE STEM AND YOKE FLANGED GATE VALVE NEAR THE INLET AND OUTLET SIDES OF THE ASSEMBLY. THE ASSEMBLY SHALL BE PROVIDED WITH THREE BRASS BALL VALVE TEST COCKS FITTED WITH BRASS OR PLASTIC THREADED PLUGS. A FOURTH TEST COCK SHALL ALSO BE PROVIDED ON THE UPSTREAM SIDE OF THE INLET SHUT-OFF VALVE. THE METERED BY-PASS LINE ON THE ASSEMBLY SHALL INCLUDE A BRONZE DETECTOR METER AND A DOUBLE CHECK (DC) BFP.

NOTE: ALL COMPONENTS OF THE ASSEMBLY SHALL BE CERTIFIED OR LISTED BY THE UNDERWRITER LABORATORIES AND FACTORY MUTUAL INSURANCE. THE DCDA BFP-ASSEMBLY SHALL HAVE APPROVAL AND CONFORM TO ALL CURRENT REQUIREMENTS OF THE UNIVERSITY OF SOUTHERN CALIFORNIA, FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (USC-FCCCHR), BE INDIVIDUALLY TESTED, SHIPPED AND INSTALLED AS A UNIT.

INSTALLATION INSTRUCTIONS: THE DCDA BFP SHALL NOT BE BURIED IN EARTH BUT INSTALLED BELOW GROUND IN A VAULT AS CLOSE AS PRACTICAL TO THE PROPERTY LINE OF THE PREMISES AND OUT OF RIGHT-OF-WAY. NO OTHER ASSEMBLY IS ALLOWED TO BE INSTALLED IN THE VAULT FOR DCDA BFP ASSEMBLY. PRIOR APPROVAL IS REQUIRED IF DCDA CANNOT BE INSTALLED OUTSIDE THE BUILDING, CLOSE TO THE PROPERTY LINE.

NOTE: UNDER NO CIRCUMSTANCES WILL ANY CONNECTION BE ALLOWED ON THE SYSTEM OTHER THAN FOR FIRE FIGHTING OR FIRE PROTECTION PURPOSES.

ASSEMBLY TESTING: ALL DCDA BFP'S SHALL BE FIELD TESTED FOLLOWING INSTALLATION, REPAIR, OR RELOCATION, AND AT LEAST ANNUALLY THEREAFTER.

PLAN APPROVAL AND INSPECTION: PLAN APPROVAL MUST BE OBTAINED AND INSPECTION SCHEDULED PRIOR TO WORK, THROUGH DEKALB COUNTY DEPARTMENT OF WATERSHED MANAGEMENT. CONTACT BACKFLOW PREVENTION SECTION AT (404) 687-4075 FOR BACKFLOW INSPECTION PRIOR TO INSTALLATION.

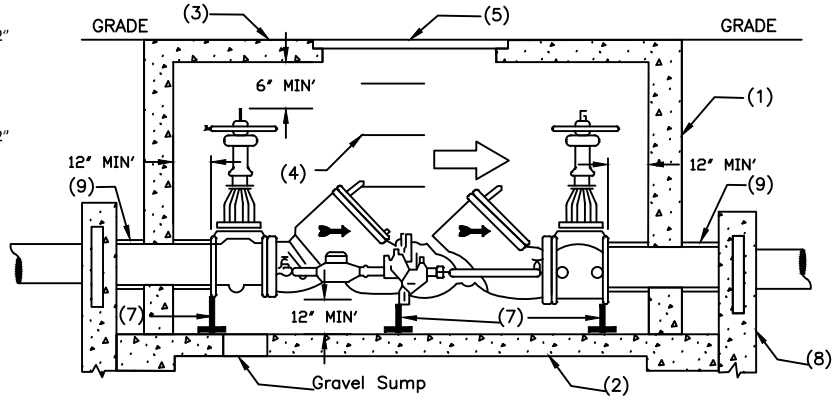
APPROVED ASSEMBLIES (OR EQUIVALENT):

AMES	3000 SS	2 ½", 3", 4", 6", 8", 10", 12"
BACKFLOW DIRECT DERINGER		2 ½", 3", 4", 6", 8"
CONBRACO	DCDA 4SG	2 ½", 3", 4", 6", 8"
FEBCO	LF856	2 ½," 3", 4", 6", 8", 10"
WATTS	709 DCDA	2 ½", 3", 4", 6", 8", 10"
WILKINS	350 DA	2 ½", 3", 4", 6", 8", 10", 12"

VAULT SPECIFICATIONS:

1. VAULT SHALL BE PRECAST REINFORCED CONCRETE WITH A MINIMUM THICKNESS OF AT LEAST 6" INCH.
2. VAULT BOTTOM SHALL BE 6" POURED CONCRETE SLAB, SLOPED TO 12" x 12" GRAVEL SUMP. SLAB TO BE POURED ON 12" OF NO. 57 COMPACTED STONE.
3. VAULT TOP SHALL BE REINFORCED CONCRETE WITH 36" x 36" ACCESS OPENING OFFSET TO ONE SIDE.
4. ACCESS LADDER DOWELED TO WALL AND CENTERED AT ACCESS OPENING.
5. HATCH COVER SHALL BE BILCO-ALUMINUM SINGLE, MODEL J-4AL OR EQUIVALENT.
6. VAULT INLET/OUTLET PIPE OPENINGS TO BE SEALED WITH NON-SHRINK GROUT OR MORTAR. PIPE MUST NOT SUPPORT VAULT.
7. BFP ASSEMBLY TO BE SUPPORTED AT THREE POINTS WITH PIPE STAND.
8. THRUST BLOCKING, AS REQUIRED, MUST BE IN ACCORDANCE WITH DCDWM SPECIFICATIONS.
9. THRUST TIE RODS SHALL BE BITUMASTIC COATED. ALL PIPE AND FITTINGS OF DUCTILE IRON.
10. VAULT TO BE INSTALLED ON OWNER'S PRIVATE PROPERTY.
11. ALL MATERIALS TO BE FURNISHED BY THE CUSTOMER / OWNER.

TYPICAL VAULT INSTALLATION
(MINIMUM CLEARANCE DIMENSIONS)



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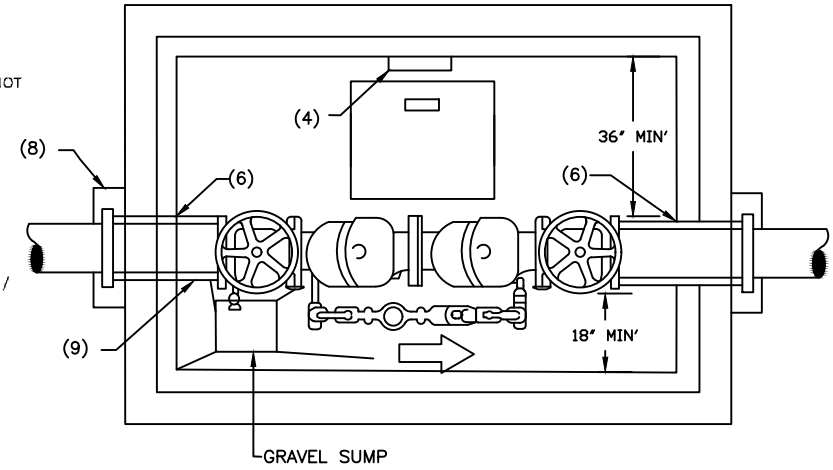


PLAN VIEW

DeKalb County
GEORGIA

STANDARD DETAILS

DCDA BFP Installation
Non Hazardous Fire Line Installation

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-009

MINIMUM CONTAINMENT PROTECTION REQUIREMENT
NEW CONSTRUCTION AND RETROFIT INSTALLATIONS
SERVICE SIZE: 2 1/2 INCH AND ABOVE METER SIZE: 2 1/2 INCH AND ABOVE
DOUBLE CHECK VALVE ASSEMBLY (DC)

SPECIFICATION: THE CUSTOMER/OWNER SHALL FURNISH AND INSTALL A DOUBLE CHECK (DC) VALVE BACKFLOW PREVENTION ASSEMBLY (BFP) IN A SIZE TO MATCH THAT OF THE REQUIRED SERVICE LINE CONNECTION. THE DC BFP SHALL BE PROVIDED WITH AN EPOXY COATED RESILIENT SEATED FLANGED OUTSIDE STEM AND YOKE GATE VALVE NEAR THE INLET AND OUTLET SIDES OF THE ASSEMBLY. THE ASSEMBLY SHALL BE PROVIDED WITH THREE BALL VALVE TEST COCKS FITTED WITH BRASS OR PLASTIC THREADED PLUGS. A FOURTH TEST COCK SHALL ALSO BE PROVIDED ON THE UPSTREAM SIDE OF THE INLET SHUT-OFF VALVE.

NOTE: ALL COMPONENTS OF THE ASSEMBLY SHALL BE CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY. THE DC BFP ASSEMBLY SHALL HAVE APPROVAL AND CONFORM TO ALL CURRENT REQUIREMENTS OF THE UNIVERSITY OF SOUTHERN CALIFORNIA, FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (USC-FCCCHR). ASSEMBLY TO BE INDIVIDUALLY FACTORY TESTED, SHIPPED AND INSTALLED AS A UNIT.

INSTALLATION INSTRUCTIONS: THE DC BFP ASSEMBLY SHALL NOT BE BURIED IN EARTH BUT INSTALLED BELOW GROUND IN CONCRETE VAULT AS CLOSE AS PRACTICAL TO THE PROPERTY LINE OF THE PREMISES TO THE DOWNSTREAM OF THE WATER METER, AND OUT OF RIGHT-OF-WAY. NO OTHER ASSEMBLY IS ALLOWED TO BE INSTALLED IN THE VAULT FOR DC BFP ASSEMBLY. PRIOR APPROVAL IS REQUIRED FOR INTERIOR INSTALLATION OF BFP ASSEMBLY.

NOTE: UNDER NO CIRCUMSTANCES WILL A BY-PASS OR ANY INTERVENING CONNECTION BE ALLOWED BETWEEN THE WATER METER AND THE DC BFP ASSEMBLY UNLESS THAT CONNECTION IS PROTECTED BY AN APPROVED BFP ASSEMBLY.

CAUTION: SECTION 607.3, THERMAL EXPANSION CONTROL, NOTED IN THE 2006 INTERNATIONAL PLUMBING CODE, ADOPTED AS THE STATE OF GEORGIA PLUMBING CODE (WITH CURRENT AMENDMENTS) SHOULD BE INCORPORATED IN THE DESIGN OF INSTALLATIONS AND DULY NOTED ON ALL APPLICABLE DRAWINGS PRIOR TO THE INSTALLATION OF ANY INLINE CHECKING DEVICE(S).

NOTE: DOMESTIC DC-BFPAs SHALL BE LEAD FREE.

ASSEMBLY TESTING: ALL DC BFP'S SHALL BE FIELD TESTED FOLLOWING INSTALLATION, REPAIR, OR RELOCATION, AND AT LEAST ANNUALLY THEREAFTER.

PLAN APPROVAL AND INSPECTION: PLAN APPROVAL MUST BE OBTAINED AND INSPECTION SCHEDULED PRIOR TO WORK, THROUGH DEKALB COUNTY DEPARTMENT OF WATERSHED MANAGEMENT. CONTACT BACKFLOW PREVENTION SECTION AT (404) 687-4075 FOR BACKFLOW INSPECTION PRIOR TO INSTALLATION.

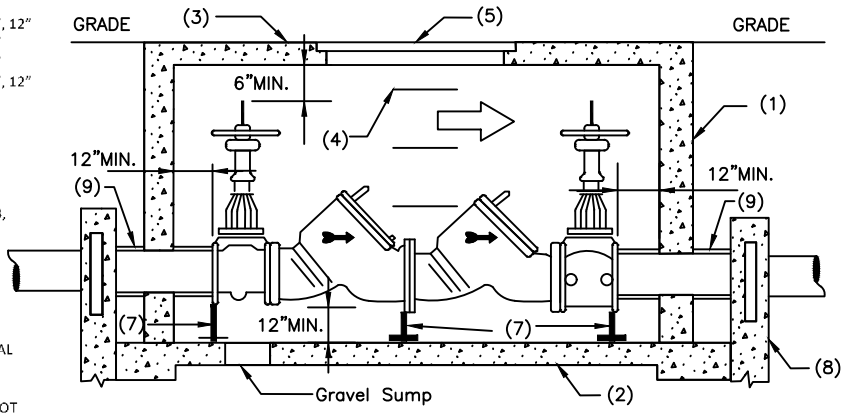
APPROVED ASSEMBLY (OR EQUIVALENT):

AMES	2000SS	2 ½", 3", 4", 6", 8", 10", 12"
BACKFLOW DIRECT DERINGER		2 ½", 3", 4", 6", 8"
CONBRACO	DCLF4A	2 ½", 3", 4", 6", 8", 10", 12"
FEBCO	LF850	2 ½", 3", 4", 6", 8", 10"
WATTS	LF709	2 ½", 3", 4", 6", 8", 10"
WILKINS	350	2 ½", 3", 4", 6", 8", 10", 12"

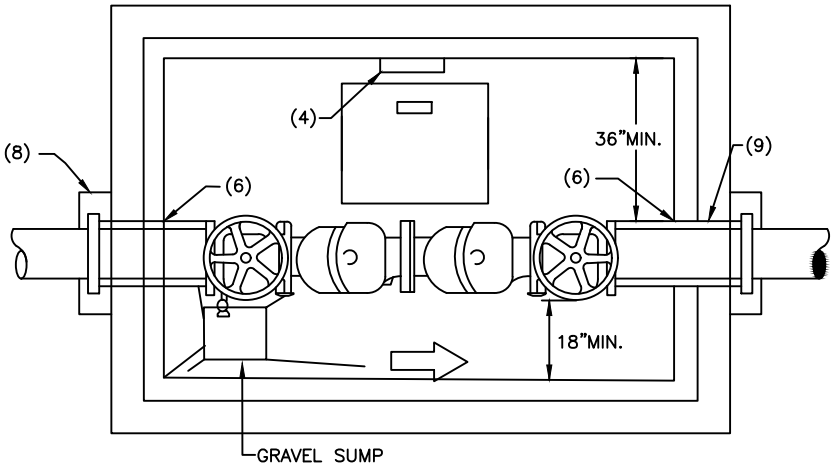
VAULT SPECIFICATIONS:

1. VAULT SHALL BE PRECAST REINFORCED CONCRETE WITH A MINIMUM THICKNESS OF 6" INCH.
2. VAULT BOTTOM SHALL BE 6" POURED CONCRETE SLAB, SLOPED TO 12" x 12" GRAVEL SUMP. SLAB TO BE POURED ON 12" OF NO. 57 COMPACTED STONE.
3. VAULT TOP SHALL BE REINFORCED CONCRETE WITH 36" x 36" ACCESS OPENING OFFSET TO ONE SIDE.
4. ACCESS LADDER DOWELED TO WALL AND CENTERED AT ACCESS OPENING.
5. HATCH COVER: BILCO-ALUMINUM SINGLE, MODEL J-4AL OR EQUIVALENT.
6. VAULT INLET/OUTLET PIPE OPENINGS TO BE SEALED WITH NON-SHRINK GROUT OR MORTAR. PIPE MUST NOT SUPPORT VAULT.
7. BFP ASSEMBLY TO BE SUPPORTED AT THREE POINTS WITH PIPE STAND.
8. THRUST BLOCKING, AS REQUIRED, MUST BE IN ACCORDANCE WITH DCDWM SPECIFICATIONS.
9. THRUST TIE RODS SHALL BE BITUMASTIC COATED. ALL PIPE AND FITTINGS OF DUCTILE IRON.
10. VAULT TO BE INSTALLED ON OWNER'S PRIVATE PROPERTY.
11. ALL MATERIALS TO BE FURNISHED BY THE CUSTOMER / OWNER.

TYPICAL VAULT INSTALLATION
(MINIMUM CLEARANCE DIMENSIONS)



ELEVATION



PLAN VIEW

DeKalb County GEORGIA

STANDARD DETAILS

DC BFP INSTALLATION
2 1/2 INCHES AND LARGER

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W–010

MINIMUM CONTAINMENT PROTECTION REQUIREMENT
NEW CONSTRUCTION AND RETROFIT INSTALLATIONS
SERVICE SIZE: ¾ INCH THRU 2 INCH METER SIZE: ¾ INCH THRU 2 INCH
REDUCED PRESSURE PRINCIPLE ASSEMBLY (RPP)

SPECIFICATION: THE CUSTOMER/OWNER SHALL FURNISH AND INSTALL A REDUCED PRESSURE PRINCIPLE (RPP) BACKFLOW PREVENTION ASSEMBLY (BFP) IN A SIZE TO MATCH THAT OF THE REQUIRED SERVICE LINE CONNECTION. THE RPP BFP ASSEMBLY SHALL INCLUDE A FULL PORT BALL VALVE ON THE INLET AND OUTLET SIDES WITH A UNION BETWEEN THE ASSEMBLY AND EACH VALVE. THE ASSEMBLY SHALL HAVE THREE BALL VALVE TEST COCKS IN AN ACCEPTABLE POSITION FITTED WITH BRASS OR PLASTIC THREADED PLUGS. A FOURTH TEST COCK SHALL ALSO BE PROVIDED ON THE UPSTREAM SIDE OF THE INLET SHUT-OFF VALVE. A STRAINER SHALL BE INSTALLED IMMEDIATELY UPSTREAM OF THE BFP, UNLESS THE BFP IS DIRECTLY DOWNSTREAM OF THE METER.

NOTE: ALL COMPONENTS OF THE ASSEMBLY SHALL BE CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY. THE RPP BFP ASSEMBLY SHALL HAVE APPROVAL AND CONFORM TO ALL CURRENT REQUIREMENTS OF THE UNIVERSITY OF SOUTHERN CALIFORNIA, FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (USC-FCCCHR). ASSEMBLY TO BE INDIVIDUALLY FACTORY TESTED, SHIPPED AND INSTALLED AS A UNIT.

INSTALLATION INSTRUCTIONS: THE RPP BFP ASSEMBLY SHALL NOT BE INSTALLED BELOW GROUND. INSTALL ABOVE GROUND AS CLOSE AS PRACTICAL TO THE PROPERTY LINE OF THE PREMISES TO THE DOWNSTREAM OF THE WATER METER, AND OUT OF RIGHT-OF-WAY. AN ABOVE GROUND ENCLOSURE MUST BE PROVIDED FOR PROTECTION FROM FREEZING TEMPERATURES. INSTALL AN APPROVED DRAIN WITH AN AIR GAP WHERE RELIEF VALVE DISCHARGE COULD CAUSE DAMAGE ESPECIALLY WHEN BACKFLOW ASSEMBLYS ARE LOCATED INSIDE THE BUILDINGS. PRIOR APPROVAL IS REQUIRED FOR INSIDE INSTALLATION.

NOTE: UNDER NO CIRCUMSTANCES WILL A BY-PASS OR ANY INTERVENING CONNECTION BE ALLOWED BETWEEN THE WATER METER AND THE RPP BFP USED FOR SYSTEM PROTECTION UNLESS THAT CONNECTION IS PROTECTED BY AN APPROVED BFP.

CAUTION: SECTION 607.3, THERMAL EXPANSION CONTROL, NOTED IN THE 2006 INTERNATIONAL PLUMBING CODE, ADOPTED AS THE STATE OF GEORGIA PLUMBING CODE (WITH CURRENT AMENDMENTS) SHOULD BE INCORPORATED IN THE DESIGN OF INSTALLATIONS AND DULY NOTED ON ALL APPLICABLE DRAWINGS PRIOR TO THE INSTALLATION OF ANY INLINE CHECKING DEVICE(S).

NOTE: DOMESTIC RPP-BFPAs SHALL BE LEAD FREE.

ASSEMBLY TESTING: ALL RPP BFP'S SHALL BE FIELD TESTED AFTER INSTALLATION, REPAIR, RELOCATION, AND AT LEAST ANNUALLY THEREAFTER.

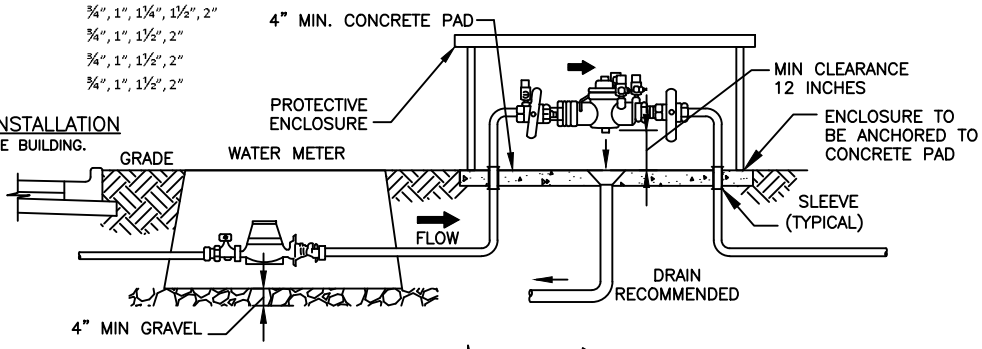
PLAN APPROVAL AND INSPECTION: PLAN APPROVAL MUST BE OBTAINED AND INSPECTION SCHEDULED PRIOR TO WORK, THROUGH DEKALB COUNTY DEPARTMENT OF WATERSHED MANAGEMENT. CONTACT BACKFLOW PREVENTION SECTION AT (404) 687-4075 FOR BACKFLOW INSPECTION PRIOR TO INSTALLATION.

APPROVED ASSEMBLYS (OR EQUIVALENT):

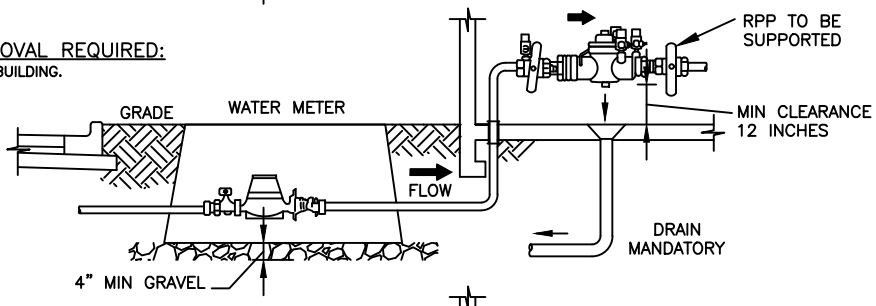
ARI RP500		¾", 1", 1 ¼", 1 ½', 2"
CONBRACO	RPLF4A	¾", 1", 1¼", 1½", 2"
FEBCO	LF860	¾", 1", 1½", 2"
WATTS	LFU009	¾", 1", 1½", 2"
WILKINS	975XL2	¾", 1", 1½", 2"

APPROVED INSTALLATION OF
REDUCED PRESSURE PRINCIPLE ASSEMBLY WITH DRAINAGE

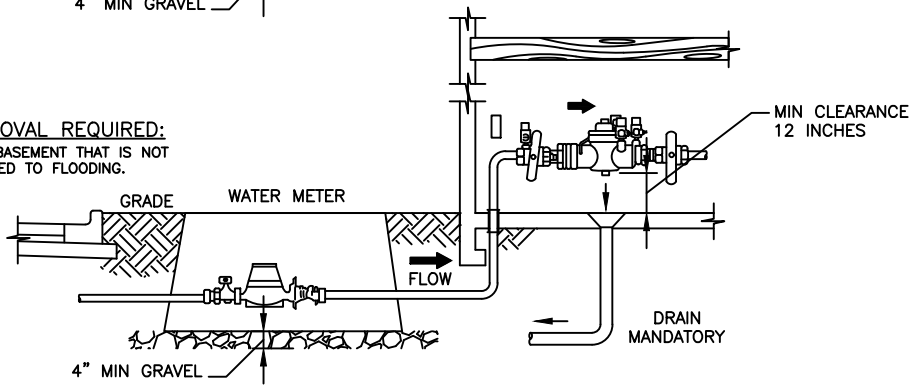
1. STANDARD INSTALLATION
OUTSIDE THE BUILDING.



2. PRIOR APPROVAL REQUIRED:
IN THE BUILDING.



2. PRIOR APPROVAL REQUIRED:
IN THE BASEMENT THAT IS NOT SUBJECTED TO FLOODING.



DeKalb County GEORGIA

STANDARD DETAILS

RPP BFP Installation 3/4" to 2"

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-011

MINIMUM CONTAINMENT PROTECTION REQUIREMENT
NEW CONSTRUCTION AND RETROFIT INSTALLATIONS
SERVICE SIZE: 2 1/2 INCH AND ABOVE METER SIZE: 2 1/2 INCH AND ABOVE
REDUCED PRESSURE PRINCIPLE (RPP) ASSEMBLY

SPECIFICATION: THE CUSTOMER/OWNER SHALL FURNISH AND INSTALL A REDUCED PRESSURE PRINCIPLE (RPP) BACKFLOW PREVENTION ASSEMBLY (BFP) IN A SIZE TO MATCH THAT OF THE REQUIRED SERVICE LINE CONNECTION. THE RPP BFP ASSEMBLY SHALL BE PROVIDED WITH AN EPOXY COATED, RESILIENT SEATED FLANGED OUTSIDE STEM AND YOKE GATE VALVE NEAR THE INLET AND OUTLET SIDES OF THE ASSEMBLY. THE ASSEMBLY SHALL BE PROVIDED WITH THREE BALL VALVE TEST COCKS IN AN ACCEPTABLE POSITION FITTED WITH BRASS OR PLASTIC THREADED PLUGS. A FOURTH TEST COCK SHALL ALSO BE PROVIDED ON THE UPSTREAM SIDE OF THE INLET SHUT-OFF VALVE.

NOTE: ALL COMPONENTS OF THE ASSEMBLY SHALL BE CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY. THE RPP BFP ASSEMBLY SHALL HAVE APPROVAL AND CONFORM TO ALL CURRENT REQUIREMENTS OF THE UNIVERSITY OF SOUTHERN CALIFORNIA, FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (USC-FCCCHR). ASSEMBLY TO BE INDIVIDUALLY FACTORY TESTED, SHIPPED AND INSTALLED AS A UNIT.

INSTALLATION INSTRUCTIONS: THE RPP BFP ASSEMBLY SHALL NOT BE INSTALLED BELOW GROUND. INSTALL ABOVE GROUND AS CLOSE AS PRACTICAL TO THE PROPERTY LINE OF THE PREMISES TO THE DOWNSTREAM SIDE OF THE WATER METER, AND OUT OF RIGHT-OF-WAY. AN ABOVE GROUND ENCLOSURE MUST BE PROVIDED FOR PROTECTION FROM FREEZING TEMPERATURES. INSTALL AN APPROVED DRAIN WITH AN AIR GAP WHERE RELIEF VALVE DISCHARGE COULD CAUSE DAMAGE ESPECIALLY WHEN BACKFLOW ASSEMBLIES ARE LOCATED INSIDE THE BUILDINGS. PRIOR APPROVAL IS REQUIRED FOR INSIDE INSTALLATION. ASSEMBLY SHALL BE SUPPORTED AT A MINIMUM OF THREE POINTS AND SHALL NOT BLOCK THE RELIEF VENT FROM FUNCTIONING.

NOTE: UNDER NO CIRCUMSTANCES WILL A BY-PASS OR ANY INTERVENING CONNECTION BE ALLOWED BETWEEN THE WATER METER AND THE RPP BFP USED FOR SYSTEM PROTECTION UNLESS THAT CONNECTION IS PROTECTED BY AN APPROVED BFP.

CAUTION: SECTION 607.3 THERMAL EXPANSION CONTROL, NOTED IN THE 2006 INTERNATIONAL PLUMBING CODE 2006, ADOPTED AS THE STATE OF GEORGIA PLUMBING CODE (WITH CURRENT COMBINED AMENDMENTS) SHOULD BE INCORPORATED IN THE DESIGN OF INSTALLATIONS AND DULY NOTED ON ALL APPLICABLE DRAWINGS PRIOR TO THE INSTALLATION OF ANY INLINE CHECKING DEVICE(S).

NOTE: DOMESTIC RPP-BFPAs SHALL BE LEAD FREE.

ASSEMBLY TESTING: ALL RPP BFP'S SHALL BE FIELD TESTED AFTER INSTALLATION, REPAIR, RELOCATION, AND AT LEAST ANNUALLY THEREAFTER.

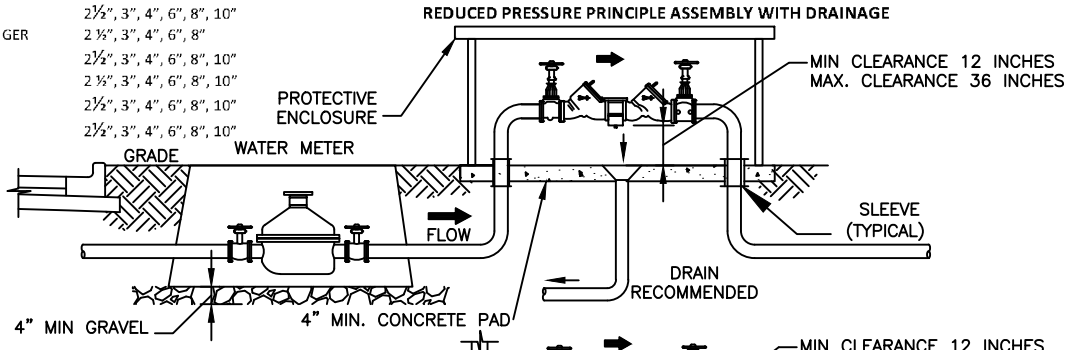
PLAN APPROVAL AND INSPECTION: PLAN APPROVAL MUST BE OBTAINED AND INSPECTION SCHEDULED PRIOR TO WORK, THROUGH DEKALB COUNTY DEPARTMENT OF WATERSHED MANAGEMENT. CONTACT BACKFLOW PREVENTION SECTION AT (404) 687-4075 FOR BACKFLOW INSPECTION PRIOR TO INSTALLATION.

APPROVED ASSEMBLYS (OR EQUIVALENT):

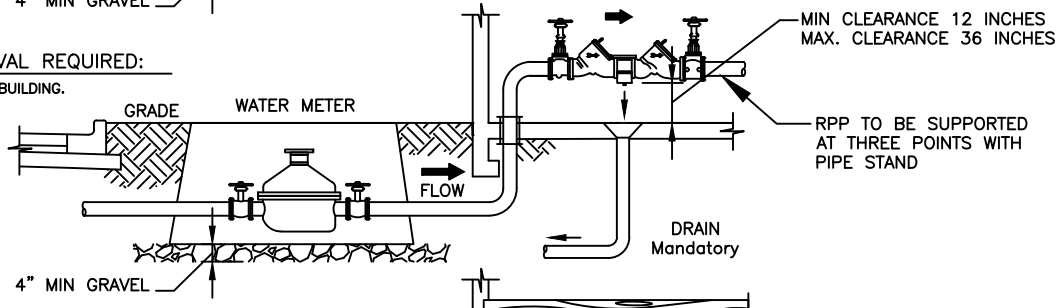
AMES	4000SS	2½", 3", 4", 6", 8", 10"
BACKFLOW DIRECT DERINGER		2 ½", 3", 4", 6", 8"
CONBRACO	RPLF4A	2½", 3", 4", 6", 8", 10"
FEBCO	LF860	2 ½", 3", 4", 6", 8", 10"
WATTS	LF909	2½", 3", 4", 6", 8", 10"
WILKINS	375XL	2½", 3", 4", 6", 8", 10"

APPROVED INSTALLATION OF
REDUCED PRESSURE PRINCIPLE ASSEMBLY WITH DRAINAGE

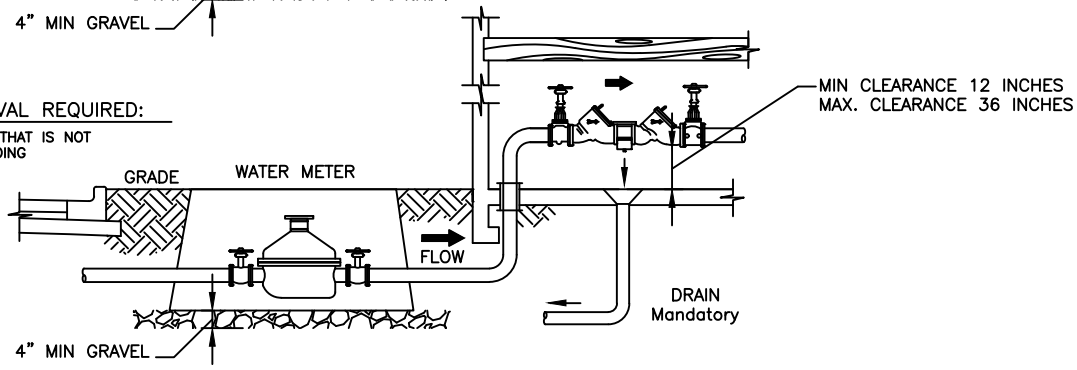
1. STANDARD INSTALLATION
OUTSIDE THE BUILDING.



2. PRIOR APPROVAL REQUIRED:
IN THE BUILDING.



3. PRIOR APPROVAL REQUIRED:
IN THE BASEMENT THAT IS NOT SUBJECT TO FLOODING



DeKalb County GEORGIA

STANDARD DETAILS

RPP BFP Installation
2 1/2 Inches And Larger

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-012

MINIMUM CONTAINMENT REQUIREMENTS FOR
NEW CONSTRUCTION AND RETROFIT
(DEDICATED) FIRELINE INSTALLATIONS
SERVICE SIZE: 2 1/2" AND ABOVE METER SIZE: 2 1/2" AND ABOVE
REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

SPECIFICATION: THE CUSTOMER / OWNER SHALL FURNISH AND INSTALL A REDUCED PRESSURE DETECTOR ASSEMBLY BACKFLOW PREVENTER IN A SIZE TO MATCH THAT OF THE REQUIRED FIRE LINE SERVICE LINE CONNECTION. THE ASSEMBLY SHALL HAVE A METERED THREE QUARTER INCH (3/4") BYPASS LINE AS SHOWN ON THE ILLUSTRATION. THE RPDA BACKFLOW PREVENTION ASSEMBLY SHALL BE PROVIDED WITH A RESILIENT SEATED OUTSIDE STEM AND YOKE FLANGED GATE VALVE NEAR THE INLET AND OUTLET SIDES OF THE ASSEMBLY. THE ASSEMBLY SHALL BE PROVIDED WITH THREE BRASS BALL VALVE TEST COCKS FITTED WITH BRASS OR PLASTIC THREADED PLUGS. A FOURTH TEST COCK SHALL ALSO BE PROVIDED ON THE UPSTREAM SIDE OF THE INLET SHUT-OFF VALVE. THE METERED BYPASS LINE ON THE ASSEMBLY SHALL INCLUDE A BRONZE DETECTOR METER AND A REDUCED PRESSURE PRINCIPAL (RPP) BACKFLOW PREVENTION ASSEMBLY. THE ASSEMBLY AND BODIES SHALL BE EQUIVALENT TO CAST IRON COATED INSIDE AND OUT WITH FDA APPROVED FUSED EPOXY COATING AND ASSEMBLED WITH BOLTS THAT ARE RESISTANT TO ELECTROLYSIS. ALL INTERIOR COMPONENTS OF THE CHECKING ASSEMBLY SHALL BE EQUIVALENT TO BRONZE OR STAINLESS STEEL CONSTRUCTION AND BE ACCESSIBLE FOR MAINTENANCE AND REPAIR

NOTE: ALL COMPONENTS OF THE ASSEMBLY SHALL BE CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY. THE REDUCED PRESSURE DETECTOR ASSEMBLY SHALL HAVE APPROVAL AND CONFORM TO ALL CURRENT REQUIREMENTS OF THE UNIVERSITY OF SOUTHERN CALIFORNIA FOUNDATION FOR CROSS CONNECTION CONTROL AND HYDRAULIC RESEARCH (USC-FCCCHR). ASSEMBLY TO BE INDIVIDUALLY FACTORY TESTED, SHIPPED AND INSTALLED AS A UNIT.

NOTE: BEFORE INSTALLING BACKFLOW ASSEMBLY ON ANY FIRE SYSTEM CONSULT WITH THE FIRE AUTHORITY FOR ADDITIONAL REQUIREMENTS. (IE: OS &Y SHUTOFFS, ALARMS ETC.)

INSTALLATION INSTRUCTIONS: INSTALLATION OF A REDUCED PRESSURE DETECTOR ASSEMBLY BACKFLOW PREVENTION ASSEMBLY SHALL NOT BE BELOW GRADE. ASSEMBLY SHALL BE INSTALLED ABOVE GROUND AS CLOSE AS PRACTICAL TO THE PROPERTY LINE AND OUT OF THE RIGHT OF WAY. AN ABOVE GROUND ENCLOSURE SHALL BE PROVIDED FOR PROTECTION FROM FREEZING TEMPERATURES. INSTALL AN APPROVED DRAIN WITH AN AIR GAP. A CONCRETE PAD SHALL BE POURED WITH A MINIMUM OF FOUR (4) INCHES DEPTH. ASSEMBLY SHALL BE SUPPORTED AT A MINIMUM OF THREE (3) POINTS AND NOT BLOCKING THE RELIEF VALVE

NOTE: UNDER NO CIRCUMSTANCE WILL ANY CONNECTION BE ALLOW ON THE SYSTEM OTHER THAN FOR FIREFIGHTING OR FIRE PROTECTION PURPOSES

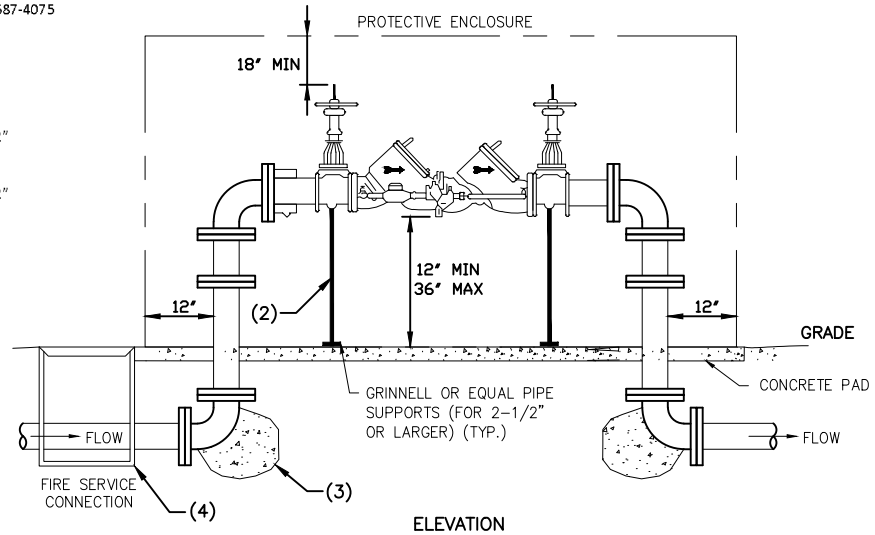
ASSEMBLY TESTING: ALL RPDA ASSEMBLIES SHALL BE TESTED AT TIME OF INSTALLATION, AFTER EACH REPAIR AELOCATION AND AT LEAST ONCE ANNUALLY

PLAN APPROVALS AND INSPECTIONS: SHALL BE OBTAINED AND SCHEDULED PRIOR TO WORK THROUGH DEKALB COUNTY DEPARTMENT OF WATERSHED MANAGEMENT. CONTACT CROSS- CONNECTION CONTROL SECTION AT 404-687-4075

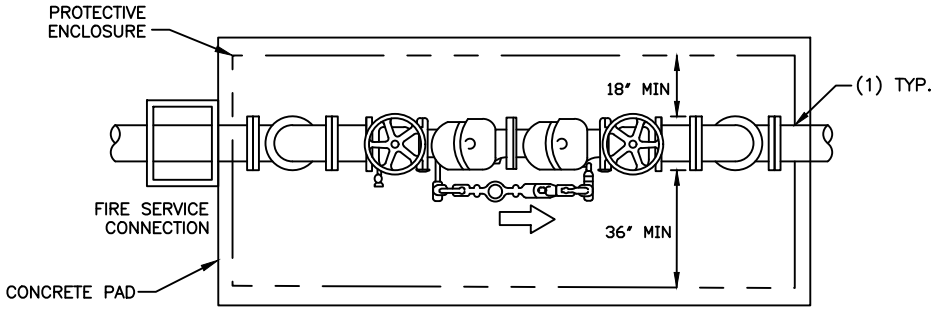
APPROVED ASSEMBLIES (OR EQUIVALENT):

AMES	5000	2 ½", 3", 4", 6", 8", 10"
BACKFLOW DIRECT DERINGER		2 ½", 3", 4", 6", 8"
Apollo/CONBRACO	RPDALF4A	2 ½", 3", 4", 6", 8", 10", 12"
FEBCO	826 TYPE YD	2 ½," 3", 4", 6", 8", 10"
WATTS	909 RPDA	2 ½", 3", 4", 6", 8", 10"
WILKINS	375ADA	2 ½", 3", 4", 6", 8", 10", 12"

1. VAULT INLET/OUTLET PIPE OPENINGS TO BE SEALED WITH GROUT OR MORTAR. PIPE MUST NOT SUPPORT VAULT.
2. BFP ASSEMBLY TO BE SUPPORTED AT THREE POINTS WITH PIPE STANDS. THE THIRD PIPE STAND SHALL BE INSTALLED IN THE LOCATION APPROVED BY DWM, (BACKFLOW SECTION).
3. THRUST BLOCKING, AS REQUIRED, MUST BE IN ACCORDANCE WITH DCDWM SPECIFICATIONS.
4. THRUST TIE RODS SHALL BE BITUMASTIC COATED. ALL PIPES AND FITTINGS OF DUCTILE IRON.
5. ALL MATERIALS TO BE FURNISHED BY THE CUSTOMER/OWNER.



ELEVATION



PLAN VIEW

DeKalb County GEORGIA

STANDARD DETAILS

RPDA BFP Installation
2 1/2 Inches And Larger

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-013

MINIMUM CONTAINMENT PROTECTION REQUIREMENT
NEW CONSTRUCTION AND RETROFIT INSTALLATIONS
SERVICE SIZE: ¾ INCH THRU 2 INCH METER SIZE: THRU ¾ INCH THRU 2 INCH
DOUBLE CHECK VALVE ASSEMBLY (DC)

SPECIFICATION: THE CUSTOMER/OWNER SHALL FURNISH AND INSTALL A DOUBLE CHECK (DC) VALVE BACKFLOW PREVENTION ASSEMBLY (BFP) IN A SIZE TO MATCH THAT OF THE REQUIRED SERVICE LINE CONNECTION. THE DC BFP ASSEMBLY SHALL INCLUDE A FULL PORT BALL VALVE ON THE INLET AND OUTLET SIDES WITH A UNION OR SWIVLE COUPLING NUT BETWEEN THE ASSEMBLY AND EACH VALVE. THE ASSEMBLY SHALL HAVE THREE BALL VALVE TEST COCKS IN THE VERTICAL POSITION FITTED WITH BRASS OR PLASTIC THREADED PLUGS. A FOURTH TEST COCK SHALL ALSO BE PROVIDED ON THE UPSTREAM SIDE OF THE INLET SHUT-OFF VALVE.

