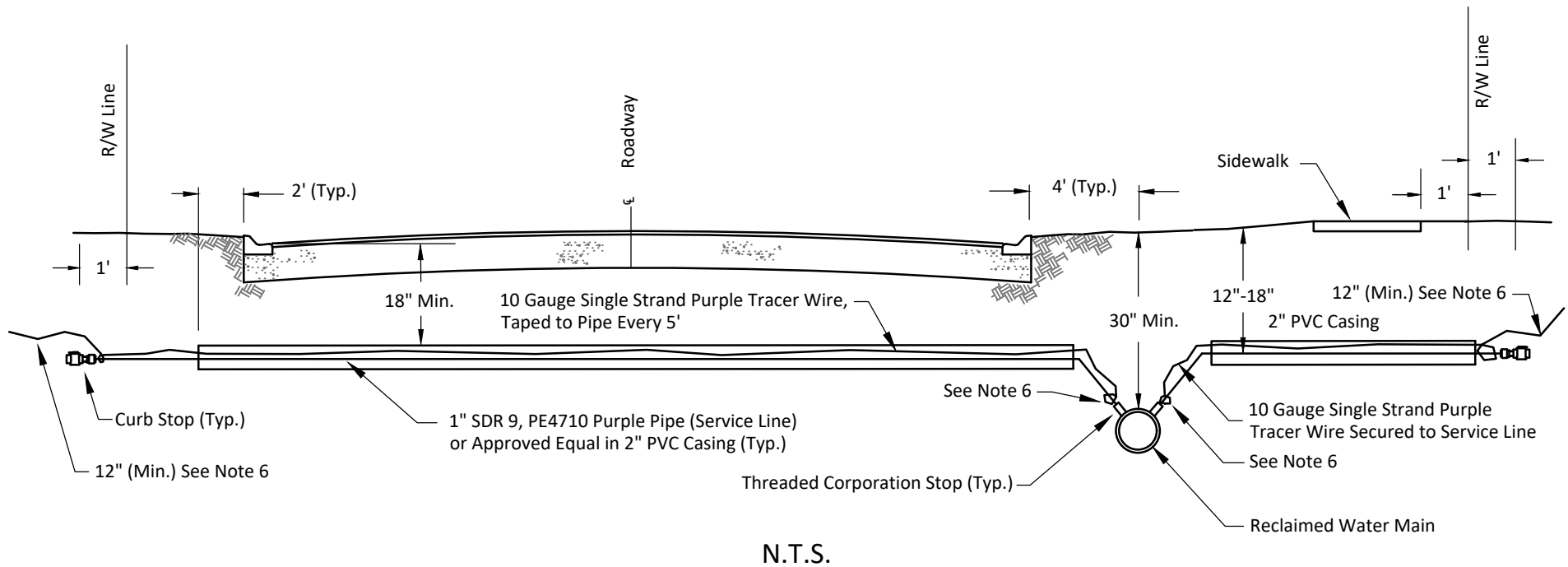


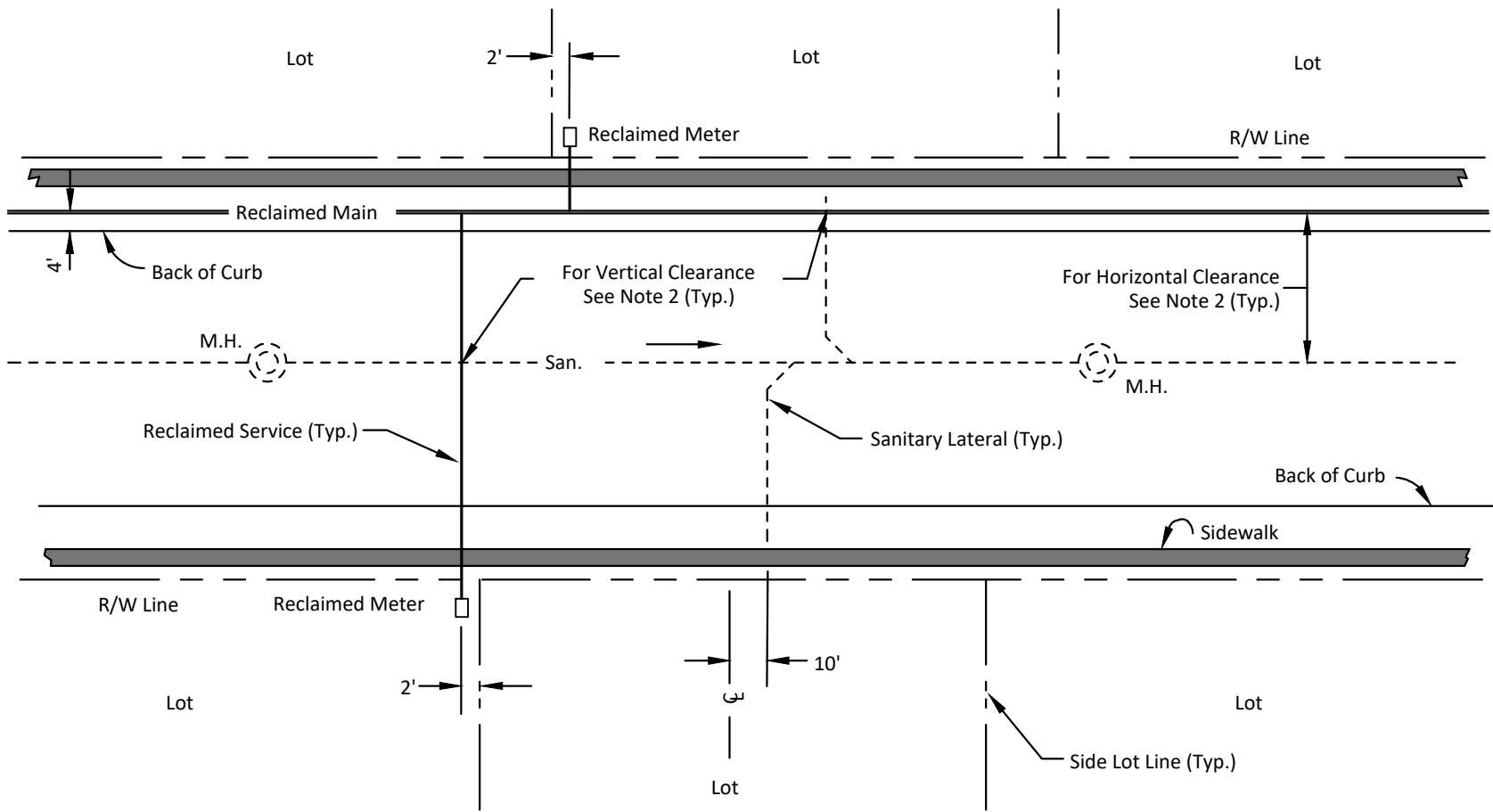
NOTES:

1. Saddles are Required to all Service Connections to Main
2. Taps Should be made on a 45° Angle from Top of Pipe
For Cover Less than 30", City of Clearwater Engineering Department Approval is Required
3. For all other Taps that can not be done as Described Above Refer to Potable Water Main Service Connection Detail (Swing Joint Installation)
4. See also City of Clearwater's Technical Specifications Section IV and Preferred Product List

NOTES:

1. 2" PVC Casing, Colored Pantone 522c, Shall Extend to Customer Side of Sidewalk
2. PVC Casing to be Min. 18" Below the Surface Measured from Top of Face of Curb
3. Reclaimed Water Mains to be Min. 36" Below Grade and Approx. 4' Back of Curb
4. Curb Stop to be Located Approx. 1' Back of Right-Of-Way
5. Service Line to be Min. 12" and Max. 18" Below Grade
6. Connect 10-Gauge Tracer Wire with Tie Wraps at Corporation Stop and at Curb Stop - Provide 1' Min. Excess Length of Tracer Wire in Meter Box
7. 10-gauge single strand tracer wire should accompany all reclaimed Service Line installations.
8. 2" SDR 9 Purple Pipe or Approved Equal Service Line Shall be in 4" Casing, Colored Pantone 522c
9. See also City of Clearwater's Technical Specification Section IV and Preferred Product List





