

Georgia Department of Natural Resources

Reply To:
Drinking Water Engineering and Permitting Program
2 Martin Luther King, Jr. Drive, SE, Suite 1362 East
Atlanta, Georgia 30334

2 Martin Luther King, Jr. Drive, SE, East Tower, Atlanta, Georgia 30334
Lonice C. Barrett, Commissioner
Harold F. Rehels, Director
Environmental Protection Division

August 23, 2002

Bryan C. Brooks
Mattern & Craig
1120-1/2 South Milledge Avenue
Athens, GA 30605

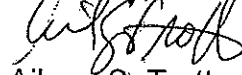
RE: "Professional Engineering Services"
City of Statham Water System (ID# 0130001)
Barrow County, Georgia

Dear Mr. Brooks:

The Drinking Water Program of the Environmental Protection Division has received your correspondence dated August 16, 2002, requesting allowance of the construction of a 340 LF project to provide water supply to one new connection. As the City has received delegated authority to review projects of this nature, the project may be reviewed and approved by the City's engineering representative provided it is in accordance with the conditions of the delegated authority.

If you have any questions concerning the above, please contact this office at the number below.

Sincerely,



Aileen S. Trotter
Environmental Engineer
Drinking Water Permitting & Engineering Program
(404) 656-0702

Enclosures
cc: Mayor Robert Bridges

6-13-2002 9:03AM

FROM CITY OF STATHAM 770 725 0202

P. 4

DELEGATION OF REVIEW AND APPROVAL FOR LIMITED WATER SYSTEM ADDITIONS

WATER SYSTEM NAME: CITY OF STATHAM WATER SYSTEM COUNTY: BARROW
Water System ID No.: 0130001

- a) Does the water system have its own water supply sources: ☒ YES NO (circle one)
b) Does the water system purchase water from another system(s): ☒ YES NO (circle one)
If YES, name the water suppliers: CITY OF WINDER - AS NEEDED BASIS
BEAR CREEK - AS NEEDED BASIS

WATER SYSTEM'S ENGINEER/CONSULTANT:

Name: BRYAN C. BROOKS, P.E.
Georgia PE Registration No.: 027637
Address: MATTHEW & CRAIG
1120 1/2 S. MILLEDGE AVE.
ATHENS, GA 30605
Phone: 706-552-3892 Fax: 706-552-3987

TO EPD:

Enclosed is a copy of the Standard Construction and Material Specifications for the Georgia Environmental Protection Division's (EPD) review and approval. I request that the above named permitted public water supply system be granted permission for its engineer(s) to review and approve the construction of all limited water system projects (subdivisions, apartment complexes and shopping centers, only) as additions to its existing permitted public water distribution system. These water system addition projects, which includes the water lines to connect these facilities to the existing permitted system's distribution lines are considered routine in nature. In the event that a proposed water system addition project has the potential for significant environmental impact or which generates substantial public concern, EPD still reserves the right to review that project. I understand that annual reporting of the approved projects is required.

During the review, approval and construction of the water system projects, steps will be taken to ensure that no part of the water mains, service lines, and the structures that they are going to be connected to these water lines are being located on or in close proximity to an abandoned landfill site or any other site used for waste disposal.

This delegation for review and approval of limited water system additions may be canceled without prior notice by the either party giving a written notice of intent to cancel.

FOR THE PUBLIC WATER SUPPLY SYSTEM (Authorized Representative)

Name (please print): Robert Bridges Title: Mayor
Signature: Robert Bridges Date: 7/18/02

FOR THE DRINKING WATER PERMITTING & ENGINEERING PROGRAM, EPD

Name (please print): ONDER F. SREFFLI Title: Program Manager I
Signature: Onder F. Sreffli Date: 8/23/2002

Georgia Department of Natural Resources

2 Martin Luther King, Jr. Drive, SE, East Tower, Atlanta, Georgia 30334

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Harold F. Reheis, Director
Environmental Protection Division

August 23, 2002

Honorable Robert L. Bridges
Mayor, City of Statham
P. O. Box 28
Statham, Georgia 30666-0028

RE: City of Statham Water System
Delegation of Review and Approval Authority
for Limited Water System Additions for WSID No. 0130001

Dear Mayor Bridges:

Enclosed, please find a signed copy of the form titled "Delegation of Review and Approval for Limited Water System Additions" for your records. This gives your engineer the responsibility to review and approve the construction of subdivisions, apartment complexes and shopping centers only, as additions to your public water system that are considered routine in nature. Compliance with the current revision of the "Division's Minimum Standards for Public Water Systems" must be maintained.

As stated in our previous correspondence, our delegation of responsibility to your water system is contingent upon your continued compliance with the following conditions:

- A. All reviews must be performed under the supervision of a professional engineer registered in the State of Georgia.
- B. The water system must have or have access to a reliable water source(s) to produce, treat and transport adequate water to accommodate new additions and conform all applicable sections of the Georgia Rules for Safe Drinking Water, Chapter 391-3-5.
- C. The owner's engineer must determine that the proposed water lines have been designed in accordance with acceptable provisions of recognized design references in general use by civil/sanitary/environmental engineers experienced in the design of potable public water systems.
- D. The owner's engineer must review and approve the designed engineering plans and specifications for technical adequacy and conformance to applicable requirements, and determine that they are suitable for construction purposes. All applicable requirements of the most recent edition of the Georgia Rules for Safe Drinking Water, Chapter 391-3-5, and the "Minimum Standards for Public Water Systems" must be satisfied.
- E. During the review, approval, and construction of the water system projects, the system owner and the engineer must take appropriate measures to ensure that none of the water mains, service lines, and the structures that are going to be connected to these water lines are being located on or in close proximity of an abandoned landfill site or any other site used for waste disposal.
- F. Construction inspections must be performed during and upon completion of the construction to ensure that the project is completed in accordance with the approved plans and specifications and the Erosion and Sedimentation Act 12-7-1 et.seq.
- G. Upon completion of construction, the water system owner must own and maintain the water lines.

Mayor Robert L. Bridges

August 23, 2002

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- H. All pertinent records and documentation of the approved projects must be maintained for EPD's overview, along with an up-to-date set of water system distribution maps.
- I. The owner's engineer must evaluate and determine the adequacy of the system's existing wastewater treatment facilities to support each water using facility that is being added to the water supply system.
- J. The system owner or the engineer must submit a yearly report to EPD each January, listing each addition approved during the previous year and the number of service connections within each addition.

One draft copy and one approved copy of the submitted "Standard Specifications for Construction of Potable Waterlines and Appurtenances" are returned herewith, and one set of specifications submitted will be retained for our files. Please note that only the sections of the submitted standard specifications applicable to the water system were reviewed by the Drinking Water Program.

Should you have any questions, please contact this office at (404) 656-2750.

Sincerely,



Aileen S. Trotter
Environmental Engineer
Drinking Water Permitting and Engineering Program
Phone: (404) 656-0702

Enclosure

cc: Mr. Bryan Brooks, Mattern & Craig
Mr. Onder Serefli, DWPEP, EPD
Mr. Peter Zorbanos, DWPEP, EPD

STANDARD SPECIFICATIONS FOR
CONSTRUCTION OF POTABLE WATER LINES AND APPURTENANCES
CITY OF STATHAM, GEORGIA

AUGUST, 2002

REVISED 8/02

STANDARD SPECIFICATIONS FOR
CONSTRUCTION OF POTABLE WATER LINES AND APPURTENANCES
CITY OF STATHAM, GEORGIA

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SECTION 01011

GENERAL INFORMATION AND DEFINITIONS

PART I GENERAL

1.01 FORWARD

- A. A source of potable water, the consistent and adequate distribution of potable water, and consistent installation of quality potable water distribution lines and appurtenances is of the utmost importance for the health and welfare of the citizens of Statham, Barrow County, Georgia. In order to ensure the consistent installation of quality potable water distribution lines, these regulations shall govern the acceptance of any potable water distribution lines and appurtenances built and installed by any Developer, or person, persons, or entities acting on behalf of a Developer, on any property being developed as a sub-division and on which potable water distribution lines and appurtenances shall be connected to and become a part of the potable water distribution lines operated by the City of Statham.

1.02 DEFINITIONS

- A. **"AWWA"** shall mean American Water Works Association and letters and numbers following AWWA shall designate sections of the AWWA Standards.
- B. **"Developer"** shall mean any person, persons, entity or entities preparing and developing any tract or parcel of land or real estate for construction of single-owner dwellings, multiple-owner dwellings, duplexes, tri-plexes, apartments, or any other structures used for residential purposes, office buildings, retail stores, or any other structure or structures used for commercial purposes or industrial use; and which structures shall require potable water to be furnished by potable water distribution lines and appurtenances.
- C. **"Contractor"** shall mean "Developer" or person, persons, entity or entities performing construction and installation of potable water distribution lines and appurtenances on behalf of a Developer.
- D. **"Sub-contractor"** shall mean "Contractor".
- E. **"Owner"** and **"Authority"** shall mean the City of Statham, Georgia.
- F. **"Inspector"** shall mean the Inspection Department of the City of Statham or the Authorized Representative of the City of Statham.

- G. **"Sub-division"** shall mean any development of real estate whereupon multiple single-owner dwellings, multiple-owner dwellings, duplexes, tri-plexes, apartments, or any other structure or structures used for dwelling purposes, office buildings, retail stores, or any other structure or structures used for commercial purposes or industrial use.

1.03

GENERAL CONDITIONS

- A. All water lines and appurtenances for water distribution installed by Developer, or person, persons, or entities acting on behalf of a Developer, in a sub-division shall become the property of the City of Statham, after appropriate testing, approval, and acceptance by the City of Statham.
- B. No potable water transported through the water lines hereinbefore referenced in Sub-paragraph A of this Paragraph shall be sold to any customer or customers until such time as the water lines and appurtenances have been tested, approved, and accepted by the City of Statham.
- C. No water lines or appurtenances installed by the Developer, or person, persons, or entities acting on behalf of a Developer, shall be accepted unless all rules, regulations, and Standard Specifications and Standard Details herein have been complied with by the Developer.
- D. The Developer shall submit six (6) sets of final construction plans of the proposed water lines and appurtenances to the Authority for review and approval. Plans shall have an overall project index map showing connection points to the City system. Plans shall be at a scale no smaller than 1"=30' horizontal and 1"=10' vertical. Design calculations (two copies) shall also be submitted, including basis of design, demand figures, pressures, domestic and fire flow head loss calculations, effect on existing City of Statham system, and service area limits. Per the Georgia Department of Natural Resources - Environmental Protection Division (EPD) Minimum Standards for Public Water Systems, May 2000, the Developer shall retain a Professional Engineer, registered in the State of Georgia, to prepare plans and specifications for approval. Said plans and specifications shall be designed in accordance with the criteria and requirements in the EPD's "Minimum Standards for Public Water Systems", and shall be sealed by the Professional Engineer (Georgia Registration). The Water System Addition and Expansion Form shall be submitted to the City. The plans shall have notes indicating compliance with the Standard Specifications and with a listing of the specific materials and appurtenances that are proposed to be used on the submitted project. Changes to the proposed materials and appurtenances after the initial submittal, either before or after approval by the Authority, shall be in writing, and shall be approved prior to installation.

- E. The Developer shall furnish the Authority two (2) sets of plans showing the location of all water lines, fire hydrants, valves, services, and any other appurtenances, as they were built. The initial submittal plans shall be revised to show the correct locations and the correct materials and appurtenances constructed.
- F. The Developer shall apply for and secure all necessary construction permits, right-of-way permits, and any other permits from City, county and/or state authorities, as appropriate.
- G. The Developer, or person, persons, or entities acting on behalf of a Developer, shall comply with all local, state and federal regulations and laws.
- H. The Developer shall reimburse the Authority for all expenses incurred by the Authority in performing any tests required by this regulation, prior to approval.
- I. Prior to approval by the Authority of any installed line or lines, and appurtenances, the Developer shall furnish to the Authority, a bond suitable to the Authority, to provide for the repairs of any installed water lines and appurtenances, due to faulty materials or installation. Such bond shall be in force for a period of one (1) year from the date of final acceptance and approval by the Authority of the installation. The value of the bond shall be determined by the City prior to issuance of any Land Disturbance Permits.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.01 WORK INCLUDED

- A. General Quality Control.
- B. Workmanship.
- C. Manufacturer's Instructions.
- D. Manufacturer's Certificates.
- E. Manufacturer's Field Services.
- F. Testing Services.

1.02 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 01410 - Testing Services

1.03 QUALITY CONTROL, GENERAL

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.04 WORKMANSHIP

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Perform work by persons qualified to produce workmanship of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, and pressures.

1.05 MANUFACTURERS' INSTRUCTIONS & CERTIFICATES

- A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Standard Specifications, request clarification from Inspector before proceeding. When required by individual Specifications Section, submit manufacturer's certificate, in duplicate, that products meet or exceed specified requirements.

1.06 MANUFACTURERS' FIELD SERVICES

- A. Require supplier, manufacturer, or installer, to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, and to make appropriate recommendations. Representative shall submit written report to Inspector listing observations and recommendations.

1.07 TESTING SERVICES

- A. Independent testing services or laboratories shall be retained to perform tests, and other services required by individual Specification Sections. Services shall be performed in accordance with requirements of governing authorities and with specified standards.
- B. Reports shall be submitted to Inspector in two (2) copies giving observations and results of tests, indicating compliance or non-compliance with specified standards and with Standard Specifications. Reports indicating non-compliance shall be faxed to the Inspector within one day of observation of non-compliance.
- C. Contractor shall cooperate with testing services personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested. Notify Inspector and testing services company 24 hours prior to expected time for operations requiring testing services. Make arrangements with testing services company and pay for samples and tests.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Telephone Service.
- B. Water.
- C. Sanitary Facilities.
- D. Barriers.
- G. Enclosures.
- H. Protection of Installed Work.
- I. Security.
- J. Surface Water Control.
- K. Cleaning During Construction.

1.02 TELEPHONE SERVICE

- A. Provide cell phone for onsite superintendent.

1.03 WATER

- A. Provide a metered service as required for construction operations. Extend branch piping with outlets located so that water is available by use of hoses. Provide backflow preventers or check valves as required by local code.

1.04 SANITARY FACILITIES

- A. Provide and maintain required temporary facilities.

1.05 BARRIERS

- A. Provide as required to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide a fence around open construction site when contractor is not working.
Construction Material: Contractor's option.
- C. Provide barricades and covered walkways as required by governing authorities for public rights-of-way and for public access to existing buildings.

1.06 PROTECTION OF INSTALLED WORK

- A. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage to water system.

1.07 SECURITY

- A. Provide security facilities to protect Project from unauthorized entry, vandalism, and theft.

1.08 SURFACE WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide and operate pumping equipment. Provide sediment control of pumped water.

1.09 CLEANING DURING CONSTRUCTION

- A. Control accumulation of waste materials and rubbish; periodically dispose of off-site.

1.10 REMOVAL

- A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installation to a depth of 2 feet; grade site as indicated. Restore existing facilities used during construction to specified, or to original condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01570

TRAFFIC REGULATION

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Construction Parking Control.
- B. Flagmen.
- C. Flares and Lights.
- D. Haul Routes.
- E. Traffic Signs and Signals.
- F. Removal.

1.02 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 01500 - Construction Facilities and Temporary Controls
 - 2. Section 02080 - Traffic, Property, and Utility Maintenance and Coordination.

PART 2 PRODUCTS

2.01 SIGNS, SIGNALS, AND DEVICES

- A. Post-mounted and wall-mounted traffic control and informational signs.
- B. Traffic Control Signals: As approved by the Authority.
- C. Traffic Cones and Drums, Flares and Lights: As approved by the Authority.
- D. Flagman Equipment: As approved by the Authority.

PART 3 EXECUTION

3.01 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking, including Contractor's employees, to prevent interference with public traffic and parking, and access by emergency vehicles.
- B. Monitor parking of construction personnel's vehicles. Maintain vehicular access to and through parking areas. Parking shall be on all weather surface.
- C. Prevent parking on or adjacent to access roads or in non-designated areas.

3.02 FLAGMEN

- A. Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.03 FLARES AND LIGHTS

- A. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.04 HAUL ROUTES

- A. Consult with the Authority, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

3.05 TRAFFIC SIGNS AND SIGNALS

- A. At approaches to site and on site, install traffic signs and signals, if needed, at crossroads, detours, parking areas and elsewhere as needed to direct construction and affected public traffic.
- B. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.
- C. Relocate signs and signals as Work progresses, to maintain effective traffic control.

3.06

REMOVAL

- A. Remove equipment and devices when no longer required. Repair damage caused by installation. Remove post settings to a depth of 2 feet.

END OF SECTION

SECTION 02080

TRAFFIC, PROPERTY AND UTILITY MAINTENANCE AND COORDINATION

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The work shall include providing all materials, equipment, labor and services required to regulate and coordinate traffic, to protect and maintain property, to notify the public of work conditions, and to coordinate the work with the respective Utility Companies.

1.02 SITE

- A. The Contractor shall, at his expense, maintain the work site in a clean and orderly appearance at all times. All debris and surplus material collected shall be disposed of off the work site by the Contractor, at his expense. Access for emergency vehicles shall be maintained at all times.

1.03 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 01570 - Traffic Regulation

1.04 REFERENCES

- A. Georgia Erosion and Sediment Control Handbook latest revision.
- B. Georgia Department of Transportation Specifications - Construction of Roads and Bridges and Standard Details; latest revisions.
- C. Georgia Department of Transportation - Work Area Protection Manual.
- D. U.S. Department of Transportation - Manual on Uniform Traffic Control Devices.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.01 TRAFFIC MAINTENANCE AND COORDINATION

- A. The Contractor shall make every attempt possible to maintain through traffic at all times. (One lane of traffic shall be maintained at all times and two (2) flagmen shall be provided at all times work is in progress and traffic must be controlled.) The Contractor shall not close or excavate within the right-of-way of a street or alley without obtaining the approval of and the required permits from the Authority.
- B. When work conditions dictate that a street or part of a street be closed to traffic, the Contractor shall provide and maintain, at his expense, all signs, barricades and flashing lights necessary to physically close a street or part of a street adjacent to work area. The Contractor shall provide and maintain all traffic control devices and signs required to coordinate and detour the through traffic around the closed street.
- C. The Contractor shall provide and maintain, at his expense, all signs, cones, stands and flagmen required to control and protect traffic passing through a work zone.
- D. The method of controlling the traffic passing through a work zone and the barricades required for closing a street to traffic shall be in accordance with GDOT Standards. All traffic control and street closed signs shall be in accordance with the Federal "Manual on Uniform Traffic Control Devices."
- E. The Contractor shall keep all street intersections open to traffic, when practical. When work is perpendicular to the street, the Contractor shall work in no more than one-half ($\frac{1}{2}$) of the street width, at one time. The first half of work must be completed and the street passable prior to working in the second half.
- F. The Contractor shall provide and maintain a safe and passable pedestrian access for the public conducting business or residing within the work area. Sidewalks shall remain clear and open at all times during the work, unless approved otherwise by the Authority.
- G. The Contractor shall provide the necessary diversion ditches, dikes or temporary culverts required to prevent mud and debris from being washed onto the streets or property. The Contractor's vehicles shall be kept clean to prevent mud or dust from being deposited on streets.

3.02

PROPERTY MAINTENANCE AND COORDINATION

- A. The Contractor shall maintain a safe and passable vehicular entrance to all private or public property. The Contractor shall notify the property owner(s) twelve (12) hours in advance of the blocking of an entrance. Do not block an entrance for more than twelve (12) hours at any one time, without approval of the property owner.
- B. Existing lawn, trees, shrubs, fences, utilities, culverts, walls, walks, driveways, poles, signs, right-of-way monuments, mailboxes and the like shall be protected from damage during the work under this contract. Any damage caused to such items shall be repaired or replaced by the Contractor at his expense.

3.03

UTILITY MAINTENANCE AND COORDINATION

- A. Before the work is started, the Contractor shall notify all companies, corporations, municipalities and individuals who own utilities on the construction site, in the right of way or immediately adjacent to the construction area of the work to be performed. The Contractor shall arrange to have the various utilities located and to have them removed or relocated as required, or to determine the method of protection acceptable to the respective owner. Any cost incurred with removing or relocating utilities shall be borne by the Contractor.
- B. The Contractor shall excavate to locate buried utilities far enough in advance of pipeline laying to allow for adjustments in pipelaying both horizontally and vertically.
- C. The work shall be coordinated and performed in a manner so that all existing fire hydrants, without exception, shall be accessible at any time during the work.
- D. The Contractor shall maintain the existing streams, ditches, drainage structures, culverts and flows at all times during the work. The Contractor shall pay for all personal injury and all property damage which occurs as a result of failing to facilitate drainage.
- E. The Contractor shall ascertain the exact location of each existing utility that may interfere with the work. The Contractor may obtain field utility locations by calling "Georgia One Call" (1-800-282-7411) forty-eight (48) hours prior to working in the vicinity of existing utilities. If the utilities fail to locate, a second call shall be made providing an additional three (3) hour notice.
- F. The Contractor shall repair or replace any existing sanitary sewer or storm drain utility damaged or misaligned during or due to the work. All other utilities shall be

repaired or replaced by the respective Utility Company(s) at the expense of the Contractor.

- G. The Contractor shall coordinate all work within the vicinity of the existing utilities with the respective Utility Company. The work shall be conducted in a manner to avoid unnecessary service interruption and in accordance with the rules and regulations of the respective Utility Company.
- H. When the work is approaching an existing utility or structure that may be in conflict with, or connected to, the work, the Contractor shall excavate test pits to verify the location, size, and elevation of the existing utility or structure. By taking this precaution the Contractor may adjust the work or have the existing utility relocated as necessary. Failure to take such precautions may result in the Contractor adjusting the work or having the existing utility relocated, at his expense.
- I. When the existing utilities cross the trench excavation, the existing utilities shall be adequately supported and protected from damage due to the work as required, specified or directed. All methods for supporting and maintaining the existing utilities shall be subject to the approval of the respective Utility Company. Any damaged utilities shall be restored using materials and installation equal to the utility's standards.
- J. The Contractor shall exercise care to insure that the grade and alignment of the existing utility be maintained and that no joints or connections are disturbed. Backfill shall be carefully placed and compacted to prevent the future damage or settlement to the existing utility.
- K. The Contractor shall notify the Authority in writing one week in advance of any required depressurizations or cutoffs of portions of the water system. All valves shall be operated by the Authority. Taps, if made in a non-pressure condition, shall be subject to the Authority's approval as to the day, the time of day, and the duration of each outage. The new water lines shall be installed, tested, and disinfected before individual service connections and before other connections to the existing mains are made. Through coordination with the Authority, the Contractor shall limit the number of persons without water service to the minimum possible number with each outage. Outages shall be of minimum duration and shall not exceed four continuous hours at any time. The Contractor shall notify residences and businesses affected by all outages. Existing water lines indicated to be removed or abandoned shall not be removed from service until all service connections are made to the new water line. The Contractor shall install all new fire hydrants before any existing hydrants are removed.

SEWER - WATER RELATION

A. Parallel installation :

1. Water lines shall be laid at least ten feet horizontally from any existing or proposed sanitary sewer, storm sewer or sewer manhole.
2. When local conditions prevent a horizontal separation of ten feet, the water line may be laid closer to a sewer or sewer manhole (on a case-by-case basis) provided that:
 - a. The water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom (invert) of the water main shall be at least 18- inches above the top (crown) of the sewer.
 - b. Where this vertical separation cannot be obtained, the sewer shall be constructed of AWWA approved ductile iron water pipe, pressure tested in place at 50 psi without leakage prior to backfilling.

B. Crossing:

1. Water lines crossing sewers shall be laid to provide a separation of at least 18 inches between the bottom of the water line and the top of the sewer whenever possible.
2. When local conditions prevent a vertical separation of 18 inches (see 1 above), the following construction shall be used:
 - a. Sewers passing over or under water lines shall be constructed of ductile iron or C900 PVC AWWA water pipe.
 - b. Water lines passing under sewers shall, in addition, be protected by providing:
 - a. A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water line.
 - b. Adequate structural support for the sewers to prevent excessive deflection of the joints and the settling on and breaking of the water line.

- c. That the length of the water line be centered at the point of the crossing so that joints shall be equidistant and as far as possible from the sewer.

C. Sewers or Sewer Manholes:

- 1. No water pipes shall pass through or come in contact with any part of a sewer or storm drain manhole.

3.05

PROTECTION OF PUBLIC AND PROPERTY

- A. The Contractor shall comply with all local, state and federal laws and the Occupational Safety and Health Act in protecting the public, the worksite, and adjacent property from damage. The Contractor shall provide all sheeting, shoring, barricades, trench boxes, warning lights, signs, and fences required for this protection. Erosion control and sediment control shall be provided.

END OF SECTION

SECTION 02208

UTILITY EXCAVATION, STABILIZATION, BEDDING, AND SURFACE WATER CROSSING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The work shall include providing all equipment, materials, labor and services required to provide the trenches to the required width and elevation.

1.02 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 02209 - Utility Backfilling and Restoration
 - 2. Section 02212 - Erosion Control & Rip Rap

1.03 QUALITY ASSURANCE

- A. Comply with all codes, laws, ordinances and regulations of governmental authorities having jurisdiction over this part of the work, including Erosion and Sediment Control Regulations and practices.
- B. Compliance with the current edition of the "Georgia Environmental Protection Division's "Minimum Standards for Public Water Systems" must be maintained.

1.04 REFERENCES

- A. American Society for Testing Materials (ASTM); latest revisions:
 - 1. D 698 Test Method for Laboratory Compaction characteristics of Soil Using Standard Effort
 - 2. D 1557 Test Method for Laboratory Compaction Characteristics of Soil using Modified Effort
 - 3. D 2216 Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock

4. D 2487 Standard Test Method for Classification of Soils for Inspecting Purposes

1.05 TESTING SERVICES

- A. The testing laboratory shall be (selected by the Contractor) approved by the Inspector and will be responsible for conducting and interpreting tests. The Testing Laboratory shall state in each report whether or not the test specimens conform to all requirements of the Standard Specifications and specifically note any deviation therefrom.
- B. Specific test and inspection requirements shall be as specified herein. Submit the Test Reports for Optimum moisture - maximum density of soils.

PART 2 PRODUCTS

2.01 GENERAL

- A. The Contractor shall comply with the latest revisions of Occupational Safety and Health Standards for the Construction Industry.
- B. The Contractor shall comply with all Local and State erosion and sedimentation control ordinances, laws and requirements.
- C. The materials and methods of construction required for trench stabilization and pipe bedding shall be in accordance with the latest revisions of the applicable Georgia Department of Transportation (GDOT) and American Society for Testing Materials (ASTM) standards.
- D. The Contractor shall excavate all materials encountered to the lines and grades indicated, the trenches and ditches, detailed on the drawings along the alignments shown on the drawings.

2.02 TRENCH STABILIZATION MATERIAL

- A. Trench stabilization material shall be Georgia Department of Transportation (GDOT) #3 or #357 coarse aggregate and shall conform with GDOT Section 800.

2.03 COMPACTED IMPROVED BEDDING MATERIAL

- A. Improved bedding material for water lines in rock shall be Georgia Department of Transportation (GDOT) (#57) (#68) coarse aggregate.

PART 3 EXECUTION

3.01 CLEARING

- A. Site clearing shall consist of the removal of all surface materials, structures, trees, vegetation and any other material that may exist within the construction limits and may interfere with the execution and completion of the work.
- B. The method of stripping, clearing and grubbing the site shall be at the discretion of the Contractor. However, all stumps, roots and other debris protruding through the ground surface or in excavated areas shall be completely removed and disposed of off the site by the Contractor, at his expense.
- C. Remove the existing topsoil to a depth of six (6) inches or to the depth encountered from all areas in which excavation will occur. The topsoil shall be stored in stockpiles separate from the excavated trench material. The topsoil stockpiles shall be graded to freely drain surface water, and shall have silt fence around the base.

3.02 TRENCHING

- A. The Contractor shall excavate all materials encountered to the lines and grades at the locations and stations indicated on the plans or specified herein.
- B. Excavation, unless otherwise specified, shall be open cut except highway crossings which shall be bored and jacked. The Contractor shall open no more than one hundred (100) feet of trench at one time in advance of the laying of pipe unless approved by the Inspector. Utilize means necessary to prevent surface water from washing into the trenches. Any water that accumulates in the trenches shall be removed promptly, and filtered.
- C. Trenches shall be excavated in straight lines and shall be accurately graded in order to establish a true elevation of the invert of the pipe. Trenches for water lines may be curved within the limits of curvature of the pipe as recommended by the pipe manufacturer.
- D. The width of trenches, from existing grade to one (1) foot above the top of the pipe shall be of sufficient width to permit the proper installation of bracing, shoring or sheeting, and trench boxes, if needed.
- E. The sides of the trenches shall be excavated with vertical walls to the width indicated in the details to a point one foot above the top of pipe.

