

ATTACHMENT "SECTION 03300"

CAST-IN-PLACE CONCRETE, REINFORCING AND FORMWORK

(17 Pages)

SECTION 03300

CAST-IN-PLACE CONCRETE, REINFORCING AND FORMWORK

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work included: Provide all labor, materials, equipment, fabrication, incidentals, transportation, placing and supervision necessary to complete all cast-in-place concrete work, its finishing, and all related work called for by the Plans and/or Specifications, or reasonably inferable from either or both, as needed for a complete and proper installation.
- B. Related work: Work affecting this Section includes, but is not limited to:
 - 1. Shop Drawings - Per General Conditions and as specified herein.
 - 2. Materials and storage thereof.
 - 3. Reinforcing-Bar and fabric.
 - 4. Accessories of every nature, including form tie system.
 - 5. Formwork and removal thereof, including shoring and reshoring.
 - 6. Concrete proportions and mixes.
 - 7. Placing of concrete.
 - 8. Admixtures.
 - 9. Joints, metal joint screeds and joint fillers.
 - 10. Finishes of all types.
 - 11. Protection and curing.
 - 12. Patching.
 - 13. Laboratory Testing.

1.02 QUALITY ASSURANCE

- A. Unless otherwise indicated, all materials, workmanship and practices shall conform to the requirements of ACI 301-96 "Specifications for Structural Concrete for Buildings", except as modified by supplemental requirements hereinafter.

1.03 STANDARDS

- A. ACI 301-10 Specifications for Structural Concrete.
- B. ACI 318-11 Building Code Requirements for Reinforced Concrete.
- C. Florida Building Code, latest edition.
- D. ACI 117-10 Standard Specifications for Tolerances for Concrete Construction and Materials.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials for Concrete:

1. Cement shall conform to the following: Portland Cement ASTM C150, normal, type I or type II. Provide domestic cement of one type and from same source for entire project.
2. Mineral Admixtures:
 - a. Fly Ash: Shall conform to ASTM C618. 20% maximum of total cementitious weight.
 - b. Ground Blast Furnace Slag: Shall conform to ASTM C989-93. 30% maximum of total cementitious weight.
3. Chemical Admixtures: The following admixtures are permitted, but require written approval from the Engineer:
 - a. Air Entraining Admixture: Comply with ASTM C260. "Specifications for Air-Entraining Admixtures for Concrete."
 - b. Water Reducing Admixture: Comply with ASTM C494 "Specifications for Chemical Admixtures for Concrete", Type A and compatible with air entraining admixture.
 - c. Water Reducing and Retarding Admixture: Comply with ASTM C494, "Specifications for Chemical Admixtures for Concrete", Type D, and compatible with air entraining admixture.
 - d. High Range Water Reducing Admixture: Comply with ASTM C494, "Specifications for Chemical Admixtures for Concrete", Type F or G, and compatible with air entraining admixture. (Including superplasticizer to reduce water content.)
 - e. Admixtures containing added calcium chloride are not permitted.
4. Aggregates: Shall conform to ASTM C33 and shall be quarried/mined in fresh water. Aggregates from salt water or brackish water are not permitted.
 - a. Fine aggregate shall be silica (quartz) sand. Manufactured sand and screenings are not permitted.
 - b. Coarse aggregate size shall not exceed:

<u>Concrete Member</u>		<u>Size</u>	
1)	Walls	3/4"	67#
2)	Beams or structural slabs not on ground	3/4"	67#
3)	Columns and all other concrete	1"	57#
4)	Drilling concrete pad or slabs on ground	1"	57#

5. In sanitary sewage applications, where called for in the Plans and/or specifications an antimicrobial admixture as specified below shall be utilized:
 - a. An antimicrobial agent, Con^{MIC}Shield[®], or approved equal, shall be used to render the concrete uninhabitable for bacteria growth.
 - b. Contractor shall mix the liquid antimicrobial additive with the

total water content of the concrete mix design in a proportion of 1 gallon per cubic yard. In the case of repairs to damaged concrete a proportion of 2 gallons per cubic yard shall be utilized.

- c. In some instances all of the concrete in the structure in will receive the additive and in other instances only a portion of the concrete will receive the additive. Hence, the Contractor shall apply the additive only as directed in the specific instance.
 - d. Contractor shall submit a letter of certification to the Department, stating that the correct amount and correct mixing procedure was followed for all antimicrobial concrete.
 - e. Con^{MIC}Shield[®] antimicrobial additive shall be as manufactured by Con^{MIC}Shield[®] Technologies, Inc.; 541 Tenth Street NW #233, Atlanta, GA 30318; Phone: 877-543-2094.
- B. Portland cement and reinforcing steel: Comply with ACI 301-10 and, with all modifications and supplements thereto listed in Part 3 of these Specifications.
- C. Burlap mats: Conform to AASHTO Specification M182. (Burleen non-staining mats.)
- D. Epoxy bonding agent: A two (2) component, solvent free, moisture insensitive structural epoxy adhesive conforming to ASTM C881-13 Type II, Sikadur 32 Hi-Mod, as manufactured by Sika Corp., Concrecive 1090 Liquid by Master Builders or approved equal.
- E. Anchor bolts, nuts and washers: Conform to ASTM A449-10, hot-dip galvanized.
- F. Dovetail slots: Galvanized steel, 22 gauge, 1 x 1 inch, with 5/8-inch throat, fiber filled.
- G. Forms:
- 1. Plywood Forms: PS-1, B-B Concrete Form, Class I, exterior type, mill oiled and edge sealed. Thickness shall be as required to support concrete at the rate placed, but not less than 3/4-inch.
 - 2. Steel Forms: Uncoated steel, 3/16-inch minimum thickness, fabricated to close tolerances, protected only by the specified release agent, braced so as not to dent, bend or dimple under wet concrete loads, vibrator impact and tool impact. Maintain steel forms in rust free condition by use of steel wool and light grinding, followed by coats of the specified release agent. Forms should be adjustable to be brought into true alignment without steps or ridges.
- H. Form release agent:
- 1. For plywood forms use a natural non-petroleum base, non-staining and non-retarding release agent that will effectively prevent absorption of moisture and prevent bond with concrete, and leaves the concrete with a

- paintable surface.
2. For steel forms, use an approved material that will not stain, color or otherwise affect the finish of the concrete. Form coating shall not be detectable on finished surfaces.
 3. Round column forms: Provide seamless fiber forms with the three plies nearest to the interior surface of the form deckled or scarfed and overlapped to minimize spiral gaps or seams on the column surface.
- I. Form Ties: Steel rod type with integral waterstops and cones, and with ends or end fasteners that can be removed without spalling the concrete and which leave a hole equal in depth to the required reinforcement clearance, but not less than 2 inches from the formed face of the concrete. Wire tie, banding wire and wood spreaders will not be permitted.
- J. Form Inserts:
1. Bevel or chamfer strips: Wood or non-staining plastic, 3/4-inch wide on each leg at exposed edges of concrete members, unless otherwise noted on plans.
 2. Tongue and Groove Joint Forms: Minimum 24 gauge with steel stakes and splice plates. Forms shall be designed for joints not to receive a poured seal.
 3. Pipe hangers and other utility supports: AISI Type 316 stainless steel.
- K. Non-Shrink Grout: Non-shrink, non-metallic grout conforming to ASTM C1107-13 Grade B or Grade C only. Grout must meet ASTM C1107-13 at a temperature range of 50°F to 90°F at a flowable consistency.
- L. Grout for Surface Repair and Bond Coat:
1. For repair, one part Portland cement to two parts fine sand, and a 50% of water and 50% Acryl 60 or equal (Thoroseal or Acryl Set Bonding Agent by Master Builders) to produce a stiff mortar.
 2. For bond coat, one part Portland cement to one part sand, and a 50% of water and 50% Acryl 60 or equal (Thoroseal or Acryl Set Bonding Agent) to produce a slurry mix.
- M. Moisture Barrier: Kraft paper and glass reinforcing fibers sandwiched between 2 layers of polyethylene film with a permeance rating of maximum 0.1 as per ASTM E96-00, Procedure A.
- N. Preformed Expansion Joint Filler: Non-extruding type, self expanding cork, 3/4-inch, 1-inch, and 1-1/2-inch cork (not to be used for sidewalks), conforming to plans or as otherwise noted on drawings, conforming to the requirements of ASTM D1752-04a (2013), Type II, and compatible with joint sealant compound.
- O. Joint Sealant Compound: Non-sag, 2 component, solvent free, moisture insensitive, flexible, epoxy resin conforming to the requirements ASTM C920-14 Type M, Grade NS. Additionally, the sealant must be recommended by the manufacturer to perform under continuous immersion in water.
- P. Polyurethane Elastomeric Sealant: Sikaflex-2c, NS/SL or approved equal. Provide a 2-component, premium-grade, polyurethane-based, elastomeric

sealant. It is principally a chemical cure in a non-sag and self-leveling consistency. Sealant shall meet ASTM C920-14 and Federal Specifications TT-S-00227E.

1. Joint Movement: +50%.

Q. Waterstops:

1. Volclay Waterstop-RX or approved equal. Flexible strip of bentonite waterproofing compound in coiled form.
 - a. Chemical Composition:
 - 1) Butyl Rubber-Hydrocarbon: 24.9% by weight; ASTM D297.
 - 2) Bentonite: 75% by weight; SS-S-210-A.
 - 3) Volatile Matter: Below 1%; ASTM D6.
 - 4) Waterstop shall not contain any asbestos fibers or asphaltics.
 - b. Physical Properties:
 - 1) Specific Gravity: 1.57; ASTM D71.
 - 2) Application Temperature Range: 5-125°F.
 - 3) Flash Point: 365; ASTM D93-97.
 - 4) Accelerated Aging: Maintained 99% solids.
 - 5) Dimensions: 1" x 3/4" x 16'-6"
2. Polyvinyl chloride (PVC): Conforming to the requirements of U.S. Army Corps of Engineers Specification CRD-C-572 and of the following type:
 - a. Expansion Joints: 9-inches by 3/8-inch, ribbed center bulb.
 - b. Construction Joint: 9-inches by 3/8-inch, flat ribbed.
 - c. Only where specified on Plans at construction and expansion joints: 9-inches by 3/8-inch, split ribbed.
 - d. Install waterstops as shown as manufactured structures.

R. Fiber Reinforcement: Fiber reinforcement shall not be used in the concrete unless ordered by the Engineer in writing. It shall consist of 100% virgin polypropylene fibrillated fiber-dosage of 2 lbs. per cubic foot.

1. Compressive Strength: 1 psi (.006895 M Pa), ASTM C39.
2. Flexural Strength: 288 psi (2.0 M Pa) after 7 days, 390 psi (2.7 M Pa) after 28 days; ASTM C78.
3. Splitting Tensile Strength: 194 psi (1.3 M Pa) after 7 days, and 290 psi (2.0 M Pa) after 28 days; ASTM C496.
4. Source: Fibermesh Micro-Reinforcement System by Fibermesh Company, Division of Synthetic Industries, Inc., or approved equal.

S. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

T. A shrinkage reducing admixture (Teraguard) or equivalent at the rate of 2.2% by weight of cement may be used in the concrete to meet the shrinkage limitations.

U. To protect the concrete slab against the elements, the Engineer may direct the Contractor to spray an evaporation retarder on the finished concrete slab

immediately behind the cement finishing process at no additional cost to the Department. This is not a curing compound.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work.

3.02 SUPPLEMENTAL REQUIREMENTS

- A. All phases of concrete construction, including materials formwork, and all other related procedures shall comply with the most stringent allowed tolerances of ACI-301 and ACI-117 Standards (Latest Edition) - Non compliance with these standards will cause full rejection of any work done.
- B. Comply with ACI 301-10 and with all modifications and supplements thereto listed herein. In addition to the ACI Standards on finished concrete, the Engineer will only approve quality finished concrete which in his opinion is ready to receive a grout finish, paint or liquid membrane.
- C. The following modifications and supplements to ACI 301-10 shall also apply to the work.
 - 1. General
 - a. These specifications cover cast-in-place structural concrete for use in buildings and appurtenances, including foundations, curbs, sidewalks, concrete pavements and utility structures, water containment tanks, and piles.
 - b. Keep minimum two (2) copies of ACI 301-10 "Specifications for Structural Concrete" in field office at all times.
 - 2. Proportioning and Design of Mixes:
 - a. General: Proportion concrete to meet properties as specified. Prepare mix designs for each type and strength of concrete. Submit with mix design the chemical admixture manufacturer's statement that the admixture proposed complies with the requirements of this specification. Where concrete of different strengths are specified for the same location, the higher strength concrete shall be used. Concrete proportions shall be established on the basis of previous field experience, or laboratory trial batches as specified in ACI 301-10 Sections 4.2.2 & 4.2.3.
 - b. Classes of Concrete:
 - 1) Structural concrete of normal weight for portions of the structure that are required to be watertight containments or tremie concrete, the water/cementitious ratio shall not exceed 0.45 if exposure is to be to fresh water.
 - 2) If the concrete is exposed to salt or brackish water, or if exposed to injurious concentrations of sulfate-containing

solutions (1,500 ppm or more of Sulfate in water) or other chemically aggressive solutions, use Type II cement with Rheobuild 1000 admixture by Master Builders, or approved equal; water/cementitious ratio shall not exceed 0.34.

- 3) Other Concrete: (This would be slabs-on-grade, concrete thrust blocks, and miscellaneous concrete). The water cementitious ratio shall not exceed 0.50 to 0.55.
- 4) Minimum f'c @ 28 days shall be 3,000 psi.
- 5) Minimum f'c @ 28 days shall be 4,000 psi with a Water/Cement ratio of 0.45. (see 1) above)
- 6) Minimum f'c @ 28 days shall be 7,000 psi with a Water/Cement ratio of 0.34. (see 2) above)

c. Slumps:

- 1) All structural concrete, pumped concrete and tremie concrete shall contain a High Range Water Reducing Admixture and be designed with a maximum water content of 270 pounds per cubic yard (32.36 gallons). The initial water slump prior to addition of the High Range Water Reducing Admixture shall be 2 inches maximum. Concrete at point of placement shall not exceed 10 inches. Concrete shall be non-segregating.
- 2) Slabs including slabs-on-grade, and all other concrete shall have a maximum water content of 287 pounds per cubic yard (34.4 gallons) and have a 5-inch maximum slump with a water reducer, or water reducer and retarder admixture added.

3. Formwork

- a. Earth cuts are not permitted for forms for vertical surfaces. Footings, grade beams and slab edges shall be formed. Provide moisture barrier under all slabs on grade. Lap 6 inches and tape punctures.
- b. The contractor is responsible for the adequacy of forms and shoring including placing, fill and equipment on roof, and for safe practice in their use and removal. Submit formwork calculations, and shop drawings including shoring and reshoring. In addition, the calculations and shop drawings for formwork, shoring, and reshoring, if required by the Engineer or Building Department, shall be signed and sealed by a Professional Engineer registered in the State of Florida.
- c. Design forms for the loads and lateral pressures resulting from the placement and vibration of concrete and for design considerations, wind loads, allowable stresses, and other applicable requirements of the Florida Building Code.
- d. Provide form facing materials as required by the specified finish of the formed surface. Do not use facing material with raised grain, torn surfaces, worn edges, patches, dents or other defects. No form may be reused more than three times without the Department's approval. The maximum deflection permitted of facing materials reflected in concrete surfaces exposed to view is

1/240 of the span between structural members.

- 1) Forms shall be free from surface defects, tight to prevent leakage and braced to keep its position and shape when filled with concrete. Adjacent edges and end panels and sections shall be held together to provide accurate alignment and prevent forming ridges, fins, offsets or similar type defects in finished concrete. It shall be tight to prevent loss of water, cement or fines during placing and vibrating concrete. The bottom of the forms placed in continuous straight even footings or slabs shall be watertight to prevent loss of water, cement and fines during placement and vibration of concrete, a gasket may be required by the Engineer under the forms to provide water tightness at the Contractor expense. The Contractor shall not proceed to place forms for concrete work adjacent to or on top of previous placed concrete without the Engineer's approval, if the stripped forms reveals columns, walls or beams are out of level or plumb or there are cold joints or other objectionable work in the opinion of the Engineer. Contractor shall submit to the Engineer for approval, how he intends to correct or remove the defective work promptly at his expense. Contractor shall perform such corrections prior to proceeding to place concrete in the next Section.
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- e. Provide positive means of adjustment (wedges or jacks) of shores and struts, and all settlement shall be taken up during concrete placing operation. Brace forms securely against lateral deflection. Do not anchor form bracing to poured concrete floors, or make holes in floor.
 - f. Provide temporary openings in columns and wall forms to limit the free fall of concrete to five (5) feet. Place such openings at no more than eight (8) feet apart to facilitate placing and consolidation of concrete. Elephant trunks may be used to vertical heights of fifteen (15) feet for tremie and other purposes, if approved by the Engineer. Provide temporary openings at the bottom of wall and column forms and elsewhere as necessary to facilitate cleaning and observation immediately before concrete is placed. Blow formwork entirely clean of all saw dust, dirt, or other items not specifically intended to be a part of the final concrete. Any evidence of non-intended items in the forms is considered sufficient cause to stop concreting operation and/or require removal of concrete placed in such contaminated forms.
 - g. Provide inserts, conduits, boxes, sleeves, anchors, ties, bolts, hangers, dowels, thimbles, nailers, grounds and other devices in coordination with other trades.
 - h. Set anchor bolts and other embedded items accurately and hold securely until concrete is placed and set. Anchor bolts shall be galvanized and of size and length as indicated on the Plans. Bolts not sized shall be 3/4-inch diameter.
 - i. Insert galvanized dovetail anchor slot in forms, in columns, beams

and slabs completely around in-fill masonry panels. Coordinate with Section 04220 Unit Masonry for spacing of dovetails.

- j. Install wall spools, wall flanges and wall anchors before placing concrete. Do not weld, tie or otherwise connect the wall spools to the reinforcing steel.
- k. Do not use pinch bars, wrecking bars or other metal tools against as-cast concrete to wedge forms loose; use only wooden wedges carefully and gradually. Driving shall be accomplished by light tapping.
- l. The Contractor is responsible for the removal of forms and shores. Concrete shall be cured in accordance with ACI 308r-01 (also see section 10 below). Do not remove forms or shores before the member has attained sufficient strength to support its weight and the loads imposed, nor sooner than listed below:
 - 1) Wall forms: 24 hours.
 - 2) Column forms: 24 hours.
 - 3) Beam and girder side forms only (not bottom form): 24 hours.
 - 4) Beam and Girder bottom forms: 7 days minimum unless otherwise approved by the Engineer.
 - 5) Slab forms: 14 days.
 - 6) Arch centers: 7 days.
 - 7) Pan joist forms: 4 days.

4. Reinforcement

- a. Prior to fabrication, submit for review shop drawings showing all fabrication dimensions, bar lists and location for placing of the reinforcing steel and accessories, including spacing of reinforcing, splices (lap, welded, Cadweld and/or mechanically threaded), grade of reinforcing and name of manufacturer. Note all deviations from the Plans and use the same designation mark as shown on the Plans where possible.
- b. Reinforcing bars: ASTM A615, Grade 60, deformed bars of USA manufacturer.
- c. Welded wire fabric: ASTM A185, galvanized.
- d. Metal bar supports: CRSI MSP-1, Chapter 3, Class 2, Type B stainless steel protected bar supports.
- e. Coupler Splice Devices: Cadweld, tension couplers capable of developing the ultimate strength of the bar.
- f. Reinforcing steel upon which unauthorized welding has been done, shall be removed and replaced at no additional cost to the Department.
- g. Place reinforcing bars to the most stringent tolerances indicated in ACI 301 and ACI 117 (Latest Edition). Tolerances specified in those standards shall govern over any other reference code or standard.
- h. All reinforcement at time concrete is placed shall be free of mud, oil or other materials that may affect or reduce the bond. Reinforcing with rust or mill scale will not be accepted without cleaning and/or brushing to remove scale and rust.
- i. Support rebar and mesh reinforcing for slabs on grade 1-1/2

- inches from top of slab on masonry blocks not less than 4 sq. in., having a compressive strength equal to or greater than the specified strength of the concrete being placed. Space blocks at no more than 4 feet apart each way for rebars, and no more than 3 feet apart for mesh reinforcement.
- j. Support reinforcing off from formwork for columns, walls and beams with stainless steel protected bar supports. Support slab reinforcing on #5 bars, or larger, spaced at no more than 48 inches on center. Space individual high chairs no more than 48 inches apart and support bars shall not exceed 24 inches past outermost chairs.
 - k. Overlap welded wire fabric in such a manner that the overlap measured between outermost cross wires of each fabric sheet is not less than the spacing of the cross wires plus 2 inches or 6 inches, whichever is greater. Do not extend fabric through expansion and/or contraction joints, unless otherwise noted on the Plans.
 - l. The minimum clear distance between parallel bars, both vertical and horizontally, shall not be less than the nominal diameter of the bars, or less than 1-1/2 times the maximum size of the aggregate, or 1 inch in beams, or 1-1/2 inches in columns, whichever is greater. Where reinforcement in beams is placed in two or more layers, the upper layer shall be placed directly above the bars in the bottom layer. Misplacement, misalignment or improper length of dowels shall be sufficient cause to require removal and reconstruction of affected work.
 - m. Unless allowed by the Engineer, bending of reinforcing partially embedded in concrete is not permitted. When permitted, bending shall be in accordance with CRSI Manual of Standard Practice.
5. Joints and Embedded Items.
- a. Provide premolded expansion joint filler strips of proper width and length as specified in the Plans. Place 1/2-inch expansion joint fillers every 20 feet in straight runs of walkways or sidewalks, at right angle turns and wherever concrete butts into vertical surfaces, unless otherwise noted on the Plans.
 - b. Provide waterstops in all construction joints, unless otherwise indicated on the Plans.
 - c. Join all waterstops at all intersections so that a continuous seal is provided. Center the waterstop in the joint. Hold water stop positively in correct position. In the event of damage to the waterstop, repair the water stop in an acceptable manner. Vibrate concrete to obtain impervious concrete in the vicinity of all joints.
 - d. Install waterstop in accordance with instructions of the manufacturer. Prior to use of the waterstop material in the field, submit to the Engineer for approval a sample of each size and shape to be used. Fabricate sample so that the material and workmanship represent in all respects the fittings to be furnished under this Specification.
 - e. Place all sleeves, inserts, anchors, and other embedded items prior to placing concrete. Anchors and bolts cast in concrete shall

be hot dip galvanized or stainless steel. Where permitted by the Engineer, concrete expansion bolts shall be stainless steel and of the wedge anchor type. Take all necessary precautions to prevent embedded items from being displaced, broken or deformed during concreting operation. Protect drains from intrusion of concrete.

6. Placing:

- a. Equipment for mixing and transporting concrete must be clean. Forms shall be thoroughly clean and damp, and reinforcing shall be secured in place. Runways for transporting concrete shall not rest on reinforcing. When concrete is placed against earth, sprinkle sufficiently before placing.
- b. Deposit of concrete in forms no longer than ninety (90) minutes after the initial design water has been added to the cement and aggregates. Concrete which can not be so placed shall not be used and shall be wasted. **No additional water shall be added.** No rettempering with water is permitted.
- c. In addition to the requirements of ASTM C94, the concrete delivery tickets shall indicate the cement content and water/cement ratio.
- d. During hot weather, proper attention shall be given to ingredients, production methods, handling, placing, protection and curing. Comply with ACI 305R "Hot Weather Concreting" recommendations.
- e. Do not place concrete in forms unless the water level is below the concrete to be placed, even if it is necessary to maintain the dewatering, or under rain.
- f. Do not place concrete under water except for tremie concrete as called for on the Plans. Submit for approval plan and details of means and methods for installation of seal tremie concrete prior to commencement of work. Seal concrete which subsequently fails to perform, shall be repaired or replaced at no additional cost to the Department.
- g. Place seal concrete under water in the space in which it is to remain, by means of a tremie, a closed-bottom dump bucket of not less than one cubic yard capacity, or other approved method, and do not disturb after it is deposited. Deposit all seal concrete in one continuous pour. Do not place concrete in running water. Design all formwork, to retain concrete under water, to be watertight. Submit shop drawings for the design of formwork and excavation sheeting signed and sealed by a Florida Registered Professional Engineer.
- h. The tremie shall consist of a tube having a minimum inside diameter of ten (10) inches, and shall be constructed of sections having tight joints. No aluminum parts which have contact with the concrete will be permitted. The discharge end shall be entirely seated at all times and the tremie tube kept full to the bottom of the hopper. When a batch is dumped into the hopper, the tremie shall be slightly raised (but not out of the concrete at the bottom) until the batch discharges to the bottom of the hopper, after which

the flow shall be stopped by lowering the tremie. The means of supporting the tremie shall be such as to permit the free movement of the discharge end over the entire top surface of the work, and shall permit it being lowered rapidly when necessary to choke off or retard the flow. The flow shall preferably be continuous and in no case shall be interrupted until the work is completed. Exercise special care to maintain still water at the point of deposit.

- i. When the concrete is placed by means of a bottom dump bucket, the bucket shall be lowered gradually and carefully until it rests upon the concrete already placed. The bucket shall then be raised very slowly during the discharge travel; the intent being to maintain, as nearly as possible, still water at the point of discharge and to avoid agitating the mixture. Aluminum buckets will not be permitted.
- j. Do not commence pumping, to dewater a sealed cofferdam, until the seal has set sufficiently to withstand the hydrostatic pressure, and in no case earlier than 72 hours after placement of concrete.
- k. Notify Engineer a minimum of 24 hours prior to concreting and request a specific time for observation of reinforcing and formwork for portions of concrete work to be placed. No observation will be made by the Engineer until rebar installation for all work to be done and all formwork has been completed and approved by the Contractor's field superintendent. Do not order concrete until all correction and additions indicated by the Engineer have been made. Should the Engineer's observation reveal that work is improperly prepared and an additional observation will be required, he will so inform the Contractor and all above requirements shall also govern.

7. Repair of Surface Defects:

- a. Repair all concrete surface defects, which includes, but not limited to cracks, tie holes (no plastic cones), uneven holes, honey combs, rough frame work and other objectionable conditions deemed unacceptable to the Engineer immediately after form removal. This repair work is to be done for all concrete expose surfaces, liquid applied surface or painted surfaces in or out of the water. Repair all cracks and defects in the concrete floors, beams, joists, columns, and other structural members, roof and walls, to the satisfaction of the Engineer, that may occur up to one year after acceptance of work regardless of the cause. Test unformed, surfaces such as monolithic slabs, for smoothness and verify placement tolerances specified for each surface and finish. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness. Repair unformed surfaces that contain surface defects which affect durability of concrete. Surface defects, as such, include cracking, cracks which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets and other objectionable and rough conditions.

- b. Proprietary compounds for adhesion or as patching ingredients may be used, if approved by the Engineer. All structural repair of surface defects to be made require the approval of the Engineer, as to the method and procedure. Approval of the completed work must be obtained from the Engineer.
8. Finishing of Formed Surfaces.
- a. Apply rough form finish to exterior walls below grade not exposed to water.
 - b. Apply smooth form finish to exterior and interior walls and columns exposed to water.
 - c. Apply smooth form finish to interior walls and underside of floors, stairs and slabs.
 - d. In addition to the smooth form finish, apply a grout cleaned finish to concrete walls and surfaces exposed to public view and underside of formed floors, stairs or slabs.
 - e. Apply a rubber float grout mix to properly prepared concrete surface, only when approved by the Engineer. Mix shall have one part Portland cement to two parts fine sand in a 50% water and 50% Acryl #60 (Thoroseal or Acryl Set) mix or Acryl Set by Master Builders. Make a 10 x 10-foot sample on the concrete wall for the approval of the Engineer. Finished surface shall be a non dusting hard finish, when scratched with a 1/4-inch metal edge.
 - f. Finish concrete surface, interior or exterior, below or above water shall include all:
 - 1) Exposed concrete.
 - 2) Grout finished concrete.
 - 3) Painted surface concrete.
 - 4) Liquid membrane finished concrete shall comply with manufacturer's requirements.
 - 5) The entire surface of finished concrete shall have a smooth uniform surface, there shall be no offsets, visually bulges, or wavering in the finished surfaces. The joints must be accurately aligned, they can not be uneven or in or out, a higher and lower, there shall be no fins, projection or unevenness between forms.
 - 6) If after stripping the forms the Engineer determines that the finished concrete does not comply with any or all of the above requirements, the Contractor shall submit his proposal in writing to the Engineer as to his methods of correcting the work at no added cost to the Department, which shall include, but not limited to all grinding of fins, projections, unevenness between joints, form high spots and uneven spots.
 - 7) In addition to all other requirements, concrete surfaces exposed to public view, irrespective of size, area or location shall be completely clean and free of: (1) Stains of any nature, (2) Parts of forms or other wood of any nature, (3) laitance, (4) "Run-downs" of leaked water from secondary pours, (5) Nails, (6) Strips, (7) Ties and (8) all other extraneous, deleterious materials and/or substances

which may affect the finished appearance and condition of exposed concrete. Surfaces not meeting the above requirements are to be repaired and treated at no additional cost to the Department.

9. Slabs
 - a. Unless otherwise noted on the Plans, place strips alternately at maximum 20 feet center-to-center and to align with column centerline. Do not place adjacent strips until elapse of twenty four hours after first strip is placed. Place slabs on grade by the "strip-cast" method. Method to be reviewed by the Engineer. Provide saw-cut joints at maximum 20 feet center-to-center and to align with column center lines within four hours of final finishing.
 - b. Provide doweled construction joints where shown on the Plans.
 - c. Provide a hard steel troweled finish, free from trowel marks and irregularities, to slabs and floors.
 - d. Provide a light hair-broom finish to exterior slabs and floors exposed to public view. Leave hair-broom lines parallel to direction of the slab drainage.
 - e. Provide a stiff bristle broom finish to slabs and floors with slopes greater than 10 percent. Leave broom lines parallel to slope drainage.
 - f. Finish exposed edges of slabs, floors and tops of walls with a 1/4-inch radius edge unless a chamfer is called for on the Plans.