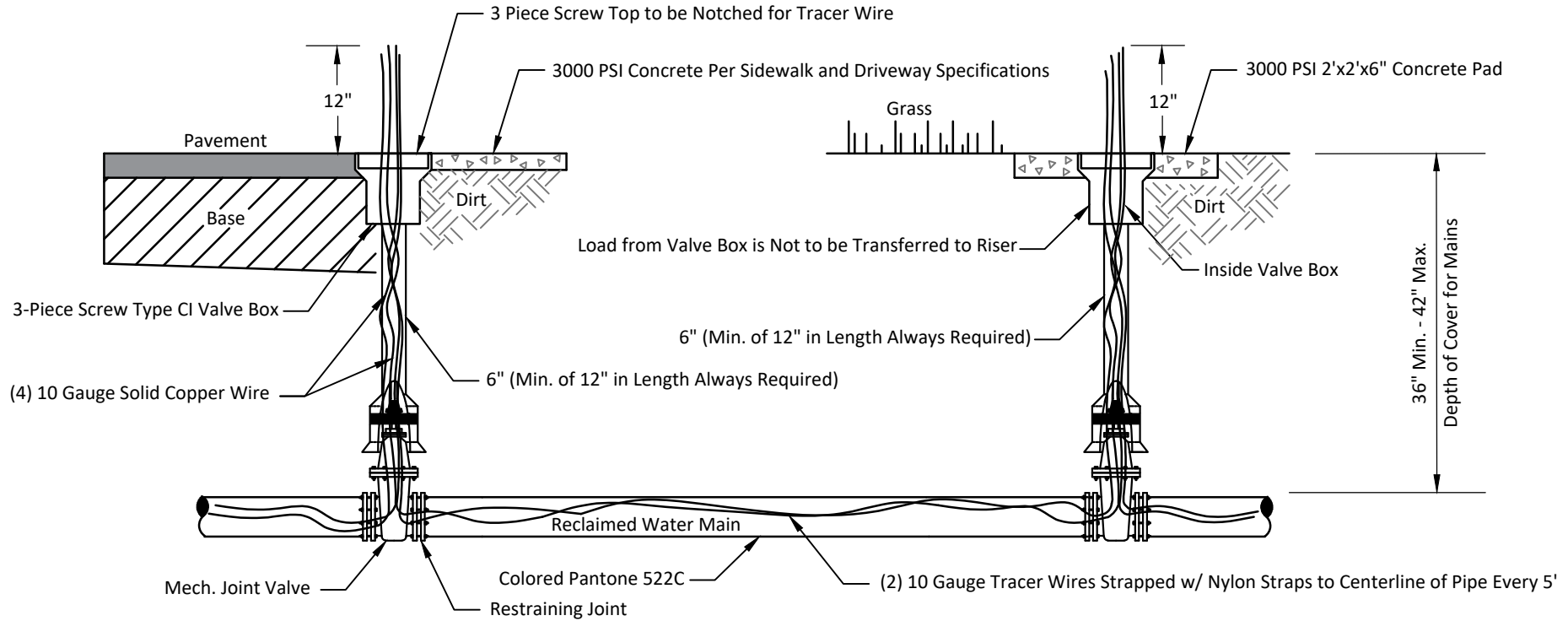
N.T.S.

NOTES:

1. See Index 401, Sheet 1 of 3, Note 2 Regarding Water Meter and Service Tap Locations Under Driveways
2. Vertical and Horizontal Clearance Between Reclaimed Water Main and Sanitary Sewer Lateral at each Intersection to be per FDEP Requirements - (See F.A.C. Rule 62-555)
3. See also City of Clearwater's Technical Specification Section IV and Preferred Product List

ROADWAY/SIDEWALK INSTALLATION

GREEN SPACE INSTALLATION



SECTION VIEW
N.T.S.

NOTES:

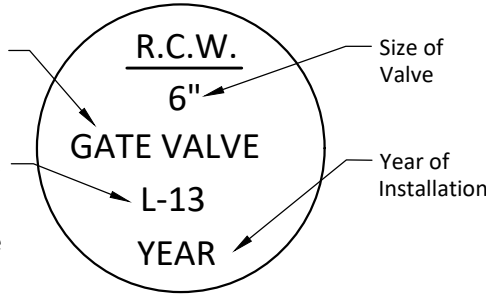
1. Must Center Operation Nut in Box
2. Gate Valves Shall be Open Left Turn Only
3. Valve Key Extensions Required on Valves with Operator Nut over 3' Deep
4. Tracer Wire Required in all Applications Including on Ductile Iron Pipe and Colored "Safety Blue"
5. See also City of Clearwater's Technical Specification Section IV and Preferred Product List

NOTES:

1. Extension on Valve Box Shall be set so as to Reserve 1/2 of the Adjustment Length for Future use
2. Install 3" Brass Identification Disk in Concrete per Detail Below - Valve Key Extension to be Bolt on Type
3. Terminate Insulated, Solid 10 Gauge Copper Tracer Wire at Top with 12" of Extra Wire
4. Reclaimed Water Valve Box Lid Openings are to be 9" x 9" Square
5. Tracing wire Station - Installed where New Construction Tie-in to existing pipe - Wire Brought up into Valve Pad on Top of Pipe
6. Valve Box to be Centered in Concrete Slab in Green Space Only
7. See also City of Clearwater's Technical Specification Section IV and Preferred Product List

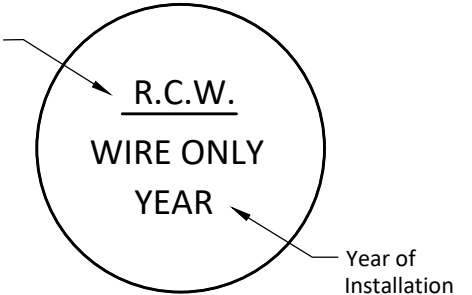
Type of Valve:
Butterfly, Gate,
or Plug

Direction &
Number of
Turns to
Open Valve

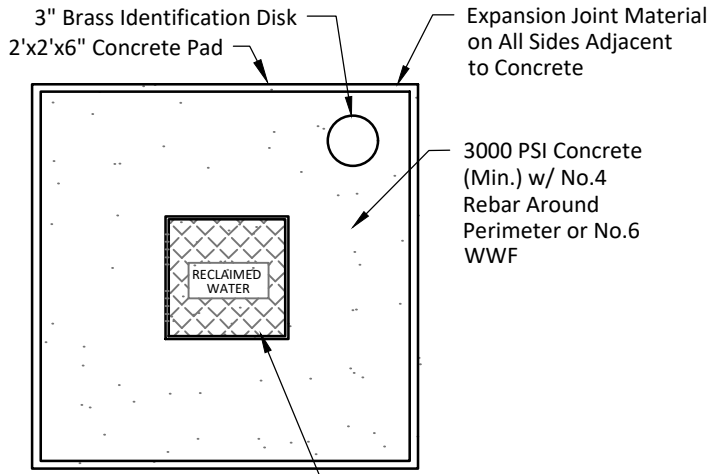


**3" BRASS IDENTIFICATION
DISK-VALVE**
N.T.S.

Type of
Service

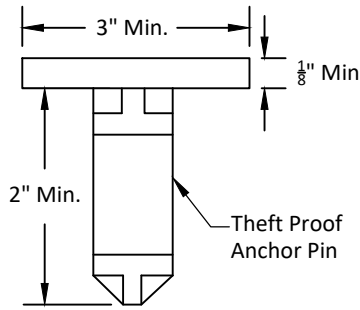


**3" BRASS IDENTIFICATION
DISK-TRACER WIRE STATION**
N.T.S.

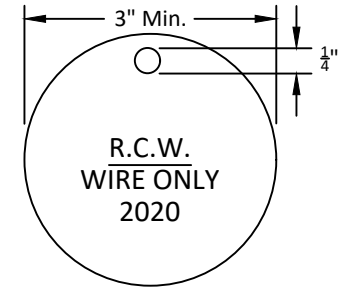


Cover Inscribed Reclaimed Water
and Colored Pantone 522c
PLAN VIEW
N.T.S.

