

SECTION UC-750**DONATION FORCE MAINS****PART 1 - GENERAL****1.01 SCOPE**

- A. These Specifications shall govern the materials and installation requirements of the MD-WASD for force mains constructed in its service area. Force mains shall be a minimum of 8-inches in diameter, designed in accordance with the State of Florida Department of Environmental Protection (DEP) Rules, Chapter 62 for Wastewater Facilities, OSHA requirements and the Sewerage Guide and the recommendations of Chapter 12 of the ASCE Manual No. 37, "Sewer Design and Construction", except as otherwise provided herein.
- B. This Specification does not purport to cover all material or installation procedures which may be required, whether by the nature of the proposed work, or by the MD-WASD, or by other regulatory agencies.
- C. It is intent of the MD-WASD to obtain a complete and working installation under this project, and any items of labor, equipment or materials which may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically shown on the Plans or stated herein.

1.02 QUALITY ASSURANCE

- A. All material and installation shall be in accordance with the MD-WASD's Design and Construction Standard Specifications and Details.
- B. The Contractor shall provide all required Certifications.

1.03 DEFINITIONS

See Section 01005, "Defined Terms"

1.04 PROJECT APPROVAL

The approval of the MD-WASD shall be secured, in accordance with Section UC-005, prior to any construction related activity.

1.05 SPECIAL CONDITIONS

The work shall proceed in accordance with the following specification sections, bound herein:

- A. Section 01011 - Site Conditions
- B. Section 01016 - Safety Requirements and Protection of Property
- C. Section 01031 - Grades, Lines and Levels
- D. Section 01100 - Special Project Procedures
- E. Section 01750 - Maintenance of Traffic and Public Streets

1.06 PERMITS, INSPECTIONS AND FEES

- A. The Contractor shall obtain and pay for all permits, official inspections and all other fees in accordance with Section 01740, "Permits".
- B. Inspection by MD-WASD personnel is required in addition to, not in lieu of, municipal and County department inspections (if any).
- C. No installation will be accepted until it has passed all inspections, including pavement installation or replacement.

1.07 PRECONSTRUCTION CONFERENCE

Prior to commencement of the work, the Contractor shall attend a "Preconstruction Conference" in accordance with Section 01150, "Preconstruction Conference".

1.08 SUBMITTALS

- A. The Contractor shall furnish "As-Builts" in accordance with Section 01725. Project Record Documents shall be submitted in accordance with Section 01720. The Contractor shall submit operating and maintenance instructions and all other submittals in accordance with Section 01730.
- B. Where the Specifications require test certification or certification that certain products or material furnished are as specified, the Contractor shall deliver such certification to the MD-WASD. No material or equipment shall be approved for use in the work until individual certification has been received.

1.09 SAFETY REQUIREMENTS

See Section UC-250, "Gravity Sanitary Sewer".

PART 2 - PRODUCTS

2.01 GENERAL

- A. All material for use in the Project shall be new and of recent domestic manufacture and shall be the products of reliable manufacturers or suppliers who, unless otherwise specified, have been regularly engaged in the manufacture of such materials and equipment for at least five (5) years.
- B. All fittings and components shall, wherever possible, be standard stock articles of well known manufacturers.
- C. Where the Specifications designate the products of a particular manufacturer, the product specified has been found suitable for the intended use, but, unless otherwise provided, articles or products of similar characteristics may be offered for the approval of the MD-WASD

- D. Copies of complete descriptive data shall be furnished regarding all material, consisting of dimension drawings, catalog references and other information necessary to clearly identify and evaluate each article.
- E. When substitutions are permitted, the Contractor shall make all necessary changes in adjacent or connected structures and equipment, at his expense
- F. Unless otherwise specified, all steel bolts, nuts, washers and all other miscellaneous ferrous metal items (except cast iron or stainless steel) furnished by the Contractor shall be hot-dip galvanized in accordance with ASTM A386, "Zinc Coating (Hot-Dip) on Assembled Steel Products" and ASTM A385, Providing High-Quality Zinc Coatings (Hot-Dip)". Where the word "galvanized" or its abbreviation is used on the Plans or in the Specifications, it shall mean hot-dip galvanized. Fabricated items shall be hot-dip galvanized after fabrication. Internal threads shall be tapped or re-tapped after galvanizing.
- G. Where miscellaneous materials are required for a complete installation the Contractor shall provide such materials in conformance with Section 15065, "Miscellaneous Materials".
- H. See Section 01100 for water used in construction.