- F. Excavation for structures shall be sufficient to leave at least 12 inches in the clear between their outer surfaces and the embankment. Any over-depths of excavation below such appurtenances shall be backfilled as specified above for over-depth in trenches.
- G. The trench bottom shall be excavated to provide a firm, stable, and uniform support for the full length of the pipe. Bell holes shall be provided at each joint to permit the proper joint assembly and pipe support. Any part of the trench bottom excavated below the required grade shall be backfilled to grade with trench stabilization material or improved bedding material, and compacted to provide firm pipe support. Rock, ledge rock, boulders and large stones shall be removed to provide 8 inches of soil cushion or improved bedding material on all sides of the pipe including the bottom, and on all sides of accessories. When an unstable subgrade condition is encountered which will provide inadequate pipe support, notify the Inspector. Additional trench depth shall be excavated and refilled with trench stabilization material. When blasting, shattered rock below the trench bottom line shall be removed and area below trench line shall be backfilled with suitable material or improved bedding. The sides of the trench shall be trimmed of projecting rock that hinders placing pipe or backfilling the trench.
- H. The trenches for water lines shall be a minimum of 12" wide plus the outside diameter of the bell of the pipe and shall be graded to avoid local high points. At the top of the pipe, the maximum trench width shall be the outside diameter of the pipe plus two (2) feet. Trenches shall be graded either level or on a continuous up-slope to the high points, which shall be designated on the drawings. Trenches shall be such a depth as to provide a minimum cover over the top of the pipe of 48 inches (4 feet) as measured from the existing ground surface, or the final grade, whichever is lower. Trenches shall have four (4) inches of loose soil in the bottom before pipe is placed, so pipe is firmly and continuous in contact with the soil. Pipe shall not bridge any areas. Rock larger than 3" shall be removed from the trench bottom and any voids filled with soil and improved bedding. Water service connection piping shall have a minimum cover of twenty-four (24) inches. Bell holes shall be provided at each joint to permit proper joint assembly and proper pipe support. Rock shall be removed eight (8) inches below pipe and the void filled with improved bedding material or suitable material.
- J. Where water lines cross or parallel sanitary sewers, the water lines shall be a minimum of eighteen (18) inches above the sanitary sewer. Water service pipes shall have 36 inches of cover. Water service pipes in paved street shall have their trenches backfilled completely with improved bedding material to the pavement base course.

- K. Excavated materials suitable for backfill shall be stockpiled in an orderly manner on the uphill side of the trench at a sufficient distance from the sides of the trench in order to avoid overloading the banks of the trench and to prevent slides or cave-ins. Stockpiles shall be located to prevent obstruction of driveways, roads and hydrants. All excess excavation, both suitable and unsuitable, shall be removed from the job site to a location provided by the Contractor, at his expense. Any additional suitable material required for backfilling shall be provided by the Contractor. Suitable material for backfilling shall be GW, GP, GM, GC, SW, SP, SM, SC, ML or CL as classified in the Unified Soil Classified System in accordance with ASTM D 2487 and moisture determinations in accordance with ASTM D 2216. The maximum particle size shall be as specified in Section 02209. Contractor shall provide testing results for areas under public streets..
- L. Unauthorized over-depths shall be backfilled with trench stabilization material with proper allowance for compacted improved bedding material.
- M. In areas where trenching for pipes will be in fills, the fills shall be brought to an elevation at least two (2) feet above the top of the pipe, and then the trench excavated in the compacted fill, as herein specified for trench excavation.

3.03 TRENCH STABILIZATION

- A. Whenever excessively wet or unstable material is encountered in the bottom of the trench, which in the opinion of the Inspector is incapable of properly supporting the pipe or structures, such material shall be removed and backfilled with trench stabilization material, which shall be graded to allow for the compacted bedding material or suitable material.

3.04 COMPACTED IMPROVED BEDDING MATERIAL

- A. The bottom of the pipe trench shall be excavated to a minimum over-depth of eight (8) inches below the bottom of the pipe, to provide for the compacted improved bedding material as specified in rock areas. Bedding material shall be placed, shaped and compacted so that at least the bottom quadrant or one-fourth of the pipe rests upon the material for the entire length of the pipe. The bottom structure excavations shall be excavated to a minimum over-depth of eight (8) inches below the bottom of the structure to provide for compacted improved bedding material. Bedding material shall be shaped, graded and compacted so that the entire bottom of the structure rests on the material for its entire area.
- B. Bell holes and depressions required for the jointing of the pipe shall be dug after the suitable material or compacted bedding material has been graded and shaped, and shall be only of the length, depth and width required to make the joint properly.

- C. Do not bed water pipe and water service pipes except as indicated in rock areas.

3.05

BLASTING

- A. The Authority may prohibit blasting when the method of detonation or the means of protection provided is inadequate. Blasting conducted with or without direct supervision of the Authority will not relieve the Contractor of the responsibilities stipulated herein. Contractor shall be wholly responsible and shall pay completely for any damage caused by blasting.
- B. Blasting shall be conducted in a manner to protect all property from damage and all persons from injury. Store and use explosives in accordance with the Occupational Safety and Health Act and with other Federal, State and local ordinances and regulations. The Contractor shall hold the Authority harmless for any injuries and for all damage caused by the explosives and shall satisfactorily correct and pay for all injuries and damage resulting from his use of explosives.
- C. Blasting shall not be allowed between the hours of 7:00 p.m. and 7:00 a.m., nor at any time on Sundays or Holidays.
- D. Blasters shall, at all times, have their license and blasting permits on the job site and shall allow examination by any official that may have jurisdiction.
- E. The blaster shall use only the quantity and strength of explosives necessary to rend or separate the rock. Blasting in the vicinity of any existing utilities shall be done carefully and with the knowledge and approval of the Owner of the utility. The Contractor shall conduct preblasting inspection of nearby facilities and structures, and vibration monitoring during blasting, and both shall be available to the Owner and Inspector as a certified report. Contractor shall use blasting mats, and other such precautions to prevent damage to persons or property.
- F. Blasters shall not explode or attempt to explode blasting powder or high explosives unless it is performed with a suitable electric blasting machine. Electric current from batteries, telephone or power lines shall not be used for detonation.
- G. A minimum of three (3) minutes prior to the detonation, the blaster shall inform competent flagmen, equipped with red flags, stationed at reasonable distances from the blast area at every avenue of approach, to warn all persons.
- H. Immediately after the loading and tamping of the drill hole and before fixing the blast, the material to be blasted shall be covered on all exposed sides with blasting mats or other approved protective material. After the protection has been applied, the blast shall be fired without unnecessary delay.

3.06

EXCAVATED TRENCH SUPPORT

- A. Trenches and excavations shall be sheeted and braced as required by the Occupational Safety and Health Act and any applicable State and local laws, and as required to protect the public, adjacent property and the work.
- B. Remove sheeting if removal will not result in damage to the work or the adjacent property.
- C. Sheeting left in place shall be cut off 18 inches below the existing ground surface, and shall be dimensionally located on the sets of construction drawings submitted by the Contractor to the Authority, showing "Record of Construction."

3.07

DEWATERING

- A. Excavation work shall be graded as required to prevent surface water from flowing into trenches.
- B. Trenches shall be kept dry until the pipe, appurtenances or structures have been installed complete-in-place to the extent that the work will not be damaged by water.
- C. Water which may accumulate in the trenches or other excavations shall be removed by pumping, well pointing or other approved methods, and filtered to remove sediment, in accordance with standard Erosion and Sediment Control practices..
- D. Water redirected during construction or removed from the trench will not be concentrated on property but shall be drained in a manner as to protect all property from damage.

3.08

PIPE OR STRUCTURES TO BE ABANDONED OR REMOVED

- A. Pipe indicated on the plans to be abandoned shall be plugged, capped or sealed with concrete, as specified herein.
- B. Pipe indicated on the plans to be removed shall be completely removed then backfilled with approved material and thoroughly compacted, in accordance with related backfill work specified elsewhere. Removed pipe not required in the completion of the work shall be taken from the site and disposed of by the Contractor.
- C. Structures indicated on the plans to be abandoned shall be cut off or removed to a minimum depth of twenty-four (24) inches below finished grade then backfilled with approved material and thoroughly compacted, in accordance with related backfill

work specified elsewhere. Existing frames and covers shall be returned to the Owner.

- D. Structures indicated on the plans to be removed shall be demolished and completely removed then backfilled with approved material and thoroughly compacted, in accordance with related backfill work specified elsewhere. Existing frames and covers shall be returned to the Owner.

3.09 HIGHWAY CROSSING

- A. A pipeline crossing roads designated by the Authority shall be installed in a steel or reinforced concrete casing pipe installed by the "dry case as you go" boring and jacking method. Lengths of steel pipe shall be welded to the preceding length installed. The carrier pipe shall be supported on standard manufactured product for this purpose, such as the Spider Support and Spacer Assembly by Spider Manufacturing, Inc. or equal product designed for this use. Use three units per 18 foot joint of pipe. The ductile iron carrier pipe shall be as specified for sewer and water pipe and shall be either mechanical joint or push-on joint. If the trench is allowed to be open cut, casing pipe shall be provided and the trench shall be backfilled entirely with GDOT #57, #68 coarse aggregate to the bottom of the pavement base course and the pavement restored within one day of placing the pipe.
- B. The steel casing pipe shall be sized in accordance with the detail in these specifications and shall be welded, seamless steel pipe with a minimum wall thickness of 0.25 inches conforming to the materials standards of ASTM A 139, grade B, or shall Class V, wall B minimum concrete pipe conforming to ASTM C 76. Where larger diameter casing pipes are used, thickness shall be in accordance with AREA requirements. The carrier pipe shall be blocked to prevent movement. The joints of the steel pipe shall be butt welded, watertight, in accordance with the American Welding Society's recommended procedures. The leading edge of the concrete pipe shall be equipped with a cutter or shoe to protect the pipe. Joints on the concrete pipe shall be O-ring rubber gaskets.
- C. The jacking operation shall be carried on in such a manner that settlement of the ground or the highway above the pipeline will not occur. The use of water or other fluids in connection with the boring and jacking operation shall not be allowed. Excavation shall not precede the jacking operation more than is necessary. Excavation shall be made by auger or manual methods at the Contractor's option to suit conditions encountered. The Contractor shall repair or replace, as directed by the Inspector, at his own expense, casing pipe which is damaged during the jacking operation.

- D. After installation of the casing pipe, the carrier pipe, if required, shall be installed. The carrier pipes shall be supported as hereinbefore specified. Additional blocking shall be strapped to the carrier pipe to prevent flotation or other movement of the carrier pipe. The ends of the casing shall be plugged with concrete prior to backfilling. A steel drain line to a one cubic yard french drain of GDOT #57 aggregate shall be provided.
- E. All operations of the Contractor shall be subordinate to the free and unobstructed use of the highway right of way for passage of traffic without delay or danger to life, equipment or property. The Contractor shall provide all necessary bracing, bulkheads, and shields to ensure complete safety to all traffic at all times.

3.11 SURFACE WATER CROSSINGS

- A. At above water crossings, the pipe shall be adequately supported and anchored, protected from damage and freezing, and accessible for repairs or replacement.
- B. For subsurface crossings, the Contractor shall construct the surface water crossing in the "dry" by providing a temporary cofferdam or bulkhead of non-erodible material (refer to Detail MCM-11). The cofferdam shall not obstruct more than one-half of the water surface at any time and shall not extend more than three (3) feet above the normal water surface. The Contractor shall not be allowed to operate construction equipment on the native stream bottom, except during removal of the cofferdam. The Contractor shall be advised that the level in the creek or river fluctuates rapidly.
- B. Non-erodible material shall be defined as GDOT #3 coarse aggregate. An earth core for the cofferdam may be constructed over the proposed excavation; however, the non-erodible material shall be in place prior to the placement of the earth, so that the erodible earth does not come in contact with the flowing water.
- C. A bulkhead may be constructed in lieu of the cofferdam. The bulkhead shall be made of wood, steel or some like material suitable to withstand the hydraulic forces to permit construction in a dry trench.
- D. At underwater crossings, a minimum of two feet of cover shall be provided over the pipe.
- E. The installation of ductile iron pipe with restrained push-on joints and encased in concrete may be considered with the prior approval of the Division. Otherwise, when crossing water courses which are greater than 15 feet in width, only pipes of special construction, having flexible watertight joints shall be installed.

- F. Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair (valves shall be easily accessible and not subject to flooding); the valve closest to the supply source shall be in a manhole. See detail at the end of the specifications.
- G. Sampling taps shall be installed at each end of the crossing, and permanent taps shall be made for testing and determining leaks.
- H. Construct the crossings as indicated and then remove the cofferdam, bulkhead, or whatever equipment or material that was used to construct the crossing. The bottom of the river in the construction area shall be restored to its original cross section. All disturbed areas on the banks of the river shall be seeded and mulched in accordance with Section "02931."
- I. Comply with all terms and conditions of all permits issued by the Corps of Engineers and the EPD for this work.

END OF SECTION

SECTION 02209

UTILITY BACKFILLING AND RESTORATION

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The work shall include providing all backfill equipment, materials, labor, and services required to fill, compact, restore and grade all trenched areas to the designated or required elevations.

1.02 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 02208 - Utility Excavation, Stabilization, Bedding, and Surface Water Crossing
 - 2. Section 02212 - Erosion Control and RipRap
 - 3. Section 02931 - Topsoiling and Seeding

1.03 QUALITY

- A. All materials for the compaction of the backfill shall be in accordance with the latest revisions of the applicable American Society for Testing Materials (ASTM), American Association of State Highway and Transportation Officials (AASHTO) and Georgia Department of Transportation (GDOT) standards.
- B. The Contractor shall comply with all Local and State erosion and sedimentation control ordinances and requirements.
- C. The Contractor shall maintain the surface over the trench or excavation for a period of one (1) year after final completion and acceptance of the work, both in public right of way and private property, and shall fill in any settled areas with suitable fill and reseed or with pavement as the location warrants.
- D. Backfilling shall not be done in freezing weather except by special permission of the Inspector, and it shall not be accomplished with frozen material. No fill shall be made where the material in the trench is already frozen.

- E. The Contractor shall at all times during the construction, and at its completion for final inspection, keep the trench, excavation or other parts of the work free from accumulated water.

1.04 REFERENCES

- A. American Society for Testing Materials (ASTM); latest revisions:
 - 1. D 698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort
 - 2. D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
 - 3. D 2216 Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock
 - 4. D 2487 Standard Test Method for Classification of Soils for Inspecting Purposes

1.05 TESTING SERVICES

- A. The testing laboratory shall be selected by the Contractor approved by the Owner and will be responsible for conducting and interpreting tests. The Testing Laboratory shall state in each report whether or not the test specimens conform to all requirements of the Standard Specifications and specifically note any deviation therefrom.
- B. Specific test and inspection requirements shall be as specified herein.

1.06 SUBMITTALS FOR MATERIAL USED UNDER PUBLIC STREETS

- A. Submit the following:
 - 1. Test Reports:
 - a. Optimum moisture - maximum density of soils.
 - b. Field density tests.

PART 2

PRODUCTS

2.01

SUITABLE BACKFILL MATERIAL

- A. Materials for backfill shall be suitable excavated material or suitable material obtained from other sources. Suitable material for backfilling shall be GW, GP, GM, GC, SW, SP, SM, SC, ML or CL as classified in the Unified Soil Classified System in accordance with ASTM D 2487 and moisture determinations in accordance with ASTM D 2216. The maximum particle size shall be as specified hereinafter. The material shall be within 3 percent above or below maximum dry density.
- B. Material shall consist of durable natural granular material or granular aggregates free of organic material, loam, debris, ashes, cinders, pavement, boulders or other objectionable material which cannot be thoroughly compacted. Backfilling shall be done in such a way as to prevent dropping of material directly on top of the pipe through any vertical distance greater than three (3) feet and shall be deposited in horizontal layers. No particles with a diameter greater than one (1) inch shall be placed in the initial backfill to a point one (1) foot over the top of the pipe. No rock particles with a diameter or dimension greater than five (5) inches shall be placed in the remainder of the backfill. Excavated rock particles with a diameter or dimension greater than five (5) inches shall be considered unsuitable backfill material.
- C. Material shall not contain stones larger in diameter than those specified herein, nor granite, broken concrete, masonry rubble or other material which in the opinion of the Inspector is unsuitable for backfill.
- D. Excessively wet excavated material shall not be used as backfill. Frozen material shall not be placed in the trench, nor shall approved backfill be placed upon frozen material. However, backfilling may be allowed in freezing weather with approval of the Inspector.
- E. Aggregate Backfill Material is required for trenches below concrete and asphalt paved, or surface treated streets shall be Class I material (IA1, IA2, IA3) in accordance with GDOT Section 810, compacted in 8 inch lifts. Bedding material shall be # 57 aggregate.
- F. Metallic locator tape shall be a standard manufactured product, used for the purpose of locating plastic utility pipes.

PART 3

EXECUTION

3.01

JOB CONDITIONS

- A. Aggregate backfill material shall be used under all Portland cement concrete pavement, floors, and walks, and under all asphalt pavement. All other areas shall be backfilled with suitable material as specified hereinbefore. Prior to placing backfill all organic, rubbish, debris, or other unsuitable or objectionable material within the trench shall be removed. All concrete forms shall be removed. All shoring or sheeting shall be removed or cut off at the elevation stipulated by the Inspector.
- B. Prior to placing backfill, the trench, the installed pipe, shall be visually inspected by the Inspector.
- C. Backfill material shall be placed in uniform horizontal layers and thoroughly compacted with mechanical equipment accepted by the Inspector to perform such work. The backfill shall be placed and compacted to the required subgrade depth in order to allow for the proper placement of pavement or topsoil.
- D. Backfill material shall be placed and compacted so as to not unevenly support, damage or displace the alignment of the pipe, or vaults. Backfill material shall be worked under the sides of the pipe to provide satisfactory haunching.
- E. Backfill shall not be placed or compacted against cast-in-place concrete until it has obtained sufficient strength to withstand the backfill pressure placed upon it.
- F. Prior to placing pressure pipes several inches of loose earth from the trench bottom or trench walls shall be placed in the trench bottom to provide a bedding for the pipe. In rock areas, eight (8) inches of GDOT #57, #68 coarse aggregate or suitable material shall be provided beneath the pipe with provisions being made for the bells, in accordance with the standard details. Backfill for pressure lines shall be placed by hand from the bottom of the pipe to a point 12 inches above the top of the pipe in 6 inch layers, compacted with hand mechanical tampers, equally on both sides of the pipe and appurtenances, using care to avoid damaging pipe or coatings. At one foot below subgrade, the continuous metallic pipe locator tape shall be placed in the trench, if PVC pipe or other non-metallic pipe or tubing is provided. Tape shall be required over service connections.
- G. Upon the completion of backfilling, all excess soil, stones and debris shall be disposed of off the project site by the Contractor, at his expense.

3.02

BACKFILL BELOW UNPAVED AREAS

- A. Backfill from the bottom of the pipe trench to one (1) foot above the top of the pipe shall be free of stones larger than one (1) inch in diameter and shall be placed in layers not to exceed six (6) inches and compacted with hand operated tampers.
- B. Backfill from one (1) foot above the top of the pipe to the topsoil subgrade shall be free of stones larger than five (5) inches in diameter and shall be placed in layers not to exceed twelve (12) inches and compacted with mechanical tampers.
- C. Final backfill in grassed areas shall be mounded three (3) inches above surrounding grade to allow for settlement.
- D. Trenches in which pipe or structures are to be abandoned or removed shall be backfilled to the topsoil subgrade with material free of stones larger than five (5) inches in diameter and shall be placed in layers not to exceed twelve (12) inches and compacted with mechanical tampers.

3.03

BACKFILL BELOW PAVED AREAS

- A. Aggregate backfill material shall be used under all Portland cement concrete pavement, floors, and walks, and under all asphalt pavement. All other areas shall be backfilled with suitable material as specified hereinbefore. Backfill from the bottom of the pipe trench to the subgrade shall be aggregate backfill material and shall be placed in layers not to exceed six (6) inches and shall be compacted with hand operated tampers to one (1) foot above the top of the pipe and with mechanical tampers thereafter to the subgrade.
- B. Backfill from one (1) foot above the top of the pipe to the subgrade shall be free of stones larger than five (5) inches in diameter and shall be placed in layers not to exceed six (6) inches and compacted with mechanical tampers.
- C. Final backfill in paved areas shall be mounded two (2) inches and allowed to settle for 30 days prior to pavement replacement. The trench in paved areas shall be maintained daily, as required, to provide a smooth crossing for vehicles until such time as the final pavement is placed.
- D. Trenches in which pipe or structures are to be abandoned or removed shall be backfilled to the subgrade with material free of stones larger than four (4) inches in diameter and shall be placed in layers not to exceed eight (8) inches and compacted with mechanical tampers.

COMPACTION AND TESTS

- A. Backfill shall be moistened or aerated as required to provide the proper moisture content necessary to achieve the compaction specified herein.
- B. Compaction by water, either natural or mechanical, shall not be permitted. Each layer shall be thoroughly tamped and compacted by hand or pneumatic tamper in place. Special care shall be taken in using a mechanical tamper directly over the pipe.
- C. Compaction:
 - 1. Backfill material shall be placed and compacted to the following minimum percentages of the maximum density as determined by Standard Proctor Test (ASTM D698).
 - 2. Fill from the bottom of the pipe trench to one (1) foot above the top of the pipe, each layer shall be compacted 95 percent (ASTM D698).
 - 3. Fill below unpaved areas from one (1) foot above the top of the pipe to the topsoil subgrade and in drainage channels to the topsoil subgrade, each layer shall be compacted 90 percent (ASTM D698).
 - 4. Fill below paved areas, floors, or walks, each layer to the pavement subgrade shall be compacted 95 percent (ASTM D698).
- D. Testing of backfill will be coordinated by the Inspector with an independent testing laboratory and paid for by the Developer. One field density test per lift, per 500 lineal feet, or fraction thereof, of pipe under public streets shall be performed by the Developer at his expense in the presence of the Inspector to assure compliance with the compaction requirements. If a test indicates that the required density has not been obtained, the backfill in that 500 foot reach of pipe shall be removed, replaced, recompact and retested at the Developer's expense unless the Developer can show by additional testing, at his expense, that the limit of improperly compacted material is confined to a lesser reach. Location of such tests shall be selected by the Inspector.
- E. Backfill material will be tested in accordance with ASTM D698 and D2216. Backfill that fails to meet the minimum percentages specified shall be removed replaced, recompact, and the area retested all at the expense of the Developer, to ensure the correct compaction has been performed.

RESTORATION

- A. The Developer shall, at his own expense, clean up all refuse, rubbish, scrap material and debris caused by his operations, to the end that at all times the site of the work shall not be a source of litter and shall present a neat, orderly and workmanlike appearance. Immediately following the backfilling of the trench, the Contractor shall "broom" or otherwise clean the surfaces of paved streets. All surplus material shall be removed and disposed of at this time.
- B. The Contractor shall fully restore and replace all pavement, surface structures, etc., removed or disturbed as part of the work, to a condition equal to that before the work began. All road shoulders shall be returned to City/County/State Standards prior to acceptance of installed water lines by the City of Statham. Developed property such as walks, steps, mailboxes, fences and the like, disturbed by the work, shall be restored or replaced to their original condition. Ditches shall be restored to their original shape and slope. All disturbed areas not covered by pavement or structures and all areas disturbed by the construction activity shall be fertilized, limed, seeded with the type of seed that produces a stand of grass similar to the existing, and mulched. Any washing or erosion of the surface, and any areas that seed does not germinate, and grass grow, prior to acceptance of the work, shall be repaired by the Contractor.
- C. Any property pins or monuments, moved or destroyed by the project work, shall be restored to their correct location by a licensed surveyor.
- D. Maintain the surface of any trench or excavation in a traveled right of way or paved surface in such condition as to make it passable and safe for traffic. The backfilled trench shall be maintained to the satisfaction of the Inspector in order that it remains passable and safe for traffic at all times following the backfilling of the trench and prior to the pavement restoration. Pavement restoration shall be in accordance with Section "Asphalt Paving."
- E. Restoration of underground utilities shall be in accordance with the Standards of the Utility, with respect to labor, equipment, and materials.

END OF SECTION

SECTION 02212

EROSION CONTROL AND RIPRAP

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The work shall include all labor, equipment, materials, and services required to control erosion and sediment on the project side and on areas beyond the project limits, affected by the project.

1.02 RELATED WORK

- A. Specified elsewhere:

1. Section 02208 - Utility Excavation, Stabilization, Bedding and Surface Water Crossing
2. Section 02209 - Utility Backfilling and Restoration
3. Section 02931 - Topsoiling and Seeding

1.03 GENERAL

- A. The Contractor shall maintain the work site in a clean and orderly appearance and condition at all times. All disturbed areas not designated for pavement and sidewalk replacement, and the like shall be stabilized. All stabilization measures and materials shall be in accordance with the specifications contained within the Manual for Erosion and Sediment Control in Georgia, Latest Edition.

PART 2 PRODUCTS

- 2.01 Materials shall be in accordance with the Manual for Erosion and Sediment Control in Georgia, Latest Edition, and subsequent revisions, and GDOT Standards, where indicated.

PART 3 EXECUTION

3.01 EROSION CONTROL

- A. The erosion control system shall protect adjacent properties, and property not in the immediate project area. The System shall be in accordance with the Manual for Erosion and Sediment Control in Georgia, Latest Edition and local ordinances, and shall be approved by the Inspector. All erosion control measures shall be placed prior to commencement of excavation.
- B. Temporary measures shall be applied throughout the construction of the project to control erosion and to minimize siltation of adjacent areas, property, street, drainage ditches, storm drains, and waterways. The Contractor, as a minimum, shall provide permanent or temporary soil stabilization to denuded areas within seven days after final grade is reached on any portion of the site. Any adjacent areas or property that has sediment from the project area shall be cleaned up by the Contractor.
- C. Stockpiled material left more than two days shall be surrounded at the base with a temporary sediment barrier. Slopes of stockpiled material shall not exceed 2 to 1.
- D. Vehicles leaving the construction site shall be cleaned to remove mud prior to entrance onto public rights of way.
- E. All applicable federal, state and local regulations pertaining to working in or adjacent to live watercourses shall be met. No construction materials, chemicals, or any other harmful material shall be allowed to enter the watercourse, whether directly or in runoff as a result of any project activity.
- F. Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:
 - 1. No more than 100 lineal feet of trench may be opened at one time.
 - 2. Excavated material shall be placed on the uphill side of trenches.
 - 3. Effluent from dewatering operation shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property.
 - 4. Restabilization shall be accomplished in accordance with these specifications.
 - 5. Applicable safety regulations shall be complied with.

- G. Where construction vehicle access routes intersect paved public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a public road surface, the road shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner.
- H. Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increase in volume, velocity and peak flow rate of stormwater runoff.
- I. The Contractor shall be responsible for daily inspection of temporary erosion control system to insure maximum effectiveness of the protective measures. Any damaged areas of the erosion control system shall be immediately repaired. The on-site supervisor shall provide a number where he may be contacted on a 24-hour basis during the life of the project.
- J. Disposal of excavated material, if done within the City of Stratham, shall be in accordance with the City Erosion and Sediment Control Ordinance.
- K. Minimum required measures:
1. Silt fence
 2. Topsoiling
 3. Temporary seeding
- L. Maintenance and inspections.
1. All erosion and sediment control structures and systems shall be maintained, inspected and repaired as needed to insure continued performance of their intended function.
 2. Periodic inspections will be made on all projects by the Authority. An inspection shall be made during or immediately following initial installation of erosion and sediment controls, at least once in every workday, within 24 hours following any runoff producing storm event, and at the completion of the project prior to the release of any performance bonds.
 3. In the event the Contractor repeatedly fails to satisfactorily control erosion and siltation, the Authority reserves the right to employ outside assistance or to use his own forces to provide the erosion control measures indicated and specified. The cost of such work, plus related Inspector costs, will be charged to the Contractor and paid prior to final approval of the project.

END OF SECTION

SECTION 02505

ASPHALT PAVING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The work shall include providing all paving equipment, materials, labor, and services required to return all excavated sections of streets and private drives to an original or better condition, and to provide all new pavement indicated.

1.02 RELATED WORK

- A. Specified elsewhere:

1. Section 02209 - Utility Backfilling and Restoration
2. Section 02524 - Concrete Walks
3. Section 02528 - Concrete Curbs and Curb and Gutter

1.03 REFERENCES

- A. All materials and methods of construction shall be in accordance with the latest revision of the applicable Georgia Department of Transportation (GDOT) Specifications - Construction of Roads and Bridges, Standard and Supplemental Specifications.

1.04 EXISTING FACILITIES

- A. Replace all excavated sections of pavement with similar base and surface material, and finish the grade of the surface material flush with the surrounding grade, unless specified otherwise.
- B. The Contractor shall, at his expense, raise or rework any existing signal, water, storm or sanitary sewer manholes that may require adjustment as a result of the paving work.
- C. Traffic and Lane markings and parking lines shall be painted and/or repainted by the Contractor upon the completion of the paving.

1.05 WARRANTY

- A. The Contractor shall maintain the paved surface over all excavated areas for a period of one (1) year after the work has been completed and accepted by the Owner.