NOTE: ALL COMPONENTS OF THE ASSEMBLY SHALL BE CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY. THE DC BFP ASSEMBLY SHALL HAVE APPROVAL AND CONFORM TO ALL CURRENT REQUIREMENTS OF THE UNIVERSITY OF SOUTHERN CALIFORNIA, FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (USC-FCCCHR). ASSEMBLY TO BE INDIVIDUALLY FACTORY TESTED, SHIPPED AND INSTALLED AS A UNIT.

INSTALLATION INSTRUCTIONS: THE DC BFP ASSEMBLY SHALL NOT BE BURIED IN EARTH. INSTALL IN A UTILITY BOX ADJACENT TO OR AS CLOSE AS PRACTICAL TO THE PROPERTY LINE OF THE PREMISES TO THE DOWNSTREAM SIDE OF THE WATER METER, AND OUT OF RIGHT-OF-WAY. THE DC BFP ASSEMBLY MUST BE CENTERED IN THE ENCLOSURE.

NOTE: UNDER NO CIRCUMSTANCES WILL A BY-PASS OR ANY INTERVENING CONNECTION BE ALLOWED BETWEEN THE WATER METER AND THE DC BFP USED FOR SYSTEM PROTECTION UNLESS THAT CONNECTION IS PROTECTED BY AN APPROVED BFP. AT THE BOTTOM, SEE EXCERPT FROM STATE OF GEORGIA PLUMBING CODE ON THERMAL EXPANSION.

APPROVED UTILITY BOXES (OR EQUIVALENT):

CARSON INDUSTRIES	MODEL NUMBER 1324CP2PGWL
CDR SYSTEM CORP.	MODEL NUMBER WA101324-18
BROOKS PRODUCTS, INC.	MODEL NUMBER 1324

NOTE: DOMESTIC DC-BFPAs SHALL BE LEAD FREE.

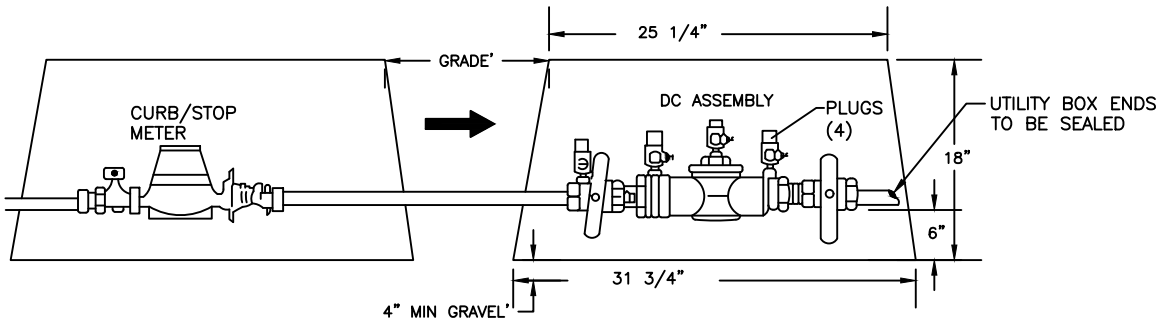
ASSEMBLY TESTING: ALL DC BFP'S SHALL BE FIELD TESTED FOLLOWING INSTALLATION, REPAIR, RELOCATION, AND AT LEAST ANNUALLY THEREAFTER.

PLAN APPROVAL AND INSPECTION: PLAN APPROVAL MUST BE OBTAINED AND INSPECTION SCHEDULED PRIOR TO WORK, THROUGH DEKALB COUNTY DEPARTMENT OF WATERSHED MANAGEMENT. CONTACT CROSS-CONNECTION CONTROL SECTION AT (404) 687-4075 FOR BACKFLOW INSPECTION PRIOR TO INSTALLATION.

APPROVED ASSEMBLYS (OR EQUIVALENT):

ARI	DC 500	¾", 1", 1¼", 1½", 2"
CONBRACO	DCLF4A	¾", 1", 1¼", 1½", 2"
FEBCO	LF850	¾", 1", 1¼", 1½", 2"
WATTS	LF007	¾", 1", 1½", 2"
WILKINS	350XL	¾", 1", 1¼", 1½", 2"

TYPICAL DC BFP INSTALLATION IN A UTILITY BOX



NOTE: FOR FINAL APPROVAL ASSEMBLY MUST BE CENTERED IN UTILITY BOX.

****** SPECIAL CAUTION ******

2006 INTERNATIONAL PLUMBING CODE ADOPTED AS THE STATE OF GEORGIA PLUMBING CODE (WITH CURRENT AMENDMENTS)

CAUTION SECTION 607.3 THERMAL EXPANSION CONTROL: A MEAN OF CONTROLLING INCREASED PRESSURE CAUSED BY THERMAL EXPANSION SHALL BE PROVIDED WHERE REQUIRED, IN ACCORDANCE WITH SECTION 607.3.2.

SECTION 607.3.1 PRESSURE REDUCING VALVE: FOR WATER SERVICE SYSTEM SIZES UP TO AND INCLUDING 2 INCHES (51 MM), An ASSEMBLY FOR CONTROLLING PRESSURE SHALL BE INSTALLED WHERE, BECAUSE OF THERMAL EXPANSION, THE PRESSURE ON THE DOWNSTREAM SIDE OF THE PRESSURE REDUCING VALVE EXCEED THE PRESSURE REDUCING VALVE SETTING.

SECTION 607.3.2 BACKFLOW PREVENTION ASSEMBLY OR CHECK VALVE: WHERE A BACKFLOW PREVENTION ASSEMBLY, CHECK VALVE OR OTHER DRVICE IS INSTALLED ON A WATER SUPPLY SYSTEM UTILIZING STORAGE WATER HEATING EQUIPMENT SUCH THAT THERMAL EXPANSION CAUSES AN INCREASE IN PRESSURE, A DEVICE FOR CONTROLLING PRESSURE SHALL BE INSTALLED.

DeKalb County GEORGIA

STANDARD DETAILS

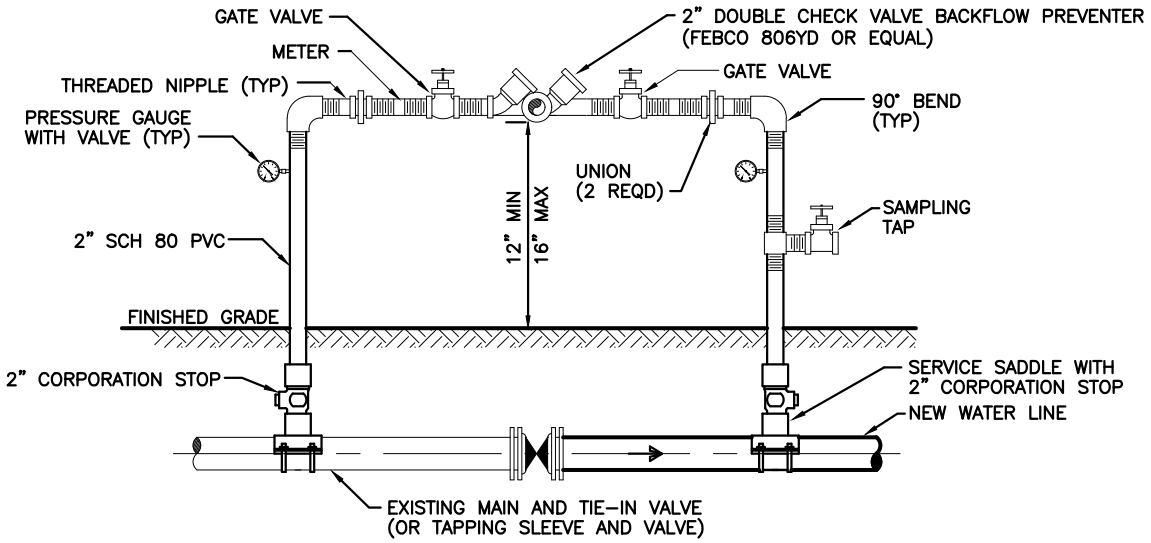
DC BFP Installation 3/4 Inch To 2 Inch

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-014



NOTES:

1. A TEMPORARY JUMPER CONNECTION IS REQUIRED AT ALL CONNECTIONS BETWEEN EXISTING ACTIVE WATER MAINS AND PROPOSED WATER MAINS.

2. THIS DETAIL IS TO BE USED FOR FILLING ANY NEW WATER MAIN AND FOR FLUSHING OF NEW MAINS UP TO 8" DIAMETER (2.5 FPS MINIMUM VELOCITY), AND FOR BACTERIOLOGICAL SAMPLING POINTS AT THE ENDS OF THE PROPOSED MAINS. THE JUMPER CONNECTIONS SHALL BE MAINTAINED UNTIL AFTER FILLING, FLUSHING, TESTING, AND DISINFECTION OF THE PROPOSED MAIN HAS BEEN SUCCESSFULLY COMPLETED AND CLEARANCE FOR USE FROM THE DCDWM HAS BEEN RECEIVED. THIS JUMPER CONNECTION SHALL ALSO BE USED TO MAINTAIN A MINIMUM PRESSURE OF 20 PSI IN THE PROPOSED MAINS AFTER DISINFECTION AND UNTIL THE CLEARANCE LETTER IS OBTAINED.

3. FLUSHING OF THE 10" DIAMETER AND LARGER WATER MAIN MAY BE DONE THROUGH THE TIE-IN VALVE UNDER VERY CONTROLLED CONDITIONS, AS FOLLOWS:

   A. THE TIE-IN VALVES SHALL BE OPERATED AND PRESSURE TESTED IN THE PRESENCE OF DCDWM AND ENGINEER TO VERIFY WATER TIGHTNESS PRIOR TO TIE-IN. VALVES WHICH ARE NOT WATERTIGHT SHALL BE REPLACED.

   B. THE TEMPORARY JUMPER CONNECTION SHALL BE CONSTRUCTED AS DETAILED. THE JUMPER CONNECTION SHALL BE USED TO FILL THE NEW MAIN AND FOR BACTERIOLOGICAL SAMPLING OF THE NEW MAIN AS REQUIRED BY THE DCDWM PERMIT.

      - FLUSHING SHALL NOT BE ATTEMPTED DURING PEAK DEMAND HOURS OF THE EXISTING WATER MAINS.
      - ALL DOWNSTREAM VALVES IN THE NEW SYSTEM MUST BE OPEN PRIOR TO OPENING THE TIE-IN VALVE.
      - MONITOR THE PRESSURE AT THE TIE-IN POINT. THE PRESSURE IN THE EXISTING MAIN MUST NOT DROP BELOW 35 PSI.
      - TIE-IN VALVE SHALL BE OPENED A FEW TURNS ONLY ENSURING A PRESSURE DROP ACROSS THE VALVE IS ALWAYS GREATER THAN 10 PSI.

   C. THE TIE-IN VALVE SHALL BE LOCKED CLOSED UNTIL FLUSHING BEGINS.

   D. THE TIE-IN VALVE SHALL BE OPENED ONLY FOR FLUSHING OF THE NEW MAIN. THE PROCEDURE SHALL BE DIRECTED BY THE DCDWM.

   E. AFTER FLUSHING, THE TIE-IN VALVE SHALL BE CLOSED AND LOCKED IN THE CLOSED POSITION.

4. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION DEMONSTRATING THAT THE DOUBLE CHECK VALVE BACKFLOW PREVENTION DEVICE HAS BEEN TESTED AND IS IN GOOD WORKING ORDER AT THE TIME OF INSTALLATION.

5. EXCEPT AS REQUIRED TO FLUSH LINES GREATER THAN 8" IN DIAMETER, THE TIE-IN VALVE SHALL REMAIN LOCKED CLOSED UNTIL THE NEW SYSTEM HAS BEEN CLEARED FOR USE BY ALL PERTINENT AGENCIES.

6. UPON RECEIPT OF CLEARANCE FOR USE FROM DCDWM, THE CONTRACTOR SHALL REMOVE THE TEMPORARY JUMPER CONNECTION. STOPS ARE TO BE CLOSED AND PLUGGED WITH 2" BRASS PLUGS.

7. ALL INSTALLATION AND MAINTENANCE OF THE TEMPORARY JUMPER CONNECTION AND ASSOCIATED BACKFLOW PREVENTION DEVICE, FITTINGS, VALVE, ETC. SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

DeKalb County GEORGIA

STANDARD DETAILS

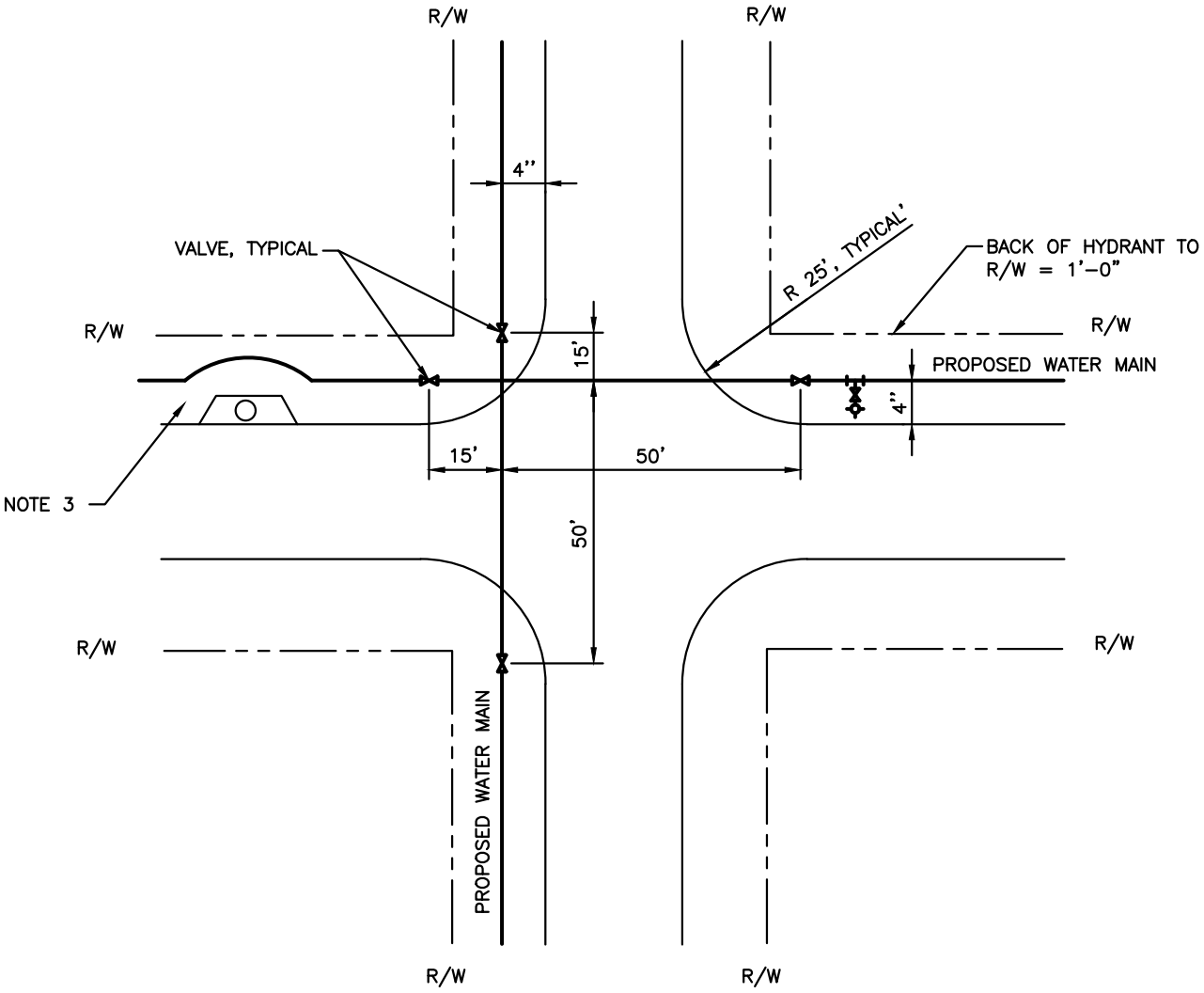
Temporary Disinfection Jumper Installation Detail

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-015



NOTES:

1. IF RADIUS IS NOT 25' ADJUST PIPE LENGTHS SO THAT VALVES ARE NOT IN STREET.
2. VALVES TO BE A MINIMUM OF 2'-0" FROM BACK OF CURB TO TOP SECTION OF BOX CONCRETE COLLAR. SEE DETAIL W-23.
3. WHEN GOING AROUND CATCH BASIN, USE 3 JOINTS OF PIPE, CENTERED, AND CHANGE ALIGNMENT BY DEFLECTING EACH JOINT. MAXIMUM DEFLECTION TO BE NO MORE THAN 4 DEGREES PER JOINT. PIPE SHALL CLEAR OUTSIDE WALL OF CATCH BASIN BY 4" MINIMUM.

DeKalb County
GEORGIA

STANDARD DETAILS

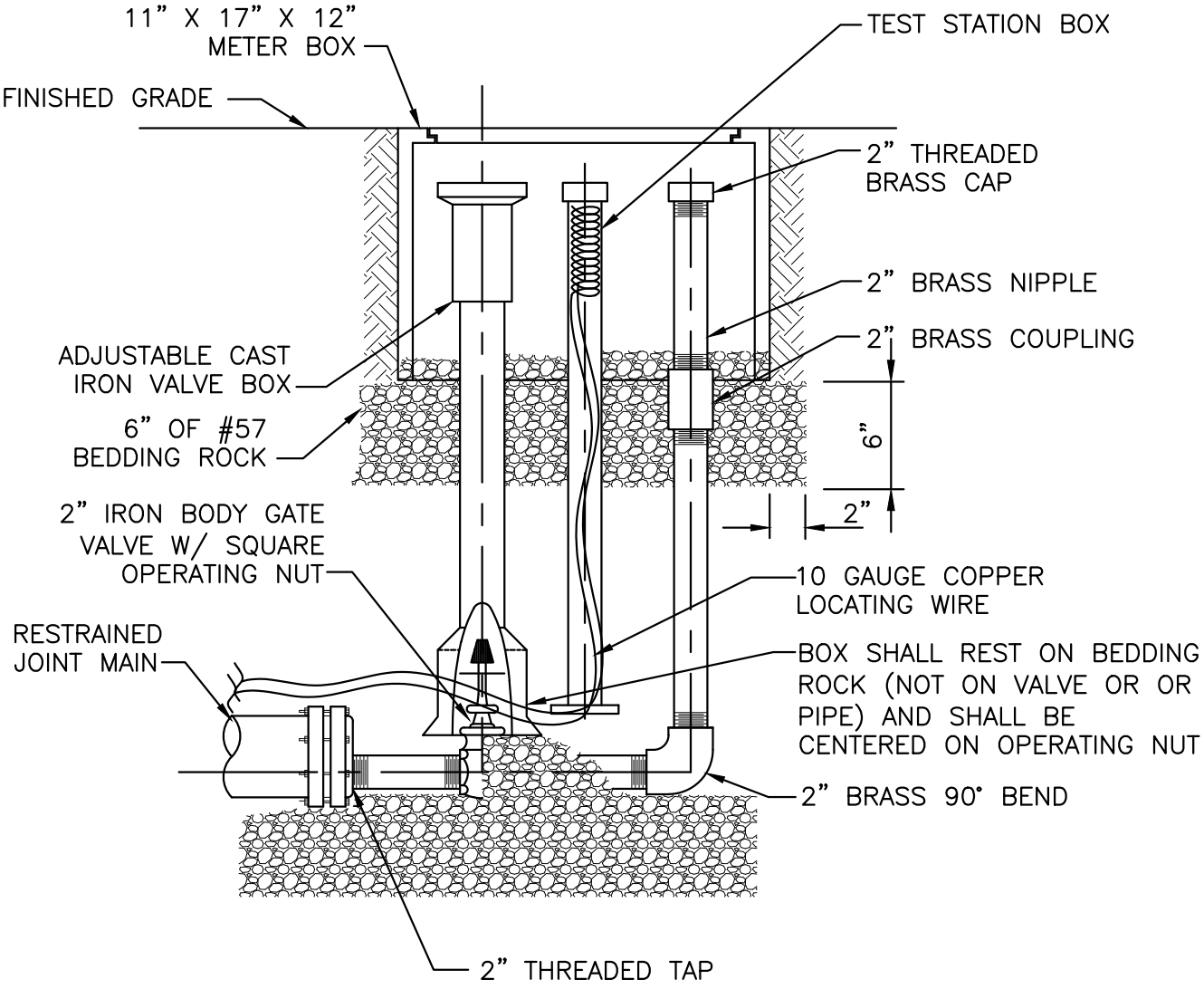
Intersection Detail
Valve Locations

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-016



NOTES:
1. SEE DESIGN STANDARDS FOR 2" BRASS PIPE AND FITTING REQUIREMENTS.

DeKalb County GEORGIA

STANDARD DETAILS

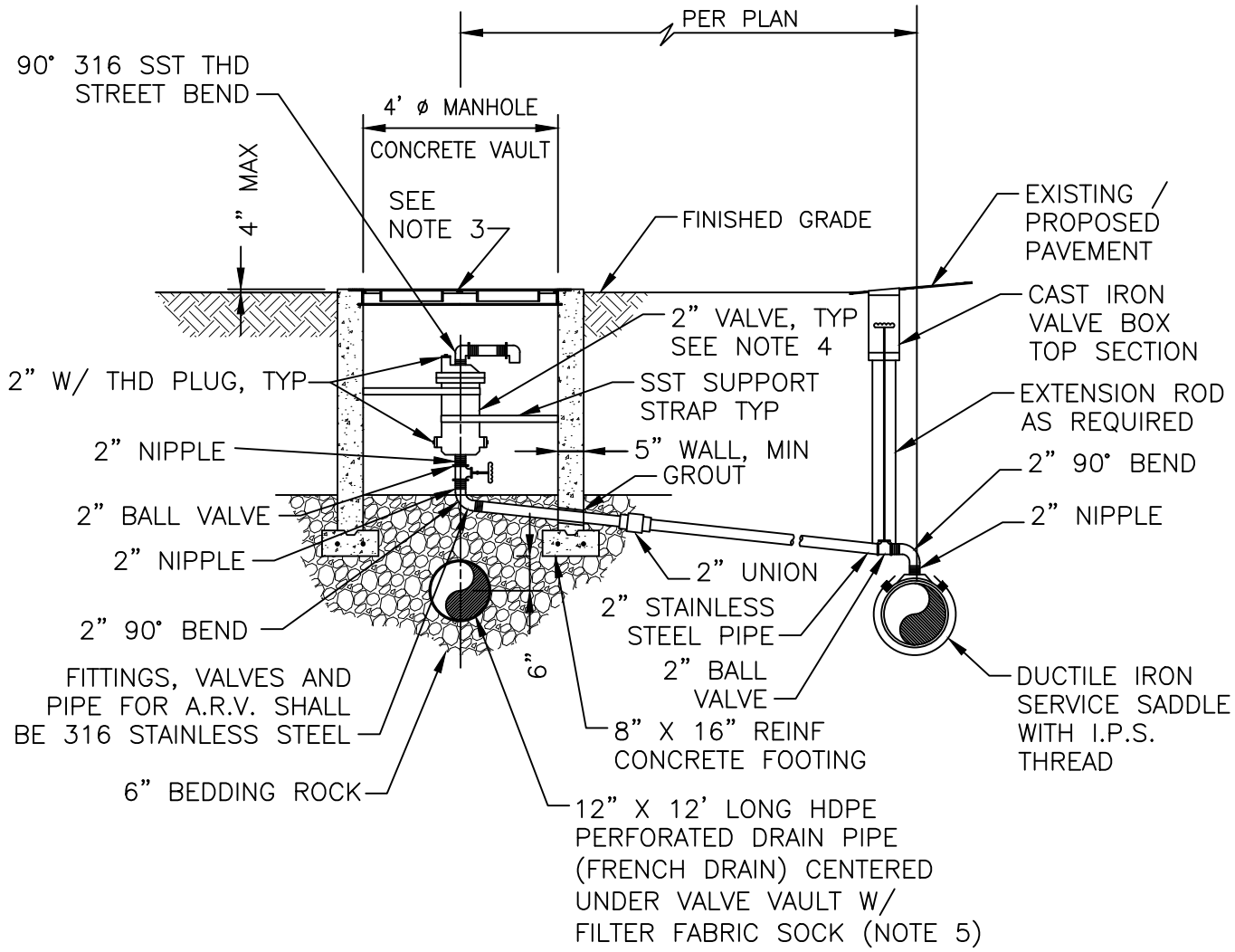
Typical Blow-off Detail

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-017



NOTES:

1. ABOVE DETAIL IS BASED ON 2" AIR RELEASE VALVE. CHANGE PIPE AND FITTINGS BY THE ENGINEER AND APPROVED BY DCDWM PRIOR TO INSTALLATION.
2. THE MINIMUM DIMENSION FROM THE TOP OF THE WATERMAIN TO FINISHED GRADE SHALL BE 4.0 FEET.
3. FRAME AND COVER SHALL BE EQUIVALENT TO U.S. FOUNDRY USF 170-E-ORS.
4. FOR POTABLE WATER AND REUSE WATER MAINS, VALVE SHALL BE APCO #200 (2") OR EQUIVALENT.
5. FRENCH DRAIN BEDDING BEYOND VALVE VAULT SHALL CONSIST OF 24" x 24" TRENCH LINED W/ 6" MIN #57 BEDDING AROUND FRENCH DRAIN CENTERED IN TRENCH.
6. NOTE ACTUAL SIZING TO BE CONFIRMED BY THE ENGINEER OF RECORD AND SUBMITTED TO DWM FOR REVIEW AND APPROVAL.

DeKalb County GEORGIA

STANDARD DETAILS

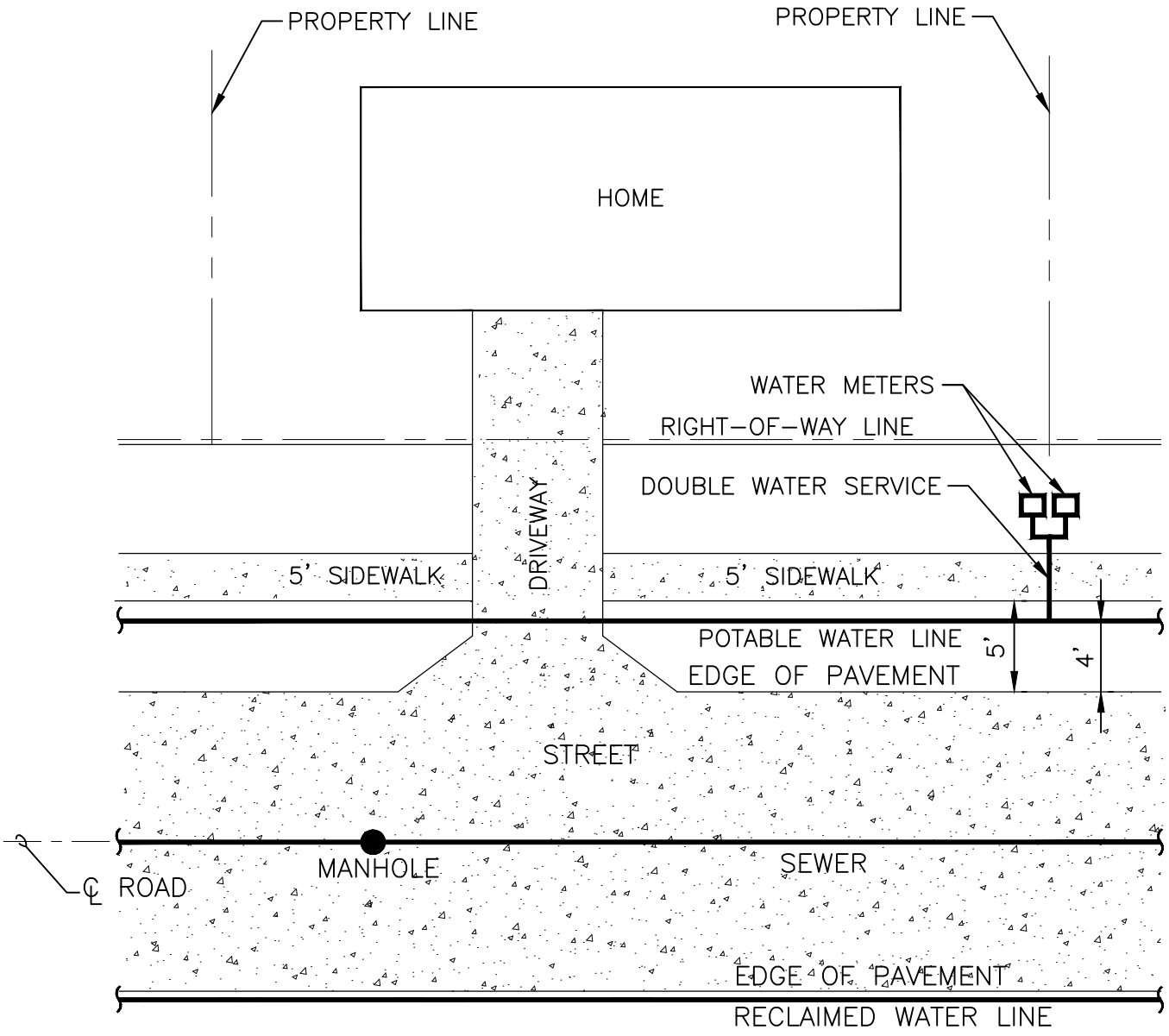
Air Release Valve Installation Detail

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-019



NOTE:

1. A 3' BY 3' AREA OF "GREEN SPACE SHALL BE ALLOTTED PER EACH WATER METER. METERS SHALL NOT BE LOCATED WITHIN PAVED AREAS.

DeKalb County GEORGIA

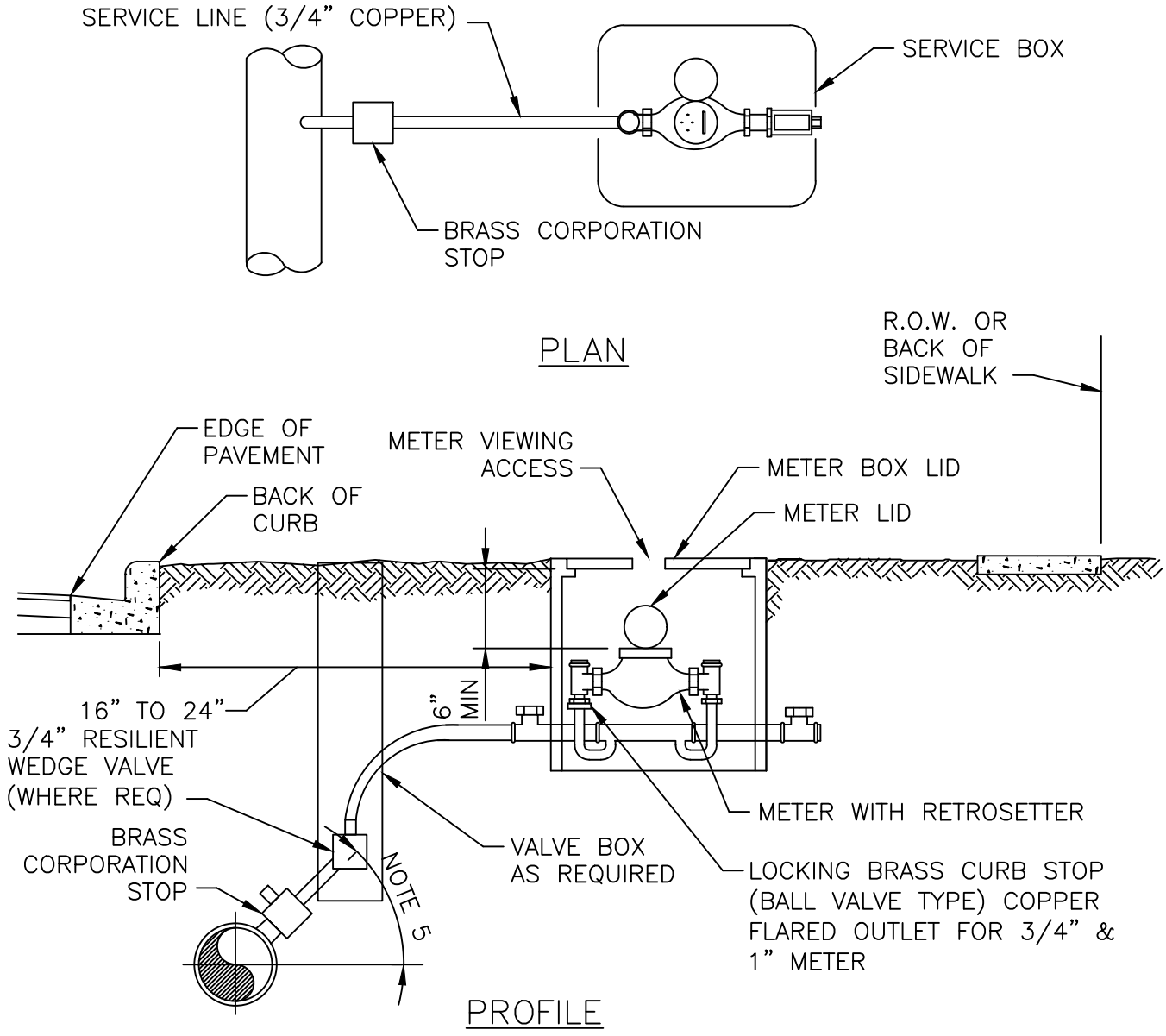
STANDARD DETAILS

05/26

Water Meter Locations Detail

NOT TO SCALE

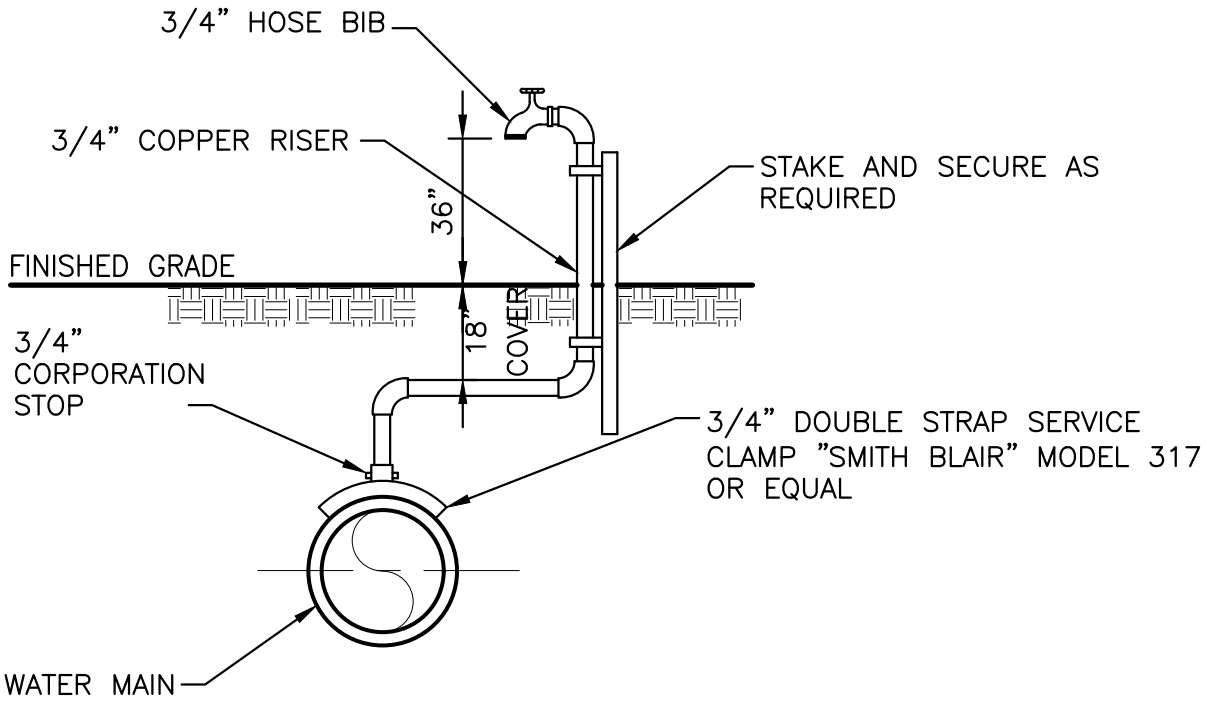
DETAIL NO. W-020



NOTES:

1. METER SHALL BE INSTALLED BETWEEN SIDEWALK AND CURB AND IN NO CASE SHALL IT BE INSTALLED IN SIDEWALK OR OTHER PAVED AREAS.
2. ALL POTABLE WATER IRRIGATION METERS REQUIRE AN APPROVED BACKFLOW PREVENTER.
3. SERVICE LINES SHALL NOT BE LESS THAN METER SIZE.
4. SERVICE TAP SHALL BE BETWEEN 10:00 O'CLOCK AND 2:00 O'CLOCK WITHOUT SADDLE TAP.

DeKalb County GEORGIA	STANDARD DETAILS	05/26
	Residential Water Meter Installation Detail	WATER Matters
	NOT TO SCALE	DETAIL NO. W-021



NOTES:

1. CONTRACTOR SHALL REMOVE SAMPLE POINT ASSEMBLY TO 3/4" CORPORATION STOP AND PLUG UPON WRITTEN ACCEPTANCE OF DISINFECTION BY DCDWM.

DeKalb County GEORGIA

STANDARD DETAILS

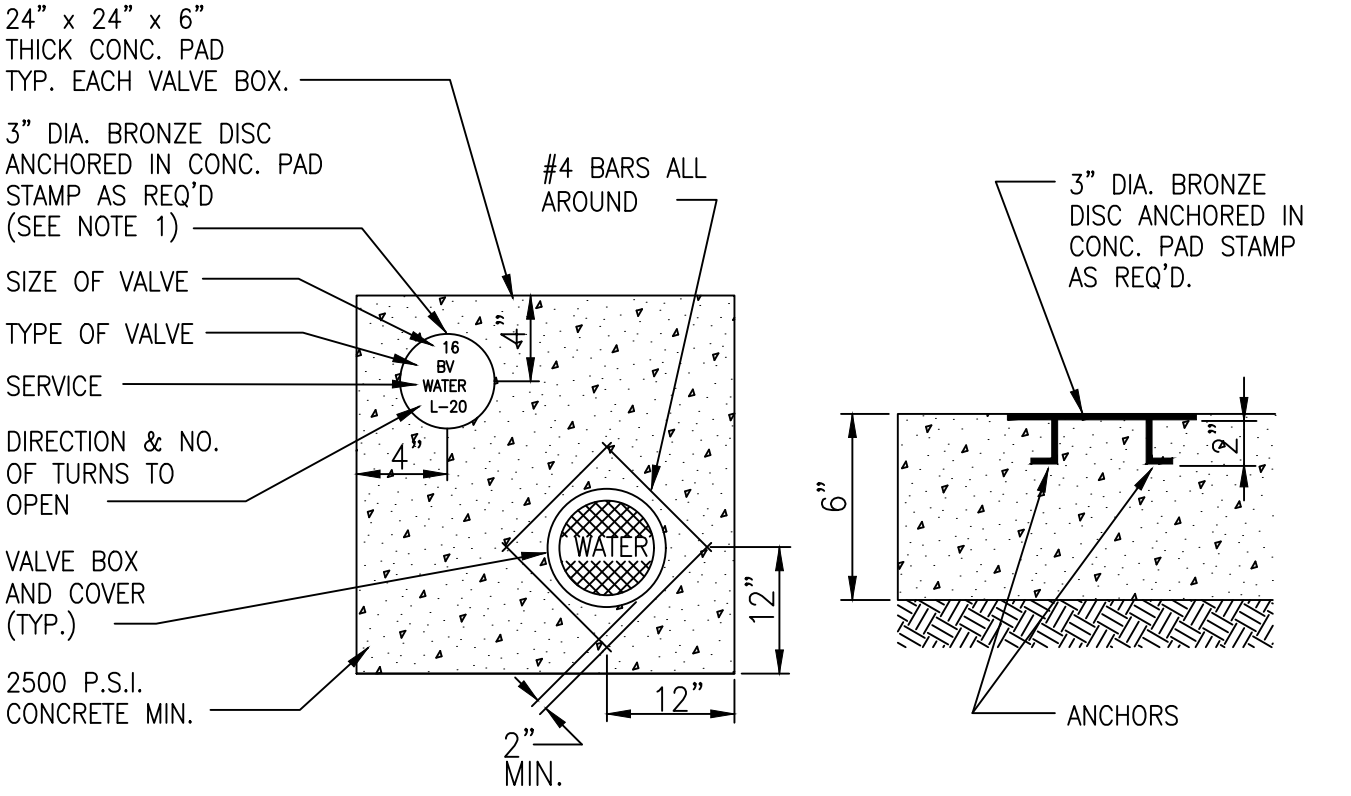
Temporary Water Sample Station Detail

NOT TO SCALE

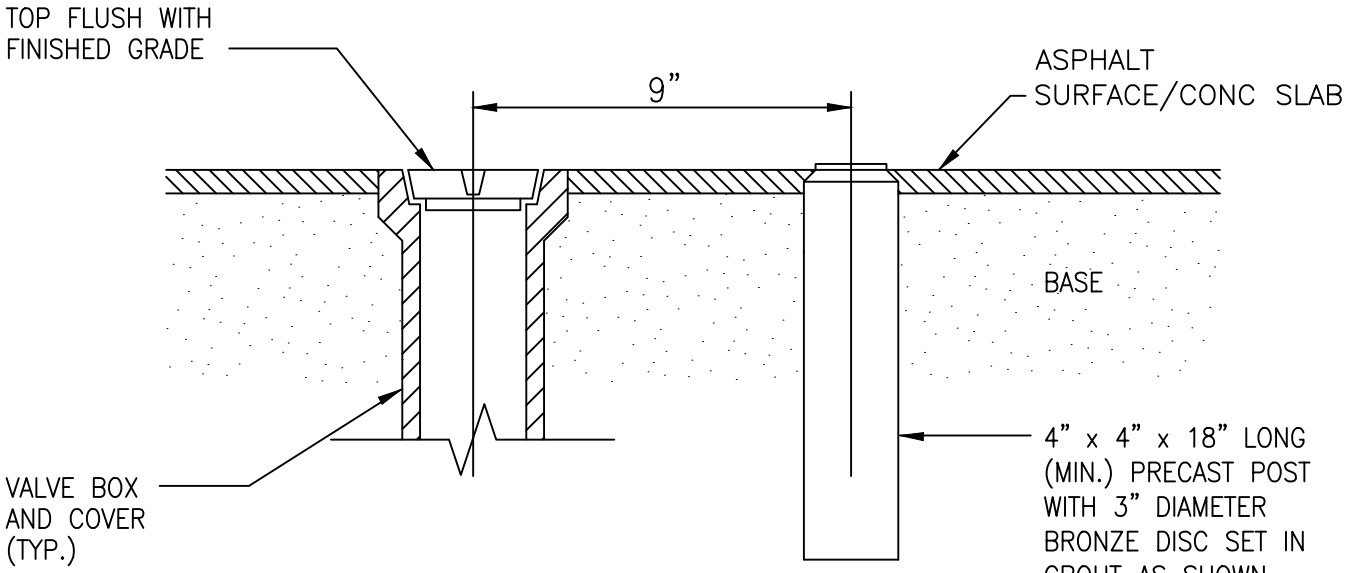
05/26

WATER Matters

DETAIL NO. W-022



OUTSIDE PAVEMENT



IN PAVED AREAS

NOTES:

1. BRONZE IDENTIFICATION DISC SHALL BE REQUIRED FOR ALL VALVES 16" AND LARGER, OR AS REQUIRED BY DCDWM.
2. VALVE COLLAR DIMENSIONS MAY BE REDUCED TO 18" X 18" X 6" WHEN THE BRONZE IDENTIFICATION DISC IS NOT REQUIRED.