2.02 CASTINGS

A. GENERAL

1. Castings shall be in compliance with Section 05550.
2. Castings shall be delivered unpainted with a shot blasted finish.

B. MANHOLE FRAMES AND COVERS

Manhole covers and frames shall be in accordance with Section 05550.

C. VALVE BOXES AND COVERS

Valve boxes and covers shall be MD-WASD No. 53 and 52, as shown in the various details. Valve box covers shall be cast labeled with the letter "S", shall have a roadway type surface and shall be non-rocking.

2.03 BRICK

See "Clay Brick Units" under Section 02536, "Precast Manholes & Covers"

2.04 CONCRETE, MORTAR AND GROUT

See Section UC-033, "Concrete, Mortar and Grout (Short)"

2.05 PILING

See Section UC-090, "Piling for Aerial Crossing"

2.06 REINFORCING STEEL

See Section UC-250, "Gravity Sewer Systems", under PART 2 - PRODUCTS

2.07 STRUCTURAL STEEL

See Section 05120, "Miscellaneous and Structural Steel"

2.08 PIPING AND FITTINGS

See Section 15060, "Piping and Fittings".

2.09 STEEL CASING

See Section 15070, "Jacking and Boring", for steel casing pipe for jacking and boring.

2.10 STEEL PIPE

See Section 15075, "Aerial Crossings", for steel pipe for aerial crossings.

2.11 MANHOLE

- A. See Section 02536, "Precast Manholes & Covers"
- B. Castings for manhole frames, covers and other items shall conform to Subsection 2.02, above. Casting patterns shall conform to those designated in the Miami-Dade Water and Sewer Standard Details.

2.12 TAPPING SLEEVE

See Section 15102, "Tapping Sleeves"

2.13 VALVES

- A. Air Release Valves: See Section 15130, "Miscellaneous Valves"
- B. Angle Valves: See Section 15130, "Miscellaneous Valves"
- C. Gate Valves: See Section 15120, "Gate Valves"
- D. Plug Valves: See Section 15125, "Plug Valves"
- E. Tapping Valves: See Section 15120, "Gate Valves"

2.14 MISCELLANEOUS MATERIAL

- A. The Contractor shall furnish and install all miscellaneous material and appurtenances required for a complete installation. Section 15065 specifies material necessary for a complete installation, not specified herein. These materials, including but not limited to the following, shall be installed when required, whether shown on the Plans or not.
1. Anchor Bolts, Bolts, Nuts and Washers
 2. Blind Flanges
 3. Corporation Stops
 4. Gasket Lubricant
 5. Joint Material for Flanged Pipe, Valves and Fittings
 6. Stainless steel repair clamps, with stainless steel bolts
 7. 90° Street Elbows
 8. Tie-Rods

PART 3 - EXECUTION

3.01 GENERAL

- A. The Engineer of Record shall furnish the Contractor with horizontal and vertical controls which shall be used to layout the work. The Florida Registered Land Surveyor hired by the Contractor shall verify all controls provided by the Engineer of Record and it shall be the responsibility of the Contractor to preserve same.
- B. The Contractor shall retain the services of a Florida Registered Land Surveyor who, shall furnish and set stakes, establishing line and grade and shall solely be responsible for the layout of the work as well as the recording of all as-built dimensions and elevations. The Contractor shall furnish additional stakes, templates, and other materials for marking and maintaining survey points and lines given.
- C. The Engineer of Record shall furnish the Contractor with horizontal and vertical controls every 1,320 feet which shall be used to layout the work. Where a proposed pipeline project shall be less than 1,320 feet, the Engineer of Record shall provide the Contractor with two horizontal and vertical control points.
- D. Except as otherwise approved by the MD-WASD, line and grade shall consist of establishing all points of bend, valves, tees, crosses, and other stations not more than 100 feet apart, along a stationed offset line as shown on the Plans, marked by a nail in a metal cap if in pavement, with the station painted nearby or by a nail in the top of a wooden stake driven flush with the ground with the station marked on a flag stake nearby, if not in pavement. Install the pipe to the lines and grades shown, and supply all equipment and personnel necessary to accomplish this end.
- E. The Contractor shall supply the MD-WASD Inspector with a copy of the Registered Land Surveyor layout of the work immediately upon its availability to his own forces.
- F. The Contractor shall make his equipment and men available to the Inspector for spot checking

