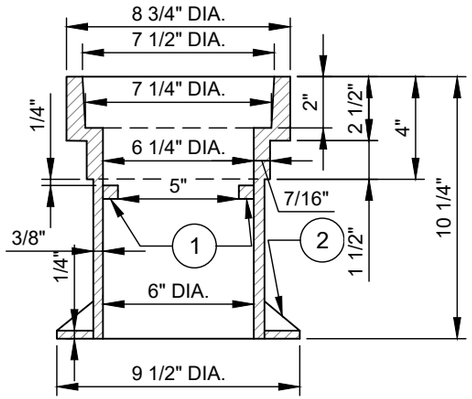
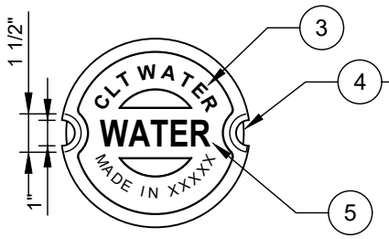
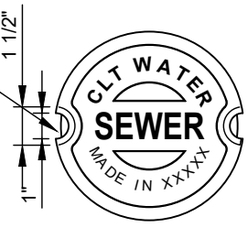


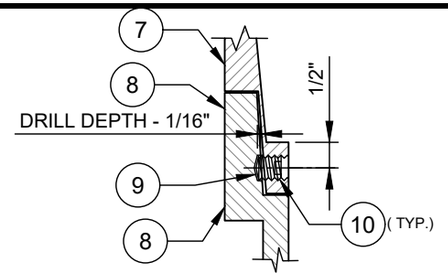
VALVE BOX - TOP SECTION
SECTION VIEW



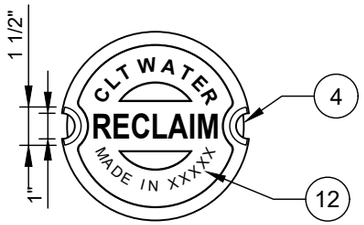
WATER COVER - TOP VIEW



SEWER COVER - TOP VIEW

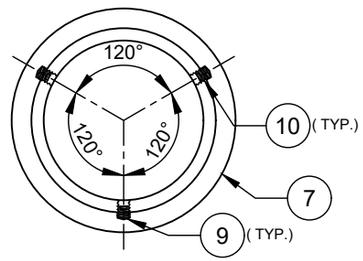


TYPE I CROSS SECTION - ASSEMBLY



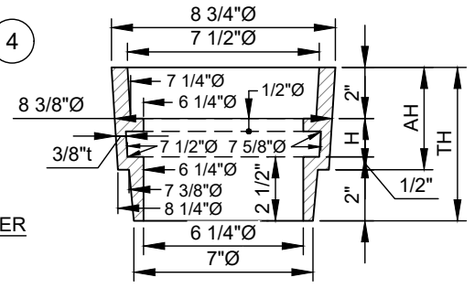
RECLAIMED WATER - TOP VIEW

CATHODIC PROTECTION COVER
TOP - VIEW

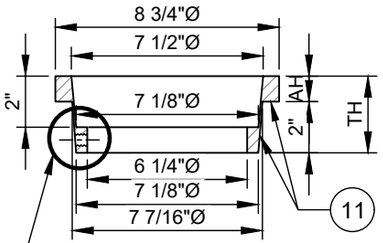


TYPE I - ADJUSTMENT RISER TOP VIEW

TRACER WIRE TERMINAL POINT COVER
TOP - VIEW

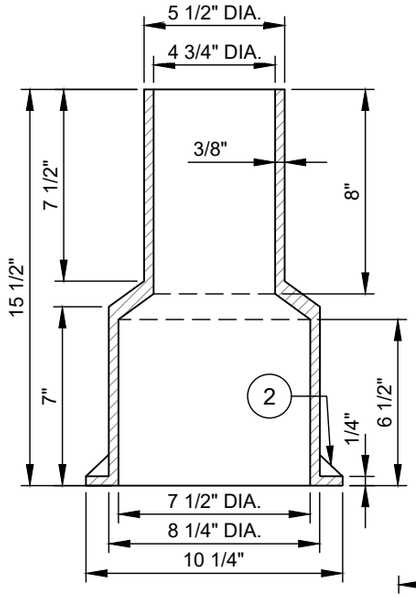


TYPE II - ADJUSTMENT RISER
SECTION VIEW

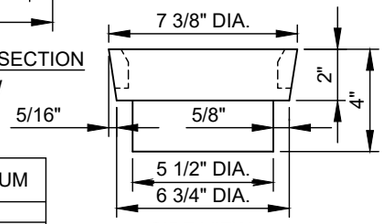


SEE CROSS SECTION

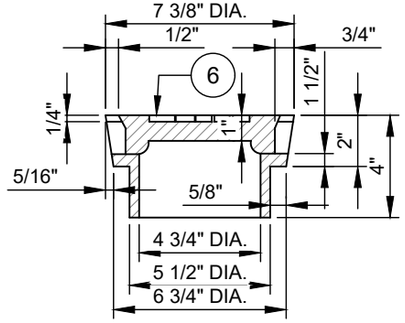
TYPE I - ADJUSTMENT RISER
SECTION VIEW



VALVE BOX - BOTTOM SECTION
SECTION VIEW



SIDE VIEW



COVER - SECTION VIEW

WEIGHT (POUNDS)	MINIMUM
TOP SECTION	31
BOTTOM SECTION	36
COVER	19
TOTAL	86

TYPE II - ADJUSTMENT RISER			
TH - TOTAL HEIGHT	AH - ADJUSTMENT HEIGHT	H	MINIMUM WEIGHT - LBS
< 4 1/2"	< 2 1/2"	NOT APPROVED	NOT APPROVED
4 1/2"	2 1/2"	0	16
5"	3"	1/2"	20
6"	4"	1 1/2"	22.5
7"	5"	2 1/2"	25