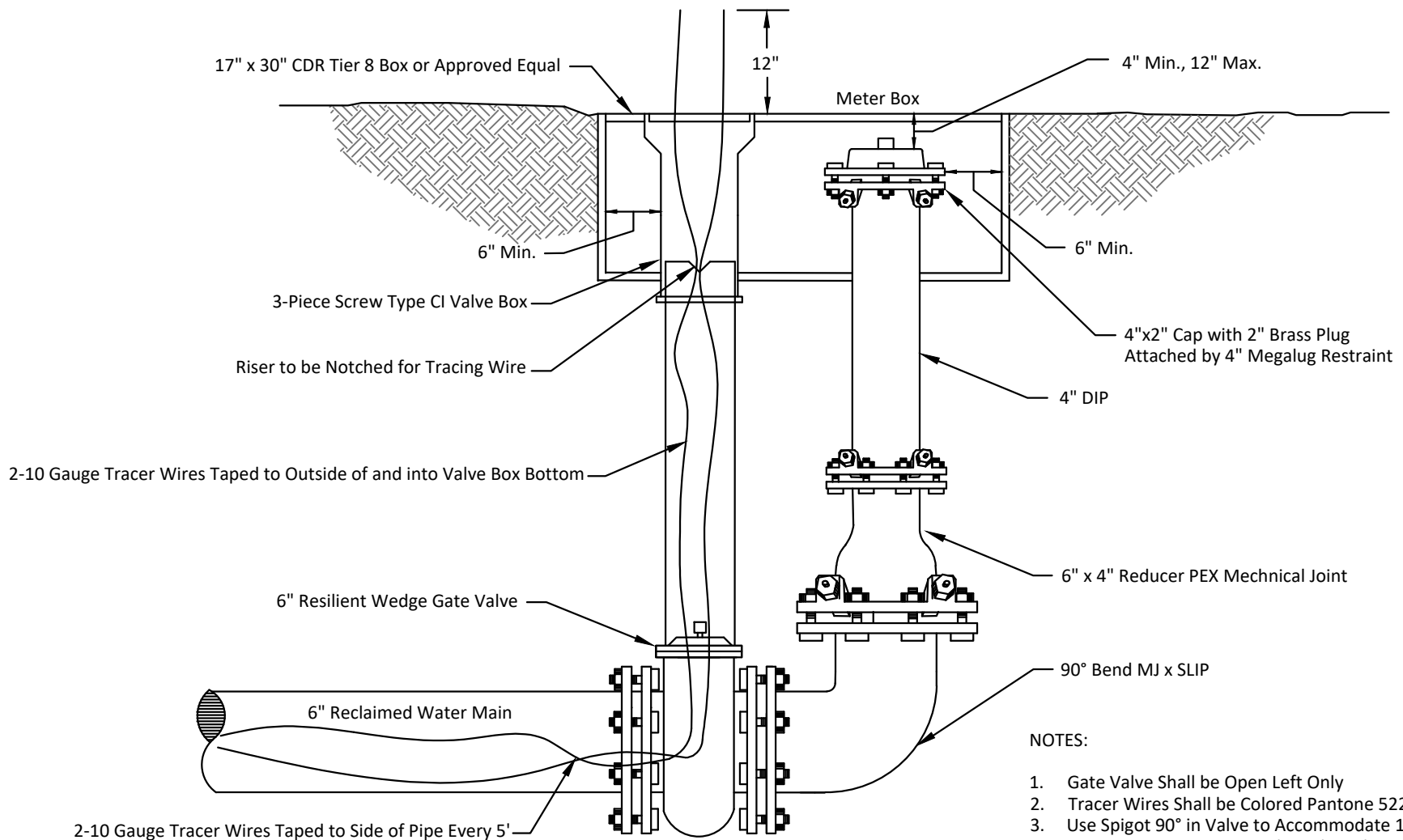
IDENTIFICATION DISC EXAMPLE



Disc To Be Embedded In Pad
OUTSIDE PAVEMENT
N.T.S.



Disc To Be Hanging in The Box Anchored to
The Locating Wire
INSIDE PAVEMENT
N.T.S.



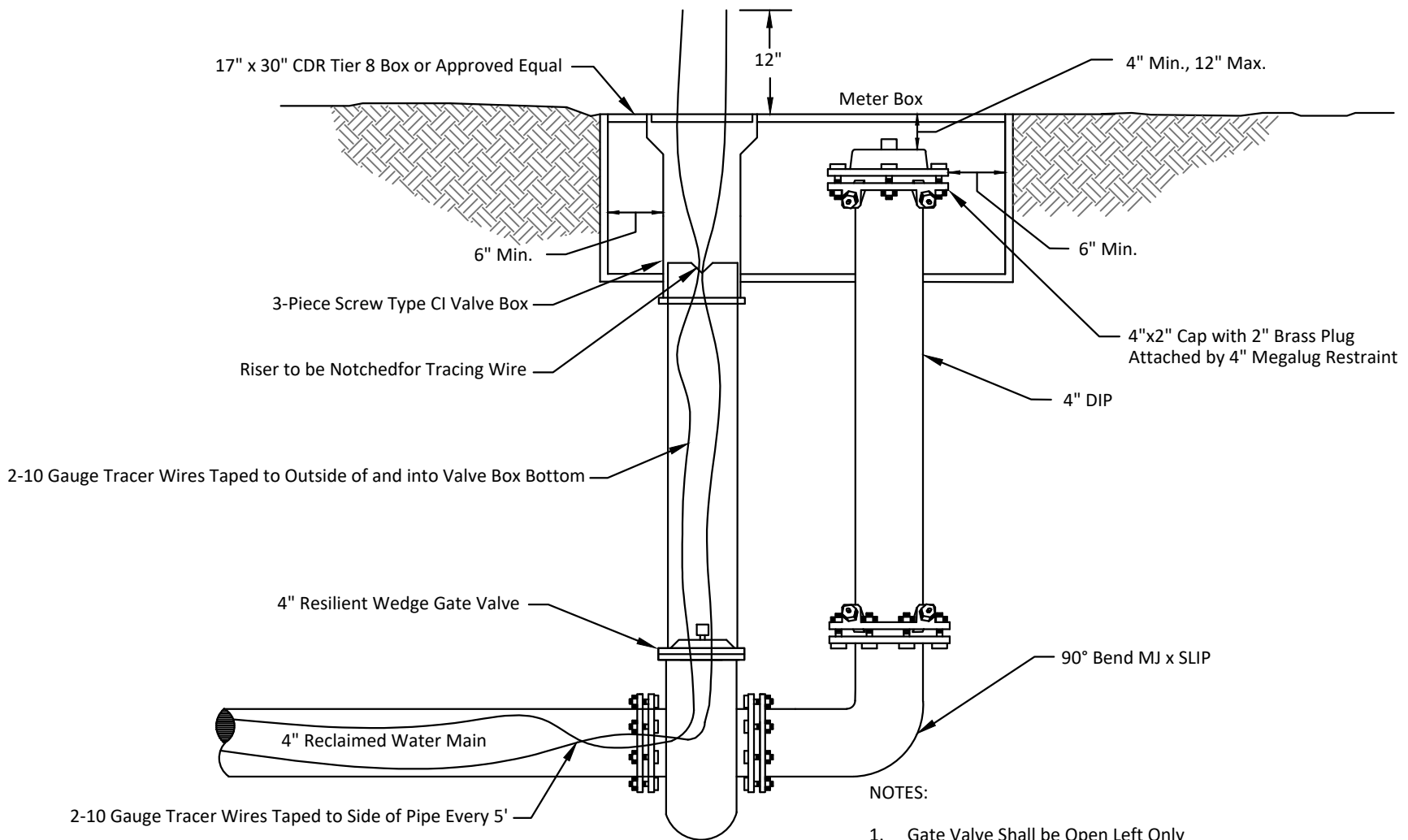
2-10 Gauge Tracer Wires Taped to Outside of and into Valve Box Bottom

2-10 Gauge Tracer Wires Taped to Side of Pipe Every 5'

NOTES:

1. Gate Valve Shall be Open Left Only
2. Tracer Wires Shall be Colored Pantone 522c
3. Use Spigot 90° in Valve to Accommodate 1 Larger Composite Box Set to Grade and Load Bearing in Traffic Areas
4. See also City of Clearwater's Technical Specification Section IV and Preferred Product List

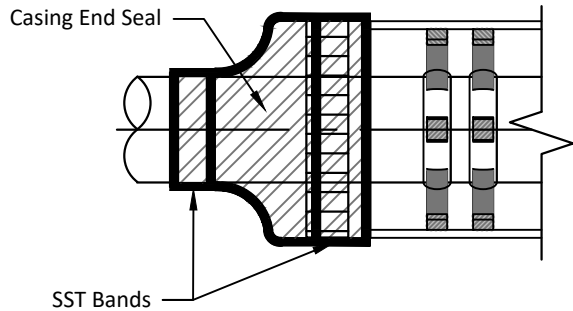
N.T.S.