the accuracy of the pipe laying but shall not rely on the Inspector to set each pipe and fitting for him. The Inspector shall require the pipe be brought within the tolerances specified in Section 15060, "Piping and Fittings", before the backfill is placed. If, due to unforeseen conditions, the line or grade of the pipe has to be changed from the planned location, the Inspector shall note the actual location in a field book assigned to him for that purpose, and the Contractor shall record the same for use in the preparation of Record Drawings.

- G. The ends of existing mains shall be temporarily capped or plugged and anchored to keep them clean and to keep the joints from blowing apart from internal pressure until the new mains can be reconnected to them.
- H. When mains are to be installed within existing street areas, the Contractor shall limit the amount of ditch open at any one time to one block (approximately 600 feet). The work in each block, including excavation, pipe laying, backfilling and temporary paving, shall be completed before proceeding with the work in the next block.
- I. Boring and jacking operations and trenches remaining open to facilitate the repair of existing underground utilities damaged by the Contractor during excavation shall not be deemed a portion of the allowable 600 feet of open trench, unless otherwise decided by the MD-WASD, at its discretion.
- J. When mains are to be installed within existing street areas, the Contractor may employ more than one installation crew on the Project but not less than 1200 feet shall separate any two open trench sections as defined hereinbefore.
- K. Where existing paving is damaged or removed, temporary paving, as specified in Section 02745, shall be placed the same day as the ditch backfill and it shall be replaced with permanent paving, where shown on the Plans, within thirty days.
- L. Pipe and fittings shall, at all times, be handled with great care to avoid damage. In loading and unloading, they shall be lifted with cranes or hoists or slid or rolled on skidways in such manner as to avoid shock. Under no circumstances shall this material be dropped or allowed to roll or slide against obstructions. Pipe and other material shall be distributed along the right-of-way in advance of installation only to the extent approved by the MD-WASD. Such materials shall be so placed as to keep traffic obstruction to a minimum.
- M. Any work within the pipe and fittings shall be performed with care to prevent damage to the interior wall or lining of the pipe. Damaged interior walls or linings shall be repaired or the pipe section or fitting replaced, as required by the MD-WASD. No cables, lifting arms, hooks or other devices shall be inserted into the pipe or fitting. All lifting, pulling or pushing mechanisms shall be applied to the exterior of the pipe or fitting.
- N. During construction the Contractor shall, by sprinkling with water or by other means approved by the Engineer of Record, eliminate dust annoyance to adjacent property owners.
- O. During the work on this Project, the Contractor's personnel may be in close contact with untreated sewage. Therefore, for his own protection, and the protection of his workers, he shall check with the Miami-Dade County Health Department, and based upon their recommendations, shall have his personnel properly inoculated against disease.