1.06 JURISDICTION

- A. Note that the streets on this project are under the jurisdiction of the Georgia Department of Transportation (GDOT) and work in the street right of way will be subject to inspection by the Department. The Contractor shall apply for the GDOT permit and when issued becomes part of this specification and any requirements of the permit more stringent than these specifications shall supersede this specification. The plans shall have been submitted to GDOT for review by the Contractor. The Contractor shall pay any and all charges, fees, and assessments from the Department including the cost of the permit for this project.
- B. Note that streets on this project are under the jurisdiction of the City of Statham and work in the street right-of-way will be subject to inspection by their Inspector.

1.07 QUALITY ASSURANCE

- A. Comply with all codes, laws, ordinances, and regulations of governmental authorities including, but not limited to, the City of Statham and sanitary districts having jurisdiction over this part of the work.
- C. Pavement testing shall be in accordance with standard GDOT requirements and shall be paid for by the Developer.

1.08 TEMPORARY RESTORATION

- A. Make temporary pavement restoration when it is not feasible to immediately replace pavement after the placement and compaction of the backfill.
- B. Furnish and install crushed stone or gravel or temporary asphalt base material as required to maintain traffic until permanent pavement can be restored.
- C. Continuously maintain the temporary material in a smooth condition, free of holes or ruts, until the permanent pavement is restored. No trench in a street shall be left open overnight without lighted barricades. Maintain the surface such that dust is not a nuisance to the public.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Coarse Aggregate shall be Number 68, Grade B minimum as indicated in these specifications and shall conform with GDOT Section 800. (Use in surface treatment pavement.)
- B. Aggregate Base Material shall be Group II Graded Aggregate and shall conform with GDOT Section 815.
- C. Liquid Asphalt Material shall conform with GDOT Section 824.
- D. Asphalt Concrete Base Material shall be Base Mix Asphalt Concrete, as available, and shall conform with GDOT Section 828. Where suitable and when approved by the Inspector and the Municipality or Agency responsible for the street, other mix designs may be used.
- E. Asphalt Concrete Surface Material shall be Mix Type E Asphalt Concrete, and shall conform with GDOT Section 828. Where suitable and when approved by the Inspector and the Municipality or Agency responsible for the street, other mix designs may be used. Aggregate shall be limestone, or where indicated, granite.
- F. Paint shall conform to GDOT Section 870, for traffic areas and shall be Benjamin Moore "Ironclad Safety Zone" (white) or equal for parking stripes, and blue for handicap areas lines and symbols. Other line types and colors are specified on the drawings.

PART 3 EXECUTION

3.01 SUBGRADE

- A. Subgrade should be scarified and compacted. Subgrade shall be compacted to ninety-five (95) percent of maximum dry density as determined by ASTM D698, moistened or dried to within plus or minus three (3) percentage points of optimum moisture, and brought up to a height suitable to allow for the pavement thickness. Subgrade fill shall be suitable material as specified in Section 02209.
- B. Edges of existing asphalt concrete or surface treatment pavement shall be saw cut in a straight line using a mechanical saw manufactured for that purpose, a minimum of six (6) inches back from the edge of the trench. A planing machine shall be an acceptable alternative.

3.02

ASPHALT CONCRETE PAVEMENT

- A. Prepare subgrade by grading and compacting backfill prior to placing the base course. The surface shall be true to line and grade.
- B. Aggregate Base Course shall consist of aggregate base material as specified herein and placed in accordance with GDOT Section 310, to the compacted thickness indicated on the drawings or as a minimum to a compacted thickness of six (6) inches, on the subgrade.
- C. Asphalt Concrete Base Course shall consist of the compacted thickness indicated on the drawings or as a minimum four (4) inches compacted thickness of asphalt concrete base material as specified herein and shall be placed in accordance with GDOT Section 400 directly on the aggregate base course. Where a trench is in an area that is to receive a pavement overlay, the top of the asphalt base shall be flush with the existing, adjacent surface, and the asphalt base course shall be 4-1/2 inches compacted thickness.
- D. Tack Coat shall consist of liquid asphalt material as specified herein and applied at a rate of 0.20 gallons per square yard and in accordance with GDOT Section 413, on the asphalt base course, when more than 2 weeks have passed since the underlying surface was placed, or on existing asphalt surface is to be overlaid.
- E. Asphalt Concrete Surface Course shall consist of the compacted thickness indicated on the drawings or as a minimum two (2) inches compacted thickness of asphalt concrete surface material as specified herein and shall be placed in accordance with GDOT Section 400 on the (tacked) asphalt base course.

3.03

SURFACE TREATMENT PAVEMENT

- A. Prepare subgrade by grading and compacting backfill prior to placing the base course. The surface shall be true to line and grade.
- B. Aggregate Base Course shall consist of aggregate base material as specified herein and placed in accordance with GDOT Section 310, to the compacted thickness indicated on the drawings or to a minimum compacted thickness of six (6) inches, on the subgrade.
- C. Prime Coat shall consist of liquid asphalt material as specified herein and applied on the aggregate base course at a rate of four-tenths (0.40) gallons per square yard with a cover of coarse #68 aggregate applied at the rate of thirty (30) pounds per square yard, all conforming to GDOT Section 412, and applicable Special Provisions.

- D. The first seal coat shall consist of liquid asphalt material applied at the rate of three tenths (0.30) gallons per square yard in accordance with Section 424. Aggregate cover shall consist of coarse aggregate #89 applied at the rate of eighteen (18) pounds per square yard.
- E. The second seal coat shall be as specified for the first seal coat.

3.04 MISCELLANEOUS RESTORATION

- A. Replacement of concrete pavement shall consist of 1 ½ times the original thickness on compacted subgrade using GDOT Class A concrete, with a broom finish, (or as specified in Section 02514), reinforcing wire mesh and reinforcing steel and dowels required to result in an acceptable job..
- B. Replacement of gravel pavement shall consist of four (4) inches compacted GDOT Group II Graded Aggregate base course on the compacted subgrade.
- C. Pavement for driveways shall be restored such that the wearing surface and the base course shall each be one and one-half times the original thickness. Materials shall be of the same type as the original pavement, and shall comply with GDOT materials and construction methods for the type of pavement involved. Soil driveways shall have the disturbed area covered with four (4) inches of gravel as specified for gravel pavement replacement.
- D. Sidewalks, curbs, curb, and gutter, headwalls, steps, and other miscellaneous concrete damaged by construction shall be replaced in full sections with a light broom finish where appropriate. Concrete shall be GDOT Class AA, and conform to ASTM C-94. Sidewalk shall be 4" minimum thickness.

3.05 MISCELLANEOUS CONCRETE

- A. All miscellaneous concrete structures, steps, low walls, walks, curbs, gutters, paved ditches and the like shall utilize concrete with concrete, reinforcing and related items conforming to Sections 02524 and 03300 of these specifications.

END OF SECTION

SECTION 02524
CONCRETE WALKS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Concrete walks as shown on the Drawings and specified herein.

1.02 RELATED WORK

- A. Specified elsewhere:

1. Section 02528 Concrete Curbs and Curb and Gutter

1.03 QUALITY ASSURANCE

- A. Walks on public property and private property shall comply with all laws, rules and regulations of governmental authorities having jurisdiction over such work.

1.04 REFERENCES

- A. American Concrete Institute (ACI); latest revision:

- | | | |
|----|-------|---|
| 1. | 301 | Standard Specifications for Structural Concrete |
| 2. | 305R | Hot Weather Concreting |
| 3. | 306R | Cold Weather Concreting |
| 4. | 306.1 | Standard Specifications for Cold Weather Concreting |

- B. American Society for Testing Materials (ASTM); latest revision:

- | | | |
|----|-----|---|
| 1. | C31 | Standard Method of Making and Curing Concrete Test Specimens in the Field |
| 2. | C33 | Standard Specifications for Concrete Aggregates |
| 3. | C39 | Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens |
| 4. | C94 | Standard Specification for Ready-Mixed Concrete |

5. C143 Standard Test Method for Slump of Portland Cement Concrete
6. C150 Standard Specification for Portland Cement
7. C173 Standard Test Method for Air Content of Freshly Mixed Concrete by Volumetric Method
8. C192 Standard Method of making and Curing Concrete Test Specimens in the Laboratory
9. C231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
10. D994 Standard Specification for Preformed Expansion Joint Filler for Concrete (Asphalt Type)
11. D1751 Standard Specification for Preformed Expansion Joint Fillers for concrete Paving and Structural Construction (nonextruding and Resilient Asphalt Types)

1.05 SUBMITTALS

- A. Submit the following in accordance with Section 01340:
1. Mix Design: Concrete mix design, including report on design strength test.
 2. Joint Layout: When joints are not shown on the drawings, submit a detailed joint layout showing the location and spacing of contraction joints and expansion joints. Also show location of proposed construction joints.
 3. Test Reports on placed concrete:
 - a. Tests of materials, or review of test reports available from suppliers.
 - b. Field tests as specified herein.
 4. Procedures for placing, finishing and curing concrete.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store material at the job site in such a manner as to prevent damage. Packaged material shall be in original containers with seals unbroken and labels intact until time of use. All damaged or otherwise unsuitable material when so ascertained shall be immediately removed from the job site.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Sika Chemical Co.
Lyndhurst, NJ 07071
- B. Master Builders
Cleveland, OH 44118
- C. W.R. Grace
Cambridge, MA 02140
- D. W.R. Meadows, Inc.
Elgin, IL 60606
- E. Guardian Chemical Company
Atlanta, GA 30301
- F. Celotex Corporation
Tampa, FL 33622
- G. Tamms Industries Co.
Itasca, IL 60143
- H. PPG Industries
One Gateway Center
Pittsburgh, PA 15222
- A. Sunnyside Corporation
Wheeling, IL 60090

2.02 MATERIALS

- A. Portland Cement: ASTM C 150, Type 1, normal portland cement; uniform gray color, from single source.
- B. Aggregates: All fine and coarse aggregate shall conform to ASTM C 33.
 - 1. Fine Aggregates: Natural or artificial, hard clean sand.
 - 2. Coarse Aggregates: Crushed stone, size 57.

C. Water: Potable.

D. Air Entraining Admixture: ASTM C 260;

- | | | |
|----|-----------|-----------------|
| 1. | Sika AER | Sika Chemical |
| 2. | MB-VR | Master Builders |
| 3. | Darex AEA | W.R. Grace |

E. Dowel Bars: ASTM A 675, plain, with metal sleeves.

F. Liquid Membrane Curing Compound: ASTM C 309, Type 1;

- | | | |
|----|-----------------------|-------------------|
| 1. | Horncrete 30C | W.R. Grace |
| 2. | WR-30 Curing Compound | W.R. Meadows |
| 3. | Clear Bond | Guardian Chemical |

G. Preformed Fiber Joint Filler non-extruding, for expansion joints which are to be sealed: ASTM D 1751;

- | | | |
|----|--|--------------|
| 1. | Fiber Expansion Joint Filler, Code 1390" | W.R. Grace |
| 2. | Fiber Expansion Joint | W.R. Meadows |
| 3. | Flexcell | Celotex |

H. Preformed Asphalt Joint Filler for expansion joints which are not sealed: ASTM D 994;

- | | | |
|----|---------------------------------|--------------|
| 1. | Code 1301 | W.R. Grace |
| 2. | Asphalt Expansion Joint" | W.R. Meadows |
| 3. | Elastic Asphalt Expansion Joint | Celotex |

2.03 PROPORTIONING AND MIXING

A. The testing laboratory shall design the mix for the concrete to obtain a strength, as determined by test cylinders, at least 15 percent higher than specified.

B. Cement content shall be in accordance with the following minimum requirements:

1.	Design Strength psi	Cement Content sacks/cubic yard
	4000	5.5

- C. Ready-Mixed concrete shall conform with ASTM C 94.
- D. The mixture shall contain no more water than is necessary to produce concrete which is workable and plastic within the limits specified herein for slump. Maximum water-cementitious materials ratio shall be 0.45. Corrections shall be made for the amount of moisture contained in the aggregates and allowances shall be made for absorption of moisture by the aggregates during the period of mixing and handling. A uniform consistency shall be maintained continuously. Mixture shall contain 5-7 percent air entrainment. No calcium chloride shall be used.
- E. The slump shall be not less than 2 or more than 4 inches.

PART 3 EXECUTION

3.01 PREPARING SUBGRADE

- A. Prior to fine grading, the rough grade shall be tamped or rolled until thoroughly compacted and shall be constructed true to grade and cross section.
- B. Fine grading and filling shall be performed using sand, or other granular subbase, uniformly graded. Subgrade shall not be built-up under forms after forms are in place. Subgrade shall be tested with an approved template. High spots shall be lowered and low spots raised. Subbase shall be compacted and leveled to grade.
- C. Wet the prepared subgrade to ensure a moist condition when concrete is placed.

3.02 FORMS FOR WALKS

- A. Side forms for walks shall be of lumber of not less than 2 inches nominal thickness or of steel of equal rigidity. They shall be held securely in place by stakes or braces, with the top edges true to line and grade. The forms for walks shall be set so that the slabs shall have a fall of 1 inch vertical to 5 feet horizontal from the edge nearest the structure or property line toward the edge farthest from the structure or property line. Forms for the aprons shall have a uniform fall between the walk proper and the curb grade.

3.03 PLACING AND FINISHING WALKS

- A. The concrete shall be placed in successive batches for the entire width of the slab, struck off from $\frac{1}{2}$ to $\frac{3}{4}$ inch higher than the finished slab, tamped until all voids are removed and free mortar appears on the surface, thoroughly spaded along the edges, struck off to the true grade, and finished to a true and even surface with bull floats and darbies before bleed water appears. Use magnesium tools for air-entrained concrete.

After the water sheen has disappeared and concrete is firm enough to leave only 1/4-inch deep foot prints, the surface shall be given a final finish using floats and then by brushing with a white wash brush. The brush shall be drawn across the walks at right angles to the edges of the walks, with adjacent strokes slightly overlapping, producing a uniform, slightly roughened surface with paralleled brush marks. Water shall NOT be added to the surface to ease finishing operations.

- B. Contraction Joints: The surface shall be divided by joints which extend to 1/4 the depth of the walks, shall be not less than 1/8 inch and not more than 1/4 inch in width, and shall be edged with an edging tool having a 1/4 inch radius. Unless otherwise shown on the drawings, no slab shall be longer than 6 feet nor less than 4 feet on any one side, unless otherwise shown. The edges of the slabs shall be edged as described above.
- C. Expansion joints shall consist of preformed joint fillers of the thickness specified below. The top of the joint shall be placed 1/8 inch below the surface of the walks for unsealed joints and 5/8 inch below the surface of the walks for joints to be sealed. Where the walks are constructed adjacent to pavements or curbs having expansion joints, the expansion joints in the walks shall be placed opposite the existing expansion joints as nearly as practicable. Expansion joints shall also be placed where the walks abut existing walks, and where walks abut curbs.
 - 1. One-half inch (1/2 inch) thick expansion joints shall be placed between the walks and all structures such as light standards and buildings which extend through the walks, and at all locations where a thicker expansion joint is not specifically required.
 - 2. Three-fourth inch (3/4 inch) thick expansion joints shall be placed transverse to the direction of the walk at intervals not to exceed 40 feet, unless otherwise shown.

3.04

PLACING CONCRETE DURING HOT AND COLD WEATHER

- A. Concrete placed in cold weather shall conform with ACI 306.1 and 306R. Do not place concrete if the air temperature has fallen below or is expected to fall below 20°F within 12 hours of concrete placement without Engineer's approval. When air temperature has fallen below or is expected to fall below 40°F within 12 hours of concrete placement, uniformly heat all water and aggregates before mixing to obtain a concrete mix temperature of not less than 50°F and not more than 75°F at point of placement. Provide adequate means to maintain the temperature in the area where concrete is being placed between 50°F and 70°F for at least seven days after placement. Protect concrete from rapid dry-out during heating and avoid thermal shock due to sudden cooling or heating. No frozen materials or materials containing snow or ice shall be used in the mix.

No dependence shall be placed on salt or other chemicals for the prevention of freezing. No concrete shall be placed on frozen subgrade.

- B. Concrete placed in hot weather shall conform with ACI 305 R. During hot weather, suitable precautions shall be taken to avoid drying of the concrete prior to finishing. Windbreaks, sunshades, covering, fog sprays, etc. shall be used as required, or directed by the Engineer. Do not place concrete if the air temperature is above or is expected to rise above 95°F within 12 hours of concrete placement. When air temperature is above or is expected to rise above 85°F within 12 hours of concrete placement, maintain concrete temperatures at time of placement below 80°F. Do not place concrete any time if concrete temperature at time of placement is above 85°F.

3.05 CURING

- A. The surface of the newly placed concrete shall be wetted by fog spraying if it becomes dry before the curing material is placed. The water shall be applied as a fine fog spray so that it will not mar or injure the surface. The top and edges of the concrete shall not be unprotected for a period of more than ½ hour at the time the forms are removed.
- B. Curing shall be maintained for at least 7 days and may be accomplished by keeping the concrete moist and covering with wetted burlap, impermeable paper, or polyethylene sheeting, or by placing a liquid membrane curing compound.

3.06 INSPECTION AND TESTS

- A. Testing laboratory shall make the following inspections and tests:
 - 1. Test materials for compliance, or review available test reports.
 - 2. Verify Contractor's mix designs.
 - 3. Perform tests on placed concrete in accordance with ACI 301 and following:
 - a. Secure composite samples in accordance with ASTM C172 at point of placement unless approved in writing by the Engineer.
 - b. Perform compression strength tests in accordance with ASTM C39 for each 25 cubic yards of concrete, or fraction thereof on specimens taken immediately before placing. Make a minimum of one strength test for concrete placed in one day. A set of specimens for a test shall consist of three standard 6 x 12 cylinders, made and cured in accordance with ASTM C 31. Test one cylinder at 7 days and two cylinders at 28 days. The set of cylinders shall be picked up within 24

hours after casting and shall be delivered to testing laboratory for further curing and for testing.

- c. The strength level of the concrete will be considered satisfactory so long as the averages of all sets of three consecutive strength test results equal or exceed the specified 28-day compressive strength, and no individual strength test result falls below the specified 28-day compressive strength by more than 500 psi. Any concrete of unsatisfactory strength will be rejected and shall be removed and replaced with acceptable concrete. Such rejection shall prevail unless: (1) the Contractor, at his expense, obtains and submits evidence acceptable to the Engineer that the strength and quality of the rejected concrete is acceptable. If such evidence consists of cores taken from the work, the cores shall be obtained and tested in accordance with the standard methods of ASTM C42, or (2) the Engineer determines that said concrete is located where it will not create an intolerable detrimental effect and the Contractor agrees to a reduced payment to compensate the Owner for loss of durability and other benefits.
- d. Whenever the average of three consecutive tests, which were made to determine acceptability of concrete, falls to less than 150 psi above the specified strength or any single test falls more than 200 psi below the specified strength, the Contractor shall at his expense, make corrective changes in concrete manufacturing procedures before placing additional concrete of that class. Such changes must be approved by the Engineer prior to use.
- e. Three additional concrete cylinders shall be made during a placement which requires temporary heating. These cylinders shall be left in the enclosure in same environment as concrete placed. One cylinder shall be tested at 3 days, one at 7 days and the third at 28 days to verify adequacy of temporary heating system.
- f. Perform slump tests in accordance with ASTM C 143. Furnish slump cone at the site. Perform a minimum of one slump test for every third load (minimum) at point of placement. Include results with concrete test results.
- g. Test of air content in accordance with ASTM C 173 or ASTM C 231. Furnish and maintain equipment for testing air content at the site. Perform a minimum of one air content test for every third load (minimum) at point of placement. Include results with concrete test results.

- h. Test concrete temperature for every third load (minimum) at point of placement. Include results with concrete test reports. Test concrete temperature for every load if air temperature is below 40°F or above 85°F.

- B. If, in the opinion of the Inspector, foregoing tests indicate concrete strengths below those required, or visual defects indicate concrete of poor quality has been placed, additional tests shall be made and reported as directed by the Inspector at the expense of the Contractor.

3.07

BACKFILLING

- A. After the concrete has been cured, the spaces along the edges of the walks shall be backfilled to the required elevation with suitable material approved by the Inspector. The material shall then be compacted until firm, and the surface neatly graded, with allowance made for topsoil.

END OF SECTION

SECTION 02528

CONCRETE CURBS AND CURB AND GUTTER

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Concrete curbs and curb and gutter as shown on the Drawings and specified herein.

1.02 RELATED WORK

- A. Specified elsewhere:

- 1. Section 02505 - Asphalt Paving.
- 2. Section 02524 - Concrete Walks.

1.03 QUALITY ASSURANCE

- A. Curbs and curb and gutter on public property and on private property shall comply with all laws, rules and regulations of governmental authorities having jurisdiction over such work.

1.04 REFERENCES

- A. American Concrete Institute (ACI); latest edition:

- 1. 301 Standard Specifications for Structural Concrete
- 2. 305R Hot Weather Concreting
- 3. 306R Cold Weather Concreting
- 4. 306.1 Standard Specifications for Cold Weather Concreting

- B. American Society for Testing Materials (ASTM); latest edition:

- 1. A675 Standard Specification for Steel Bars, Carbon, Hot-Wrought Special Quality, Mechanical Properties
- 2. C31 Standard Method of Making and Curing Concrete Test Specimens in the Field
- 3. C33 Standard Specifications for Concrete Aggregates
- 4. C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

5. C94 Standard Specification for Ready-Mixed Concrete
6. C143 Standard Test Method for Slump of Portland Cement Concrete
7. C150 Standard Specification for Portland Cement
8. C173 Standard Test Method for Air Content of Freshly Mixed Concrete by Volumetric Method
9. C192 Standard Method of Making and Curing Concrete Test Specimens in the Laboratory
10. C231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
11. D994 Standard Specification for Preformed Expansion Joint Filler for concrete (Asphalt Type)
12. D1751 Standard Specification for Preformed Expansion Joint Fillers for concrete Paving and Structural Construction (Nonextruding and Resilient asphalt Types)

1.05 SUBMITTALS

- A. Submit the following in accordance with Section 01340:
1. Mix Design: Concrete mix design, including report on design strength test.
 2. Test reports on placed concrete:
 - a. Tests of materials, or review of test reports available from suppliers.
 - b. Field tests as specified herein.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store material at the job site in such a manner as to prevent damage. Packaged material shall be in original containers with seals unbroken and labels intact until time of use. All damaged or otherwise unsuitable material when so ascertained shall be immediately removed from the job site.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Sika Chemical Co.
Lyndhurst, NJ 07071
- B. Master Builders
Cleveland, OH 44118
- C. W.R. Grace
Cambridge, MA 02140
- D. W.R. Meadows, Inc.
Elgin, IL 60606
- E. Guardian Chemical Company
Atlanta, GA 30301
- F. Celotex Corporation
Tampa, FL 33622

2.02 MATERIALS

- A. Portland Cement: ASTM C 150, Type 1, normal Portland cement; uniform gray color, from single source.
- B. Aggregates: All fine and coarse aggregate shall conform to ASTM C 33.
 - 1. Fine Aggregates: Natural or artificial, hard clean sand.
 - 2. Coarse Aggregates: Crushed stone, size 57.
- C. Water: Potable.
- D. Air Entraining Admixture: ASTM C 260;
 - 1. Sika AER Sika
 - 2. MB-VR Master Builders
 - 3. Darex AEA W.R. Grace
- E. Dowel Bars: ASTM A 675, plain, with metal sleeves.

F. Liquid Membrane Curing Compound (100 percent Resin Type): ASTM C 309, Type 1;

- | | | |
|----|-----------------------|-------------------|
| 1. | Horncrete 30C | W.R. Grace |
| 2. | WR-30 Curing Compound | W.R. Meadows |
| 3. | Clear Bond | Guardian Chemical |

G. Preformed Fiber Joint Filler non-extruding, for expansion joints which are to be sealed: ASTM D 1751;

- | | | |
|----|--|--------------|
| 1. | Fiber Expansion Joint Filler Code 1390 | W.R. Grace |
| 2. | Fiber Expansion Joint | W.R. Meadows |
| 3. | Flexcell | Celotex |

H. Preformed Asphalt Joint Filler for expansion joints which are not sealed: ASTM D 994;

- | | | |
|----|----------------------------------|--------------|
| 1. | Code 1301 | W.R. Grace |
| 2. | Asphalt Expansion Joint | W.R. Meadows |
| 3. | Elastite Asphalt Expansion Joint | Celotex |

2.03 PROPORTIONING AND MIXING

A. The testing laboratory shall submit the copies of the mix design and the test results to the Inspector for approval before any concrete is placed.

B. Cement content shall be in accordance with the following minimum requirements:

1.	Design Strength psi	Cement Content sacks/cubic yard
	4000	5.5

C. Ready-Mixed Concrete shall conform with ASTM C 94.

D. The mixture shall contain no more water than is necessary to produce concrete which is workable and plastic within the limits specified herein for slump. The maximum water-cementitious materials ratio shall be 0.45. Corrections shall be made for the amount of moisture contained in the aggregates and allowances shall be made for absorption of moisture by the aggregates during the period of mixing and handling. A uniform consistency shall be maintained continuously. Mixture shall contain 5-7 percent air entrainment. No calcium chloride shall be used.

E. The slump shall be not less than 2 or more than 4 inches.

PART 3 EXECUTION

3.01 PREPARING SUBGRADE

- A. Prior to fine grading, the rough grade shall be tamped or rolled until thoroughly compacted and shall be constructed true to grade and cross section.
- B. Fine grading and filling shall be performed using sand, or other granular subbase, uniformly graded. Subgrade shall not be built-up under forms after forms are in place. Subgrade shall be tested with an approved template. High spots shall be lowered and low spots raised. Subbase shall be compacted and leveled to grade.
- C. Wet the prepared subgrade to ensure a moist condition when concrete is placed.

3.02 FORMS FOR CURBS AND CURBS AND GUTTERS

- A. Forms shall be carefully set to alignment and grade and to conform to the dimensions of the curb. All forms shall be held rigidly in place by the use of steel or wooden stakes placed at intervals not to exceed 4 feet. The forms on the front of the curb shall not be removed less than 2 hours nor more than 6 hours after the concrete has been placed. Forms for back of curbs shall remain in place until the face or top of the curb has been rubbed and finished. In no event shall forms be removed while the concrete is sufficiently plastic to slump in any direction.

3.03 PLACING AND FINISHING CURBS AND CURBS AND GUTTERS

- A. Concrete shall be placed in the forms to the specified depth in 6 inch layers and thoroughly consolidated by tamping and spading so that there are no rock pockets at forms, and mortar entirely covers top surfaces. The surface of the top of the curb shall be edged with the proper edging tool and floated and finished with a smooth wood float or a concrete rubbing block until it is true to grade and section and uniform in texture. Immediately after removing the front curb form, the face of the curb shall be rubbed with a wood or concrete rubbing block until all blemishes, form marks, and tool marks have been removed. The face of the finished curb shall be true and straight, and the top surface of curbs shall be of uniform width, free from humps, sags, or other irregularities. When a straightedge 10 feet long is laid on the top or face of the curb, the surface shall not vary more than 1/8 inch from the edge of the straightedge, except at grade changes or curves. All visible surfaces and edges of the finished curb shall be free of all blemishes and form and tool marks and shall be uniform in color, shape, and appearance.
- B. Expansion joints and contraction joints shall be provided in all curbs and curbs and gutters, and shall be constructed at right angles to the line of curbs, as specified

hereinafter and as shown. Provide dowels with metal sleeves in expansion joints as required.

1. Contraction joints shall be formed in the fresh concrete immediately after removal of the forms and as a part of the finishing operation. Form contraction joints by cutting a groove 1-1/4 inches in depth in the top and face of the curb using an approved cutting tool having a blade 1/8 inch wide and jointer having a radius of 1/8 inch.
2. Expansion joints shall be formed by means of the specified type preformed filler material, cut and shaped to the cross-section of the curb. Expansion joints shall be provided in curbs at the ends of all returns and directly opposite the expansion joints of abutting concrete pavement, and unless otherwise shown shall be of the same thickness as the joints in the pavement. Three-fourth inch (3/4 inch) thick expansion joints shall be placed at intervals not exceeding 60 feet except as otherwise shown.

3.04

PLACING CONCRETE DURING HOT AND COLD WEATHER

- A. Concrete placed in cold weather shall conform with ACI 306.1 and 306 R. Do not place concrete if the air temperature has fallen below or is expected to fall below 20°F within 12 hours of concrete placement without Inspector's approval. When air temperature has fallen below or is expected to fall below 40°F within 12 hours of concrete placement, uniformly heat all water and aggregates before mixing to obtain a concrete mix temperature of not less than 50°F and not more than 75°F at point of placement. Provide adequate means to maintain the temperature in the area where concrete is being placed between 50°F and 70°F for at least seven days after placement. Protect concrete from rapid dry-out during heating and avoid thermal shock due to sudden cooling or heating. No frozen materials or materials containing snow or ice shall be used in the mix. No dependence shall be placed on salt or other chemicals for the prevention of freezing. No concrete shall be placed on frozen subgrade.
- B. Concrete placed in hot weather shall conform with ACI 305 R. During hot weather, suitable precautions shall be taken to avoid drying of the concrete prior to finishing. Windbreaks, sunshades, covering, fog sprays, etc. shall be used as required, or directed by the Inspector. Do not place concrete if the air temperature is above or is expected to rise above 95°F within 12 hours of concrete placement. When air temperature is above or is expected to rise above 85°F within 12 hours of concrete placement, maintain concrete temperatures at time of placement below 80°F. Do not place concrete any time if concrete temperature at time of placement is above 85°F.