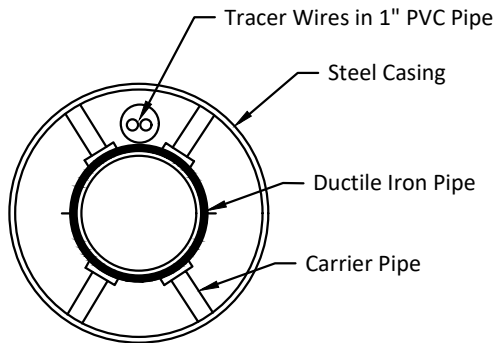
N.T.S.

NOTES:

1. Gate Valve Shall be Open Left Only
2. Tracer Wires Shall be Colored Pantone 522c
3. Use Spigot 90° in Valve to Accommodate 1 Larger Composite Box set to Grade and Load Bearing in Traffic Areas
4. See also City of Clearwater's Technical Specification Section IV and Preferred Product List

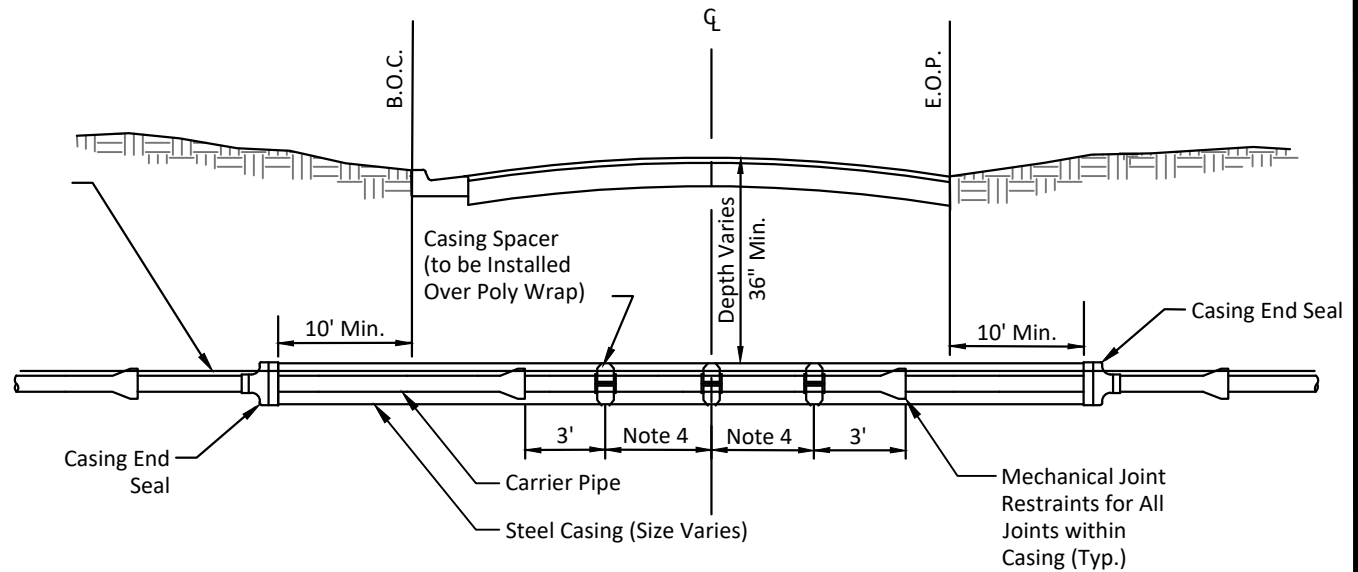


(2) 10 Gauge HDD Tracer Wires
(Installed in 1" PVC Pipe While in
Steel Casing)



STREET WITH CURB

STREET WITHOUT CURB

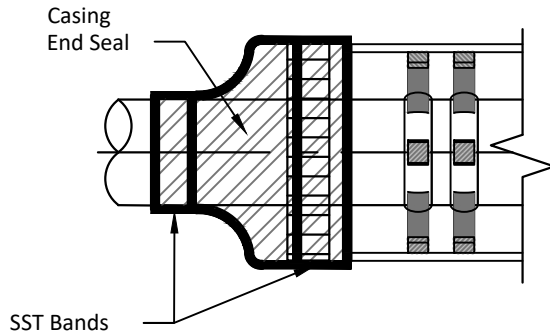


N.T.S.

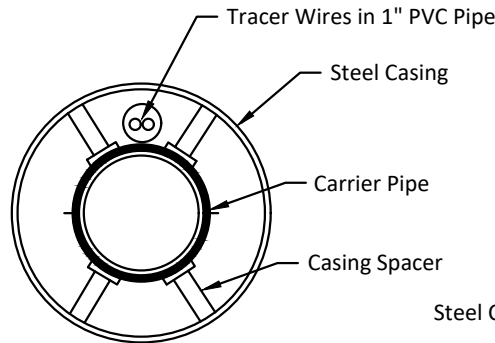
NOTES:

1. All Pipe Installed Within the Casing Shall be Ductile Iron or Approved by the City Engineer
(2) 10 Gauge HDD Tracer Wires will be used over Ductile Iron Pipe
2. Approved Casing Spacers must be Installed to keep Pipe Centered in Casing
3. Distance Between Casing Spacers Shall be per Manufacturer Specification or Maximum 6.5', Whichever is more Stringent
4. See also City of Clearwater's Technical Specification Section IV and Preferred Product List

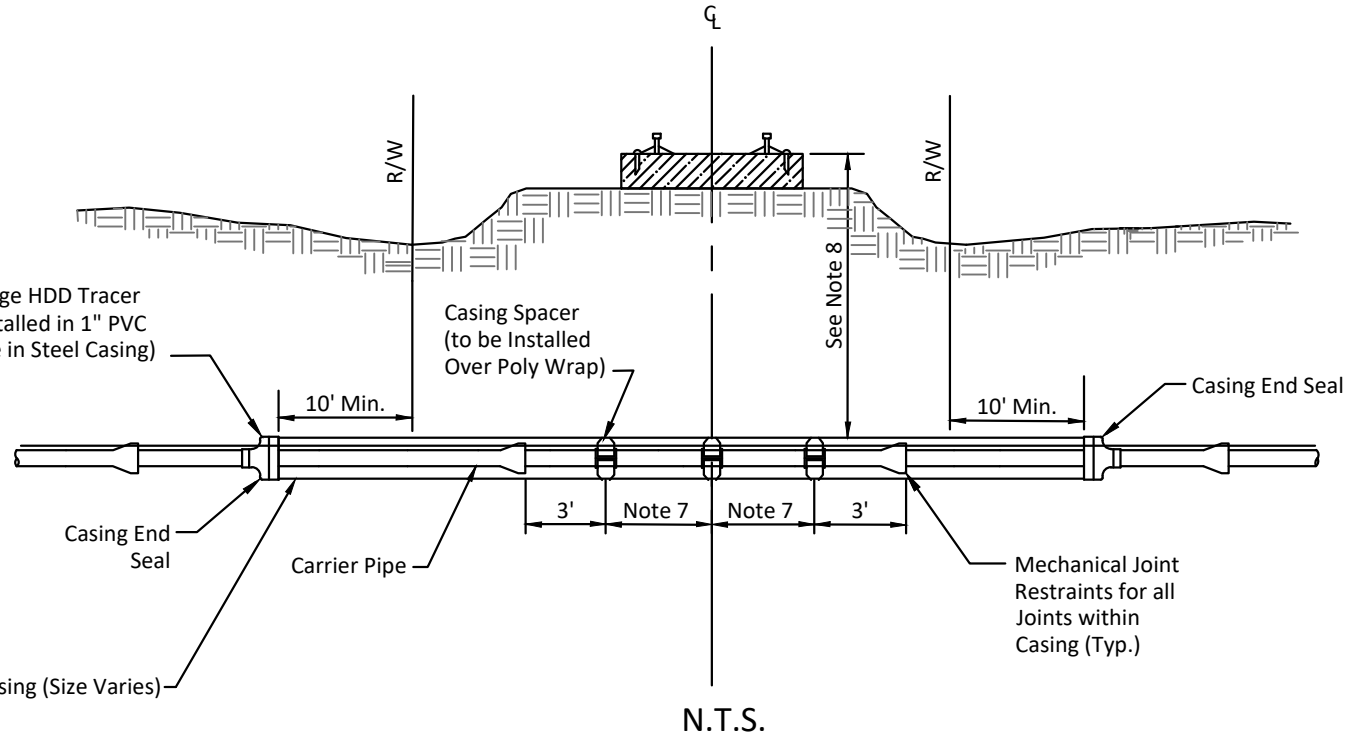
CARRIER PIPE NOMINAL DIAMETER	4	6	8	10	12	16	20	24	30	36	42
MINIMUM CASING OUTSIDE DIAMETER (INCHES)	16	16	18	20	24	30	36	42	48	54	60
MINIMUM CASING WALL THICKNESS (INCHES)	.250"	.250"	.250"	.250"	.250"	.312"	.375"	.500"	.500"	.500"	.500"