3.02 EXCAVATION

See Section 02315, "Trenching and Backfilling for Piping Systems"

3.03 REMOVAL OF WATER

See Section 02315, "Trenching and Backfilling for Piping Systems"

3.04 PIPE BEDDING

- A. Excavate pipe trenches to a minimum of 6 inches below the outside bottom of the proposed pipe barrel. The resulting excavation shall be backfilled with approved pipe bedding material up to the level of the outside bottom of the proposed pipe barrel. This backfill shall be tamped and compacted to provide a proper bedding for the pipe. Recesses for the pipe bells or couplings, shall then be excavated by hand digging, and the pipe installed. Placing and compacting the bedding up to the level of the lower one-third of the pipe barrel shall immediately follow the installation of the pipe. Bedding shall be provided under the branch of all fittings to furnish adequate support and bearing under the fitting. Bedding material shall be select backfill as defined in Section 02315, or shall be drainfield limerock, or similar materials, as approved by the MD-WASD. Limerock screenings, sand, or other fine material shall not be used for bedding.
- B. All excavation below the levels required for installation of the pipe bedding shall be backfilled with approved bedding material, tamped, and compacted to provide proper support for the proposed pipe, at the Contractor's expense.

3.05 BACKFILL AND COMPACTION

See Section 02315, "Trenching and Backfilling for Piping Systems"

3.06 INSTALLATION OF PIPING AND FITTINGS

- A. The centerline of the pipe shall not vary by more than two inches from the location shown on the Plans, and the top of the pipe shall not vary by more than two inches from the established grade, except at points where this tolerance must be changed to clear obstructions, or make connections. Deviation from this location will be permitted only upon written approval from the MD-WASD.
- B. The interior of the pipes shall be thoroughly cleaned of all foreign matter before being gently lowered into the trench and shall be kept clean during laying operations by means of plugs or other approved methods. During suspension-of work for any reason at any time, a suitable stopper shall be placed in the end of the pipe last laid to prevent mud or other foreign material from entering the pipe. Any pipe found defective shall be immediately removed and replaced with sound pipe.
- C. Lines shall be laid straight and depth of cover shall be maintained as shown on the Plans. Grades or pipe centerline elevations are shown on the Plans. The Contractor shall use surveying instruments to maintain alignment and grade. At least one elevation shot shall be taken on each length of pipe and recorded. No abrupt changes in direction or grade will be allowed.

- D. All bends, tees and plugs shall be backed with concrete thrust blocks to undisturbed ground. Encasement-type thrust anchors and collars shall be placed where indicated on the Plans. The bearing area and/or volume of concrete in the anchors and blocks, shall be shown on the Plans or Standards.
- E. All bolts, nuts, gaskets, and other joint materials for use in the pipeline, shall be properly protected.
- F. Gaskets shall be properly stored, and care shall be exercised to keep them away from heat, lights oil, gasoline, or other petroleum products. Gaskets shall be kept clean at all times and not handled with greasy or dirty hands.
- G. The joints of all pipelines shall be properly homed. The particular joint used shall be approved by the Engineer, prior to installation.
- H. Unless otherwise directed cast iron pipe shall be laid with the bell ends facing in the direction of laying; and for lines on an appreciable slope, the bells shall, at the discretion of the MD-WASD, face upgrade.
- I. Push-on and mechanical joints in cast/ductioe iron pipe and fittings shall be made in accordance with the manufacturer's standards, except as otherwise specified herein. Joints between push-on and mechanical joint pipe and/or fittings shall be in accordance with ANSI/AWWA Standard C600, "Installation of Ductile-Iron Water Mains and Their Appurtenances", except that deflection at joints shall not exceed one-half of the manufacturer's recommended deflection or the allowable deflection specified in ANSI/AWWA Standard C600, whichever is the lesser amount.
- J. Before laying push-on and mechanical joint pipe and fittings, all lumps, blisters, and excess bituminous coating shall be removed from the bell and spigot ends. The outside of each spigot and the inside of each bell shall be wire brushed, and wiped clean and dry, The entire gasket groove area shall be free of bumps or any foreign matter which might displace the gasket& The cleaned spigot and gasket shall not be allowed to touch the trench walls or trench bottom at any time. Vegetable soap lubricant shall be applied in accordance with the pipe manufacturer's recommendations to aid in making the joint. The workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Deflections shall be made only of after the joint has been assembled.
- K. Flanged joints shall be used only where indicated on the Plans. Before making up flanged joints in cast iron pipe and fittings the back of each flange under the bolt heads and the face of each flange shall have all lumps, blisters, and excess bituminous coating removed and shall be wire brushed and wiped clean and dry. Flange faces shall be kept clean and dry when making up the joint, and the workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Bolts and nuts shall be tightened by opposites in order to keep flange faces square with each other, and to insure that bolt stresses are evenly distributed.
- L. Bolts and nuts in mechanical joints and flanged joints shall be tightened in accordance with the recommendations of the pipe manufacturer for a leak-free joint. The workmen shall exercise caution to prevent overstress. Torque wrenches shall be used until, in the opinion of the Engineer

the workmen have become accustomed to the proper amount of pressure to apply on standard wrenches.