3.05

CURING

- A. The surface of the newly placed concrete shall be wetted by fog spray if it becomes dry before the curing material is placed. The water shall be applied as a fine fog spray so that it will not mar or injure the surface. The top and edges of the concrete shall not be unprotected for a period of more than ½ hour at the time the forms are removed.
- B. Curing shall be maintained for at least 7 days and may be accomplished by keeping the concrete moist and covering with wetted burlap, impermeable paper, or polyethylene sheeting, or by placing a liquid membrane curing compound.

3.06

INSPECTION AND TESTS

- A. Testing laboratory shall make the following inspections and tests:
 - 1. Test materials for compliance, or review available test reports.
 - 2. Verify Contractor's mix designs.
 - 3. Perform tests on placed concrete in accordance with ACI 301 and following:
 - a. Secure composite samples in accordance with ASTM C172 at point of placement unless approved in writing by the Inspector.
 - b. Perform compression strength tests in accordance with ASTM C39 for each 25 cubic yards of concrete, or fraction thereof on specimens taken immediately before placing. Make a minimum of one strength test for concrete placed in one day. A set of specimens for a test shall consist of three standard 6 x 12 cylinders, made and cured in accordance with ASTM C 31. Test one cylinder at 7 days and two cylinders at 28 days. The set of cylinders shall be picked up within 24 hours after casting and shall be delivered to testing laboratory for further curing and for testing.
 - c. Perform slump tests in accordance with ASTM C 143. Furnish slump cone at the site. Perform a minimum of one slump test for every third load (minimum) at point of placement. Include results with concrete test results.
 - d. Test of air content in accordance with ASTM C 173 or ASTM C 231. Furnish and maintain equipment for testing air content at the site. Perform a minimum of one air content test for every third load

(minimum) at point of placement. Include results with concrete test results.

- e. Test concrete temperature for every third load (minimum) at point of placement. Include results with concrete test reports. Test concrete temperature for every load if air temperature is below 40°F or above 85°F.

- B. If, in the opinion of the Inspector, foregoing tests indicate concrete strengths below those required, or visual defects indicate concrete of poor quality has been placed, additional tests shall be made and reported as directed by the Inspector at the expense of the Contractor.

3.07 BACKFILLING

- A. After the concrete has been cured, the spaces along the edges of the walks and curbs shall be backfilled to the required elevation with material approved by the Inspector. The material shall then be compacted until firm, and the surface neatly graded, with allowance made for topsoil

END OF SECTION

SECTION 02605

PIPE, JOINTS, FITTINGS AND APPURTENANCES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The work shall include providing all equipment, materials, labor and services required to provide all piping, joints, fittings and appurtenances specified and indicated.

1.02 RELATED WORK

- A. Specified elsewhere:

- 1. Section 02209 - Utility Backfill and Restoration
- 2. Section 02505 - Asphalt Paving
- 3. Section 02524 - Concrete Walks
- 4. Section 02528 - Concrete Curbs and Curb and Gutter

1.03 QUALITY ASSURANCE

- A. All materials and appurtenances required for the work shall be new, of first class quality and shall be furnished, delivered, erected, connected and finished in every detail as specified or indicated. All materials found defective, regardless of the circumstances, shall be replaced with new material at the expense of the Contractor.
- B. Comply with all codes, laws, ordinances and regulations of governmental authorities including, but not limited to, local municipalities and sanitary districts having jurisdiction over this part of the work. All work shall comply with the applicable provisions of AWWA Specifications, latest revision.
- C. All materials that come in contact with drinking water shall not adversely affect drinking water quality and public health and must be certified for conformance with ANSI/NSF Standard 61.
- D. Any pipe, solder, or flux used in the installation or repair of the public water distribution system shall be lead free with not more than 8.0% lead in pipes and fittings, and not more than 0.2% lead in solders and flux.

REFERENCES

- A. The materials specified for the construction shall comply with the latest revisions of the applicable American Society for Testing Materials (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI) and the Georgia Department of Transportation (GDOT) standards, and the Standard Details herein.
- B. Georgia Department of Transportation (GDOT) Specifications - Construction of Roads and Bridges and Standard Details; latest revisions.
- C. American National Standards Institute (ANSI)/American Water Works Association (AWWA); latest revision:
1. ANSI/AWWA C 104/A 21.4 Pipeline Coatings and Linings
 2. ANSI/AWWA C 110/A 21.10 Fittings, Flanges and Valves
 3. ANSI/AWWA C 111/A 21.11 Gaskets
 4. ANSI/AWWA C 151/A 21.51 Pipe, Iron
 5. ANSI/AWWA C 153/A 21.53 Ductile Iron Compact Fittings, 3" through 16" for Water and Other Liquids
 6. ANSI/AWWA C500 Gate Valves for Water and Sewerage Systems
 7. ANSI/AWWA C502 Dry-Barrel Fire Hydrants
 8. ANSI/AWWA C509 Resilient Seated Gate Valves for Water and Sewerage Facilities
 9. ANSI/AWWA C600 Installation of Ductile-Iron Water Mains and their appurtenances
 10. ANSI/AWWA C651 Disinfecting Water Mains
 11. ANSI/AWWA C800 Underground Service Lines Valves and Fittings
 12. ANSI/AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inch through 12 inch for Water Distribution

- | | | |
|-----|----------------|--|
| 13. | ANSI/AWWA C909 | Molecularly Oriented Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in. for Water Distribution |
| 14. | ANSI/AWWA C901 | Polyethylene (PE) Pressure Pipe, Tubing and Fittings, ½ inch through 3 inch, for Water Service |

1.05 SUBMITTALS

- A. Shop drawings, catalog data sheets, diagrams, design calculations, and other such data necessary to describe completely and to substantiate compliance with the drawings and specifications shall be submitted for all materials, joints and accessories specified in this section. As a minimum, shop drawing submittals shall be made for pipe, valves, fire hydrants, fittings, and harnessing method. Three copies of each shop drawing shall be submitted.

1.06 CONNECTION REQUIREMENTS

- A. All persons requiring a two (2") inch or larger tap must make application at the City of Statham City Hall at least seven (7) working days prior to the date the tap is to be made. It is the responsibility of the Contractor to locate the underground utilities and to protect them. Utility lines or services damaged by the Contractor shall be repaired by the Contractor at his own expense.
- B. The Contractor shall furnish the following information when making application:
1. An approved plan for the project
 2. A copy of the Street or Highway permit, if applicable.
 3. The meter size and detector application if the application is for an apartment, shopping center, etc.
 4. The billing address and purchase order, if required.
 5. The plan and profile of the meter installation if two (2") inch or larger.
- C. Water Line Tap Made on City of Statham System:
1. All taps must be approved by the City of Statham.
 2. The Authority shall be notified four (4) working days prior to the date of the tap on the main.
 3. The Contractor shall locate the main line valves on both sides of the tap on the main line.
 4. Authority personnel shall supervise the service taps and associated work by private contractors.
 5. All taps shall be made on existing mains and new mains under pressure (wet taps).

6. A minimum of twenty-four (24) hours advance notice shall be given to any occupied building served by a waterline which is required to be shut off. Occupants shall be informed of the date, and the time of the cut-off, and the duration of the stoppage. Failure to follow this procedure will make the Contractor liable and responsible for any damages reported to the City of Statham relating to the shut-off.

D. All services shall be metered.

PART 2 PRODUCTS

2.01 PIPE SELECTIONS

- A. The Contractor shall install only one (1) type of pipe between structures except where ductile iron pipe is specified or indicated. Where existing pipe is to be replaced or extended the same type of pipe shall be installed, unless specified or indicated otherwise. All piping shall be installed in strict accordance with the recommendations of the manufacturer.
- B. Water pipe shall be ductile cast iron, or AWWA polyvinyl chloride (AWWA PVC). Minimum diameter shall be 6 inches. PVC pipe shall have metallic locator tape placed one (1) foot below final grade, above the pipe. Carrier pipes in casing pipes shall be ductile iron pipe, supported on standard manufactured devices used for this purpose, such as "Spyders".
- C. Water service pipes connecting a main to a meter shall be polyethylene tubing, minimum diameter 3/4 inches. Water service lines shall include tracer wire over centerline of pipe.

2.02 TYPES OF PIPE

- A. Ductile iron pipe shall conform with AWWA C 151/ANSI 21.51 and fittings shall conform with ANSI/AWWA C 110, or C153 (compact fittings). Fittings shall be pressure rated at a minimum of 250 psi, and shall be cement lined. Rubber gaskets shall conform to ANSI/AWWA C111/A21.11. The pipe and fittings shall be asphalt coated and cement lined in accordance with AWWA C 104/ANSI 21.40. The pipe thickness shall conform with AWWA C 150/ANSI 21.50 and shall be thickness class 51, suitable for working pressure of 350 psi, as a minimum, through the 12" size unless specified or indicated otherwise. Fittings for water pipe shall be mechanical or push-on joint. Fittings shall be either ductile iron or gray iron. For larger diameter pipe, the pipe Pressure Class shall be 300 psi. Pipe shall be marked in accordance with AWWA C151, Section 4.6, Marking the Pipe.

- B. Polyvinyl chloride (PVC) pipe for water lines shall conform to AWWA C900 and shall have a wall thickness dimension ratio of 14 (pressure rated at 200 psi). The pipe shall have an outside diameter conforming to the dimensions of cast iron pipe. The pipe shall be listed by Underwriters Laboratory and shall be Factory Mutual approved. The pipe shall have a factory installed coupling or gasket bell end. Solvent cement shall not be used. Fittings shall be cast iron as specified for ductile iron pipe. Pipe shall bear the approval of the National Sanitation Foundation Standard 61 for potable water use, and ASTM D1784, Type 1, Grade 1 (at a maximum interval of 5 feet). Pipe shall meet all the requirements set forth in ASTM Standard D 2241. Gaskets shall comply with ASTM F477 and ASTM D3139. Pipe shall be from a single manufacturer. Pipe shall be marked in accordance with AWWA C900, Section 6.1, Marking. Lubricants shall be non-toxic, shall not promote biological growth, and shall be certified for conformance of the National Sanitation Foundation Standard 61 for potable water use.
- C. Molecularly oriented polyvinyl chloride (PVCO) pressure pipe for water lines shall conform to AWWA C909 and shall have a pressure class rating of 200 psi. The pipe shall have an outside diameter conforming to the dimensions of cast iron pipe. Certification for use in potable-water service shall meet the requirements of ANSI/NSF 61. The pipe shall be listed by Underwriters Laboratory and shall be Factory Mutual approved. The pipe shall have a factory installed coupling or gasket bell end. Solvent cement shall not be used. Fittings shall be cast iron as specified for ductile iron pipe. Pipe shall bear the approval of the National Sanitation Foundation Standard 61 for potable water use, and ASTM D1784, Type 1, Grade 1 (at a maximum interval of 5 feet). Gaskets shall comply with ASTM F477 and ASTM D3139. Pipe shall be from a single manufacturer. Pipe shall be marked in accordance with AWWA C909, Section 6.1, Marking.
- D. Polyethylene tubing shall conform to AWWA C 901 and shall be PE 3406 code designation. Tubing shall be the size indicated with an IDR of 5.3, Pressure Class 200 psi (burst pressure 800 psi). Pipe shall be National Sanitation Foundation Standard 61 approved, and shall conform to ASTM D2837 and D15599

2.03 JOINTS AND COUPLINGS

- A. General: The Contractor shall include in his bid a sum sufficient to cover the cost of the field services of experienced and qualified representatives of the manufacturer whose products are approved for the work. Such representative shall be available to instruct the Contractor's personnel in the proper jointing procedure to be used to secure the best possible joints with the materials selected.
- B. Ductile iron pipe and fittings for buried service shall be either mechanical or bell and spigot type joints as specified or indicated. Joints shall be made with a single watertight rubber gasket manufactured in accordance with AWWA C 111/ANSI 21.11. The joints shall be made in strict accordance with the recommendations of the

pipe manufacturer. Joints for above ground or in-vault service shall be flanged joints in accordance with AWWA C115.

- C. Joints for PVC water pipe shall be elastomeric gaskets conforming to AWWA C900. All fittings and valves shall be mechanical joint. When assembling the PVC pipe to the fittings, the rubber gasket supplied with the fitting shall be used. The rubber ring provided with the PVC pipe shall not be used. When connecting to the mechanical joints, the beveled spigot of the PVC pipe is not required. The beveled end of the pipe shall be cut off prior to insertion into the mechanical joint fitting.
- D. Joints for polyethylene tubing shall be couplings manufactured by Ford Meter Box Company, Mueller, McDonald or equal.
- E. Couplings to join different types of pipe together shall be standard manufactured fittings designed for this purpose and specifically designed for the pipe sizes and materials connected.

2.04 WATER SYSTEM APPURTENANCES

A. Gate Valves and Blowoff Valves:

1. Gate valves and blowoff gate valves (3" and larger) shall be compression resilient seated valves conforming to AWWA C509. Valves 12" and smaller shall be pressure rated for 200 psi. The valve shall be designed so that no sliding or shear on the resilient seating surface is present when compressed to a drop tight shut off. Valve shall seal equally well in either direction. Valve shall provide fully open waterway. Valve shall have O-ring sealing and a fusion bonded epoxy coating inside and out. Valve shall be permanently lubricated. Valve shall have a manganese bronze, non-rising stem and nut with anti-thrust washers. Operating nut shall be 2 inch square, and shall open counterclockwise. Valve shall be mechanical joint. The valves shall be AFC-2500 by American Flow Control, Ken-Seal Fig. 4571, by Kennedy Valve, or F-6100 by Clow Corporation.
2. Gate valves smaller than 3 inch shall be bronze with ends to suit piping and shall be 200 psi working pressure. Valves shall be Stockham Figure B103, B104, or B109 or equal.
3. Each gate valve shall be provided with a valve box constructed of cast iron with a round base. The valve box shall be the two piece, screw type with a five and one-quarter inch shaft and the cover shall be slotted for easy removal. Covers shall have the word "WATER" cast into them. The valve box shall be Tyler Model 562-S, Clow Model F-2454, or similar models as manufactured by Richard Foundry Corporation.

access to the site at all times. All pipe work shall be left open until the Inspector views the work. The trench may be backfilled with the approval of the Inspector if the work is inspected by the close of the working day. No valves, hydrants, tees, harnessing, or lot services shall be backfilled without the approval of the Inspector.

- B. Contractor shall repair or replace, at his expense, any length of pipe, structure, pavement, and any material that is found or tested to be defective or deficient during the work or within one (1) year after the work has been completed and accepted by the Authority.
- C. Any unfaithful or imperfect work that may be discovered before the final acceptance of the work shall be corrected immediately on the requirement of the Inspector, notwithstanding that it may have been overlooked or approved by the proper inspector. The inspection of the work shall not relieve the Contractor of any of his obligations to perform sound and reliable work as herein described. And all the work, of whatever kind, which during its progress, and before it is finally accepted may become damaged for any cause, shall be properly taken up or removed so much of its as may be objectionable and be replaced by good and sound work satisfactory to the Inspector.

3.02 PIPE TESTS

- A. All pipe shall be tested by the Contractor in the presence of the Inspector before being incorporated into the work. Inspector shall be notified to schedule inspections and tests. When laid, pipe shall not be covered unless and until inspected by the Inspector and permission granted. The necessary facilities for proper inspection and testing shall be provided by the Contractor.

3.03 TESTING OF WATER LINES

- A. After placing all harnessing and all valve support concrete, sufficient backfill shall be placed prior to filling the pipe with water and field testing to prevent lifting of the pipe. When local conditions require that the trenches be backfilled immediately after the pipe has been laid, the testing shall be carried out after backfilling has been completed but prior to placement of the permanent surface. At least seven (7) days shall elapse after the last valve support or hydrant block has been cast (Type I Portland Cement) prior to testing, unless high early strength concrete (Type III) is used, in which case three (3) days shall elapse.
- B. All testing will be performed in accordance with the AWWA C600, current revision.
- C. Pressure Test: After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 1.5 times the working pressure at the point of testing, but not less than 150 psi, whichever is greater.

1. Test pressure restrictions. Test pressures shall:
 - a. not be less than 1.5 times the working pressure, but not less than 150 psi, whichever is greater at the highest pressure point along the test section;
 - b. not exceed pipe or thrust restraint design pressures;
 - c. be of at least 2-hour duration;
 - d. not vary by more than + 5 psi;
 - e. not exceed twice the rated working pressure of the valves or hydrants when the pressure boundary of the test section includes closed gate valves or hydrants;
 - f. not exceed the rated pressure of any valve, hydrant, or service.
2. Each valved section of pipe shall be filled with properly disinfected water slowly and the specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Inspector.
3. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. Taps shall be added at high points if hydrants or blow-off valves are not located where needed.
4. All exposed pipe, fittings, valves, hydrants and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the Inspector.

- D. A leakage test shall be conducted concurrently with the pressure test. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 2 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133,200}$$

in which L is the allowable leakage, in gallons per hour; S is the length of pipeline tested in feet; D is the nominal diameter of the pipe, in inches; and P is the average test

pressure during the leakage test, in pounds per square inch gauge. When testing against closed metal-seated valves, an additional leakage per enclosed valve of 0.0078 gal/hr/in. of nominal valve size shall be allowed. When hydrants are in the test section, the test shall be made on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than the allowable amount, the Contractor shall, at his own expense, locate and repair the defective material until the leakage is within the specified allowance. All visible leaks are to be repaired regardless of the amount of leakage.

3.04 INTERMEDIATE INSPECTIONS

- A. The Inspector shall be allowed access to inspect any work to insure compliance with the plans and specifications. All valves shall be located and operation checked. All hydrants shall be operated.
- B. Any inspection by the Inspector that may have overlooked or approved improper or damaged work shall not relieve the Contractor of the responsibility to repair or replace the defective or damaged work.

3.05 FINAL INSPECTION

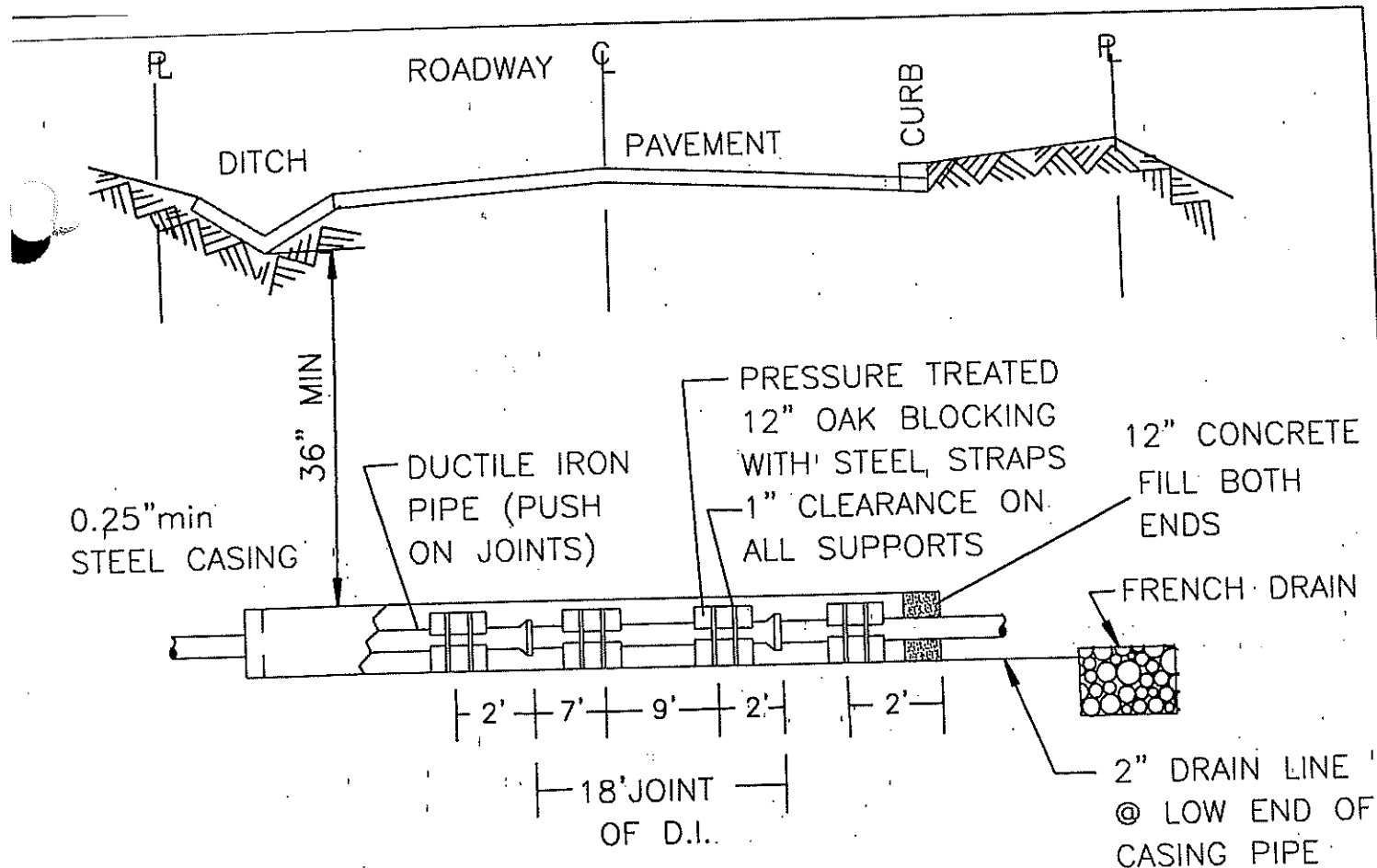
- A. Prior to the final inspection, repair or replace any damaged pipe, pavement, curb and gutter, landscaping, or any other items. The entire system shall be watertight with the valve boxes and hydrants set at the proper elevations.
- B. Upon notification by the Contractor of the completion of any major part of the work, the Inspector shall carefully inspect the part of the work, in part and as a whole and make such tests as will satisfy him that every provision of the contract has been faithfully carried out. The project site shall be clean, and all excess materials removed.

3.06 ACCEPTANCE OF THE WORK

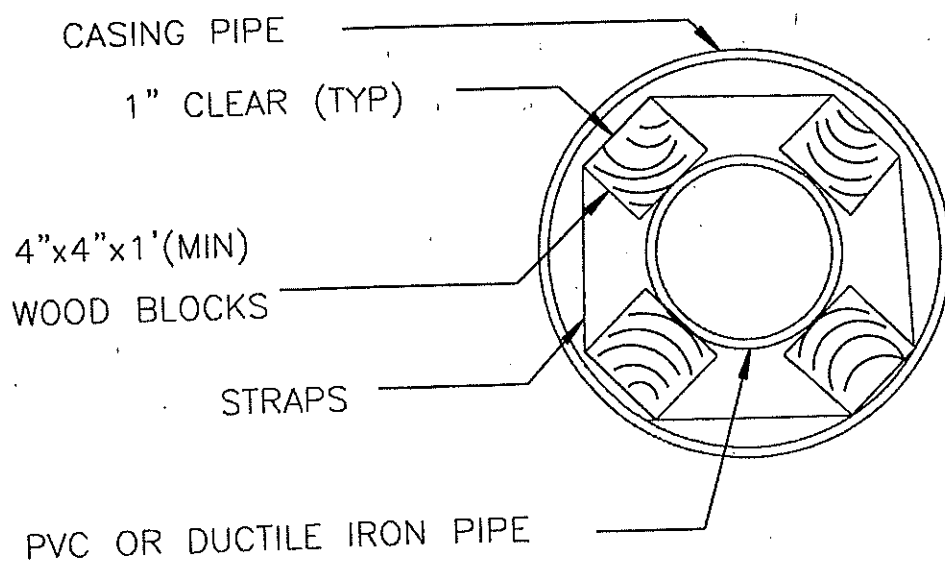
- A. Contractor shall do and provide the following prior to requesting an intermediate or final inspection:
 - 1. Complete the work and clean the job site.
 - 2. Written description of the length of water line by the line size.
 - 3. For line projects, two (2) copies of the as built water plans from a surveyor or engineer showing location of lines, fire hydrants, air release valves, valves, tap locations, and lot services. Locations shall show distances from curb and property pins. Valves at intersections shall have triangle locations.
 - 4. For site projects, two (2) copies of the as built plans showing location, size, and elevation of all existing and proposed sewer lines, and water lines, and of any easements required; location of all fire mains, and fire hydrants, valves, and appurtenances; and location, size, and number of dwelling units and buildings.

5. Inspection shall be complete as herein specified.
6. A check sheet issued if corrective work is required.
7. Disinfection has been completed and testing completed as herein specified.
8. The City of Statham has issued a letter of acceptance for the work when the requirements of Sections 02666 and 02980 are met.
9. Acceptance of the job by the City of Statham is subject to final inspection.

END OF SECTION



NOTE: STEEL CASING TO EXTEND TO BACK OF CURB, DITCH, SIDEWALK, ETC. OR MIN 3' PAST PAVEMENT



PIPE CASING DETAIL

NOTES:

1. BLOCK SPACING FOR PVC PIPE SHALL BE 4'-0" MAX
2. WHERE INDICATED ON THE DRAWINGS PVC PIPE CAN BE USED IN LIEU OF D.I.
3. SEE SPECS FOR ALTERNATES TO WOOD BLOCKS AND STRAPS



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CONSULTING ENGINEERS - SURVEYORS

HIGHWAY CROSSING DETAIL

DETAIL
NUMBER

MC M-1

EXST. ASPHALT / CONCRETE SURFACE

NEW ASPHALT / CONCRETE SURFACE

SAW CUT

TACK COAT

12"
(MIN)

NEW BASE COURSE

EXST BASE COURSE

PRIME COAT

PAVEMENT TRANSITION
DETAIL

DETAIL
NUMBER

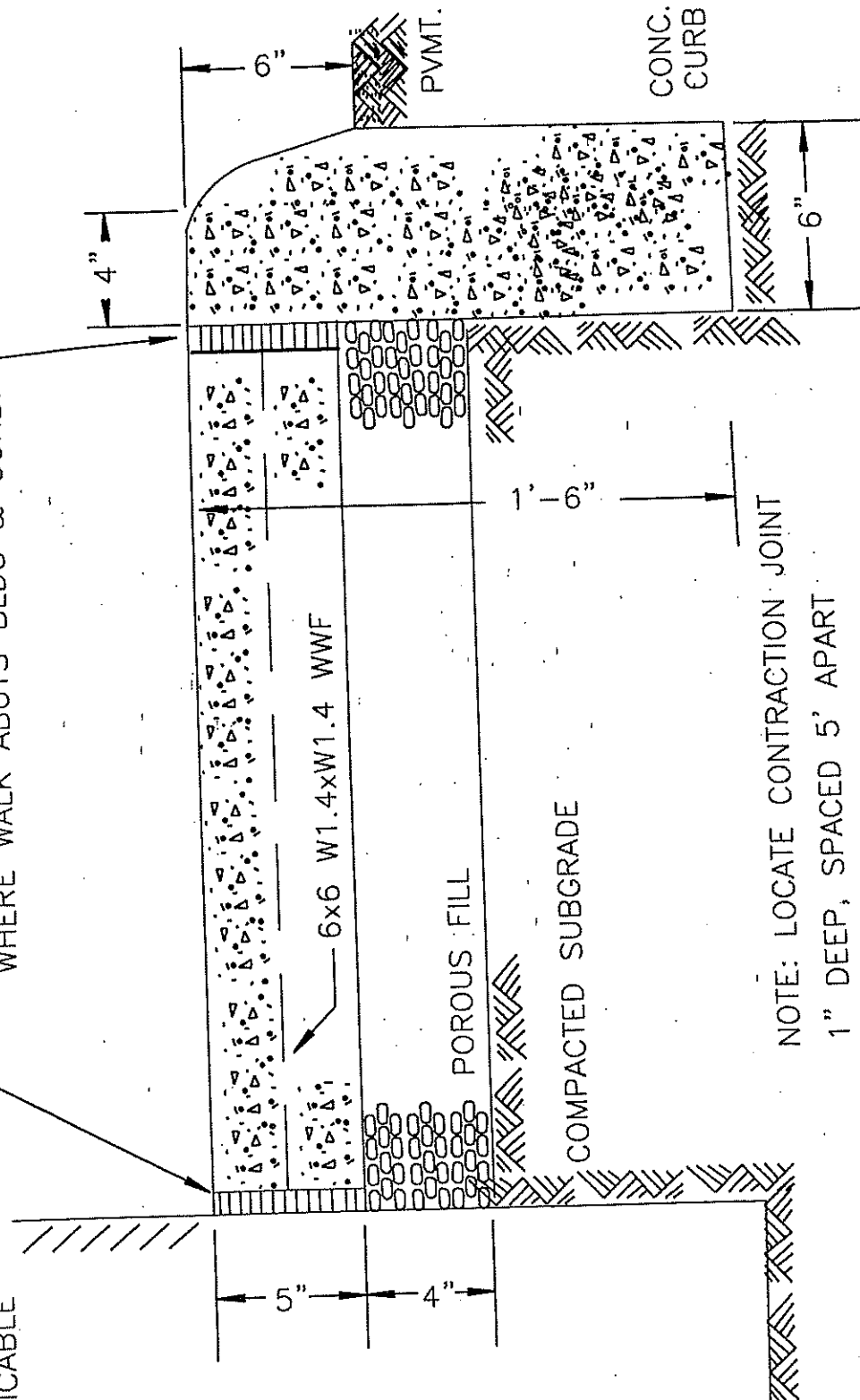
MC M-7



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EXPANSION JOINT WITH 1/2"
PREMOLDED JOINT FILLER,
WHERE WALK ABUTS BLDG & CURB.