10. Curing and Protection
 - a. Comply with ACI 305 "Hot Weather Concreting", Chapter 4, with the supplements and modifications to ACI 301 listed herein.
 - b. Only concrete water curing for not less than 7 days (24 hours/day continuously) will be accepted; Burlene mats shall be used in curing. Water cure by ponding or continuous sprinkling covering complete surface with minimum runoff. The application of water to wall may be interrupted for grout cleaning only over the areas being cleaned at the time, and the concrete surfaces shall not be permitted to become dry during such interruption.
 - c. Begin all water curing as soon as concrete is set and concrete will not be damaged. Keep concrete and wall forms wet the first 24 hours. Remove forms as indicated in Formwork, Section 3.02-C.4, and continue with 7 day water curing. Recoat damaged surfaces subject to heavy or surfaces damaged by construction procedures within 3 hours of damage. Method of repair shall be approved by the Engineer.

11. Testing
 - a. Testing laboratory will be selected and paid for by the Department. Send results of all test to the Department and to the Contractor. The Contractor shall notify the Testing laboratory at least 24 hours before each concrete placing.
 - b. Obtain and mold 3 specimens for each fifty (50) cu. yds., or fraction thereof, of each class of concrete placed each day or as directed by the Engineer.

- c. Cure specimens from each sample in accordance with ASTM C31. Record in test report any deviations from this Standard.
- d. Test specimens in accordance with ASTM C39. Test one specimen at twenty eight (28) days for acceptance and, one specimen at three (3) days and seven (7) days respectively, for information. If one specimen in a test manifests evidence of improper sampling, molding or testing, it shall be discarded and the strength of the remaining cylinders shall be considered the test result.
- e. Contractors Superintendent shall color code on a set of structural drawings the extent of days work and date to conform to cylinders test.
- f. Perform slump test at discharge of mixer, one for each strength test in accordance with ASTM C143. In the event slump is excessive, testing laboratory will immediately notify the Contractor's superintendent and the Engineer's representative on site. The Contractor shall then reject all concrete with excessive slump and/or deposit time.
- g. Drying Shrinkage Test: A drying shrinkage test shall be conducted on the preliminary trial batch with the maximum water-cementitious materials ratio used to qualify each proposed concrete mix design using the concrete materials, including admixtures, that are proposed for the project. Three test specimens shall be prepared for each test. Drying shrinkage specimens shall be 4 x 4 x 11 inch prisms with an effective gauge length of 10 inches fabricated, cured, dried, and measured in accordance with ASTM C157 except with the following modifications:
 - 1) Specimens shall be removed from the molds at an age of 23 hours \pm 1 hour after trial batching, shall be placed immediately in water at 73°F \pm 3°F for at least 30 minutes, and shall be measured within 30 minutes thereafter to determine original length and then submerged in lime-saturated water as specified in ASTM C157. Measurement to determine expansion expressed as a percentage of original length shall be taken at age 7 days. The length at 7 days shall be the base length for drying shrinkage calculations ("0" days drying age). Specimens then shall be stored immediately in a humidity controlled room maintained at 73°F \pm 3°F and 50% \pm 4% relative humidity for the remainder of the test. Measurements to determine shrinkage expressed as percentage of base length shall be reported separately for 7, 14, and 21 days \pm 4 hours of drying from "0" day after 7 days of moist curing.
 - 2) Drying shrinkage deformation for each specimen shall be computed as the difference between the base length (at "0" days drying age) and the length after drying at each test age. Results of the shrinkage test shall be reported to the nearest 0.001 percent. If drying shrinkage of any specimen deviates from the average for that test age more than 0.004 percent, the results for that specimen shall be

- disregarded.
- 3) The average drying shrinkage of each set of test specimens cast in the laboratory from a trial batch as measured at the 21 days drying age shall not exceed 0.036 percent and 0.042 percent at the 28-day drying stage for all concrete.
 - a) The maximum concrete shrinkage for specimens cast in the field shall not exceed the trial batch maximum shrinkage requirement by more than 25 percent.
 - b) If the required shrinkage limitation is not met during construction, the Contractor shall take any or all of the following actions at no additional cost to the Owner, for securing the specified shrinkage requirements. These actions may include changing the source or aggregates, cement and/or admixtures, including Tetra Guard AS 20 or approved equal; reducing water content; washing of aggregate to reduce fines; increasing the number of construction joints; modifying the curing requirements; or other actions designed to minimize shrinkage or the effects of shrinkage.
 - 4) Alkali-aggregate reactivity potential shall be determined in accordance with Appendix XI of ASTM C33. Aggregates shall be tested in accordance with ASTM C289 and C295 to determine potential reactivity. Aggregates which do not indicate a potential for alkali reactivity or reactive constituents may be used without further testing. Aggregates which indicate a potential for alkali reactivity shall be further tested in accordance with ASTM C227 or C1105, as appropriate, using a cement containing less than 0.6 percent alkalis. At the discretion of the Engineer, testing in addition to that indicated in Appendix XI of ASTM C33 may be performed on potentially reactive aggregates. Nonreactive aggregates shall be imported if, in the opinion of the Engineer, local aggregates exhibit unacceptable potential reactivity.
12. Evaluation and Acceptance of Concrete.
- a. If tests are insufficient or inadequate, test and evaluate by core tests. Failure of any concrete cylinder to meet specified requirements shall be deemed as non-complying and costs of additional tests to determine the adequacy or inadequacy shall be borne by the Contractor. Concrete rejected for any reason is to be removed and replaced, including labor, forms and reinforcing, to meet specifications at no additional cost to the Department and no additional time extension.
13. Additional Requirements.
- a. Submit shop drawings as required per General Conditions and

elsewhere in these specifications. Prime Contractor shall check and approve all shop drawings prior to submission. Do not fabricate any item requiring shop drawings until approval of shop drawings has been granted by the Department. Partial shop drawings are not accepted, submit drawings for complete submittal.

- b. Provide precast or cast-in-place reinforced concrete lintels at all masonry openings and sills at all windows. Reinforce to suit loads and span. Provide minimum 8-inch bearing at each end and, pour integral with columns where opening abuts columns.
- c. Sidewalks in R.O.W.: Provide poured-in-place 4-inch thick concrete slab, 3,000 psi concrete, with continuous 8-inch deep thickened slab edges. Isolate walks from vertical surfaces with 1/2-inch expansion joint material. Provide 1/2-inch expansion bituminous joint material flush with top of concrete slabs at 20 feet on center and tooled joints at 5 feet on center. Tool all open edges to a smooth radius and all edges adjacent to the forms.

END OF SECTION

APPENDIX "A"

**MIAMI-DADE COUNTY
DEPARTMENT OF REGULATORY AND ECONOMIC RESOURCES
DIVISION OF ENVIRONMENTAL RESOURCES MANAGEMENT**

NOTICE TO ALL CONTRACTORS

(1 Page)

MIAMI DADE COUNTY, FLORIDA
DEPARTMENT OF REGULATORY AND ECONOMIC RESOURCES
701 NW 1ST COURT
SUITE 200
MIAMI, FLORIDA 33136
(305) 372-6789

**NOTICE TO ALL CONTRACTORS INVOLVED IN ANY CONSTRUCTION
ACTIVITY WHICH REQUIRES DEWATERING WITH ULTIMATE
DISCHARGE INTO A CANAL, LAKE, DITCH OR STORM SEWER
WHICH DISCHARGES INTO AN OPEN BODY OF WATER OR
BISCAYNE BAY.**

Please be aware that if you are involved in any construction activity as above described, you are required to provide all necessary measures in order to maintain turbidity in the receiving body of water within the acceptable limits as established by the Florida Building Code. You must present a separate plan to be included with your building plans indicating your proposed measures or apply for a permit from Miami-Dade County Department of Regulatory and Economic Resources before your construction plans will receive final approval. For additional information, please contact Maria Molina, P.E. Chief, Water Control Section at 305-372-6769.

APPENDIX "B"


**MIAMI-DADE
WATER AND SEWER DEPARTMENT**

STANDARD DETAILS

(45 Pages)

1. ALL MATERIALS AND LABOR UNDER THIS PROJECT SHALL BE IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE MIAMI-DADE WATER AND SEWER DEPARTMENT AND SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS AVAILABLE AND ON FILE WITH THE DEPARTMENT. SUBMIT SHOP DRAWINGS FOR ALL MATERIALS.
2. COVER OVER WATER OR SEWER FORCE MAINS SHALL BE 4'-0" MIN.
3. ALL MAIN LINE VALVES SHALL BE INSTALLED COMPLETE WITH 10" RISER PIPES AND NO. 3 OR 53 VALVE BOXES FIRE HYDRANTS AND SERVICE VALVES SHALL BE INSTALLED COMPLETE WITH 6" RISER PIPES AND NO. 2 VALVE BOXES.
4. ALL FORCE MAIN SERVICE CONNECTIONS INTO PRESSURE TRANSMISSION MAINS SHALL HAVE A SHUT OFF VALVE AND CHECK VALVE AT THE POINT OF ENTRY.
5. ALL GRAVITY SYSTEMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DEPARTMENT STANDARDS.
6. ALL WATER METERS WILL BE INSTALLED BY THE MIAMI-DADE WATER AND SEWER DEPARTMENT, PROVIDING THE APPROPRIATE CHARGES HAVE BEEN PREPAID.
7. FIRE HYDRANT REQUIREMENTS (NUMBER AND LOCATION) SHALL BE AS REQUIRED BY MIAMI-DADE COUNTY FIRE DEPARTMENT OR THE APPROPRIATE FIRE AGENCY WITH INSTALLATION IN ACCORDANCE WITH DEPARTMENT STANDARDS.
8. CONTRACTOR MUST CALL MDWASD INSPECTION DIVISION TO ARRANGE FOR A PRECONSTRUCTION MEETING 2 FULL BUSINESS DAYS PRIOR TO PROPOSED START OF CONSTRUCTION. CONTACT ONE CALL CENTER 48 HRS PRIOR TO EXCAVATION.
9. CONTRACT INSPECTOR WILL INSPECT ANY FACILITIES APPROVED BY THE DEPARTMENT. ALL OTHER REQUIREMENTS OF THE PERMITTING AGENCY SHALL BE IN ACCORDANCE WITH THEIR STANDARDS AND REQUIREMENTS.
10. WORK PERFORMED UNDER THIS PROJECT WILL NOT BE CONSIDERED AS COMPLETE UNTIL FINAL ACCEPTANCE OF THE SYSTEM BY THE DEPARTMENT AND UNTIL THE FOLLOWING DOCUMENTS ARE RECEIVED AND APPROVED BY THE DEPARTMENT:
 - a. EASEMENTS, IF REQUIRED
 - b. CONTRACTOR'S WAIVER AND RELEASE OF LIEN
 - c. ABSOLUTE BILL OF SALE
 - d.
 - i. CONTRACTOR'S LETTER OF WARRANTY (I.E., LETTER AGREEMENT)
 - ii DEVELOPER'S CONTRACT BOND (I.E., CONTRACT AGREEMENT).
 - e. "RECORD DRAWING" PRINTS (24"x 36") SHOWING SPECIFIC LOCATIONS, DEPTH, ETC. OF ALL WATER AND SEWER FACILITIES AS LOCATED BY A LICENSED SURVEYOR & MAPPER, ALONG WITH PRINTS OF "RECORD DRAWINGS" WHICH HAVE BEEN SIGNED AND SEALED BY A REGISTERED SURVEYOR & MAPPER. (No. OF PRINTS: 3-FOR WATER, 4-FOR GRAVITY SEWER AND 5-FOR FORCE MAIN OR PUMP STATION PROJECTS). Submittal of final CAD Files required.
 - f. H.R.S. LETTER OF RELEASE REQUIRED FOR ALL WATER PROJECTS
 - g. BILL OF SALE SKETCH (8½"x 11") FOR WATER AND SEWER, SEPARATELY
11. ALL NEW CONNECTIONS FROM EXISTING DEPARTMENT MAINS TO BE MADE BY DEPARTMENT FORCES ONLY. THE CONTRACTOR TO EXCAVATE AT REQUIRED LOCATIONS, PROVIDE AND INSTALL MATERIAL WITH FITTINGS, PRIOR TO TAP.
12. AN APPROVED PAVING AND DRAINAGE PLAN MUST BE SUBMITTED TO MDWASD FOR ALL NEW SUBDIVISIONS PRIOR TO APPROVAL OF WATER AND SEWER PERMIT PLANS, UPON REQUEST.
13. UNLESS OTHERWISE SPECIFIED, ALL TAPS 20 INCHES AND SMALLER FOR CONNECTIONS TO EXISTING MAINS WILL BE DONE BY DEPARTMENT FORCES. UNDER NO CIRCUMSTANCES WILL THE CONTRACTOR BE PERMITTED TO TAP EXISTING MAINS IN THE SIZE RANGE SPECIFIED ABOVE. THE TAPPING SLEEVE AND TAPPING VALVE ARE FURNISHED AND INSTALLED BY THE CONTRACTOR UNDER THE SUPERVISION OF THE INSPECTOR.

I T E M	CROSS REF.	SPEC. REF.

 MIAMI-DADE COUNTY <i>Delivering Excellence Every Day</i> WATER & SEWER DEPARTMENT	ISSUE DATE	APPROVED BY	STANDARD DETAIL STANDARD REQUIREMENTS WATER AND SEWER CONSTRUCTION	GS 0.5 SHEET 1 OF 2
	03/01/2010	V.F.C.		
	07/20/2016	D.V.		

1. AT THE COMPLETION OF ANY WATER AND SEWER JOB EITHER DONATION OR CONTRACT, THE CONTRACTOR SHALL SUBMIT:
 - a. RECORD DRAWING PRINTS WHICH HAVE BEEN SIGNED AND SEALED BY A FLORIDA LICENSED PROFESSIONAL SURVEYOR AND MAPPER (QTY. OF PRINTS AS REQUIRED BY THE DEPARTMENT).

2. "RECORD DRAWING" FORMAT:
 - a. 24"x 36" PRINTS
 - b. PDF FILE
 - c. CADD FILE (DWG OR DXF) ROTATED AND TRANSLATED TO STATE PLANE COORDINATES NAD 83 FLORIDA EAST ZONE
 - d. THE WORDS "RECORD DRAWING" IN LARGE LETTERS
 - e. TITLE BLOCK WITH DEPARTMENT DS, DW OR ER NUMBER AND PERTINENT INFORMATION
 - f. PREFERRED SCALE TO BE 1"= 40' HORIZONTALLY AND 1"= 4' VERTICALLY*
 - g. STREET NOMENCLATURE
 - h. SEPARATE RECORD DRAWINGS FOR WATER AND SEWER
 - i. SEPARATE WATER AND SEWER PROFILE
 - j. STATIONING STARTING WITH 0+00 AT PERMANENT REFERENCE POINT (I.E. \odot , \otimes , ETC.) OR AS SHOWN ON DESIGN PERMIT PLANS, AND TO RUN CONTINUOUSLY TO END OF MAIN
 - k. EASEMENTS, IF ANY, TIED TO PERMANENT REFERENCE POINT
 - l. IDENTIFY ALL CONTROL LINES (I.E. BLDG. LINE, PROPERTY LINE, R/W, ETC.)
 - m. ALL "PROPOSED" INFORMATION TO BE REMOVED FROM PRINTS, LEAVING ONLY RECORD DRAWING INFORMATION REFLECTED IN DRAWINGS

3. WATER "RECORD DRAWINGS" MUST INCLUDE:
 - a. PLANS SHOWING PIPE SIZE, MATERIAL AND OFFSET OF MAIN, DEFLECTIONS (IF ANY), STATION OF SERVICES, HYDRANTS, VALVES, FITTINGS, IF ANY, ALL IN STATE PLANE COORDINATES. UTILITY CROSSINGS SHALL BE CLEARLY IDENTIFIED AND LOCATED.
 - b. PROFILE SHOWING TOP OF GROUND AND TOP OF PIPE ELEVATIONS AT EVERY 100' STATION AND AT ANY CHANGE IN GRADE (WITH CORRESPONDING STATION), PIPE SIZE AND PIPE MATERIALS REFERENCED TO PLAN.

4. SEWER "RECORD DRAWINGS" MUST INCLUDE:
 - a. PLAN SHOWING MANHOLE NUMBER, PIPE SIZE AND PIPE MATERIAL OF PIPE, DEFLECTION, SLOPE OF GRAVITY SEWER, LOCATION OF LATERALS WITH REFERENCE TO MANHOLE AND CLEANOUTS.
 - b. THE NORTHERLY AND EASTERLY COORDINATES ON ALL FIELD OBTAINED MEASUREMENTS AND PROVIDED ON ALL RECORD DRAWING SUBMITTALS
 - c. PROFILE SHOWING MANHOLE NUMBER (AS PER PLAN), RIM AND INVERT ELEVATIONS (IF MORE THAN ONE INVERT, LABEL NORTH, SOUTH, ETC.), AND STATION STARTING AT 0+00 AT DOWNSTREAM MANHOLE.

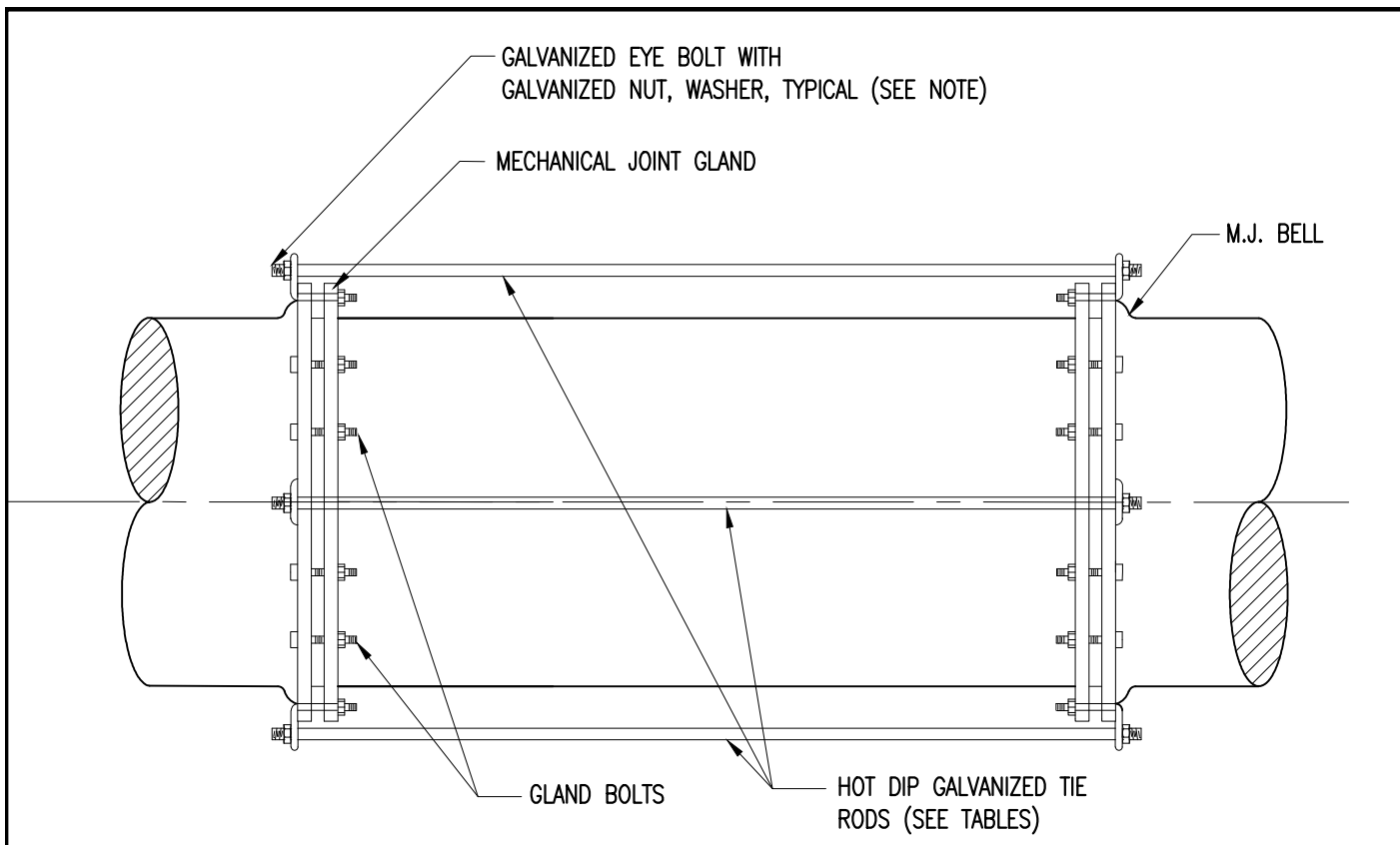
5. FORCE MAIN "RECORD DRAWING" SAME AS WATER MAIN.

6. EACH RECORD DRAWING SHALL SHOW THE FLORIDA STATE PLANE COORDINATES (CURRENT READJUSTMENT) OF ALL THE MANHOLES AND VALVES AND OF AT LEAST TWO HORIZONTAL CONTROL POINTS PROPERLY IDENTIFIED AND LOCATED WITHIN THE PROJECT.

* OTHER SCALE MAY BE PERMITTED, BUT MUST BE APPROVED BY THE DEPARTMENT PRIOR TO PREPARATION OF DRAWINGS.

I T E M	CROSS REF.	SPEC. REF.

 Delivering Excellence Every Day WATER & SEWER DEPARTMENT	<u>ISSUE DATE</u>	<u>APPROVED BY</u>	S T A N D A R D D E T A I L "RECORD DRAWING" REQUIREMENTS	GS 0.5 SHEET 2 OF 2
	03/11/2009	V.F.C.		
	07/20/2016	D.V.		



PRESSURE AT 150 P.S.I.		
PIPE SIZE	ROD DIAMETER	No. OF RODS
8" & SMALLER	3/4"	3
12"	3/4"	4
16"	3/4"	6
20"	3/4"	8
24"	3/4"	12
30"	1"	14
36"	1"	14
42"	1- 1/4"	16
48"	1- 1/4"	16

NOTES:

1. EYE BOLT REPLACES GLAND BOLT AT TIE ROD LOCATIONS.
2. IN LIEU OF BELL/ROD RESTRAINTS, MECHANICAL JOINT RESTRAINTS MAY BE USED

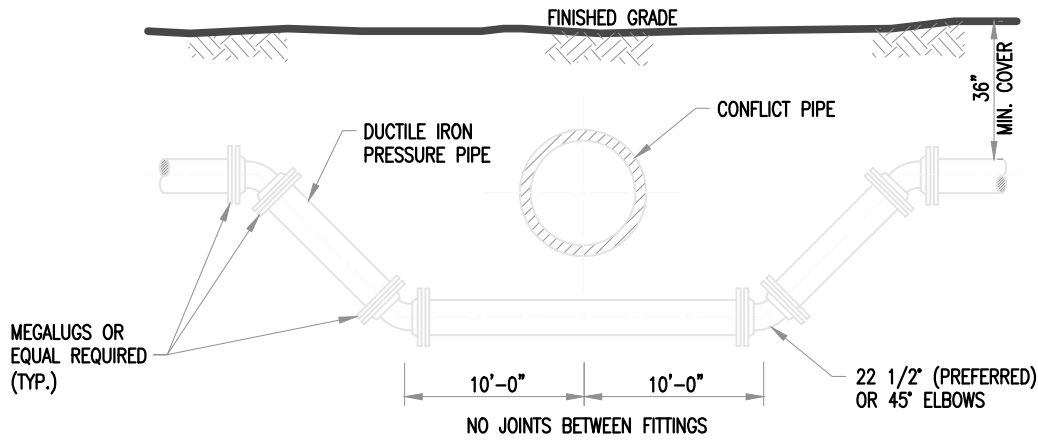
ITEM	CROSS REF.	SPEC. REF.



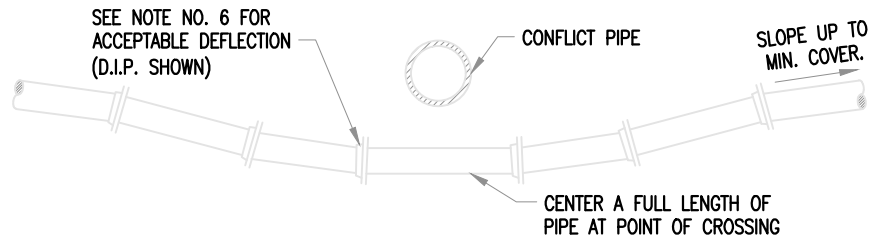
<u>ISSUE DATE</u>	<u>APPROVED BY</u>
11/01/2006	V.E.F.
07/20/2016	D.V.

STANDARD DETAIL
**TYPICAL TIE-ROD
 DETAILS**

**GS
 1.0
 SHEET 1 OF 1**



FITTING TYPE



DEFLECTION TYPE

NOTES:

1. STORM SEWER, GRAVITY WASTEWATER AND RECLAIMED WATER MAIN CROSSING UNDER POTABLE WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF TWELVE (12) INCHES BETWEEN THE INVERT OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, THE CROSSING SHALL BE ARRANGED SO THAT THE TORM/WASTEWATER/RECLAIMED WATER PIPE JOINTS AND POTABLE WATER MAIN JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING WITH NO LESS THAN TEN (10) FEET BETWEEN ANY TWO JOINTS, BOTH PIPES SHALL BE D.I.P., AND THE MINIMUM VERTICAL SEPARATION SHALL BE 6 INCHES. WHERE THERE IS NO ALTERNATIVE TO STORM/WASTEWATER/RECLAIMED WATER PIPES CROSSING OVER A POTABLE WATER MAIN, THE CRITERIA FOR MINIMUM 12" VERTICAL SEPARATION BETWEEN LINES AND JOINT ARRANGEMENT, AS STATED ABOVE, SHALL BE REQUIRED, AND BOTH PIPES SHALL BE D.I.P. IRRESPECTIVE OF SEPARATION. D.I.P. IS NOT REQUIRED FOR STORM SEWERS.
2. WHENEVER POSSIBLE MAINTAIN MIN. TEN (10) FEET HORIZONTAL DISTANCE (WALL TO WALL) BETWEEN POTABLE WATER MAIN AND STORM SEWER, WASTEWATER MAIN, OR FORCE MAIN (A MIN. 6' SEPARATION MAY BE APPROVED ON A CASE BY CASE BASIS.) MAINTAIN MIN. THREE (3) FEET HORIZONTAL DISTANCE (WALL TO WALL) BETWEEN RECLAIMED WATER MAIN AND POTABLE WATER MAIN, STORM SEWER, WASTEWATER GRAVITY MAIN OR FORCE MAIN.
3. FORCE MAIN CROSSING POTABLE WATER MAIN OR RECLAIMED WATER MAIN SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF TWELVE (12) INCHES BETWEEN THE OUTSIDE OF THE FORCE MAIN AND OUTSIDE OF THE POTABLE WATER MAIN OR RECLAIMED WATER MAIN WITH THE POTABLE WATER MAIN OR RECLAIMED WATER MAIN CROSSING OVER THE FORCE MAIN.
4. FITTINGS SHALL BE RESTRAINED.
5. THE DEFLECTION TYPE CROSSING IS PREFERRED.
6. DO NOT EXCEED 50% OF MANUFACTURERS RECOMMENDED MAXIMUM JOINT DEFLECTION FOR DUCTILE IRON PIPE. PVC PIPE CURVATURE MAY ONLY BE ACCOMPLISHED BY INSTALLING APPROPRIATE BENDS.
7. POTABLE WATER SERVICE LINES SHALL CROSS OVER WASTEWATER MAINS WITH MIN. 12" VERTICAL SEPARATION. WHERE THIS MIN. SEPARATION CAN NOT BE MAINTAINED, THE WATER SERVICE SHALL BE ENCASED IN A MIN. 10' LONG CASING CENTERED OVER THE CROSSING WITH MIN. 6" VERTICAL SEPARATION.
8. WASTEWATER MAINS, WATER MAINS, STORM PIPES AND OTHER UTILITY PIPES SHALL CROSS PERPENDICULAR WHENEVER POSSIBLE.

ITEM	CROSS REF.	SPEC. REF.

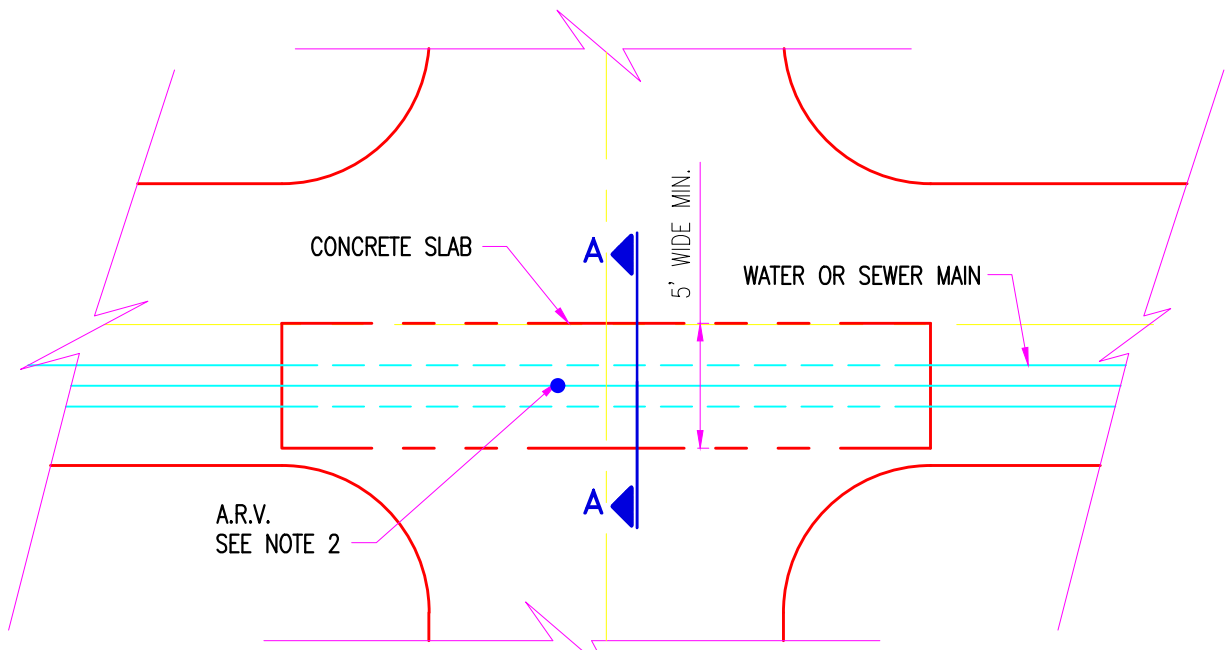


ISSUE DATE	APPROVED BY
07/20/2016	D.V.