- M. Cutting of cast/ductile iron pipe for inserting valves, fittings, and the like, shall be done in a neat and workmanlike manner without damage to the pipe, lining, or coating. Pipe shall be cut with an approved saw. After cutting the pipe, the plain end shall be filed to remove all sharp edges and burrs.
- N. Taps into ductile iron pipe for corporation stops shall be AWWA thread only, and the Contractor shall provide suitable equipment for this purpose, as approved by the MD-WASD. After the tap has been made, coat the inside of the pipe around the tap with Carboline Bitumastic No. 300M, or approved equal. Also after installation of the corporation stop heavily coat the exposed exterior surfaces of the stop with Carboline Bitumastic No. 300M, or approved equal.
- O. Areas of loose or damaged polyethylene lining associated with field cutting the pipe shall be repaired, if approved by the MD-WASD, as recommended by the pipe manufacturer. The damaged area shall be stripped back by chiseling or scraping about 1 to 2 inches into the well-adhered lining before patching.
- P. The exposed metal and the 1 to 2-inch lining overlap shall be roughened with a course grade of emery cloth (#40 grit), rasps, or small chisel. Avoid wire brushing or similar buffing since these tend to make the surface too smooth for good adhesion.
- Q. After the area has been cleaned and suitably roughened apply a thick coat (1/16 inch min.) of a two-part coal tar epoxy such as Madewell 1104 manufactured by the Madewell Products Corp., Duluth, Georgia, or approved equal. The epoxy shall be worked into the scratched surfaces and onto the new edge by thorough brushing.
- R. The pipe and fittings shall be restrained at reaction points as specified and shown on the Plans. The pipe manufacturer shall instruct the Contractor in the making of such joints. In addition, concrete thrust blocks shall be placed at all bends, tees, plugs, and other fittings. Encasement-type thrust anchors and collars shall be placed where indicated on the Plans.
- S. Cleaning methods shall meet the Engineer's approval, and must be sufficient to remove silt, rocks, or other debris which may have entered the pipeline during its installation. A thorough flushing of the pipeline shall also be performed.
- T. Polyethylene encasement of cast or ductile iron pipe and fittings, if required by the MD-WASD, shall be installed in accordance with ANSI/AWWA C105/A21.5, "Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids", Method A or B. The MD-WASD's position regarding installation of polyethylene encasement for the project shall be final.

3.07 INSTALLATION OF VALVES

- A. Installation of all valves shall be in accordance with Section 15100, "Valves, General".
- B. The installation of all valves, including bypass gate valves and air release valves, shall include either a valve box and riser, or a manhole in accordance with the Details shown on the Plans for the various sizes and types of valves to be installed.

- C. Polyethylene encasement of valves and riser pipes, if required by the MD-WASD, shall be installed in accordance with ANSI/AWWA Standard C105/A21.5, "Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids", Method A, B or C.
- D. Riser pipes and valves boxes shall be carefully centered and set flush with the finished grade, if in paving, or with the top of the ground, if out of paved areas. All valve boxes shall be held in position with concrete as shown on the Plans or Details.
- E. Upon completion of the Project, but prior to final acceptance, the Contractor shall fully open each valve, except at connections to existing MD-WASD mains. Count the number of turns required to operate each valve from a completely closed to a fully opened position, and paint the number on the bottom of the valve box lid or manhole cover. Valves at connections to existing MD-WASD mains shall only be operated by MD-WASD forces.
- F. Installation of Air Release Valves: See Section 15130
- G. Installation of Bypass Gate Valve: See Section 15102
- H. Installation of Tapping Valves: See Section 15102