BLDG WHERE
APPLICABLE



NOTE: LOCATE CONTRACTION JOINT
1" DEEP, SPACED 5' APART
EXPANSION JOINTS SHALL BE
LOCATED EVERY 40' (MAX SPACING)

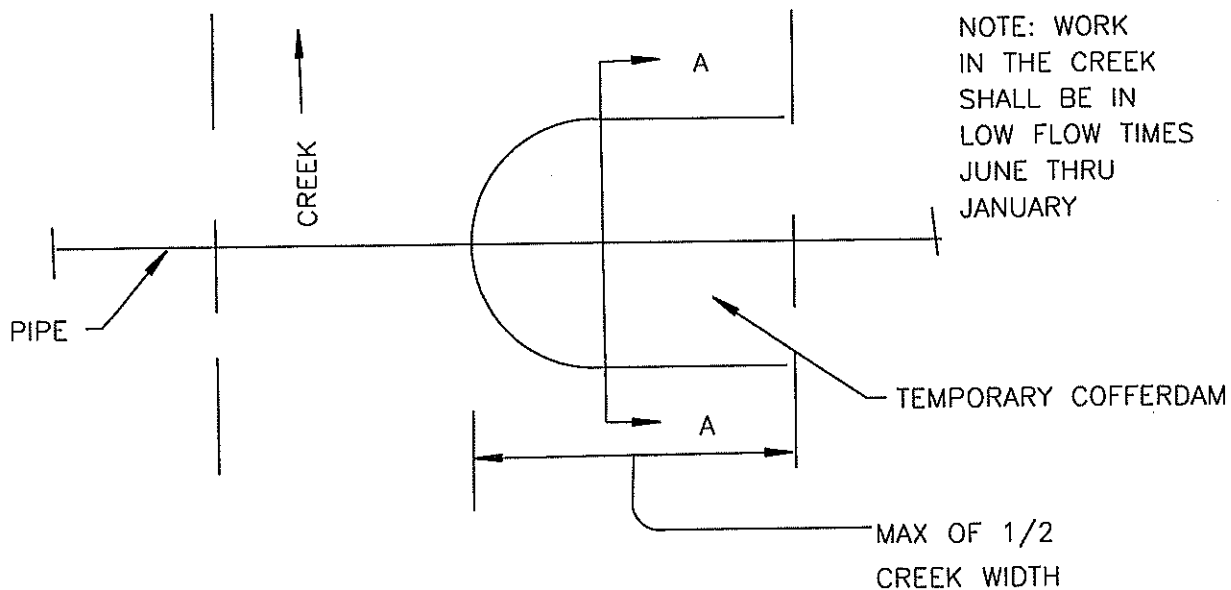
TYPICAL SIDEWALK SECTION

DETAIL
NUMBER

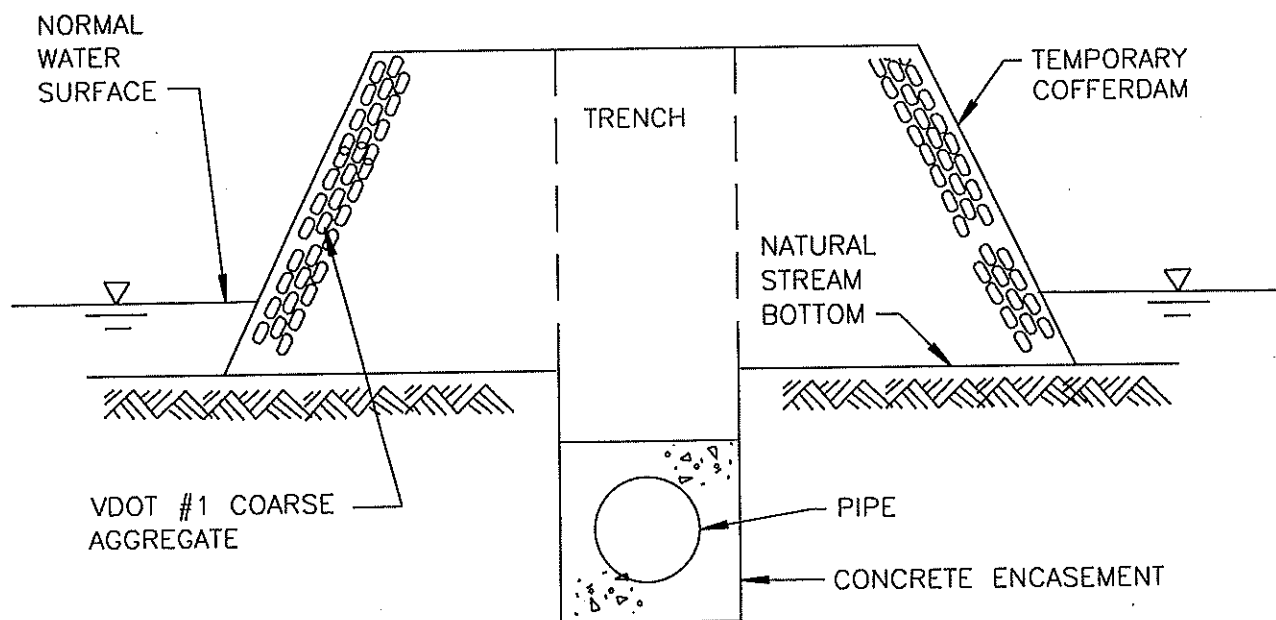
MC M-9



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PLAN
NO SCALE



SECTION A-A
NO SCALE



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DETAIL
TEMPORARY COFFERDAM
NO SCALE

DETAIL
NUMBER
MC-M11

- B. Fire hydrant laterals shall include 6-inch ductile-iron pipe, as specified, 6 inch gate valve with valve box, frame and cover. Fire hydrants shall be a maximum of 500 feet apart, measured center to center along the main. A fire hydrant shall be installed at the end of any line, regardless of the distance to the last preceding hydrant. Where appropriate, hydrants shall be at the high points of the main.
- C. Fire hydrants shall conform to AWWA C 502 (latest revision) and shall be dry top, dry barrel, compression type with double O-ring seals on the operating chamber suitable for 150 psi working pressure. Hydrants shall be designed for water mains having three feet-six inch (3.5) feet minimum cover; however, each proposed location shall be coordinated by the Contractor as to the exact setting depth required. Hydrants shall be the "breakable" type made in two sections with flange or "break" feature 2 inches above grade. Main valve stem shall be made in two sections with a breakable coupling. Hydrants shall be equipped with a 5 1/4 inch valve opening, and a 7 inch minimum inside diameter standpipe. Each hydrant shall have a 6 inch mechanical joint shoe, two (2) 2-1/2 inch hose nozzles with National Standard threads connection and one (1) 4-1/2 inch pumper nozzle with threads matching the City of Statham standard. Prior to ordering hydrants, Contractor shall confirm with local fire department that nozzles, threads, and operating nut suit their standards. Each hydrant shall be provided with one operating wrench for its operating stem nut. The operating stem nut shall match those in the City of Statham system, and shall have same direction of opening and paint colors as the City system. Hydrant shall have at least two bronze drain valves. Hydrants shall be coated and painted in accordance with AWWA C502, with colors to suit the Owner's standard. The upper and lower operating stems shall be joined by a safety coupling, located to prevent damage to hydrant valve when upper standpipe is damaged. Hydrants shall be shop tested in accordance with AWWA C502. The fire hydrants shall be M&H Model 129.
- D. Restrained Joints (Thrust Restraint) shall be provided at all points where hydraulic thrust may develop to prevent movement to all bends, tees, valves, plugs and hydrants. Restrained joints (harnessing assemblies) shall be provided where specified, and shall be suitable for a 150 psi working pressure and a 150 psi water hammer. Harnessing of joints shall be accomplished with friction clamps on each pipe and at least two tie bolts extending across the joint connecting the friction clamps, or with a bent bar strap extending around the fitting and across the fitting joint to a friction clamp on the adjacent length of pipe. Tie bolts and bent bar straps shall conform to ASTM A 193, grade B8M and shall be a minimum size of 5/8" diameter. All clamps, washers, tie bolts, and straps shall be galvanized steel, and shall comply with the requirements of the National Fire Protection Association Standard NFPA-24 for Outside Protection. The restraint devices shall be manufactured by ITT-Grinnell Corporation, Star Industries or equal. The LOK-FAST joint, as manufactured by American Cast Iron Pipe Company, the Megalug by Ebba Iron Inc., or equal, is an acceptable alternative to the tie bolt systems. Restraint of PVC pipe shall be accomplished with Series 1300 or 1350 restraints as manufactured by Uni-Flange, installed in strict accordance with the PVC pipe manufacturer's instructions.

E. Water Service Connections

1. Water service connections shall include all 3/4 inch diameter pipe (tubing) and fittings required at the depths encountered (minimum 24 inches cover) to run the service to the property line or the connection point to the residence's system as indicated. The length shown on the drawings is an approximate value and the location shall be adjusted to suit the requirements of each residence. The connection shall include all lineal footage of pipe required to serve the residence or business indicated and the connection of the new service line to the building water line. All service lines must bear the National Sanitation Foundation (NSF) seal for potable water use. The work shall include the tap at the main, the tapping saddle for PVC pipe, the corporation stop, the insert stiffeners, the service pipe, the meter, the meter setter, the meter stop valve, the angle check valve, the meter box and cover, the pressure reducing valve, if required, the connection to the existing meter or pipe, if required, and the cap of the tubing, if connection is to be made in the future. The equipment shall all be compatible with the tubing provided. All pipe connections shall be made by the compression method. Any pipe, solder, or flux used in the installation or repair shall be lead free with not more than 8.0% lead in pipes and fittings, and not more than 0.2% lead in solders and flux.
2. All connections which are indicated or directed to be for future use shall be capped with a standard, manufactured cap installed in strict accordance with the manufacturers recommendations. Each cap shall be marked by a 2 x 4 x 18 inch stake, with the end painted dark blue, driven at the cap, flush with the ground.
3. Taps of the new or existing mains shall be made on the top quadrant of the main and shall be made with a standard tool designed for this purpose. Tapping saddle for PVC pipe shall be Ford Model S90, and for ductile iron pipe shall be Ford Model 202B. Each tap shall be threaded and shall be provided with a 3/4"quarter bend coupling and a 3/4"corporation stop. Corporation stops shall be suitable for 250 psi working pressure, and shall be Type F1000 as manufactured by Ford Meter Box Company, or equal. Quarter bend couplings shall be Type LO2 as manufactured by Ford Meter Box, or equal. Curb stops shall be Ford Model F-44-333 MW with padlock wings. Insert stiffeners shall be stainless steel, Ford Model 51. Additional couplings and unions shall be provided as required. Service clamps shall be Ford FC-101 or equal, and be provided for each corporation stop if PVC water pipe is provided, and no taps shall be made where pipe is discolored. Multiple taps on the same length of pipe shall be located on slightly different planes and separated by at least three (3) feet.

4. Meter setters shall be 3/4" by 5/8" coppersetter (or meter yoke tandem type for use with a pressure reducing valve ahead of the meter, as needed), with 9 inch rise with end connections to suit tubing provided, an angle meter ball valve and a dual cartridge check valve, all as manufactured by Ford or equal. The pressure reducing valve shall be Watts Model U5, Wilkins No. 70, or equal.
 5. Meters shall be 3/4" by 5/8" inch cold water meters, Neptune T10 with encoder, reading in U. S. gallons.
 6. The meter boxes shall be suitable for a 24 minimum inch depth burial of the water service line. Meter boxes shall be Brooks Model 1419 with lid Model No. 290-TR suitable for radio read meters.
 7. Ball valves shall be Watts Model 600. All service connections shall have a back flow valve approved by the Authority.
- F. Approved automatic air relief valves shall be installed at the high points in the system as shown on the drawings. Each assembly shall consist of a riser pipe, gate valve, fittings, and a precast concrete manhole cone section (including frame and cover). The riser shall be galvanized pipe. Fittings shall be galvanized. Gate valves shall be inside screw, solid bronze, tapered seat and double disc with a working pressure of not less than 250 psi. The open end of the air relief pipe shall be extended to at least one (1) foot above grade and provided with a screened downward facing elbow. An APCO #143C(1") or #200A(1") air relief valve, a PL-10 by Crispin or approved equal shall be used on lines smaller than twelve (12) inches in diameter. A two (2) inch air relief valve shall be used on lines equal to or larger than twelve (12) inches. The two (2) inch air relief valve shall be an APCO #145C(2") or #200C(2"), a PL-20 by Crispin, or approved equal.
- G. Tapping sleeves shall be all stainless steel (18-8 Type 304) style FAST as manufactured by Ford Meter Box Co. or equal. Tapping sleeves shall have mechanical joint ends and flanged outlets conforming to Class 250, ANSI B16.1. Tapping valves shall meet the requirements of ANSI/AWWA C509.
- H. Pressure Reducing Valves
1. The pressure reducing and sustaining valve shall maintain any desired downstream-delivery pressure for which Reducing Pilot Valve is adjusted provided the upstream head does not drop below a determined head. In event upstream head drops to a minimum pressure for which Sustaining Pilot Valve is adjusted, it will cause the main valve to close to sustain the minimum pressure in the higher pressure system, and not serve the lower pressure system, until the head in the higher pressure system comes back to or more than normal. The valve shall be completely piped ready for installation.

SUPPLEMENTARY DRAWINGS

2.
 - a. This valve shall be hydraulically operated, diaphragm-actuated, globe valve. It shall contain a resilient, synthetic rubber disc, having a rectangular cross-section, contained on three and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. The diaphragm assembly containing a valve stem shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm shall consist of nylon fabric bonded with synthetic rubber and shall not be used as the seating surface.
 - b. The pressure reducing pilot control shall be a direct-acting, adjustable, spring loaded, normally open diaphragm valve which closes when downstream pressure exceeds the spring setting.
 - c. The pressure sustaining pilot control shall be a direct-acting, adjustable, spring loaded normally closed diaphragm valve which opens when upstream pressure exceeds the spring setting. The control system shall include a strainer-orifice assembly.
 - d. This valve shall be Clayton 92G-01 Combination Pressure Reducing and Pressure Sustaining Valve as manufactured by Cla-Val Co., Newport Beach, California, the 723 valve by Bermad Control Valves of Leaverton, CT, or approved equal. The valves shall have a V-port plug and a valve position indicator.
3.
 - a. As an alternate, the main valve shall operate on the differential piston principle such that the area on the underside of the piston is no less than the pipe area, and the area on the upper surface of the piston is of a greater area than the underside of the piston.
 - b. The valve piston shall be guided on its outside diameter by long stroke stationary Vee ports which shall be downstream of the seating surface to minimize the consequences of throttling. Throttling shall be done by valve Vee ports and not the valve seating surfaces.
 - c. The valve shall be capable of operating in any position and shall incorporate only one flanged cover at the valve top from which all internal parts shall be accessible. There shall be no stems, stem guides, or spokes within the waterway. There shall be no springs to assist the valve operation.

- d. The valve body shall be of cast iron ASTMA-126 with flanges conforming to the latest ANSI Standards. The valve shall be extra heavy construction throughout. The valve interior trim shall be bronze B-62 as well as the main valve operation.
 - e. The valve seals shall be easily renewable while no diaphragm shall be permitted within the main valve body.
 - f. All controls and piping shall be of non-corrosive construction.
 - g. A visual valve position indicator shall be provided for observing the valve piston position at any time.
 - h. The valve shall be as manufactured by GA Industries of Mars, Pennsylvania and shall be Figure #43 for 2" and smaller and shall be Fig. 4700-D (globe) for 3" or larger, or equal.
4. Valve sizes and pressure settings shall be as scheduled on the drawings, and shall be installed in the vaults detailed and indicated. The pressure settings shall be field adjustable.

2.05 POST INDICATORS AND VALVES

- A. Post indicator valves shall be designed for use of post indicators and shall have an indicator post flange. Valves shall be "UL" and "FM" approved and shall conform to AWWA C-111. Valves shall be Fig. 70X or 71X by Kennedy or equal.
- B. Indicator post shall be "UL" and "FM" approved and shall be 54120 Series by Kennedy or equal. Post shall be suitable for the depth of bury specified and required.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Installation of all materials and equipment shall be in accordance with manufacturer's recommendations and instructions, and in accordance with all regulations and rules as promulgated by the City of Statham, whichever is more stringent. Installation of all hydrants, valves, valve boxes, services, meters, waterlines, etc. shall be in accordance with applicable standard design drawings of the City of Statham.

END OF SECTION

SECTION 02666

WATER SYSTEM INSTALLATION

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The work shall include the providing of all proper materials, equipment, tools, accessories, labor and services required to install the water system, complete-in-place, using sound standard Inspecting techniques and construction practices.

1.02 RELATED WORK

- A. Specified elsewhere:

- 1. Section 02209 - Utility Backfilling and Restoration
- 2. Section 02505 - Asphalt Paving
- 3. Section 02605 - Pipe, Joints, Fittings and Appurtenances
- 4. Section 02980 - Inspections and Tests

1.03 QUALITY ASSURANCE

- A. The water system installation shall conform to AWWA C600, latest revision, the manufacturer's recommendations, and the Georgia DNR EPD. Any equipment, tool or accessory found to be defective or not in a fit condition to accomplish the work continuously and expeditiously shall be promptly replaced with satisfactory equipment.
- B. Include the expense of procuring the field services of experienced and qualified manufacturer representatives for the approved materials. The representative shall instruct the Contractor's employees as to the proper installation procedure for the particular material.
- C. Comply with all codes, laws, ordinances and regulations of governmental authorities including, but not limited to the City of Statham.

1.04

REFERENCES

- A. Georgia Department of Transportation (GDOT) Specifications - Construction of Roads and Bridges and Standard Details; latest revisions.
- B. American National Standards Institute (ANSI)/American Water Works Association (AWWA):
 - 1. ANSI/AWWA C110/A21.10 Fittings, Flanges and Valves
 - 2. ANSI/AWWA C111/A21.11 Gaskets
 - 3. ANSI/AWWA C151/A21.51 Pipe, Iron
 - 4. ANSI/AWWA C502 Dry-Barrel Fire Hydrants
 - 5. ANSI/AWWA C509 Resilient Seated Gate Valves for Water and Sewerage Facilities
 - 6. ANSI/AWWA C600 Installation of Ductile-Iron Water Mains and their appurtenances
 - 7. ANSI/AWWA C651 Disinfecting Water Mains
 - 8. ANSI/AWWA C800 Underground Service Lines Valves and Fittings
 - 9. ANSI/AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe 4 inch through 12 inch for water
 - 10. ANSI/AWWA C901 Polyethylene (PE) Pressure Pipe, Tubing and Fittings, ½ inch through 3 inch, for water

1.05

WORKING PRESSURE

- A. The working pressure in the system varies from 80 psi to 150 psi, depending on location.

PART 2

PRODUCTS - Not Used

PART 3 EXECUTION

3.01 PVC PIPE

- A. If PVC water pipe is used, it shall have the same outside diameter as cast iron pipe, and therefore shall be assembled directly into the mechanical joint fittings. The mechanical joint rubber ring that comes with the mechanical joint fitting or valve, shall be used to make the joints. The beveled end of the pipe shall be cut off prior to insertion into the mechanical joint.

3.02 ADJUSTMENTS

- A. Before the start of the construction, dig test pits on all crossings of and connections to determine existing system location, size and piping material. Care shall be taken at crossings for hydrants so that new hydrants have the required setting depth. Fire hydrant extensions shall be provided, where required, at no additional cost to the Owner. Based on the location and the elevation of the pipe in each test pit, the horizontal and vertical alignment of the new pipe shall be adjusted to avoid sharp changes in direction or localized high points.

3.03 LAYING PIPE AND INSTALLING APPURTENANCES

- A. Proper implements, tools and facilities as approved by the Inspector shall be provided and used. All pipes, fittings, valves and appurtenances shall be lowered carefully into the trenches by means of derricks, ropes or other suitable equipment. Under no circumstances shall water system materials be dropped or dumped into the trenches. All pipe shall be installed with the bell ends facing the direction of laying or flow and in accordance with the recommendations of the pipe manufacturers and as directed by the Inspector.
- B. The water pipe shall be laid and maintained at the required lines and grades with fittings and valves at the required locations. The cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner, without damage to the pipe, so as to leave a smooth end at right angles to the axis of the pipe. Care shall be taken to avoid damaging the lining. Flame cutting of pipe with oxyacetylene torch will not be permitted.
- C. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the trench. If the pipe-laying crew cannot put the pipe into the trench and in place without getting earth into it, the Inspector may require that a heavy, tightly woven canvas bag of suitable size be placed over each end of the pipe before lowering the pipe into the trench and left there until the connection is to be made to the adjacent pipe. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe.

- D. Any pipe, solder, or flux used in the installation or repair of public water systems shall be lead free with not more than 8.0% lead in pipes and fittings, and not more than 0.2% lead in solders and flux.
- E. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or other means approved by the Inspector. This provision shall apply during the noon hour as well as overnight. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry.
- F. Before joints are made the pipe shall be well bedded on a firm foundation and no pipe shall be brought into position until the preceding length has been thoroughly embedded and secured in place. Any defects due to settlement shall be made good by the Contractor at his expense. Bell holes shall be dug sufficiently large to insure the making of proper joints.
- G. All tees, bends, plugs and abrupt change in direction of the water lines three (3) inches and larger in diameter shall be either harnessed. Hydrants and their isolation gate valves shall be harnessed to the main water pipe and shall be harnessed such that the hydrant could be removed and the valve would still be harnessed to the main water pipe.
- H. The trench may be curved to change direction or to avoid obstructions within the limits of the curvature of the pipe (joint deflections) as recommended by the pipe manufacturer. Where necessary to maintain the required curvature, short sections of pipe or fittings shall be provided. Restraint shall be provided for these short sections of pipe or where fittings are provided for the water pipe.
- I. All fittings, valves and hydrants shall be supported by concrete independently of the pipe. All bends, tees, and changes in direction or changes in pipe size shall be provided with harnessing. Joints between the pipe and the mechanical joint fittings shall be made in accordance with the pipe manufacturer's requirements with a lubricant supplied by the pipe manufacturer. All nuts shall be tightened to the torque listed below:

BOLT SIZE - INCHES TORQUE - FT. LBS.

5/8	40 - 60
3/4	60 - 90
1	70 -100

Nuts shall be tightened on alternate sides of the gland until the pressure on the gland is equally distributed.

- J. Valves shall be installed in accordance with ANSI/AWWA C 600 with the operator's stems in the vertical plane through the pipe axis and perpendicular to the pipe axis. Valves shall be located where shown on the drawings and shall be supported on a concrete cradle so that no load transfers to the pipe. Valves shall be thoroughly cleaned before installation and shall be checked for satisfactory operation. All underground valves shall be equipped with valve boxes. Valve boxes shall be set in alignment with the valve stem centered on the valve nut, and shall be set to prevent transmitting shock or stress to the valve. The cover shall be set flush with the finished ground surface or pavement. Pour concrete collars around all valve boxes and place concrete valve marker post at all valves located outside paved areas.
- K. Fire hydrants shall be installed in accordance with ANSI/AWWA C 600 where indicated on the drawings in accordance with the details. The hydrants shall be set plumb at the elevation of existing or finished grade, whichever is higher and shall be supported on a concrete cradle so that the drain line is not obstructed and so that no load transfers to the pipe. The pumper nozzles shall be placed perpendicular to the street line with nozzles at least 18 inches above grade. Hydrant shall be harnessed as hereinbefore specified and as indicated. Drainage fill shall be provided at the base of the hydrant, as detailed.
- L. Carefully remove existing hydrants indicated on the drawings and shall deliver them to a location designated by the Authority.

3.04 DEAD ENDS

- A. Dead ends shall be minimized by making appropriate tie-ins wherever practical.
- B. Where dead-end mains occur, they shall be provided with a fire hydrant, when fire flows are available, or with an acceptable flushing hydrant or blow-off for flushing purposes. The blow-off shall be at least 2-inches in diameter, but must be appropriately sized to provide flushing velocities of 2.5 feet per second or greater in the water main being flushed.
- C. In locations where valves and/or plugs are installed for future expansion, measures must be taken to prevent stagnant water from developing in the main. This may be accomplished by providing a flushing hydrant, blow-off line or other measures approved by the City, Engineer or EPD.

3.05 RELATION OF SANITARY SEWER AND STORM DRAINS TO WATER MAINS

- A. For relation of sanitary sewer and storm drains to water mains, see Section 02080, paragraph 3.04.

3.06

CONNECTIONS TO EXISTING SYSTEM

- A. Provide the connections to the existing system under a pressure condition or non pressure condition, as indicated, complying with the Authority's requirements for the time of day such work can be done. The tapping sleeves and valves shall be as specified in Section 02605. The Contractor shall pay all costs associated with the connections.

3.07

DISINFECTION

- A. All pipe, fittings, hydrants, meters, and valves shall be disinfected, tested and flushed in accordance with AWWA Standard C651 (latest revision) and minimum Standards for Public Water Systems - Georgia DNR EPD. Water required for sterilization, testing and flushing shall be provided by the City of Statham. In no circumstance shall any meters or services be connected to a dry main or a main that has not been disinfected, tested and accepted by the City of Statham.
- B. Chlorine Solution Method: the disinfection solution shall be liquid sodium hypochlorite conforming to ANSI/AWWA B300 containing 5 to 15% available chlorine. The solution used shall have a free chlorine residual concentration not less than 25 mg/l. A table is in the Division's "Minimum Standards for Public Water Systems" that gives dosages for various size mains.
- C. Contractor shall provide all materials, equipment, necessary taps and perform all work required for the sterilization, testing and flushing of the water main. All tests shall be performed only by the City of Statham, and its health officers, and only they will give approval to tie in customers.
- D. No tested section of water line shall be approved to deliver water service until a favorable laboratory report has been achieved. Any tested section of water line failing to meet the requirements specified shall be repaired by the Contractor and retested until the results are within the limits specified.
- E. The water main or valved off section that has been completed shall be filled, tested and flushed. Test locations shall be subject to the discretion of the Inspector and as valves and blow-offs permit. Flushing velocities shall be 2-5 feet per second minimum.
- F. As soon as the main or valved off section has been laid and sufficiently backfilled for safety, water shall be turned on and the main allowed to fill slowly. The water flowing into the section shall not have a velocity greater than one foot per second. Care shall be exercised not to flush the main at this time. Air only shall be allowed to escape.

- G. During the disinfection process, valves shall be manipulated to prevent the treatment dosage from falling back into the line supplying the water. The application shall not cease until the entire section is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least 24 hours, during which time all valves and hydrants in the system shall be operated in order to disinfect the appurtenances. At the end of this 24 hour period, the treated water shall be tested and shown to contain no less than 10 milligrams per liter (ppm) of available chlorine throughout the section.
- H. After the retention period, the heavily chlorinated water shall be flushed from the system with potable water until the chlorine concentration in the water leaving the system is no higher than that generally prevailing in the system, or less than one milligram per liter. Neutralizing chemicals such as sulfur dioxide, sodium bisulfite, or sodium sulfite shall be used to neutralize the chlorine. The heavily chlorinated water shall not be allowed to flow into adjacent natural waterways. The chlorine residual determinations shall be made to ascertain that the heavily chlorinated water has been removed from the system. The disposal of the heavily chlorinated water shall be in accordance with Section 6 (and Appendix B) of AWWA C651.
- I. After final flushing, and before the water system is placed in service, at least two consecutive bacteriologically satisfactory samples shall be collected from the end of the section and from each appurtenance. In no case shall the interval between bacteriological stations exceed 1000 feet. The samples shall be collected at least 24 hours apart. The samples shall be analyzed by a certified laboratory. Samples shall be tested for bacteriological quality and shall show the absence of coliform organisms. If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained. The Contractor shall arrange for and pay for all sampling.
- J. All water mains shall be hydrostatically tested in accordance with Section 02980.