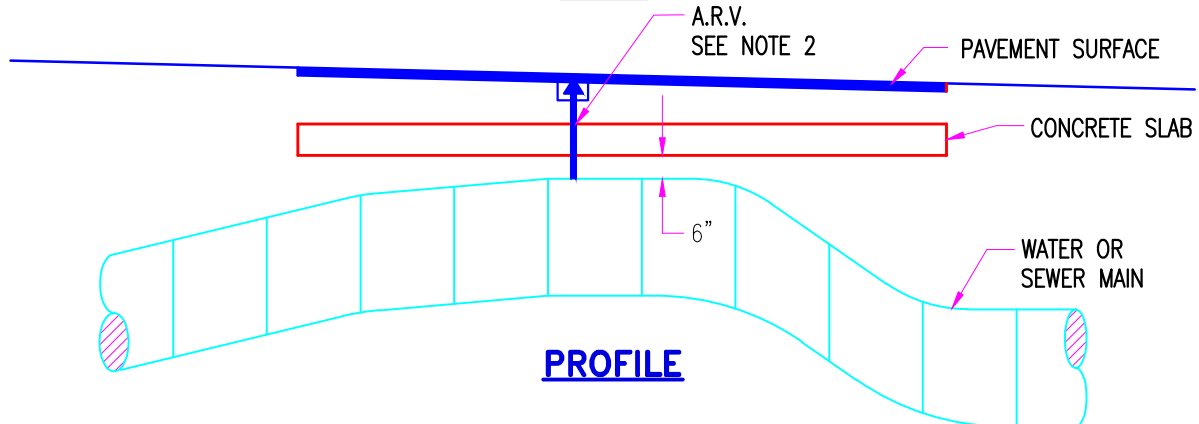
STANDARD DETAIL

**POTABLE WATER MAIN/FORCE MAIN
PRESSURE PIPE CONFLICT DETAIL**

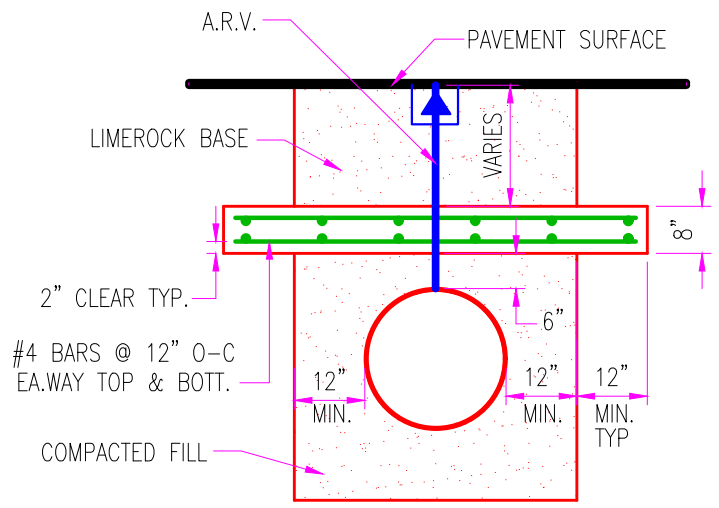
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SHEET 1 OF 1



PLAN



PROFILE



SECTION A-A

NOTES:

1. FOR PIPE DIA. \geq 30", REINF. CONCRETE SLAB TO BE DESIGNED BY A FLA. REGISTERED P.E. AND SUBMITTED FOR APPROVAL.
2. AIR RELEASE VALVES (A.R.V.) REQUIRED ON SEWER FORCE MAINS ONLY.
3. EXTEND CONCRETE SLAB UNTIL COVER EXCEEDS 30".
4. CONCRETE TO BE 3,000 psi.
5. THIS DETAIL TO BE USED ONLY WITH WRITTEN APPROVAL FROM WASD.

AIR RELEASE VALVE	SS 11.0	
ITEM	CROSS REF.	SPEC. REF.

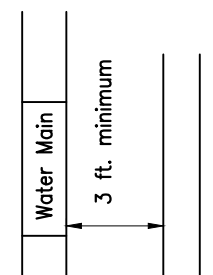
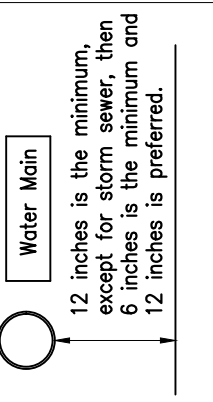
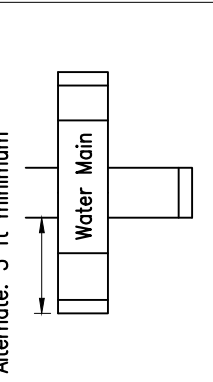
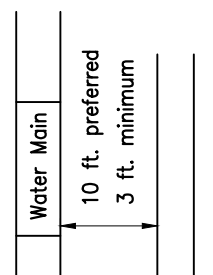
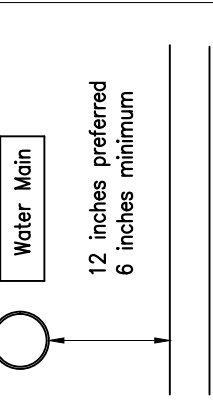
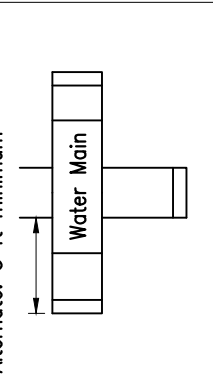
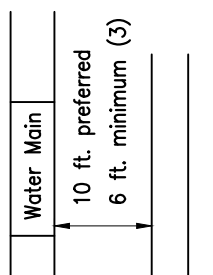
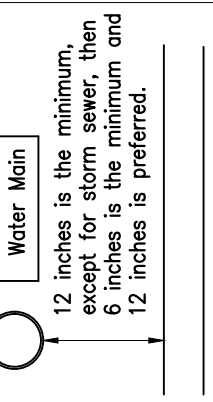
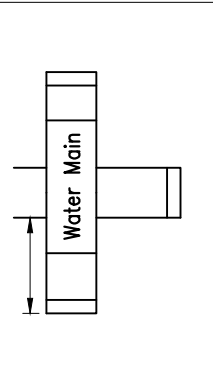


ISSUE DATE	APPROVED BY
06/01/2008	V. E. F.
07/20/2016	D.V.

STANDARD DETAIL
**REINFORCED CONC. SLAB
 FOR GROUND COVER
 LESS THAN 2.5'**

**GS
 1.2
 SHEET 1 OF 1**

LOCATION OF PUBLIC WATER SYSTEM MAINS ACCORDANCE WITH F.A.C. RULE 62-555.314

OTHER PIPE	HORIZONTAL SEPARATION	CROSSINGS (1)	JOINT SPACING @ CROSSINGS (FULL JOINT CENTERED)
Storm Sewer; Stormwater Force Main; Reclaimed Water (2)	 <p style="text-align: center;">Water Main 3 ft. minimum</p>	 <p style="text-align: center;">Water Main 12 inches is the minimum, except for storm sewer, then 6 inches is the minimum and 12 inches is preferred.</p>	 <p style="text-align: center;">Alternate: 3 ft minimum</p>
Vacuum Sanitary Sewer	 <p style="text-align: center;">Water Main 10 ft. preferred 3 ft. minimum</p>	 <p style="text-align: center;">Water Main 12 inches preferred 6 inches minimum</p>	 <p style="text-align: center;">Alternate: 3 ft minimum</p>
Gravity or Pressure; Sanitary Sewer; Sanitary Sewer Force Main; Reclaimed Water (4)	 <p style="text-align: center;">Water Main 10 ft. preferred 6 ft. minimum (3)</p>	 <p style="text-align: center;">Water Main 12 inches is the minimum, except for storm sewer, then 6 inches is the minimum and 12 inches is preferred.</p>	 <p style="text-align: center;">Alternate: 6 ft minimum</p>
On-Site Sewage Treatment & Disposal System	10 ft minimum	-	-

NOTES:

- (1) WATER MAIN SHOULD BE ABOVE OTHER PIPE. WHEN WATER MAIN MUST BE BELOW OTHER PIPE, THE MINIMUM SEPARATION IS 12 INCHES.
- (2) RECLAIMED WATER REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.
- (3) 3 FT. GRAVITY SANITARY SEWER WHERE THE BOTTOM OF THE WATER MAIN IS LAID AT LEAST 6 INCHES ABOVE THE TOP OF THE GRAVITY SANITARY SEWER.
- (4) RECLAIMED WATER NOT REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.



<u>ISSUE DATE</u>	<u>APPROVED BY</u>
07/20/2016	D.V.

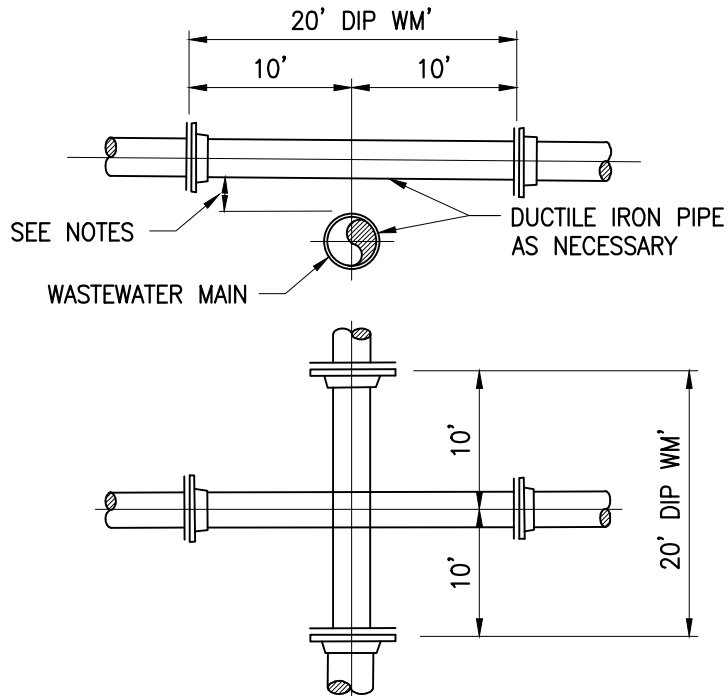
STANDARD DETAIL

**POTABLE WATER MAIN,
WASTEWATER & STORM SEWER CONFLICT**

ITEM	CROSS REF.	SPEC. REF.

GS
1.5

SHEET 1 OF 2



NOTES:

1. STORM SEWER, GRAVITY WASTEWATER AND RECLAIMED WATER MAIN CROSSING UNDER POTABLE WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF TWELVE (12) INCHES BETWEEN THE INVERT OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, THE CROSSING SHALL BE ARRANGED SO THAT THE STORM/WASTEWATER/RECLAIMED WATER PIPE JOINTS AND POTABLE WATER MAIN JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING WITH NO LESS THAN TEN (10) FEET BETWEEN ANY TWO JOINTS, BOTH PIPES SHALL BE D.I.P., AND THE MINIMUM VERTICAL SEPARATION SHALL BE 6 INCHES. WHERE THERE IS NO ALTERNATIVE TO STORM/WASTEWATER/RECLAIMED WATER PIPES CROSSING OVER A POTABLE WATER MAIN, THE CRITERIA FOR MINIMUM 12" VERTICAL SEPARATION BETWEEN LINES AND JOINT ARRANGEMENT, AS STATED ABOVE, SHALL BE REQUIRED, AND BOTH PIPES SHALL BE D.I.P. IRRESPECTIVE OF SEPARATION. D.I.P. IS NOT REQUIRED FOR STORM SEWERS.
2. WHENEVER POSSIBLE MAINTAIN MIN. TEN (10) FEET HORIZONTAL DISTANCE (WALL TO WALL) BETWEEN POTABLE WATER MAIN AND STORM SEWER, WASTEWATER MAIN, OR FORCE MAIN (A MIN. 6' SEPARATION MAY BE APPROVED ON A CASE BY CASE BASIS). MAINTAIN MIN. THREE (3) FEET HORIZONTAL DISTANCE (WALL TO WALL) BETWEEN RECLAIMED WATER MAIN AND POTABLE WATER MAIN, STORM SEWER, WASTEWATER GRAVITY MAIN OR FORCE MAIN.
3. FORCE MAIN CROSSING POTABLE WATER MAIN OR RECLAIMED WATER MAIN SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF TWELVE (12) INCHES BETWEEN THE OUTSIDE OF THE FORCE MAIN AND OUTSIDE OF THE POTABLE WATER MAIN OR RECLAIMED WATER MAIN WITH THE POTABLE WATER MAIN OR RECLAIMED WATER MAIN CROSSING OVER THE FORCE MAIN.
4. WASTEWATER LATERALS SHALL CROSS UNDER POTABLE WATER MAINS WITH A MIN. 12" VERTICAL SEPARATION WHENEVER POSSIBLE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, A 20' SECTION OF DUCTILE IRON PIPE POTABLE WATER MAIN CENTERED ON THE CROSSING IS REQUIRED AND THE MINIMUM VERTICAL SEPARATION SHALL BE 6". WHERE THERE IS NO ALTERNATIVE TO A WASTEWATER LATERAL PIPE CROSSING OVER A POTABLE WATER MAIN, A MINIMUM 12" VERTICAL SEPARATION IS REQUIRED, THE LATERAL SHALL BE P.V.C. C-900 SDR18 OR BETTER, THE POTABLE WATER MAIN SHALL BE D.I.P. AND THE PIPE JOINTS SHALL BE EQUIDISTANT FROM THE POINT OF CROSSING.
5. POTABLE WATER SERVICE LINES SHALL CROSS OVER WASTEWATER MAINS WITH MIN. 12" VERTICAL SEPARATION. WHERE THIS MIN. SEPARATION CAN NOT BE MAINTAINED, THE WATER SERVICE SHALL BE ENCASED IN A MIN. 10' LONG CASING CENTERED OVER THE CROSSING WITH MIN. 6" VERTICAL SEPARATION.
6. WASTEWATER MAINS, WATER MAINS, STORM PIPES AND OTHER UTILITY PIPES SHALL CROSS PERPENDICULAR WHENEVER POSSIBLE.

I T E M	CROSS REF.	SPEC. REF.

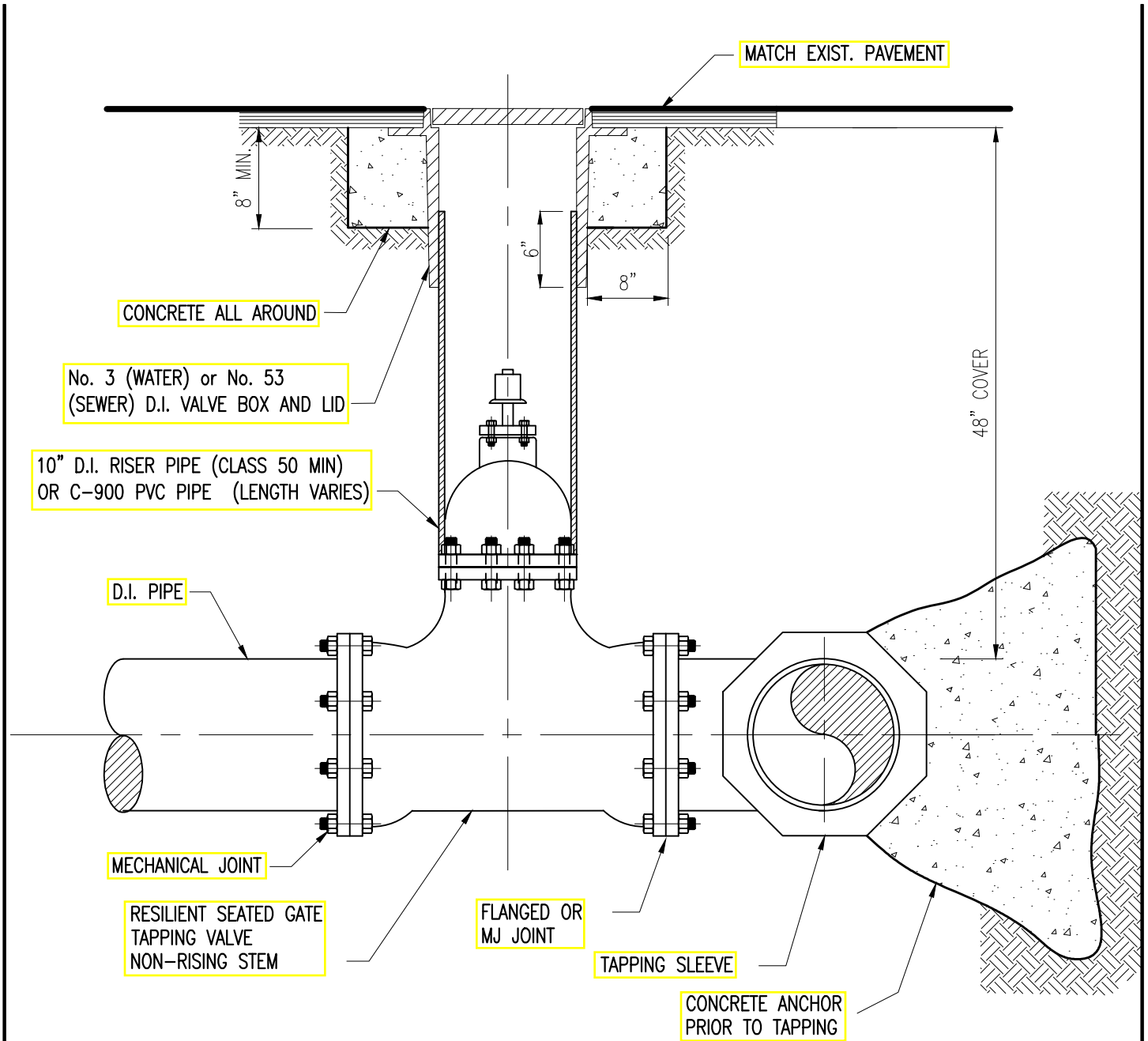


<u>ISSUE DATE</u>	<u>APPROVED BY</u>
10/06/2008	V.F.C.
07/20/2016	D.V.

S T A N D A R D D E T A I L

**WATER AND SEWER
MAINS CROSSING**

GS
1.5
SHEET 2 OF 2



NOTES:

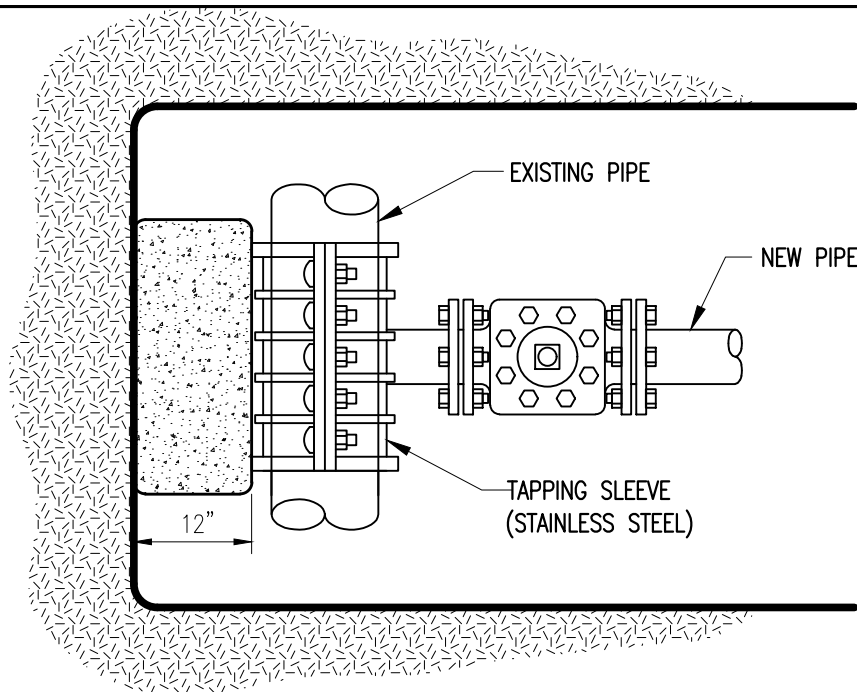
1. RESILIENT SEATED GATE TAPPING VALVE CAN BE USED FOR SEWER CONNECTION.
2. 18" CLEARANCE FROM FITTINGS AND BELLS.
3. TAPPING VALVE AND SLEEVE SHALL BE PRESSURE TESTED AT 150 "psi" PRIOR TO BEING TAPPED.
4. TAPPING ON CONCRETE MAINS SHALL BE PRESSURE TESTED AT A LOWER PRESSURE THAN THE ACTIVE OPERATING PRESSURE OF THE MAIN.

No.53 Valve Box	SS 13.0	
No.3 Valve Box	WS 3.11	
INSTALLATION	GS 1.8	
ITEM	CROSS REF.	SPEC. REF.

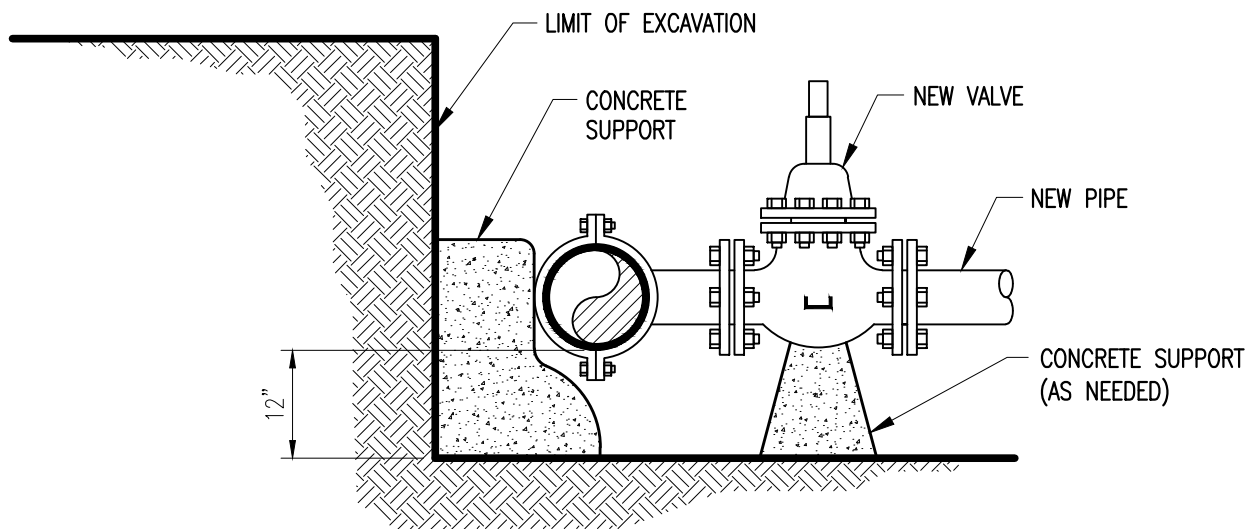
ISSUE DATE	APPROVED BY
01/22/2009	V.F.C.
07/20/2016	D.V.

STANDARD DETAIL
TYPICAL TAPPING VALVE SETTING (16" AND SMALLER)

GS 1.7
SHEET 1 OF 1



PLAN VIEW



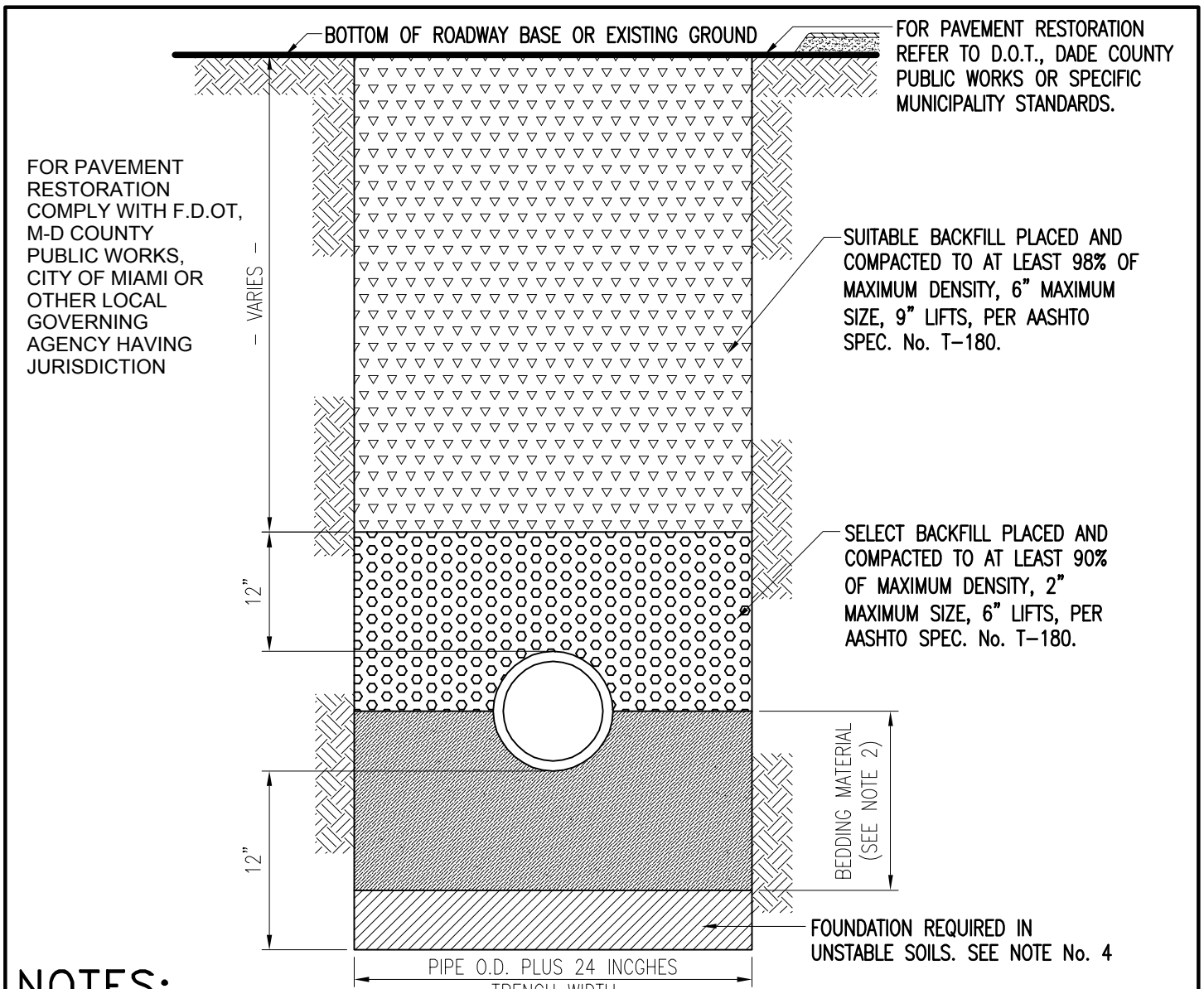
SECTION

PROCEDURE:

1. CONTRACTOR TO INSTALL AND PRESSURE TEST TAPPING SLEEVE AND VALVE, WITNESSED BY M-D.WASD INSPECTOR.
2. ALL TAPS LARGER THAN 20 INCHES SHALL BE DONE BY A TAPPING SPECIALIST WITH CREDENTIALS ACCEPTABLE TO THE DEPARTMENT.
3. CONTRACTOR TO SUPPLY EQUIPMENT TO HANDLE TAPPING MACHINE & DEWATERING EQUIPMENT.
4. 18" CLEARANCE FROM FITTINGS AND BELLS.
5. TAPPING VALVE AND SLEEVE SHALL BE PRESSURE TESTED AT 150 psi PRIOR TO BEING TAPPED.

ITEM	CROSS REF.	SPEC. REF.

 WATER & SEWER DEPARTMENT	ISSUE DATE	APPROVED BY	STANDARD DETAIL TAPPING SLEEVE AND VALVE INSTALLATION (PROPOSED)	GS 1.8 SHEET 1 OF 1
	01/22/2009	V.F.C.		
	07/20/2016	D.V.		



NOTES:

- 1 FOR EXCAVATION AND BACKFILL AROUND MANHOLES, APPURTENANCES, OR IN WATER, REFER TO PROVISIONS WITHIN THE SPECIFICATIONS.
- 2 UNLESS OTHERWISE SPECIFIED, BEDDING MATERIAL SHALL CONSIST OF SELECT BACKFILL MATERIAL 2" MAX. SIZE, OR WASHED AND GRADED LIMEROCK (3/8"-7/8"), COMPACTED TO AT LEAST 90° OF MAX. DENSITY, 6" LIFTS, PER AASHTO SPEC. No. T-180.
- 3 WHERE REQUIRED, SHEETING AND SHORING SHALL BE IN ACCORDANCE WITH SPECIFICATIONS.
- 4 WHERE UNSTABLE SOILS ARE ENCOUNTERED, INCLUDING PEAT, MUCK OR OTHER ORGANIC SOILS, ELASTIC SILT AND CLAYS BELOW THE WATER TABLE, A FOUNDATION IS REQUIRED. COMPACTED TO AT LEAST 90° OF MAX. DENSITY, 6" LIFTS, PER AASHTO SPEC. NO. T-180. FOUNDATION MATERIAL SHALL BE SELECT BACKFILL MATERIAL, 2" MAXIMUM SIZE 6" LIFTS EXTEND EXCAVATION AT LEAST 2' DEEPER FOR FOUNDATION ENLESS SUITABLE MATERIAL IS FOUND AT A LESSER DEPTH, GREATER DEPTHS MAY BE REQUIRED FOR EXTREMELY POOR CONDITIONS.
- 5 POLYETHYLENE ENCASMENT OF CAST IRON VALVES, PIPE AND FITTINGS, IF REQUIRED BY THE DEPARTMENT, SHALL BE PER ANSI/AWWA C105/A21.5, METHOD A, B OR C FOR TYPE I CLASS C TUBE, MIN. 8 MILS

ITEM	CROSS REF.	SPEC. REF.
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	ISSUE DATE	APPROVED BY	STANDARD DETAIL TYPICAL TRENCH BACKFILL FOR D.I. WATER AND FORCE MAINS	GS 1.9 SHEET 1 OF 1
	11/01/2006	V.E.F.		
	07/20/2016	D.V.		