(2) 10 Gauge HDD Tracer Wires (Installed in 1" PVC Pipe While in Steel Casing)



Steel Casing (Size Varies)

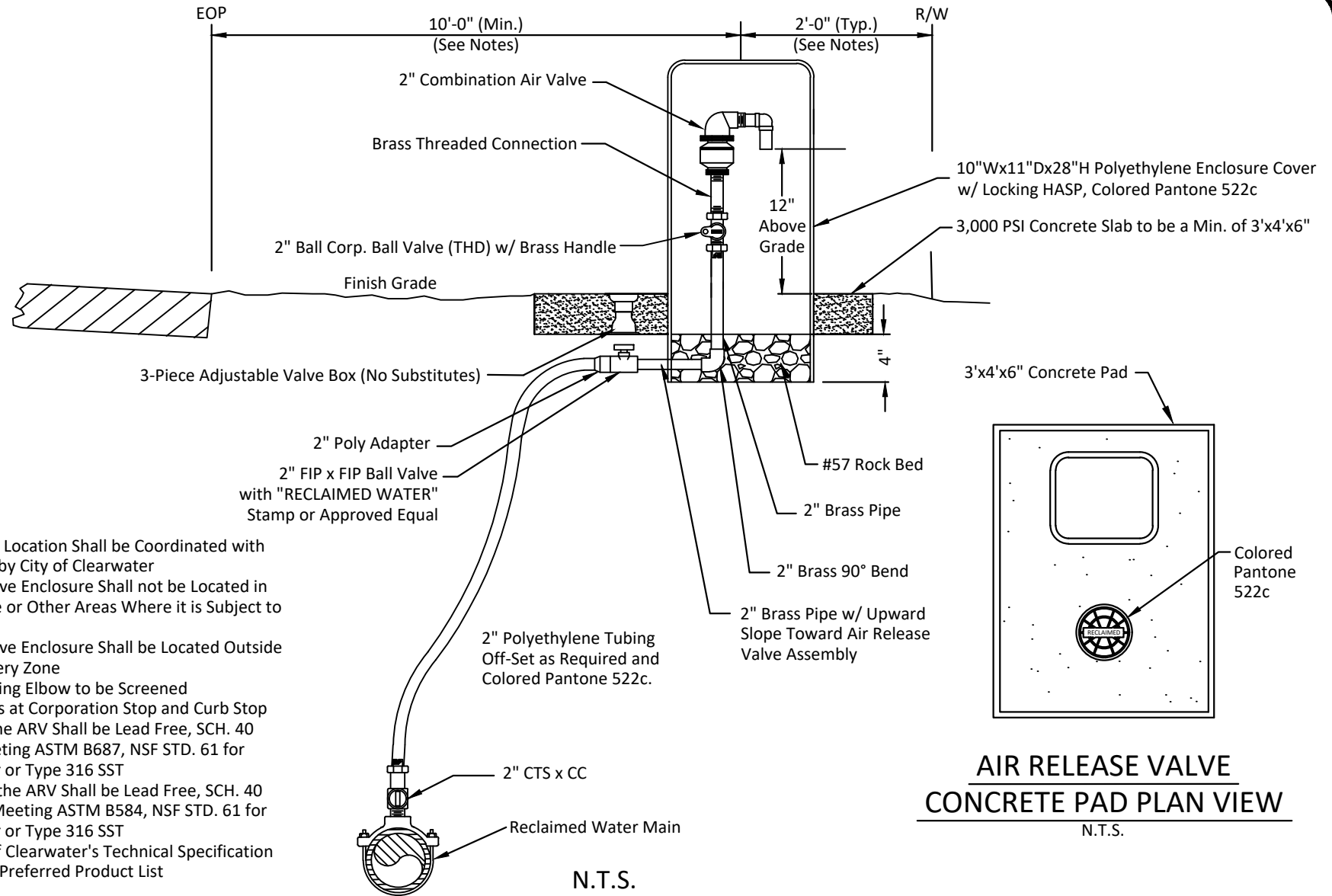


NOTES:

1. CSX Permit Required for Work Under Railway Right-Of-Way
2. All Pipe Installed Within the Casing Shall be Ductile Iron or Approved by the City Engineer
3. (2) 10 Gauge HDD Tracer Wires will be used over Ductile Iron Pipe
4. All Pipes Within Casing to be Restrained by Restraining Gaskets
5. All Materials to meet Latest FDOT Standards
6. Approved Casing Spacers must be Installed to keep Pipe Centered in Casing

7. Distance Between Casing Spacers Shall be per Manufacturer Specification or Maximum 6.5', Whichever is more Stringent
8. Distance from Top of Railway Cross Ties to Top of Casing Shall be 5' Min. or as Required by the Permitting Railroad
9. See also City of Clearwater's Technical Specification Section IV and Preferred Product List

CARRIER PIPE NOMINAL DIAMETER	4	6	8	10	12	16	20	24	30	36	42
MINIMUM CASING OUTSIDE DIAMETER (INCHES)	16	16	18	20	24	30	36	42	48	54	60
MINIMUM CASING WALL THICKNESS (INCHES)	.250"	.250"	.250"	.250"	.250"	.312"	.375"	.500"	.500"	.500"	.500"



NOTES:

1. Final Enclosure Location Shall be Coordinated with and Approved by City of Clearwater
2. Air Release Valve Enclosure Shall not be Located in Drainage Swale or Other Areas Where it is Subject to Submergence
3. Air Release Valve Enclosure Shall be Located Outside of Clear Recovery Zone
4. Downward Facing Elbow to be Screened
5. Insert stiffeners at Corporation Stop and Curb Stop
6. All Piping for the ARV Shall be Lead Free, SCH. 40 Brass Pipe Meeting ASTM B687, NSF STD. 61 for Drinking Water or Type 316 SST
7. All Fittings for the ARV Shall be Lead Free, SCH. 40 Brass Fittings Meeting ASTM B584, NSF STD. 61 for Drinking Water or Type 316 SST
8. See also City of Clearwater's Technical Specification Section IV and Preferred Product List

**AIR RELEASE VALVE
CONCRETE PAD PLAN VIEW**

N.T.S.