END OF SECTION

SECTION 02931

TOPSOILING AND SEEDING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The work shall include providing all equipment, materials, labor and services required to establish permanent vegetation cover over all areas disturbed by construction.

1.02 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 02208 - Utility Excavation, Stabilization, Bedding, and Surface Water Crossing
 - 2. Section 02209 - Utility Backfilling and Restoration

1.03 GENERAL

- A. Materials shall be delivered in unbroken containers, clearly marked by the manufacturer as to contents. Limes, Fertilizer and Seed shall be labeled as to proportions, analysis and quality. Store all materials in a manner affording protection from damage by weather or vandalism. Seed shall produce a stand of grass the same as in adjacent areas.
- B. Follow the specifications set forth in strict fashion except as directed by the Inspector. Should a soil test or other competent test data indicate such a change is necessary, the Inspector will direct the Contractor accordingly.

1.04 REFERENCES

- A. The materials and method of construction for protective covering and erosion control shall be in accordance with the latest revisions of the Georgia Department of Transportation (GDOT) Standards and Specifications, and the Manual for Erosion and Sediment Control in Georgia, latest edition.

1.05 JOB CONDITIONS

- A. Topsoil shall be stockpiled, on the project site, for reuse on all disturbed areas in the grading and landscape work, and in lawns. Additional topsoil required for the project shall be provided by the Contractor.

- B. Seeding shall not begin until all site work has been completed, except utility trenches shall be seeded so that no more than 500 lineal feet remain unseeded at any one time. Seeding shall not be performed on frozen or muddy grounds or when prevailing winds exceed five (5) miles per hour.

PART 2 PRODUCTS

2.01 LIME

- A. A soil test shall be made of the area using the guidelines included in these specifications unless one is readily available and shall be made available to the Inspector. The test shall provide among other information, the required fertilizer and the relative pH of the soil and the amount of lime needed in tons per acre or pounds per one thousand square feet to be applied to correct the pH to a satisfactory level of between 6.0 and 7.0. Lime shall be applied at the rate indicated by the soil test. The fertilizer shall be an agricultural grade 10-20-10 or any equivalent 1-2-1 ratio fertilizer. The rate of application shall be as recommended by the soil test.

2.02 SEED

- A. Seed shall be the type and variety stated and shall conform to all State and Federal seed laws. Seed used shall be delivered in the manufacturer's original container except where a blend is desired and supplied by a competent recognized blending source. Prior to seeding, scarify the topsoil surface with a rake to a minimum depth of 1/4 inch. The application of seed shall be by broadcast, hydroseeder, or other equipment approved for application by the Inspector. The Contractor shall take great care to insure that the seed is not sown into landscaping areas or asphalt and/or concrete pavement. This includes bed areas, landscaped berms, parking and drive areas as well as sidewalks, etc. The seeded area shall remain undisturbed until the application of mulch immediately following the application of the seed.

2.03 MULCH

- A. Mulch shall be straw or grain mulch as described, or wood cellulose fiber. Straw mulch shall be from oats wheat and or barley and shall be free of noxious weeds and noxious weed seeds. The straw will not contain sticks rocks or other objectionable material and will not be wet, moldy or otherwise undesirable. Straw mulch shall be applied at the rate of 2000 pounds per acre. Wood cellulose fiber mulch shall be applied at the rate of 1500 pounds dry weight per acre. Mulch shall cover 60 to 75 percent of the area. The application of wood cellulose fiber mulch shall cover 85 to 90 percent of the area.
- B. Take all necessary precautions to prevent the application of the wood cellulose fiber mulch, straw or binders onto streets, walks, landscaped areas, fixtures, fences and signs in the area to be mulched.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

- A. All subgrade for finished lawn areas and drainage channels shall be raked to remove all debris and stones over two (2) inches in diameter. All subgrade for open field areas and shoulders shall be raked to remove all debris and stone over three (3) inches in diameter.
- B. Prior to spreading topsoil, the subgrade shall be loosened to a minimum of four (4) inches by tilling, disking or harrowing.

3.02 TOPSOIL PREPARATION

- A. Topsoil shall be spread over the prepared subgrade in all lawn areas to a minimum depth of four (4) inches. Bond topsoil to subgrade by tilling, disking or harrowing. Topsoil shall not be spread over the subgrade when either the topsoil or subgrade are frozen or excessively wet. Where topsoil is not applied, the surface of finished grade shall also be prepared as specified for topsoil hereinafter. Prior to seeding finished lawn areas and drainage channels, topsoil surface shall be raked to remove all debris and stones over two (2) inches in diameter and to smooth any surface irregularities. Prior to seeding open field areas and shoulders, topsoil shall be raked to remove all debris and stones over three (3) inches in diameter and to smooth any surface irregularities.

3.03 PREPARATION OF AREAS TO BE SEEDED

- A. Preparation of Residential Lawn Areas:
 - 1. Topsoiled Lawn Areas:
 - a. On areas that are to receive topsoil placement, disk the surface of the subsoil grade to a depth of four to five inches to insure that the topsoil bonds to the subgrade. Before topsoil is placed remove large rocks, roots and other debris that may interfere with the placement of the topsoil. Rake the area smooth and remove roots, rocks and other debris that may interfere with the seeding operation.
 - 2. Non-Topsoiled Lawn Areas:
 - a. In the absence of topsoil placement, use a disk or harrow to loosen the top four inches of soil. Rake the area smooth and remove roots, rocks and other debris that may interfere with the seeding operation.

3.04 APPLICATION

- A. The fertilizer, lime, seed and mulch shall be applied to the indicated and specified areas in accordance with the standard procedures and required rates, and in accordance with standard practices and recommendations of the suppliers and manufacturers.

3.05 PROTECTION AND MAINTENANCE OF SEEDED AREAS

A. Protection and Maintenance of Seeded Areas:

1. After the seeding is completed in a particular area, the area shall be protected from vehicular, and or foot traffic by erecting, barricades, signs, ropes or other such devices to prevent traffic where necessary. Surfaces gullied or otherwise damaged following seeding shall be repaired and re-graded as required and re-seeded as directed by the Inspector.
2. The maintenance of the seeded lawn areas shall also include periodic weeding mowing and re-seeding and re-fertilizing as necessary to insure that a satisfactory stand of turf is produced by the end of the Establishment Period. Surfaces gullied or otherwise damaged following seeding shall be repaired and regraded as required and reseeded as directed by the Inspector.

3.06 ACCEPTANCE OF SEEDED AREAS

A. Acceptance of Seeded Areas:

1. The acceptance of seeded areas shall be when a uniform stand of the desired species exists, free of bare areas and weedy areas as a result of poor germination and/or development. The acceptance of the seeded area shall be by the Inspector and shall be provided to the Contractor in writing.

END OF SECTION

SECTION 02980

INSPECTIONS AND TESTS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The work shall include providing all necessary equipment, material, labor and services required to properly test and inspect all work. Work in this Section shall be at the Contractor's expense

1.02 RELATED WORK

- A. Specified elsewhere:

1. Section 02209 - Utility Backfilling and Restoration
2. Section 02505 - Asphalt Paving
3. Section 02605 - Pipe, Joints, Fittings and Appurtenances
4. Section 02666 - Water System Installation

1.03 REFERENCES

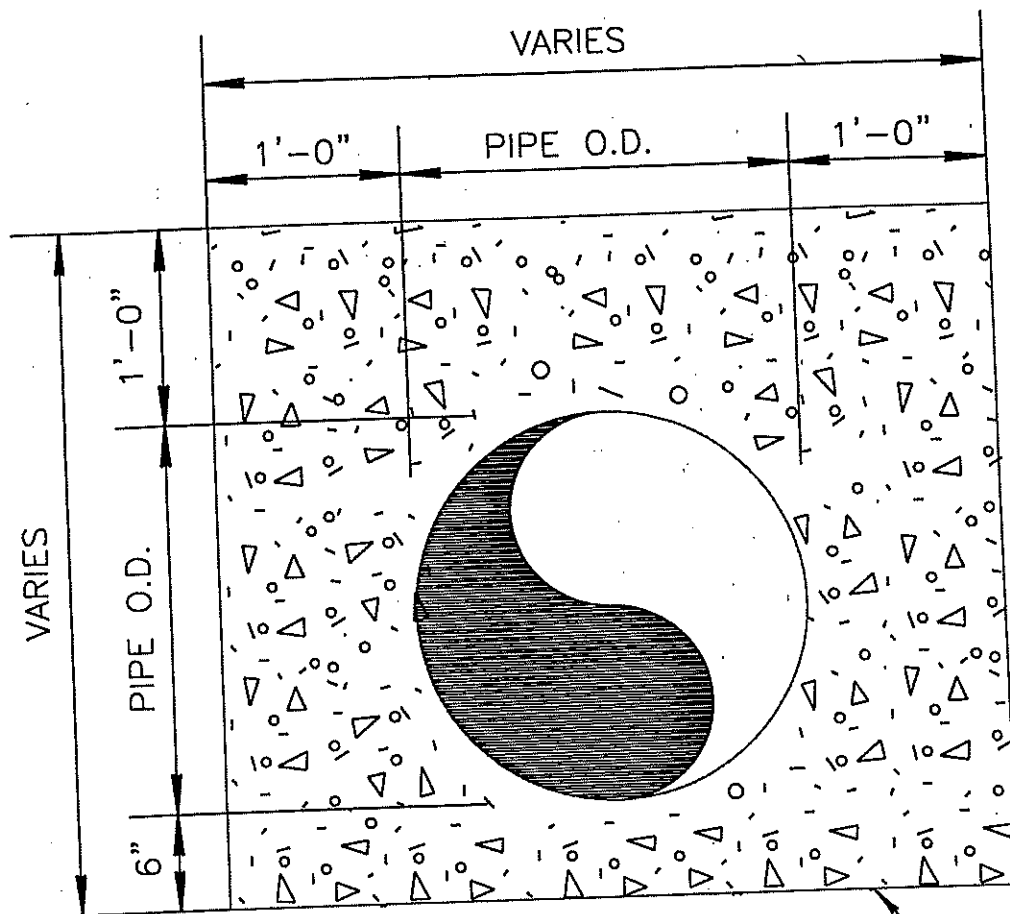
- A. American National Standards Institute (ANSI)/American Water Works Association (AWWA); latest edition:
1. ANSI/AWWA C600 Installation of Ductile-Iron Water Mains and their Appurtenances
 2. ANSI/AWWA C651 Disinfecting Water Mains

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.01 INSPECTION

- A. The Contractor shall notify the Inspector by 8:15 am of each work day when work is scheduled. The Inspector shall inspect the work in any part, or as a whole, and shall make pressure and leakage tests deemed necessary to insure that the work has been completed in accordance with the plans and specifications. Inspector shall be allowed



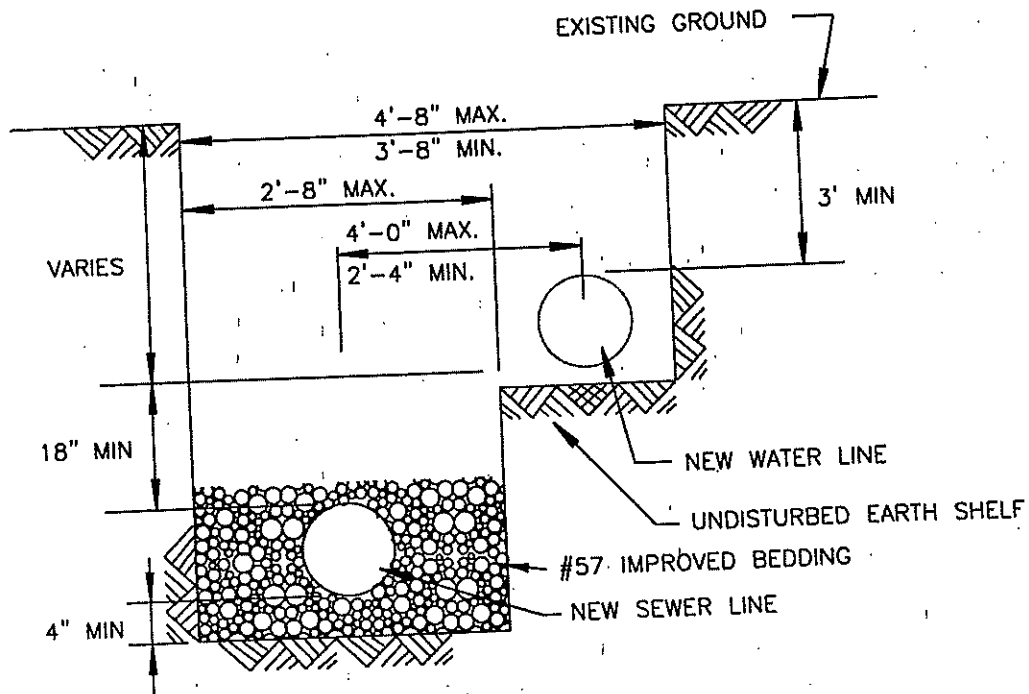
CONCRETE 3000 PSI
COMPRESSIVE @ 28 DAYS



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SINGLE PIPE ENCASEMENT

DETAIL
NUMBER
MC M-13

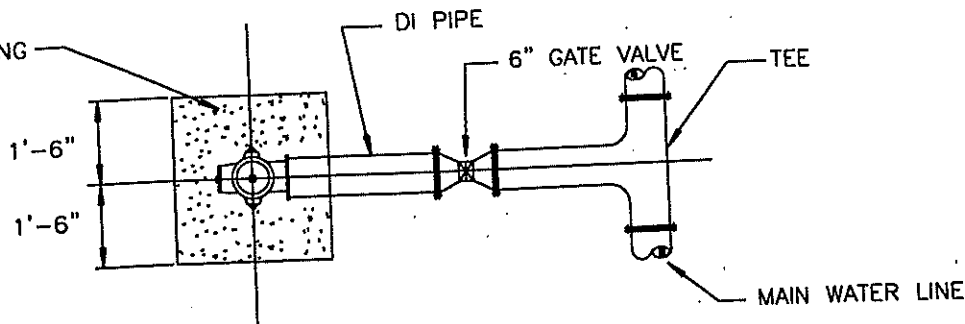


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METHOD OF PLACEMENT
OF WATER LINE AND SEWER LINE
WITHIN SAME TRENCH

DETAIL
NUMBER
MC SS-19

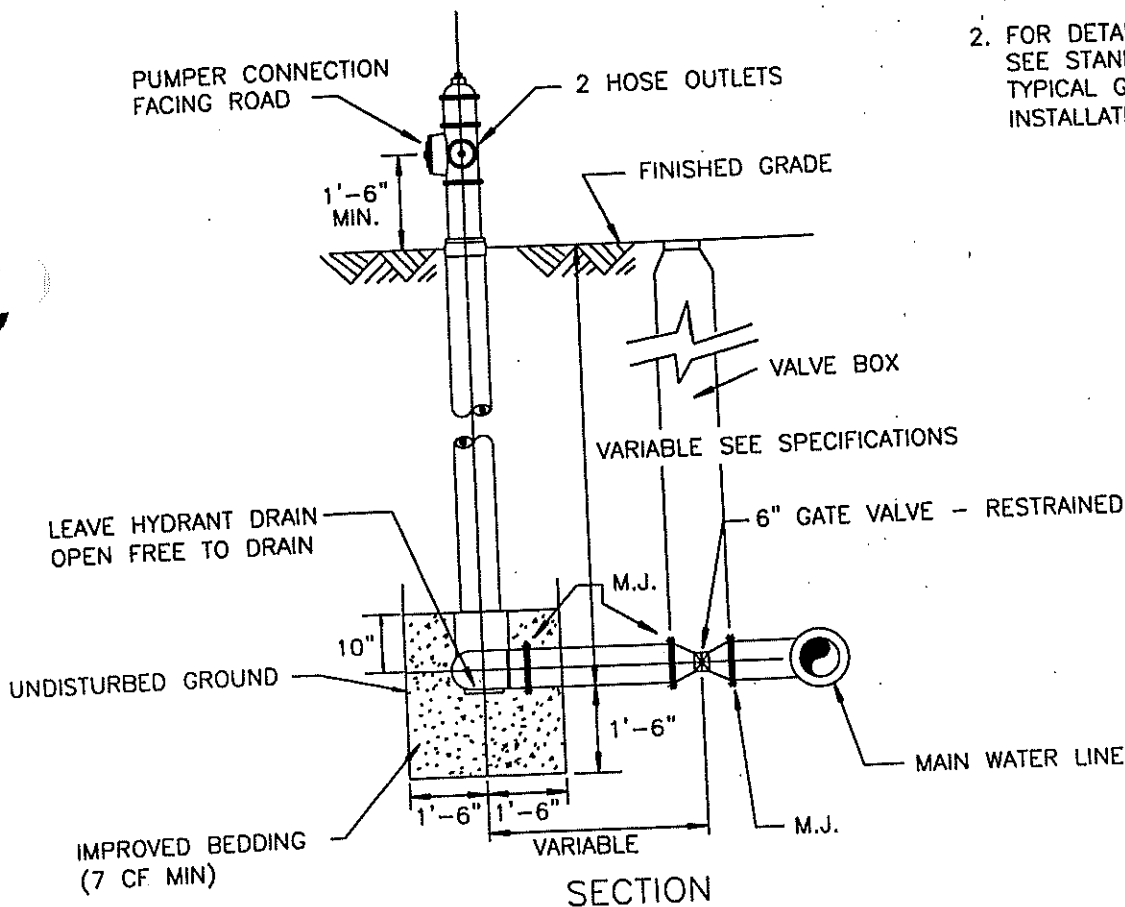
OPEN GRADED
AGGREGATE -
IMPROVED BEDDING



PLAN

NOTES:

1. REFER TO DETAIL MC W-2 FOR RESTRAINING VALVE AND FIRE HYDRANT TO MAIN
2. FOR DETAIL OF VALVE - SEE STANDARD DETAIL - TYPICAL GATE VALVE INSTALLATION.



SECTION

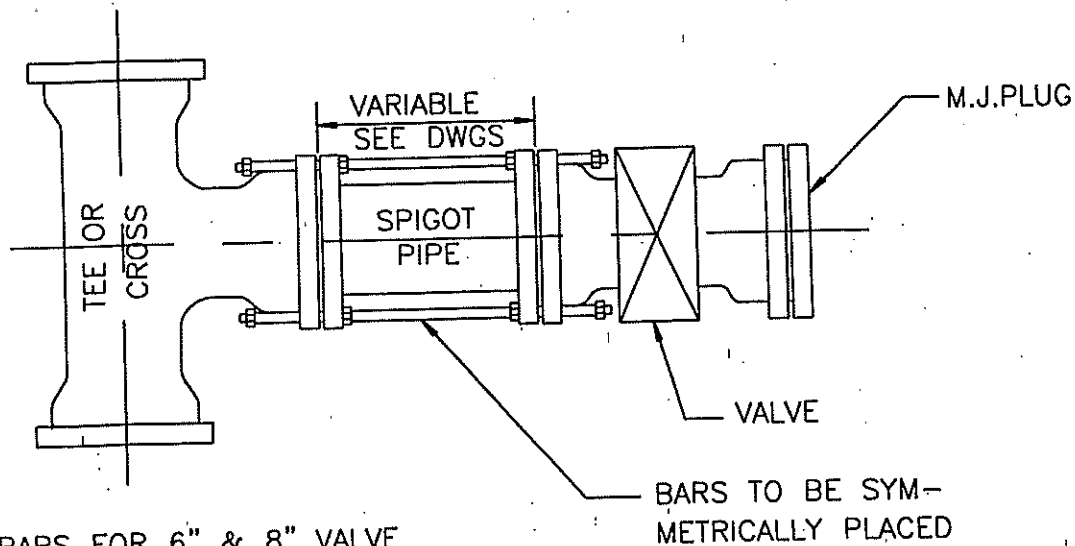
NOTE: PLASTIC SHALL BE PLACED AROUND VALVES WHERE CONCRETE IS POURED



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FIRE HYDRANT INSTALLATION

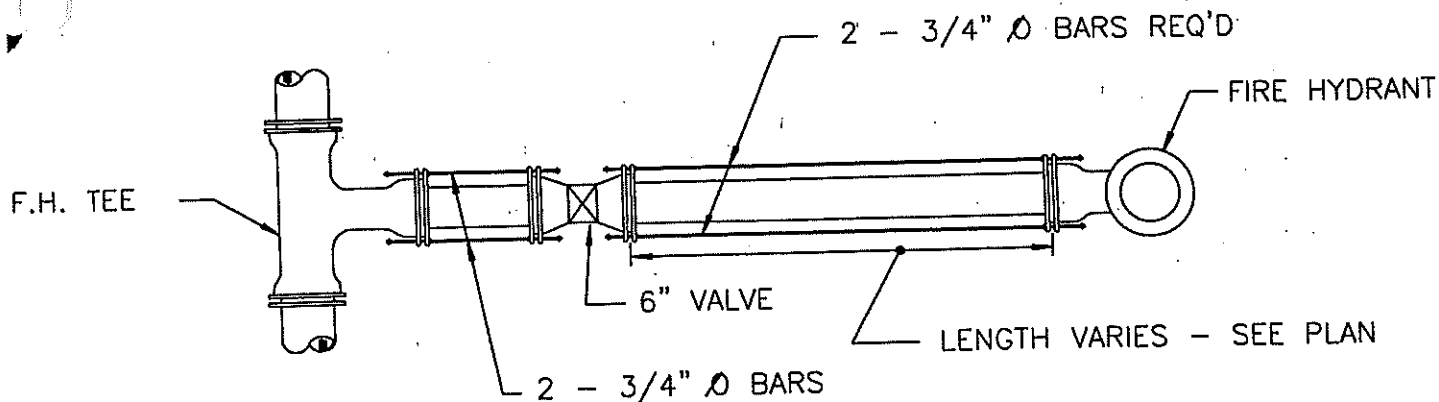
DETAIL
NUMBER
MC W-1



NOTE:

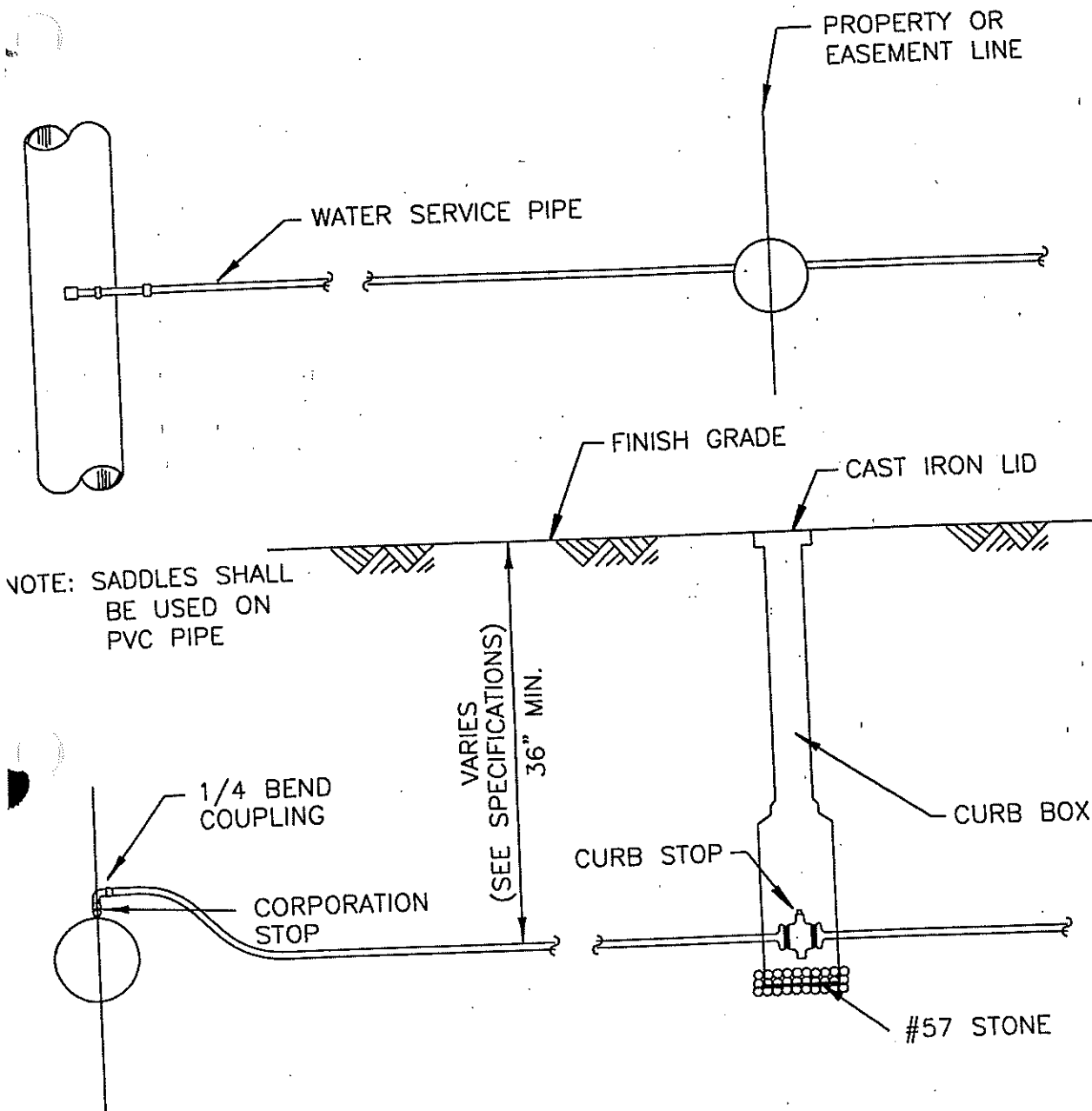
- SE 2-3/4" Ø BARS FOR 6" & 8" VALVE
- SE 4-3/4" Ø BARS FOR 10" VALVE
- SE 6-3/4" Ø BARS FOR 12" VALVE

DETAIL STRAPPING VALVE TO MAIN



DETAIL STRAPPING FIRE HYDRANT TO MAIN

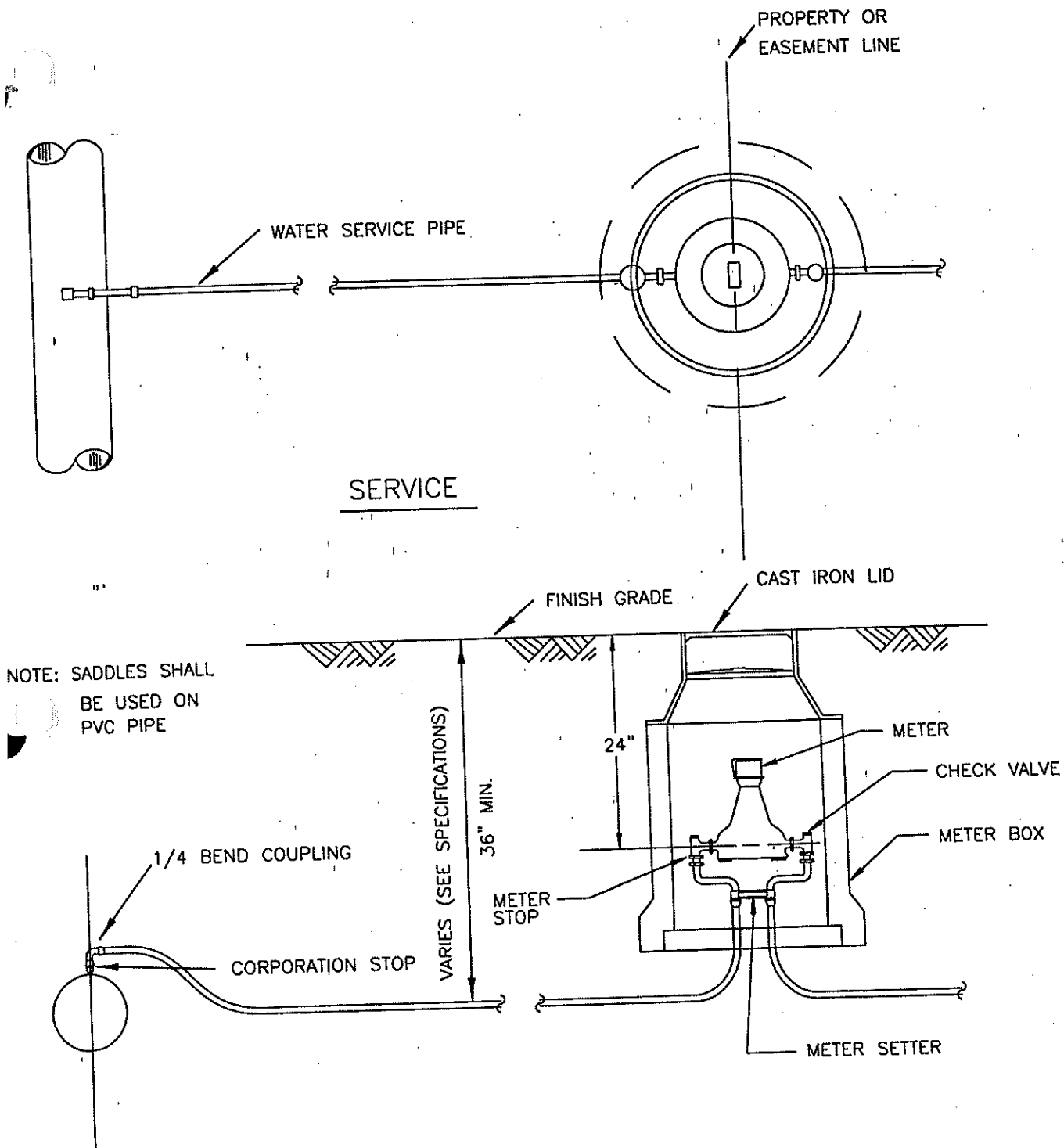
NOTE: SEE SPECIFICATIONS FOR REQUIREMENTS FOR RESTRAINING VALVES, PIPE, FITTINGS & HYDRANTS, AND ALTERNATE METHODS.