MINIMUM LENGTH OF PIPE (FEET) TO BE RESTRAINED

(SOURCES: EBAA IRON RESTRAINT LENGTH CALCULATION PROGRAM FOR PVC PIPE, RELEASE 3.1, AND
DIPRA THRUST RESTRAINT FOR DUCTILE IRON PIPE, RELEASE 3.2)

FITTING TYPE		PIPE SIZE											
		4"	6"	8"	10"	12"	16"	20"	24"	30"	36"	42"	48"
90° HORIZONTAL BEND		14	20	25	30	35	45	54	62	73	84	93	101
45° HORIZONTAL BEND		6	8	11	13	15	19	22	26	30	35	38	42
22.5° HORIZONTAL BEND		3	4	5	6	7	9	11	12	15	17	18	20
11.25° HORIZONTAL BEND		1	2	3	3	4	4	5	6	7	8	9	10
90° VERTICAL OFFSET	UPPER BEND	55	79	103	125	147	189	228	266	319	368	412	454
	LOWER BEND	22	38	49	59	69	88	106	123	145	165	184	201
45° VERTICAL OFFSET	UPPER BEND	22	32	42	51	60	77	93	109	131	151	170	187
	LOWER BEND	10	14	19	23	28	35	43	50	59	67	75	82
22.5° VERTICAL OFFSET	UPPER BEND	7	12	17	21	26	34	42	49	60	70	78	87
	LOWER BEND	2	4	6	8	10	14	17	21	25	29	33	36
11.25° VERTICAL OFFSET	UPPER BEND	3	4	6	9	11	15	19	22	28	32	37	41
	LOWER BEND	1	1	1	2	3	5	7	8	10	12	14	16
PLUG (DEAD END)		32	45	59	70	83	107	129	151	190	220	244	270
IN-LINE VALVE		32	45	59	70	83	107	129	151	100	110	125	135
TEE (BRANCH RESTRAINT)	4" x 0	23											
	6" x 0	21	35										
	8" x 0	18	34	47									
	10" x 0	16	32	46	58								
	12" x 0	13	30	44	57	69							
	16" x 0	7	26	41	55	67	90						
	20" x 0	1	21	38	52	65	88	109					
	24" x 0	1	16	34	49	62	86	108	129				
	30" x 0	8	28	44	58	83	106	127	154				
	36" x 0	1	1	22	39	54	80	103	124	153	179		
	42" x 0	1	1	15	33	49	77	100	122	151	177	201	
	48" x 0	1	1	7	27	44	73	97	120	149	176	200	222
REDUCER (LARGER PIPE RESTRAINT)	6" x 0	23											
	8" x 0	38	25										
	10" x 0	57	43	24									
	12" x 0	72	60	44	41								
	16" x 0	99	90	78	75	45							
	20" x 0	123	116	107	105	81	45						
	24" x 0	146	140	132	131	111	82	45					
	30" x 0	157	153	148	141	133	113	87	56				
	38" x 0	182	179	175	169	163	147	126	101	56			
	42" x 0	205	202	199	194	189	175	158	138	100	54		
	48" x 0	226	224	221	217	213	201	187	169	138	98	53	

NOTES:

- THE DATA IN THE ABOVE TABLE ARE BASED UPON THE FOLLOWING INSTALLATION CONDITIONS:
 - SOIL TYPE-SAND
 - TEST PRESSURE-150 PSI
 - DEPTH OF BURY-4'
 - TRENCH TYPE-3
 - SAFETY FACTOR-1.5
 - VERTICAL OFFSET-3'
 - MINIMUM PIPE LENGTH ALONG TEE RUN-5'
- THE RESTRAINED PIPE LENGTHS APPLY TO DUCTILE IRON AND PVC PIPE.
- ALL JOINTS BETWEEN UPPER AND LOWER BENDS SHALL BE RESTRAINED.
- RESTRAINED PIPE LENGTHS APPLY TO PIPE ON BOTH SIDES OF VALVES AND FITTINGS.

ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
04/10/2014	J.F.
07/20/2016	D.V.

STANDARD DETAIL
**STANDARD REQUIREMENTS FOR
WATER AND SEWER MECHANICAL
THRUST RESTRAINT**

**GS
2.0**
SHEET 1 OF 1

LEGEND

GAS MAIN	_____	SIZE ? G.	_____
TELEPHONE DUCT UNDREGROUND (U) OVERHEAD (O)	_____	SIZE ? TEL.	_____
ELECTRIC CABLE UNDREGROUND (U) OVERHEAD (O)	_____	SIZE ? ELEC.	_____
ELECTRICAL PULL BOX	_____	SIZE ? ELEC.	_____
STORM SEWER	_____	∅ SS	_____
CATCH BASIN OR INLET	_____		C.B.

EXISTING

PROPOSED

FLUSHING VALVE OUTLET		
WATER MAIN (W.M.)	∅, (MATERIAL) W.M.	∅, (MATERIAL) W.M.
GATE AND PLUG VALVE		
METER (SINGLE SERVICE)		
METER (SINGLE SERVICE)		
METER (SINGLE SERVICE)		
TEE, CROSS		
FIRE HYDRANT		
SANITARY SEWER (SAN)	∅, SAN. (MATERIAL)	PROPOSED ∅, SAN.
SAN. MANHOLE		M.H.

ITEM	CROSS REF.	SPEC. REF.



<u>ISSUE DATE</u>	<u>APPROVED BY</u>
02/10/2009	V.F.C.
07/20/2016	D.V.

STANDARD DETAIL

STANDARD SYMBOLS

GS
3.0










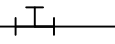

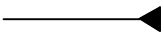


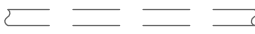
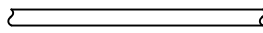
SHEET 1 OF 2

LEGEND

SECTION LINE	— § — — — — —
RIGHT-OF-WAY-LINE	— R/W — — — — —
PROPERTY LINE	— P — — — — —
CENTER LINE OF PAVEMENT	— C — — — — —
BASE LINE	— B — — — — —
EDGE OF PAVEMENT LINE	- - - - -

EXISTING

PROPOSED

BACKFLOW PREVENTER	— —  — —	— —  — —
CHECK VALVE		
BEND OTHER THAN 90°		
BENDS 90°		
TEE	— —  — —	— —  — —
PLUG	— — 	— — 
TAPPING SLEEVE & TAPPING VALVES	— —  — —	— —  — —
PIPES 20 INCHES OR GREATER		

I T E M	CROSS REF.	SPEC. REF.



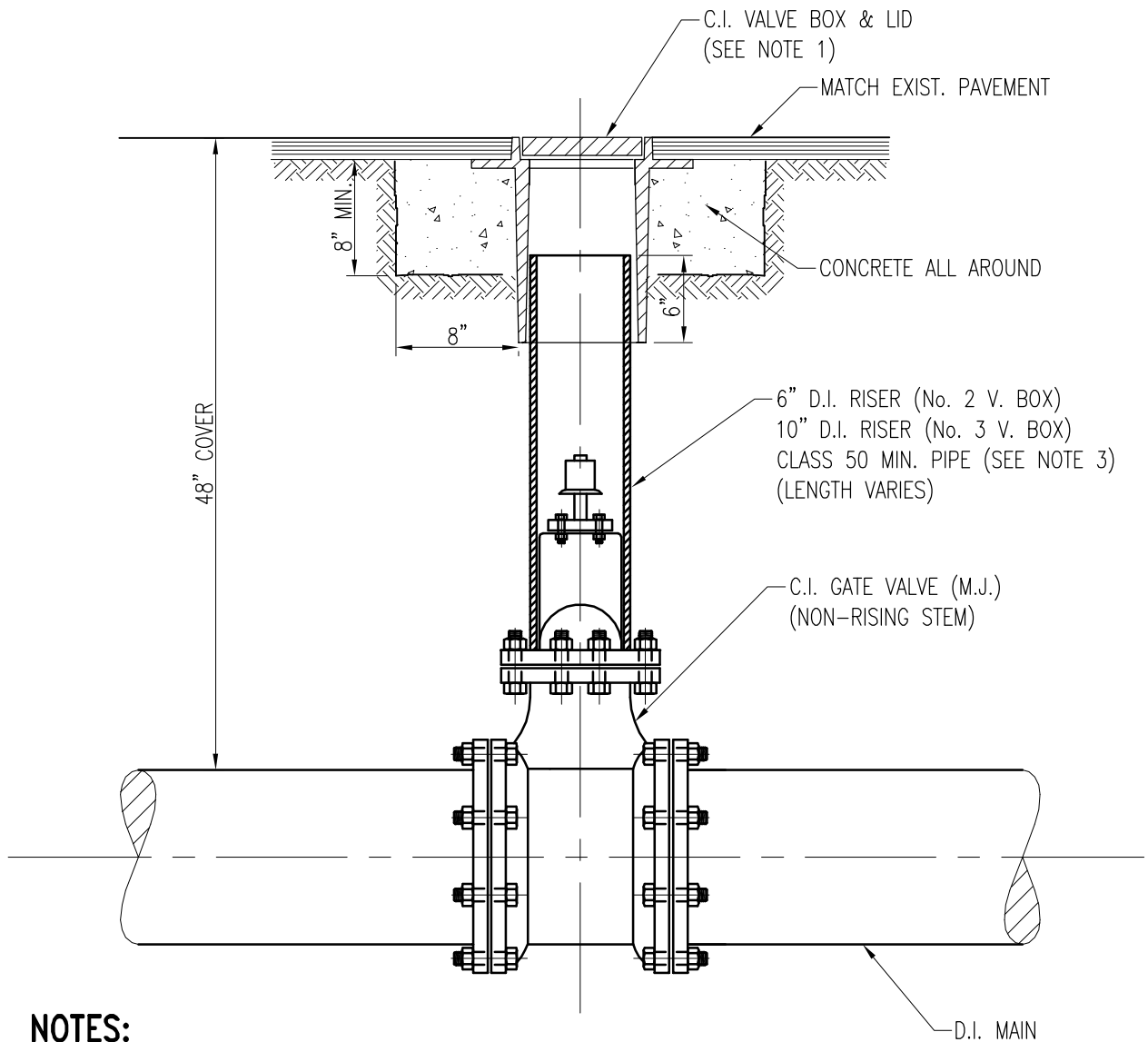
<u>ISSUE DATE</u>	<u>APPROVED BY</u>
11/01/2006	V.E.F.
07/20/2016	D.V.

S T A N D A R D D E T A I L

S T A N D A R D S Y M B O L S

GS
3.0

SHEET 2 OF 2



NOTES:

1. USE No. 2 VALVE BOX FOR:

- FIRE HYDRANT VALVES
- FIRE LINE SERVICES & DOMESTIC SERVICES
- 2" MAINS IN EASEMENTS
- BYPASS VALVES

2. USE No. 3 VALVE BOX FOR ALL MAIN LINE VALVES.

3. PVC C900 PIPE CAN BE USED FOR RISER IN LIEU OF DUCTILE IRON.

4. IF USED FOR RECLAIMED WATER VALVES, THE LID SHALL BE MARKED "R" AND BOTH THE LID AND THE RISER PIPE ARE TO BE COLORED PURPLE PANTONE 522C.

No. 3 VALVE BOX & LID	WS 3.11	
No. 2 VALVE BOX & LID	WS 3.10	
I T E M	CROSS REF.	SPEC. REF.

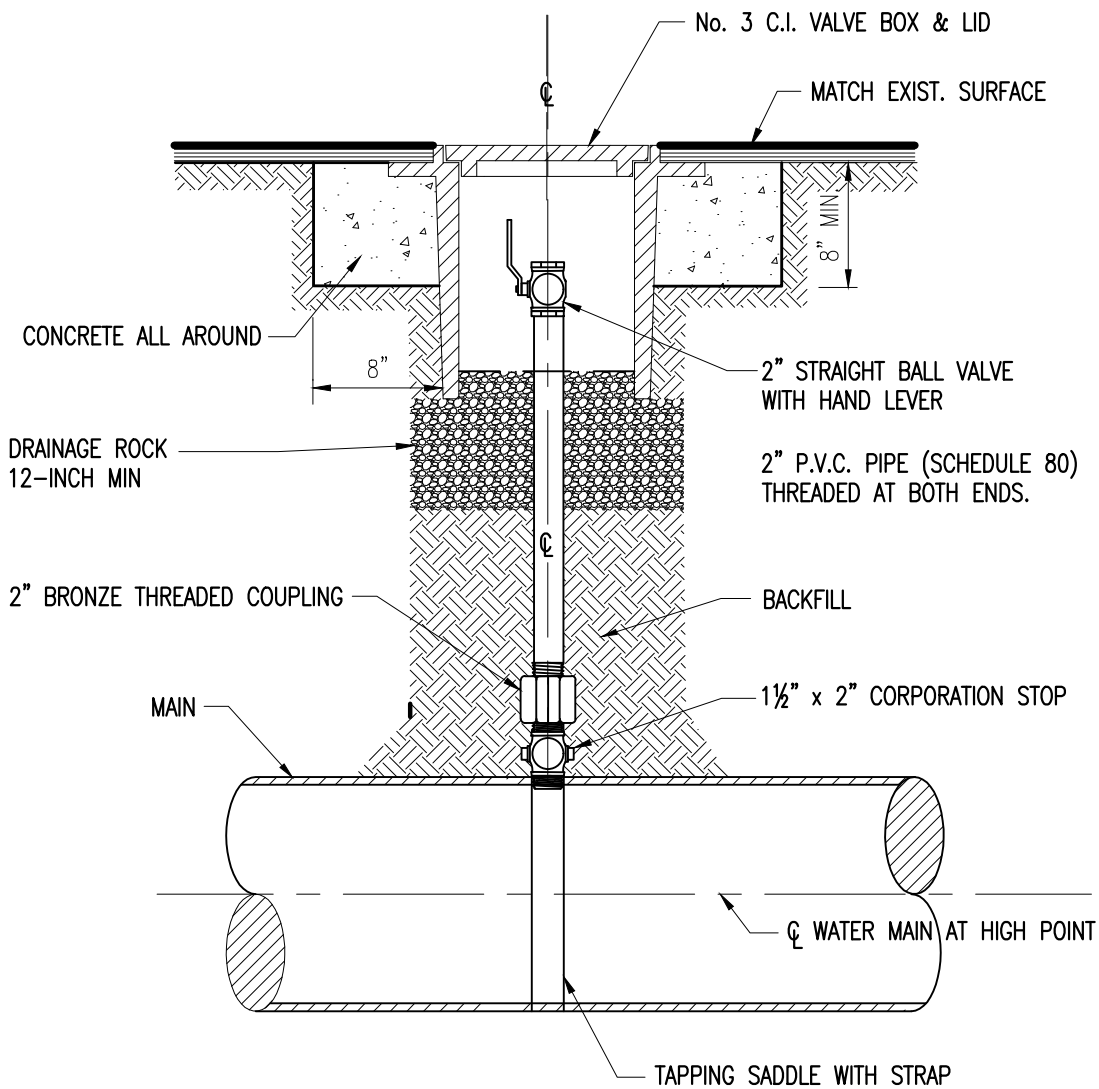


ISSUE DATE	APPROVED BY
10/10/2008	V.F.C.

S T A N D A R D D E T A I L

TYPICAL GATE VALVE SETTING
(SMALLER THAN 16")

WS
1.0
SHEET 1 OF 1



No. 3 VALVE BOX & LID	WS 3.11	
ITEM	CROSS REF.	SPEC. REF.



<u>ISSUE DATE</u>	<u>APPROVED BY</u>
10/06/2009	V.F.C.
06/09/2016	D.V.


STANDARD DETAIL
**MANUAL
 AIR RELEASE VALVE**

**WS
 1.60**
 SHEET 1 OF 1

THE FOLLOWING REQUIREMENTS SHALL APPLY TO ALL CASTINGS
(OR FABRICATED MATERIALS) CONTAINED HEREIN:

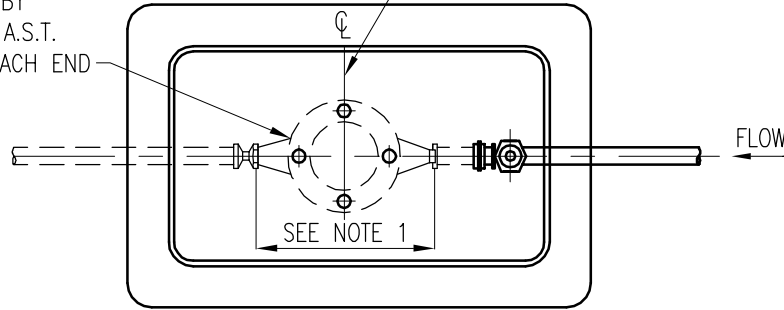
1. SUB-COMPONENTS OF ALL CASTINGS FROM THE SAME SUPPLIER SHALL BE INTERCHANGEABLE.
2. MATING SURFACES OF ALL CASTINGS SHALL BE MACHINED, WITH NO ROCKING PERMITTED.
3. ALL CASTINGS SHALL BE IN ACCORDANCE WITH ASTM-A48, AS MODIFIED HEREIN:
 - A. ARTICLE 10.1.3.1. SHALL NOT APPLY, TIME LIMIT IS 4 HRS. MAXIMUM.
 - B. NOTIFICATION TIME LIMIT IN ARTICLE 16.2 SHALL NOT APPLY.
 - C. SUPPLIER SHALL PROVIDE CERTIFIED TEST RESULTS WITH EACH LOT OF CASTING SHIPPED. CERTIFICATION SHALL IDENTIFY LOT.
 - D. SIGNATURE IN ARTICLE 17.2 SHALL BE REQUIRED. CERTIFICATION SHALL BE SIGNED BY LICENSED PROFESSIONAL ENGINEER, OR EQUIVALENT WHEN IN FOREIGN COUNTRY.
 - E. SUPPLIER SHALL PROVIDE CAST TEST BAR, SUITABLE FOR MACHINING, FOR EACH FOUNDRY LOT OF CASTINGS SHIPPED. TEST BAR SHALL IDENTIFY LOT AND SHALL BE SUITABLE FOR CLASS NO. 35B SPECIMEN.
4. MANUFACTURER'S NAME AND LOCATION (I.E. FOUNDRY AND COUNTRY OF ORIGIN) SHALL BE PERMANENTLY CAST ON THE BOTTOM OF ALL CAST COVERS AND LIDS.
5. SUPPLIER OF FABRICATED ITEMS (I.E. NON-CAST ITEMS) SHALL PERMANENTLY MARK HIS NAME AND DATE OF MANUFACTURE ON MATERIAL, BY WELDING, STAMPING OR OTHER METHOD APPROVED BY THE DEPARTMENT.

I T E M	CROSS REF.	SPEC. REF.

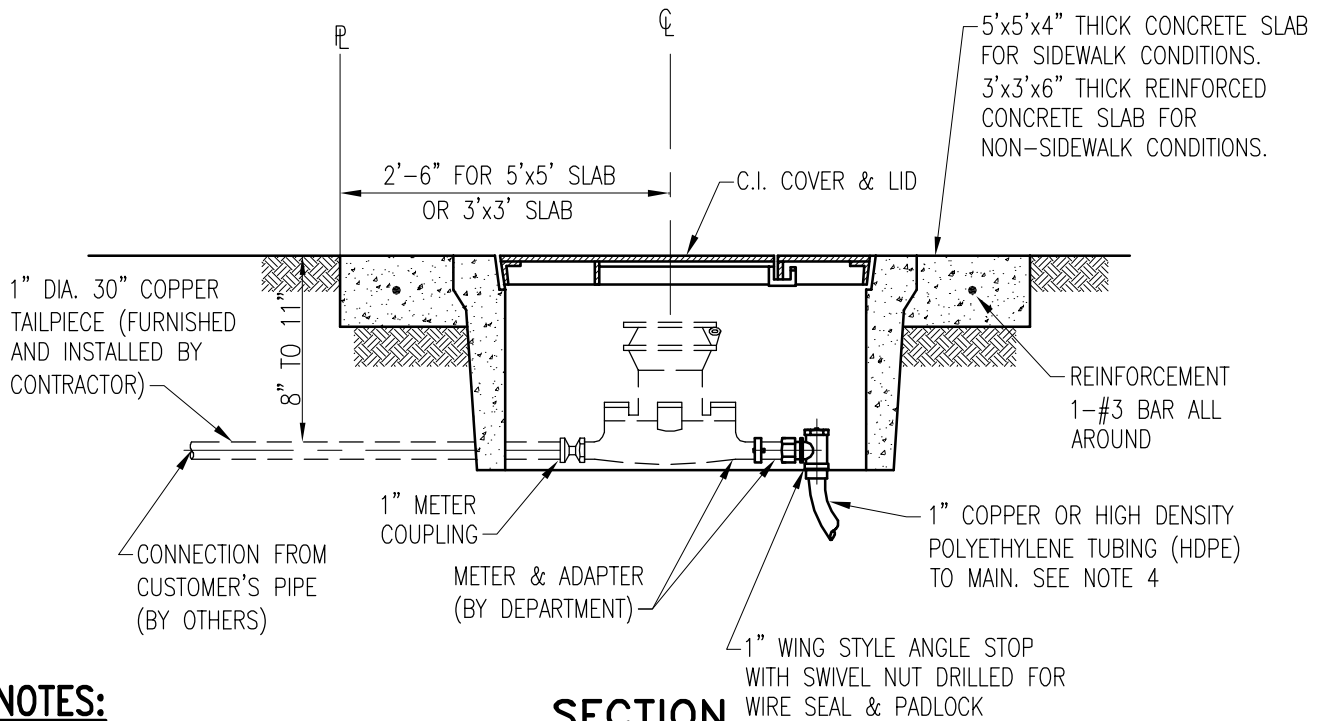
 <p>MIAMI-DADE COUNTY <i>Delivering Excellence Every Day</i></p>	<u>ISSUE DATE</u>	<u>APPROVED BY</u>	S T A N D A R D D E T A I L CASTING STANDARDS	WS 2.05 SHEET 1 OF 1
	6/01/2015	J.F.		

5/8" x 3/4" WATER METER (BY DEPARTMENT) WITH 1 1/4" A.S.T. MALE CONNECTION ON EACH END

METER SHALL BE ALIGNED WITH CL OF METER BOX AS SHOWN. (TYP.)



PLAN



SECTION

NOTES:

- METER LAYING LENGTH AS SHOWN:
10 3/4" (OUTLET TO OUTLET) FOR 5/8" OR 1" METER (11" WITH GASKETS).
- USE SINGLE METER BOX.
- CONCRETE SLAB REINFORCEMENT SHALL HAVE 1-#3 BAR ALL AROUND.
- USE 1" BLUE COLOR HDPE OR 1" COPPER TUBING FOR POTABLE WATER SERVICE. USE ONLY 1" PURPLE COLOR HDPE (NO COPPER ALLOWED) FOR RECLAIMED WATER SERVICE.
- METERS WILL NOT BE INSTALLED IF THE METER BOX IS IN A DRIVING SURFACE.
- WHEN USING 1" HDPE SERVICE A TEN GAUGE BLUE (PURPLE FOR RECLAIMED WATER) DIRECT BURY STANDARD COPPER TRACE WIRE IS TO BE TAPED CONTINUOUSLY WITH POLY OR DUCT TAPE TO THE SERVICE FOR LOCATION PURPOSES. WIRE SHALL BE ATTACHED TO WATER MAIN. WIRE MUST EXTEND INTO METER BOX.
- IF USED FOR RECLAIMED WATER, THE COVER SHALL BE PERMANENTLY EMBOSSED WITH THE WORDING: "RECLAIMED WATER-DO NOT DRINK-NO BEBER-PA BOUE".
- ALL SPACER TUBES AND TAILPIECES SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR.
- REPAIRS TO SLAB AND METER ARE PROHIBITED.

1" SERVICE CONNECTION	WS 4.11	
TYPICAL SERVICE PLAN	WS 4.10	
ITEM	CROSS REF.	SPEC. REF.

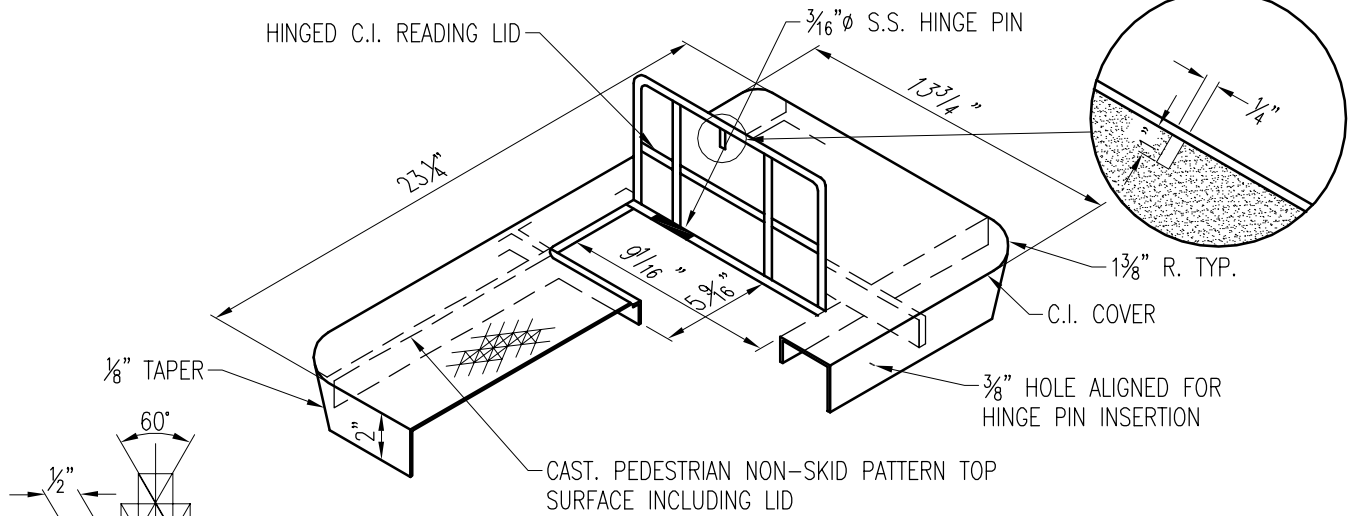


ISSUE DATE	APPROVED BY
06/01/2008	V.F.C.

STANDARD DETAIL
SINGLE METER BOX
INSTALLATION

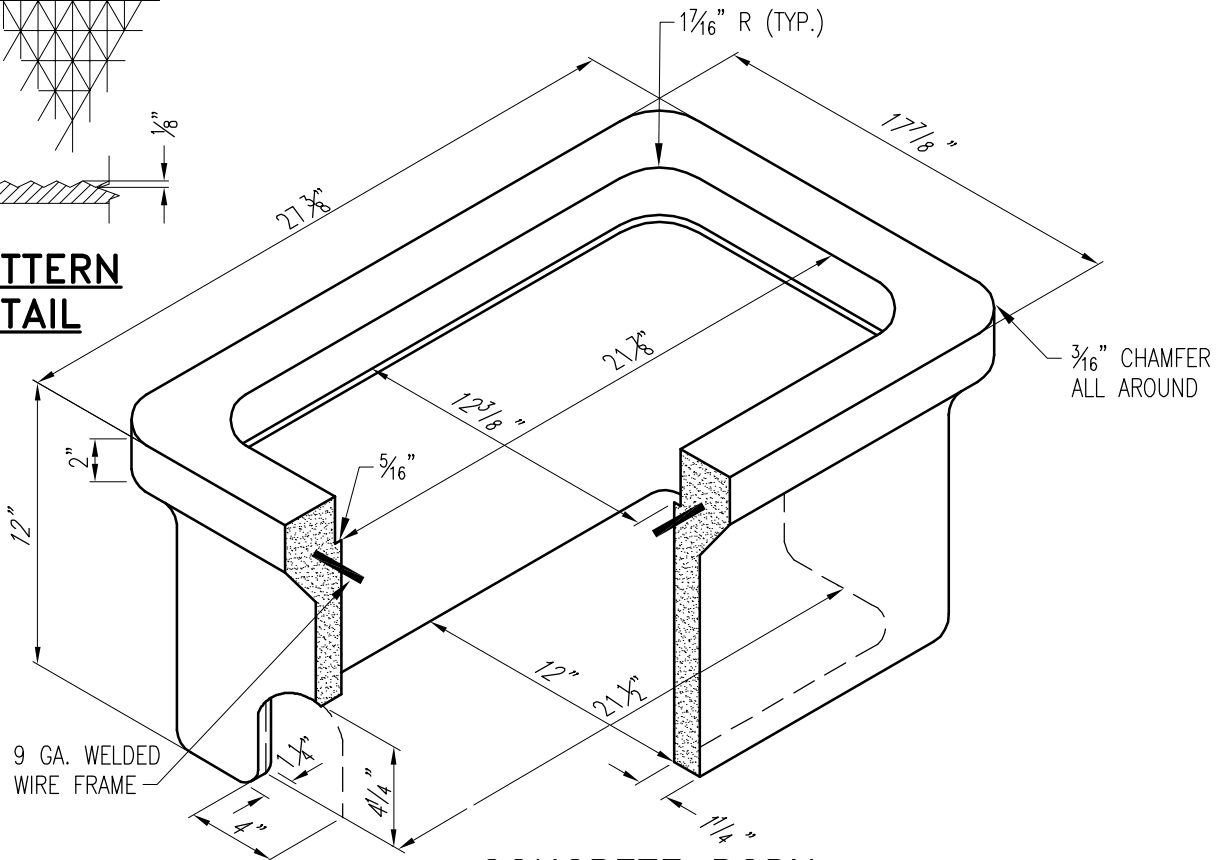
WS
2.10
SHEET 1 OF 3

PICKHOLE DETAIL



C.I. COVER WITH HINGER LID

PATTERN DETAIL



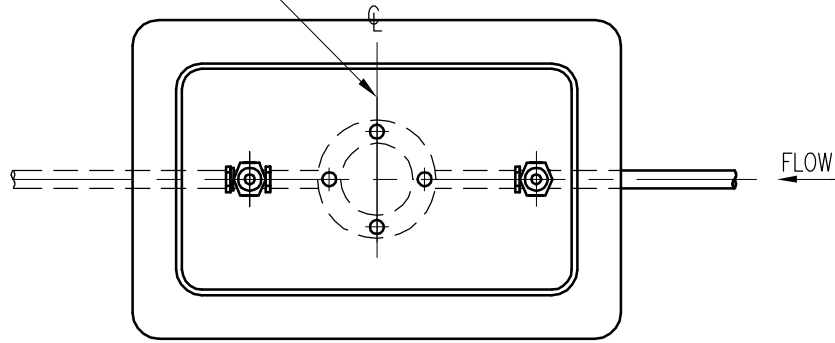
CONCRETE BODY

NOTES:

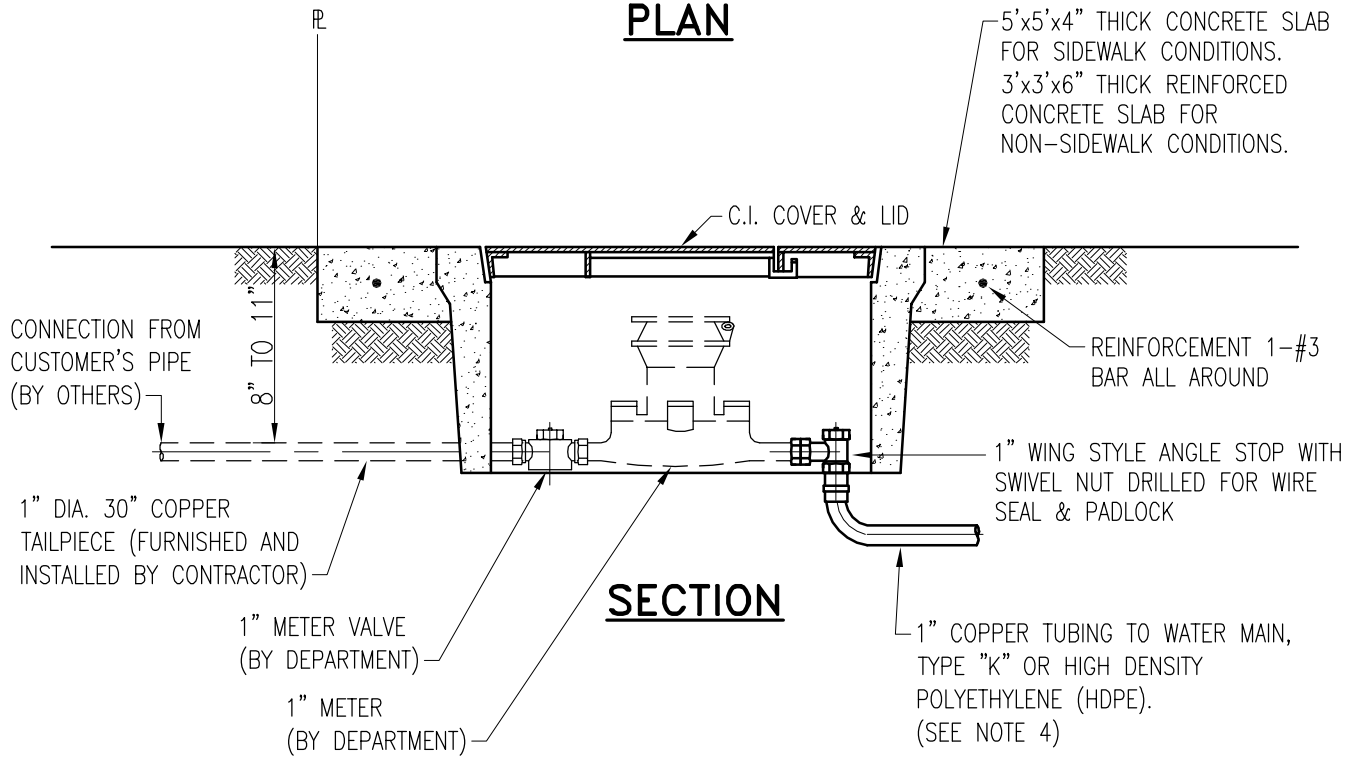
- SOME DIMENSIONS MAY VARY WITH DEPARTMENT APPROVAL.
LID W.T.= MAX. 53 LBS., MIN. 42 LBS.
- METERS WILL NOT BE INSTALLED IF THE METER BOX IS IN A DRIVING SURFACE.