DeKalb County GEORGIA

STANDARD DETAILS

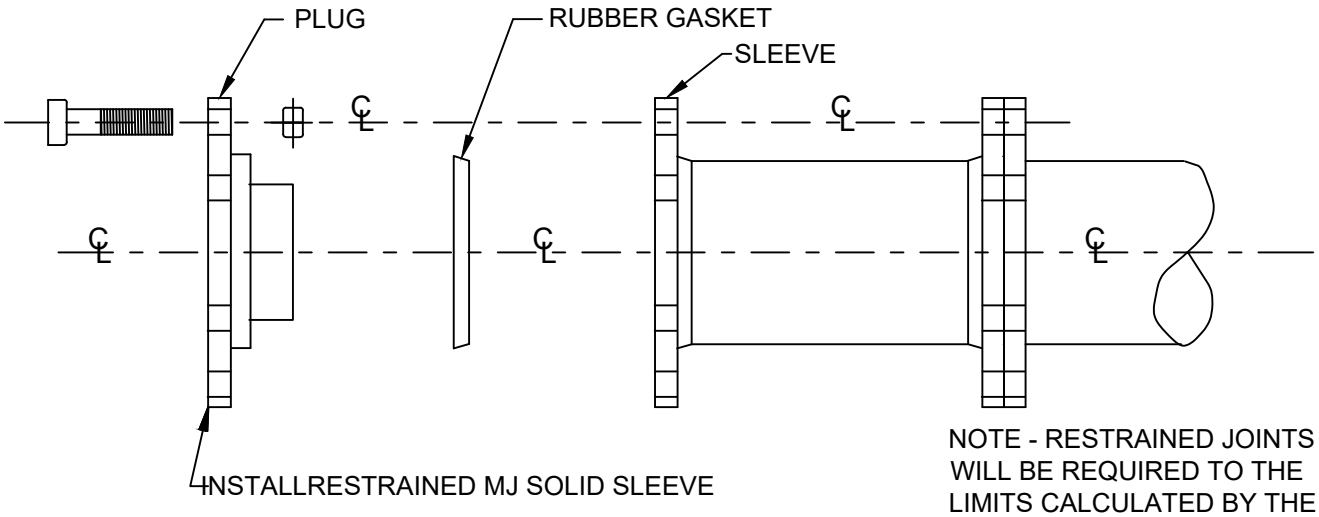
Valve Cover and Marker Disc

NOT TO SCALE

05/26

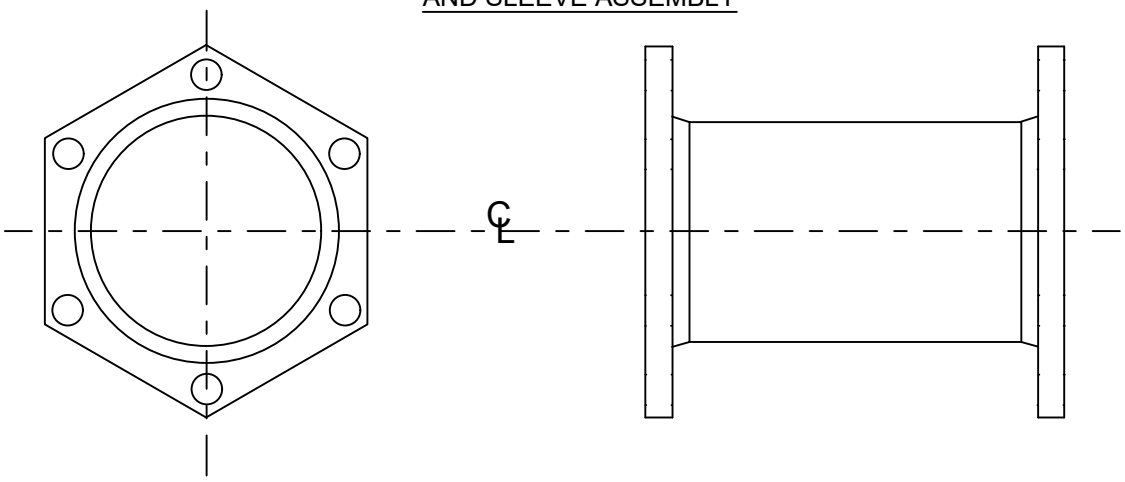
WATER Matters

DETAIL NO. W-023



NOTE - RESTRAINED JOINTS WILL BE REQUIRED TO THE LIMITS CALCULATED BY THE ENGINEER OF RECORD AND AS APPROVED BY DWM

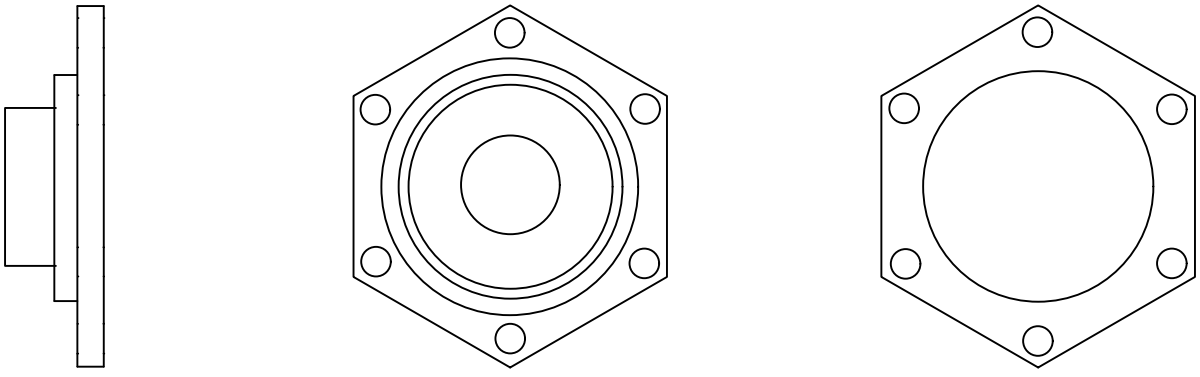
SIDE VIEW OF END-OF-LINE PLUG AND SLEEVE ASSEMBLY



END VIEW OF SLEEVE

SIDE VIEW OF SLEEVE

END OF WATERLINE SLEEVE



SIDE VIEW

BOTTOM VIEW

TOP VIEW

END OF WATERLINE PLUG

DeKalb County GEORGIA

STANDARD DETAILS

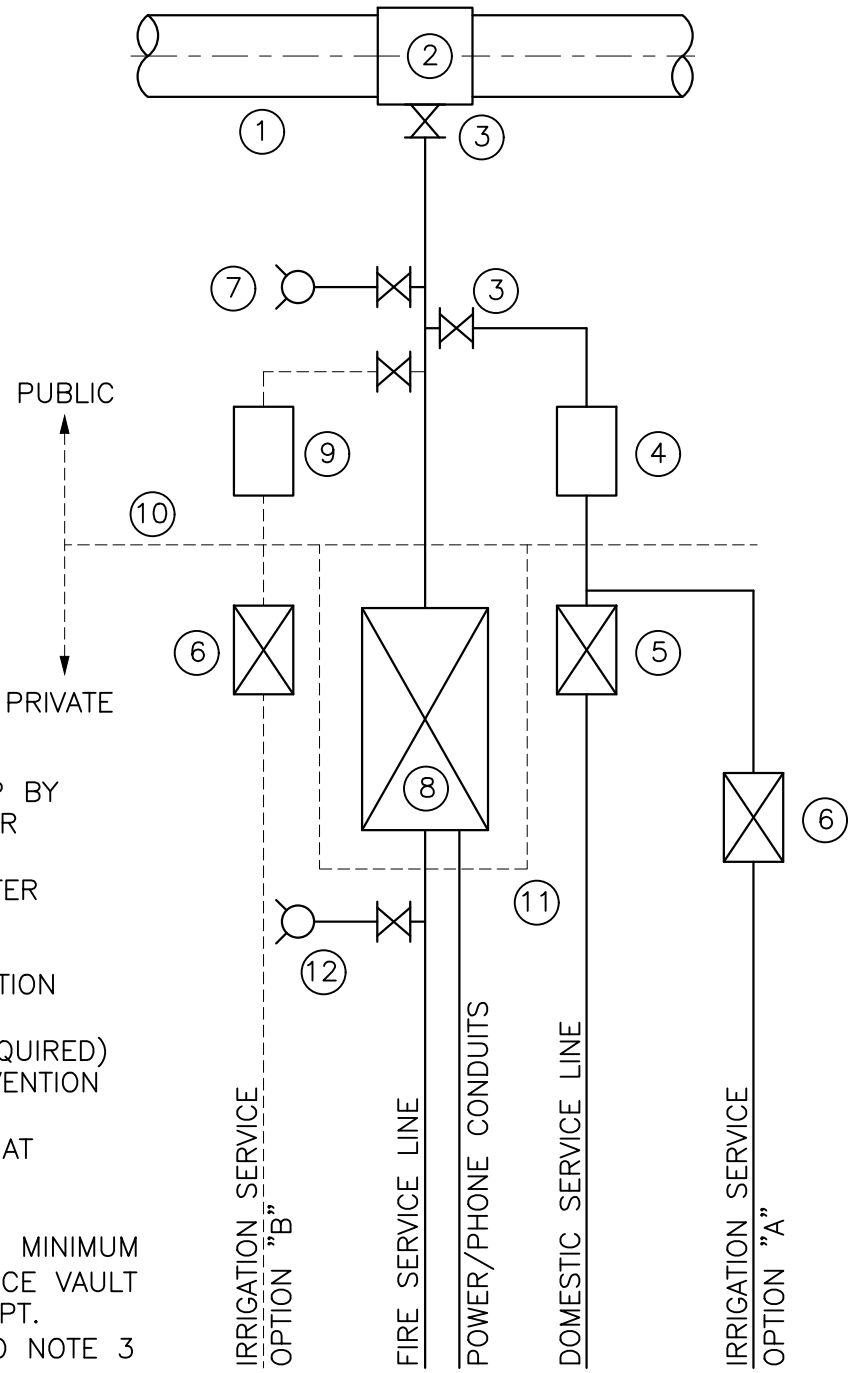
End of Water Line Plug & Sleeve Assembly

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-024



KEYNOTES:

1. EXISTING WATER MAIN
2. SERVICE CONNECTION WET TAP BY DCDWM APPROVED CONTRACTOR
3. GATE VALVE (TYP.)
4. DOMESTIC WATER SERVICE METER
5. DOMESTIC SERVICE BACKFLOW PREVENTION ASSEMBLY
6. IRRIGATION BACKFLOW PREVENTION ASSEMBLY
7. PUBLIC FIRE HYDRANT, (IF REQUIRED)
8. FIRE SERVICE BACKFLOW PREVENTION ASSEMBLY
9. IRRIGATION METER, (OPTIONAL AT ADDITIONAL SDC EXPENSE)
10. RIGHT-OF-WAY LINE
11. PERMANENT UTILITY EASEMENT, MINIMUM 5'-0" OUTSIDE OF FIRE SERVICE VAULT
12. PRIVATE HYDRANT OR FIRE DEPT. CONNECTION, (FDC). REFER TO NOTE 3

NOTES:

1. THE IRRIGATION SYSTEM SHALL BE CONNECTED DOWNSTREAM OF THE DOMESTIC SERVICE BACKFLOW PREVENTION ASSEMBLY (OPTION A) OR SHALL HAVE ITS OWN METER AND BACKFLOW ASSEMBLY (OPTION B).
2. DOMESTIC AND FIRE SERVICE LINES 3" AND LARGER SHALL BE DUCTILE IRON.
3. PRIVATE FDC OR HYDRANT MUST BE LOCATED ON THE CUSTOMER SIDE OF BACKFLOW DEVICE.

DeKalb County GEORGIA

STANDARD DETAILS

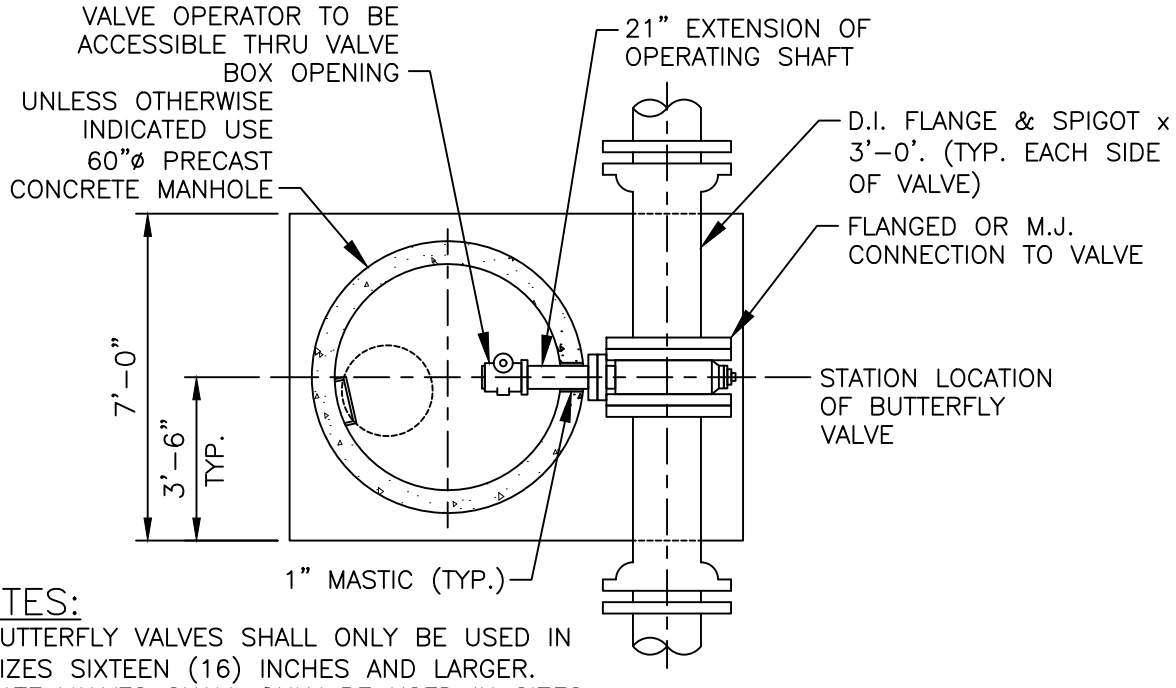
Typical Commercial / Industrial Service Layout

NOT TO SCALE

05/26

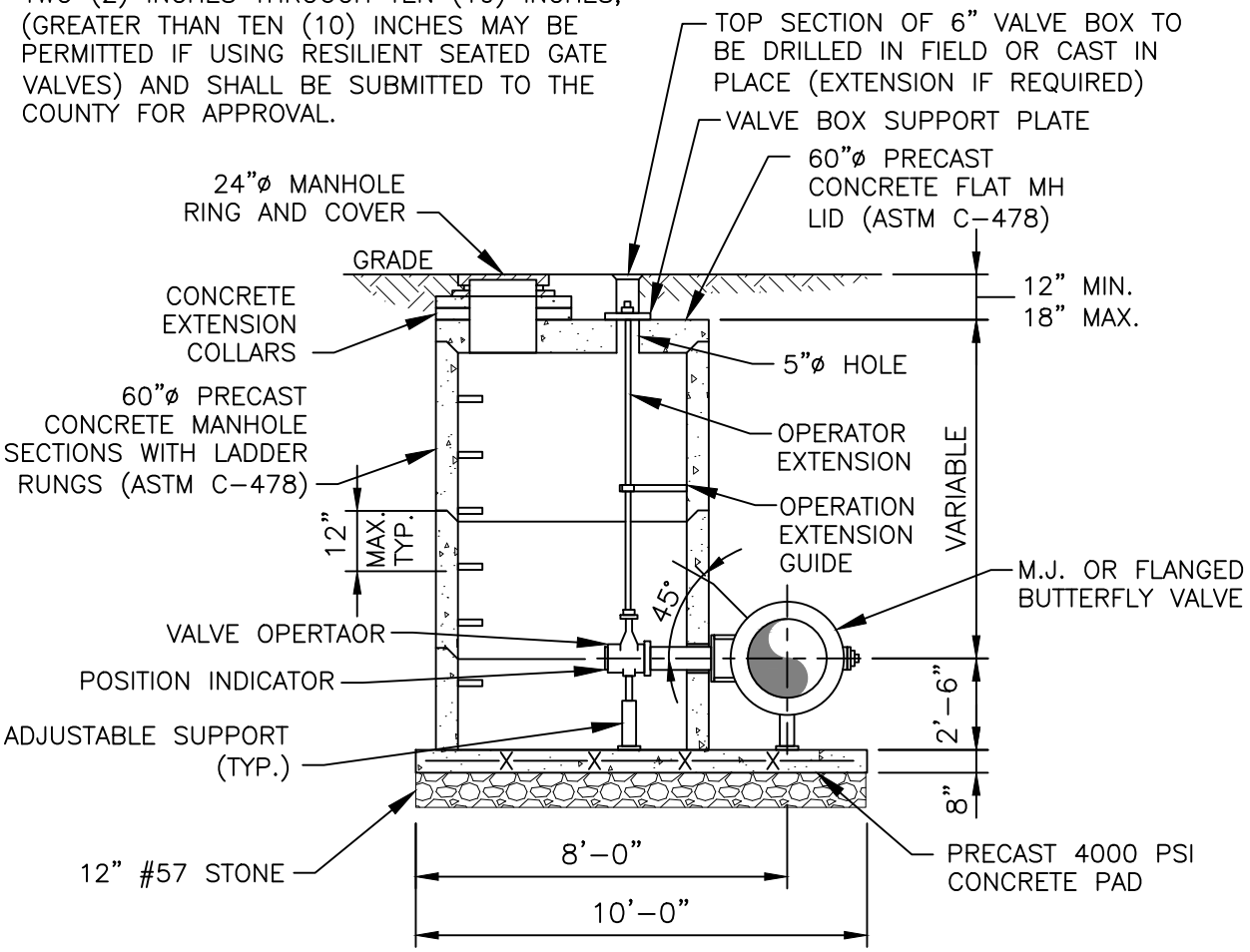
WATER Matters

DETAIL NO. W-025



NOTES:

1. BUTTERFLY VALVES SHALL ONLY BE USED IN SIZES SIXTEEN (16) INCHES AND LARGER.
2. GATE VALVES SHALL ONLY BE USED IN SIZES TWO (2) INCHES THROUGH TEN (10) INCHES, (GREATER THAN TEN (10) INCHES MAY BE PERMITTED IF USING RESILIENT SEATED GATE VALVES) AND SHALL BE SUBMITTED TO THE COUNTY FOR APPROVAL.



DeKalb County GEORGIA

STANDARD DETAILS

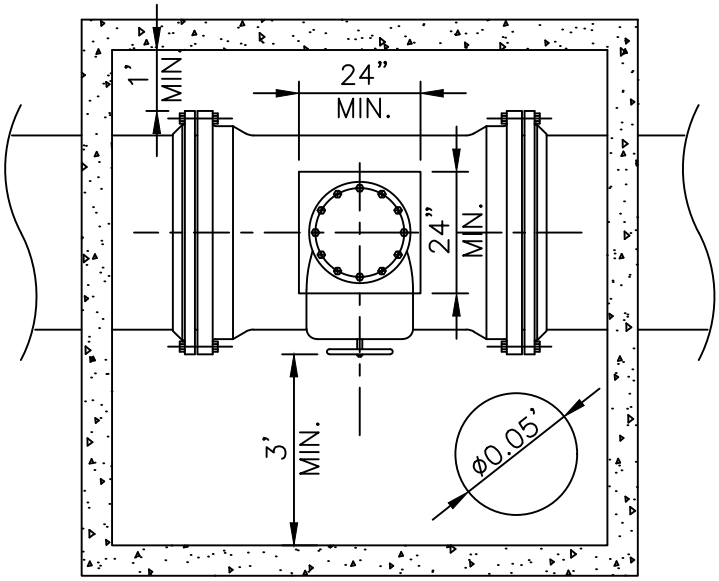
Butterfly Valve And Vault Assembly No. 2

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-027



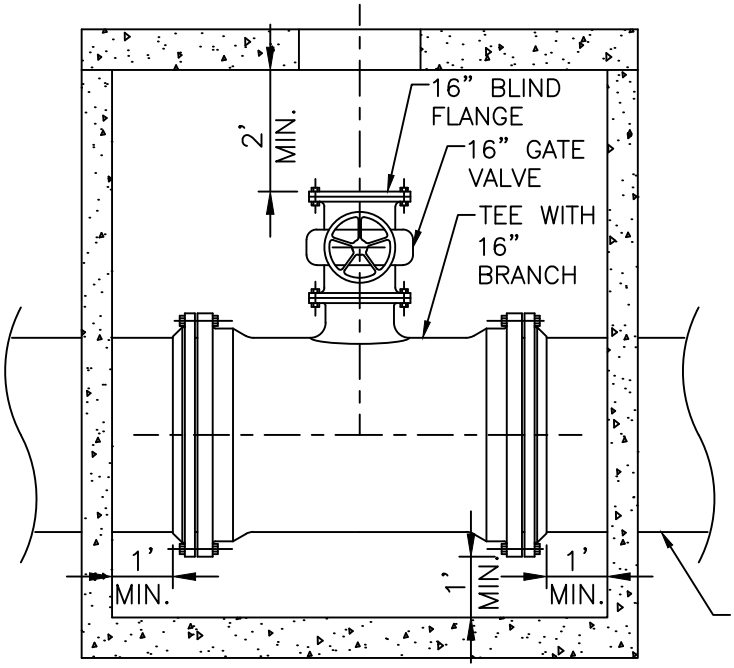
A TRANSMISSION MAIN INSPECTION PORT SHALL BE INCLUDED IN ALL NEW TRANSMISSION MAIN CONSTRUCTION, EVERY APPROXIMATELY 5,000 LF OR 1 MILE, FOR MAINS 24" NOMINAL DIAMETER AND LARGER.

THE PORT IS A TEE WITH THE THROUGH–SIZE THE SAME AS THE MAIN, AND A BRANCH–SIZE OF 16". A RESILIENT SEATED HORIZONTAL GATE VALVE SHALL BE INSTALLED ON THE TEE BRANCH. A BLIND FLANGE SHALL BE INSTALLED ON THE VALVE.

FOR EXISTING MAINS THE USE OF A TAPPING SLEEVE IN LIEU OF THE TEE SHALL BE ALLOWED.

THE PORT SHALL BE INSTALLED IN A VAULT, WITH CLEARANCES AS SHOWN. A STRUCTURAL ENGINEER SHALL DESIGN THE VAULT. THE TOP OF THE VAULT SHALL HAVE A HATCH WITH DIMENSION OF AT LEAST 24"x24" CENTERED ABOVE THE TEE BRANCH. THE TOP SHALL HAVE A SEPARATE HATCH FOR PERSONNEL ENTRY.

THE TEE, VALVE AND BLIND FLANGE SHALL BE OF THE SAME OR COMPATIBLE MATERIALS AND PRESSURE CLASS AS THE TRANSMISSION MAIN. THE TEE SHALL BE MOUNTED ON THE MAIN WITH MECHANICALLY RESTRAINED JOINTS. THE VALVE AND THE BLIND FLANGE SHALL BE BOLTED TO THE BRANCH OF THE TEE WITH STAINLES STEEL BOLTS. THE DESIGN ENGINEER MAY SPECIFY THAT THE TEE BE SUPPORTED ON A SADDLE (NOT SHOWN).



DeKalb County GEORGIA

STANDARD DETAILS

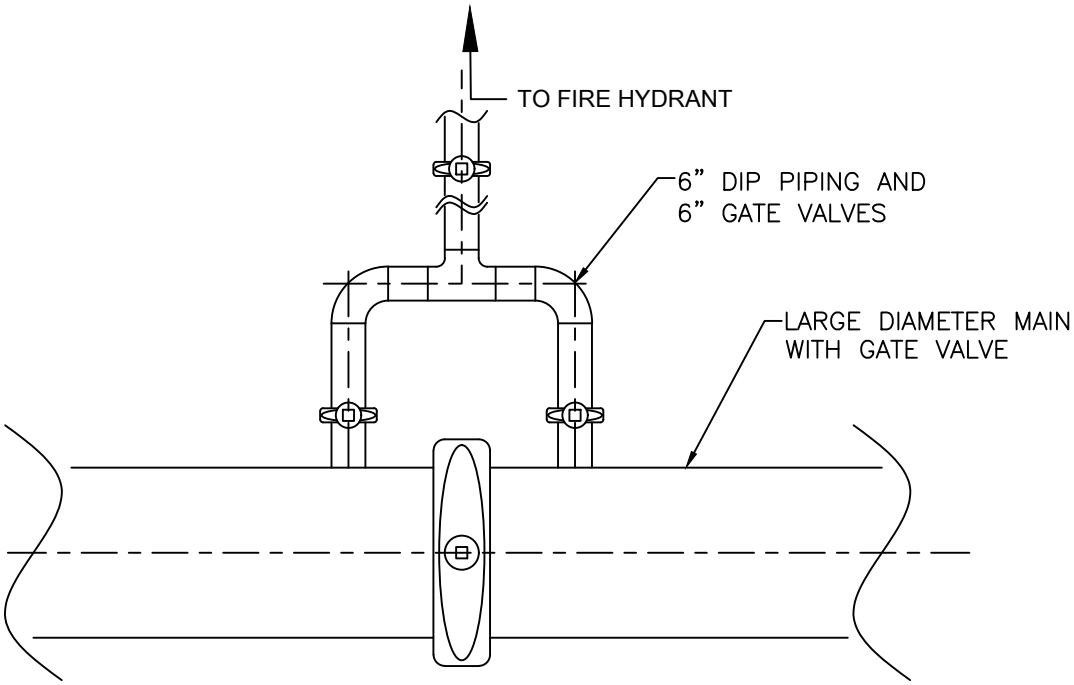
Transmission Main Inspection Port

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. W-028



DeKalb County
GEORGIA

STANDARD DETAILS

05/26

Large Valve Bypass

NOT TO SCALE

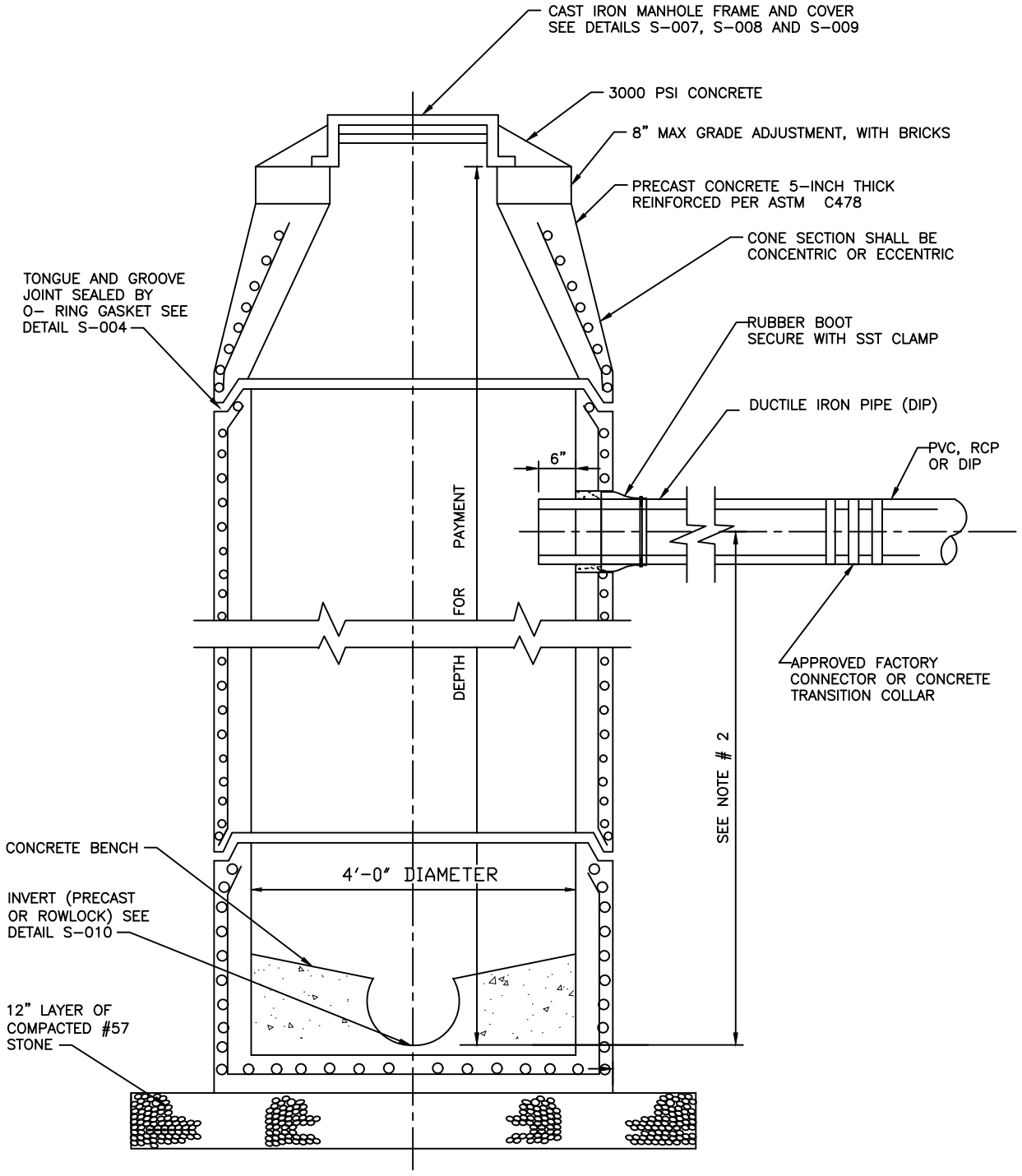
DETAIL NO. W-029

APPENDIX B
GRAVITY SANITARY SEWER STANDARDS

Department of Watershed Management
Standard Details List – Gravity Sanitary Sewer

Standard Details List – Gravity Sanitary Sewer	
Detail Number	**TITLE**
S-001	Standard Precast Manhole
S-002	Not Used
S-003	Outside Drop Connection for Precast Manhole
S-004	Manhole Joint Detail with Joint Wrap
S-005	Method of Manhole Abandonment
S-006	Typical Manhole Step
S-007	Concrete Collar for Manhole Frame and Cover
S-008	Bolt Down Manhole Frame and Cover
S-009	Traffic Manhole Frame and Cover
S-010	Invert Plan
S-011	New Line Connection to an Existing Structure
S-012	Typical Service Line and Clean Out Detail
S-013	Class “A” Bedding
S-014	Class “B” Bedding
S-015	Deep Service Connection Detail
S-016	Alternate Deep Service Connection Detail
S-017	Sanitary Sewer Lateral Connection
S-018	Service Stub Location Detail
S-019	Plug Location Detail
S-020	Transition Coupling Detail
S-021	Precast Concrete FAT, Oil & Grease Interceptor 1000, 1500 & 2000 Gal Capacity
S-022	Precast Concrete FAT, Oil & Grease Interceptor 2500 & 3000 Gal Capacity
S-023	Tracer Wire Detail for PVC
S-024	Large Diameter Manhole Base (Eccentric) Detail
S-025	Large Diameter Manhole Transition Base Detail

Standard Details List – Gravity Sanitary Sewer	
Detail Number	**TITLE**
S-026	Manhole Over Existing Sewer (Doghouse)
S-027	Piped Inside Drop Connection for Manhole



NOTES:

1. WHERE NECESSARY TO CONSTRUCT MANHOLE OVER EXISTING SEWER, 9" THICK CONCRETE POURED-IN-PLACE FOOTING/FOUNDATION MAY BE USED IN LIEU OF PRECAST BOTTOM SECTION.

2. WHERE DROP FROM INVERT OF MANHOLE TO INVERT OF INFLUENT PIPE(S) EXCEED 2'-0", AN OUTSIDE DROP CONNECTION SHALL BE REQUIRED EXCEPT WHEN DCDWM SPECIFICALLY APPROVES ITS ELIMINATION. SEE DETAILS S-003 OR S-027.

3. PRECAST ALL OPENINGS FOR PIPE IN BASE AND RISER UNITS.

DeKalb County
GEORGIA

STANDARD DETAILS

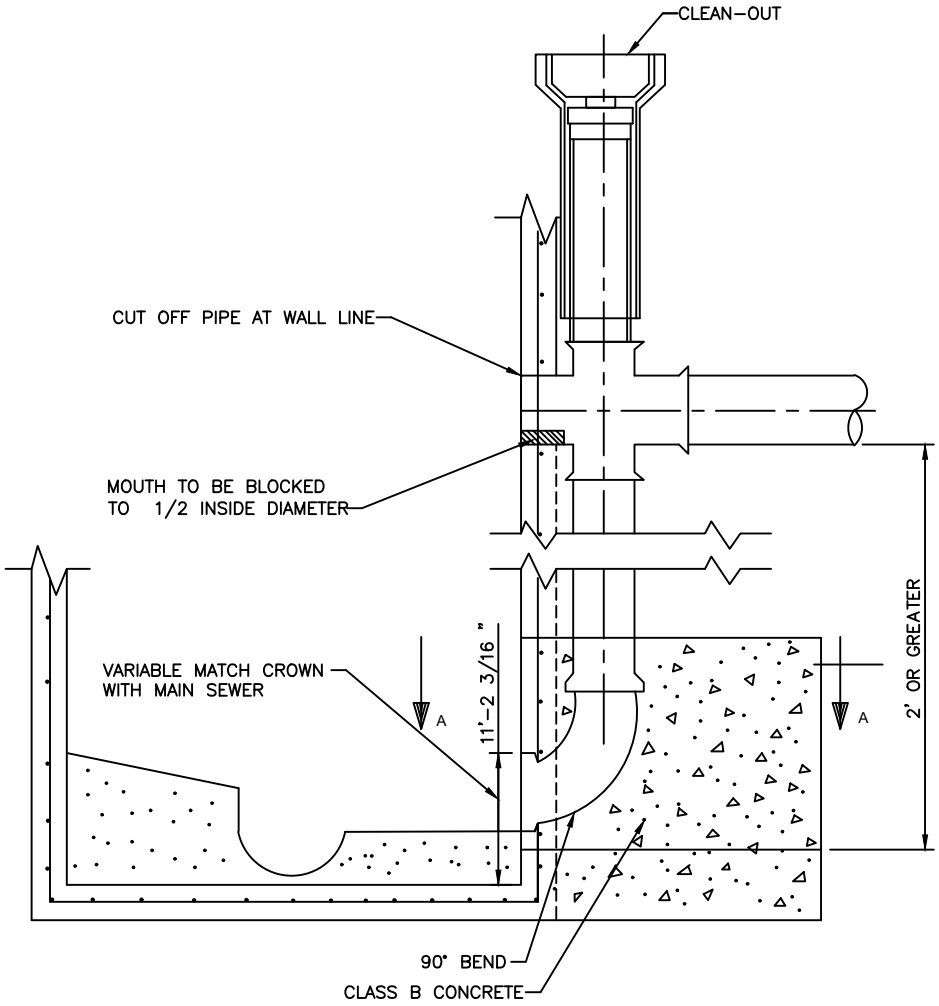
Standard Precast Manhole

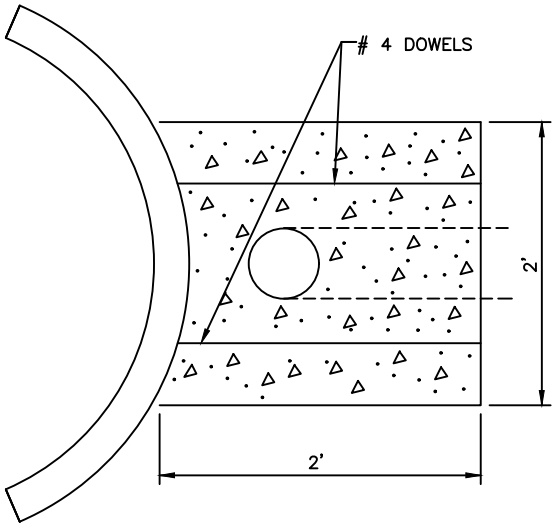
NOT TO SCALE

05/26

WATER Matters

DETAIL NO. S-001





NOTES:
1. "DROP CONNECTION" SHALL INCLUDE THE EXCAVATION, MH CORE, CONCRETE, DIP, FITTINGS AND OTHER INCIDENTALS NECESSARY TO COMPLETE THE ITEM. DUCTILE IRON PIPE (18' MIN) INSTALLED UPSTREAM OF THE TEE.

2. ALL BENDS, TEES, AND FITTINGS REQUIRED TO INSTALL OUTSIDE DROP SHALL BE DUCTILE IRON.

DeKalb County GEORGIA

STANDARD DETAILS

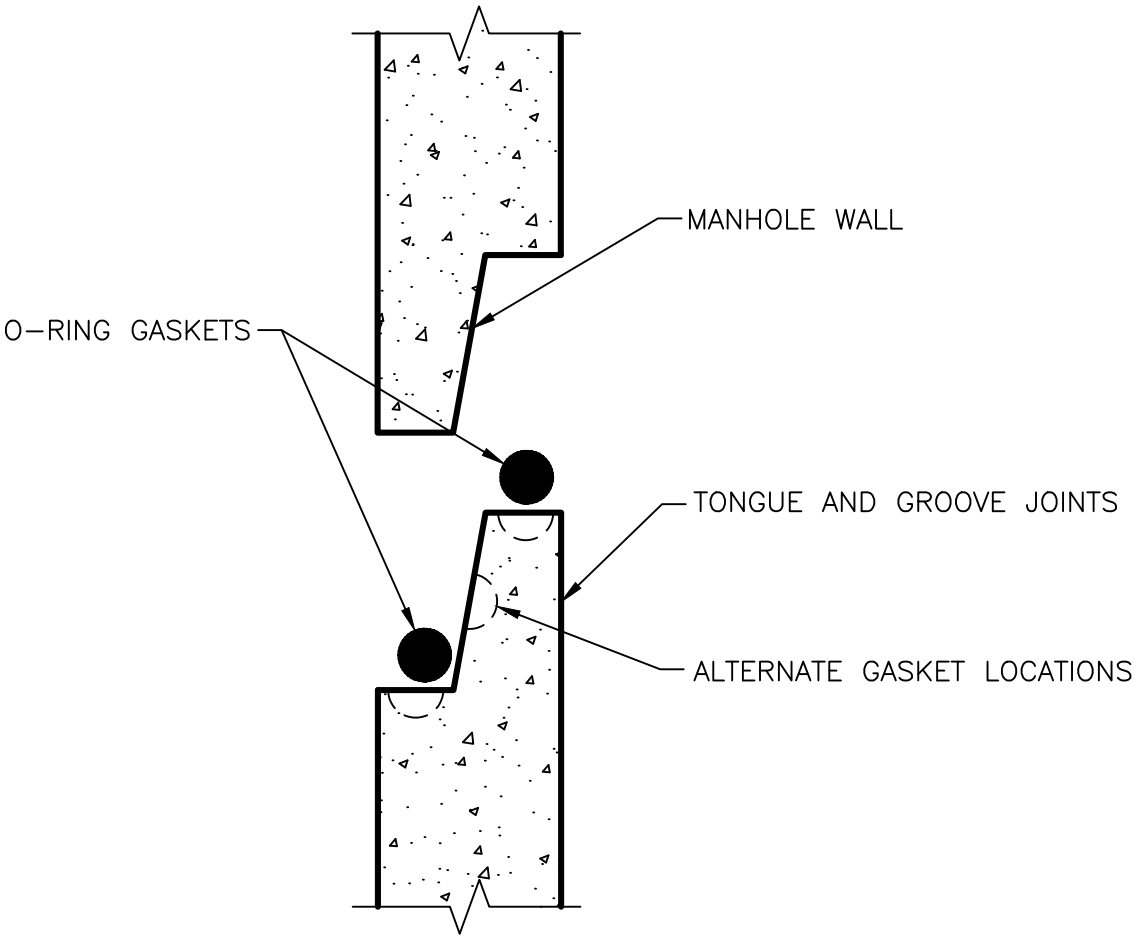
Outside Drop Connection For Precast Manhole

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. S-003



NOTE:

AFTER INSTALLATION JOINTS SHALL BE GROUTED SMOOTH WITH CEMENT GROUT ON INSIDE AND OUT. ALSO AN EXTERNAL WRAP SUCH AS INFI-SHIELD GATOR WRAP OR EQUAL SHALL SEAL EACH OUTSIDE JOINT.