3.08 SYSTEM IDENTIFICATION

1. All pipe and fittings shall be clearly identified as force mains. The standard color is Eye-Rest Green (Carboline, Color No. 2369) for all above ground force main system piping and appurtenances.
2. Buried pipes shall be color coded with a green paint as required by the Florida Department of Environmental Protection and the recommended standards for waste water facilities. If paint is applied during installation of the pipe, the paint shall be applied in a continuous line that runs parallel to the axis pipe and that is located on the top of the pipe. For pipes with an internal diameter of 24-inches or greater, paint shall be applied in continuous lines along each side of the pipe as well as along the top of the pipe.

3.09 CONNECTIONS TO EXISTING SYSTEM

- A. All force main service connections into pressure transmission mains shall be provided with a shut-off valve and a check valve at point of entry.
- B. Connections to existing mains of the Miami-Dade Water and Sewer Department shall be made under direct supervision of MD-WASD personnel. Valves separating the main being installed from existing mains shall be operated by MD-WASD personnel upon request. Under no circumstances shall any of these valves be operated by the Contractor's personnel.
- C. Attention is called to the fact that connections to existing mains will probably involve the removal

of a concrete anchor and cast iron plug, also that the existing mains may be cast iron with poured lead sulphur compound, or rubber gasket type joints, concrete with flanged outlet connections, galvanized iron with threaded joints, or others. Use the proper tools and equipment to make connections to any one or more of these types of existing mains. New gaskets shall always be installed, regardless of the condition of the existing one. Other joint accessories such as nuts, bolts and glands, shall only be reused if approved by the MD-WASD's representative.

- D. The Contractor shall notify and coordinate with the MD-WASD well in advance of when tapping connection (20-inch and smaller) is tentatively scheduled to be made. He shall have the tapping sleeve and valve installed on the existing main and satisfactorily tested as specified below, or the valve installed on the tapping flange outlet. A sufficient excavated work area shall have been prepared for the MD-WASD forces making the tap.
- E. Install a mechanical joint plug on the free end of the tapping valve, and pressure test the tapping sleeve and valve after installation on the main, but prior to tapping operations. No leakage shall be permitted at any joint in either the tapping sleeve or tapping valve. The test shall be conducted in the presence of the Inspector, who upon satisfactory conclusion of the test, will arrange a time and date for MD-WASD forces to make the tap.
- F. The Contractor shall furnish a crane, or other suitable equipment to unload the tapping machine from the MD-WASD vehicle, position it in the trench for bolting to the valve, and to reload it after the tapping operation has been completed.
- G. MD-WASD forces will connect the tapping a machine to the valve, and disconnect it after tap is complete. However, the Contractor shall furnish suitable devices or material to support the machine in the trench for proper alignment if required by the MD-WASD. The Contractor shall aid the MD-WASD forces whenever, and to whatever extent necessary, for the tapping operation to be performed efficiently, and without undue time lost.
- H. The Contractor shall perform all necessary sheeting, shoring, dewatering, excavation, backfill and compaction, surface repairs, and other items and work appurtenant to, or incidental to the work.

3.10 AERIAL CROSSING

See Section 15075, "Aerial Crossings"

3.11 JACKING AND BORING

See Section 15070, "Jacking and Boring"

3.12 CLEANING AND TESTING

See Section UC-170, "Cleaning and Testing Mains"

3.13 FINAL ACCEPTANCE BY MD-WASD

The following conditions must be met prior to acceptance of the Project by the MD-WASD:

- A. Final pavement installation shall be completed with the top surface of all castings flush with the new pavement.
- B. Flush and pressure test mains and appurtenances in accordance with Section UC-170.
- C. Acceptance by any other governing agency, if any.
- D. Final field inspection and completion of punch list items, if any, to the MD-WASD's satisfaction.
- E. Final cleanup of worksite.
- F. Delivery and approval of "As-Built" record drawings and product and test Certification.
- G. Final acceptance by the MD-WASD.

END OF SECTION