1" SERVICE CONNECTION	WS 4.11	
TYPICAL SERVICE PLAN	WS 4.10	
ITEM	CROSS REF.	SPEC. REF.

METER SHALL BE ALIGNED WITH C
OF METER BOX AS SHOWN. (TYP.)



PLAN




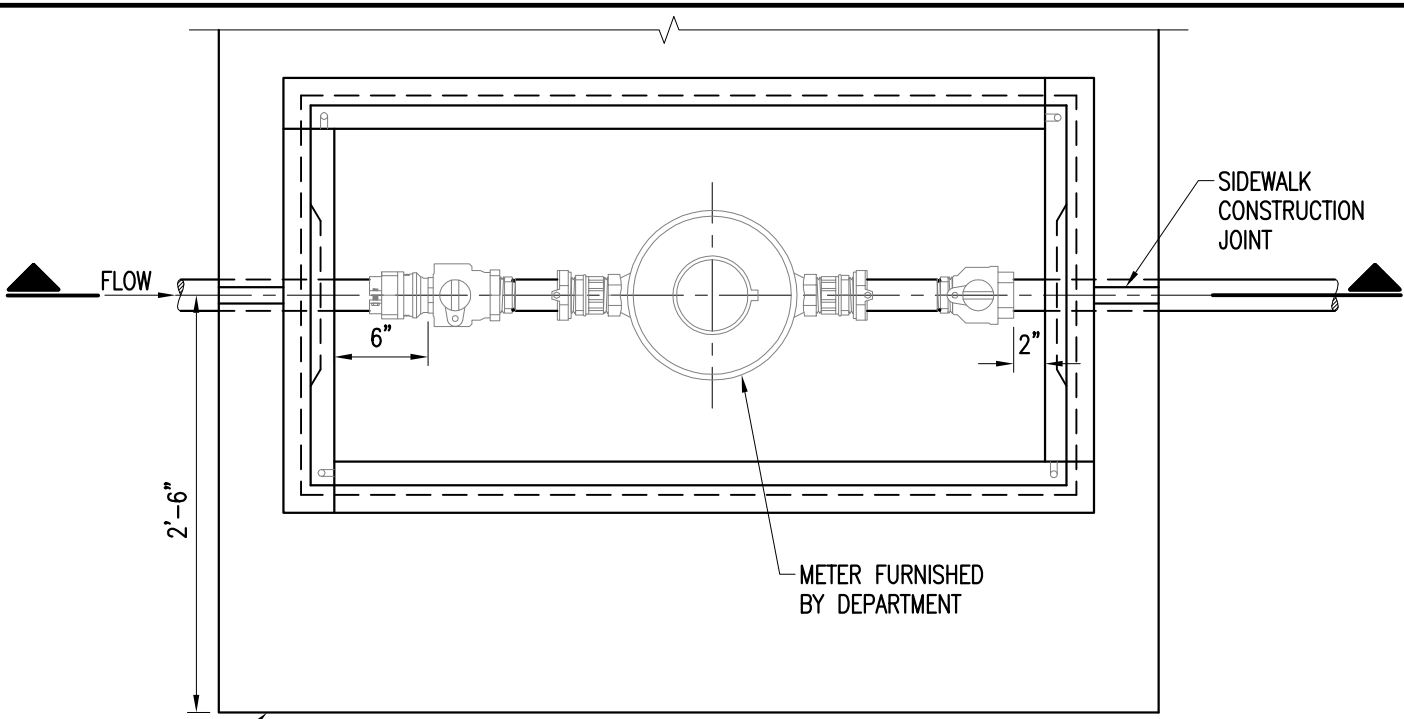
SECTION

NOTES:

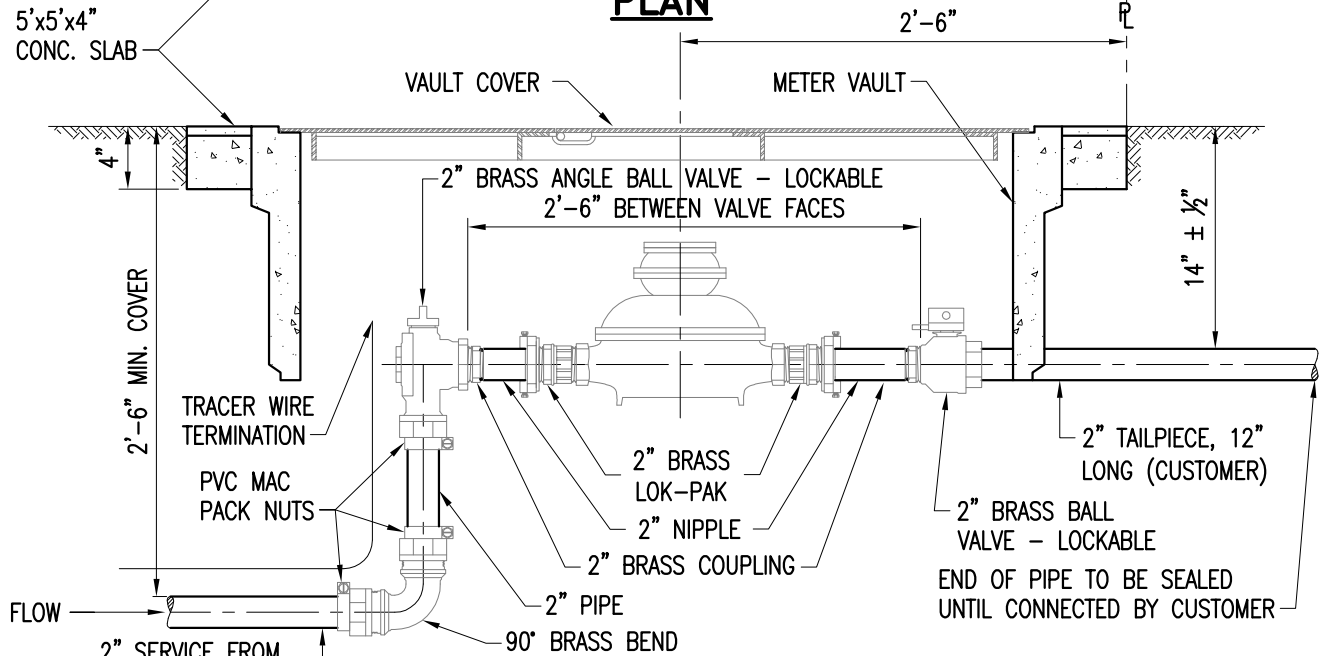
1. SEE SHEET 1 OF 3 FOR DETAILS.
2. USE SINGLE METER BOX.
3. CONCRETE SLAB REINFORCEMENT SHALL HAVE 1-#3 BAR ALL AROUND.
4. USE 1" BLUE COLOR HDPE OR 1" COPPER TUBING FOR POTABLE WATER SERVICE. USE ONLY 1" PURPLE COLOR HDPE (NO COPPER ALLOWED) FOR RECLAIMED WATER SERVICE.
5. METERS WILL NOT BE INSTALLED IF THE METER BOX IS IN A DRIVING SURFACE.
6. WHEN USING 1" HDPE SERVICE, A TEN GAUGE BLUE (PURPLE FOR RECLAIMED WATER) DIRECT BURY STANDARD COPPER TRACE WIRE IS TO BE TAPED CONTINUOUSLY WITH POLY OR DUCT TAPE TO THE SERVICE FOR LOCATION PURPOSES. WIRE MUST BE ATTACHED TO WATER MAIN AND EXTEND INTO WATER METER.
7. ALL SPACER TUBES AND TAILPIECES SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR.
8. REPAIRS TO SLAB AND METER ARE PROHIBITED.

1" SERVICE CONNECTION	WS 4.11	
TYPICAL SERVICE PLAN	WS 4.10	
I T E M	CROSS REF.	SPEC. REF.

 MIAMI-DADE COUNTY <i>Delivering Excellence Every Day</i> WATER & SEWER DEPARTMENT	ISSUE DATE 06/01/2008	APPROVED BY V.F.C.	STANDARD DETAIL SINGLE METER BOX FOR MULTI-STORY BUILDING	WS 2.10 SHEET 3 OF 3	



PLAN



SECTION

NOTES:

1. USE 2'x4' METER VAULT.
2. METER BOX TO BE IN 5'x5'x4" THICK CONCRETE SLAB WITH 6x6-W1.4xW1.4 W.W.M.
3. A TEN GAUGE BLUE (PURPLE FOR RECLAIMED WATER) DIRECT BURY STRANDED COPPER TRACER WIRE TO BE TAPED CONTINUOUSLY WITH POLY OR DUCT TAPE TO THE SERVICE FOR LOCATION PURPOSES. WIRE MUST BE ATTACHED TO WATER MAIN AND EXTEND INTO THE WATER METER BOX.
4. USE 2" BLUE COLOR HDPE FOR POTABLE WATER SERVICE. USE 2" PURPLE COLOR HDPE FOR RECLAIMED WATER SERVICE.
5. METERS WILL NOT BE INSTALLED IF THE METER BOX IS LOCATED ON A DRIVING SURFACE.
6. METER BOX SHALL BE INSTALLED BETWEEN TWO SEPARATE FLAGS OF CONCRETE.
7. ALL BRASS COMPONENTS SHALL BE MARKED "NL" MEETING THE S3874 AMENDMENT TO THE SAFE DRINKING WATER ACT.

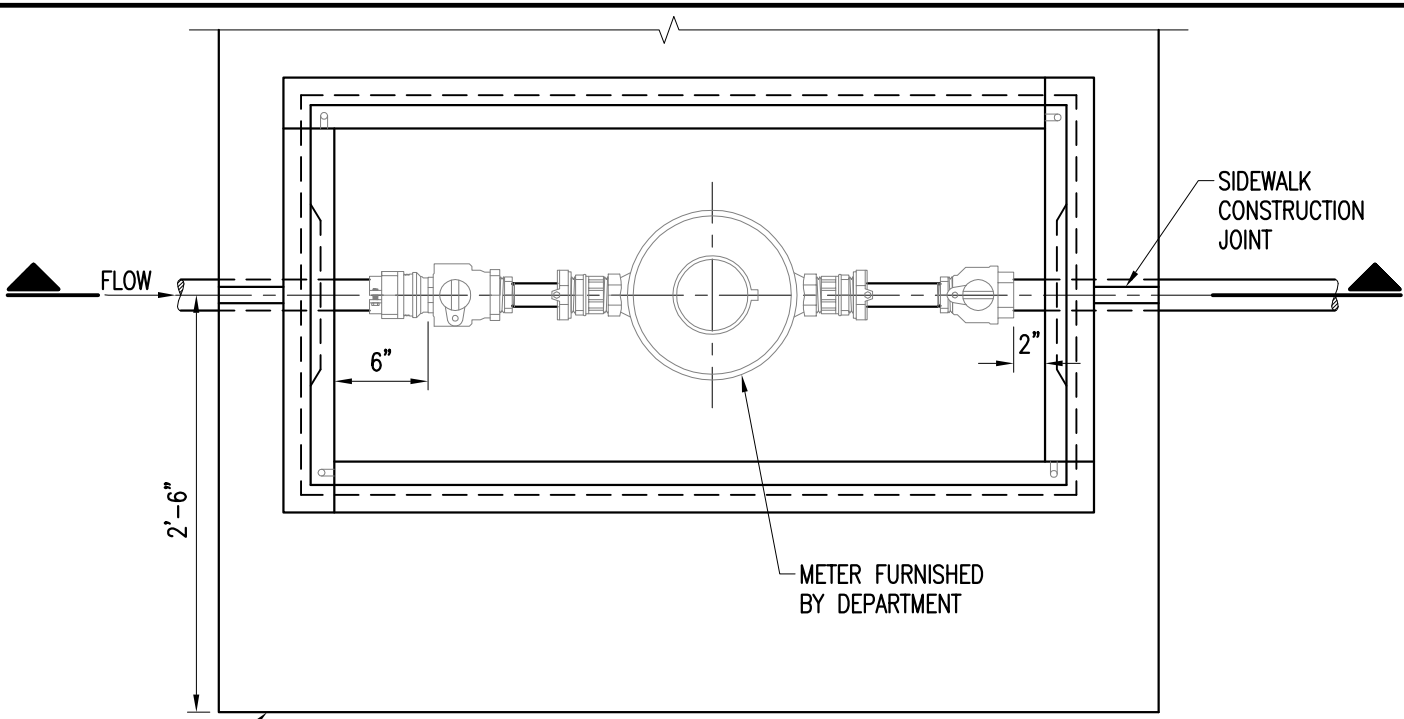
TYPICAL SERVICE PLAN	WS 4.10	
2'x4' METER VAULT	WS 2.17	
ITEM	CROSS REF.	SPEC. REF.



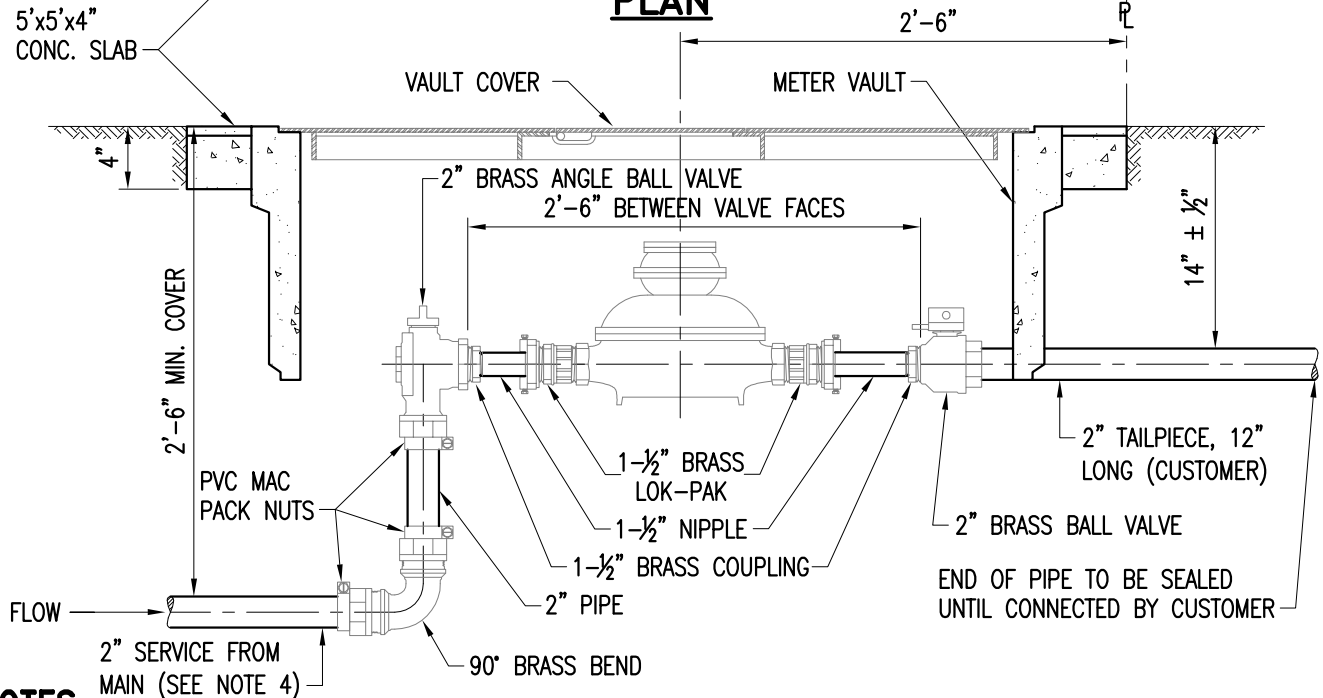
ISSUE DATE	APPROVED BY
05/31/2013	E.A.V.

STANDARD DETAIL
**TYPICAL 2" SERVICE
 INSTALLATION WITH A 2" METER**

**WS
 2.16**
 SHEET 1 OF 4



PLAN



SECTION

NOTES:

1. USE 2'x4' METER VAULT.
2. METER BOX TO BE IN 5'x5'x4" THICK CONCRETE SLAB WITH 6x6-W1.4xW1.4 W.W.M.
3. A TEN GAUGE DIRECT BURY STRANDED COPPER TRACER WIRE TO BE TAPED CONTINUOUSLY WITH POLY OR DUCT TAPE TO THE SERVICE FOR LOCATION PURPOSES. WIRE MUST BE ATTACHED TO RECLAIMED WATER MAIN AND EXTEND INTO THE METER BOX.
4. USE 2" BLUE COLOR HDPE FOR POTABLE WATER SERVICE. USE 2" PURPLE COLOR HDPE FOR RECLAIMED WATER SERVICE.
5. METERS WILL NOT BE INSTALLED IF THE METER BOX IS IN A DRIVING SURFACE.
6. FOR SIDEWALK CONDITIONS, METER BOX SHALL BE INSTALLED IN A SINGLE CONCRETE SIDEWALK FLAG.
7. ALL BRASS COMPONENTS SHALL BE MARKED "NL" MEETING THE S3874 AMENDMENT TO THE SAFE DRINKING WATER ACT.

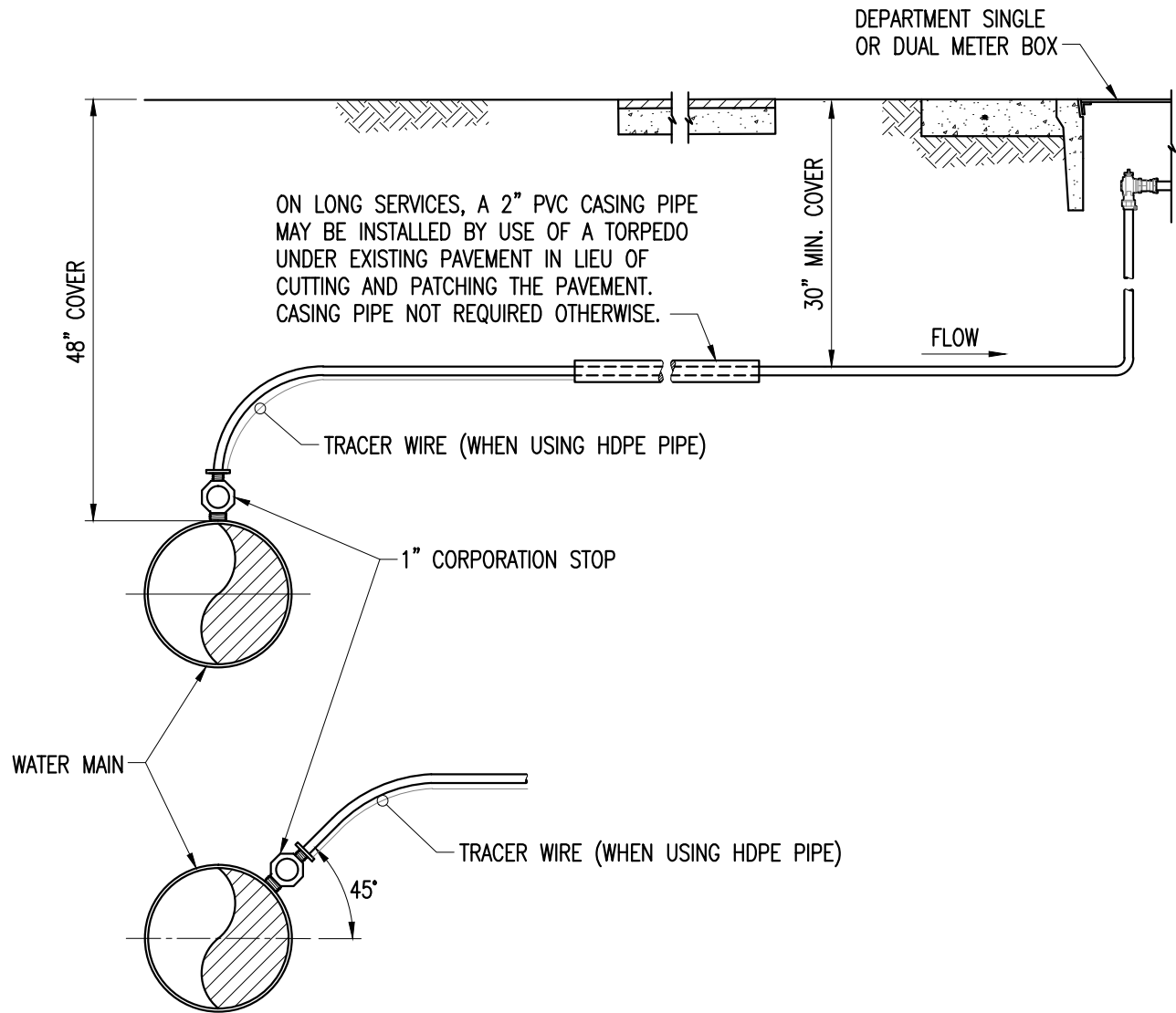
TYPICAL SERVICE PLAN	WS4.10	
2'x4' METER VAULT	WS2.17	
ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
5/31/2013	E.A.V.

STANDARD DETAIL
 TYPICAL 2" SERVICE
 INSTALLATION WITH A 1-1/2" METER

WS
2.16
 SHEET 2 OF 4



NOTES:

1. CONTRACTOR HAS THE OPTION OF TAPPING AT 45°.
2. METERS WILL NOT BE INSTALLED IF THE METER BOX IS LOCATED ON A DRIVING SURFACE.
3. PROVIDE 36" MIN. COVER FOR SERVICES INSTALLED WITHIN ARTERIAL ROADS (INCLUDING ALL SECTION LINE AND HALF-SECTION LINE ROADS).
4. INSTALL TAPPING SADDLE FOR: THICKNESS CLASS D.I. MAINS 4" & SMALLER, PRESSURE CLASS D.I. WATER MAINS 6" & SMALLER, OR WHEN MAIN IS PVC, HDPE OR AC PIPE.
5. WHEN MAIN IS SHALLOWER THAN 48", A 1/8" OR 1/4" BEND MUST BE USED.
6. WHEN USING HDPE SERVICE PIPE, A TEN GAUGE BLUE TRACER WIRE TO BE TAPED TO THE PIPE EVERY 2 FT. WITH POLY OR DUCT TAPE. TRACER WIRE TO BE MECHANICALLY FASTENED TO THE MAIN WHEN A METAL WATER MAIN IS USED.
7. USE SERVICE SADDLE AND TAPPING SLEEVE FOR PVC RECLAIMED WATER MAIN.

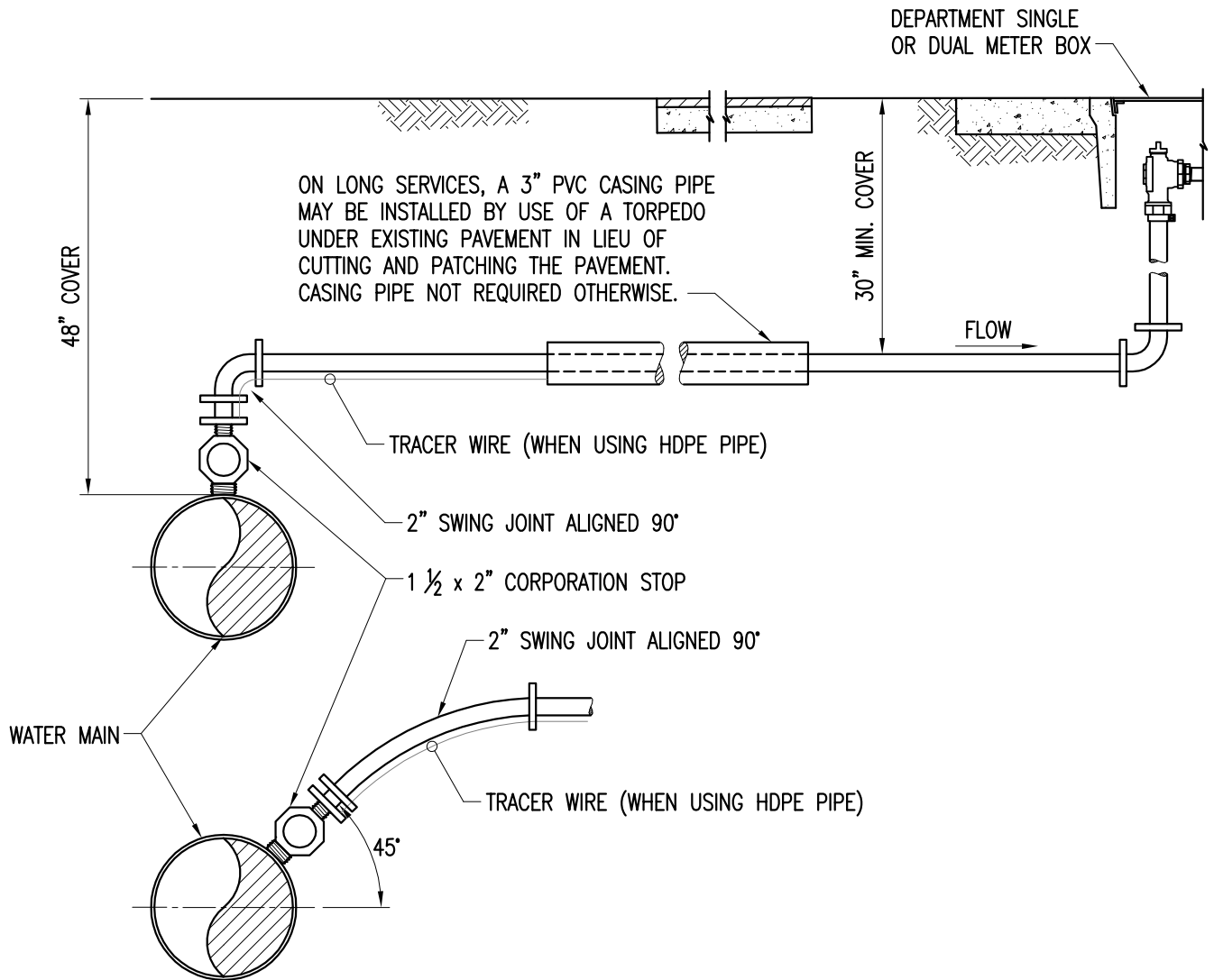
TYPICAL SERVICE PLAN	WS. 4.10	
ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
1/3/2011	V.F.C.