DeKalb County GEORGIA

STANDARD DETAILS

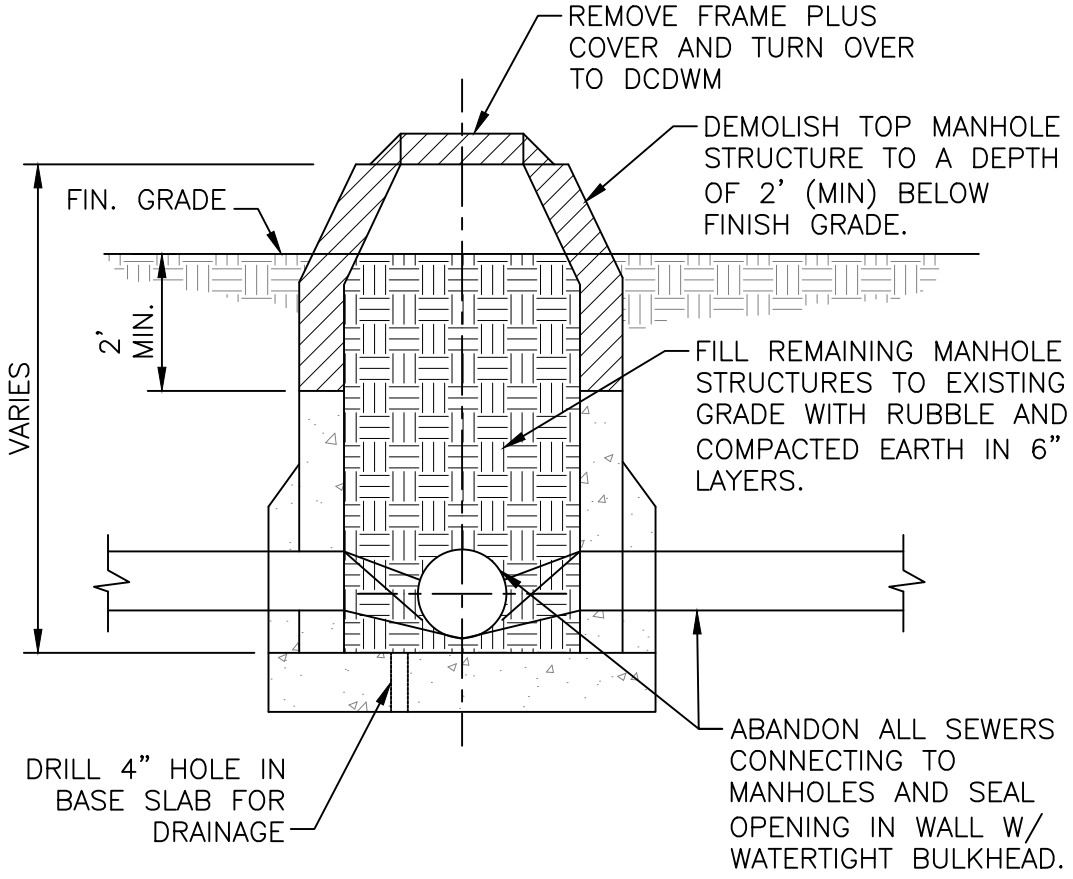
Manhole Joint Detail With Joint Wrap

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. S-004



DeKalb County GEORGIA

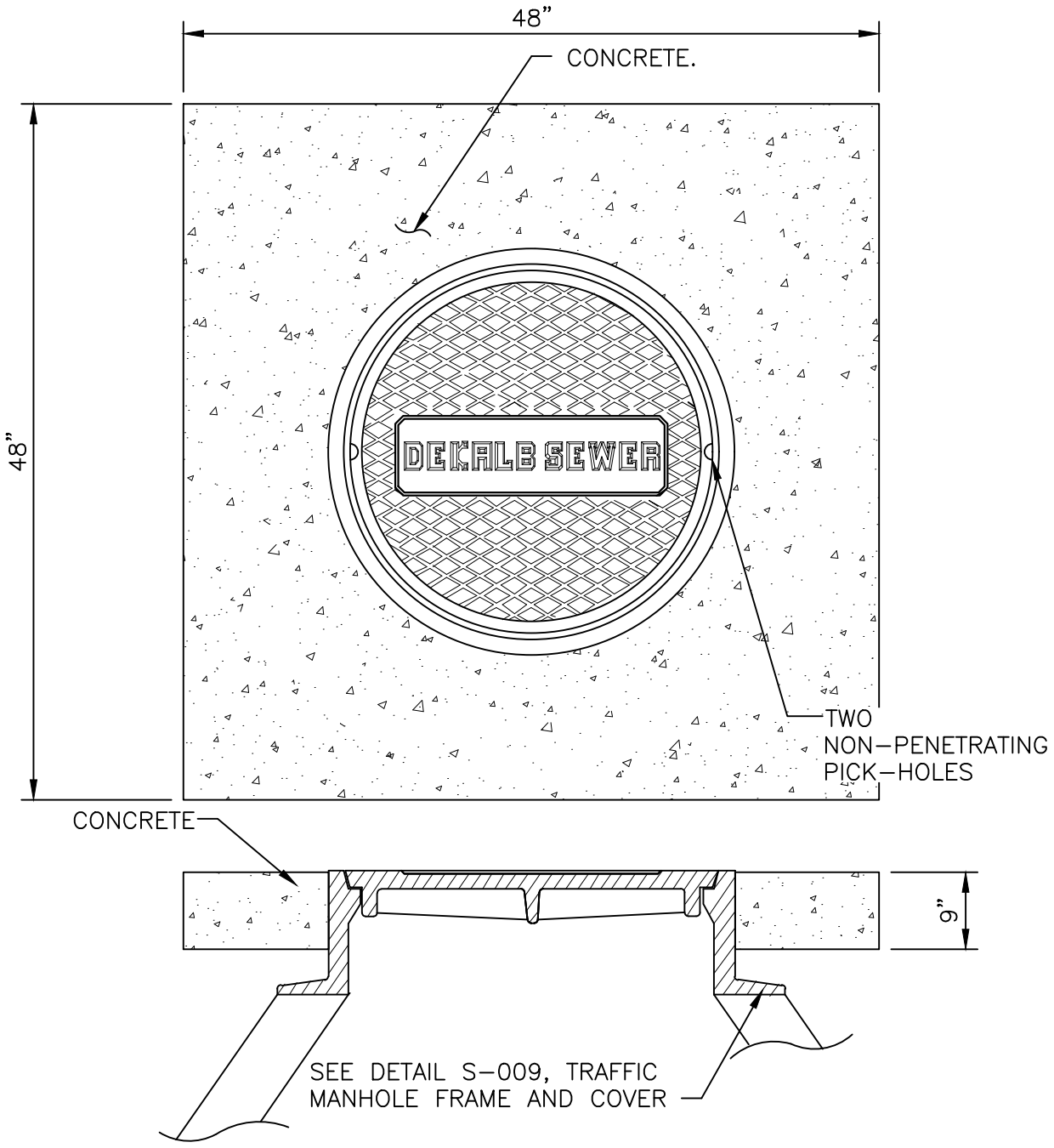
STANDARD DETAILS

05/26

Method of Manhole Abandonment

NOT TO SCALE

DETAIL NO. S-005



GRAY IRON ASTM A48 CL30
FRAME WT = 282 LBS
LID WT. = 178 LBS

TOTAL WT. = 460 LBS

NOTE: CONCRETE COLLARS ONLY REQUIRED IN STREETS, ROADWAYS AND OTHER AREAS SUBJECT TO VEHICULAR TRAFFIC. CONCRETE SHALL BE 5000 psi (QUICK SETTING MIX).

DeKalb County
GEORGIA

STANDARD DETAILS

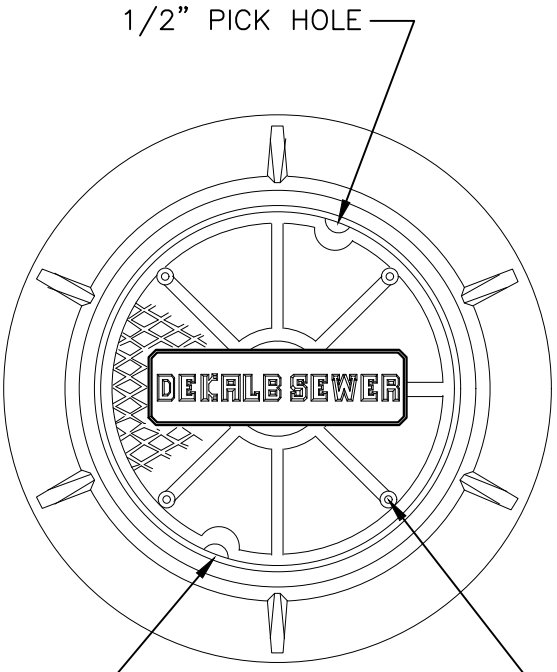
Concrete Collar for Manhole Frame and Cover

NOT TO SCALE

05/26

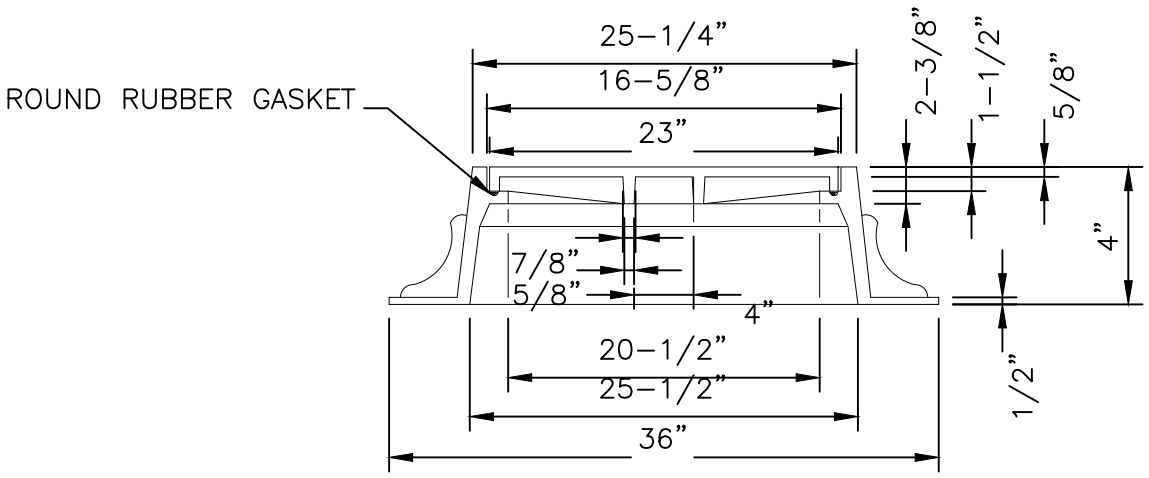
WATER Matters

DETAIL NO. S-007

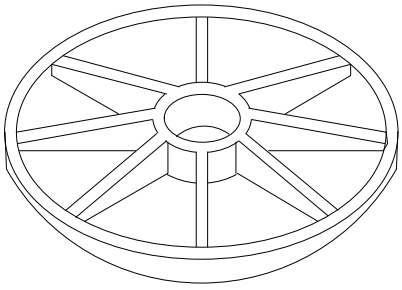


ISOMETRIC OF
1/4" HIGH LETTERS

TOP VIEW



SIDE VIEW



GRAY IRON
ASTM A48 CL30
TOTAL WT. = 320 LBS.

NOTES:

1. MANHOLES CONSTRUCTED IN NON-PAVED AREAS SHALL BE INSTALLED WITH BOLT DOWN LID.

2. "DEKALB SEWER" MUST FIT WITHIN LID DIMENSIONS, LETTER HEIGHT WILL BE 2 INCHES.

DeKalb County
GEORGIA

STANDARD DETAILS

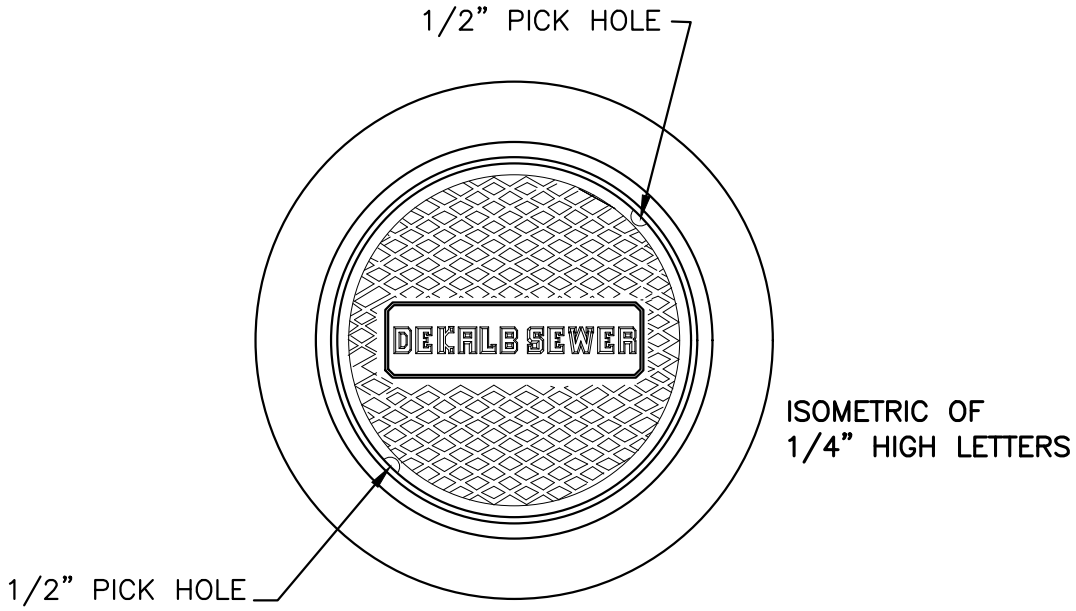
Bolt Down Manhole Frame and Cover

NOT TO SCALE

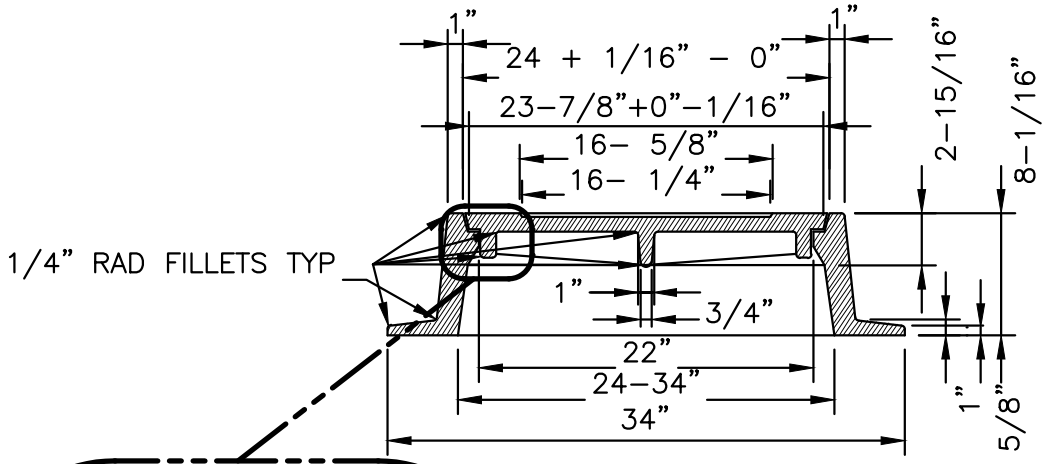
05/26

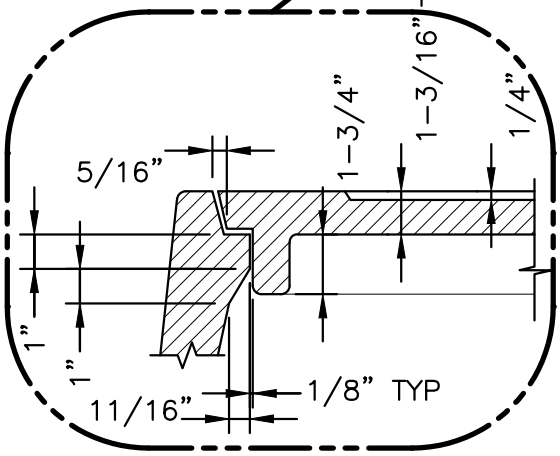
WATER Matters

DETAIL NO. S-008



TOP VIEW





SIDE VIEW

GRAY IRON ASTM A48 CL30
FRAME WT = 282 LBS
LID WT. = 178 LBS

TOTAL WT. = 460 LBS

NOTES:

1. "DEKALB SEWER" MUST FIT WITHIN LID DIMENSIONS, LETTER HEIGHT WILL BE 2 INCHES.

DeKalb County GEORGIA

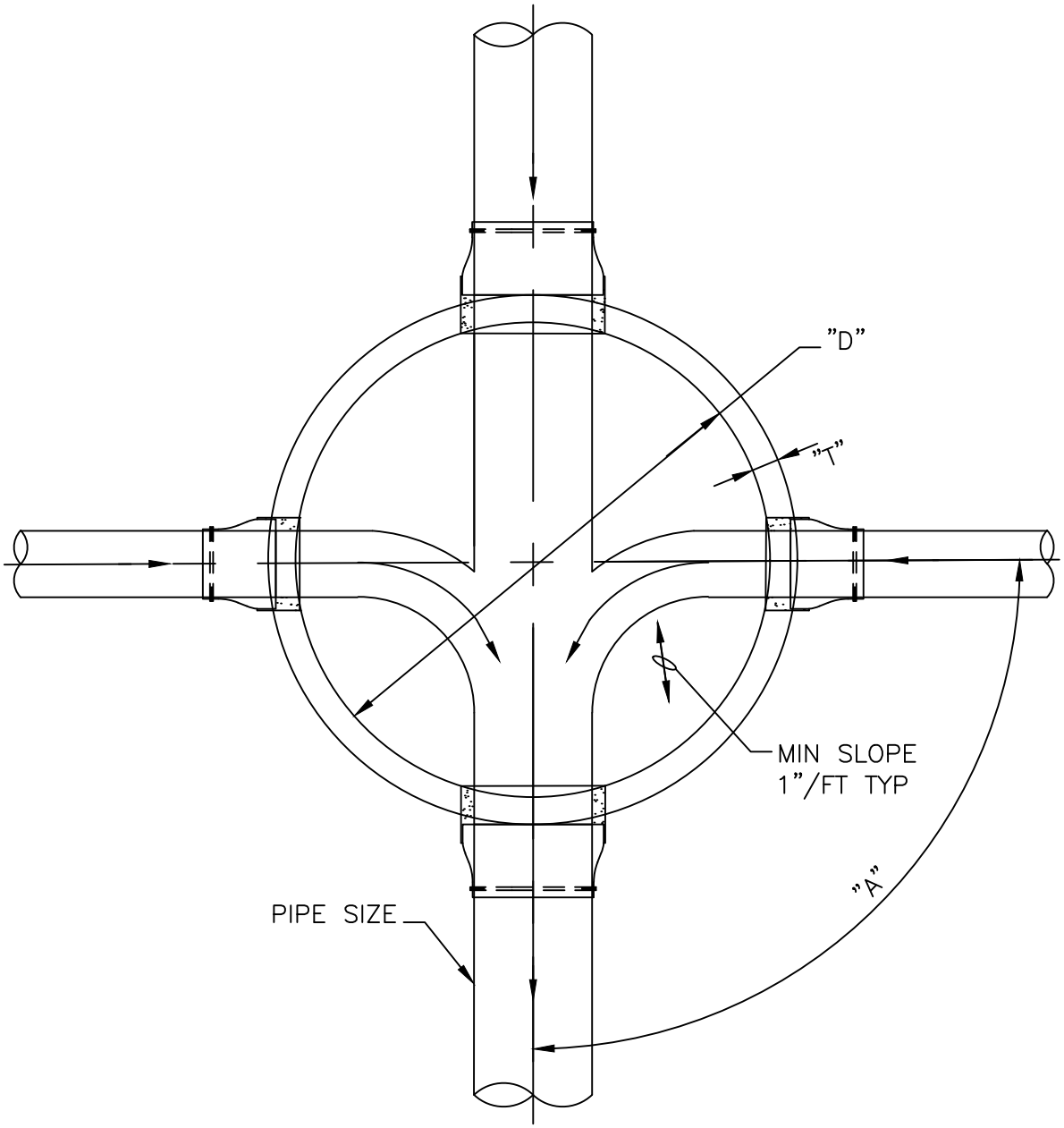
STANDARD DETAILS

05/26

Traffic Manhole Frame and Cover

NOT TO SCALE

DETAIL NO. S-009



PIPE SIZE	"A"	"D"	"T"
6" & 15"	0° – 90°	4'–0"	5"
18"	0° – 60°	4'–0"	5"
18"	60° – 90°	5'–0"	6"
21" & 24"	0° – 60°	5'–0"	6"
21" & 24"	60° – 90°	6'–0"	7"

NOTE:

1. MINIMUM CENTERLINE RADIUS OF MANHOLE INVERT = 1.5 x PIPE DIAMETER

DeKalb County GEORGIA

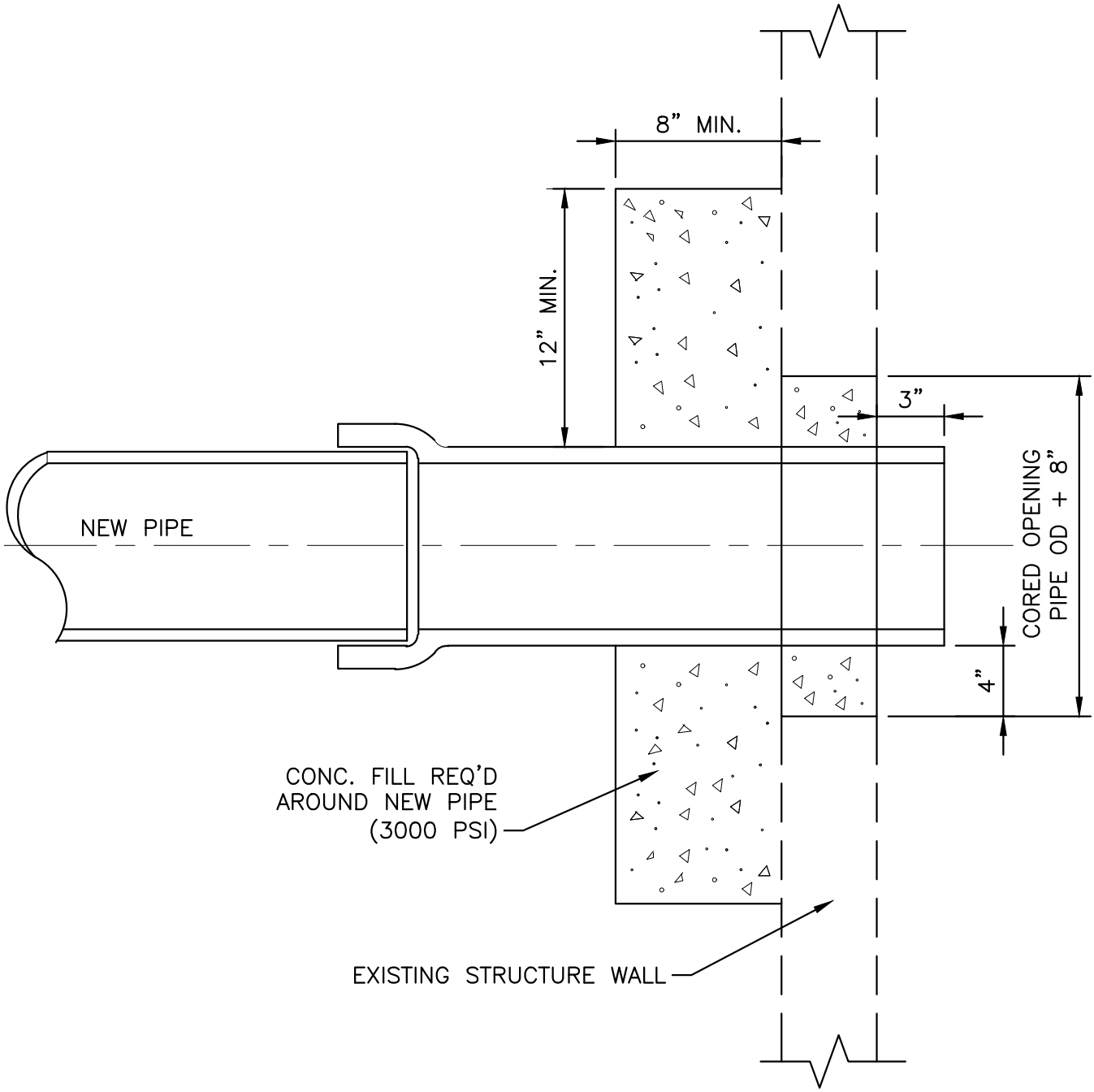
STANDARD DETAILS

05/26

Invert Plan

NOT TO SCALE

DETAIL NO. S-010



DeKalb County
GEORGIA

STANDARD DETAILS

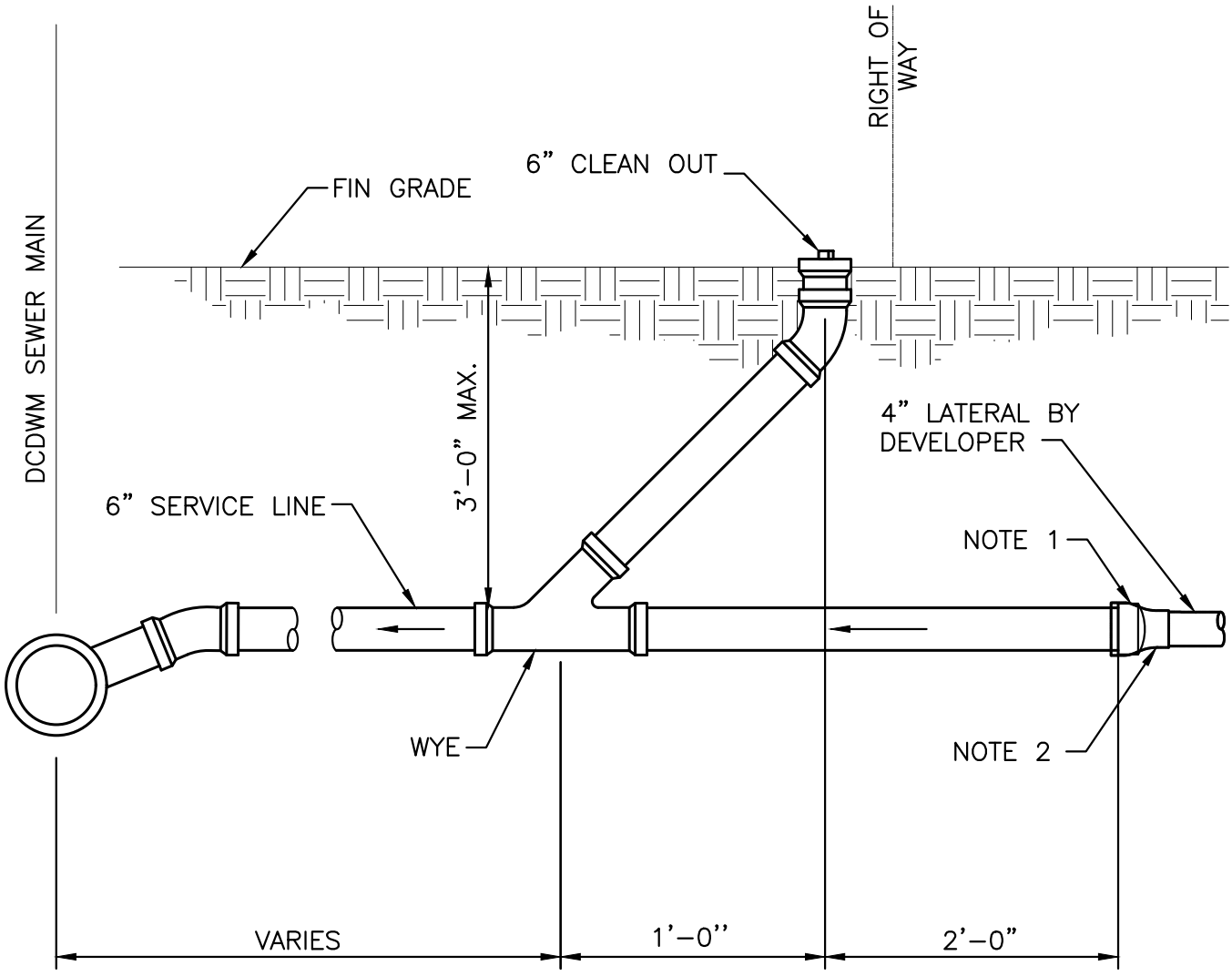
New Line Connection to an Existing Structure

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. S-011



NOTES:

1. PLUG 6" SERVICE LINE.
2. CONNECT DEVELOPER'S 4" LATERAL TO 6" SERVICE LINE W/ 4" X 6" FERNCO COUPLING INCLUDING SST BANDS

DeKalb County GEORGIA

STANDARD DETAILS

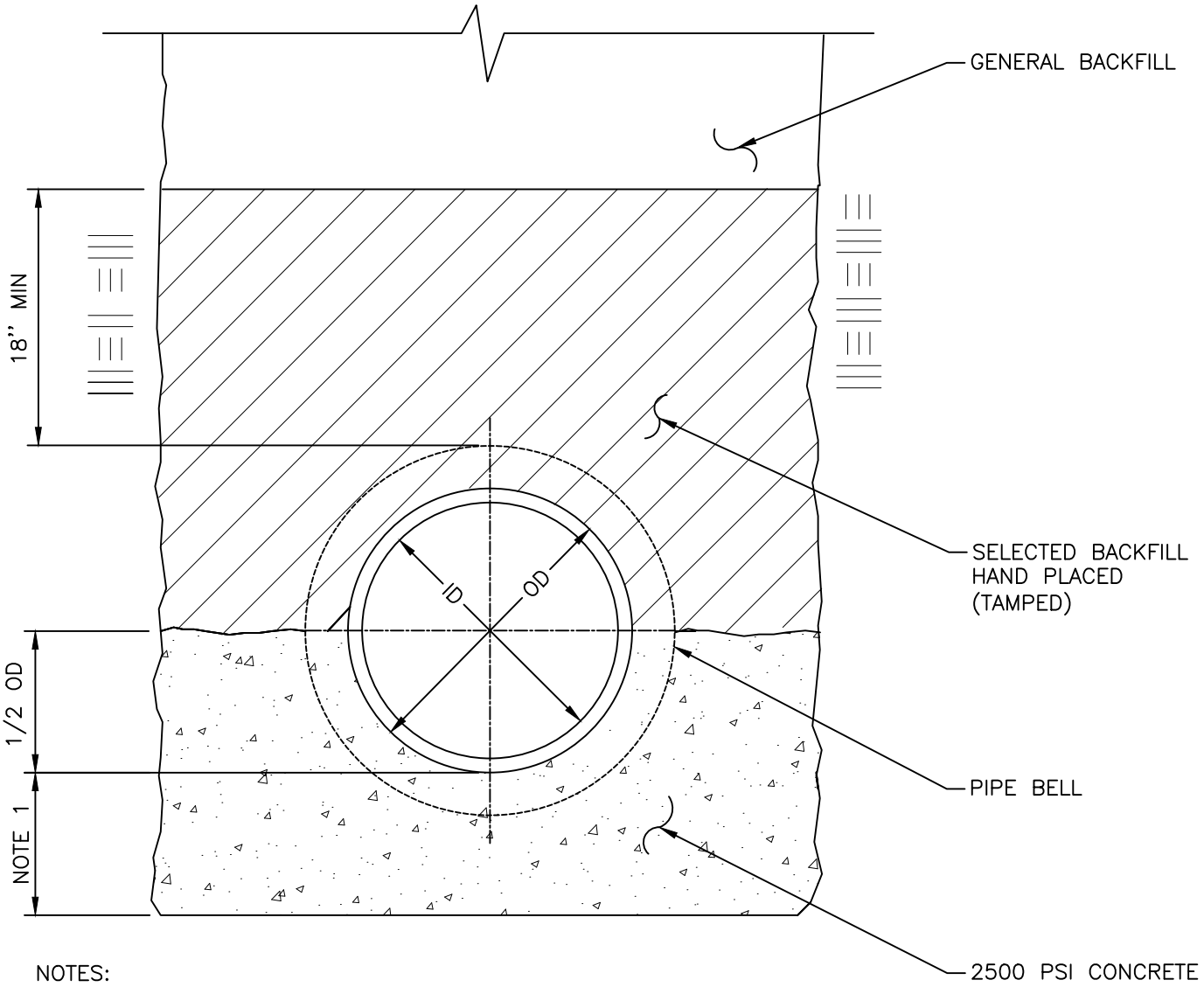
Typical Service Line and Clean Out Detail

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. S-012



NOTES:

1. CONCRETE DEPTH BELOW PIPE:
   - a.) PIPE DIAMETER UP TO 12":
     - i.) EQUAL TO 1/2 TIMES THE OUTSIDE DIAMETER (OD)
     - ii.) MINIMUM 6"
   - b.) PIPE DIAMETER GREATER THAN 12":
     - i.) EQUAL TO 1/4 TIMES THE OUSIDE DIAMETER (OD)
     - ii.) MINIMUM 6"
   - C.) MAXIMUM 12"

DeKalb County GEORGIA

STANDARD DETAILS

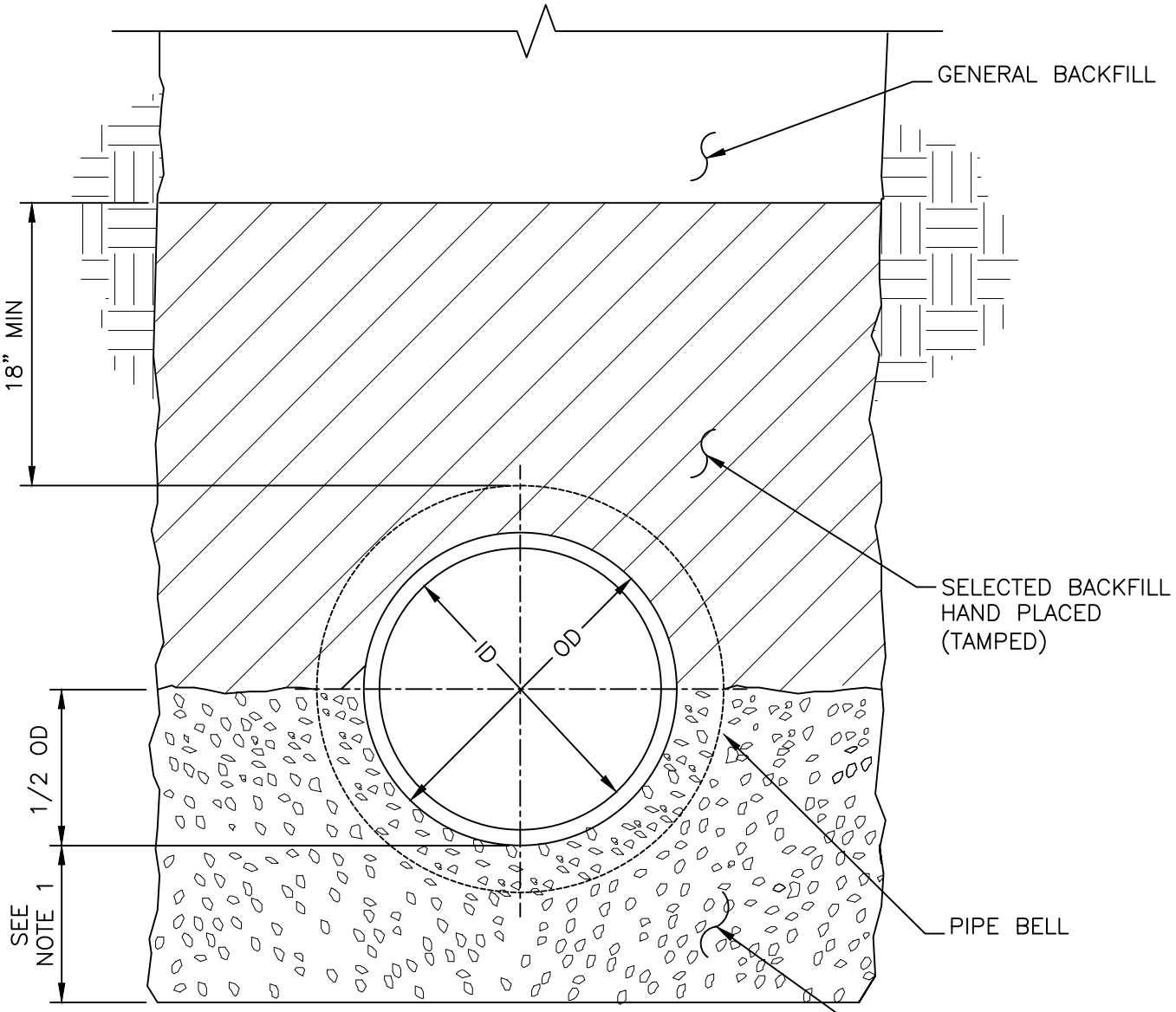
Class "A" Bedding

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. S-013



NOTES:

1. BEDDING DEPTH BELOW PIPE:

   a.) PIPE DIAMETER UP TO 12":

      i.) EQUAL TO 1/2 TIMES THE OUTSIDE DIAMETER (OD)

      ii.) MINIMUM 4"

   b.) PIPE DIAMETER GREATER THAN 12":

      i.) EQUAL TO 1/4 TIMES THE OUSIDE DIAMETER (OD)

      ii.) MINIMUM 6"

   C.) MAXIMUM 12"

DeKalb County GEORGIA

STANDARD DETAILS

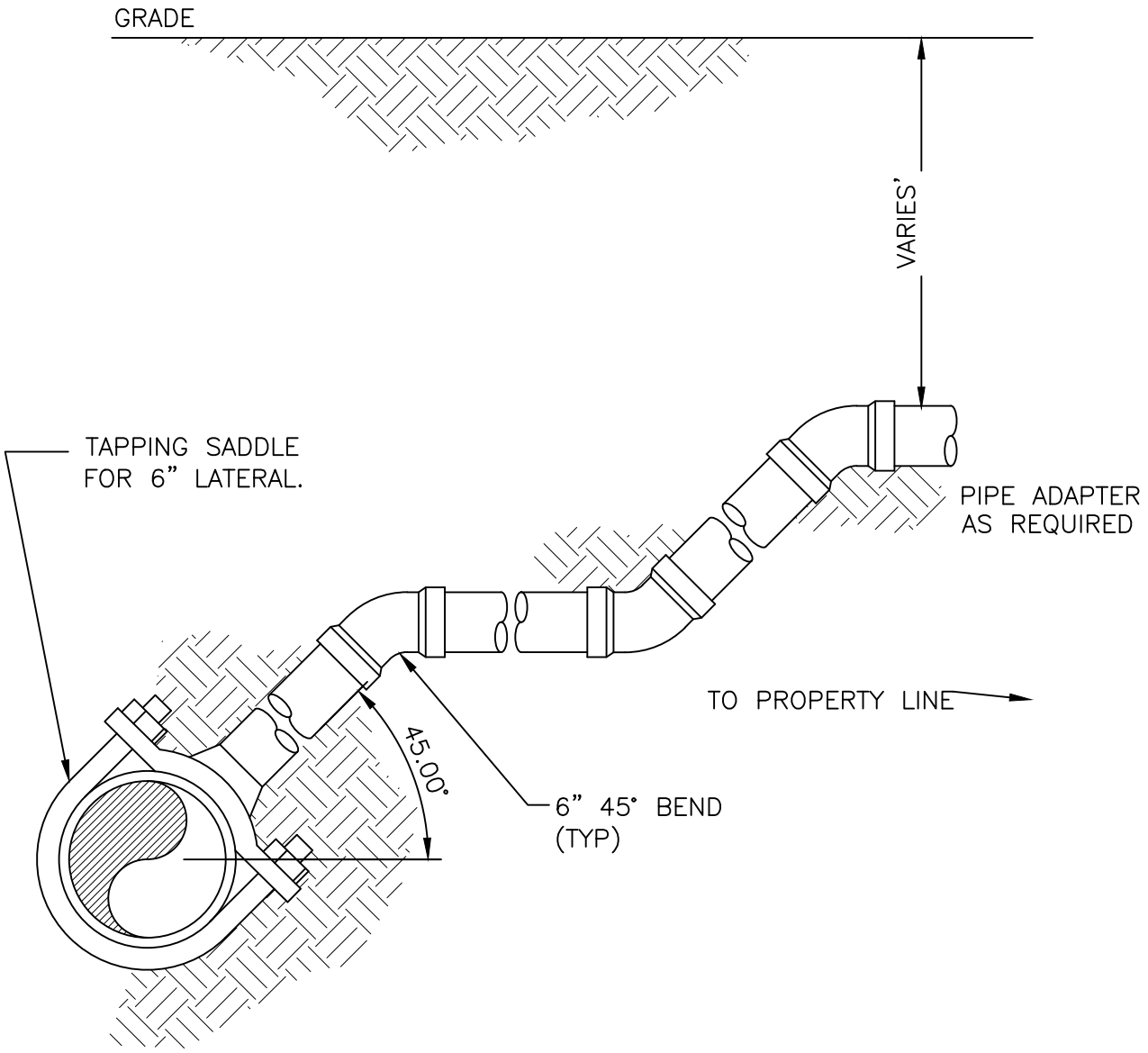
Class "B" Bedding

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. S-014



NOTES:
1. DEEP HOUSE CONNECTIONS MAY BE ALLOWED WHEN SEWER INVERT IS 12 FEET OR GREATER BELOW SURFACE.

2. FROM THE TAPPING SADDLE ALL LATERALS SHALL BE DIP.

DeKalb County
GEORGIA

STANDARD DETAILS

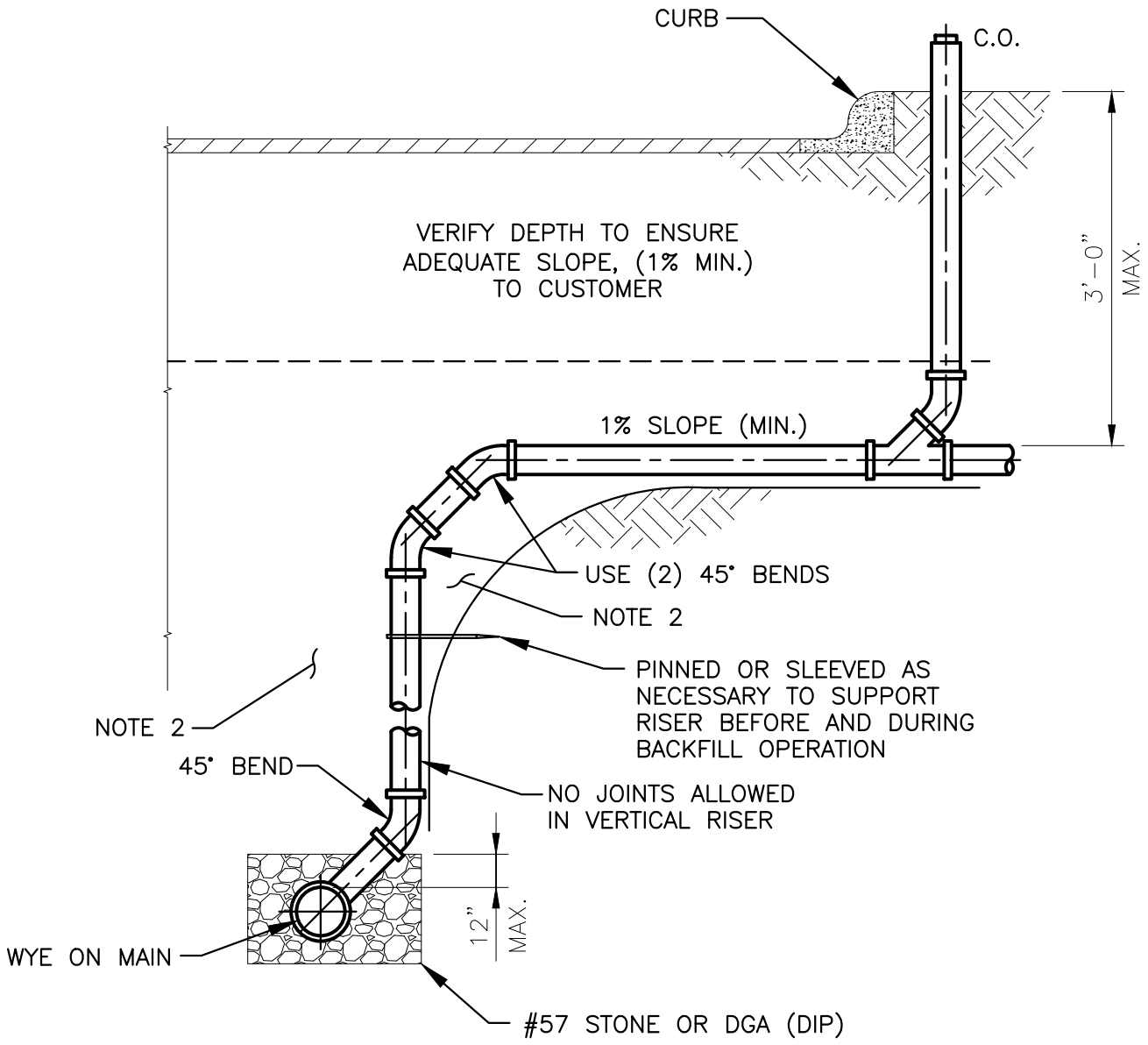
Deep Service Connection Detail

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. S-015



NOTES:

1. THIS DETAIL SHALL NOT BE USED WITHOUT WRITTEN PERMISSION FROM DCDWM.
2. CRUSHER RUN BACKFILL TAMPED IN 6" LAYERS TO NOT LESS THAN 95% STANDARD PROCTOR DENSITY BELOW ANY PAVED AREA.
3. ALL THE LATERAL CONNECTIONS INCLUDING THE WYE SHALL BE DIP.