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**TYPICAL SERVICE CONNECTION
WITH CURB STOP**

DETAIL
NUMBER
MC W-3

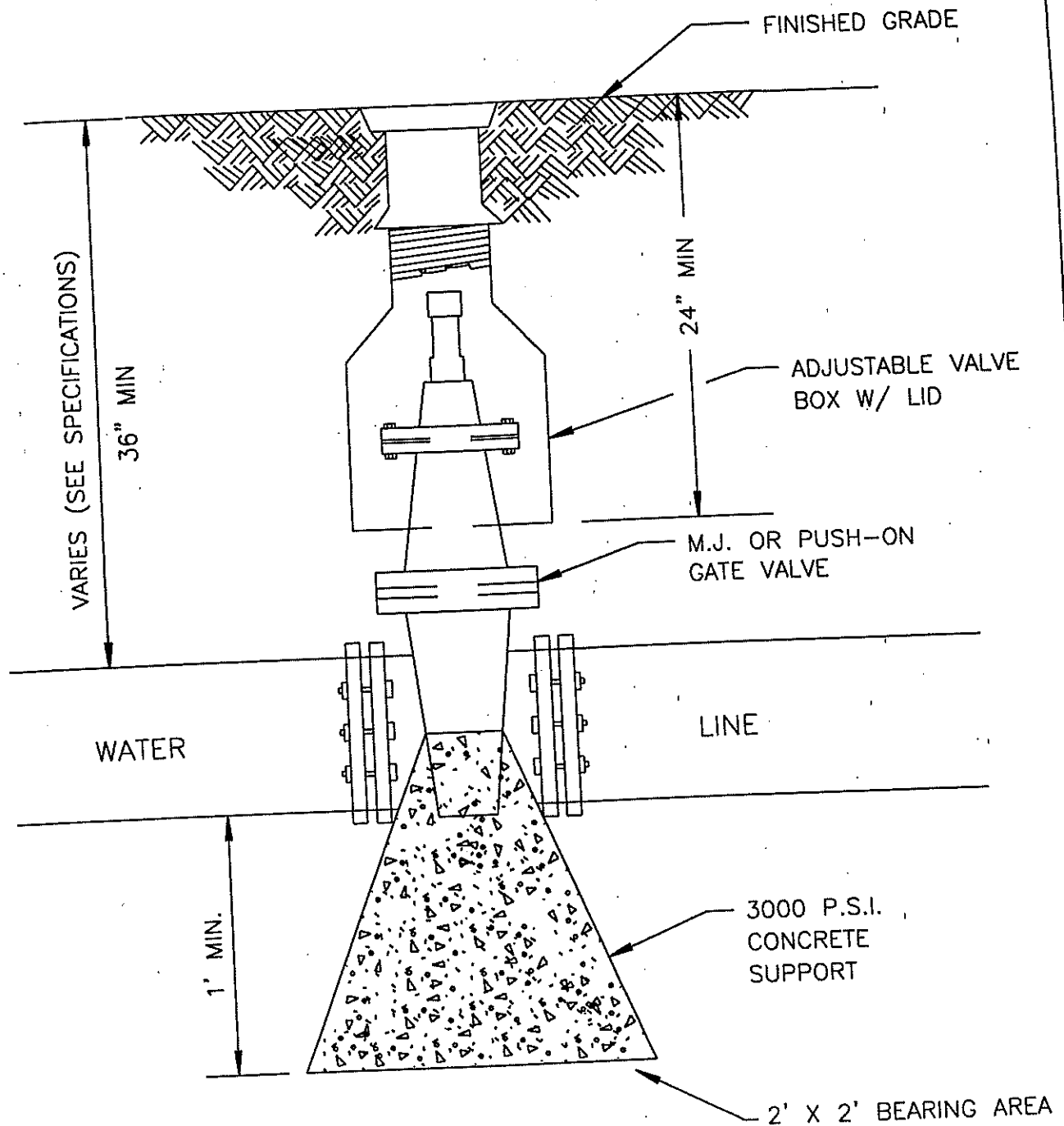


TYPICAL SERVICE CONNECTION
WITH METER

DETAIL
NUMBER
MC W-3A



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NOTES: 1. IN REMOTE AREAS, VALVE BOXES SHALL
EXTEND SIX(6) INCHES ABOVE GRADE

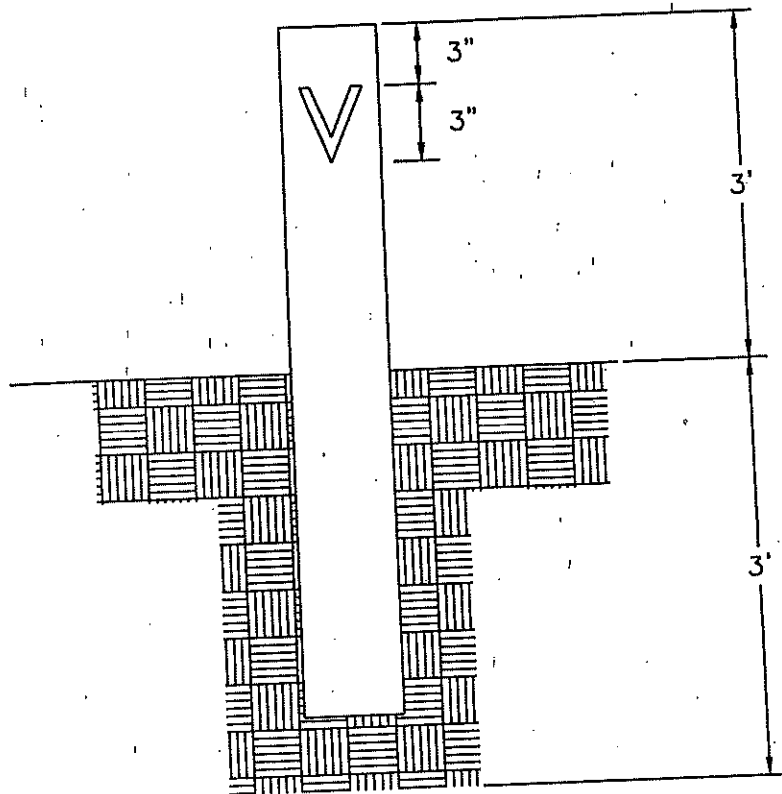
2. TAR PAPER OR PLASTIC SHALL BE PLACED AROUND
VALVES WHERE CONCRETE SUPPORT IS POURED.



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TYPICAL GATE VALVE INSTALLATION

DETAIL
NUMBER
MC W-4



NOTES:

1. LETTER "V" SHALL BE 3" HIGH x 2" WIDE x 3/4" DEEP
2. #5 x 5'-9" BAR TO BE CAST IN CENTER
3. CONCRETE SHALL BE 3000 PSI W/ 1/2" AGGREGATE
4. VALVE MARKERS SHALL BE LOCATED AS DIRECTED BY CITY

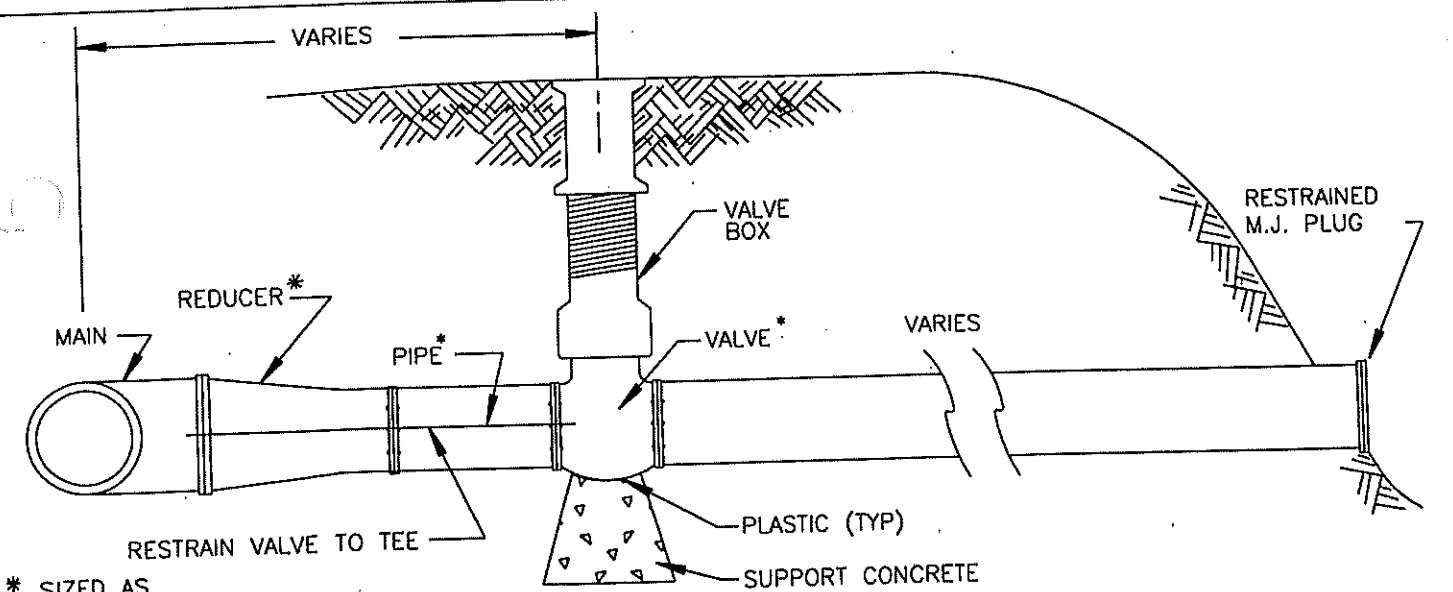


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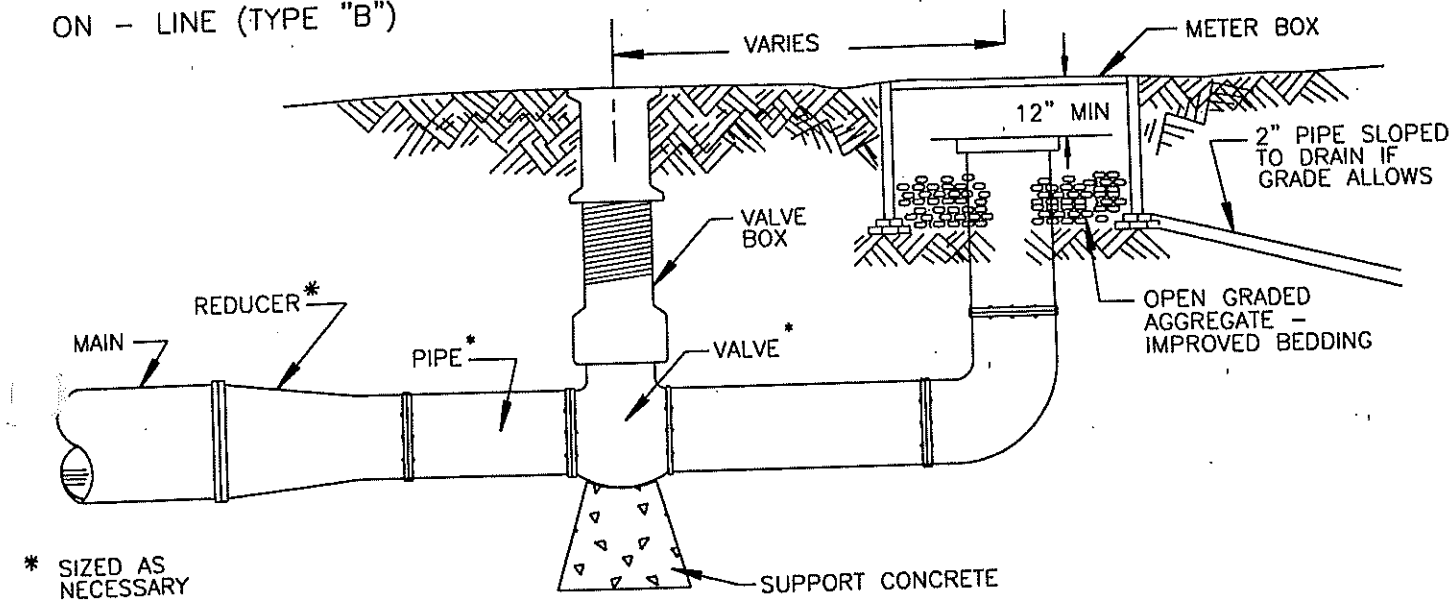
VALVE MARKER POST

DETAIL
NUMBER

MC W-4A



* SIZED AS NECESSARY
ON - LINE (TYPE "B")



* SIZED AS NECESSARY

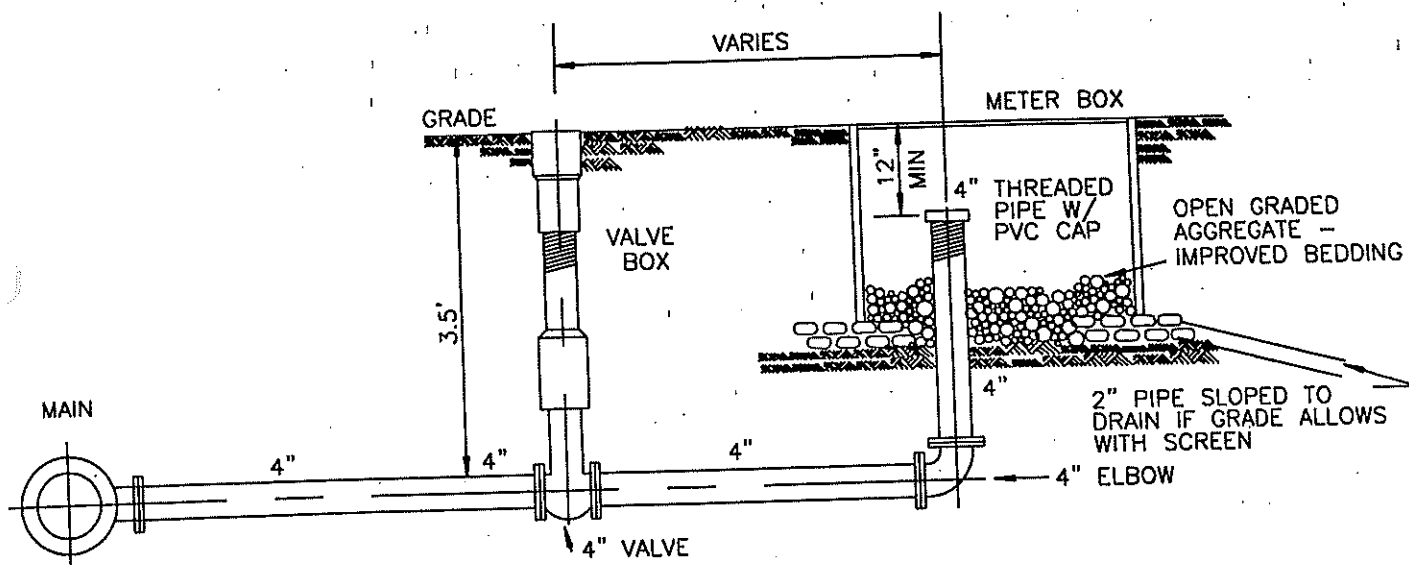
WATER MAIN DIAM.	BLOW-OFF PIPE DIAM.
6"	3"
8"	4"



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BLOW-OFF ASSEMBLY

DETAIL
NUMBER
MC W-5



REDUCING TEE
SEE PLANS
FOR SIZE

NOTES:

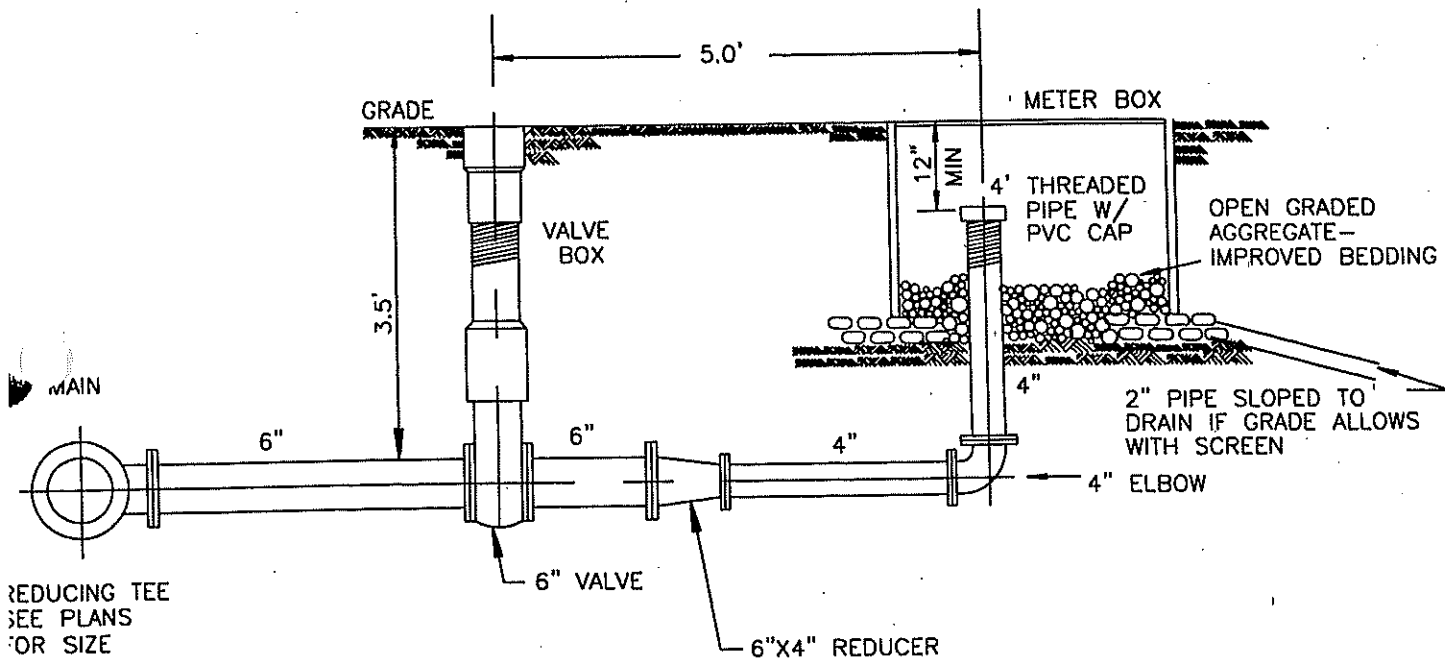
1. PIPE, VALVE, AND FITTINGS SHALL BE PUSH-ON JOINTS OR MECHANICAL JOINTS, AND SHALL BE RESTRAINED. SEE SPECIFICATIONS.
2. TAR PAPER OR PLASTIC SHALL BE PLACED AROUND END OF WATER MAIN AND AROUND VALVES WHERE CONCRETE IS POURED.



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BLOW-OFF DETAIL
(STANDARD)

DETAIL
NUMBER
MC W-5A



NOTES:

1. PIPE VALVE AND FITTINGS SHALL BE PUSH-ON JOINTS OR MECHANICAL JOINTS, AND SHALL BE RESTRAINED. SEE SPECIFICATIONS.
2. TAR PAPER OR PLASTIC SHALL BE PLACED AROUND END OF WATER MAIN AND AROUND VALVES WHERE CONCRETE IS POURED.

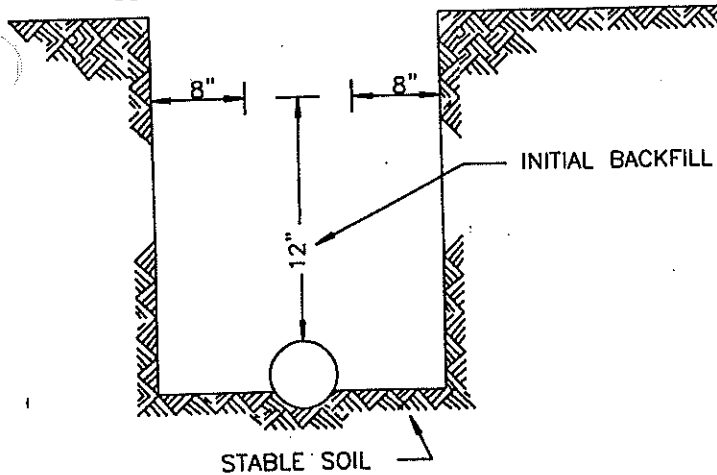


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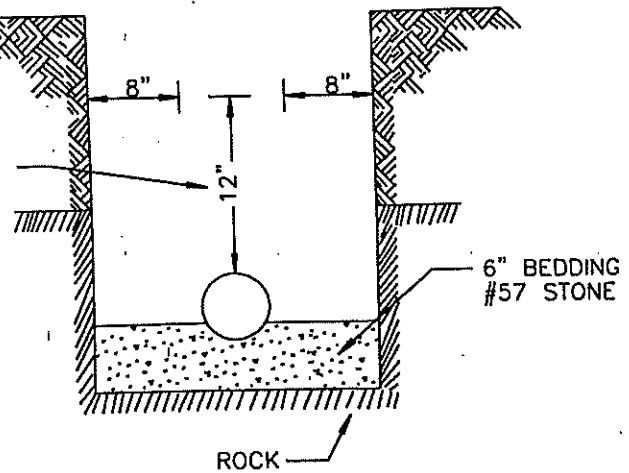
BLOW-OFF DETAIL
(FOR FUTURE ADDITION
OF FIRE HYDRANT)

DETAIL
NUMBER
MC W-5B

GOOD FOUNDATION MATERIAL

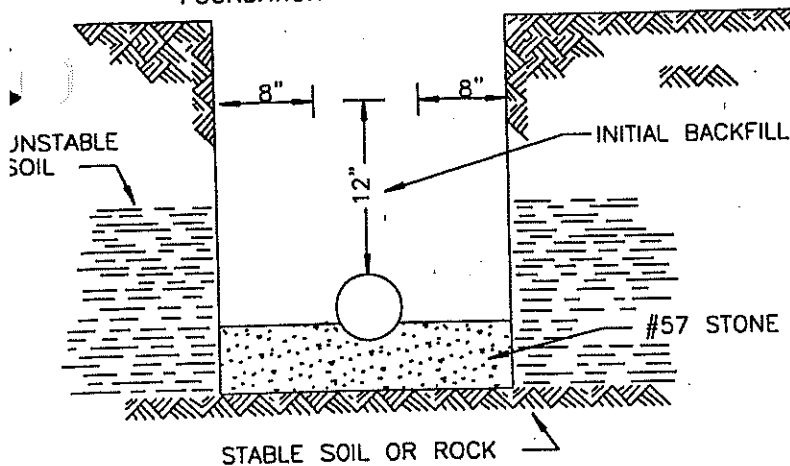


ROCKY FOUNDATION MATERIAL

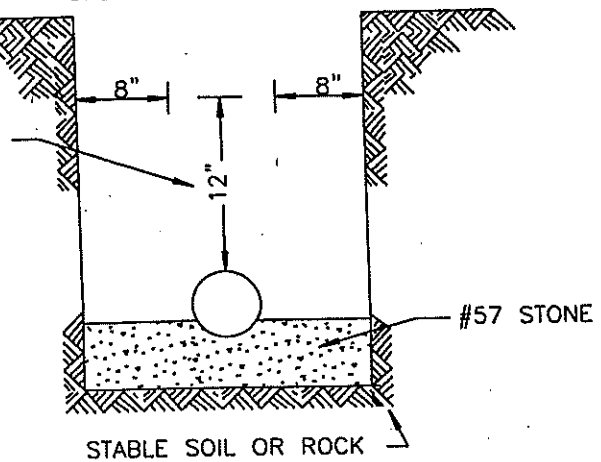


SCRAPE THE BOTTOM OF THE TRENCH. REMOVE ALL STONES TO INSURE THE PIPE DOESN'T REST ON ROCK AND THEN COMPACT THE SOIL OR PROVIDE A 4" BEDDING OF #57 STONE.

FOUNDATION IN POOR SOIL



UNDER-CUT CONDITION



NOTE:

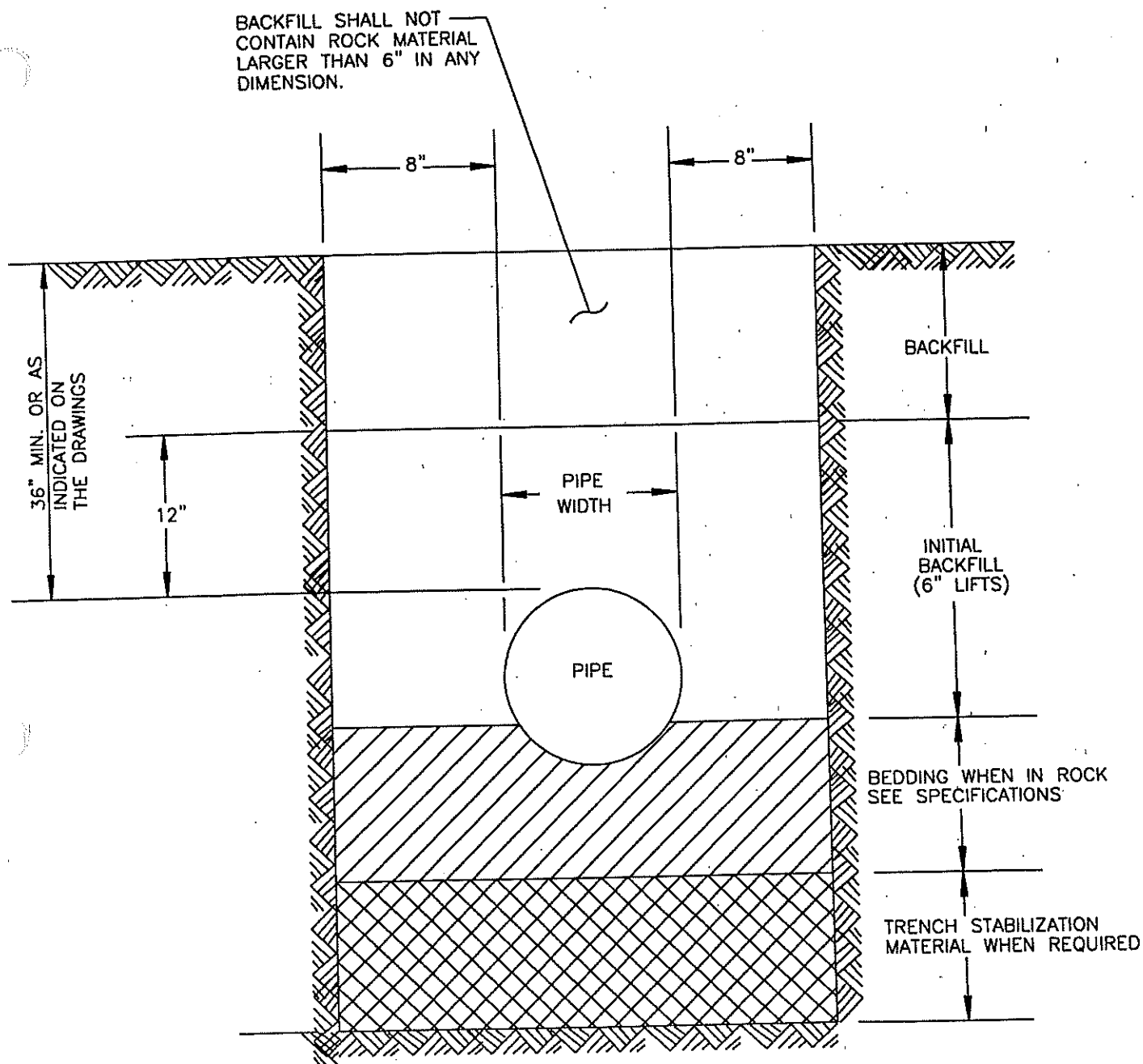
1. NO ROCKS SHALL BE ALLOWED WITHIN 12" OF THE WATER LINES.
2. NO ROCKS LARGER THAN 6" IN ANY DIMENSION SHALL BE ALLOWED ABOVE THE INITIAL.
3. THE INITIAL BACKFILL SHALL BE PLACED AND COMPACTED IN 6" LIFTS.
4. NO ORGANIC OR FROZEN MATERIAL OR DEBRIS SHALL BE ALLOWED IN THE TRENCH.
5. BELL HOLES SHALL BE DUG OUT IN ALL CASES.