STANDARD DETAIL
**TYPICAL 1" SERVICE CONNECTION
 (COPPER OR HDPE)**

WS
2.16
 SHEET 3 OF 4



NOTES:

1. CONTRACTOR HAS THE OPTION OF TAPPING AT 45°.
2. METERS WILL NOT BE INSTALLED IF THE METER BOX IS LOCATED ON A DRIVING SURFACE.
3. PROVIDE 36" MIN. COVER FOR SERVICES INSTALLED WITHIN ARTERIAL ROADS (INCLUDING ALL SECTION LINE AND HALF-SECTION LINE ROADS).
4. INSTALL TAPPING SADDLE FOR: THICKNESS CLASS D.I. MAINS 4" & SMALLER, PRESSURE CLASS D.I. WATER MAINS 8" & SMALLER, OR WHEN MAIN IS PVC, HDPE OR AC PIPE.
5. WHEN MAIN IS SHALLOWER THAN 48", A 1/8 OR 1/4 BEND MUST BE USED.
6. WHEN USING HDPE SERVICE PIPE, A TEN GAUGE BLUE TRACER WIRE TO BE TAPED TO THE PIPE EVERY 2 FT. WITH POLY OR DUCT TAPE. TRACER WIRE TO BE MECHANICALLY FASTENED TO THE MAIN WHEN A METAL WATER MAIN IS USED.
7. USE SERVICE SADDLE AND TAPPING SLEEVE FOR PVC RECLAIMED WATER MAIN.

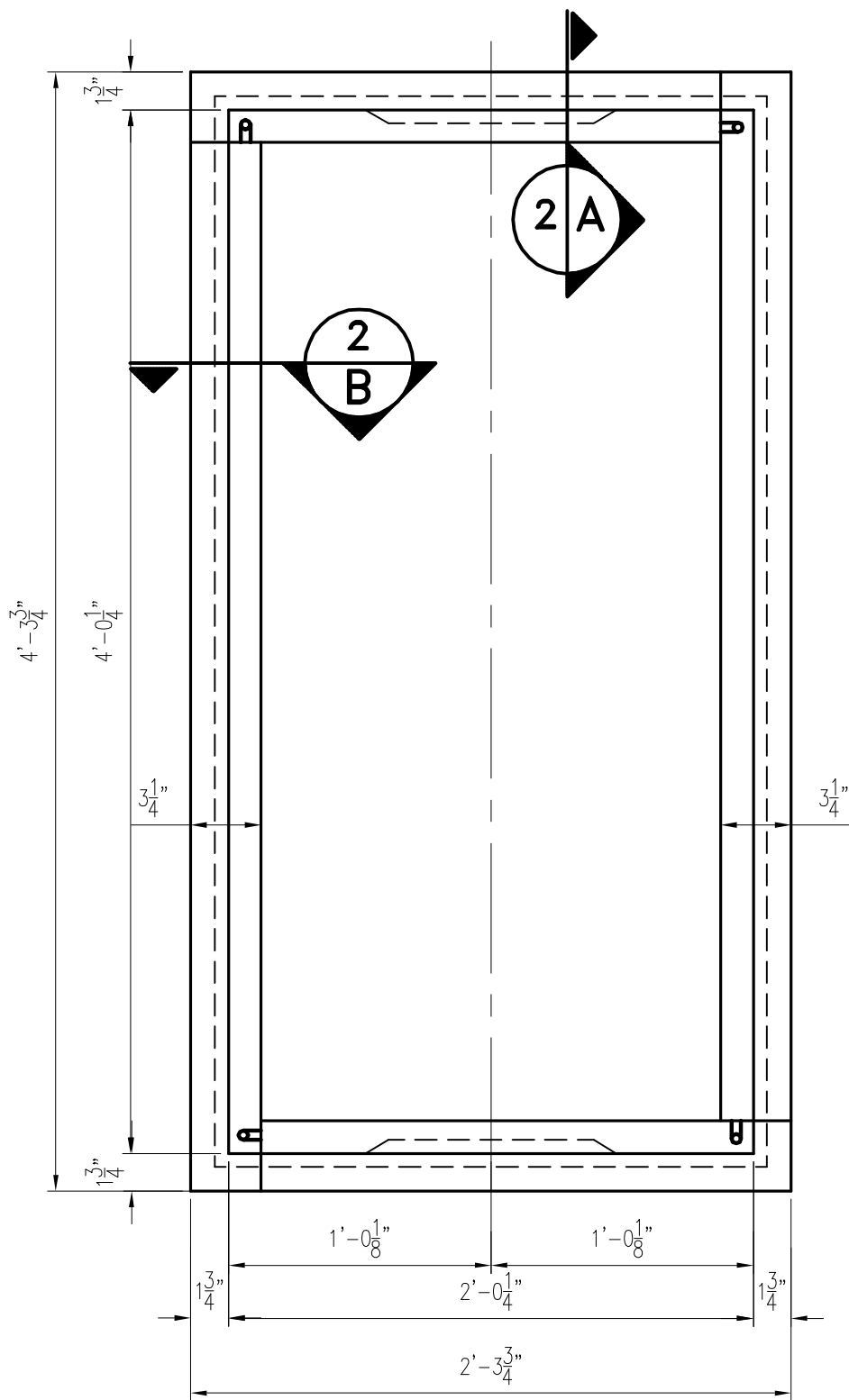
DUAL METER BOX	WS 2.12	
SINGLE METER BOX	WS 2.10	3.02
ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
12/16/2009	V.F.C.

STANDARD DETAIL
 TYPICAL 2" SERVICE CONNECTION (HDPE)

WS
 2.16
 SHEET 4 OF 4



PLAN

SCALE: 1- 1/2 " = 1'-0"

NOTES:

1. FOR SECTION A-A AND B-B SEE SHT No. 2
2. FOR STEEL COVER PLATE DETAILS SEE SHT. NO.3
3. PRECAST VAULT ONLY

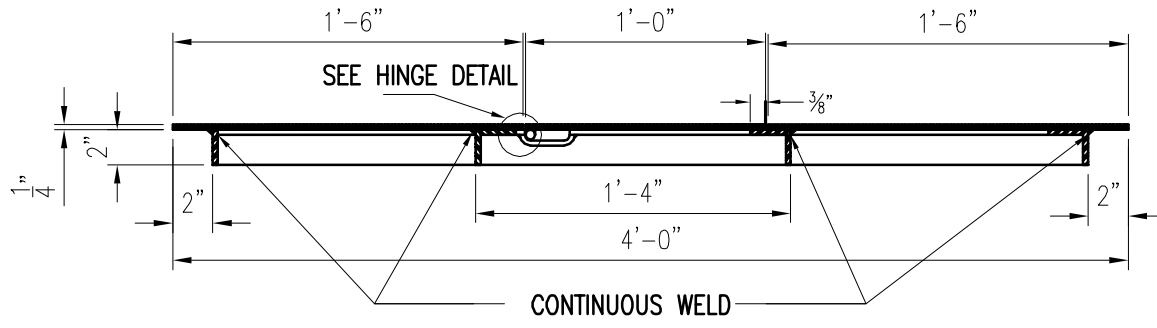
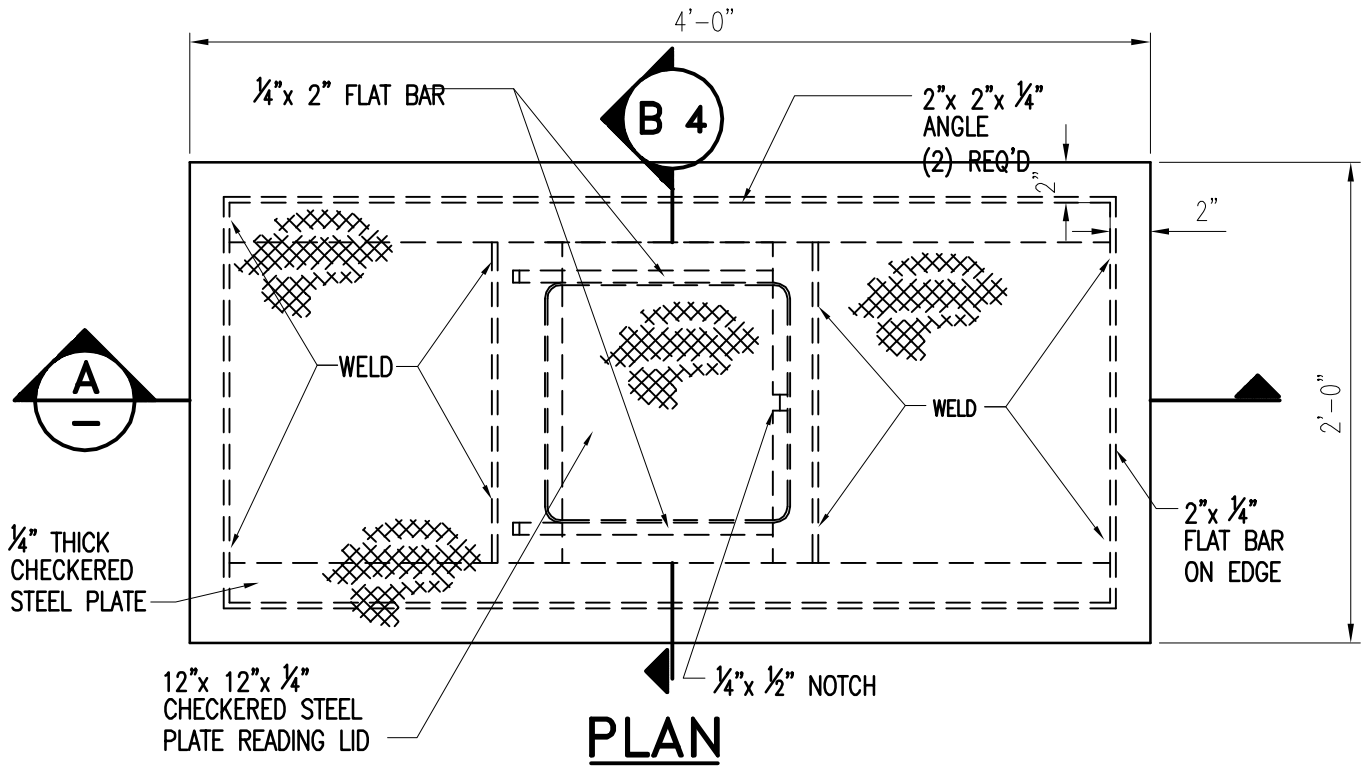
XXXXX		
ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
11/01/2006	V. E. F.

STANDARD DETAIL
ASSEMBLED
 2' x 4' VAULT
 (PRECAST SECTIONS)

WS
2.17
 SHEET 1 OF 5



NOTES:

1. SUPPLIER SHALL PERMANENTLY MARK HIS NAME AND DATE OF MANUFACTURE ON BOTTOM OF EACH COVER BY WELDING, STAMPING OR AS APPROVED BY THE DEPARTMENT
2. ALL WELDS SHALL BE CONTINUOUS.
3. FOLLOWING FABRICATION THE ENTIRE UNIT SHALL BE THOROUGHLY CLEANED AND HOT-DIP GALVANIZED.

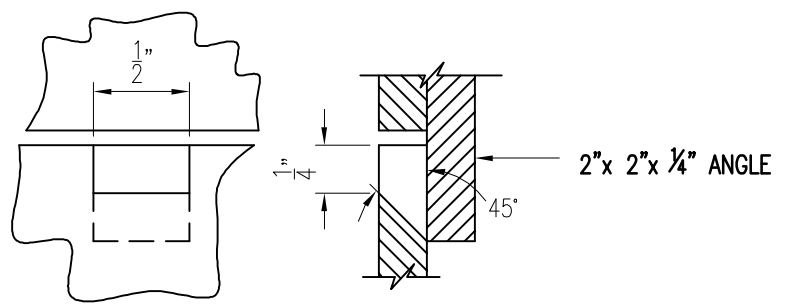
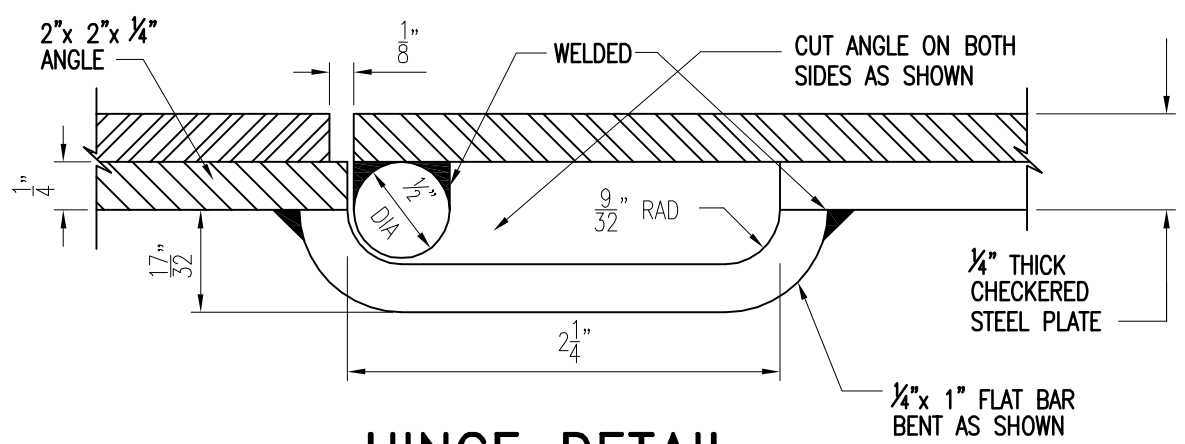
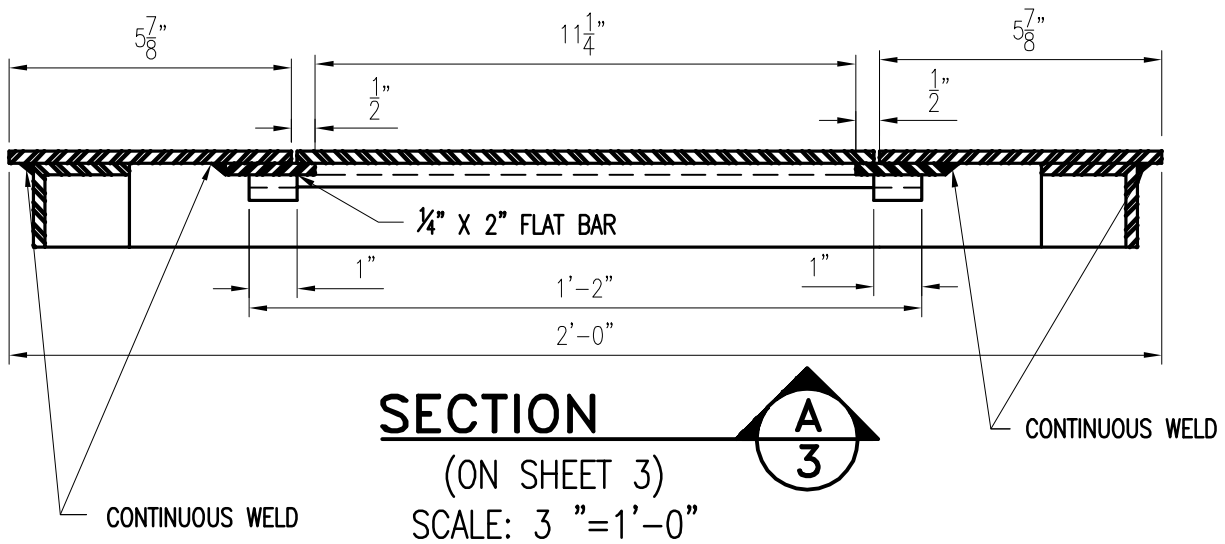
XXXXX		
ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
11/01/2006	V. E. F.

STANDARD DETAIL
 STANDARD 2' x 4'
 STEEL COVER PLATE
 FOR NON-TRAFFIC VAULT

WS
 2.17
 SHEET 3 OF 5



(IN HINGED PART OF
2' x 4' COVER)

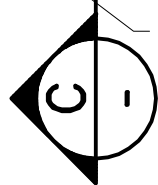
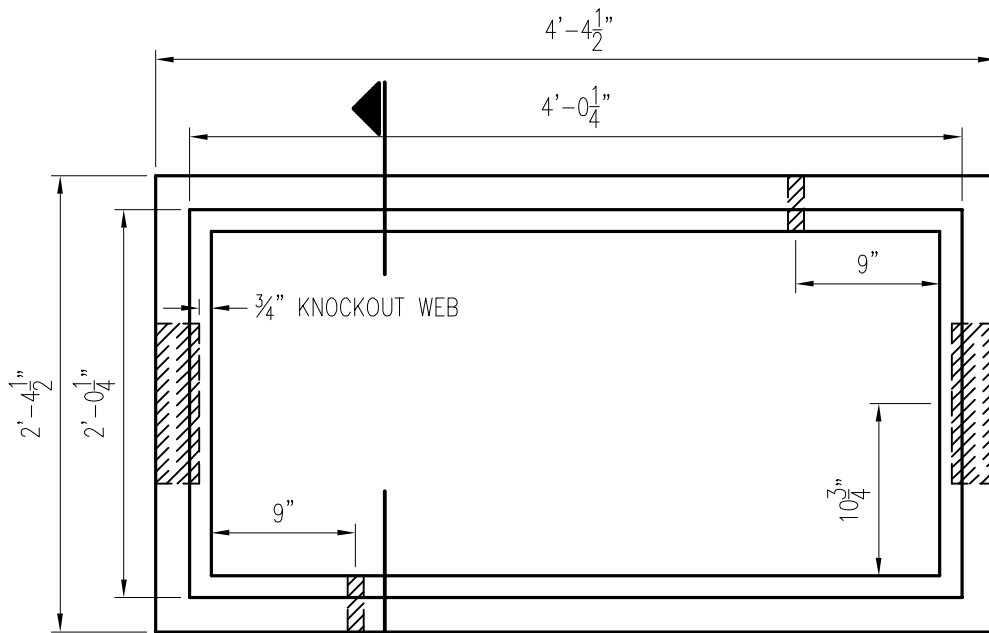
XXXXX		
ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
11/01/2006	V. E. F.

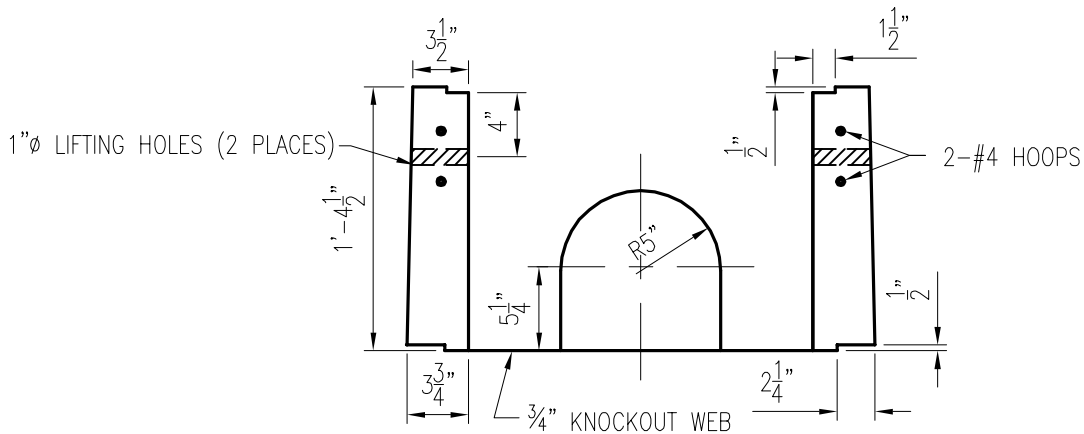
STANDARD DETAIL
DETAILS OF 2'x4'
STEEL COVER PLATE
FOR NON-TRAFFIC VAULT

WS
2.17
SHEET 4 OF 5



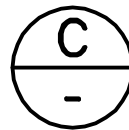
PLAN

SCALE: 1" = 1'-0"



SECTION

SCALE: 1" = 1'-0"



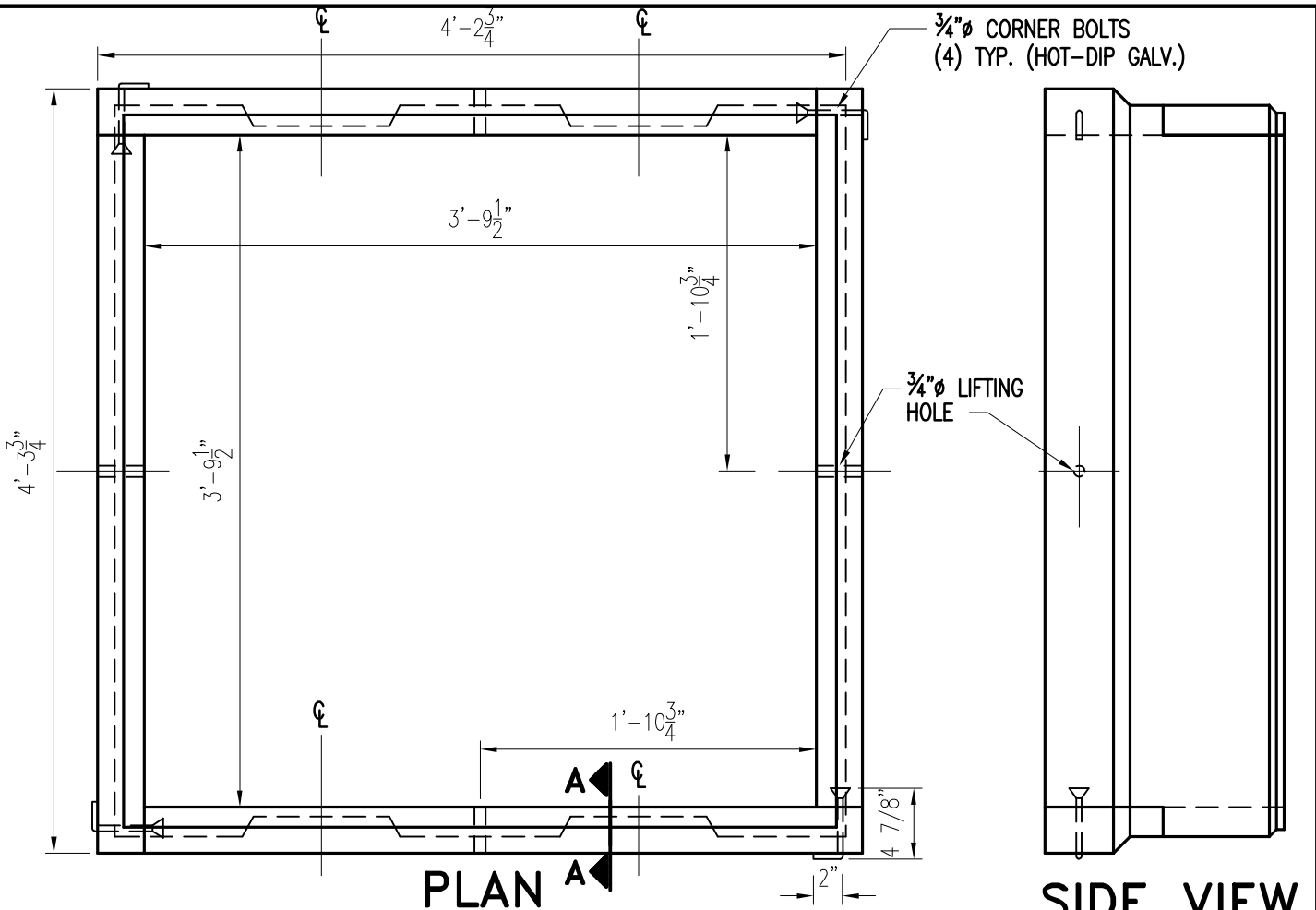
XXXXX		
ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
11/01/2006	V. E. F.

STANDARD DETAIL
 2' x 4' PRECAST METER VAULT
 FOR NO-TRAFFIC AREAS)

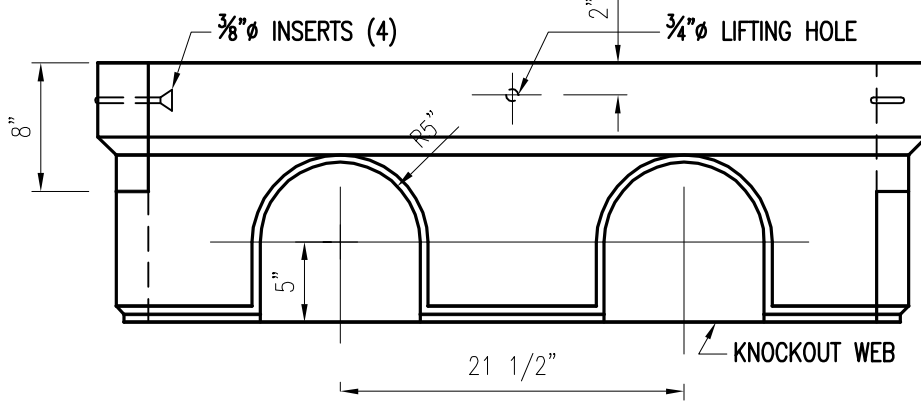
WS
 2.17
 SHEET 5 OF 5



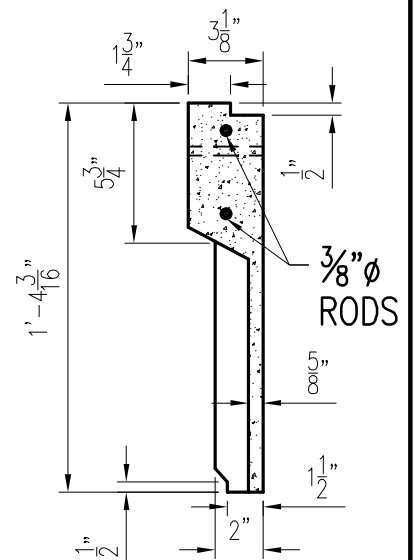
PLAN A

SIDE VIEW

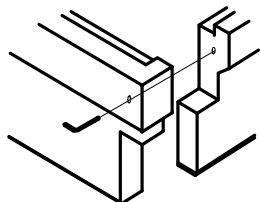
NOTE: VAULT COVER TO BE TWO (2) STARDARD 2' x 4' STEEL COVERS FOR NON-TRAFFIC VALT (SEE DRAWING WS 2.17, 3 OF 4)



END VIEW



SECTION A-A



CORNER JOINT ASSEMBLY

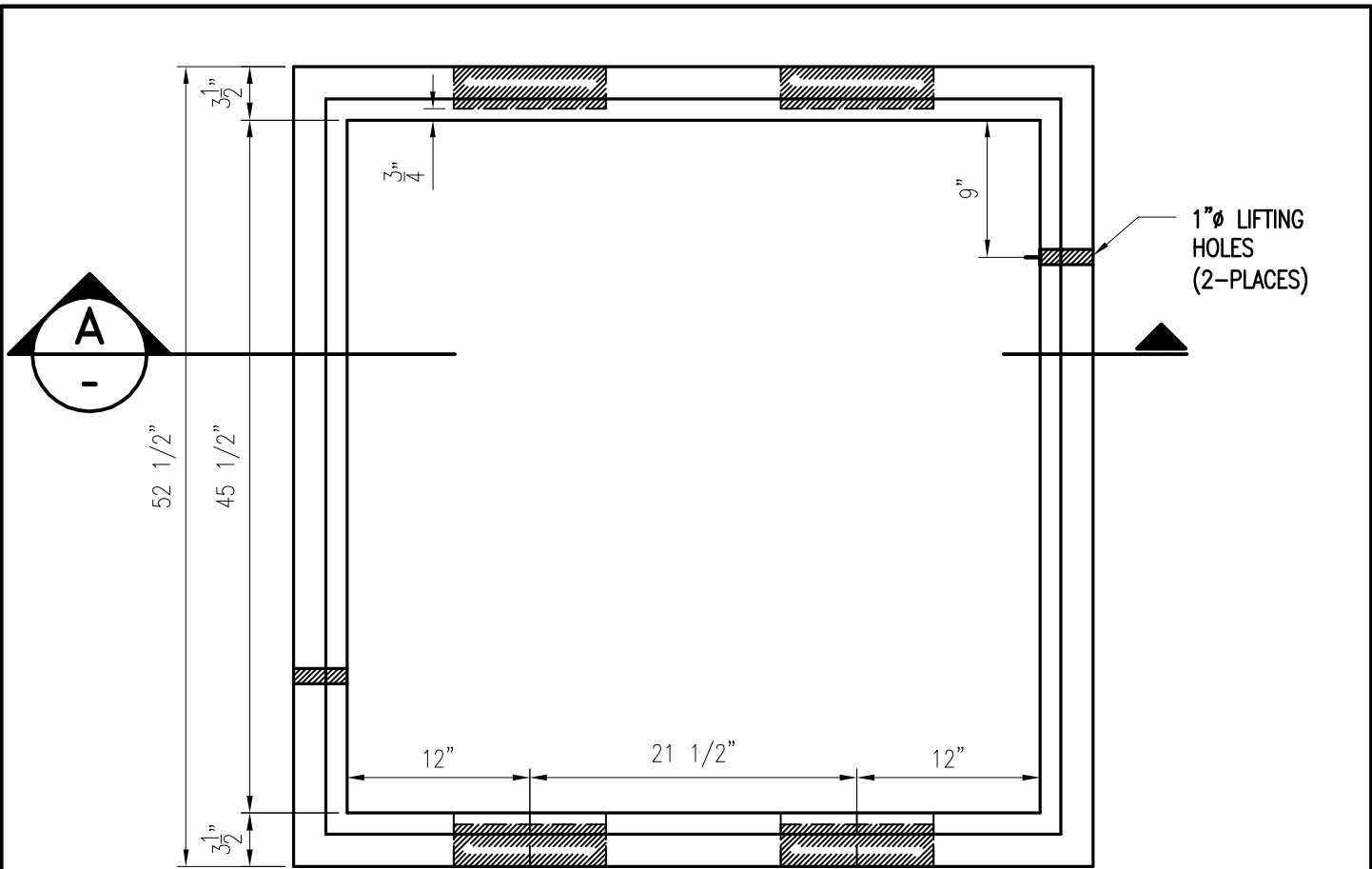
2' x 4' STEEL COVERS	WS 2.17	
XXXXX		
ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
11/01/2006	V. E. F.