DeKalb County GEORGIA

STANDARD DETAILS

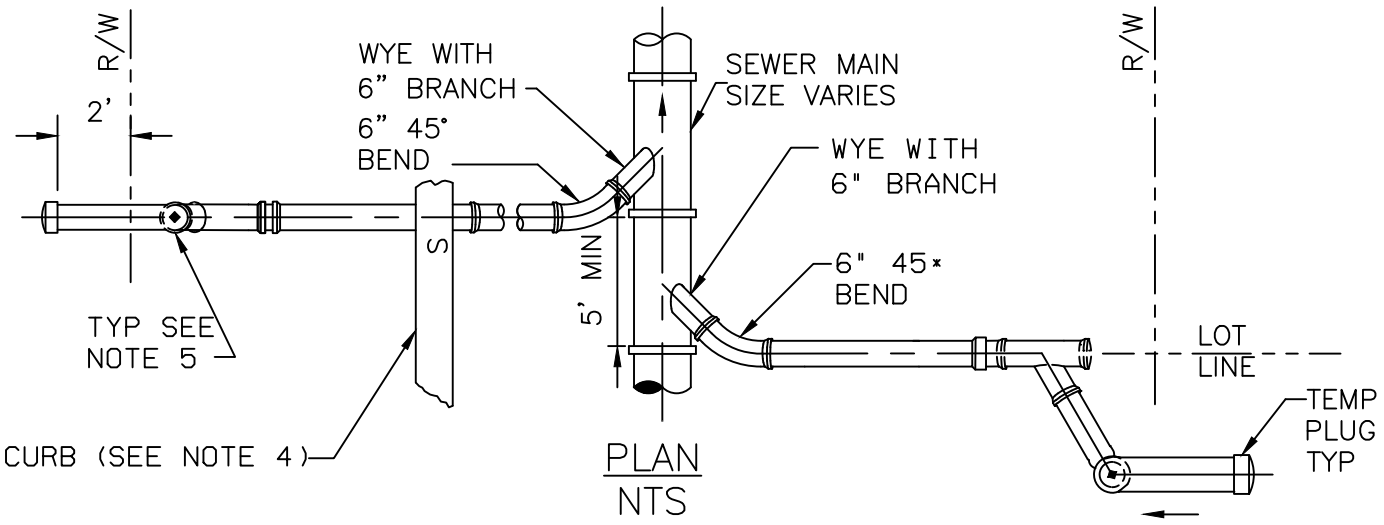
Alternate Deep Service Connection Detail

NOT TO SCALE

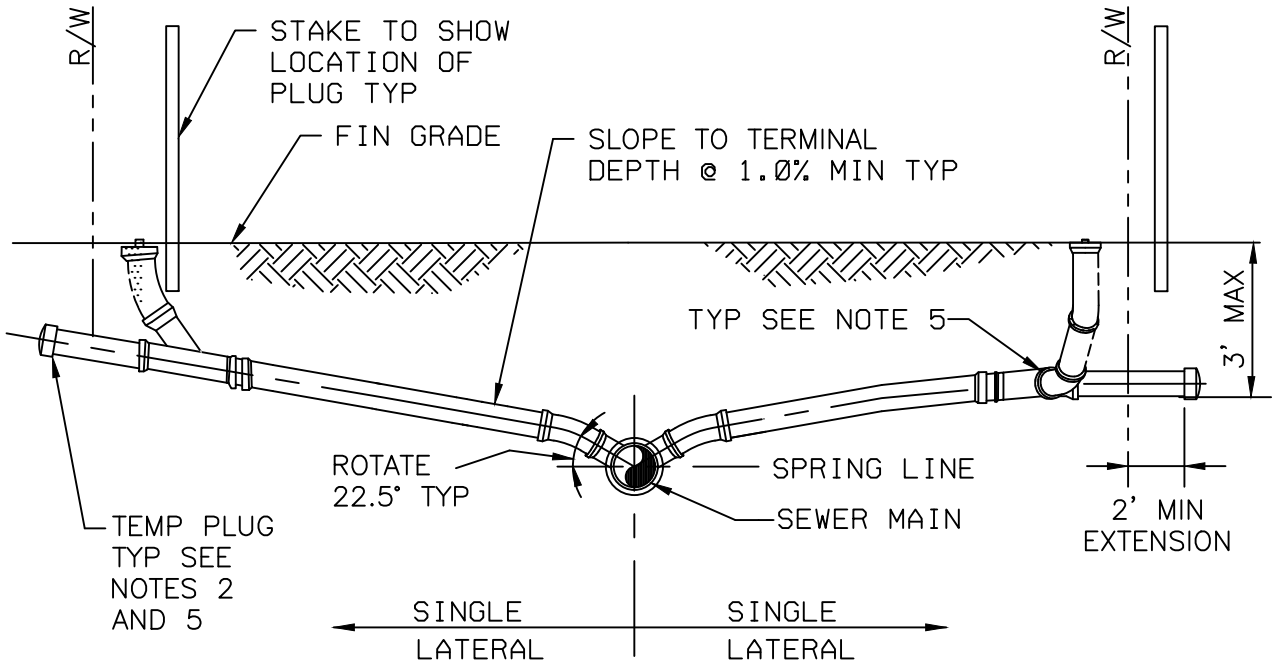
05/26

WATER Matters

DETAIL NO. S-016



PLAN
NTS



PROFILE
NTS

NOTES:

1. INVERT OF SERVICE LATERAL SHALL NOT ENTER SEWER MAIN BELOW SPRING LINE.
2. SERVICE LATERAL SHALL BE CAPPED BY DEVELOPER'S CONTRACTOR.
3. ALL FITTINGS SHOWN ARE TO BE INSTALLED.
4. SERVICE CONNECTIONS SHALL BE PERMANENTLY MARKED BY CUTTING AN "S" IN THE CURB DIRECTLY OVER THE LATERAL.
5. DEVELOPER'S CONTRACTOR SHALL INSTALL CLEANOUT.

DeKalb County
GEORGIA

STANDARD DETAILS

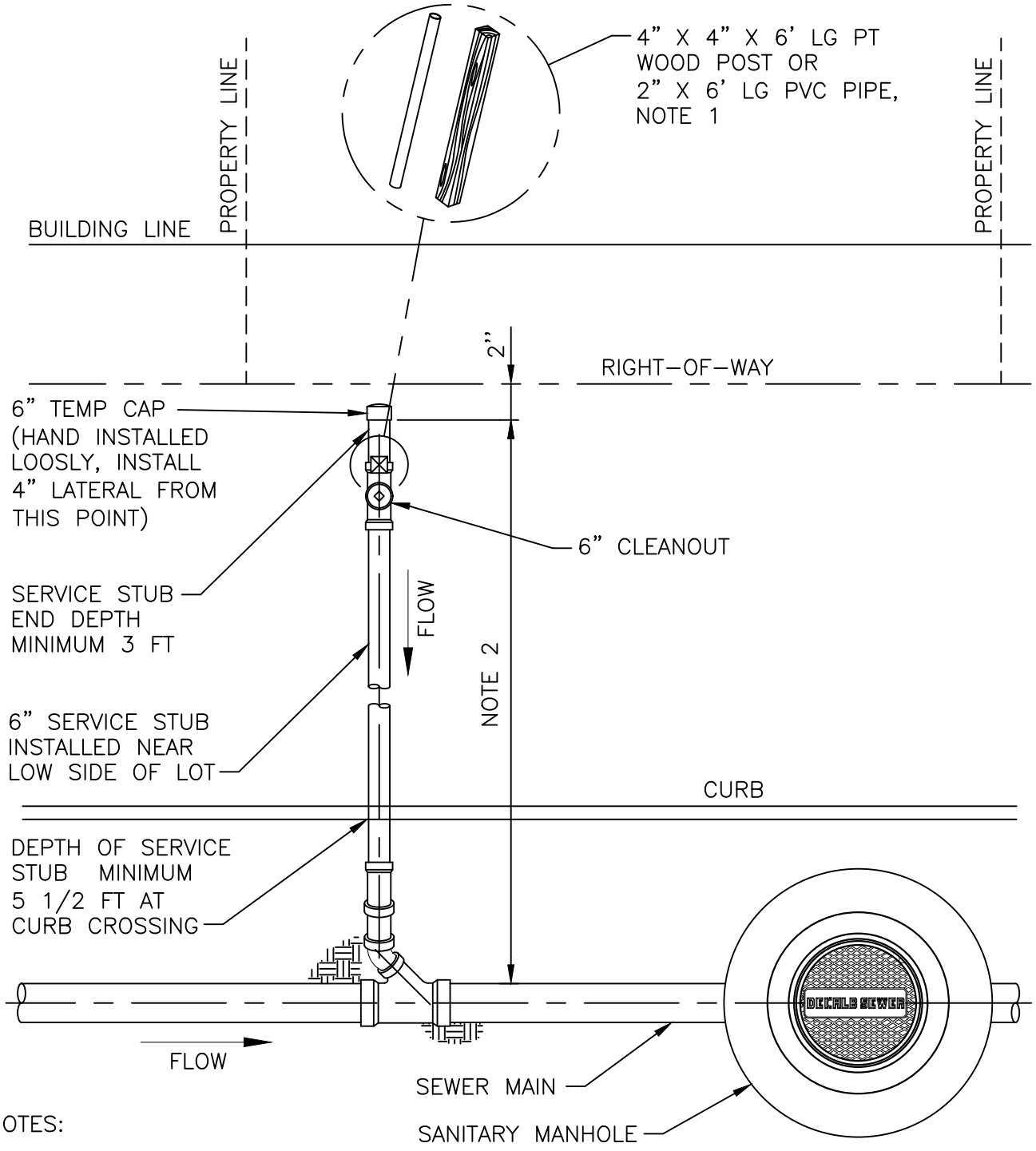
SANITARY SEWER LATERAL CONNECTION

NOT-TO-SCALE

05/26

WATER Matters

DETAIL NO. S-017



NOTES:

1. IDENTIFY AS PER OSHA SAFETY STANDARD SPECIFICATION 1910.44 UTILITY PROTECTION MARKING PAINT (GREEN)

2. MINIMUM LENGTH OF SERVICE STUB IS ONE FULL PIPE JOINT LENGTH OR TO THE RIGHT-OF-WAY.
MAXIMUM LENGTH OF SERVICE STUB IS 75 FEET.

3. REFER TO S-012 FOR SERVICE AND CLEANOUT PROFILE

DeKalb County
GEORGIA

STANDARD DETAILS

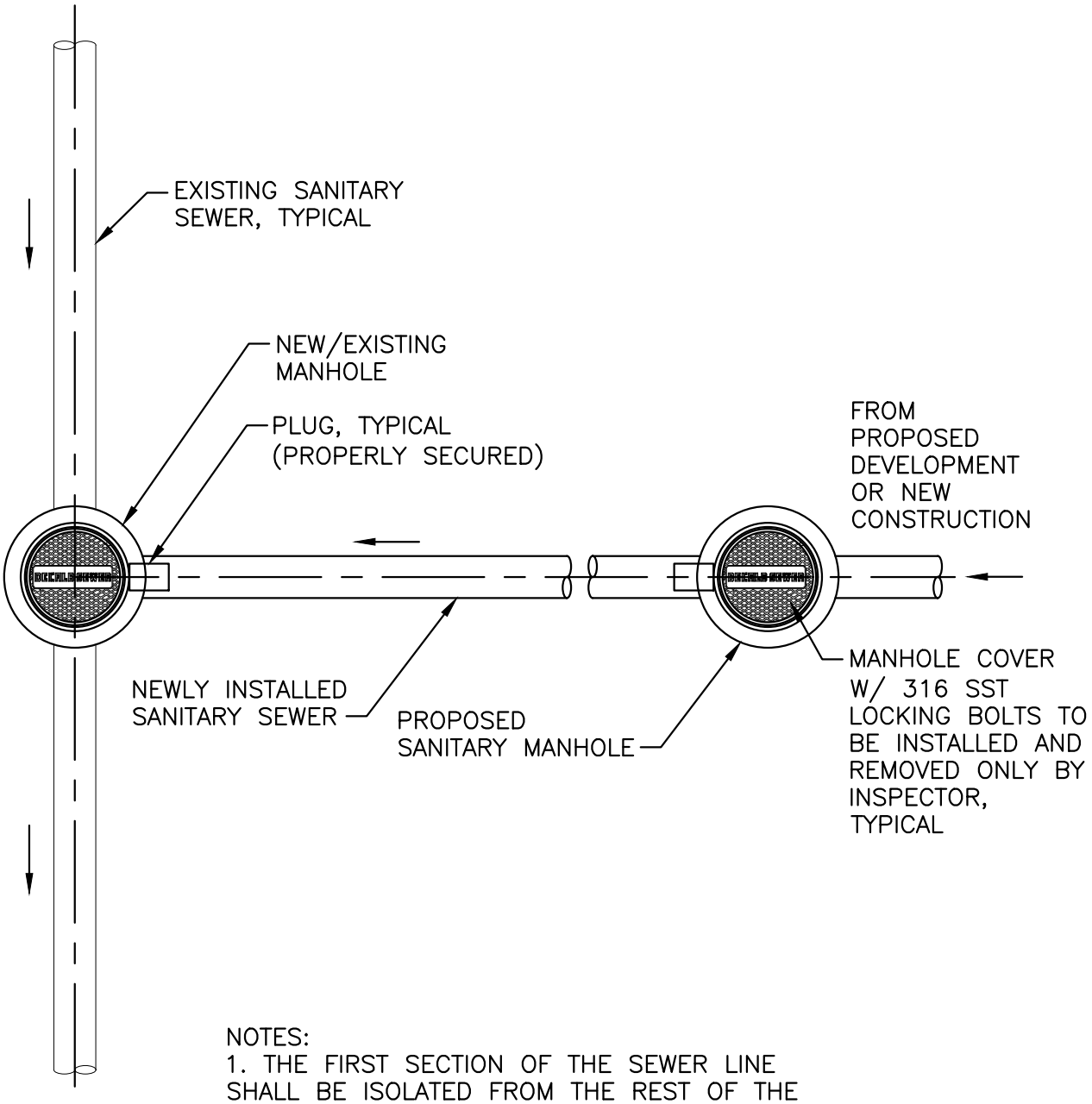
Service Stub Location Detail

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. S-018



NOTES:
1. THE FIRST SECTION OF THE SEWER LINE SHALL BE ISOLATED FROM THE REST OF THE PROPOSED SYSTEM.

2. THE FIRST MANHOLE OF THE PROPOSED SYSTEM SHALL BE USED TO PUMP OUT ANY INFLOW/INFILTRATION, MUD, ETC., THAT ENTERED THE SYSTEM DURING CONSTRUCTION.

3. THE PLUGS SHALL NOT BE REMOVED UNTIL APPROVAL OF PROPOSED SEWER SYSTEM BY DCDWM INSPECTORS.

DeKalb County GEORGIA

STANDARD DETAILS

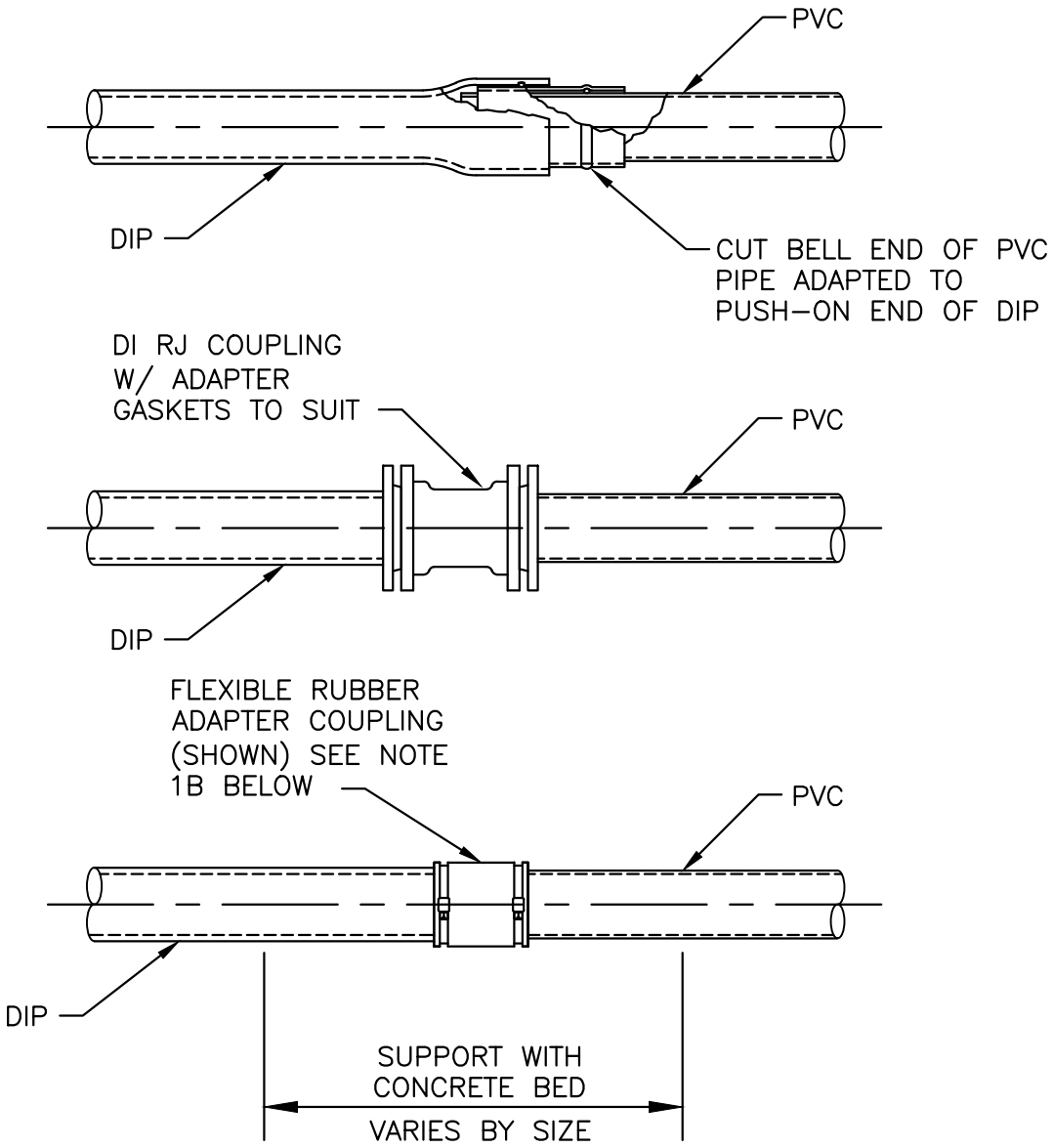
05/26

Plug Location Detail (New Development Connections)

NOT TO SCALE

WATER Matters

DETAIL NO. S-019



NOTES:

1. TRANSITION JOINTS: THE FOLLOWING SHALL BE UTILIZED FROM DUCTILE IRON PIPE TO PVC FOR PIPE SIZES LESS THAN 12 INCHES:

   A. WATER MAIN TYPE COMPRESSION COUPLINGS WITH ADAPTER GASKETS AS NEEDED.

   B. "FERNCO" TYPE FLEXIBLE RUBBER ADAPTER COUPLING (SHOWN) OR APPROVED EQUAL.

2. TRANSITION COUPLINGS SHALL BE CONSTRUCTED AS SHOWN ABOVE.

DeKalb County GEORGIA

STANDARD DETAILS

05/26

Transition Coupling Detail

NOT TO SCALE

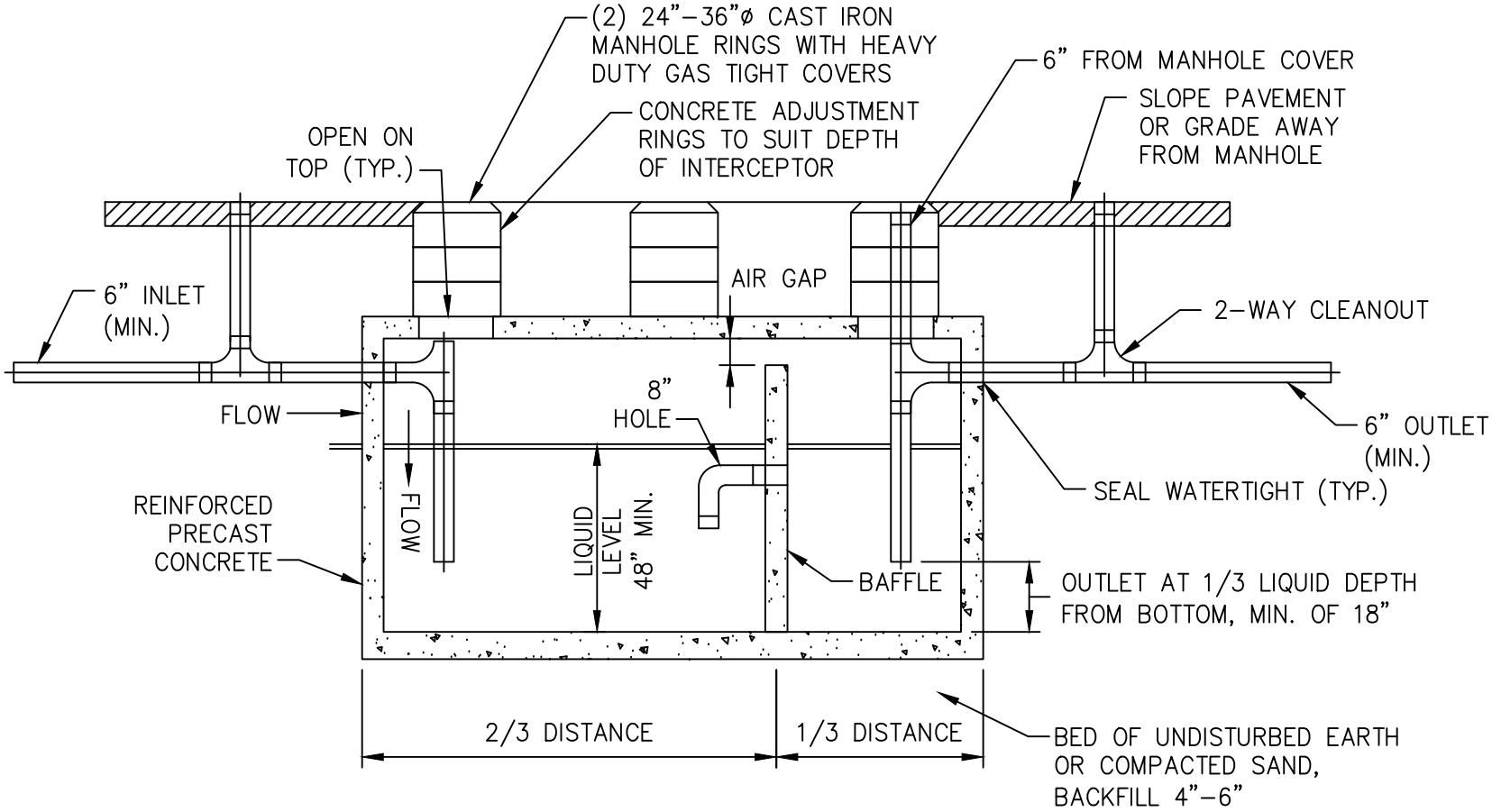
DETAIL NO. S-020

DeKalb County GEORGIA

STANDARD DETAILS

PRECAST CONCRETE FAT, OIL & GREASE INTERCEPTOR 1000, 1500 & 2000 GAL. CAPACITY

Not To Scale



DETAIL SHOWS GENERAL SCHEMATIC REQUIREMENTS. CONTRACTOR SHALL SUBMIT PROPOSED INTERCEPTOR INSTALLATION PLANS AND SPECIFICATIONS TO AUTHORITIES GOVERNING JURISDICTION FOR APPROVAL BEFORE ACQUISITION OF INTERCEPTOR. PROVIDE INTERCEPTOR WITH ADEQUATE STRUCTURAL STRENGTH TO ACCOMMODATE VEHICULAR TRAFFIC AT INSTALLATION LOCATION.

Water Matters

DETAIL NO. S-021

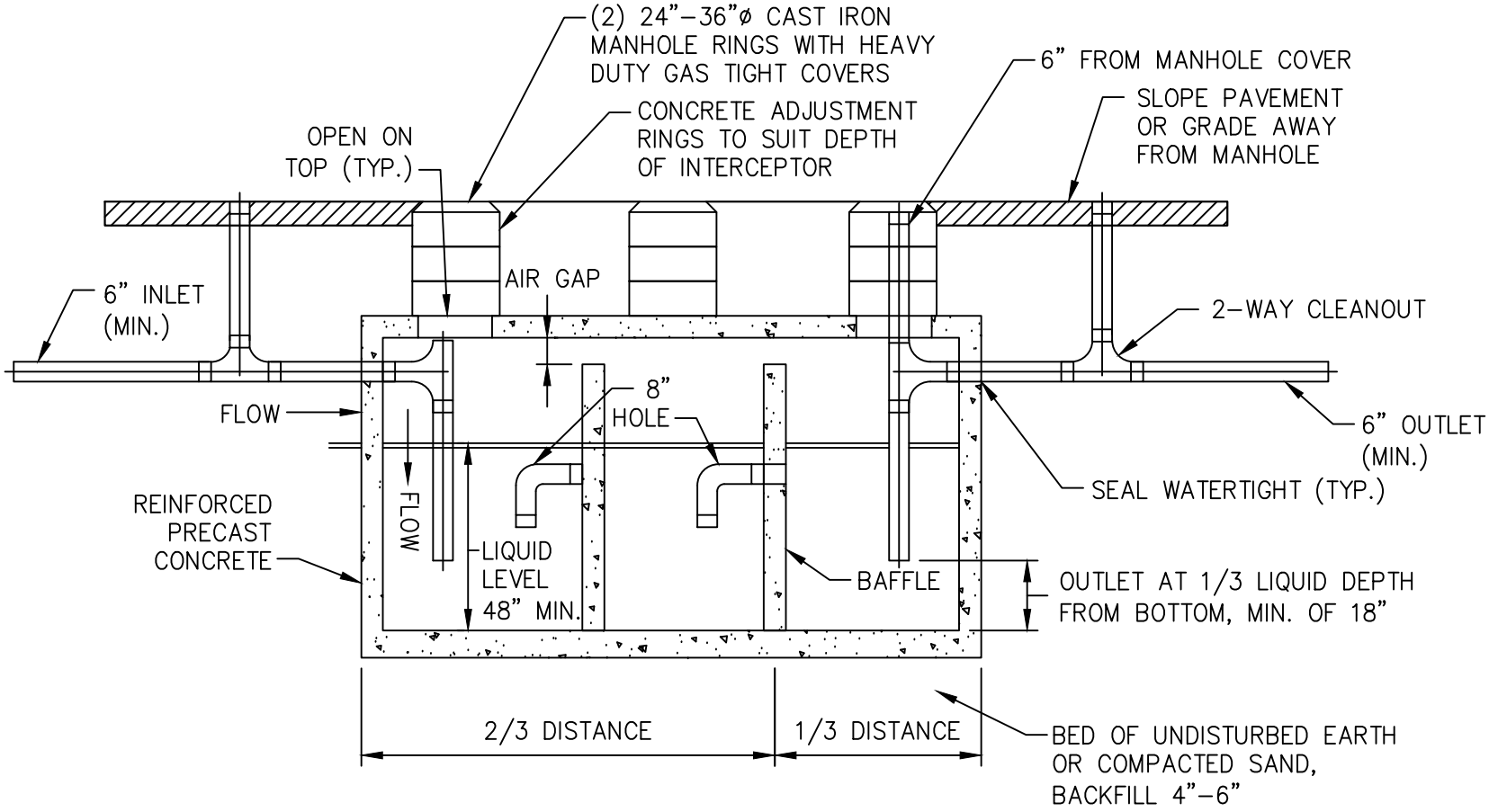
05/26

DeKalb County GEORGIA

STANDARD DETAILS

PRECAST CONCRETE FAT, OIL & GREASE INTERCEPTOR 2500 & 3000 GAL. CAPACITY

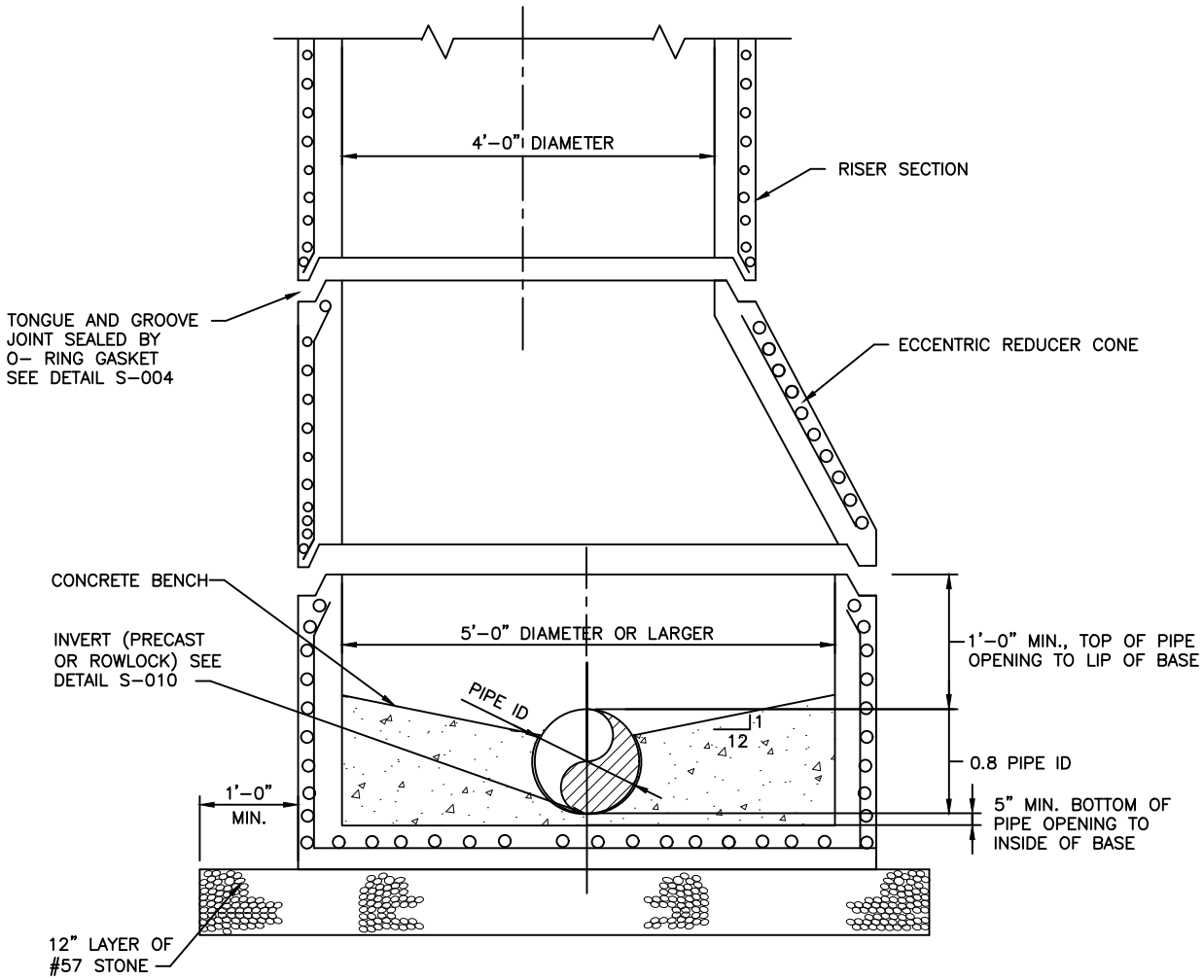
Not To Scale



DETAIL SHOWS GENERAL SCHEMATIC REQUIREMENTS. CONTRACTOR SHALL SUBMIT PROPOSED INTERCEPTOR INSTALLATION PLANS AND SPECIFICATIONS TO AUTHORITIES GOVERNING JURISDICTION FOR APPROVAL BEFORE ACQUISITION OF INTERCEPTOR. PROVIDE INTERCEPTOR WITH ADEQUATE STRUCTURAL STRENGTH TO ACCOMMODATE VEHICULAR TRAFFIC AT INSTALLATION LOCATION.

DETAIL NO. S-022

05/26



DeKalb County GEORGIA

STANDARD DETAILS

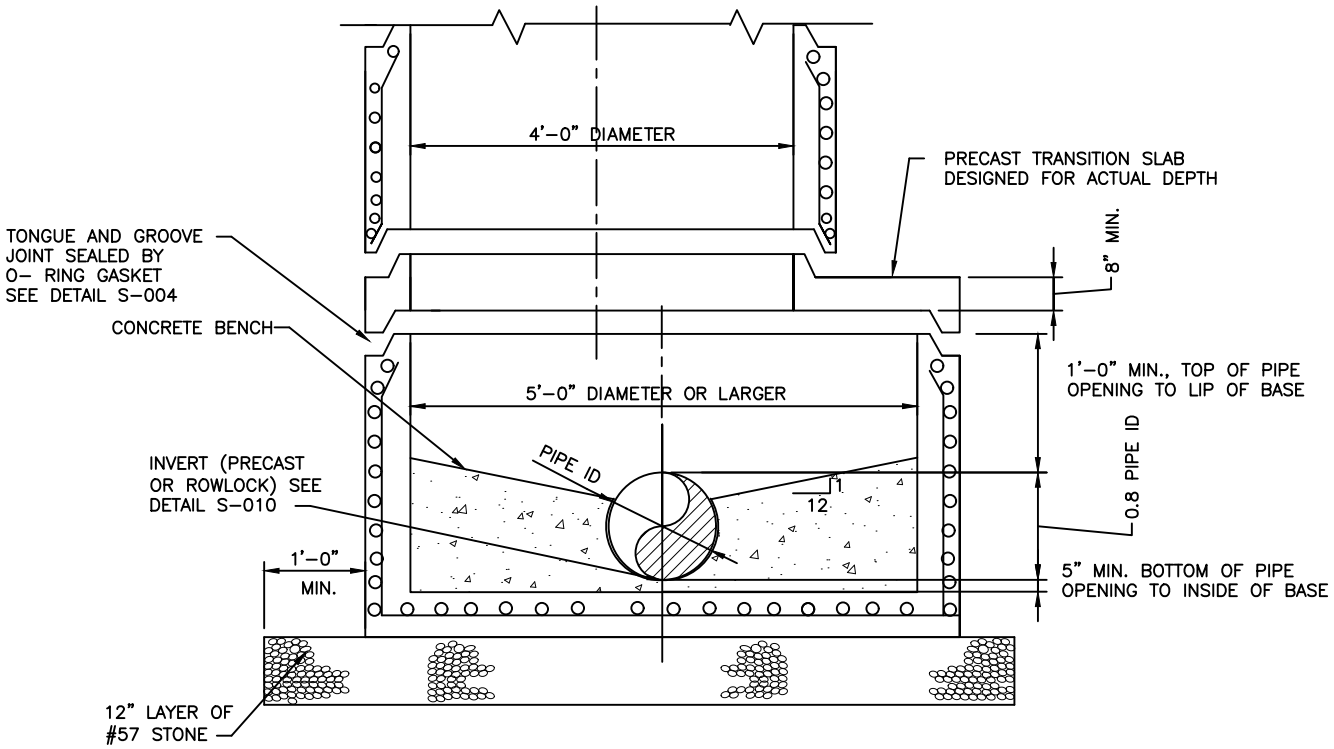
LARGE DIAMETER MANHOLE BASE (ECCENTRIC) DETAIL

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. S-024



DeKalb County
GEORGIA

STANDARD DETAILS

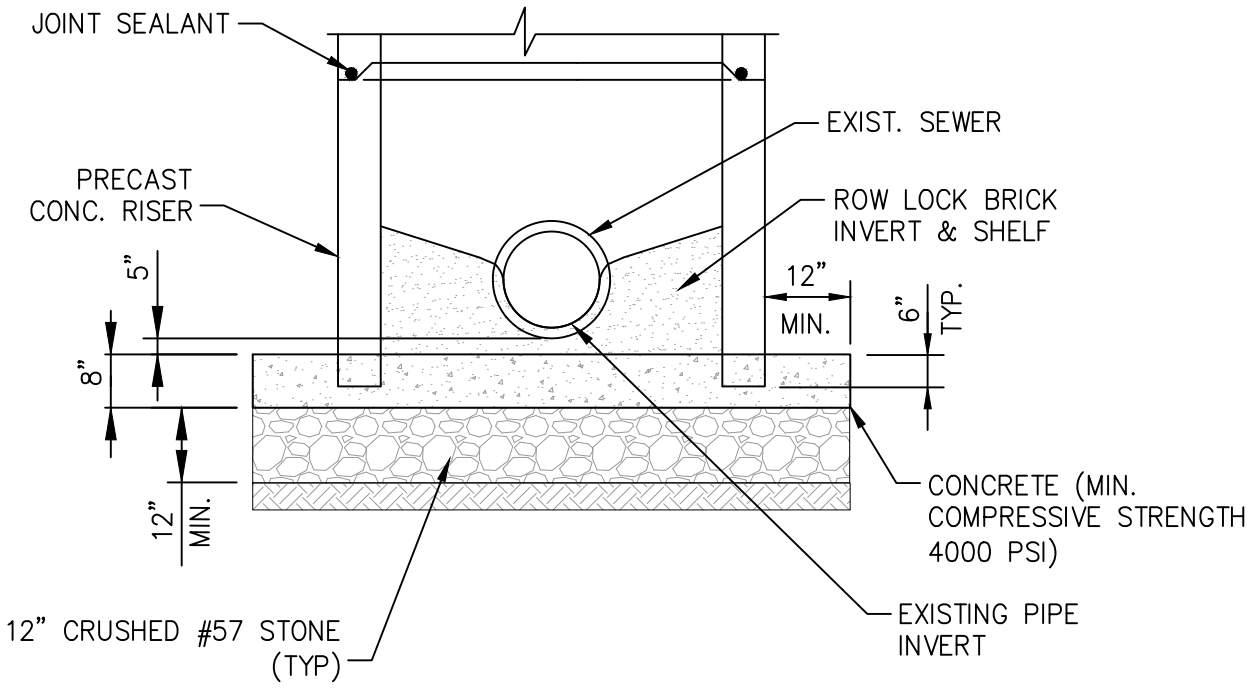
Large Diameter Manhole Transition Base Detail

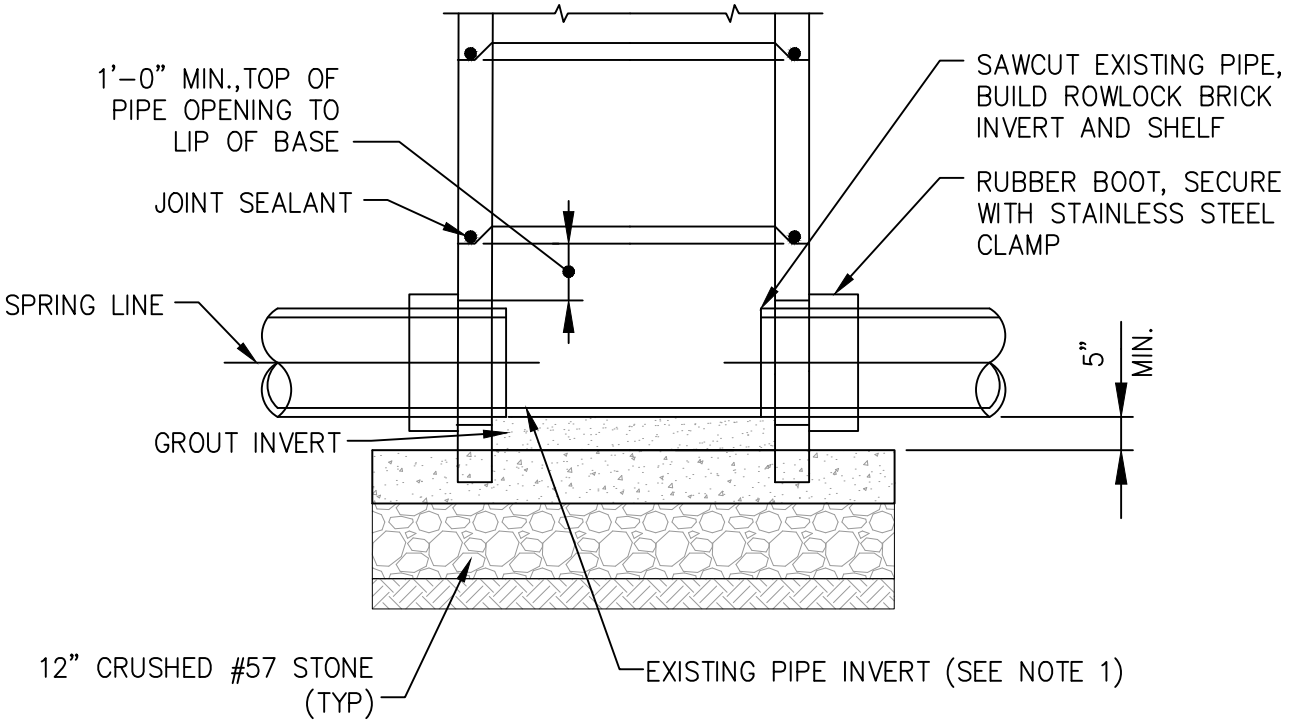
NOT TO SCALE

05/26

WATER Matters

DETAIL NO. S-025





NOTE:
1. MAY USE THE EXISTING PIPE AS THE MANHOLE CHANNEL WITH DCDWM APPROVAL. PIPE SHALL BE SAWCUT AT SPRING LINE AND SHELF.