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TRENCH INSTALLATION
DUCTILE IRON PIPE

DETAIL
NUMBER
MC W-8



NOTES:

1. SEE SPECIFICATIONS FOR BEDDING MATERIAL. IF PIPE IS NOT BEDDED, BOTTOM OF TRENCH SHALL BE SHAPED TO MATCH PIPE.
2. SEE SPECIFICATIONS FOR BACKFILL REQUIREMENTS AND COMPACTION.
3. THIS DETAIL IS FOR WATER LINES, FORCE MAINS, AND OTHER PRESSURE PIPES.

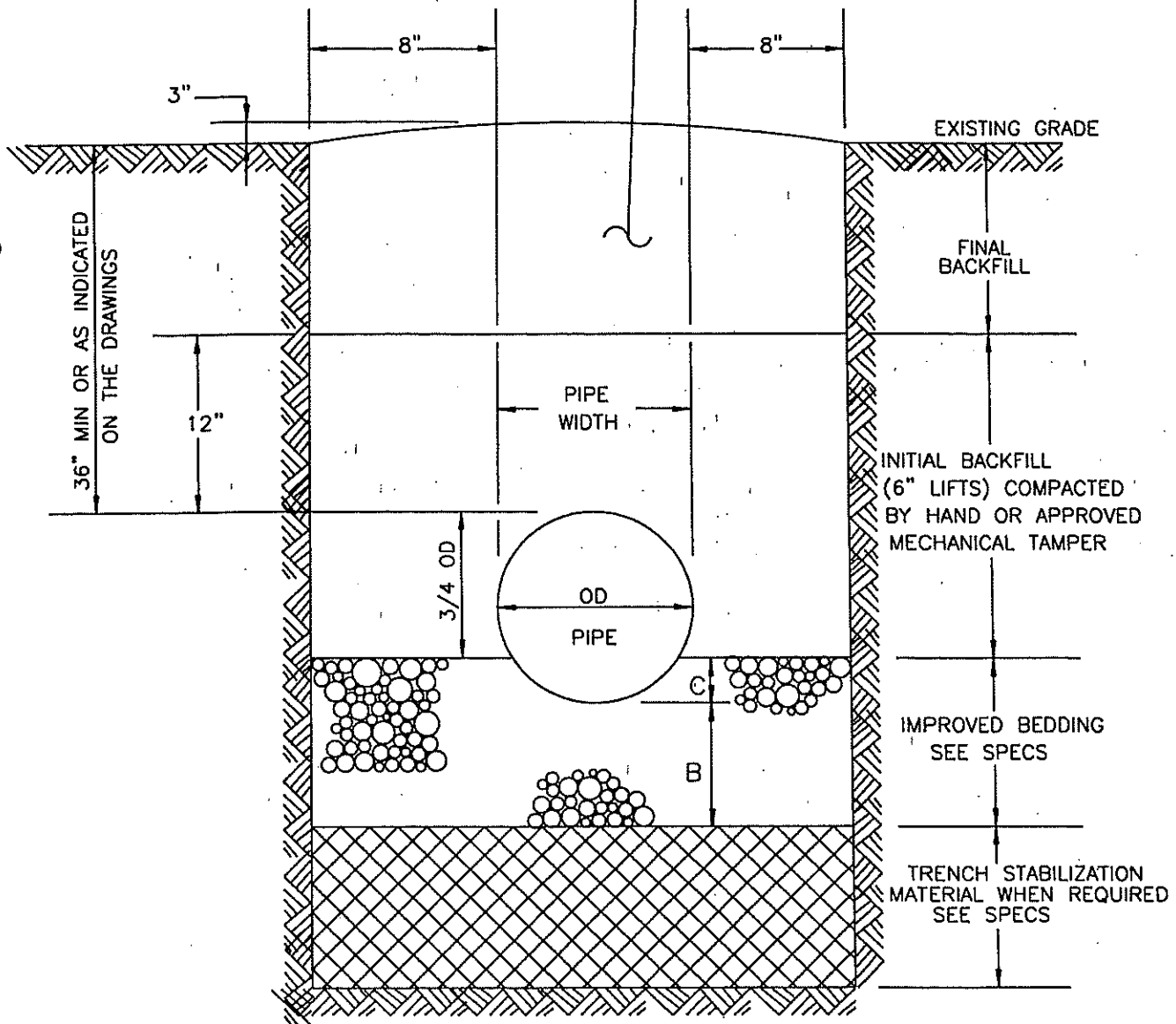


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**TRENCH INSTALLATION FOR
PRESSURE PIPE (NOT BEDDED)**

**DETAIL
NUMBER
MC W-9**

BACKFILL SHALL NOT CONTAIN
ROCK MATERIAL LARGER THAN
6" IN ANY DIMENSION.



DIMENSION "B"
4" TYPICAL
6" IF ROCK IN BOTTOM OF TRENCH
SEE SPECIFICATIONS

DIMENSION "C"
1/4 OD



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**TRENCH INSTALLATION FOR
PRESSURE PIPE (BEDDED)**

DETAIL
NUMBER
MC W-9A

MANHOLE SHALL NOT
REST ON PIPE

STD. FRAME
& COVER

PRECAST M.H.
SECTION
CONCENTRIC

3/4" HOSE BIB
ON CREEK SIDE
OF VALVE

12"
MIN

VALVE

4"IMPROVED BEDDING

3'-3"

VALVE VAULT

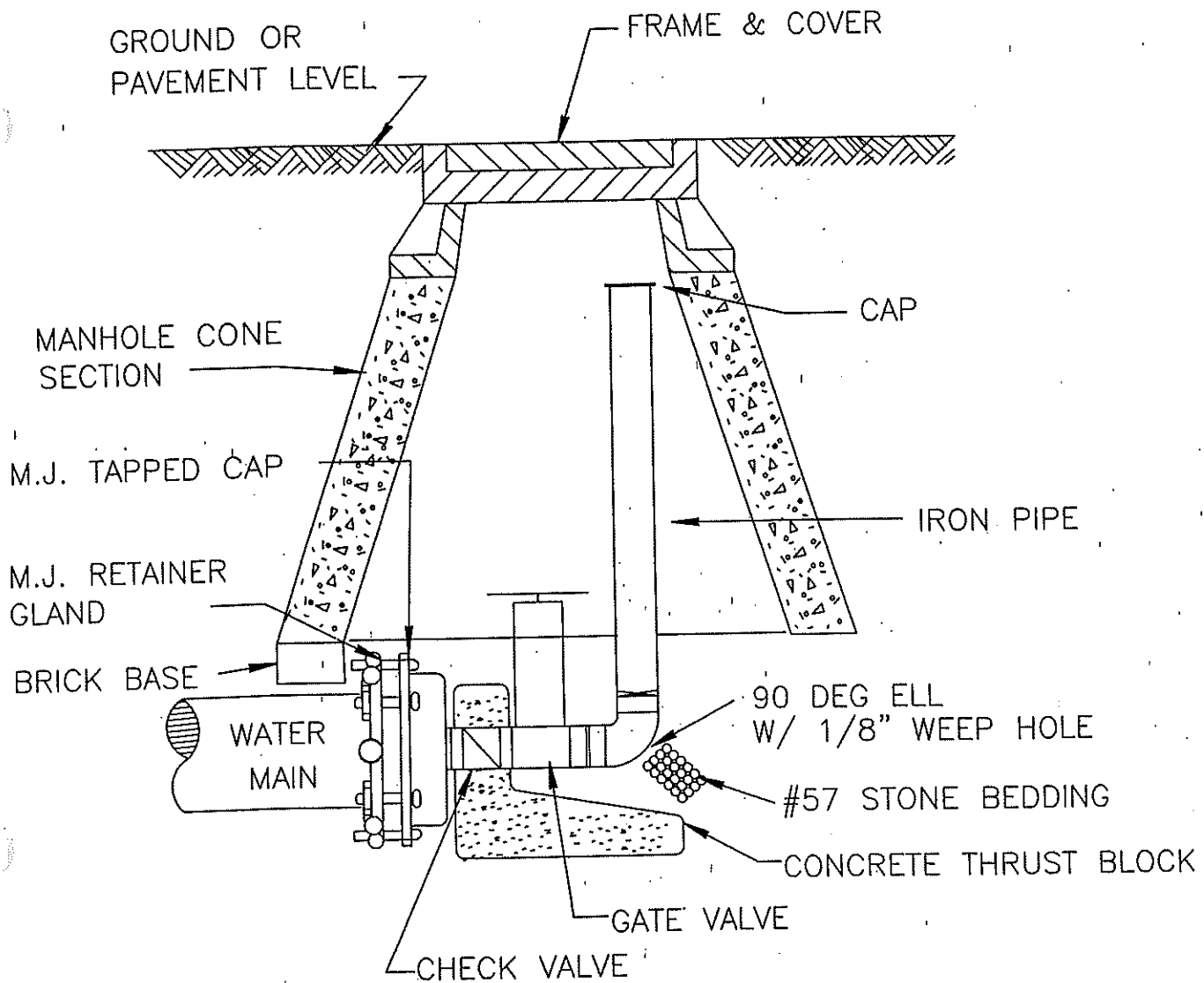
WITH SAMPLE TAP

DETAIL
NUMBER

MC W-10



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NOTES:

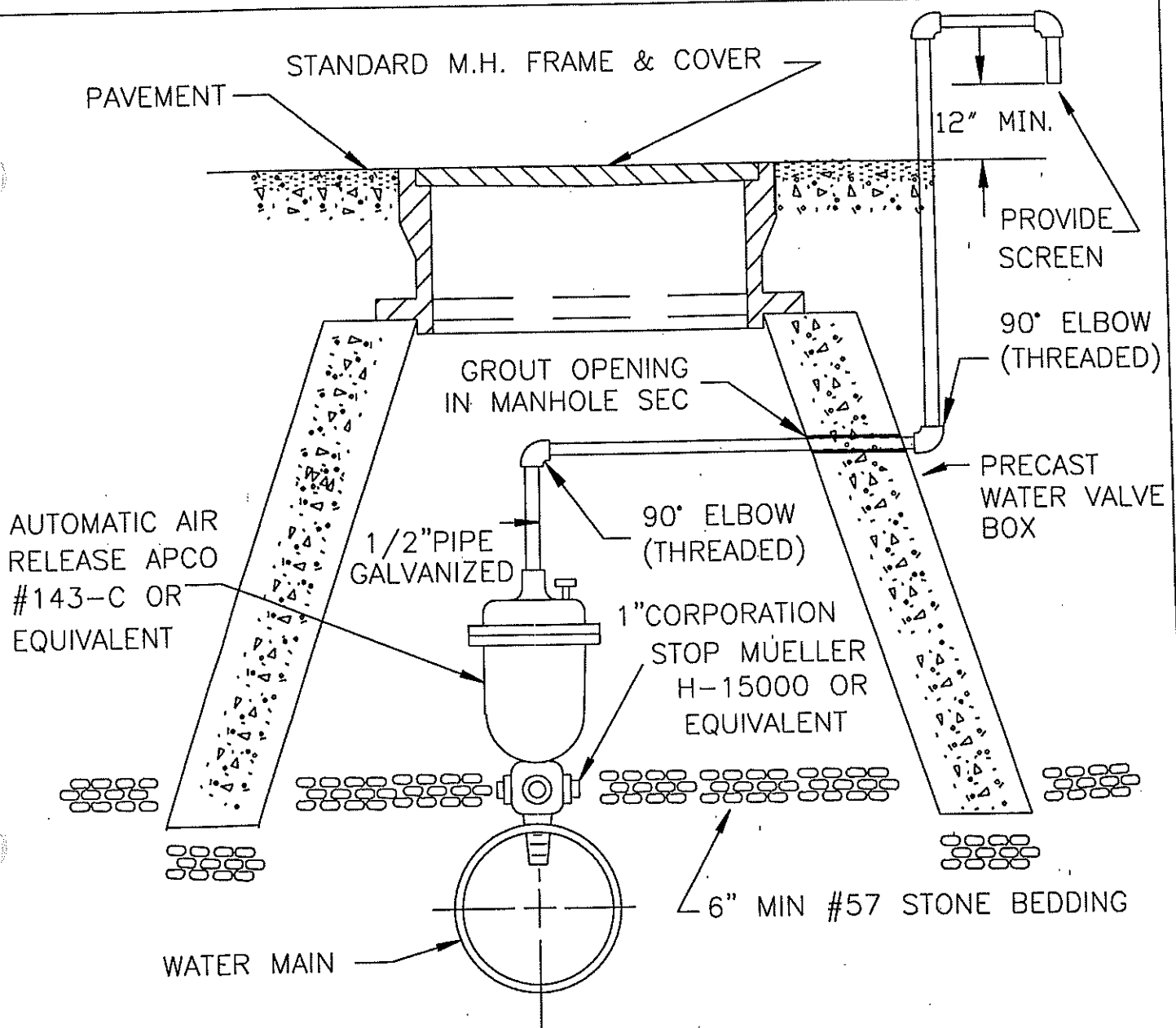
1. 1 1/2" MATERIAL SHALL BE USED ON 4" MAINS OR SMALLER.
2. 3" MATERIAL SHALL BE USED ON 6" MAINS. 4" MATERIAL SHALL BE USED ON 8" MAINS AND LARGER.
3. WEEP HOLE MUST BE DRAINED TO GRAVEL BED AND MAY NOT BE INSTALLED IN AREAS OF HIGH GROUNDWATER OR WHERE PIT IS SUBJECT TO FLOODING.
4. TAR PAPER OR PLASTIC SHALL BE PLACED AROUND END OF WATER MAIN AND AROUND VALVES WHERE CONCRETE THRUST BLOCK IS POURED.
5. DEAD END BLOW-OFF VALVE ASSEMBLIES SHALL ONLY BE USED FOR FLUSHING THE MAIN WHEN FIRE FLOWS ARE NOT OBTAINABLE. IF FIRE FLOWS ARE OBTAINABLE, A FIRE HYDRANT SHALL BE INSTALLED IN LIEU OF BLOW-OFF VALVE.



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DEAD END BLOWOFF ASSEMBLY
(VAULT)

DETAIL
NUMBER
MC W-11A



NOTES:

1. STANDARD FRAME & COVER RICHARD FOUNDRY CO. DESIGN No. B-1444, DEWEY BROTHERS INC. MH-RCR-56 OR APPROVED EQUIVALENT.
2. CONCRETE SHALL BE 3000 PSI COMPRESSIVE AT 28 DAYS.
3. REINFORCEMENT SHALL BE .277 WIRE ON 6" C-C.
4. CONE SHALL NOT REST ON WATER PIPE.

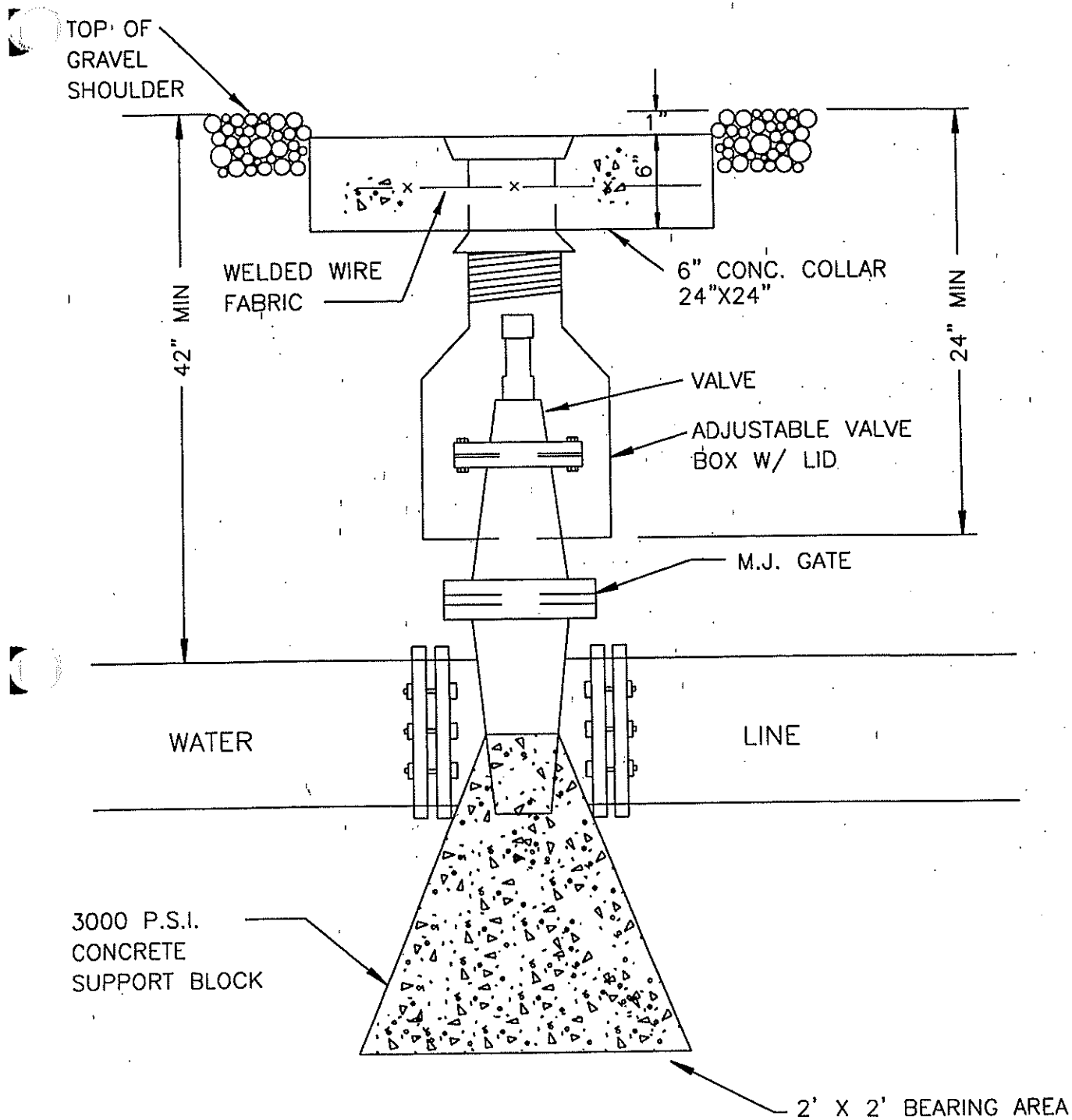


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AUTOMATIC AIR RELEASE ASSEMBLY

DETAIL
NUMBER

MC W-12



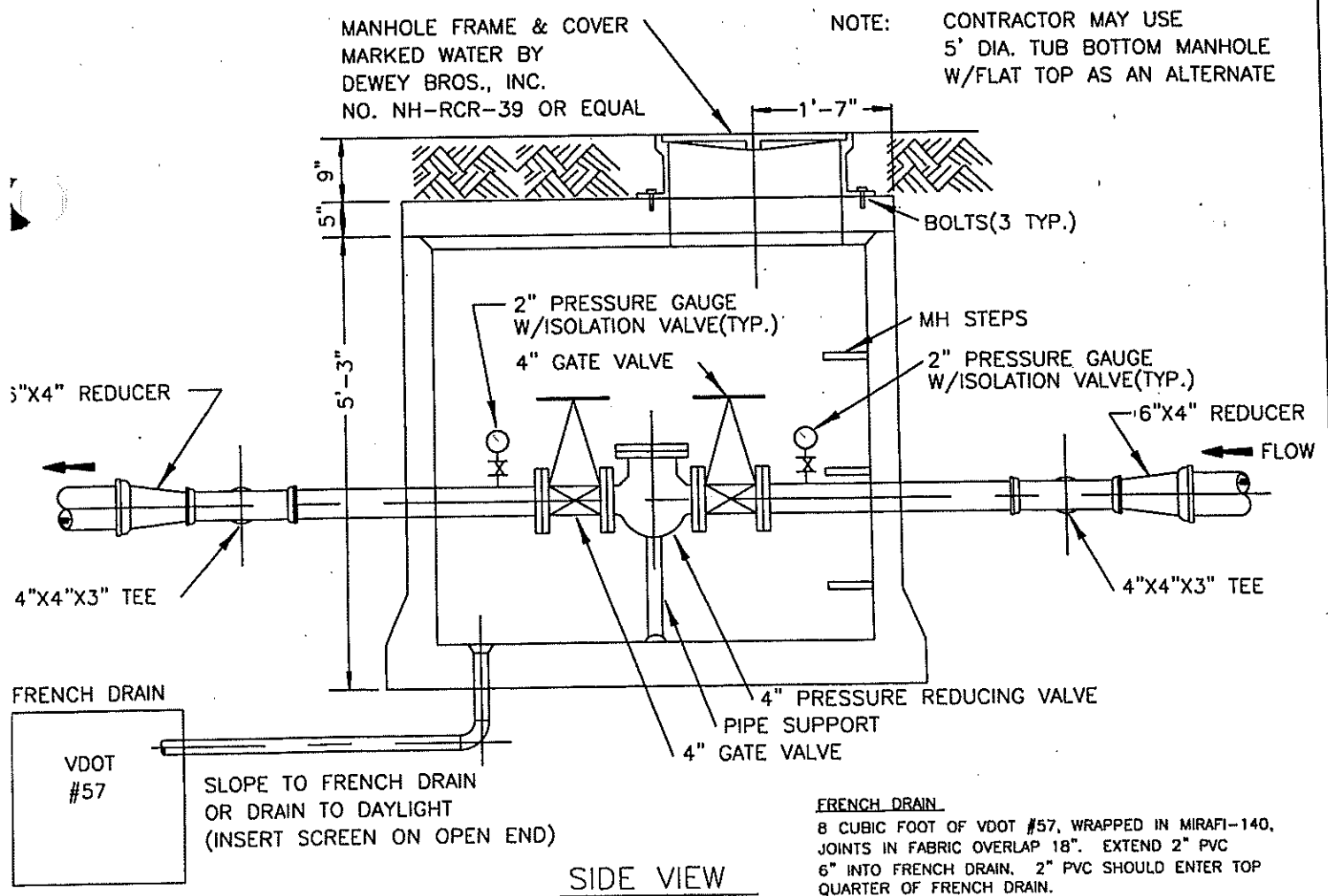
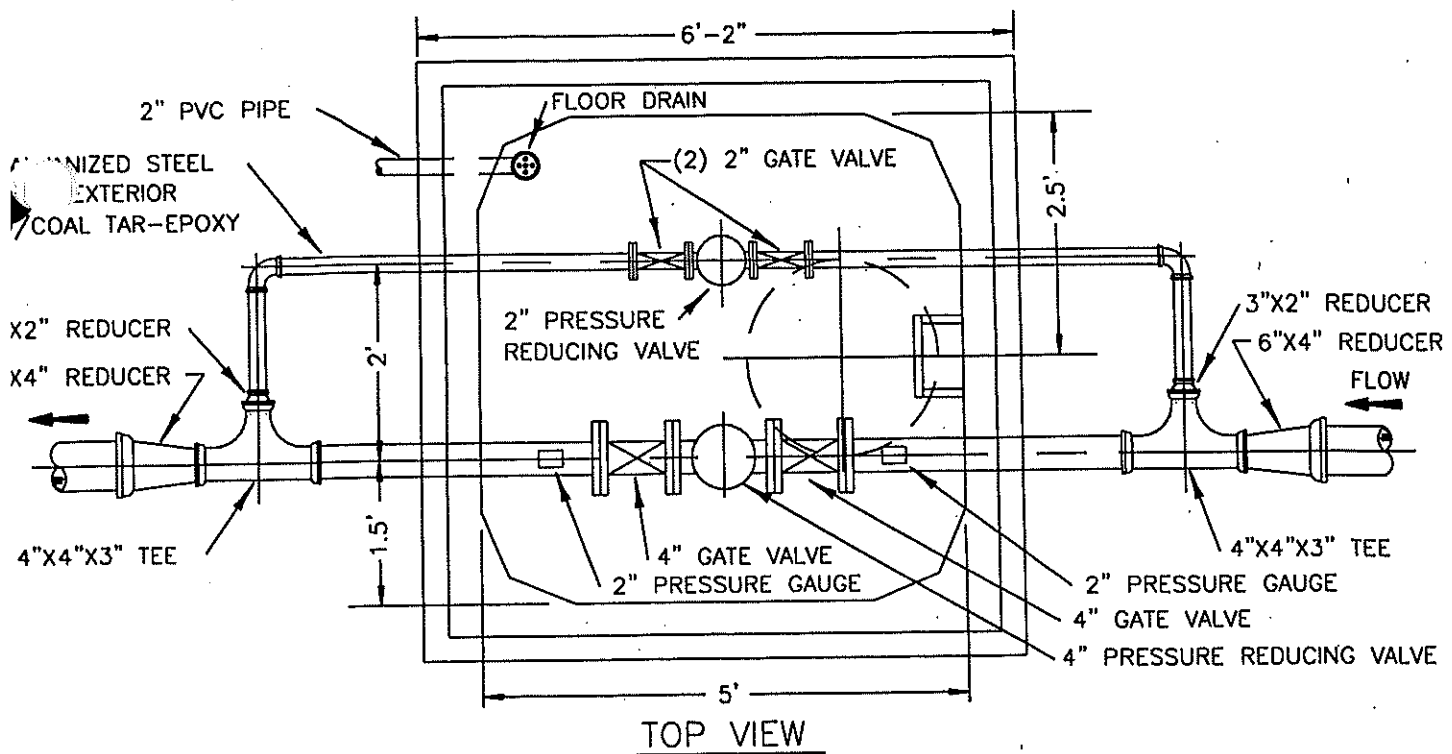
NOTE: TAR PAPER OR PLASTIC SHALL BE PLACED AROUND END OF WATER MAIN AND AROUND VALVES WHERE CONCRETE SUPPORT BLOCK IS POURED.



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VALVE BOX
IN
ROAD SHOULDER

DETAIL
NUMBER
MC W-15

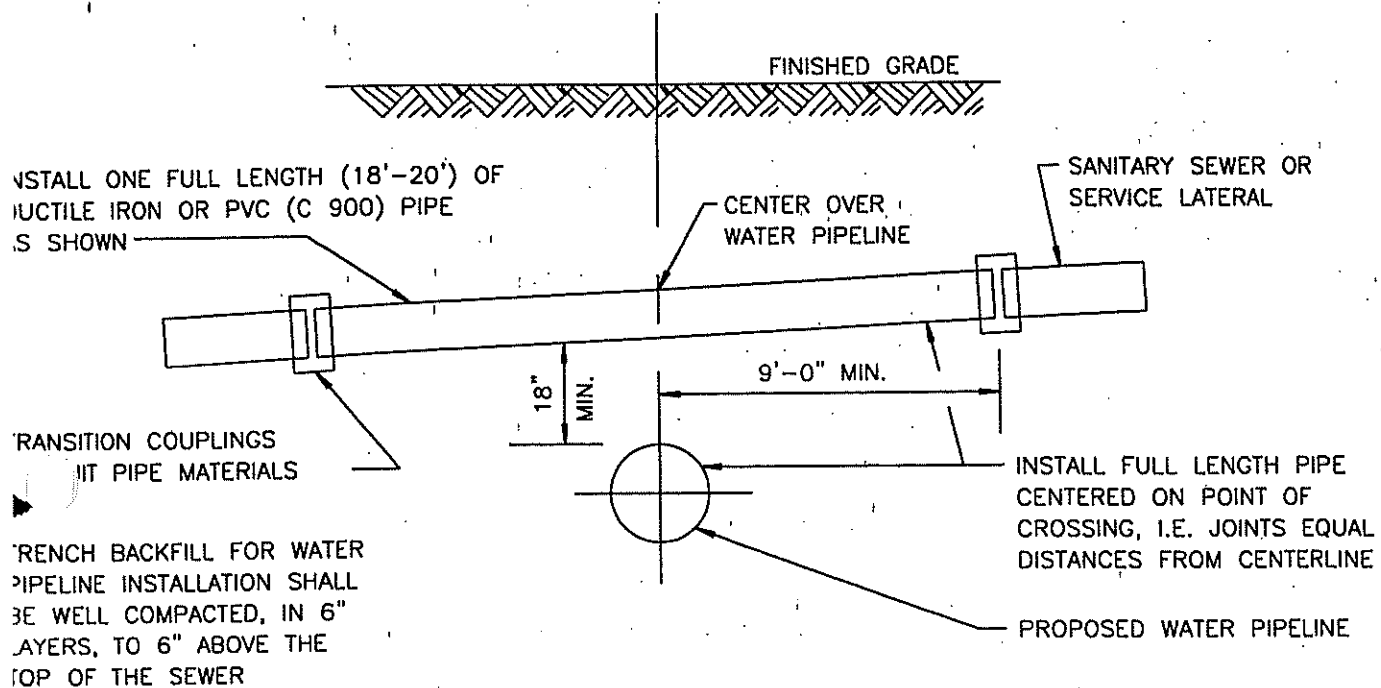


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PRESSURE REDUCING STATION

DETAIL
NUMBER

MC W-16



MISCELLANEOUS