STANDARD DETAIL
4' x 4' PRECAST METER VAULT FOR NON TRAFFIC AREAS

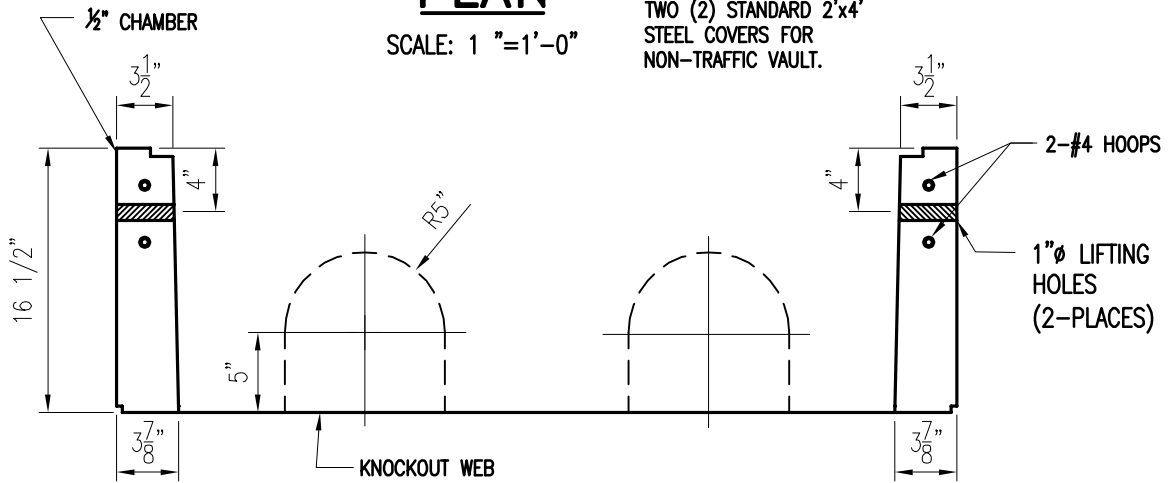
WS 2.20
 SHEET 1 OF 2



PLAN

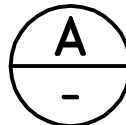
SCALE: 1"=1'-0"

NOTE: VAULT COVER TO BE TWO (2) STANDARD 2'x4' STEEL COVERS FOR NON-TRAFFIC VAULT.



SECTION

SCALE: 1"=1'-0"



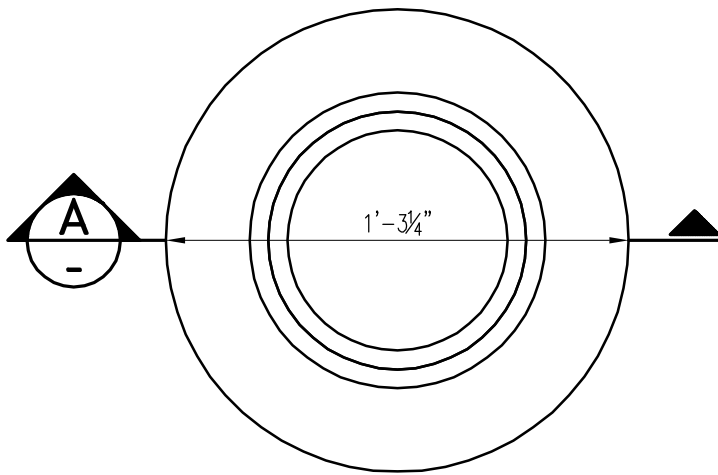
2' x 4' STEEL COVERS	WS 2.17	
XXXXX		
ITEM	CROSS REF.	SPEC. REF.



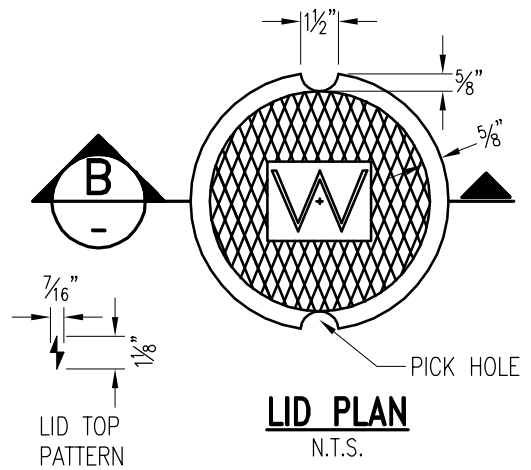
ISSUE DATE	APPROVED BY
11/01/2006	V. E. F.

STANDARD DETAIL
4' x 4' PRECAST METER VAULT FOR NON TRAFFIC AREAS

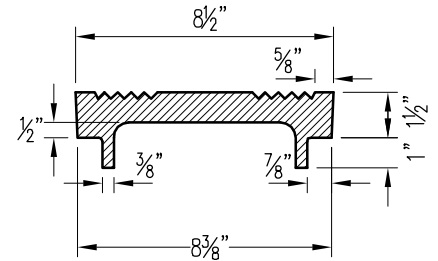
WS 2.20
 SHEET 2 OF 2



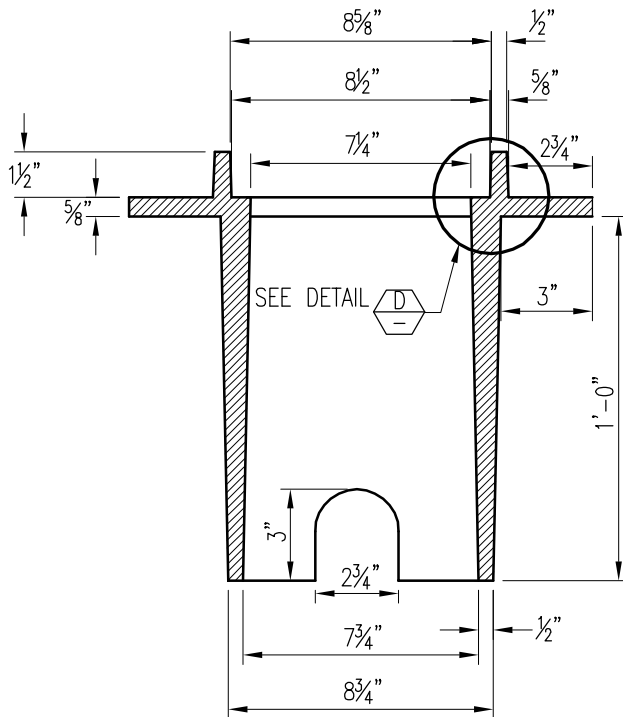
BOX PLAN
N.T.S.



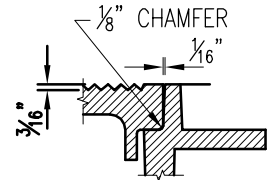
LID PLAN
N.T.S.



SECTION B
N.T.S.



SECTION A
N.T.S.

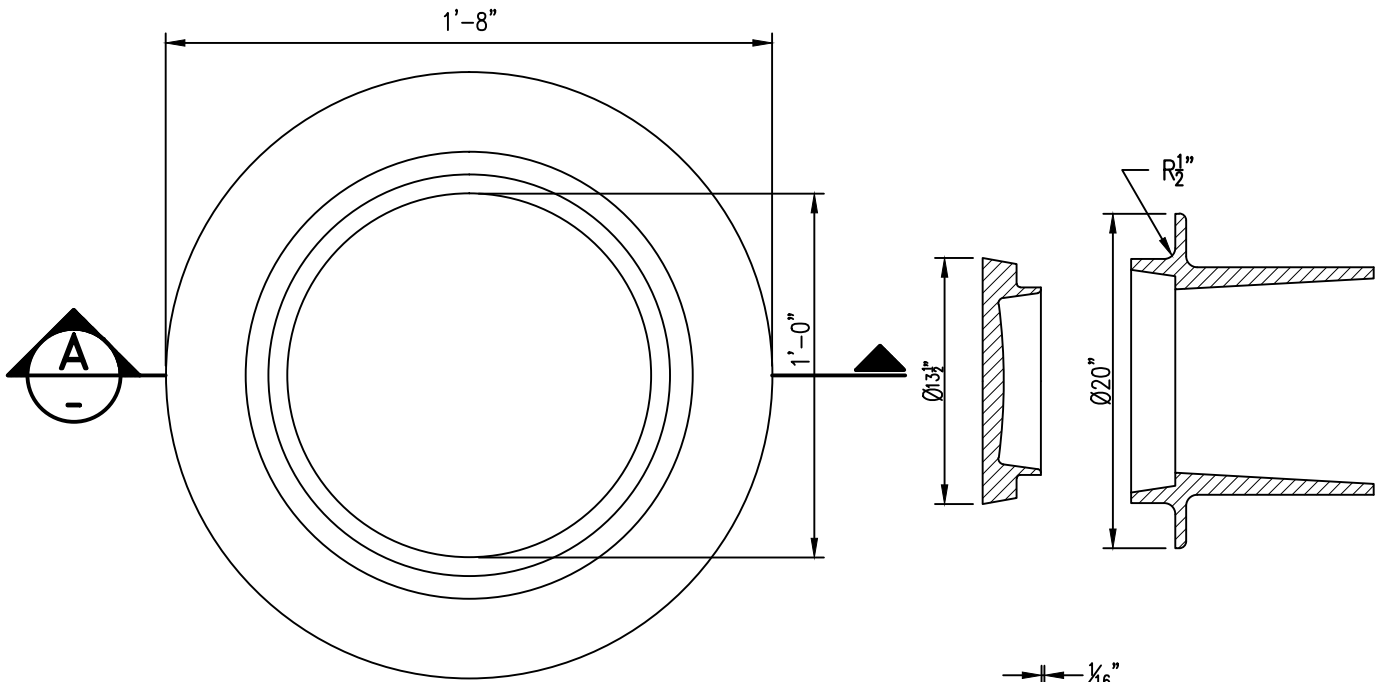


DETAIL D
N.T.S.

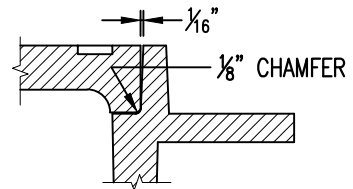
NOTES:

1. FOUNDRY AND LOCATION SHALL BE CAST ON BOTTOM OF LID. (SEE WS 2.05)
2. MACHINE FINISH BOTTOM OF COVER AND SEAT OF FRAME.
3. ALL DIMENSIONS ARE NET CASTING, NOT PATTERN.
4. IF USED FOR RECLAIMED WATER, THE CAST IRON LID AND BOX ARE TO BE COLORED PURPLE PANTONE 522C, AND THE LETTER "W" REPLACED WITH "R".

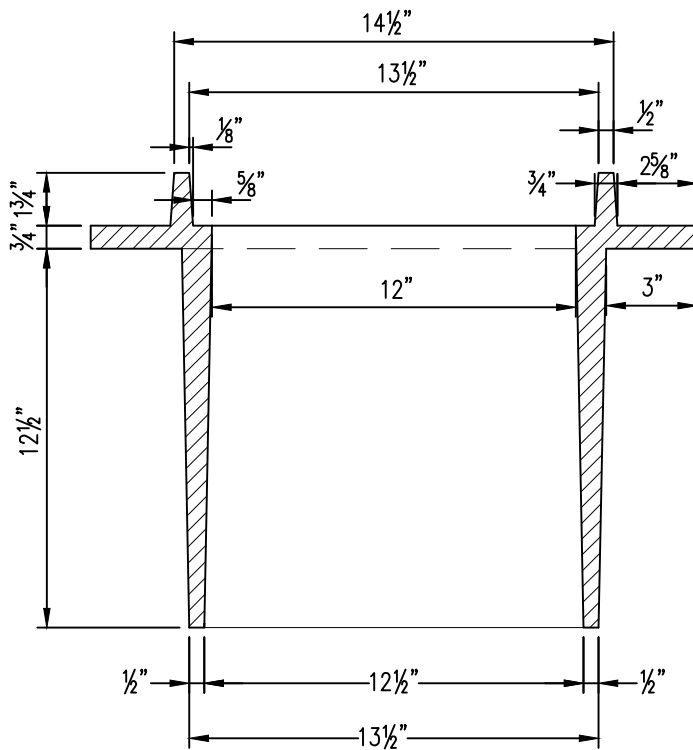
ITEM	CROSS REF.	SPEC. REF.



PLAN VIEW
N.T.S.



LID DETAIL
N.T.S.



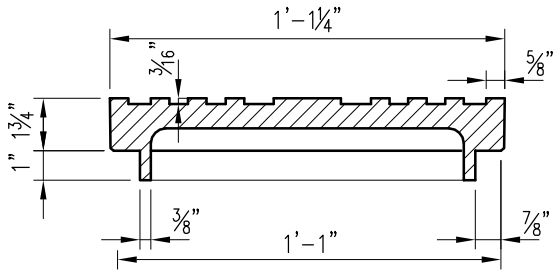
SECTION A
N.T.S.

NOTES:

1. FOUNDRY AND LOCATION SHALL BE CAST ON BOTTOM OF THE LID. (SEE WS 2.05)
2. ALL DIMENSIONS ARE NET CASTING, NOT PATTERN.
3. IF USED FOR RECLAIMED WATER, THE CAST IRON LID AND BOX ARE TO BE COLORED PURPLE PANTONE 522C, AND THE LETTER "W" REPLACED WITH "R".
4. MIN. WEIGHTS
RING: 135 LBS.
COVER: 37 LBS

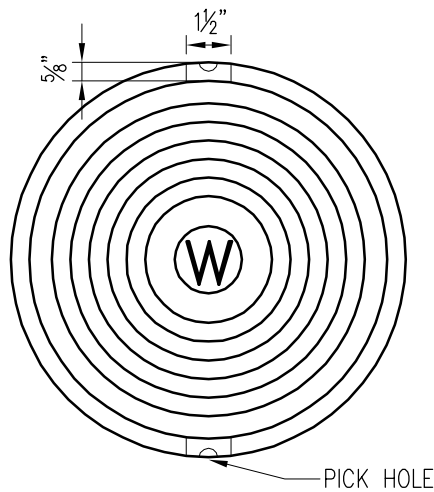
ITEM	CROSS REF.	SPEC. REF.

ISSUE DATE	APPROVED BY
6/1/2015	J.F.



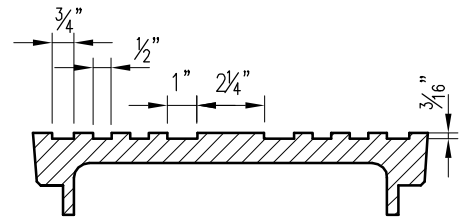
SECTION VIEW

N.T.S.



PLAN VIEW

N.T.S.



DETAIL OF LID TOP

N.T.S.

NOTES:

1. MACHINE FINISH BOTTOM OF COVER AND SEAT OF FRAME.
2. ALL DIMENSIONS ARE NET CASTING, NOT PATTERN.
3. FOUNDRY AND LOCATION SHALL BE CAST ON BOTTOM OF THE LID. (SEE WS 2.05)
4. IF USED FOR RECLAIMED WATER, THE CAST IRON LID IS TO BE COLORED PURPLE PANTONE 522C, AND THE LETTER "W" REPLACED WITH "R".

I T E M	CROSS REF.	SPEC. REF.

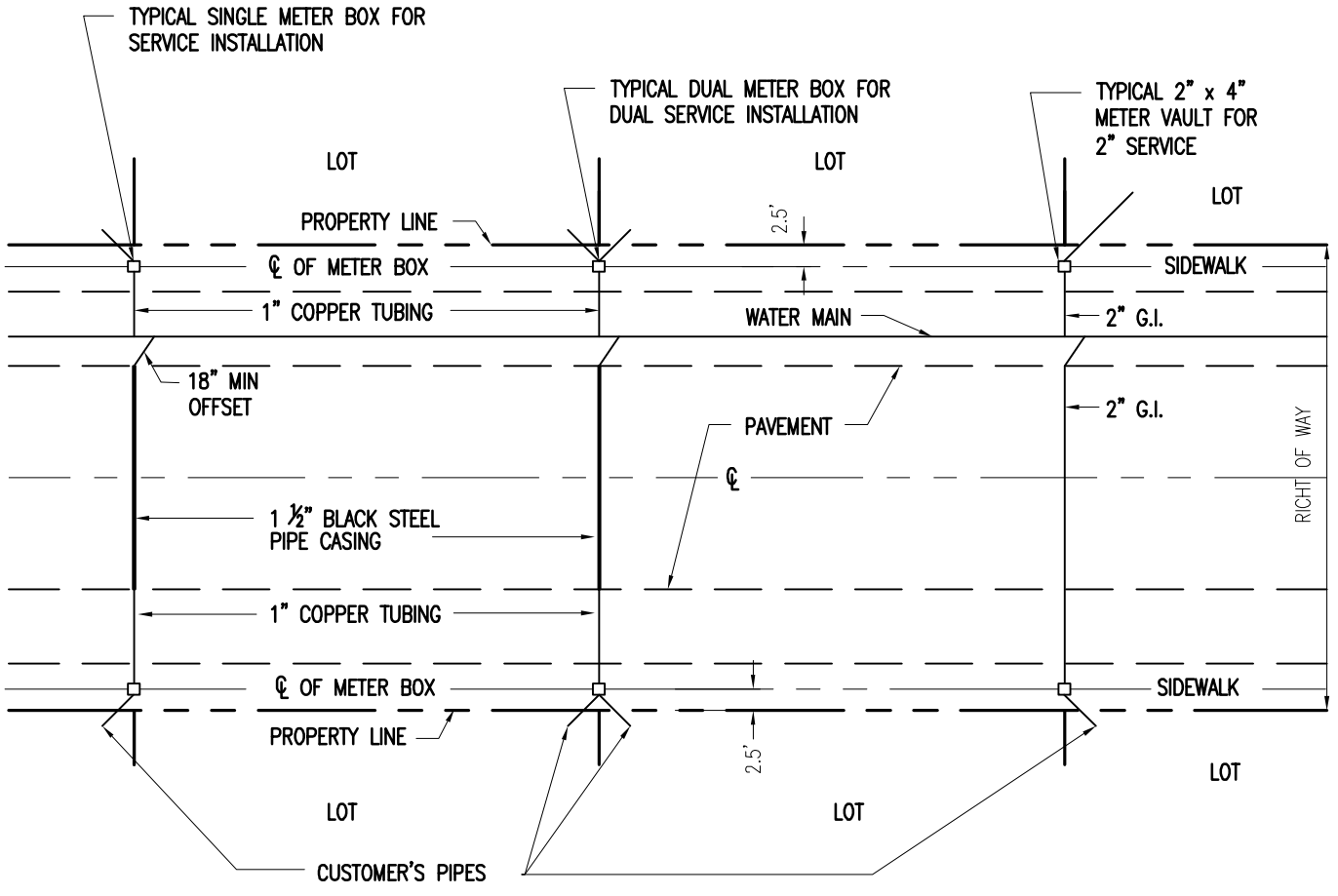


ISSUE DATE	APPROVED BY
06/01/2008	V.F.C.

S T A N D A R D D E T A I L

No. 3 C.I. LID

WS
3.11
SHEET 2 OF 2



PLAN

NOTE: METERS WILL NOT BE INSTALLED IF THE METER BOX IS IN A DRIVING SURFACE.

ITEM	CROSS REF.	SPEC. REF.

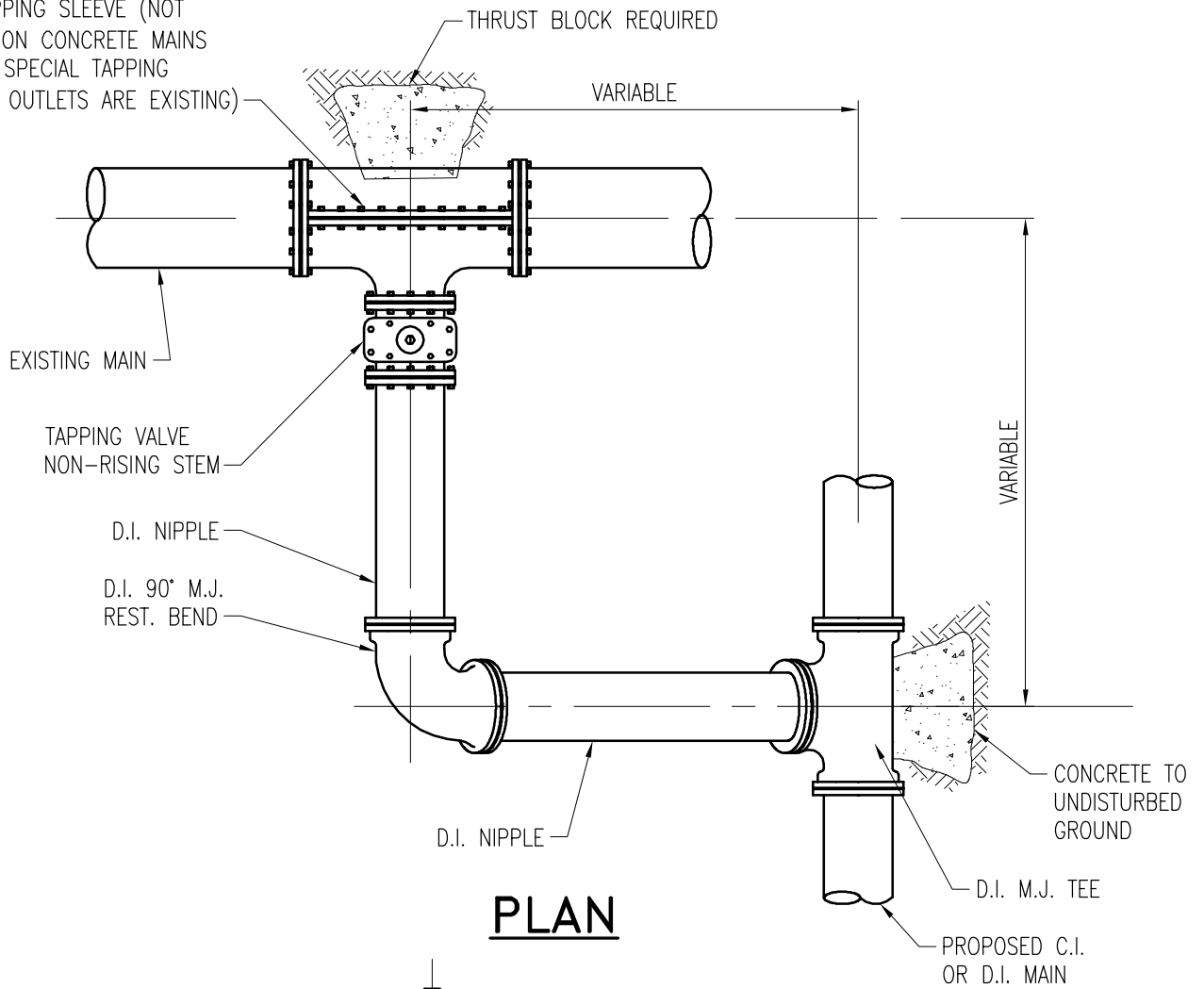


ISSUE DATE	APPROVED BY
11/01/2006	V.E.F.

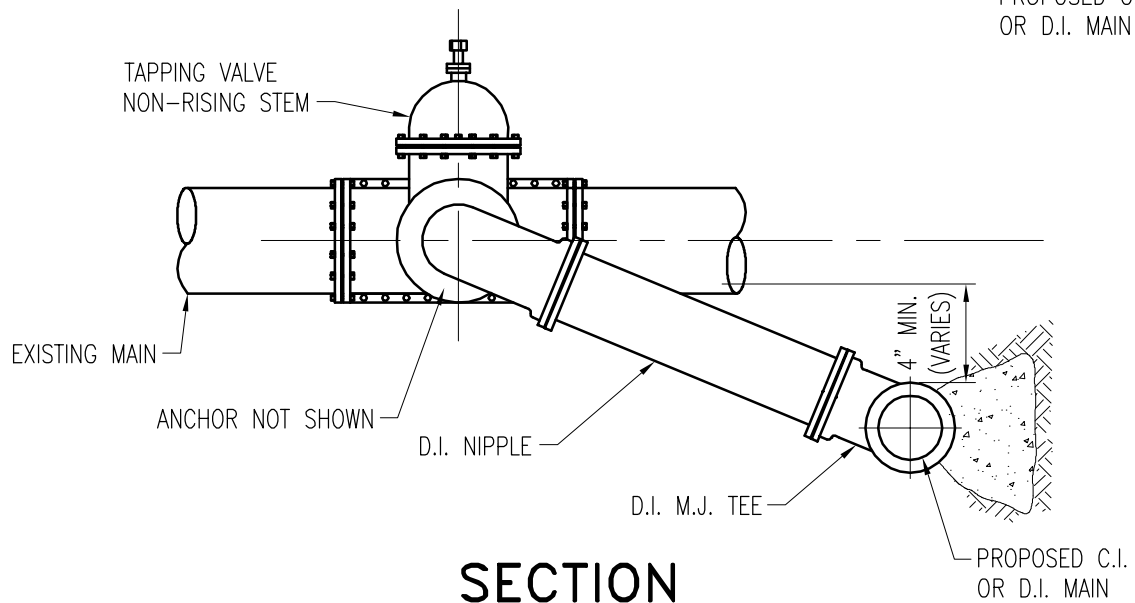
STANDARD DETAIL
TYPICAL SERVICE PLAN

WS
4.10
SHEET 1 OF 1

D.I. TAPPING SLEEVE (NOT REQ'D. ON CONCRETE MAINS WHERE SPECIAL TAPPING FLANGE OUTLETS ARE EXISTING)



PLAN



SECTION

NOTE:

1. ALL PIPE AND FITTINGS TO BE RESTRAINED.

ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
06/20/2008	V.F.C.

STANDARD DETAIL
TYPICAL CONNECTION TO EXISTING MAIN

WS
4.12
SHEET 1 OF 2

D.I. TAPPING SLEEVE (NOT REQ. ON CONCRETE MAINS WHERE SPECIAL TAPPING FLANGE OUTLETS ARE EXISTING)

THRUST BLOCK REQUIRED

VARIABLE

EXISTING MAIN

TAPPING VALVE
NON-RISING STEM

D.I. NIPPLE

D.I. 90° M.J.
REST. BEND

D.I. BEND AS REQUIRED
ANCHOR NOT SHOWN

D.I. NIPPLE

VARIABLE

CONCRETE TO
UNDISTURBED
GROUND

D.I. M.J. TEE

PROPOSED C.I.
OR D.I. MAIN

PLAN

TAPPING VALVE
NON-RISING STEM

D.I. BEND
AS REQUIRED

D.I. M.J. TEE

4" MIN.
(VARIES)

EXISTING MAIN

ANCHOR NOT SHOWN

D.I. NIPPLE

PROPOSED C.I.
OR D.I. MAIN

SECTION

NOTE:

1. ALL PIPE AND FITTINGS TO BE RESTRAINED.

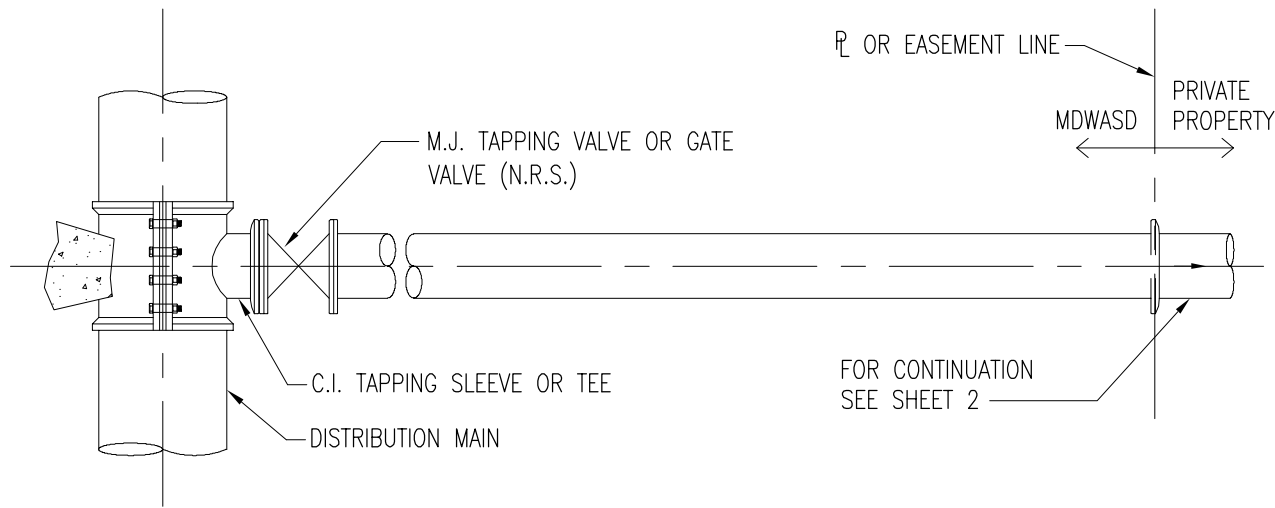
ITEM	CROSS REF.	SPEC. REF.



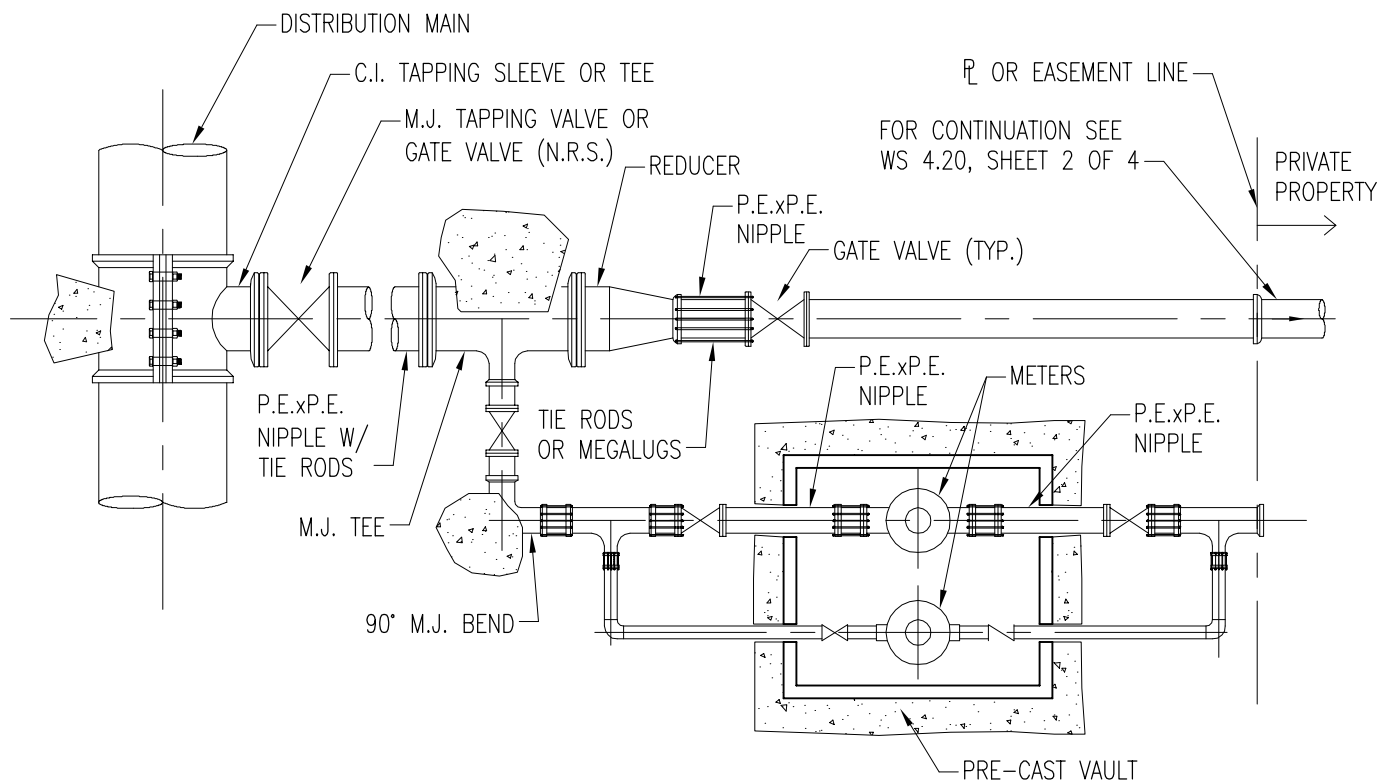
ISSUE DATE	APPROVED BY
06/20/2008	V.F.C.