DeKalb County
GEORGIA

STANDARD DETAILS

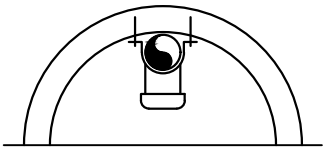
Manhole Over Existing Sewer (Doghouse)

Not To Scale

05/26

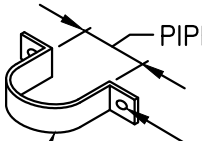
WATER Matters

DETAIL NO. S-026

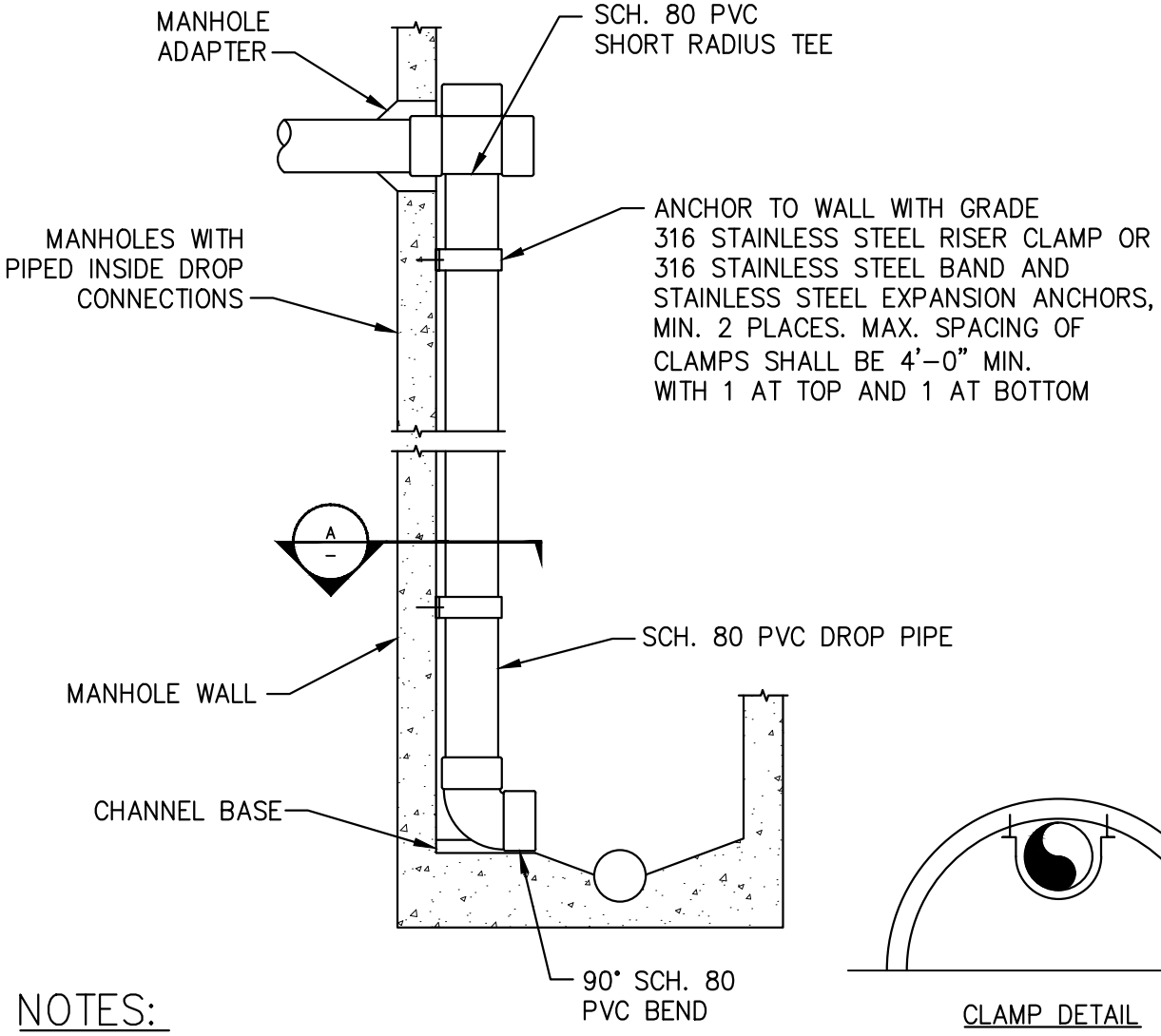


CLAMP DETAIL

A – SECTION
SCALE: NONE



STRAP DETAIL



CLAMP DETAIL

A – SECTION
SCALE: NONE

NOTES:

1. MINIMUM MANHOLE DIAMETER SHALL BE 5'–0".

DeKalb County GEORGIA

STANDARD DETAILS

PIPED INSIDE DROP CONNECTION FOR MANHOLE

Not To Scale

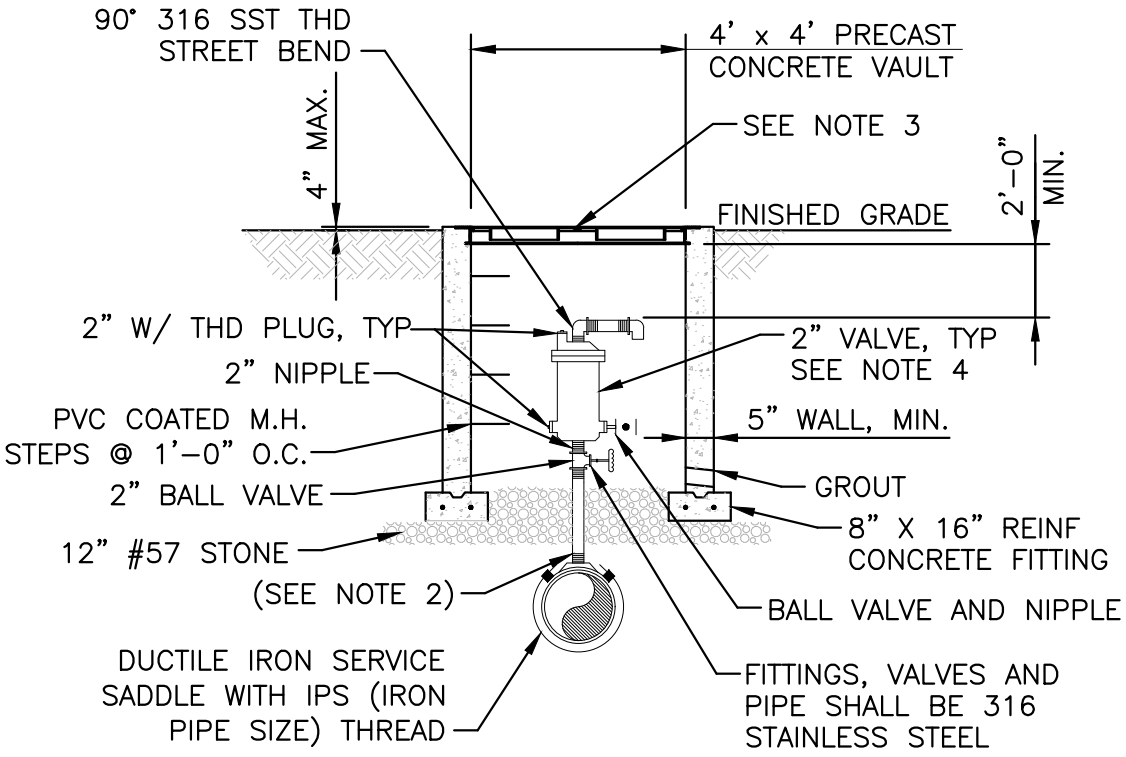
05/26

WATER Matters

DETAIL NO. S-027

APPENDIX C

FORCE MAIN STANDARD DETAILS



NOTES:

1. COMBINATION AIR–VACUUM VALVES SHALL BE DETERMINED BY THE DEVELOPER'S ENGINEER AND APPROVED BY DCDWM PRIOR TO INSTALLATION.
2. THE MINIMUM DIMENSION FROM TOP OF PIPE TO FINISHED GRADE SHALL BE 4.0 FEET.
3. FRAME AND COVER SHALL BE EQUIVALENT TO U.S. FOUNDRY USF 170–E–ORS.
4. VALVE SHALL BE VALMATIC 28A W/BWA OR EQUAL. SIZE SHALL BE BASED ON FORCE MAIN SIZE.
5. THE WASTEWATER AIR/VACUUM RELEASE VALVE VAULT SHALL BE DESIGNED FOR VEHICULAR TRAFFIC LOADS.

DeKalb County
GEORGIA

STANDARD DETAILS

Combination Air-Vacuum
Valve Installation Detail

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. P-017

APPENDIX D
CREEK CROSSINGS

APPENDIX D
Creek Crossings - Sanitary Sewer, Water Mains, and Force Mains

Overview

Creek crossings or stream crossings primarily consist of two types:

- Aerial Crossings: Pipe is visible and usually a few to several feet above the creek bed, or attached to a roadway bridge.
- Buried Crossing: Pipe is under the creek bed and in some instances, the top of the existing pipe or casing may be visible during low flow conditions occurring during summer months.

Sewer systems shall be designed to minimize the number of creek crossings. While designing creek crossings, use the proposed future creek bed elevation, and employ construction methods that would be minimally invasive to the stream. For example, the **Contractor** shall use rock cutting trenchers instead of explosives for sewers in rocky strata.

Collection system capacity and water quality can be jeopardized by damage to sewers at creek crossings.

Environmental and Buffer Requirements

A minimum buffer separation shall be maintained between sewers, force mains, and streams/surface water bodies classified as nutrient sensitive streams or watershed buffers (from normal high water). See also within these Design Standards for other requirements regarding minimum separation with streams, lakes and impoundments.

Before crossing streams or ditches, working within one hundred (100) feet of a private or public water supply sources or fifty (50) feet of non-water supply ponds, lakes, creeks or rivers**,** the **Developer's Design Engineer** shall verify whether the line is exempt and, if not, obtain a permit to encroach into a watershed or nutrient-sensitive river basin buffer. Unless otherwise permitted, water, sewer, or force mains crossing a stream, river, pond, or lake buffer are to be as nearly perpendicular as possible. The crossing is considered perpendicular if it intersects the stream or surface water between an angle of seventy five (75) and one hundred and five (105) degrees). The **Contractor** shall not disturb more than forty (40) linear (longitudinal) feet of a riparian buffer. The proposed design shall identify and adequately address the protection of the drinking water supply wells, sources, intake structures, and others, up to a distance of one hundred (100) feet of the sewer line installation. The **Contractor** shall adhere to the following best management practices in Zone 1, the lower thirty (30) feet beside the stream or surface water, during design/construction.

- Woody vegetation shall be cleared by hand. No grading allowed.
- Stumps shall remain except in trench where trees are cut. Disturbance to roots in buffer zone shall be minimized.

- The trench shall be backfilled with the excavated soil immediately following installation.
- Fertilizer shall not be used except for the one-time application to reestablish vegetation.
- Removal of woody vegetation shall be minimized with respect to the amount of disturbed area and the time the disturbed area remains disturbed.
- Measures shall be taken to ensure diffuse flow of water through the buffer after construction.
- In wetland areas, crane mats shall be used to minimize soil disturbance.
- Topsoil shall be separated from excavated material, so that the original topsoil is replaced over the excavated area.

Wetlands

The Professional Engineer registered in the State of Georgia whose seal appears on the drawings shall certify the following:

- The National Wetlands Inventory maps have been consulted.
- The appropriate plan sheet does/does not indicate areas of USACE Jurisdictional Wetlands as shown on the maps. If jurisdictional wetlands are indicated, the **Developer** shall obtain a Federal Wetlands Alteration (Section 404) permit prior to initiating construction activity and/or any land disturbance of the protected wetlands.

Landscaping

Trees and bushes shall not be planted near the collection system pipes and structures to prevent roots from entering the pipes causing blockages and cracked pipes. Planting for stabilizing disturbed areas shall be required to restore the area to its original or better condition. The specifications shall define the entity responsible for developing a grassing and planting and stream restoration plan for review and approval by the **County**.

Siltation and Erosion

Construction methods that shall minimize siltation and erosion shall be employed. The **Design Engineer** shall include in the project specifications the method(s) to be employed in the construction of sewers in or near streams. Such methods shall provide adequate control of siltation and erosion by limiting unnecessary excavation, uprooting trees and vegetation, dumping of soil or debris, pumping silt-laden water into the stream, changing course of stream without encroachment permit, leaving cofferdams in streams, and leaving behind temporary equipment. Specifications shall require cleanup, grading, seeding, sodding, and planting or total restoration of disturbed areas commence immediately to meet local and state standards. Exposed areas shall not remain unprotected at any given time. The disturbed stream bank shall be restored using bioengineering methods. If the velocity of flowing water is anticipated to be greater than ten (10) fps, then cement stabilized backfill shall be used from bank to bank and covered with rip rap. In areas where there is planned channel improvement, the stabilized backfill shall be used up to the line of planned improvement.

Sewers In Relation To Storm Drainage Infrastructure

No sanitary sewer shall be located in a detention basin or other drainage structure. Sanitary sewer pipe and manholes shall not be located in or underneath the dam or dike of the detention basin, or located anywhere within twenty (20) feet horizontally of the projected maximum high water line of the detention basin.

Aerial Crossings for Sanitary Gravity Sewers and Force Mains

The aerial crossing shall be designed with minimal infringement on the floodway, typically by spanning the waterways.

- **Large/wide creeks** - Piers and anchor collars or with pipes in a casing spanning over piers.
- **Medium-sized creeks** - Piers and anchor collars of I-beam anchored to stream banks with pipe resting on top of the I-beam.
- **Small creeks** - Pipe spanning creeks and anchored to concrete collars at the bank.

Creek Crossing Design Guidance		
Type	**Span**	**Requirements**
Large Width	>40 Feet	Submit Detailed Design
Medium Width	18 To 40 Feet	Submit Design if Span > 30 Feet
Narrow Width	<18 Feet	Use **County** Details
Note: Use reinforced cement concrete for piers and anchor collars.		

Methods of support/carriage of pipe other than the ones described above, requires review and approval of **DCDWM**. Visual impact shall be minimal after regrowth of vegetation. The pipe shall be adequately supported, protected from damage and freezing, accessible for maintenance, repair or replacement, and non-obstructive to flow line of surface water. The bottom of the pipe shall be placed no lower than the elevation of the fifty- (50-) year flood.

The **Engineer** or **Contractor** shall provide detail design drawings and pipe specifications for each crossing for review by **DCDWM**. Site conditions may dictate more stringent requirements than shown in the Standard Construction Details. The **Engineer** shall delineate on the plans flood elevations for the ten- (10-), twenty five- (25-), fifty- (50-) and one hundred- (100-) year flood events as defined by the **County** Flood Plain Supervisor. The design plans and structural details shall be signed, sealed, and dated by a Georgia Registered Professional Engineer.

Creek crossings for gravity sanitary sewer and force mains, unless otherwise approved by **DCDWM**, shall be constructed of epoxy-lined DIP with flexible restrained joints. **DCDWM** reserves the right to approve seamless or straight seam steel pipes that need to be lined inside and coated outside in a manner similar to epoxy-lined DIP. Spiral-welded steel pipes are not allowed by **DCDWM**. Pipes crossing wetlands and low-flow creeks shall have at least two (2) supports at each joint, with one support near the bell.

Interior Lining *of* the EDIP for gravity sanitary sewer and force main shall have a completely covered inner surface of the pipe from bell to spigot. The lining shall be virgin polyethylene complying with ANSI/ASTM D1248 and be a minimum of forty (40) mils in thickness as manufactured by American Cast Iron Pipe Company (ACIPCO) polybond lining, or U.S. Pipe Protecto 401 ceramic epoxy lining or Warren epoxy. epoxy-lined DIP, with lining defects such as cracking or holes in the lining shall not be installed and shall be removed from the site immediately to avoid a Stop Work Order. Field repair of epoxy is not permitted.

Exterior Coating

Gravity Sewer Pipe six (6) to twelve (12) inches shall be Pressure Class 350 in accordance with ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51.

Gravity Sewer Pipe sixteen (16) inches and Larger shall be a minimum of Pressure Class 250 in accordance with ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51. Loading and depths may require greater pressure classes of pipe.

Flanged Ductile Iron Pipe and Fittings shall be four (4) inches and larger. Flanged pipe shall be a minimum of Class 53 per AWWA C115. Flanged pipe, fittings, and appurtenances are for above ground use, inside vault, or lift wet well only. Flanged pipe shall be shop-fabricated, face drilled, lined and exterior coated by the manufacturer or the manufacturers lining company. Fabrication or lining of flanged pipe on site is not permitted. Complete shop drawings of the pipe, fittings, and appurtenances shall be submitted to **DCDWM** for approval before delivery to the site.

Pipe Joints **-** Proper joint technology, such as flanged, restrained, or mechanical; adequate supports to prevent excessive deflection and flexion; or a combination shall be provided for aerial pipe crossings. Pipe supports shall be designed to withstand the hydrodynamic effects of the stream flow pressure using the following formula:

$$P = 2.5KV^2$$

Where

2.5 = Safety factor against overturning

P = Pressure, psf

V = Velocity of water, fps

K = 4/3 for square ends, 1/2 for angle ends when angle is < 30°, and 2/3 for circular piers.

Expansion jointing shall be provided between above ground and below ground sewers. When buried sewers change to aerial sewers, special construction techniques shall be used to minimize heaving. Special construction details, submitted to the **County** for approval, also shall be required between above ground and below ground sewer transition to account for seismic and sudden unexpected forces arising due to erosion of stream banks.

Impact of Flood Waters

If it is probable that the aerial pipe could be submerged by the stream flow, the effects of flow pressure on the pipe shall be taken into account when computing pier-overturning moments. For aerial crossings, the impact of flood waters and debris shall be considered in the design calculations.

The following criteria shall be used in design calculations:

- Pipe crossing shall be anchored in the bank in such a way that if the pipe supports are lost, the pipe system shall not separate, and shall be restrained by the anchor blocking of

appropriate size in the bank. Anchor blocking structural computations and details shall be provided.

- Pipe joint stability calculations and details shall be provided.
- Pipe joints shall be flexible restrained joints.
- For wide stream crossings, steel pipe of appropriate thickness shall be used, with interior lining and external coating as mentioned above for epoxy-lined DIP. Design computations and details shall be provided.

Pipe Joint Seals – Pipe joints for epoxy-lined DIP shall be sealed externally using a flexible epoxy-based sealing compound to ensure a water tight joint, in addition to the rubber ring or other type of seals supplied by the manufacturer at the bell and spigot joint location.

Casing Pipe – Aerial crossings shall be a restrained carrier pipe inside a high-strength steel casing pipe. The minimum steel casing pipe for aerial crossings shall be 0.33 inch thick.

Freeze Protection – Precautions against freezing, such as insulation and increased slope, shall be provided. Expansion jointing shall be provided between above ground and below ground sewers. Where buried sewers transition to aerial sewers, special construction techniques shall be used to minimize frost heaving.

Concrete Collar Anchors – Concrete collars for casing anchoring shall be designed for each application by a Georgia Registered Professional Engineer. The collars shall be a minimum of four thousand (4,000) PSI reinforced concrete, minimum twelve (12) inches thick and four (4) feet square. Anchors shall have minimum reinforcing steel of #5 @ 12 E.W. The collars shall be installed eighteen (18) inches from end of casing pipe. Collars shall be secured to the casing. The collar shall not cover the casing to carrier end seals or be used as a pipe transition.

Concrete Piers – Piers for aerial crossings shall be designed for each location by a Georgia Registered Professional Engineer. Piers are not permitted within the natural flow line of the creek. The piers shall be a minimum of five thousand (5,000) PSI concrete, minimum of two (2) feet square and well anchored into the bed rock or have sufficient depth as directed by the Geo-Technical Engineer. Piers shall have a minimum reinforcing steel of #5 @ 12 E.W., and E.F. The top of the pier shall have an adjustable bracket or cylindrical cradle anchored in the concrete to secure the casing pipe. Anchors, cradles and exposed brackets shall be stainless steel and epoxy coated (minimum forty, 40, mils) to resist corrosion. Cushion material shall be placed between the pipe, clamps, and support. The invert elevation of the pipe from upstream to downstream piers shall match the design elevations.

Design Computations – Pipe supporting structures shall be designed to prevent frost heaving, overturning or settlement. Provide calculations for the aerial pipe crossings and supporting structures that are subject to hydrodynamic forces. Calculations are to provide for a minimum factor of safety of two and a half (2.5) against overturning and one and a half (1.5) for uplift due to buoyancy. Calculations shall also address applicable seismic and other unexpected loads.

Structures – The sewer interceptors, manholes, or other structures shall be located so they do not interfere with free discharge of flood flows of the stream. Portions of manholes above grade subject to hydrodynamic forces of flooding shall be designed to be watertight and be able to resist the flood forces with a safety factor of two and a half (2.5), as mentioned above for pipes and piers. Frames and covers shall be bolt-down watertight frames and covers. Manhole rims shall be twenty four (24) inches above the one hundred- (100-) year base flood elevation.

Buoyancy and Flotation – Buoyancy shall be considered and flotation of the manholes, piers, anchors or any other structure shall be prevented with appropriate construction where high groundwater or flooded conditions are anticipated. For design purposes, the **Engineer** shall assume water to top of manhole and that the manhole is empty. The **Contractor** shall be responsible for protection against flotation of pipe or structures installed or partially installed. Pipes or structures that are partially floated or completely floated from original installation locations shall be removed and reinstalled as per **DCDWM** Standards. Damaged pipe or structures shall be discarded and replaced in accordance with as per **DCDWM** Standards. The factor of safety for uplift is one and a half (1.5) for pipes and structures.

Anti-Seepage Collars – Wetland Areas – In areas where the sewer trench has the potential to drain wetlands, anti-seepage collars shall be installed. In these areas, a USACE 404 Wetland Permit and/or a NCDENR 401 Water Quality Permit may be required. Trench water shall not be diverted or pumped into the sanitary sewer system.

Buried Crossings for Sanitary Gravity Sewers and Force Mains

The buried crossing is to be designed with a steel casing and epoxy-lined DIP carrier pipe, and shall be as near perpendicular to the stream as possible, and shall be free from change in grade. Gravity sewers crossing creeks shall be placed below the streambed such that there is a minimum of two (2) feet bury below the streambed and minimum one (1) foot of cover over the casing. If the minimum two (2) feet bury depth cannot be attained, either encase the sewer in concrete or design the sewer as an aerial crossing as per above-mentioned criteria. Aerial sewers shall only be allowed when it can be demonstrated that no other practical alternative exists. The design and material requirements for aerial crossings also apply for buried crossings. The sewer shall be designed and constructed such that it remains watertight (exhibit zero infiltration), and free from changes in alignment or grade due to anticipated hydraulic loads, erosion, impact, etc., and tested per **DCDWM** Standards. Sewers shall remain fully operational during the one hundred- (100-) year flood event. Sewers and associated appurtenances located along the creeks shall be protected against the normal range of high and low water flow conditions, including the one hundred- (100-) year flood event.

Bedding and Backfill – Special care shall be taken to provide a firm base for pipe bedding. The plans shall specify that the soft organic material within the creek banks shall be replaced with select imported backfill. Install concrete blocks under each bell and spigot joint when pipe is encased in concrete. In addition, a layer of four- (4-) inch to eight- (8-) inch cobbles shall be placed on top surface of trench area for the full width of the creek. Additional material used to backfill the trench shall be stone, coarse aggregate, washed gravel, or other material that will not readily erode, cause siltation, damage pipe during placement, or corrode the pipe.

Special design requirements shall be employed to prevent stream flow from sinking at the crossing and following the pipe bedding. This can be accomplished with an in-trench impounding structure of compacted clay or other acceptable impermeable material that will match with the native stream bed.

Check Dams - To prevent French drain effect of the sewer or any other pipe crossing the creek, install check dams upstream in the pipe conduit trench. Check dams shall be separate from any concrete encasement or steel casing.

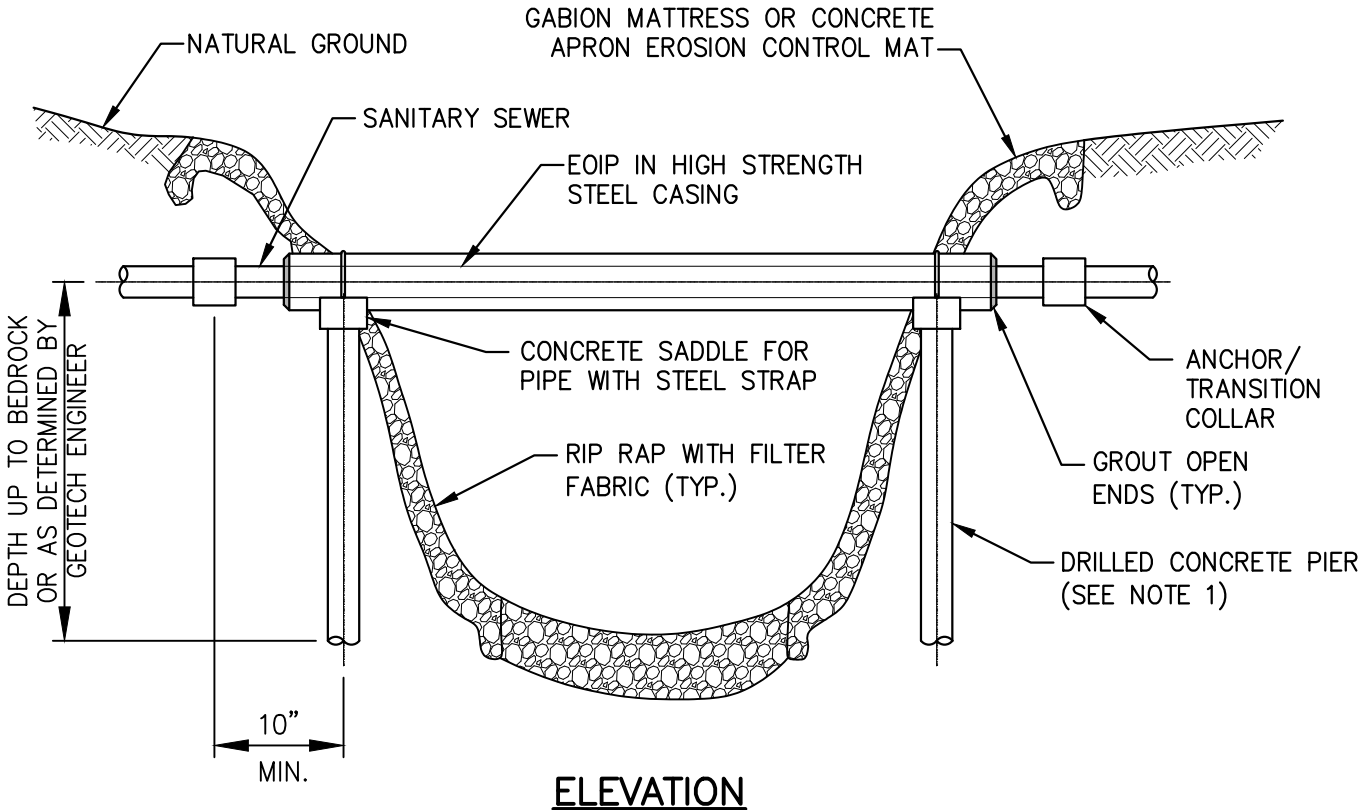
Clay Plug - A clay plug shall be required at the downstream side of the crossing. The plug shall be a minimum of (four) 4 feet in length, shall extend the full width of the trench, and shall extend

twelve (12) inches above and below the pipe.

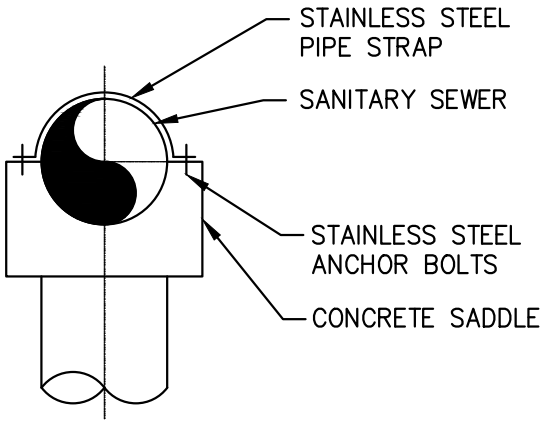
Buried Pipe Cover Depth – The top of sewers entering or crossing streams shall be at a sufficient depth below natural bottom of the streambed to protect the sewer line. The following requirements shall be met:

- One (1) foot of minimum cover where the sewer is located in rock.
- Three (3) feet of cover in other material, unless the pipe is encased in concrete or in a steel casing.
- More than three (3) feet cover is required in major rivers, creeks or streams.
- Minimum seven (7) feet cover is required in shifting creeks or stream channels.
- In paved stream channels, the top of sewer pipe shall be placed at least eighteen (18) inches below the bottom of the channel base.

Less cover may be approved by the **County** only if the proposed sewer crossing shall not interfere with future modifications to the stream channel. Justification for less cover shall be submitted in writing to **DCDWM** for review and approval.



ELEVATION



CROSS SECTION AT PIPE

NOTES:

1. DRILLED PIER DIAMETER, DEPTH AND REQUIRED REINFORCING SHALL BE DESIGNED BY AN ENGINEER REGISTERED AND LICENSED IN THE STATE OF GEORGIA.
2. HIGH STRENGTH STEEL CASING PIPE SHALL BE DESIGNED TO SPAN FULL WIDTH OF CHANNEL OR CREEK.

DeKalb County GEORGIA

STANDARD DETAILS

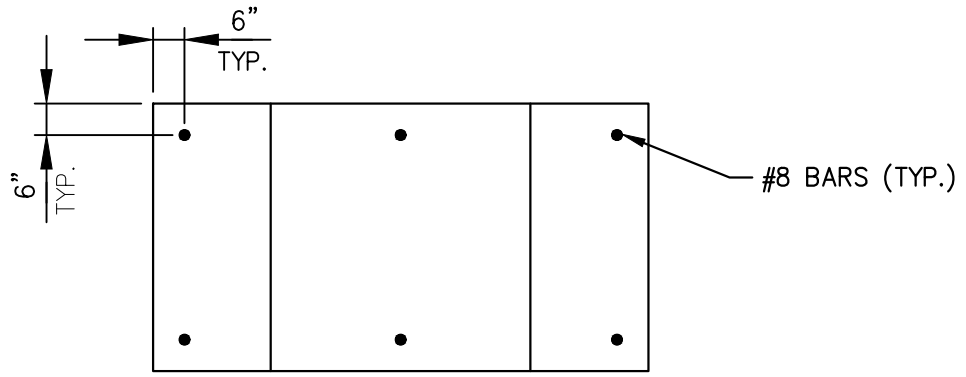
Drilled Pier Creek Crossing For Pipe Bottom Above The 50 Year Flood Elevation

Not To Scale

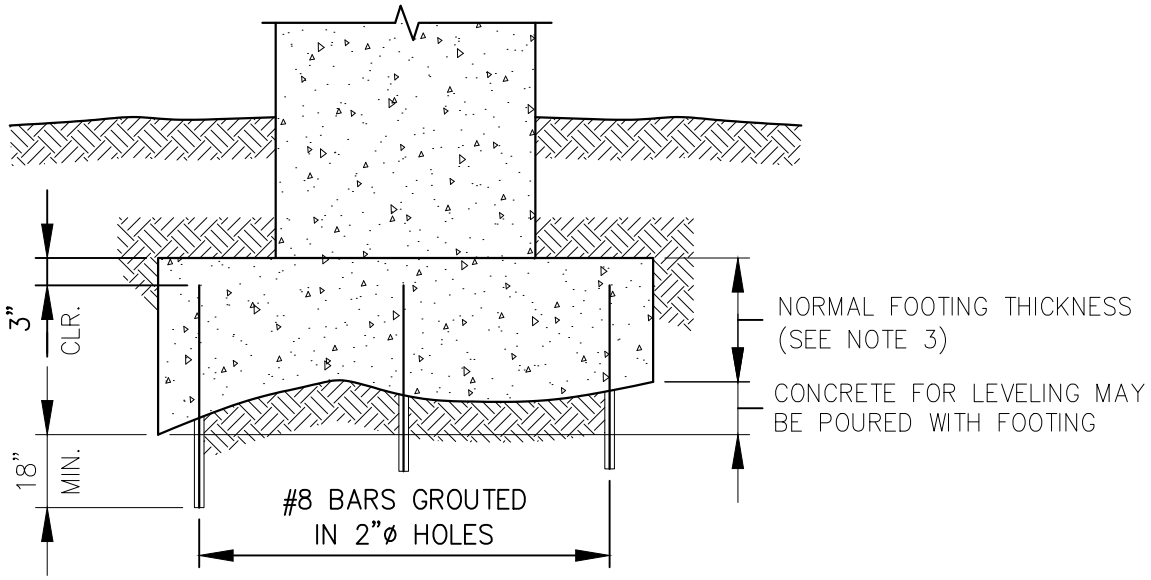
05/26

WATER Matters

DETAIL NO. CC-001



PLAN



NOTES:

1. CONCRETE SHALL BE 4,000 PSI MINIMUM.
2. THIS DETAIL SPECIFIES HOW TO TIE FOOTINGS TO ROCK. MAT STEEL FOR FOOTING SHALL BE TIED TO DOWELS.
3. MINIMUM THICKNESS OF FOOTING ABOVE ROCK TO BE SAME AS BASE THICKNESS OF PIER.
4. FINAL DIMENSIONS AND DETAILS TO BE DETERMINED BASED ON LOCATION, HEIGHT AND OTHER FIELD CONDITIONS. DETAILS MUST BE SIGNED, SEALED AND DATED BY A GEORGIA REGISTERED STRUCTURAL PROFESSIONAL ENGINEER.

DeKalb County GEORGIA

STANDARD DETAILS

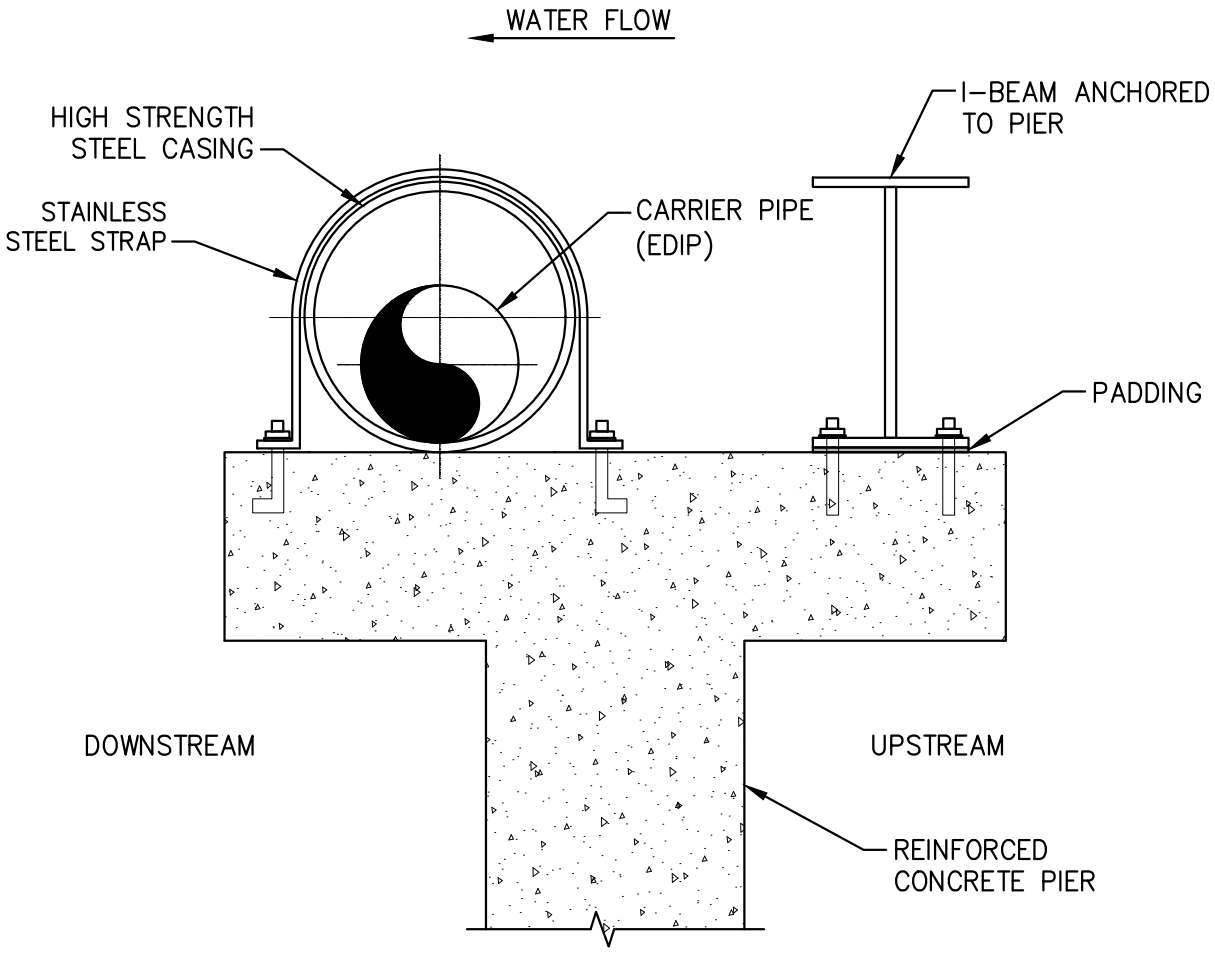
Pier Footing On Rock

Not to Scale

05/26

WATER Matters

DETAIL NO. CC-003



NOTES:

1. USE EDIP IN A HIGH STRENGTH STEEL CASING PROTECTED BY AN I-BEAM ON UPSTREAM SIDE TO WITHSTAND IMPACT OF FALLEN TREES AND OTHER DEBRIS IF BOTTOM OF PIPE IS BELOW THE 50 YEAR FLOOD ELEVATION

DeKalb County GEORGIA

STANDARD DETAILS

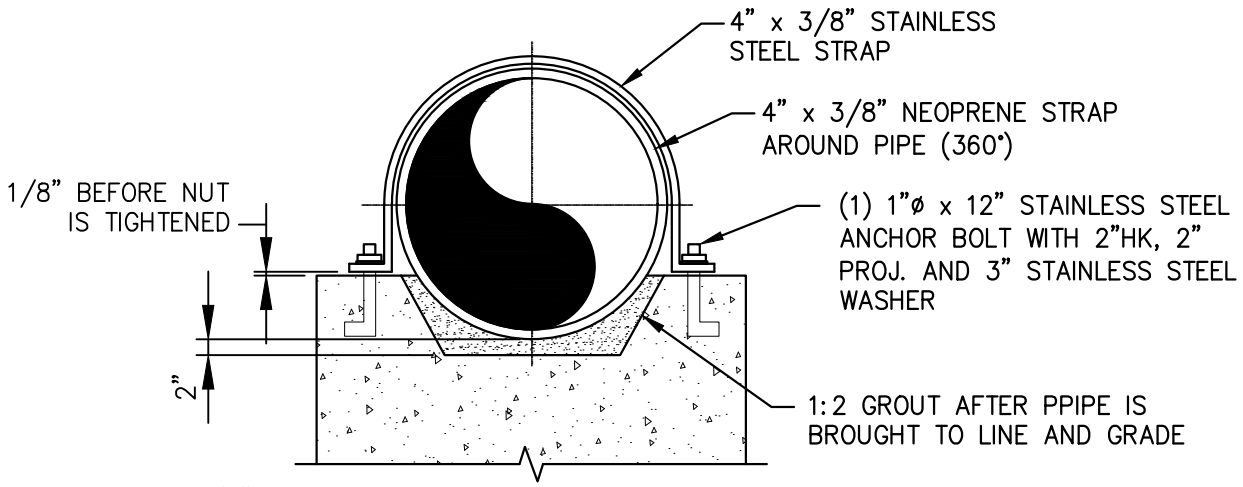
Pier

Not to Scale

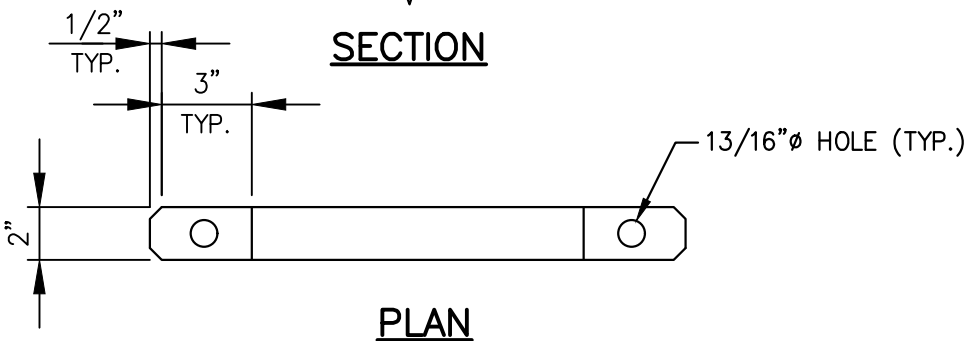
05/26

WATER Matters

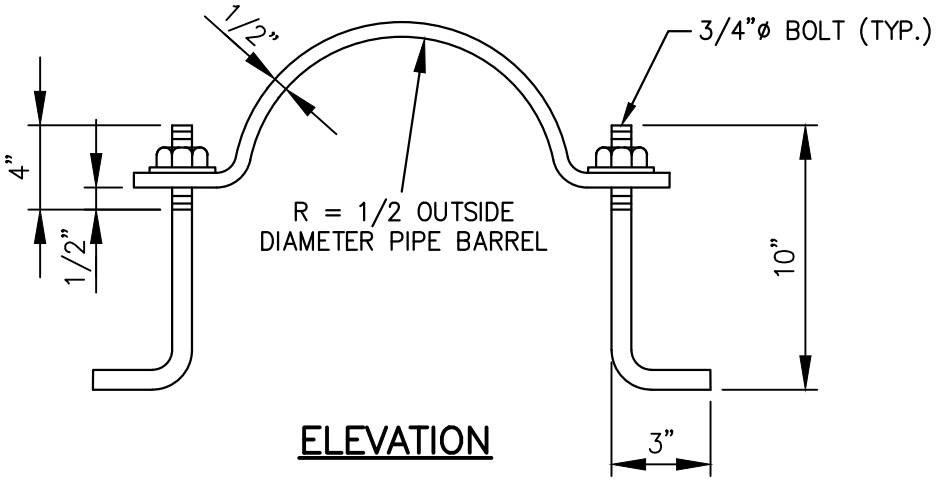
DETAIL NO. CC-004



SECTION



PLAN



ELEVATION

NOTES:

1. ANCHOR BOLTS AND STRAPS SHALL BE STAINLESS STEEL AND HOT ASPHALT DIPPED AND COATED WITH EPOXY.
2. STAINLESS STEEL OR IRON CAN BE USED.
3. FOR PIPES 24" AND LARGER USE 1"ø BOLTS AND 1–1/16"ø HOLE IN STRAP.
4. HOLES TO BE DRILLED IN STRAP.
5. PROVIDE WASHERS UNDER STRAP SUCH THAT STRAP IS PULLED DOWN TIGHT.
6. PROVIDE EXPANSION JOINTS BETWEEN ABOVE GROUND AND BELOW GROUND SEWERS.