PVC PIPE, FEET									
PIPE SIZE									
		4"	6"	8"	10"	12"	16"	20"	24"
11.25°	H-B	3	4	5	6	6	8	9	11
	VU-B	3	4	5	6	6	8	9	11
	VD-B	6	9	11	13	16	20	24	28
22.5°	H-B	5	7	9	11	12	16	18	21
	VU-B	5	7	9	11	12	16	18	21
	VD-B	12	17	22	27	31	40	48	56
45°	H-B	10	14	18	22	25	32	38	43
	VU-B	10	14	18	22	25	32	38	43
	VD-B	25	35	46	55	65	82	99	115
90°	H-B	24	33	44	52	60	76	91	104
	VU-B	24	33	44	52	60	76	91	104
	VD-B	61	85	111	132	155	198	238	277
DEAD END PLUG & VALVE		61	85	111	132	155	198	238	277
TEE		61	85	111	132	155	198	238	277

DUCTILE IRON PIPE, FEET									
PIPE SIZE									
		4"	6"	8"	10"	12"	16"	20"	24"
11.25°	H-B	2	3	4	5	6	7	8	9
	VU-B	2	3	4	5	6	7	8	9
	VD-B	5	6	8	10	11	14	17	20
22.5°	H-B	5	6	8	9	11	13	16	18
	VU-B	5	6	8	9	11	13	16	18
	VD-B	9	12	16	19	22	28	34	39
45°	H-B	9	12	16	19	22	27	33	37
	VU-B	9	12	16	19	22	27	33	37
	VD-B	18	25	32	39	45	58	69	81
90°	H-B	21	29	37	44	52	65	78	90
	VU-B	21	29	37	44	52	65	78	90
	VD-B	43	59	78	93	109	139	167	194
DEAD END PLUG & VALVE		43	59	78	93	109	139	167	194
TEE		43	59	78	93	109	139	167	194

MINIMUM DESIGN CRITERIA

Bedding Type: 3
 Design Pressure: 150 PSI
 Safety Factor: 1.5
 Depth Of Cover: 3.0 FT
 Soil Designation: SM (Sand-Silt)

MINIMUM FOOTAGE OF PIPE RESTRAINT

H-B: Horizontal Bend
 VU-B: Vertical-Up Bend
 VD-B: Vertical-Down Bend

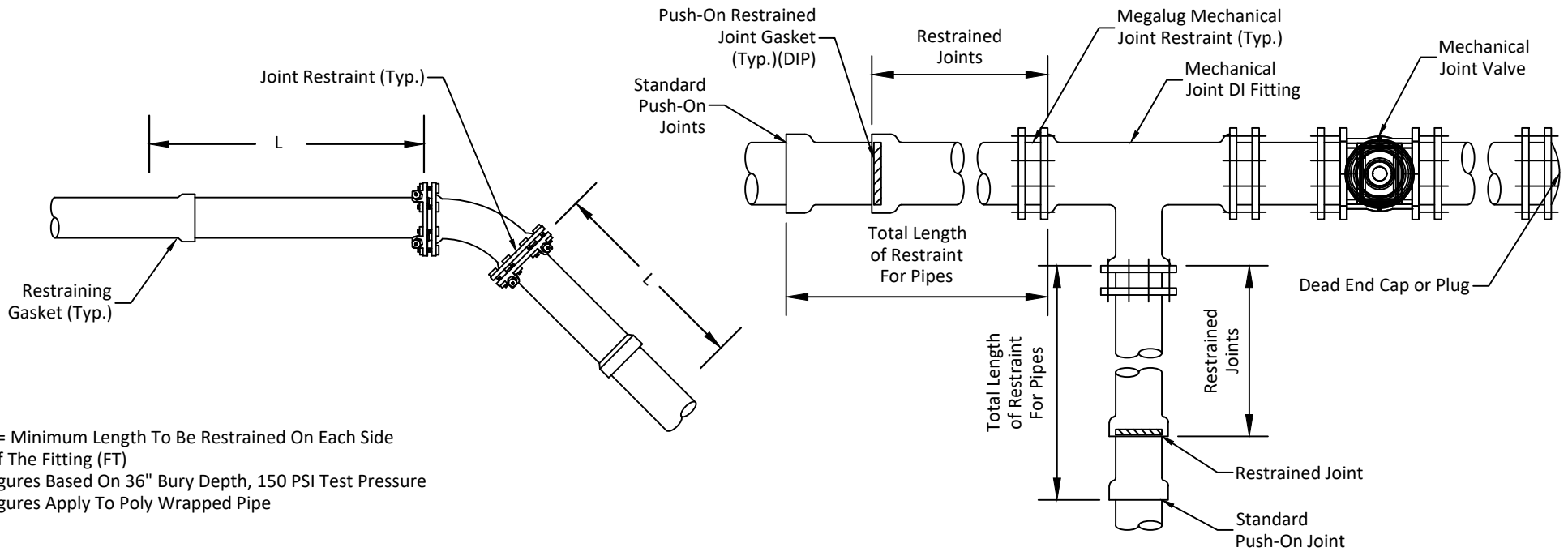
The Restrained Joint Pipeline Lengths Shown in these Tables are Calculated for a Single Fitting Only

Restrained Joint Pipeline Lengths Required for Combinations of Fittings Shall be Determined on a Case by Case Basis by the Engineer of Record

Combinations of Fittings would Include Vertical Offsets, Combined Vertical Offsets, Horizontal Offsets and Combined Horizontal Offsets as Defined in the DIPRA Design Guideline, "Thrust Restraints Design for Ductile Iron Pipe"

NOTES:

1. See also City of Clearwater's Technical Specification Section IV and Preferred Product List

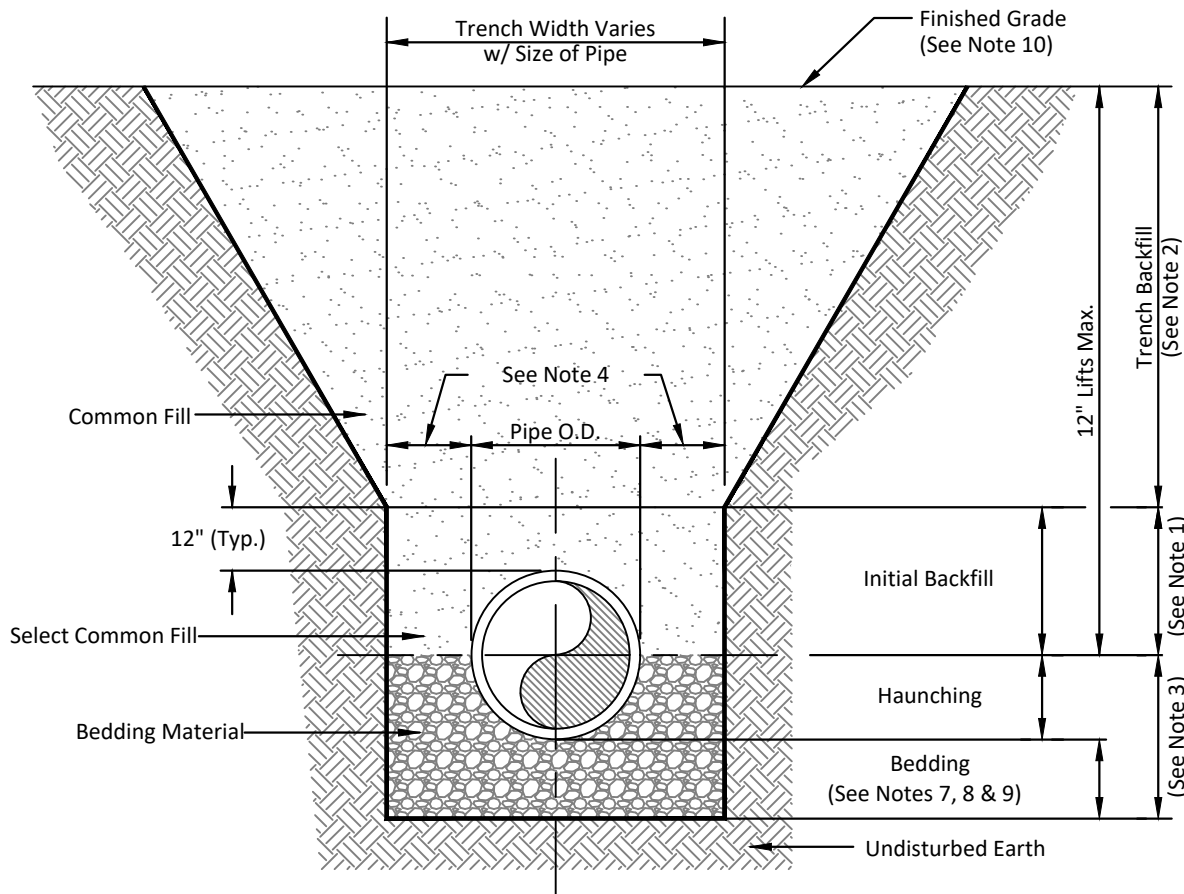


L = Minimum Length To Be Restrained On Each Side Of The Fitting (FT)
 Figures Based On 36" Bury Depth, 150 PSI Test Pressure
 Figures Apply To Poly Wrapped Pipe