STANDARD DETAIL
TYPICAL CONNECTION
TO EXISTING MAIN

WS
4.12
SHEET 2 OF 2



TYPICAL FIRE SERVICE CONNECTION TO MAIN



TYPICAL FIRE & DOMESTIC WATER CONNECTION TO MAIN

NOTES:

1. ALL EXPOSED METALLIC THREADS ARE TO BE COATED WITH BITUMASTIC PAINT AFTER INSTALLATION.
2. CONCRETE SLAB REQUIRED FOR SECTIONAL VAULTS ONLY.
3. FOR DETAILS OF TIE RODS, SEE DETAIL WS 1.10.
4. DOMESTIC SERVICES 1", 2" & 4" (PER WS 4.21).

4" x 4" VAULT	WS 2.20	
No. 2 & No. 3 VALVE BOX	WS 3.11	
CONC. ANCHORS	GS 1.1	
I T E M	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
10/05/2009	V.F.C.

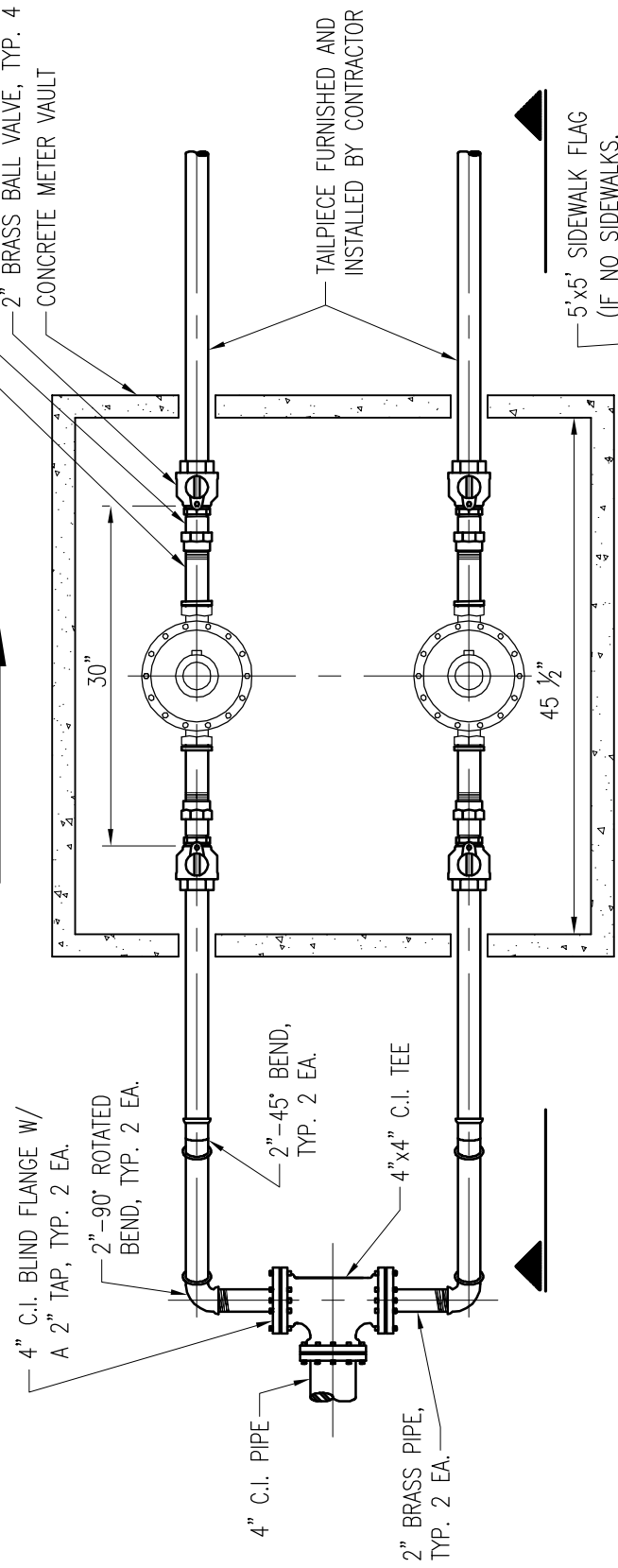
STANDARD DETAIL

TYPICAL FIRE & DOMESTIC WATER SERVICE CONNECTIONS

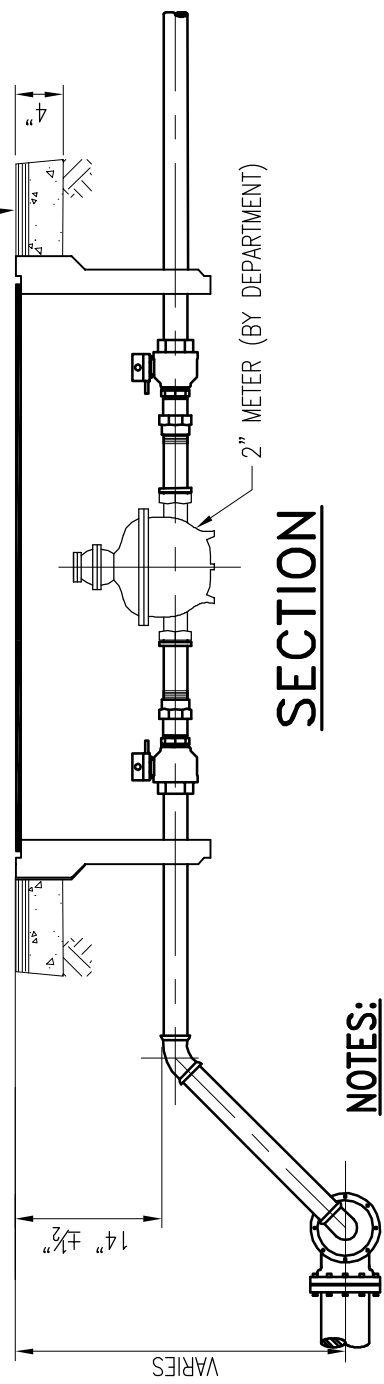
WS 4.20
SHEET 1 OF 4

- 2" LOK-PAK COUPLING, TYP. 4 EA.
- 2" GI. SHORT NIPPLE, TYP. 4 EA.
- 2" BRASS BALL VALVE, TYP. 4 EA.
- CONCRETE METER VAULT

FLOW



PLAN



SECTION

NOTES:

1. METER BOX TO BE IN 5'x5'x4" THICK CONCRETE SLAB WITH 6x6- W1.4 x W1.4 W.W.M.N.
2. ALL EXPOSED METALLIC THREADS ARE TO BE PAINTED WITH BITUMASTIC PAINT AFTER INSTALLATION.
3. USE 4'x4' VAULT.
4. ALL 2" PIPING TO BE SCH. 40 BRASS.
5. METER WILL NOT BE INSTALLED IF THE METER BOX IS LOCATED ON A DRIVING SURFACE.
6. ALL SPACER TUBES AND TAILPIECES SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR.

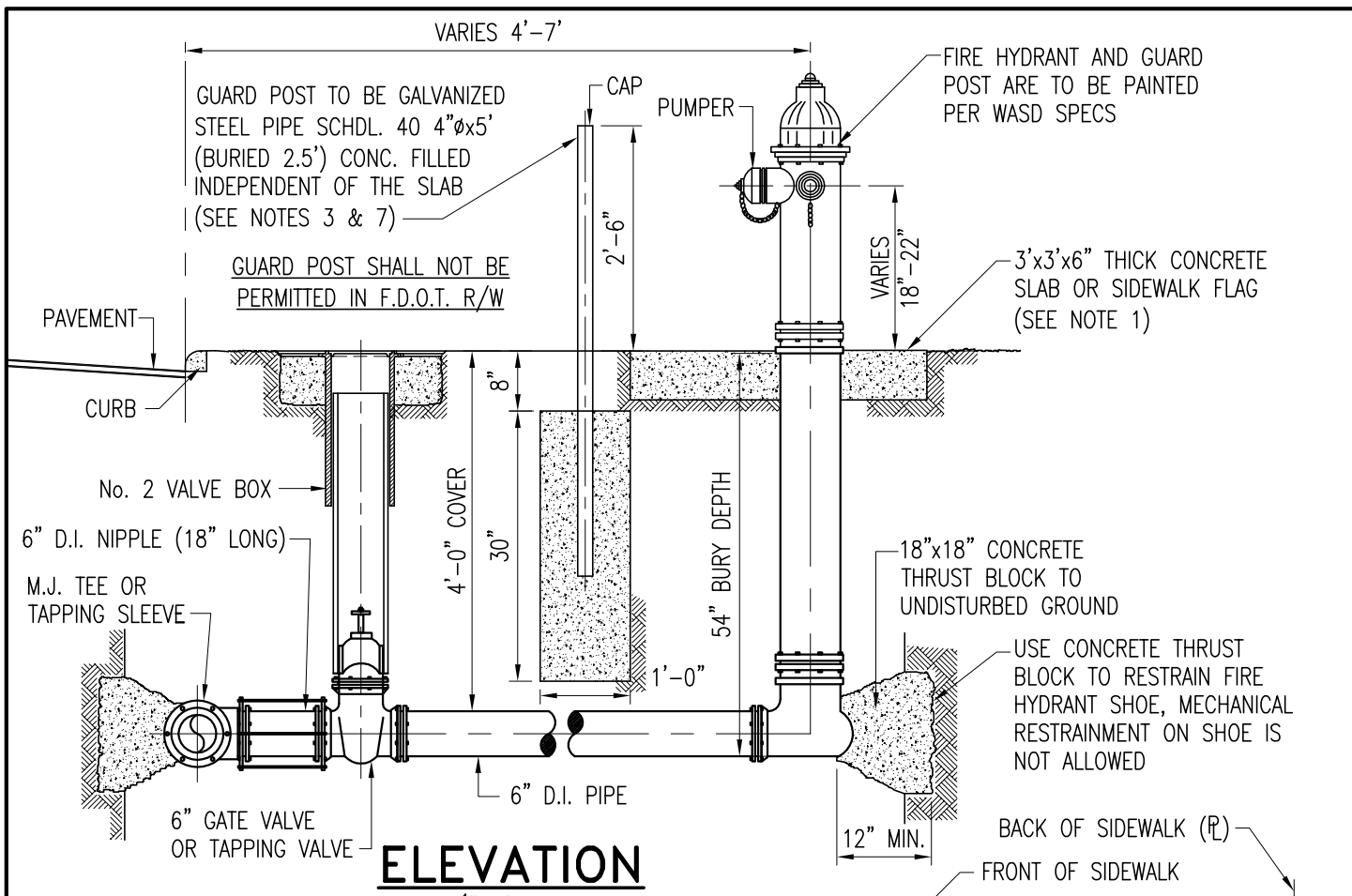
No. 2 VALVE BOX & LID	GS 1.1	
ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
09/16/2008	V.F.C.

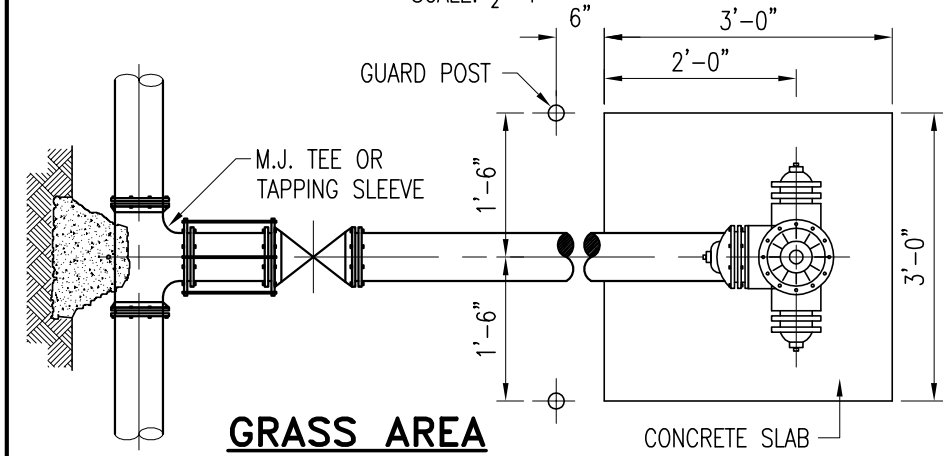
STANDARD DETAIL
**DUAL 2" METER INSTALLATION
 FOR TYPICAL 2" DOMESTIC
 SERVICE LINES**

WS
4.21
 SHEET 2 OF 2



ELEVATION

SCALE: 1/2"=1'



GRASS AREA

SIDEWALK

PLAN

SCALE: 1/2"=1'

NOTES:

1. WHEN THE PORTION OF THE SIDEWALK IS WITHIN THE 4'-7' OFFSET, LOCATE FIRE HYDRANT 1' FROM FACE OF WALK, WITHIN GRASS AREA.
2. IN ALL OTHER CASES, CONTACT FIRE DEPARTMENT FOR FIRE HYDRANT LOCATION.
3. IN SIDEWALK LOCATE GUARD POSTS AT THE FACE OF THE PUMPER AND 2'-6' LEFT/RIGHT OF Q̄ OF THE FIRE HYDRANT.
4. FIRE HYDRANT SLAB AND GUARD POST CONCRETE WORK SHALL BE DIFFERENT POURS.
5. EXTRA POSTS MAY BE REQUIRED IN INDUSTRIAL AND CONGESTED TRAFFIC AREAS.
6. FIRE HYDRANTS SHALL NOT BE LOCATED WITHIN A RADIUS.
7. GUARD POSTS SHALL NOT BE ALLOWED IN F.D.O.T. R/W (SEE SHEET 2 OF 2)
8. POSTS TO BE INSTALLED AT DISCRETION OF INSPECTOR.

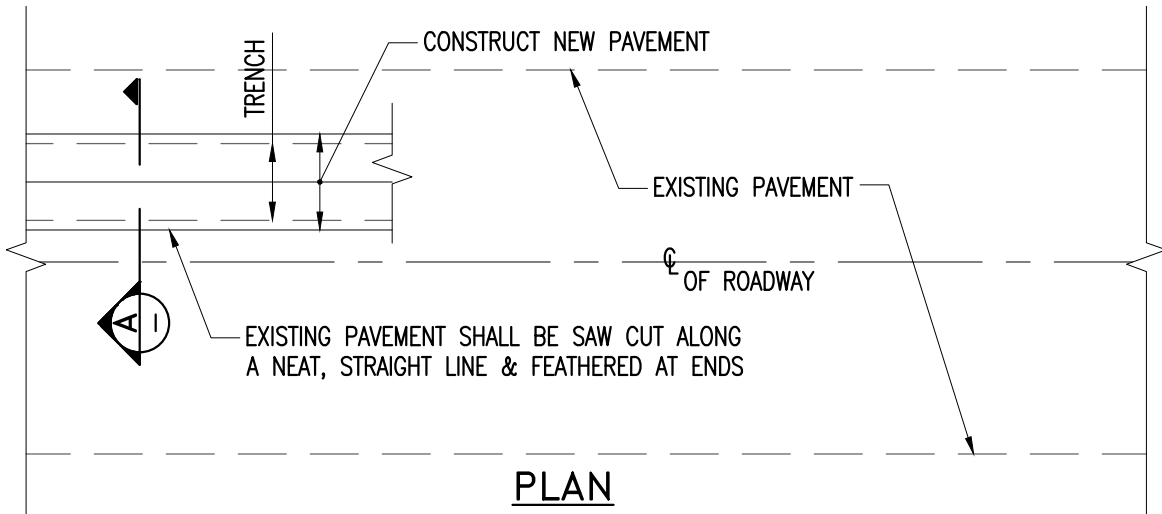
CONC. ANCHOR	GS 1.1	
No. 2 VALVE BOX	WS 3.10	
TYP. TIE ROD DETAIL	GS 1.0	
TYP. GATE VALVE	WS 1.0	
ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
02/25/2013	F.A.

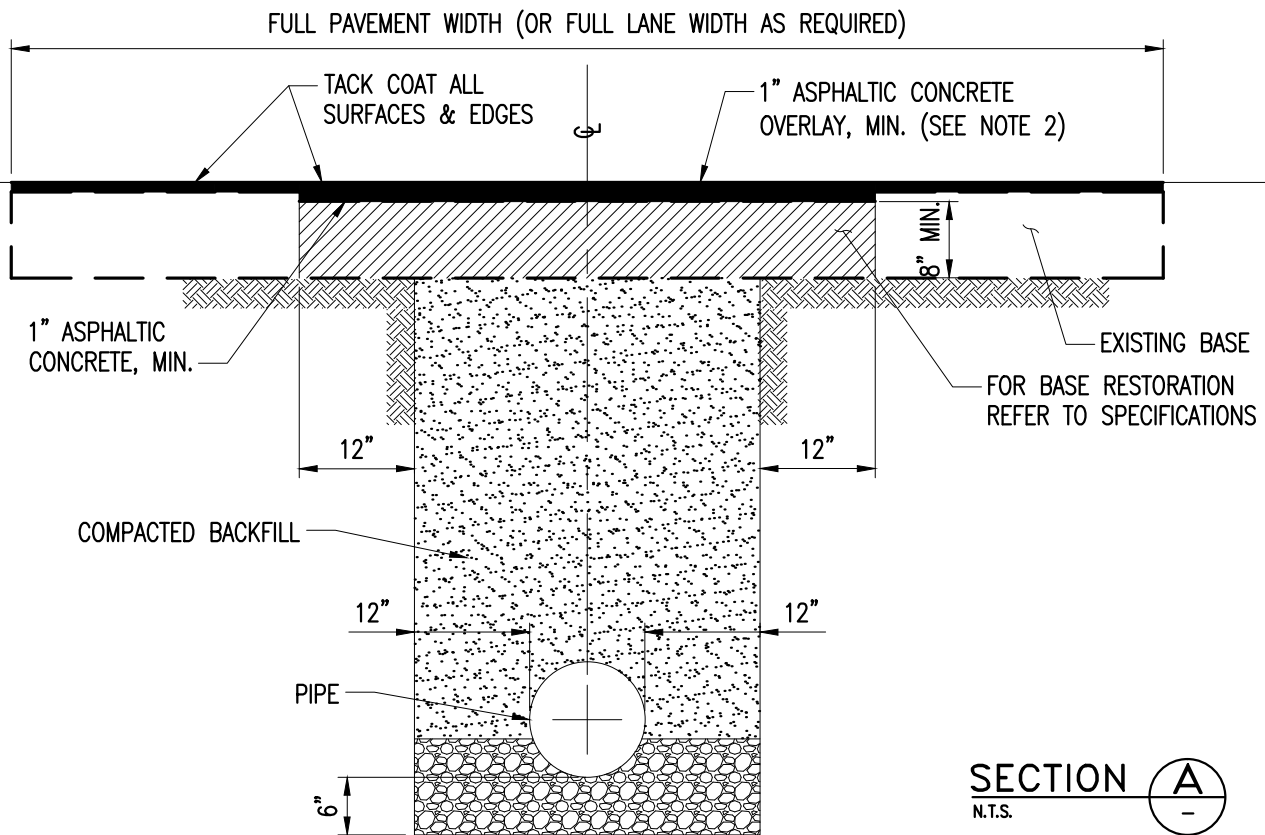
STANDARD DETAIL
TYPICAL FIRE HYDRANT
INSTALLATION WITH GUARD POSTS

WS
4.50
SHEET 1 OF 2



PLAN

N.T.S.



SECTION A
N.T.S.

NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL ASPHALTIC CONCRETE DRIVEWAYS OR OIL-SAND DRIVEWAYS SHALL BE REPLACED WITH TYPE I PAVEMENT RESTORATION. (REFER TO STANDARD DETAIL A 1.0).
2. FOR PAVEMENT RESTORATION, REFER TO F.D.O.T., MIAMI-DADE COUNTY PUBLIC WORKS OR SPECIFIC MUNICIPALITY STANDARDS.
3. FOR FDOT ROADS, MILL A MINIMUM OF 1½-INCH AND OVERLAY 1½-INCH WITH FRICTION COURSE 9.5 WITH RUBBER.
4. FOR MIAMI-DADE COUNTY ROADS, MILL 1-INCH AND OVERLAY 1-INCH.

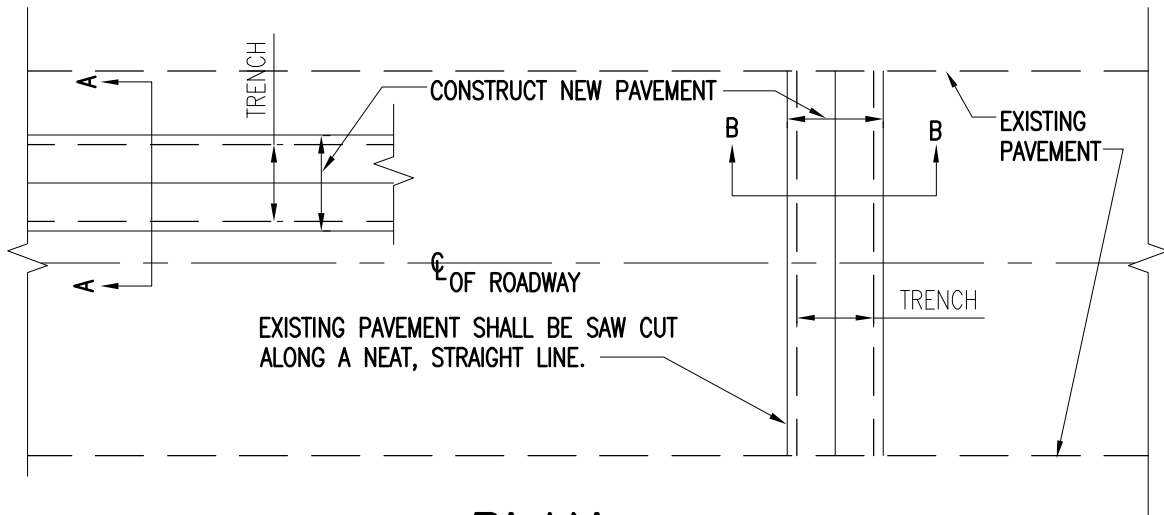
ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
08/02/2013	J.B.F.

STANDARD DETAIL
**PAVEMENT RESTORATION
TYPE V**

A
1.1
SHEET 1 OF 1

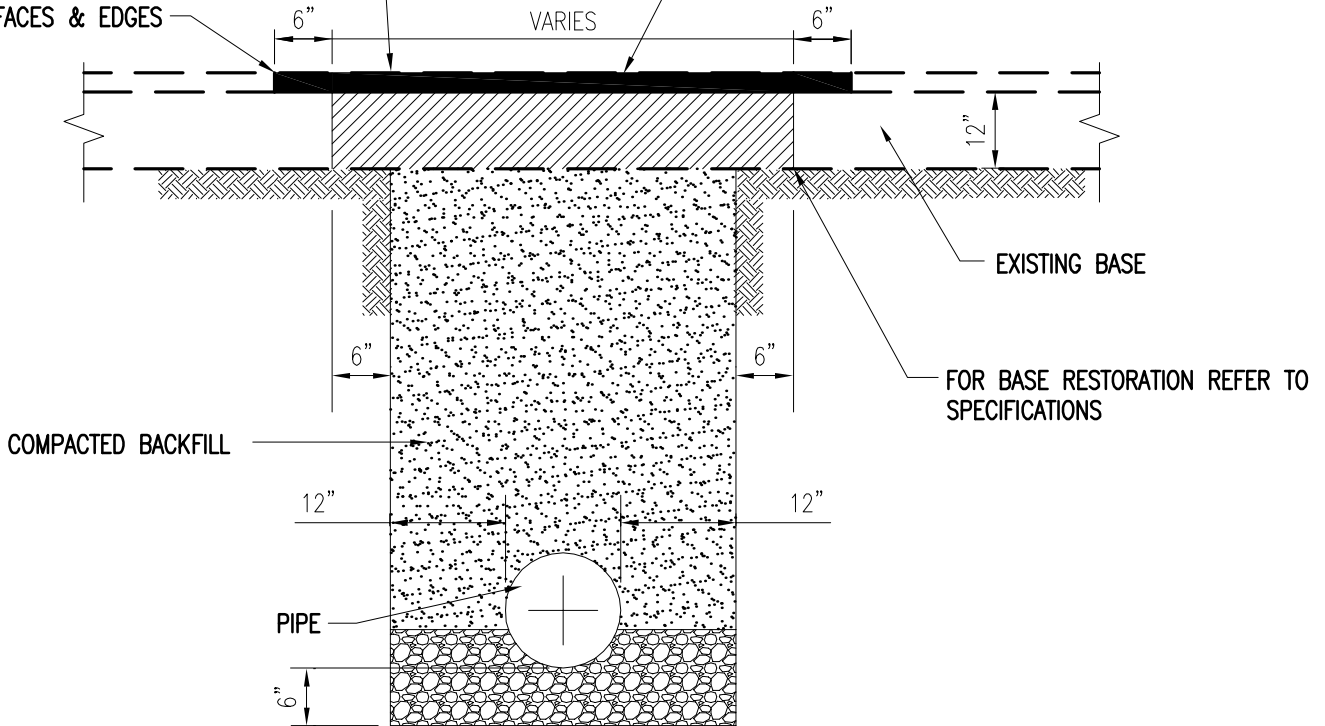


PLAN

FOR PAVEMENT RESTORATION, REFER TO D.O.T., MIAMI DADE COUNTY PUBLIC WORKS OR SPECIFIC MUNICIPALITY STANDARDS.

ASPHALTIC CONCRETE THICKNESS TO BE THE SAME AS ADJACENT ROADWAY, OR 1½ INCH MIN.

TACK COAT ALL SURFACES & EDGES



SECTION A-A & B-B

ITEM	CROSS REF.	SPEC. REF.

STANDARD DETAIL

PAVEMENT RESTORATION
TYPE "M"

A
4.0
SHEET 1 OF 1



ISSUE DATE

11/01/2006

APPROVED BY

V.E.F.

Method "A"

Cut the polyethylene tube 2 ft. longer than the length of pipe section. Slip the tube around the pipe so as to allow 1 ft. overlap at each end. Overlap the other pipe section after pipe is installed.

Method "B"

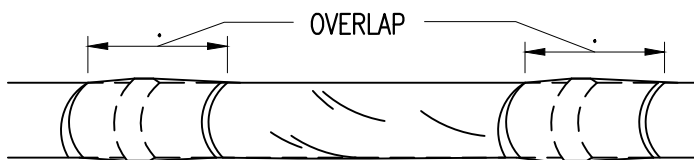
Cut the polyethylene tube 1 ft. shorter than the length of pipe sections. Slip the tube around the pipe so as to allow 6 in. of bare pipe at each end. Before making a joint, slip a 3 ft. Length of polyethylene tube over the preceding pipe section. Overlap by at least 1 ft. and secure, after joint is made.

Method "C"

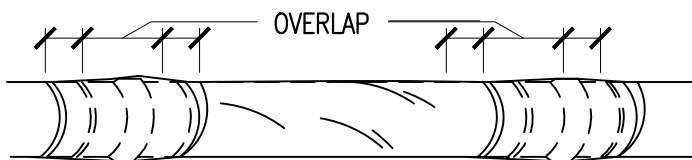
Wrap odd shaped fitting with sheet or split length of polyethylene tube by passing the sheet under the fitting and bringing it up around the body. Make seams by bringing it folding over twice, and taping down. Tape sheet securely in place at valve stem and other penetrations.

NOTES:

1. The Department reserves the right to require polyethylene encasement wherever, in their opinion, corrosive soils exist.
2. Tube size will be as listed in table.
3. Pipe-shape fittings (bends, reducers, etc.) shall be treated according to Methods "A" and "B". Odd shaped fittings (valves, tees, etc.) shall be treated according to Method "C".
4. 6" adhesive tape shall be used to secure encasement.
5. Special care shall be taken to prevent damage to wrapping when placing backfill.
6. Refer to ASTM D1248 for approved material and accessories.
7. Only virgin polyethylene material having a minimum thickness of 8 mils is approved.



METHOD A (TUBE)



METHOD B (TUBE)

TABLE	
NOMINAL PIPE DIAMETER (IN)	POLYETHYLENE FLAT TUBE WIDTH (IN)
4	16
6	20
8	24
12	30
16	37
20	45
24	54
30	67
36	81
42	95
48	108
54	121

ITEM	CROSS REF.	SPEC. REF.



ISSUE DATE	APPROVED BY
10/29/2010	V.E.F.

STANDARD DETAIL
**POLYETHYLENE ENCASEMENT
 FOR
 DUCTILE IRON PIPE**

A
9.0
 SHEET 1 OF 1

APPENDIX "C"

**MIAMI-DADE
WATER AND SEWER DEPARTMENT**

**WASD ID CARD SECURITY PROCEDURES
NON-WASD EMPLOYEES**

(Not Used)

APPENDIX "D"

**MIAMI-DADE COUNTY CODE
SECTION 2-8.4. PROTEST PROCEDURES**

**MIAMI-DADE COUNTY
ADMINISTRATIVE ORDER NO. 3-21
BID PROTEST PROCEDURES**

(Not Used)

APPENDIX "E"

QUARTERLY REPORTS

(2 Pages)