DeKalb County GEORGIA

STANDARD DETAILS

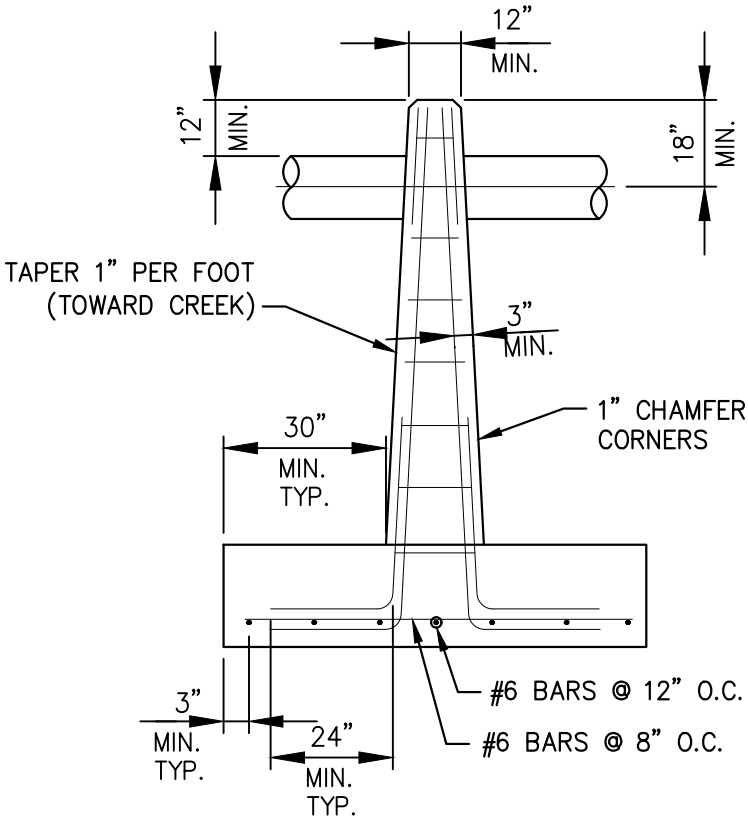
Pipe or Casing Anchorage Up to 24"Ø pipe

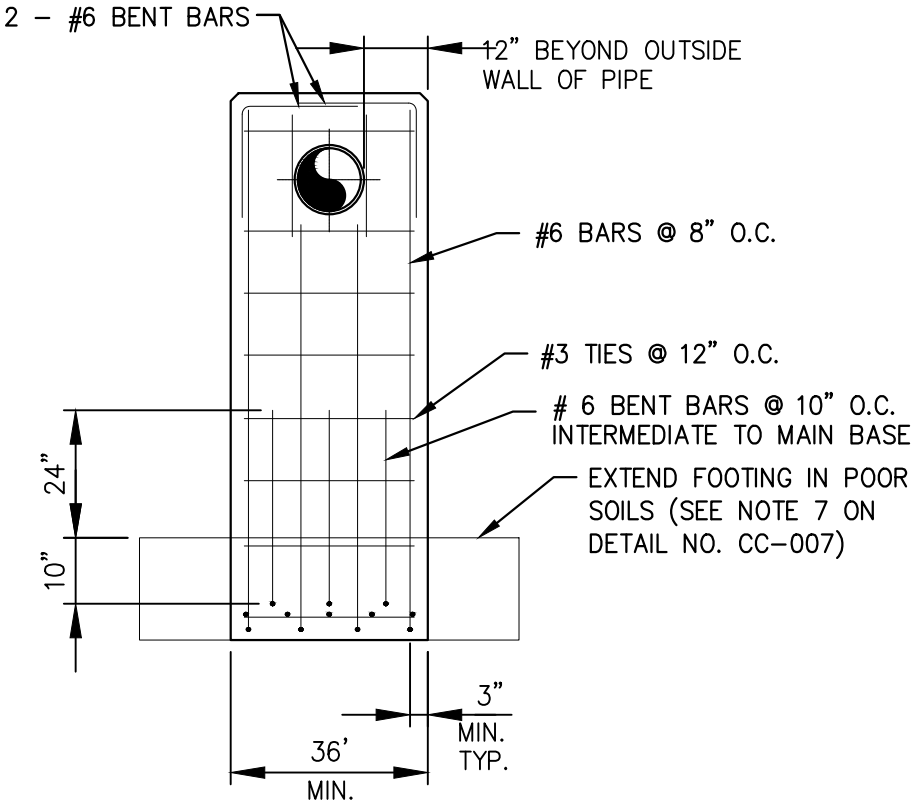
Not to Scale

05/26

WATER Matters

DETAIL NO. CC-005





DeKalb County GEORGIA

STANDARD DETAILS

Reinforced Concrete Anchor Pier and Footing (Sheet 1 of 2)

Not to Scale

05/26

WATER Matters

DETAIL NO. CC-006

NOTES:

1. CONCRETE SHALL BE 4,000 PSI MINIMUM.
2. DEPTH AND SIZE OF PIERS TO BE DETERMINED BY ENGINEER.
3. FOOTING THICKNESS SAME AS BASE THICKNESS OF PIER.
4. PIERS TO BE BUILT WITH LONG SIDE OF FOOTING PERPENDICULAR TO CREEK FLOW.
5. REINFORCING STEEL TO BE PLACED WITH A MINIMUM CLEARANCE OF 3" WITH THE SURFACE OF THE CONCRETE.
6. THE CREEK UPSTREAM AND DOWNSTREAM OF THE AERIAL CROSSING MAY NEED STRAIGHTENED FOR PROPER INSTALLATION OF THE PIERS. APPROVAL MAY BE REQUIRED FROM REGULATORY AGENCIES TO STRAIGHTEN CREEK. STABILIZE ALL DISTURBED BANKS WITH RIP RAP.
7. IN SOME INSTANCES WHEN POOR SOILS AND SUBGRADE EXIST, THE FOOTING MAY HAVE TO BE EXTENDED EACH WAY TO PROPERLY SUPPORT THE PIER. THE ENGINEER IS TO DETERMINE WHEN TO EXTEND THE FOOTING. LENGTH OF THE FOOTING TO BE AT LEAST EQUAL TO THE FOOTING LENGTH PERPENDICULAR TO THE CREEK.
8. FINAL DIMENSIONS AND DETAILS TO BE DETERMINED BASED ON LOCATION, HEIGHT AND OTHER FIELD CONDITIONS. DETAILS MUST BE SIGNED, SEALED AND DATED BY A GEORGIA REGISTERED STRUCTURAL PROFESSIONAL ENGINEER.

DeKalb County GEORGIA

STANDARD DETAILS

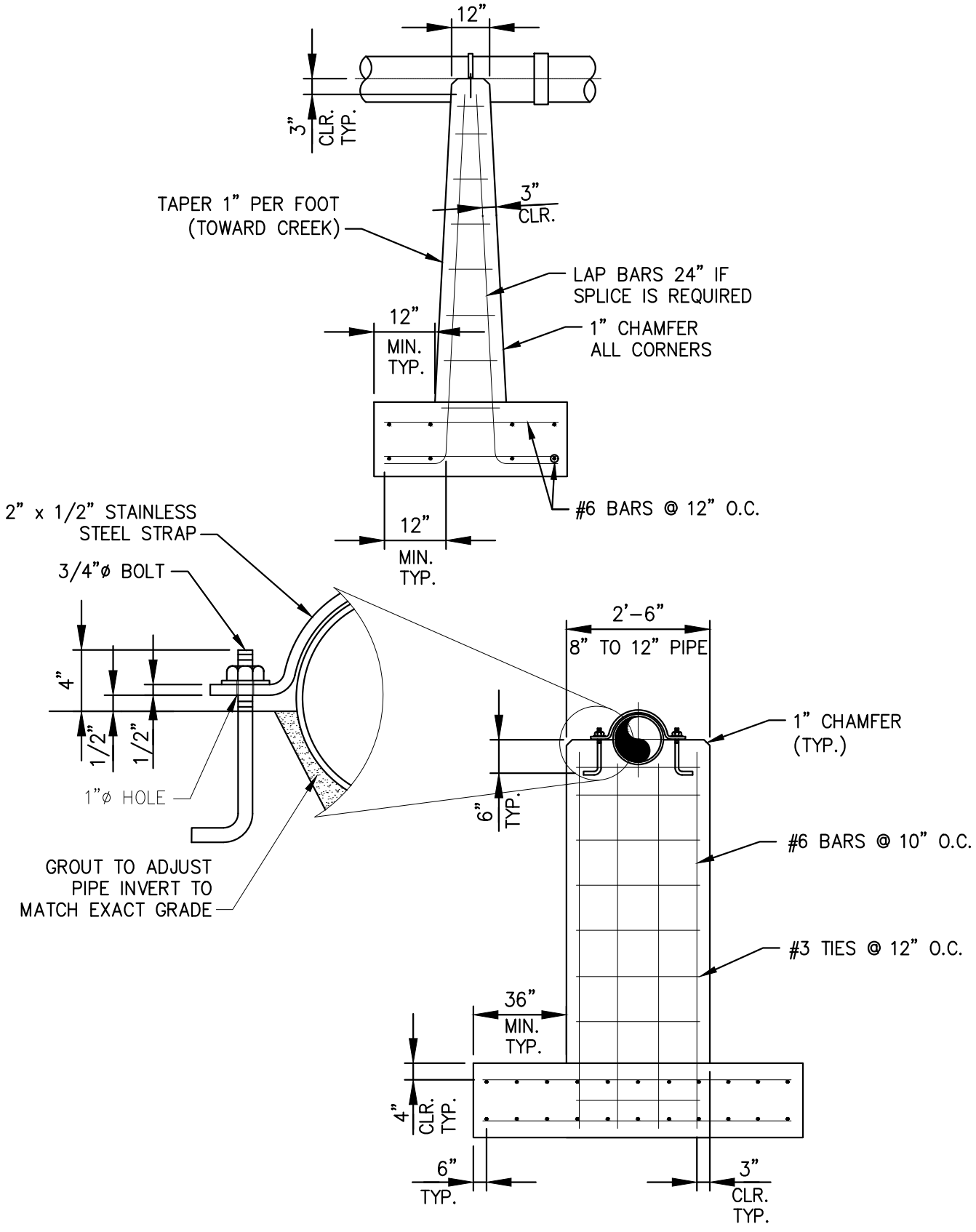
Reinforced Concrete Anchor Pier and Footing (Sheet 1 of 2)

Not to Scale

05/26

WATER Matters

DETAIL NO. CC-006



DeKalb County GEORGIA

STANDARD DETAILS

Reinforced Concrete Pier and Footing (Sheet 1 of 2)

Not to Scale

05/26

WATER Matters

DETAIL NO. CC-008

NOTES:

1. CONCRETE SHALL BE 4,000 PSI MINIMUM.

2. MAXIMUM HEIGHT OF REINFORCED CONCRETE PIERS TO BE 20'–0".

3. FOOTING THICKNESS SAME AS BASE THICKNESS OF PIER.

4. PIERS TO BE BUILT WITH LONG SIDE OF FOOTING PERPENDICULAR TO CREEK FLOW, SEE NOTE 8.

5. PIER TO BE CENTERED ON FOOTING WHEN PIPE IS PARALLEL TO CREEK, SEE NOTE 8.

6. PIPE TO BE SET 1/2 IN PIER AND 1/2 PROTRUDING ABOVE PIER. WHEN PIERS ARE PLACED PARALLEL TO THE FLOW OF THE CREEK AND THE PIPE IS ON A SKEW WITH THE PIER, HOLDING STRAPS MAY STILL BE PLACED AT RIGHT ANGLES TO THE PIPE, PROVIDING THE ANCHOR COLTS ARE NOT SET WITH A CLEARANCE OF LESS THAN 2" TO THE SURFACE OF THE PIER.

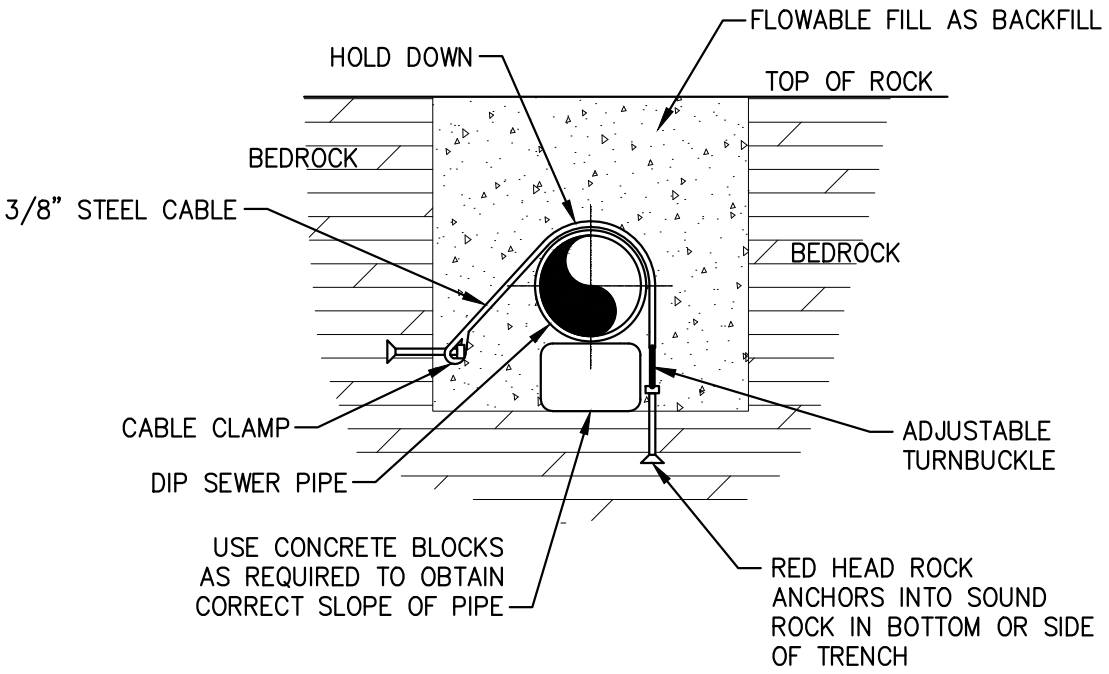
7. REINFORCING STEEL TO BE PLACED WITH A MINIMUM CLEARANCE OF 3" WITH THE SURFACE OF THE CONCRETE.

8. IN SOME INSTANCES WHEN POOR SOILS AND SUBGRADE EXIST, THE FOOTING MAY HAVE TO BE EXTENDED EACH WAY TO PROPERLY SUPPORT THE PIER. THE ENGINEER IS TO DETERMINE WHEN TO EXTEND THE FOOTING. LENGTH OF FOOTING TO BE EQUAL EACH WAY.

9. THE CREEK UPSTREAM AND DOWNSTREAM OF THE AERIAL CROSSING MAY NEED STRAIGHTENED FOR PROPER INSTALLATION OF THE PIERS. APPROVAL MAY BE REQUIRED FROM REGULATORY AGENCIES TO STRAIGHTEN CREEK. STABILIZE ALL DISTURBED BANKS WITH RIP RAP.

10. FINAL DIMENSIONS AND DETAILS TO BE DETERMINED BASED ON LOCATION, HEIGHT AND OTHER FIELD CONDITIONS. DETAILS MUST BE SIGNED, SEALED AND DATED BY A GEORGIA REGISTERED STRUCTURAL PROFESSIONAL ENGINEER.

DeKalb County GEORGIA	STANDARD DETAILS	05/26
	Reinforced Concrete Pier and Footing (Sheet 2 of 2) Not to Scale	WATER Matters
		DETAIL NO. CC-009



NOTES:

1. ROCK ANCHORS TO BE 3/8"ø x 5" LONG INTO SOUND ROCK. ANCHORS TO BE IN TRENCH BOTTOM OR INTO TRENCH WALL BELOW THE INVERT OF THE PIPE.
2. HOLD DOWN TO BE 3/8" STEEL CABLE.
3. CONNECT CABLE TO ROCK ANCHORS WITH 3/8" FLAT WASHER AND CABLE CLAMPS.
4. TWO HOLD DOWNS PER LENGTH OF PIPE.

DeKalb County GEORGIA

STANDARD DETAILS

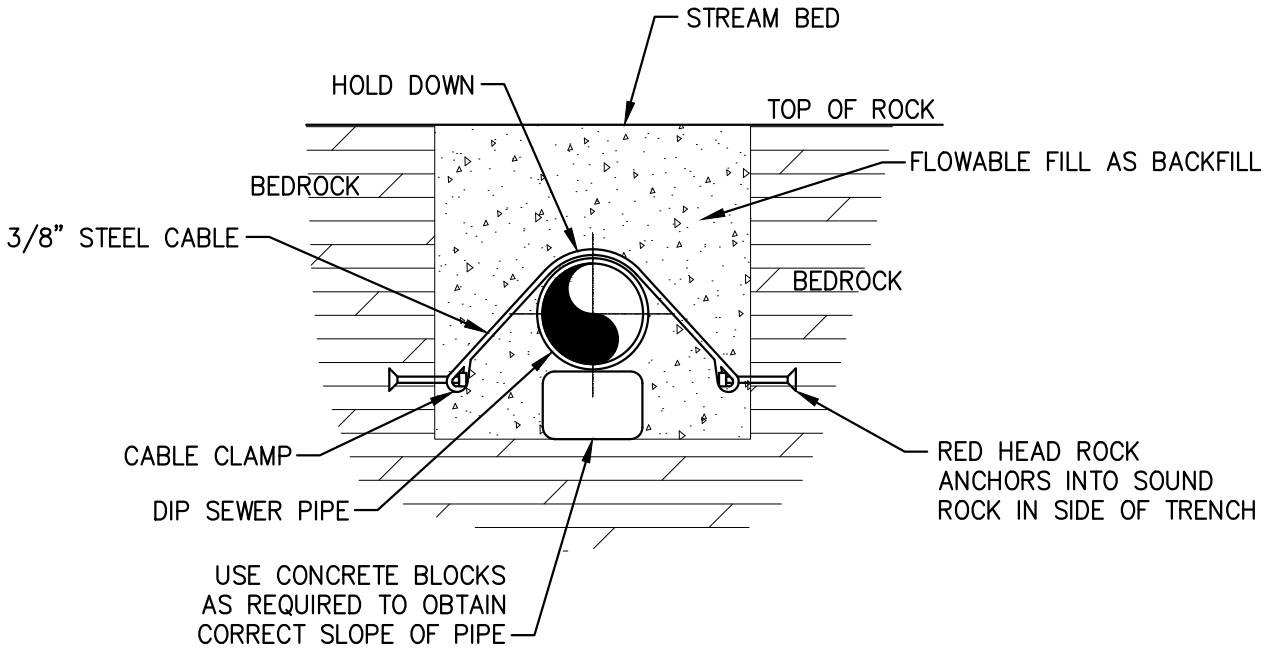
Sanitary Sewer Creek Crossing Hold Down

Not to Scale

05/26

WATER Matters

DETAIL NO. CC-010



NOTES:

1. DO NOT LAY PIPE ON CRUSHED STONE BEDDING. DO NOT BACKFILL PIPE WITH CRUSHED STONE IN ROCK EXCAVATION AREAS.
2. FLOWABLE FILL TO BE UNDER AND AROUND DIP SEWER PIPE FROM BOTTOM OF TRENCH IN ROCK EXCAVATION AREAS TO TOP OF ROCK EXCAVATION.
3. FLOWABLE FILL TO BE GENERAL USE FLOWABLE FILL CONFORMING TO GEORGIA DEPARTMENT OF TRANSPORTATION (GDOT) STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION FOR CONTROLLED LOW-STRENGTH MATERIAL (CLSM) FOR GENERAL USE FLOWABLE FILL.

DeKalb County GEORGIA

STANDARD DETAILS

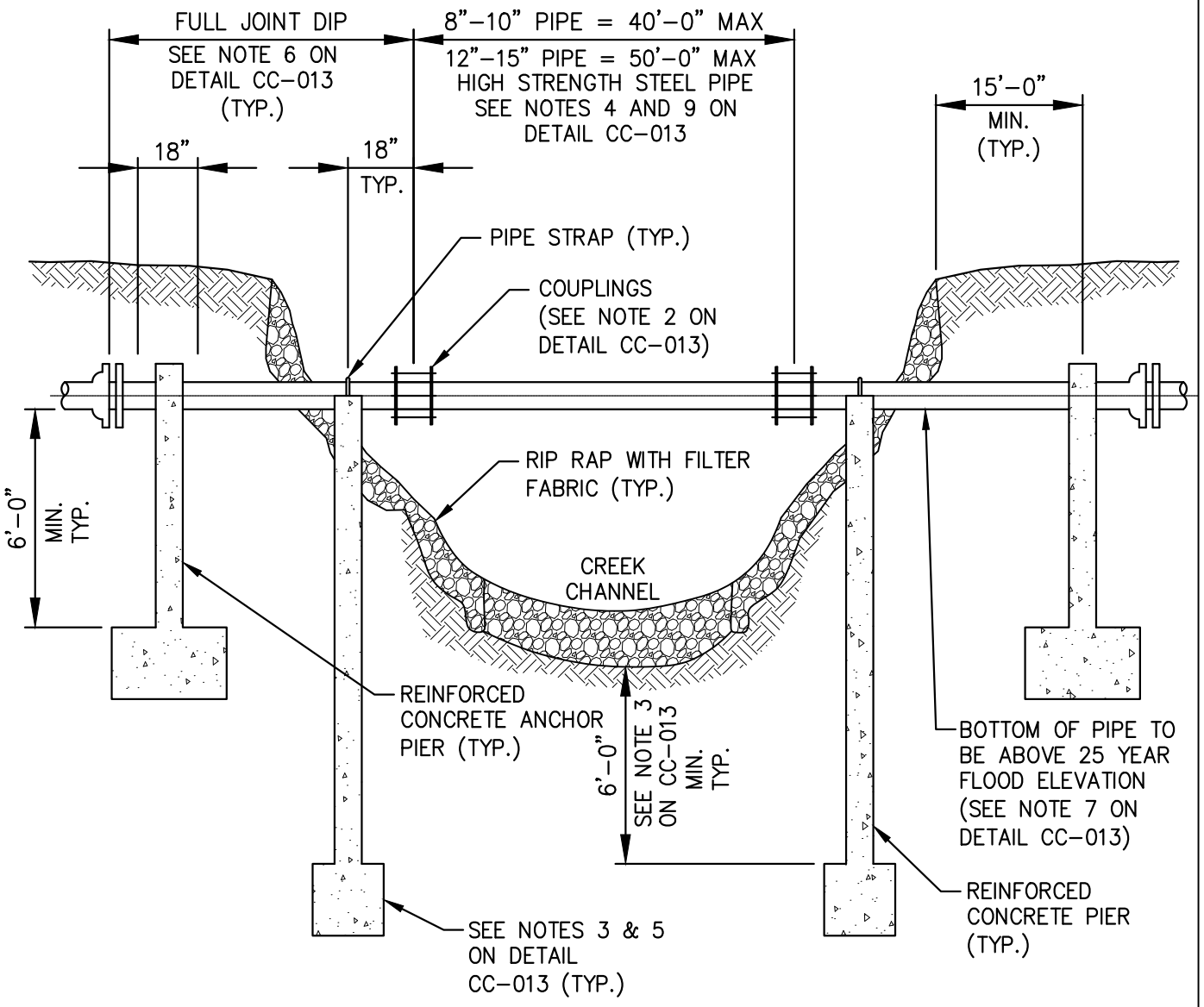
Sanitary Sewer Creek Crossing In Rock Utilizing Flowable Fill

Not to Scale

05/26

WATER Matters

DETAIL NO. CC-011



DeKalb County GEORGIA

STANDARD DETAILS

Typical Large Width Creek Crossing For Pipe Bottom Above 50 years Flood Elevation (Sheet 1 of 2)

Not to Scale

05/26

WATER Matters

DETAIL NO. CC-012

NOTES:

1. THIS DETAIL APPLIES TO SEWERS RANGING FROM 8" TO 15" IN DIAMETER. FOR SEWERS GREATER THAN 15", SUBMIT A DETAILED DESIGN FOR REVIEW AND APPROVAL.

2. COUPLINGS SHALL BE LONG BODY TYPE AND COMPLETELY EXPOSED. COUPLINGS TO BE AS MANUFACTURED BY DRESSER INDUSTRIES – STYLE 62 TRANSITION COUPLING OR APPROVED EQUAL. CENTER RING LENGTH FOR 8" AND SMALLER PIPE SHALL BE 5". CENTER RING LENGTH FOR 10" TO 15" PIPE SHALL BE 7". THE CENTER RING, GLANDS, BOLTS AND NUTS SHALL RECEIVE A MINIMUM 40 MIL EPOXY.

3. FOOTING DEPTH SHALL BE SUITABLE GRADE AS DETERMINED BY THE ENGINEER., BUT SHALL NOT BE LESS THAN AS SHOWN, (EXCEPT WHEN PIER IS ANCHORED TO SOLID ROCK).

4. STEEL PIPE MUST BE SEAMLESS OR STRAIGHTSEAM. SPIRAL WELD IS NOT ALLOWED. THE INSIDE DIAMETER OF THE STEEL PIPE TO MATCH THE INSIDE DIAMETER OF THE DUCTILE IRON PIPE. STEEL PIPE TO BE COATED PER THE SPECIFICATIONS. USE DUCTILE IRON PIPE FOR NARROW CREEK CHANNELS, SEE NOTE 9.

5. REFER TO DETAIL FOR PIERS ON SOLID ROCK.

6. DUCTILE IRON PIPE TO EXTEND TO THE NEXT MANHOLE. NO PIPE TRANSITIONS BETWEEN MANHOLES SHALL BE ALLOWED.

7. CREEK CROSSINGS MAY REQUIRE A PERMIT FROM THE STATE AND FEDERAL REGULATORY AGENCIES. WHERE THE PIPE BOTTOM CANNOT BE INSTALLED ABOVE THE 25 YEAR FLOOD ELEVATION, SPECIAL APPROVAL MUST BE GIVEN BY THE COUNTY AND/OR REGULATORY AGENCIES.

8. THE CREEK UPSTREAM AND DOWNSTREAM OF THE AERIAL CROSSING MAY NEED STRAIGHTENED FOR PROPER INSTALLATION OF THE PIERS. APPROVAL MAY BE REQUIRED FROM REGULATORY AGENCIES TO STRAIGHTEN CREEK. STABILIZE ALL DISTURBED BANKS WITH RIP RAP.

9. STANDARD DUCTILE IRON PIPE CAN BE USED FOR CREEK CROSSINGS IF THE CROSSING IS 18'–0" OR LESS. LONG SPAN DUCTILE IRON PIPE AS RECOMMENDED BY THE MANUFACTURER CAN BE USED FOR CROSSINGS 38'–0" AND LESS.

DeKalb County
GEORGIA

STANDARD DETAILS

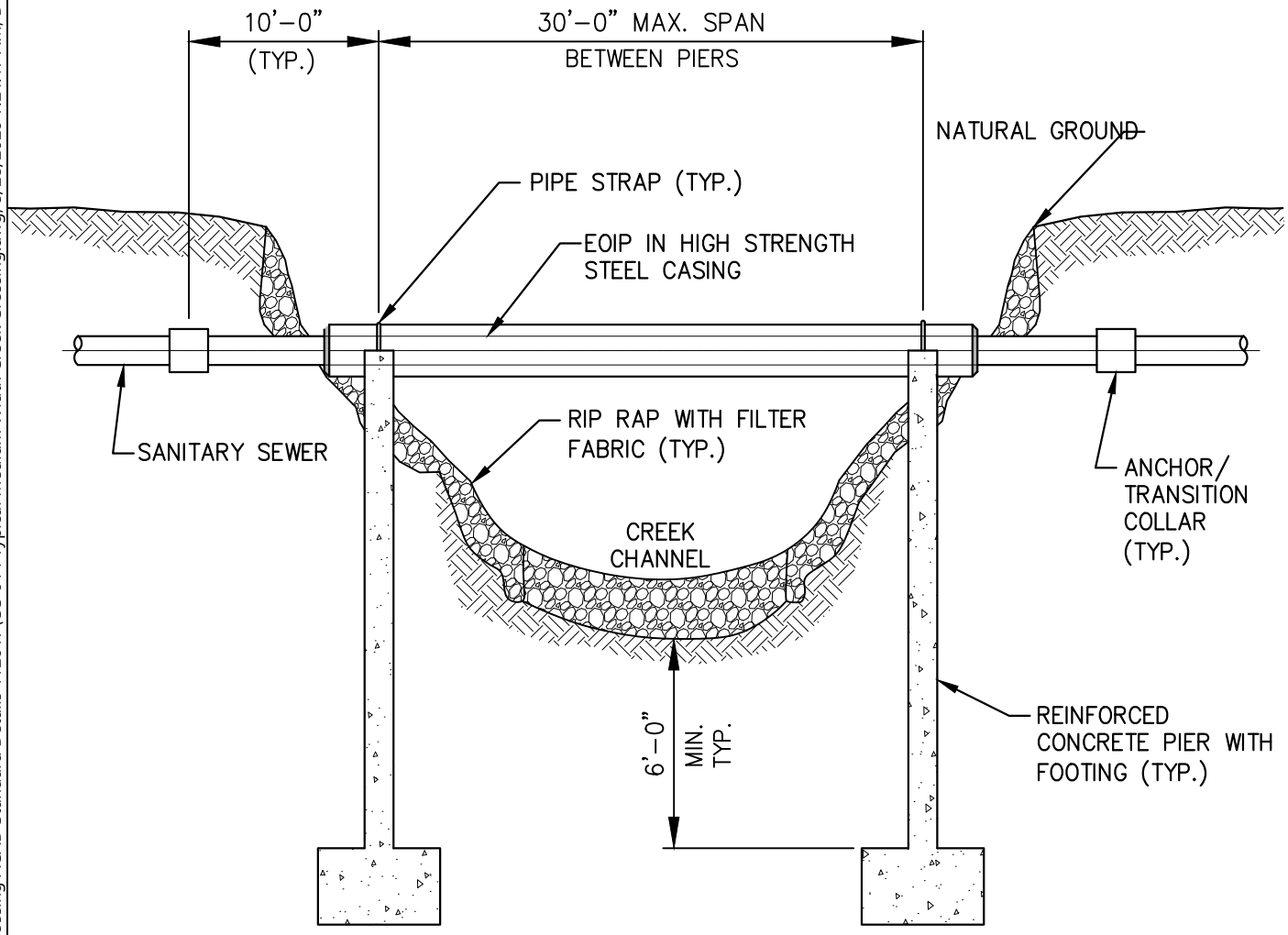
Typical Large Width Creek Crossing For Pipe Bottom Above 50 year Flood Elevation (Sheet 2 of 2)

Not to Scale

05/26

WATER Matters

DETAIL NO. CC-013



NOTES:

1. NO PIERS SHALL BE PLACED IN NORMAL FLOW OF CREEK, UNLESS APPROVED BY DWM ENGINEER.
2. ALL AERIAL CROSSINGS MUST BE APPROVED BY DEKALB COUNTY DEPARTMENT OF WATERSHED MANAGEMENT.
3. SPANS EXCEEDING 30'–0" REQUIRES SUBMITTAL OF DESIGN CALCULATIONS.
4. PIERS ARE NOT NEEDED UNLESS AERIAL SPAN IS OVER 18'–0" IN LENGTH.

DeKalb County
GEORGIA

STANDARD DETAILS

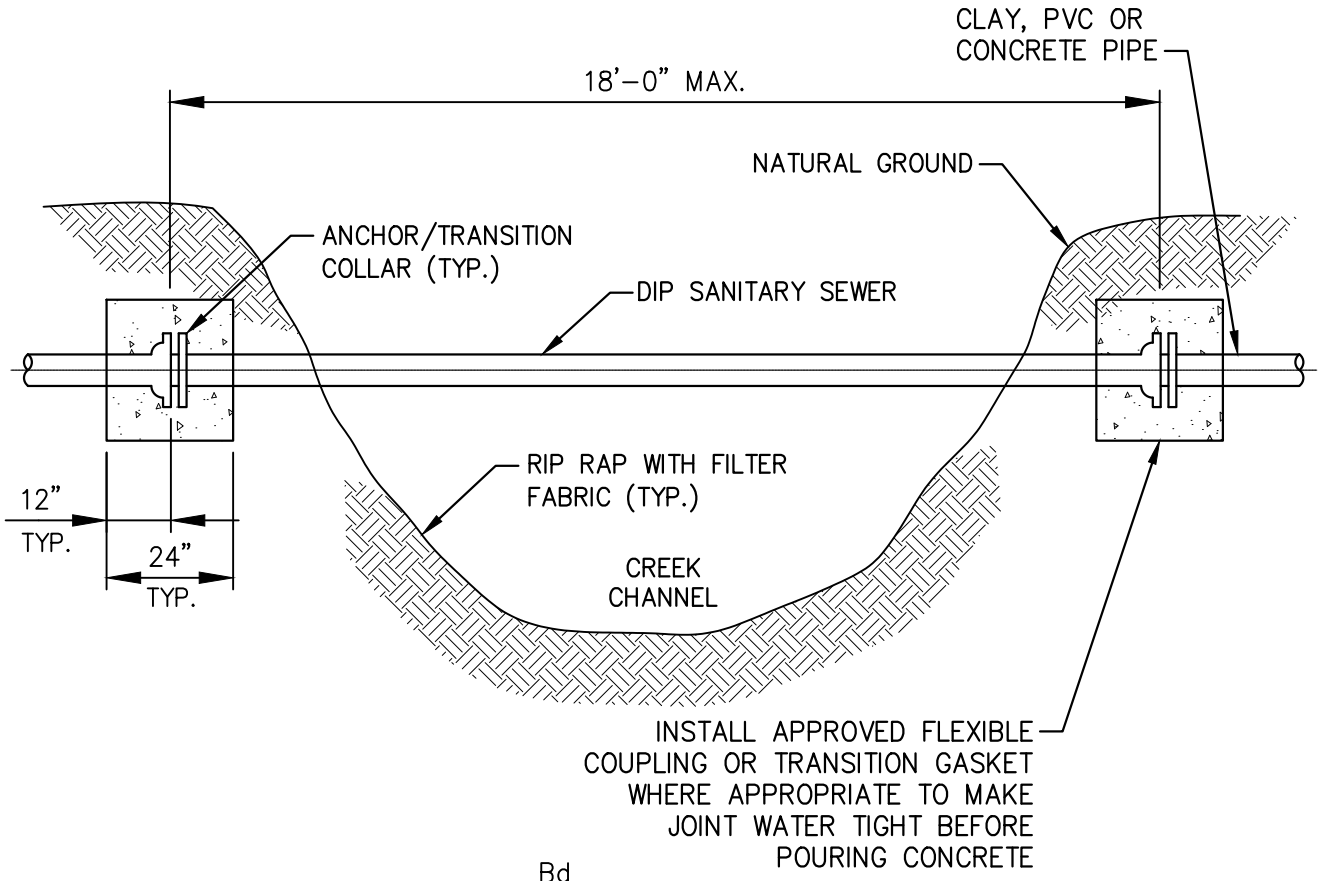
Typical Medium Width Creek Crossing For Pipe Bottom Above 50 Year Flood Elevation

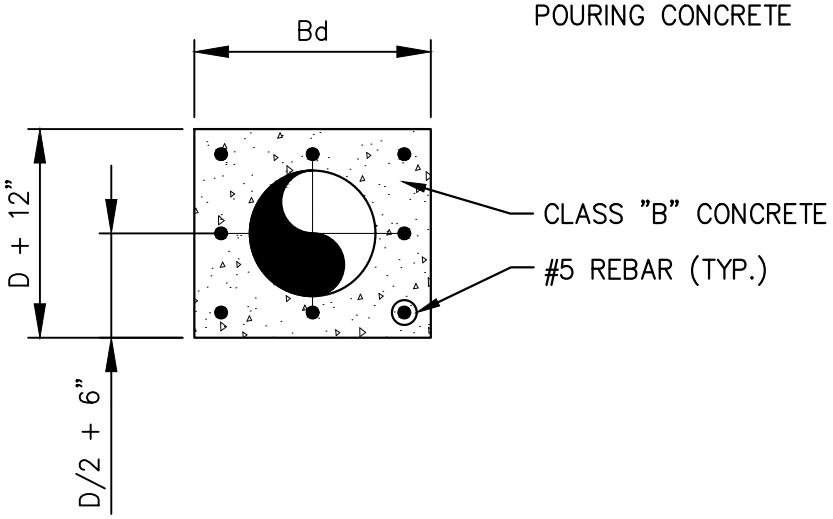
Not To Scale

05/26

WATER Matters

DETAIL NO. CC-014





NOTES:

1. NO PIERS SHALL BE PLACED IN NORMAL FLOW OF CREEK, UNLESS APPROVED BY DEKALB COUNTY DEPARTMENT OF WATERSHED MANAGEMENT.
2. ALL AERIAL CROSSINGS MUST BE APPROVED BY DEKALB COUNTY DEPARTMENT OF WATERSHED MANAGEMENT.
3. SPANS EXCEEDING 30'-0" REQUIRES SUBMITTAL OF DESIGN CALCULATIONS.
4. PIERS ARE NOT NEEDED UNLESS AERIAL SPAN IS OVER 18'-0" IN LENGTH.

DeKalb County
GEORGIA

STANDARD DETAILS

Typical Narrow Width Creek Crossing For Pipe Bottom Above 50 Year Flood Elevation

Not to Scale

05/26

WATER Matters

DETAIL NO. CC-015

Force Main Creek Crossings

a. Force mains shall be routed such that the number of stream crossings is minimized. When a stream crossing is required by the design, the crossing shall be as nearly perpendicular to the stream flow as possible.

b. DIP with joints equivalent to water main standards or a watertight ferrous encasement pipe shall be used to construct force mains that cross streams.

c. Force main bedding, haunching, and backfill shall be appropriate for the installation location and pipe material. However, the ability of the bedding and backfill material to readily erode, cause siltation, damage the force main during installation, and corrode the force main after installation shall also be considered.

d. Only DIP with flanged joints, in conjunction with adequate supports, shall be used for aerial stream crossings.

    1. Supports for aerial stream crossings shall be designed to prevent frost heave, overturning, and settlement.

    2. The force main shall be adequately protected from freezing and heaving.

    3. The impact of floodwaters and debris shall be considered during the design of aerial crossings. The bottom of the force main pipes shall be placed no lower than the elevation of the twenty five- (25-) year flood stage of the stream.

Department of Watershed Management
Standard Details List – Creek Crossing

Standard Details List – Creek Crossing	
Detail Number	**TITLE**
CC-001	Drilled Pier Creek Crossing For Pipe Bottom Above The 50 Year Flood Elevation
CC-002	Not used
CC-003	Pier Footing On Rock
CC-004	Pier
CC-005	Pipe Or Casting Anchorage Up To 24” Diameter Pipe
CC-006	Reinforced Concrete Anchor Pier and Footing (Sheet 1 of 2)
CC-007	Reinforced Concrete Anchor Pier and Footing (Sheet 2 of 2)
CC-008	Reinforced Concrete Pier and Footing (Sheet 1 of 2)
CC-009	Reinforced Concrete Pier and Footing (Sheet 2 of 2)
CC-010	Sanitary Sewer Creek Crossing Hold Down
CC-011	Sanitary Sewer Creek Crossing In Rock Utilizing Flowable Fill
CC-012	Typical Large Width Creek Crossing For Pipe Bottom Above 50 Year Flood Elevation (Sheet 1 of 2)
CC-013	Typical Large Width Creek Crossing For Pipe Bottom Above 50 Year Flood Elevation (Sheet 2 of 2)
CC-014	Typical Medium Width Creek Crossing For Pipe Bottom Above 50 Year Flood Elevation
CC-015	Typical Narrow Width Creek Crossing For Pipe Bottom Above 50 Year Flood Elevation

APPENDIX E

GENERAL CONSTRUCTION STANDARDS

Electrical Conduit And Accessories Specifications for the DeKalb County Wastewater Treatment and Collection System

All outdoor electrical conduits and supporting accessories for new installations at the Snapfinger plant, Polebridge plant and lift stations shall be of type PVC Coated REDH2OT supplied by PLASTI-BOND or an approved equal. This requirement applies to all outdoor, exposed and buried types of installations as well as any installation indoor and outdoor where the air is determined to be corrosive.

Equivalent substitution and/or exceptions due to conformance criteria, performance, availability or other considerations must be individually itemized and approved by the responsible party from the watershed Management's wastewater treatment plants.

All compounds used in conjunction with PLASTI-BOND conduits and accessories must be of the type specified or recommended by PLASTI-BOND for use with their products.

The following is a partial list of available PLASTI-BOND REDH2OT products:

Product	PLASTI-BOND REDH2OT Item	Description
Rigid Conduit	PLASTI-BOND Coated Galvanized Rigid Conduit	PVC coated rigid metal conduit with red urethane interior coating protects conductors from mechanical damage and corrosive attack. Electrical continuity is maintained across assembled joints.
Nipple	PLASTI-BOND Coated Nipples	Factory threaded nipples save you time and money in the field. Electrical continuity is maintained across assembled joints. *The exteriors of certain short nipples are coated with urethane in lieu of PVC. This is dictated by the manufacturing process as well as assembly considerations.
Pipe Strap Support	PLASTI-BOND Coated Pipe Straps	PLASTI-BOND PVC coated pipe straps are used to securely mount conduit to a wall or other structure for support. They are available in two types: a one-hole malleable iron strap or a two-hole stamped steel strap. Mounting hardware not provided.