NOTES:

The Following Joints Must Be Restrained In All Applications:

1. Bend - Inlet And Outlet
 2. Tee - Inlet And Outlets
 3. Offsets - Inlet And Outlet
 4. Caps
 5. Plugs
 6. Dead Ends
 7. Hydrant Runouts Shall Be Restrained As Dead Ends
1. Water Mains Larger than 12" will be Ductile Iron Pipe Only.
 2. For Lengths of Pipe and Number of Joints to be Restrained - See Table on Index No. 506, Sheet 1 of 2
 3. Only Ductile Iron Pipe Fittings Shall be used at Joints to be Restrained Unless Otherwise Specified by the Engineer of Record
 4. Restrained Joint Lengths Shown were Calculated using the On-line DIPRA Thrust Restraint Calculator Program Based on the DIPRA "Thrust Restraint for Ductile Iron Pipe" Design Guideline
 5. All Restraints Shall meet the Specifications Defined in the City of Clearwater Technical Specifications See also City of Clearwater's Technical Specifications Section IV and Preferred Product List



BEDDING AND TRENCHING

N.T.S.

NOTES:

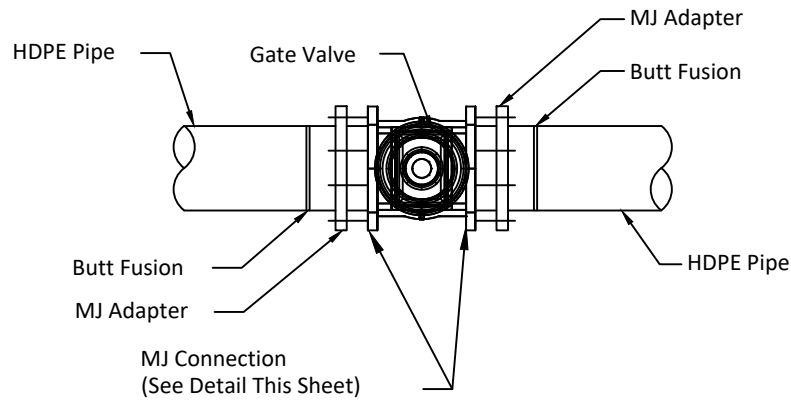
1. Initial Backfill: Select Common Fill Compacted to 95% (98% under Pavement) of the Maximum Density as per AASHTO T-180
2. Trench Backfill: Common Fill Compacted to 95% (98% under Pavement) of the Maximum Density as per AASHTO T-180
3. Type A Bedding Material Shall Conform to FDOT No. 57 aggregate
4. 15" Max. (12" Min.) for Pipe Diameter Less than 24" and 24" Max - (12" Min.) for Pipe Diameter 24" and Larger
5. Water Shall not be Permitted in the Trench During Construction Dewatering may be Necessary to Maintain the Water Table at a Minimum of 1-ft below the Bottom of the Trench until Sufficient Backfill is Placed to Maintain Dry Conditions Any Necessary Dewatering Shall be of the Responsibility of the Contractor
6. All Pipe to be Installed with Bell Facing Upstream to the Direction of the Flow
7. Bedding Material Shall be Required when Existing Soil Contains Organics, Clays, Debris, Other Unsuitable Material and as Directed by the City Engineer
8. Bedding Depth Shall be 4" Minimum for Pipe Diameter up to 12" and 6" Minimum for Pipe Diameter 16" and Larger
9. Depth for Removal of Unsuitable Material Shall Govern Depth of Bedding Rock Below the Pipe
For City projects and/or Work Within the Right-Of-Way, the City Inspector Shall Determine the Required Removal of Unsuitable Fill to Reach Suitable Foundation
For Private Developments, Outside of the Right-Of-Way, Engineer and/or Their Designee Shall Determine the Required Removal of Unsuitable Fill to Reach Suitable Foundation
10. Final Restoration in Improved Areas shall be in Compliance with all Applicable Regulations of Governing Agencies
Surface Restoration Within City of Clearwater Right-Of-Way Shall Comply with Requirements of City Right-Of-Way Utilization Regulations and Road Construction Specifications
11. See also City of Clearwater's Technical Specifications Section IV and Preferred Product List

HORIZONTAL AND VERTICAL UTILITY SEPARATION REQUIREMENTS

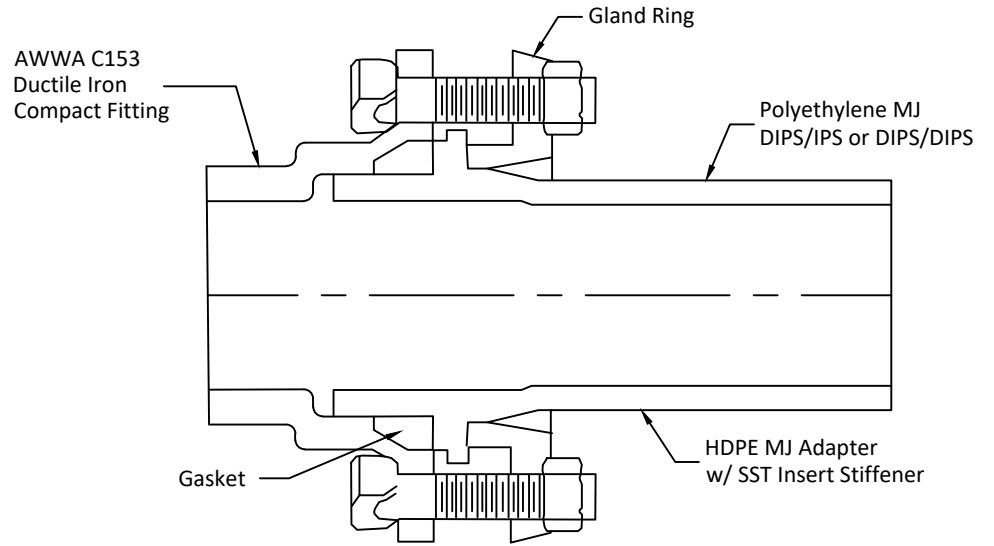
PROPOSED UTILITY	POTABLE WATER		RECLAIMED WATER		WASTEWATER FORCEMAIN		SANITARY SEWER		STORM SEWER		STRUCTURAL FOUNDATION, WALLS, ETC	ROADWAY RIGHTS-OF-WAY
	HORIZ	VERT	HORIZ	VERT	HORIZ	VERT	HORIZ	VERT	HORIZ	VERT	HORIZ	HORIZ
POTABLE WATER MAIN	4 FEET NOTE: 2	12"	4 FEET NOTES: 2 & 4	12" NOTE: 4	6 FEET NOTE: 4	12" / 18" NOTES: 3 & 4	6 FEET NOTE: 4	12" / 18" NOTES: 3 & 4	4 FEET NOTES: 2 & 4	12" / 18" NOTES: 3 & 4	15 FEET NOTE: 6	5 FEET NOTE: 2A
RECLAIMED WATER MAIN	4 FEET NOTES: 2 & 4	12" NOTE: 4	4 FEET NOTE: 2	12"	4 FEET NOTE: 2	12"	4 FEET NOTE: 2	12"	4 FEET NOTE: 2	12" / 18" NOTE: 3	15 FEET NOTE: 6	5 FEET NOTE: 2A
WASTEWATER FORCE MAIN	6 FEET NOTE: 4	12" / 18" NOTES: 3 & 4	4 FEET NOTE: 2	12"	4 FEET NOTE: 2	12"	4 FEET NOTE: 2	12"	4 FEET NOTE: 2	12" / 18" NOTE: 3	15 FEET NOTE: 6	5 FEET NOTE: 2A
SANITARY SEWER	6 FEET NOTE: 4	12" / 18" NOTES: 3 & 4	4 FEET NOTE: 2	12"	4 FEET NOTE: 2	12"	4 FEET NOTE: 2	12"	4 FEET NOTE: 2	12" / 18" NOTE: 3	VARIES PER DEPTH	5 FEET NOTE: 2A