Product	PLASTI-BOND REDH2OT Item	Description
Clamp Hanger Support	PLASTI-BOND Coated Clamp Hangers	PLASTI-BOND PVC coated conduit clamp hangers are used with threaded rod to securely suspend conduit runs supported from above. They are provided with stainless steel hardware.
Thread Rod Support	PLASTI-BOND Coated Thread Rods	PLASTI-BOND PVC coated all thread rod is used with coated conduit hangers and coated strut to securely suspend conduit runs supported from above. It is provided in 3/8" and ½" sizes and three standard lengths, 3', 6', and 10'.
Elbow	PLASTI-BOND Coated Elbows	Factory bent standard radius elbows are available and ready to ship. Factory bent elbows are more accurate, quicker to install and more economical, because they save field bending time and do not waste materials. Electrical continuity is maintained across assembled joints.
Pulling Elbow	PLASTI-BOND Coated Pulling Elbows	PLASTI-BOND pulling elbows are used at 90 degree bends in conduit runs to allow straight pulls at bends, to serve as pull outlets for stiff conductors, to allow for service entrance into buildings or to allow conductor entrance into motors. Electrical continuity of the conduit system is maintained across assembled joints.
Conduit Thread and Coupling	PLASTI-BOND Coated Conduit Thread and Coupling	PVC coated rigid metal conduit couplings with red urethane interior coating connect coated conduit sections. Electrical continuity is maintained across assembled joints. PVC sleeves on couplings seal off on conduit PVC coating when assembled to prevent corrosive liquids and vapors from attacking threaded joints.
Strut Support	PLASTI-BOND Coated Struts	PLASTI-BOND PVC coated strut is a versatile system of structural elements that can be used to build supports for a variety of applications. When combined with coated conduit hangers and other accessories, coated strut is a versatile and economical way to provide reliable support for conduit runs and other

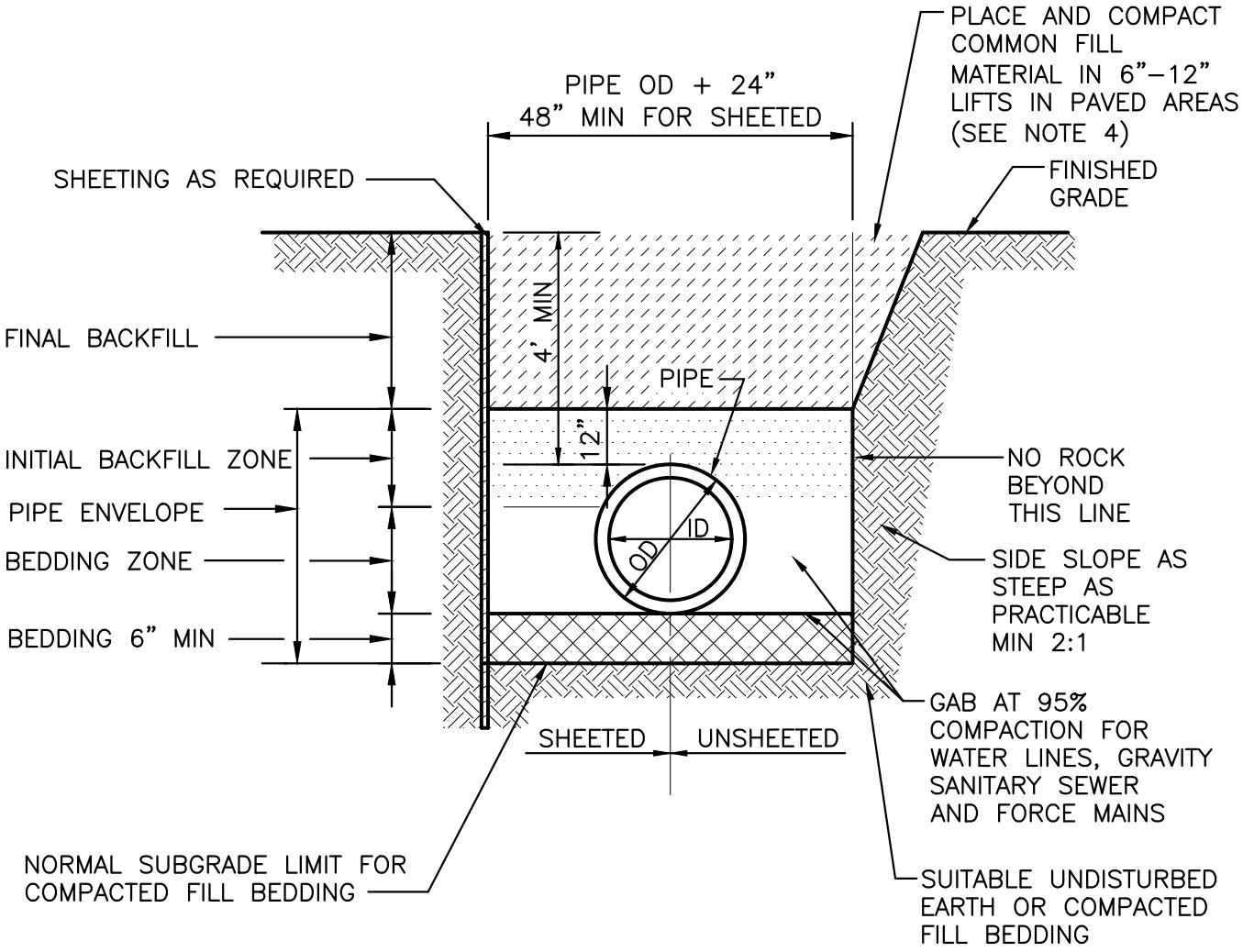
Product	PLASTI-BOND REDH2OT Item	Description
		electrical and mechanical installations.
Pipe Strut Strap Support	PLASTI-BOND Coated Pipe Strut Straps	PLASTI-BOND PVC coated pipe straps are used with coated strut to support conduit installations in a variety of configurations. B2008 style straps may be used in either vertical or horizontal positions to support conduit. Straps provided with stainless steel hardware. Conduit spacing may be as close together as allowed by the couplings. B3690 style straps may be used with hanger rods or other means of support to securely fasten conduit runs.
Conduit Body	PLASTI-BOND Coated Form 8 & Form 7 Conduit Bodies for General Service	PLASTI-BOND conduit bodies with covers are offered in Form 8 and Form 7 styles, each with numerous configurations to provide a complete coated conduit system. May be used to make 90 degree bends, for pull outlets, to provide for taps or splices, to act as a mounting outlet for wiring devices or lighting fixtures etc. Electrical continuity of the conduit system is maintained across assembled joints.
Mogul Conduit Body	PLASTI-BOND Coated Mogul Style Conduit Bodies	PLASTI-BOND mogul style conduit bodies are offered in numerous configurations to provide a complete coated conduit system. Mogul BG Covers are sold separately. Mogul style fitting bodies have long openings and may be used to make bends in conduit runs, for pull outlets for stiff conductors, to provide additional room for taps or splices, etc. Electrical continuity of the conduit system is maintained across assembled joints.
Device Boxes	PLASTI-BOND Coated Cast Device Boxes and Covers	PLASTI-BOND device boxes and covers are available in several configurations and may be used in coated conduit systems to accommodate wiring devices, to serve as pull boxes for conductors, or to allow for splices and taps in conductors. Covers are available separately. Electrical continuity of the conduit system is maintained across assembled

Product	PLASTI-BOND REDH2OT Item	Description
		joints.
GUA Conduit Box	PLASTI-BOND Coted GUA Conduit Boxes – Hazardous Location	PLASTI-BOND GUA series conduit outlet boxes are installed in hazardous location conduit systems to serve as pull and splice box, to change the direction of a conduit run, to connect runs of conduit, or to provide access to conductors. They are provided with covers as standard. Inquire about special covers to allow use to mount lighting fixtures or as sealing fittings. Electrical continuity of the conduit system is maintained across assembled joints.
Sealing Fitting	PLASTI-BOND Coated sealing Fittings	PLASTI-BOND Sealing fittings are used in conduit runs to stop gasses, vapors or flames from migrating from one part of the conduit system to another. This limits the spread of any potential explosion, enhancing safety. The PVC and urethane coatings of the fittings protect them from corrosive atmospheres so they can continue to function in hazardous locations. These fittings are available in several different configurations and with optional breathers and drains to accommodate installation in a variety of locations and positions. The EY, EYM, EYD, and EYDEF styles of fittings are installation in vertical conduit runs. The EYA, EYAM, and EYSEF style fittings are for installation in either vertical or horizontal runs. The EZS and EZDM style fittings may be used in any angle of conduit run. These PLASTI-BOND sealing fittings should be used with a suitable system of sealing compound, such as Chico A, Chico X, or Chico A-P from Crouse-Hinds. Follow the installation instructions included with the sealing compound.
Knockout Hub	PLASTI-BOND Knockout Hubs ST Style	PLASTI-BOND ST style knockout hubs are used to terminate conduit runs through the wall of a sheet metal electrical enclosure. They are available with or without grounding lug. STTB

Product	PLASTI-BOND REDH2OT Item	Description
		style hubs are Through-Bulkhead fittings used to pass conduit runs through firewalls or bulkheads up to 1/8" thick. STTTB style hubs perform the same function for unlimited wall thicknesses, (furnished without nipples).
Conduit Outlet Box	PLASTI-BOND Coated OE Series Conduit Outlet Boxes	PLASTI-BOND OE Series Conduit Outlet Boxes are installed in hazardous location conduit systems to serve as pulling and splicing fittings, to connect runs of conduit, to change the direction of a conduit run, or to provide access to conductors. They are provided with covers. Electrical continuity of the conduit system is maintained across assembled joints.
Conduit Unions	PLASTI-BOND Coated Conduit UNF & UNY Unions	PLASTI-BOND UNF unions are used o connect conduit to conduit or to allow for future changes to the conduit system. Female threads are provided at each end. PLASTI-BOND UNY unions are used to connect conduit to a conduit fitting, junction box, or device enclosure. One end is a male thread and the other is female.
L Elbow	PLASTI-BOND Coated EL Style Malleable Elbows	PLASTI-BOND EL Style malleable elbows are used in a conduit run to change direction 90 degree or to terminate at a fitting or box. They are available with male threads only, female threads only, or male and female threads.
Service Entrance Elbow	PLASTI-BOND Coated LBY Service Entrance Elbows	PLASTI-BOND LBY type elbows are used as service entrance elbows between service entrance and vertical weatherhead conduit runs, to change direction of a conduit run 90 degree when space is limited, and for pull outlets. They are available for general service (Series LBY-50-GS through LBY-150-GS) and hazardous (Series LBY-50 through LBY-55) locations.
Expansion Joint	PLASTI-BOND XJG Conduit Expansion Joints	PLASTI-BOND XJG type expansion joints are used to connect two lengths of conduit subject to longitudinal movement, including that caused in

Product	PLASTI-BOND REDH2OT Item	Description
		long runs by thermal expansion and contraction.
Liquid Tight Connector	PLASTI-BOND Liquid Tight Connectors	PLASTI-BOND REDH2OT liquid tight connectors are used with liquid tight conduit to wire motors, transformers, processing equipment, pumps, etc. The flexible conduit and the PVC coated connector work together to seal out water and other corrosive liquids, protecting the conductors from damage
Reducing Coupling	PLASTI-BOND Coated reducing Couplings	PLASTI-BOND reducing couplings are used to connect two pieces of conduit of different size. They are available in 17 different size combinations.
Plug & Bushing	PLASTI-BOND Plugs and Bushings	GLL Grounding Bushings GLL style PVC coated threaded grounding bushings have an aluminum lug for copper or aluminum grounding conductors. RE Reducers RE style reducers reduce conduit hubs to a smaller size. They are provided with an integral bushing to prevent conductor damage and full, clean cut threads for ease of assembly. All RE reducers are coated inside and out with polyurethane for corrosion protection. PLG Plugs PLG style plugs are used to close unused conduit hubs. They are available with either recessed square drive sockets or raised square drive heads. All PLG plugs are completely coated with polyurethane for corrosion protection.
Strut Nut Support	PLASTI-BOND Coated Strut Nut Supports	PLASTI-BOND PVC coated strut nuts are used to assemble strut components and to secure coated a thread rod in a section of strut. These are available wit or without a spring to aid in placement and assembly.
Beam Clamp	PLASTI-BOND Coated Beam Clamps	PLASTI-BOND PVC coated beam clamps are used to securely support conduit runs by attaching them to beams, angles, trusses and other structural members. They are available in four different styles:

Product	PLASTI-BOND REDH2OT Item	Description
		Right Angle: to attach the conduit run at a 90 degree angle to a beam or structural member. **Parallel**: to attach the conduit run parallel to a beam or structural member. **Edge**: to attach the conduit run at a 90 degree angle to a thin beam or structural member. **Hanger Rod Beam Clamp**: to attach a single all thread rod to a beam or structural member.



NOTES:

1. SEE DESIGN STANDARDS FOR ADDITIONAL BEDDING AND TRENCH BACKFILL REQUIREMENTS. ADDITIONALLY PIPE MANUFACTURER'S RECOMMENDATIONS SHALL BE FOLLOWED FOR FLEXIBLE PIPE INSTALLATIONS.

2. DEPTH OF COVER OVER WATER MAINS, FORCE MAINS AND GRAVITY SANITARY SEWERS SHALL BE 4'–0" AS MEASURED FROM TOP OF PAVEMENT OR FINISHED GRADE TO TOP OF PIPE.

3. NO ROCK, ONLY BEDDING MATERIAL IN BACKFILL FOR FIRST 2'–0" ABOVE TOP OF PIPE.

4. BEDDING AND BACKFILL TO BE GADED AGGREGATE BASE (GAB) AT 95% COMPACTION UNDER ALL PAVING FROM 12" ABOVE THE TOP OF PIPE TO THE BOTTOM OF THE CONCRETE ROAD CAP.

5. BACKFILL TO BE FREE OF ORGANICS, OBJECTIONABLE MATERIAL AND STONES LARGER THAN 3" IN ITS LONGEST DIMENSION.

DeKalb County GEORGIA

STANDARD DETAILS

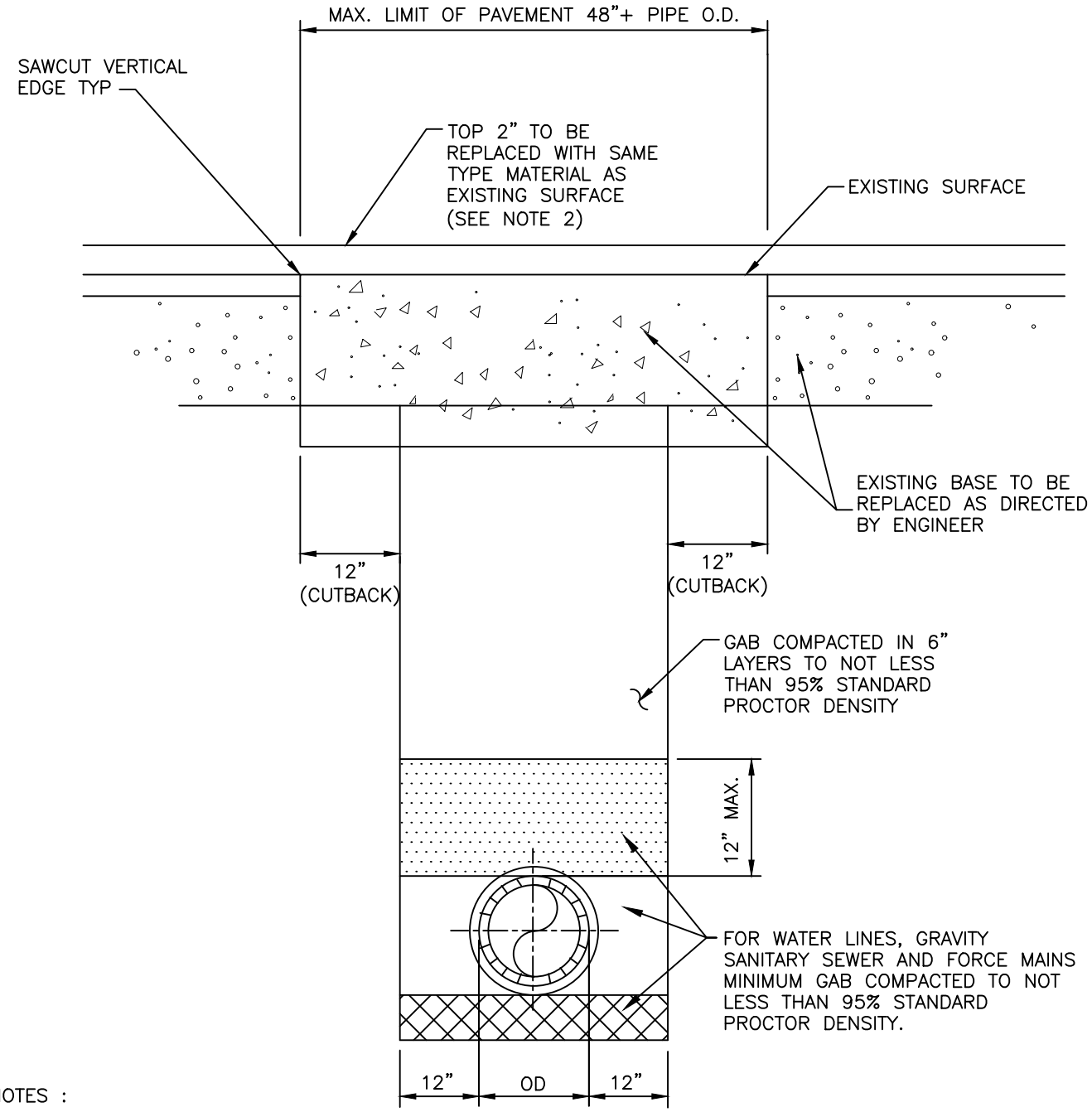
Backfill and Allowable Trench Widths Detail

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. G-004



NOTES :

1. SAW CUT EXISTING PAVEMENT TO PROVIDE STRAIGHT VERT. JOINTS.

2. SURFACES TO BE CLEANED AND BITUMINOUS TACK COAT APPLIED BEFORE PLACEMENT OF ASPHALTIC TOP.

3. FOR EXIST SURFACE OF PORTLAND CEMENT CONCRETE, FURNISH NEW SURFACE OF 3000 PSI MINIMUM HIGH EARLY STRENGTH CONCRETE.

4. ON LONGITUDINAL CUTS EXCEEDING 100 FEET, THE CONC IN THE TRENCH SHALL BE BROUGHT FLUSH WITH THE EXISTING PAVEMENT AND THE ENTIRE WIDTH OF ROADWAY RESURFACED W/ THE SAME TYPE OF MATERIAL AS THE EXISTING SURFACE..

DeKalb County GEORGIA

STANDARD DETAILS

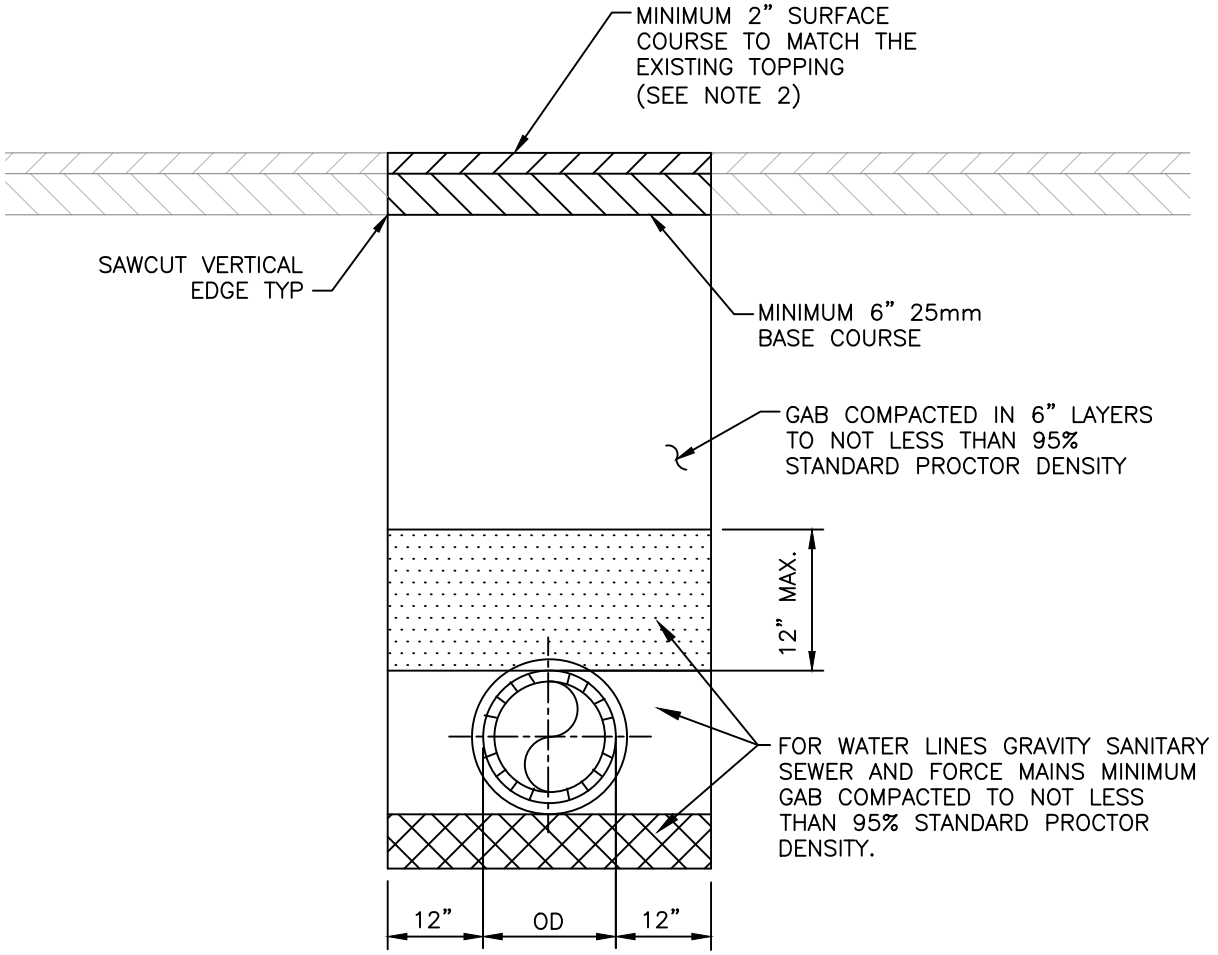
Typical Patch and Resurfacing Detail

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. G-005



NOTE: TRENCH WIDTH SHALL DEPEND ON PIPE MATERIAL BEING INSTALLED. MANUFACTURER'S RECOMMENDATIONS SHALL BE FOLLOWED.

NOTES :

1. SAW CUT EXISTING PAVEMENT TO PROVIDE STRAIGHT VERT. JOINTS.

2. SURFACES TO BE CLEANED AND BITUMINOUS TACK COAT APPLIED BEFORE PLACEMENT OF ASPHALTIC TOP.

DeKalb County GEORGIA

STANDARD DETAILS

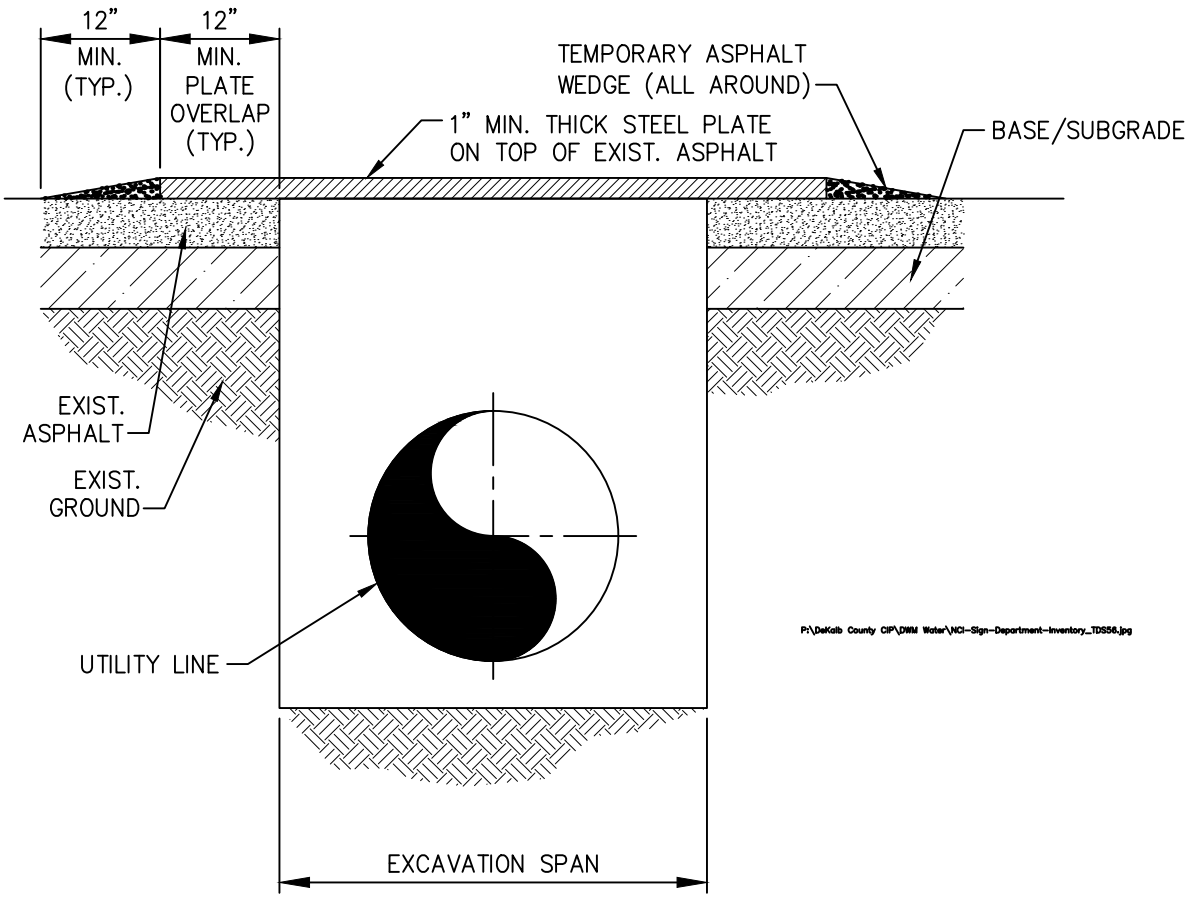
Typical Asphalt Pavement Patch

NOT TO SCALE

05/26

WATER Matters

DETAIL NO. G-006



NOTES:

1. INSTALLATION SHALL BE USED IN AREAS WHERE BACKFILLING OPERATIONS OF AN EXCAVATION IN THE ROADWAY CANNOT MEET THE MINIMUM COMPACTION REQUIREMENTS AND PERMANENT PATCHING PLACEMENT WITHIN THE SAME DAY.
2. ALL EXCAVATIONS SHALL BE BACKFILLED WITHIN THE ROADWAY.
3. EACH PLATE IS TO OVERLAP EXISTING PAVEMENT 12" MINIMUM IN EVERY DIRECTION AND MULTIPLE PLATES SHALL ABUT AND BE SECURED TO EACH OTHER.
4. EACH STEEL PLATE SHALL BE ANCHORED SECURELY TO PREVENT MOVEMENT.
5. TEMPORARY PAVING WITH A COLD ASPHALT MIX OR APPROVED EQUAL SHALL BE USED TO FEATHER EDGES OF THE PLATE TO FORM A WEDGED TAPER TO COVER THE EDGES OF THE STEEL PLATE.
6. THE STEEL PLATE SHALL BE REMOVED WITHIN 30 DAYS OF PLACEMENT WITH THE EXCAVATION MEETING THE MINIMUM COMPACTION REQUIREMENTS AND PERMANENT PATCHING INSTALLED.
7. ANY DITCH LINE NEEDING A STEEL PLATE LONGER THAN 30 DAYS SHALL REQUIRE DCDWM'S WRITTEN APPROVAL.
8. WARNING SIGNS ADVISING MOTORIST THAT THEY SHOULD EXPECT TO ENCOUNTER STEEL PLATES SHALL BE PLACED APPROXIMATELY 100 FEET IN ADVANCE OF THE STEEL PLATE LOCATION. THE SIGNS SHALL MEET MUTCD SIGN SIZE REQUIREMENTS, SHALL STATE STEEL PLATE AHEAD, AND SHALL BE VISIBLE TO THE MOTORIST.

DeKalb County GEORGIA

STANDARD DETAILS

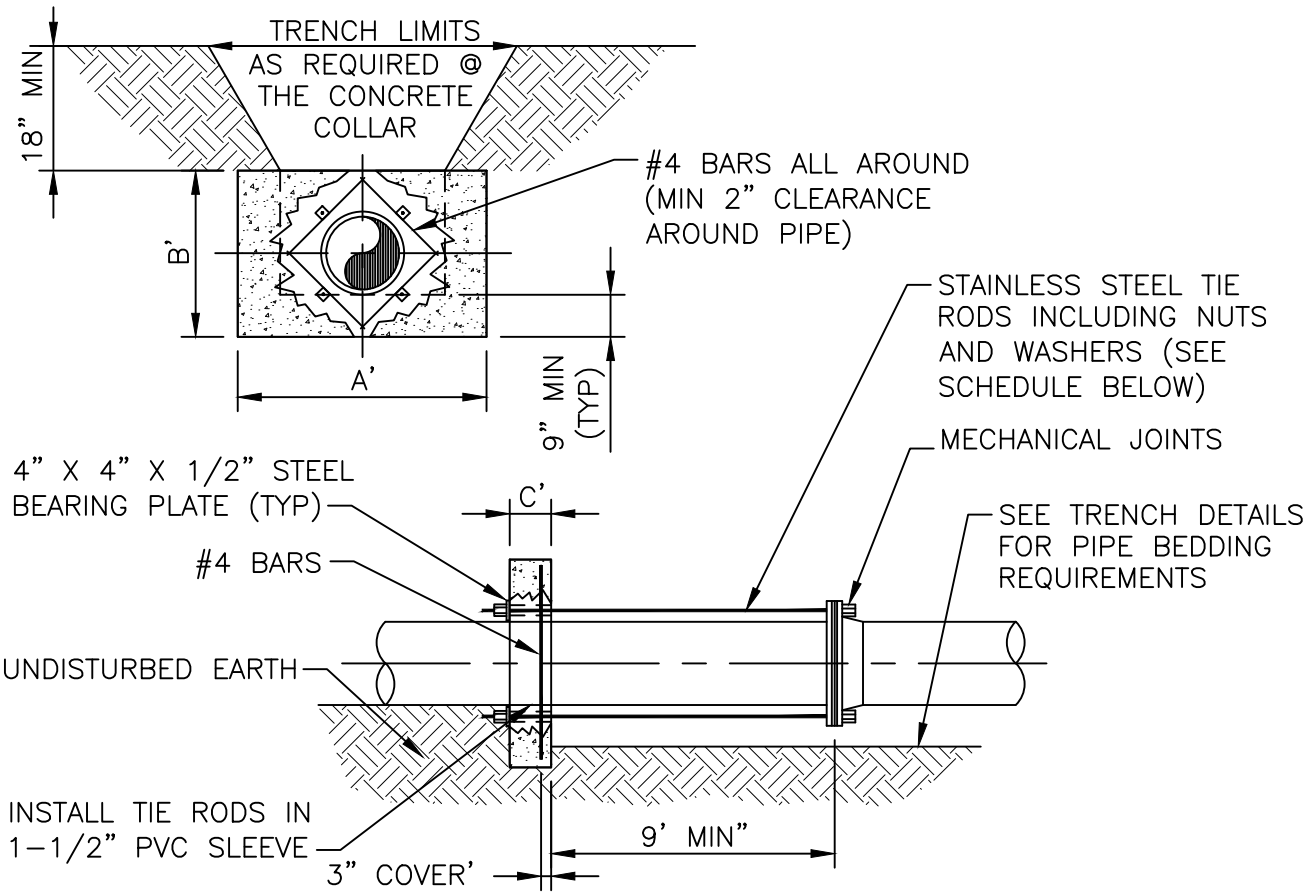
STEEL PLATE INSTALLATION URBAN AND RESIDENTIAL

Not To Scale

05/26

WATER Matters

DETAIL NO. G-007



SCHEDULE OF DIMENSIONS AND MATERIALS

PIPE SIZE (INCHES)	DIMENSIONS (FT.)			TIE RODS REQ'D	
	A	B	C	DIA. INCHES	NO.
6	2.0	2.0	1.0	3/4	2
8	2.5	2.5	1.0	3/4	2
10	3.5	3.0	1.0	3/4	2
12	5.0	3.0	1.0	3/4	2
16	6.0	4.0	1.5	3/4	4
20	8.0	5.0	1.5	3/4	6
24	9.0	6.0	1.5	3/4	8

NOTE: THRUST COLLAR AREAS TO BE COMPUTED ON BASIS OF 2000 LBS/SF SOIL RESTRAINT BEARING.

NOTES:
1. ADDITIONAL REINFORCEMENTS SHALL BE AS SPECIFIED BY THE ENGINEER.
2. MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE SHALL BE 3000 PSI.
3. BEDDING, BACKFILL AND COMPACTION SHALL BE AS SPECIFIED ELSEWHERE IN THE STANDARDS.
4. ALL FORM BOARDS SHALL BE REMOVED PRIOR TO BACKFILL.
5. NO ALLOWANCE SHALL BE MADE FOR FRICTION BETWEEN THE PIPE WALL AND THE THRUST COLLAR.
6. DESIGN PRESSURE: 200 PSI.
7. PIPE SIZE GREATER THAN 24" DIAMETER SHALL HAVE THRUST RESTRAINT DESIGNED BY A REGISTERED P.E.

DeKalb County GEORGIA

STANDARD DETAILS

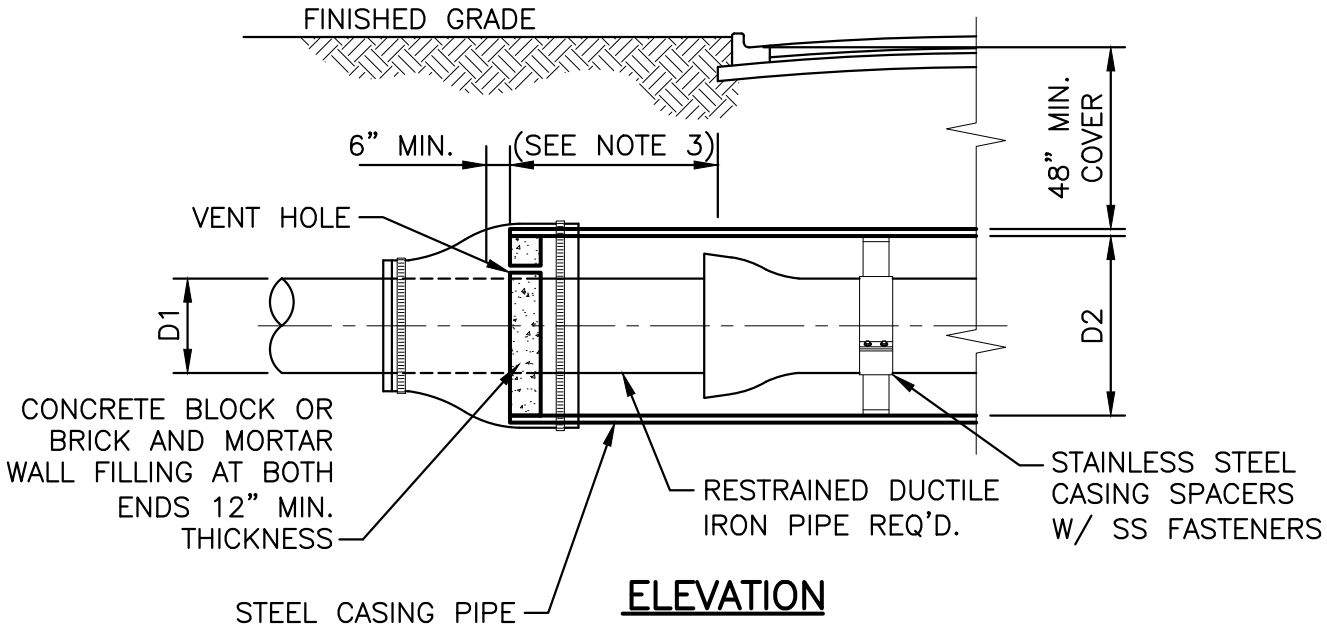
Thrust Restraint (200 psi) Tie-rod Installation Detail

NOT TO SCALE

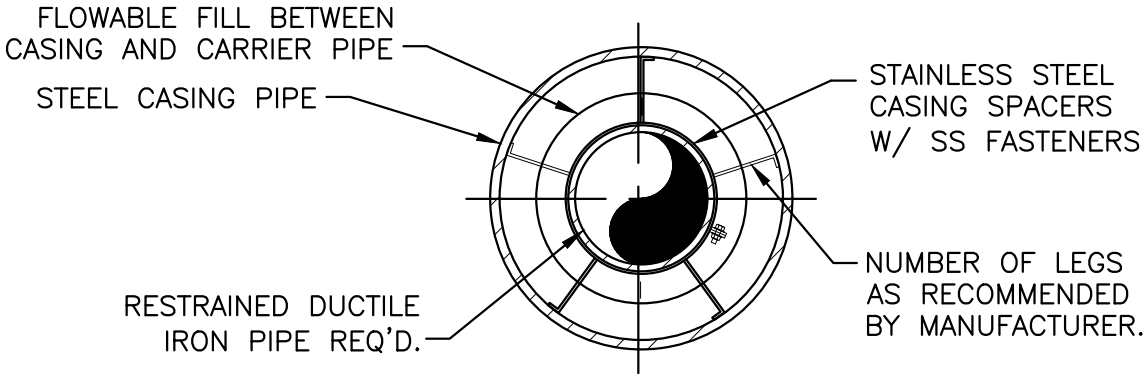
05/26

WATER Matters

DETAIL NO. G-008



ELEVATION



SECTION

CARRIER PIPE AND CASING PIPE SIZES (MIN.)										
CARRIER PIPE NOM. DIA. (DI)	2	4	6	8	10	12	14	16	20	24
CASING PIPE NOM. DIA. (D2)	6	14	16	18	20	22	24	30	32	36
WALL THICKNESS (IN.) COATED	0.250	0.250	0.250	0.250	0.281	0.312	0.344	0.406	0.438	0.469
WALL THICKNESS (IN.) UNCOATED	0.282	0.282	0.313	0.313	0.344	0.375	0.407	0.469	0.501	0.532

NOTES:

1. STAINLESS STEEL CASING SPACERS ARE REQUIRED AS SHOWN.
2. WHERE PRACTICAL, CASING SHALL EXTEND A MIN. OF 10'–0" BEYOND EDGE OF PAVEMENT OR LONGER AS REQUIRED BY LOCAL PERMITTING AGENCIES.
3. A MINIMUM OF 3 CASING SPACERS PER JOINT OF INSTALLED CARRIER PIPE SHALL BE PROVIDED.

DeKalb County GEORGIA

STANDARD DETAILS

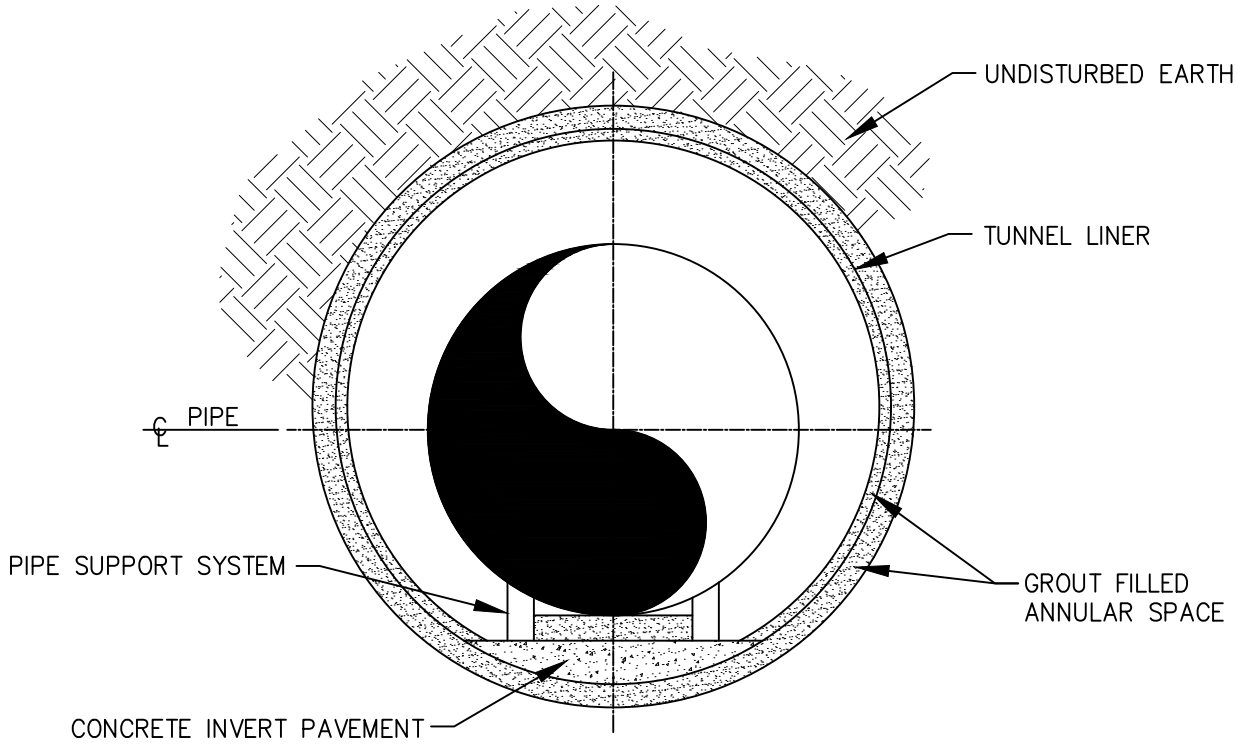
Casing And Pipe Support Installation Detail

NOT TO SCALE

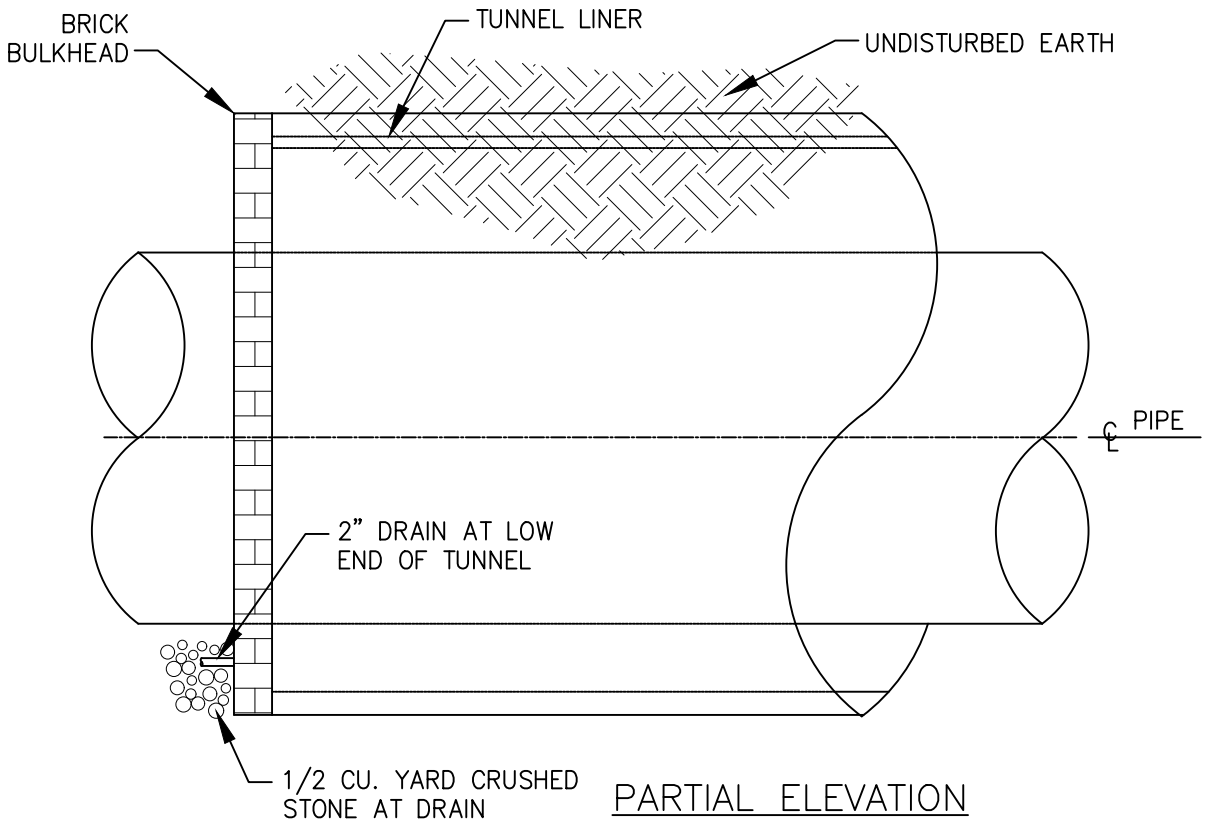
05/26

WATER Matters

DETAIL NO. G-009



TYPICAL TUNNEL SECTION



PARTIAL ELEVATION

DeKalb County
GEORGIA

STANDARD DETAILS

TYPICAL TUNNEL SECTION

Not to Scale

05/26

WATER Matters

DETAIL NO. G-010