NOTES:

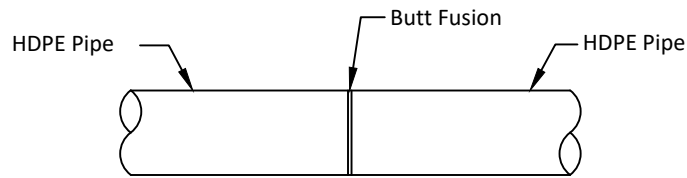
1. Distances Given are from Outside of Pipe to Outside of Pipe
2. (a) This Separation Requirement is to Provide Accessibility for Construction and Maintenance
(b) 4' Horizontal Separation for Utility Pipelines is the Minimum for Pipes with 3' of Cover
For Pipes Installed at Greater Depths, Provide an Additional Foot of Horizontal Separation for each Additional Foot of Depth
3. The 18" Separation Requirement Applies when the Wastewater Force Main, Sanitary Sewer or Storm Sewer Crosses Above the Utility Main and when the Storm Sewer Pipe has a Diameter Equal to or Greater than 24" - Otherwise the Required Separation is 12"
4. This Separation Requirement Complies with the Minimum FDEP Separation Requirements Outlined in Chapter 62-555.314, FAC
Variances from the FDEP Requirements must Comply with Chapter 62-555.314(5), FAC and must be Approved Individually by both FDEP and the City Utility Engineering Department
5. No Water Pipe Shall Pass Through or come in Contact with any Part of Sanitary Sewer or a Storm Sewer Mmanhole or Structure
6. Separation of Pressure Utility Mains may be Reduced to 10' of Separation from Structural Foundations, Walls, etc if the Cover of the Utility Main is 4' or Less and all Joints of the Utility are restrained for a Minimum of 25' Outside the Structure Limits
7. See also City of Clearwater's Technical Specifications Section IV and Preferred Product List



GATE VALVE RESTRAINT
N.T.S.



MJ CONNECTION
N.T.S.

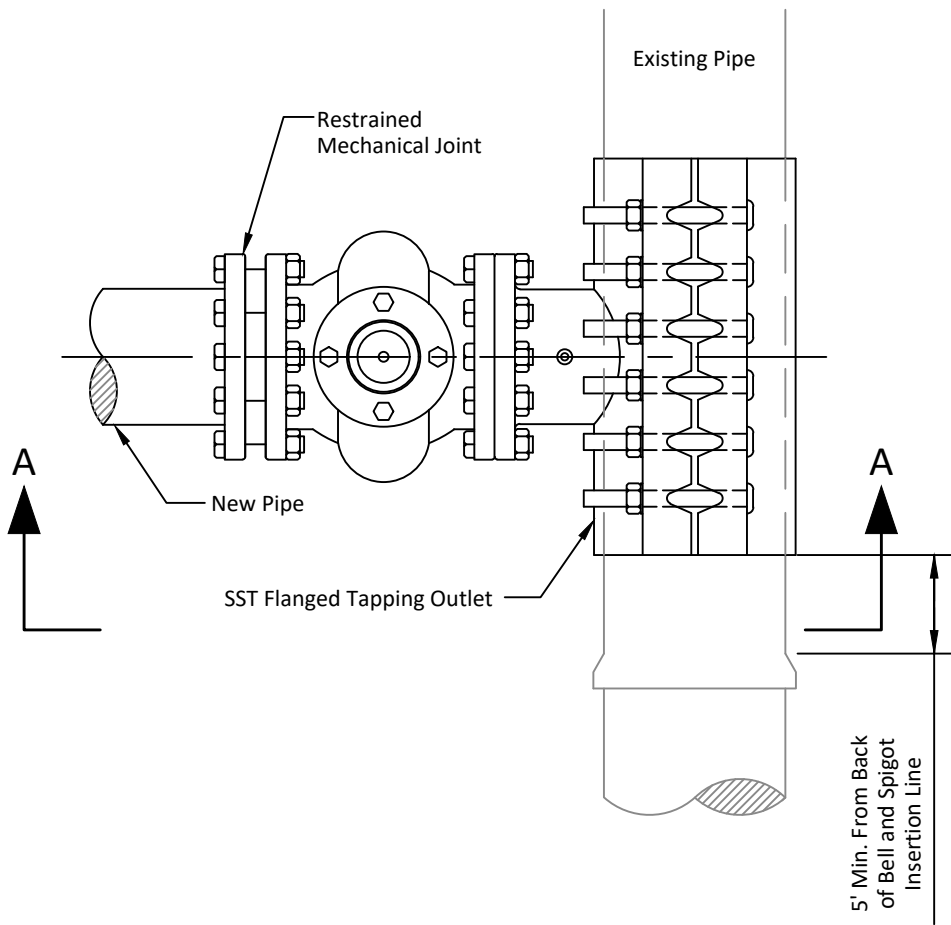


BUTT FUSION
N.T.S.

HDPE TO HDPE CONNECTIONS

NOTES:

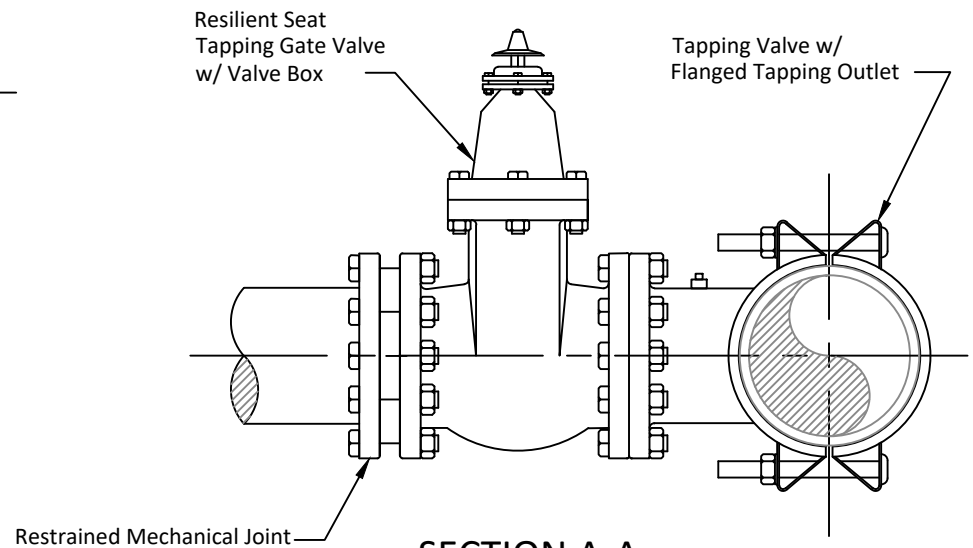
1. See also City of Clearwater's Technical Specification Section IV and Preferred Product List



PLAN
N.T.S.

NOTES:

1. Tapping Shall be Completed by a Specialty Contractor with Previous Experience in Tapping Pressurized Mains
The contractor Shall Provide all Necessary Information as Specified in the City's Technical Specifications to the City Engineering Department/Inspector to ensure that the Tapping Contractor is Acceptable
2. The Contractor Shall Provide 48 Hours Notice Prior to Tapping to the City Engineering Department/Inspector
3. The Contractor Shall be Responsible for Ensuring all Piping on the Tapped Pipeline is Properly Restrained Prior to Tapping
4. Specialty Contractor to Provide City Engineering Department/Inspector with Recovered Coupons from Tapping/Mains Drilled
5. See also City of Clearwater Technical Specifications Section IV and Preferred Product List



SECTION A-A
N.T.S.