8"	6"	3 1/2"	27
10"	8"	5 1/2"	32

TYPE I - ADJUSTMENT RISER		
TH - TOTAL HEIGHT	AH - ADJUSTMENT HEIGHT	MIN. WEIGHT LBS
3"	1"	7
3 1/2"	1 1/2"	9
4"	2"	15
> 4"	NOT APPROVED	N/A

NO.	DESCRIPTION:
1.	2 LUGS 3/8" X 1/4".
2.	(4) 1/4" RIBS.
3.	3/4" LETTERING (TYP.).
4.	(2) PICK HOLES.
5.	1 1/4" RAISED FLUSH LETTERS (TYP.).
6.	RECESSED LETTERING.
7.	TYPE I ADJUSTMENT RISER.
8.	VALVE BOX - TOP SECTION.
9.	1/2" DIAMETER X 1/16" - FIELD DRILL HOLE.
10.	18 - 8 S.S. 3/8"-16 X 3/8" HEX SET SCREW WITH PERMANENT THREAD LOCK (RED) - LOCTITE #271, PERMABOND HM128, OR APPROVED EQUAL.
11.	MACHINED SURFACE.
12.	0.44"-1/2" LETTERING (TYP.).

NOTES:

A. LOAD RATING - HEAVY DUTY.
B. FERROUS CASTINGS MATERIAL - ASTM A48 - CLASS 35 GRAY IRON.
C. COATING - UNDIPPED OR ASPHALT VARNISH.
D. WEIGHT - 0% MINUS TOLERANCE.
E. CASTINGS SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.
F. TYPE II ADJUSTMENT RISERS MAY BE STACKED.
G. TYPE I ADJUSTMENT RISERS MAY NOT BE STACKED.
H. ADJUSTMENT RINGS ARE NOT APPROVED FOR USE IN NEW CONSTRUCTION.
I. ADJUSTMENT RINGS MAY ONLY BE USED ON RESURFACING PROJECTS AND IS LIMITED TO ONE RISER PER VALVE BOX.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

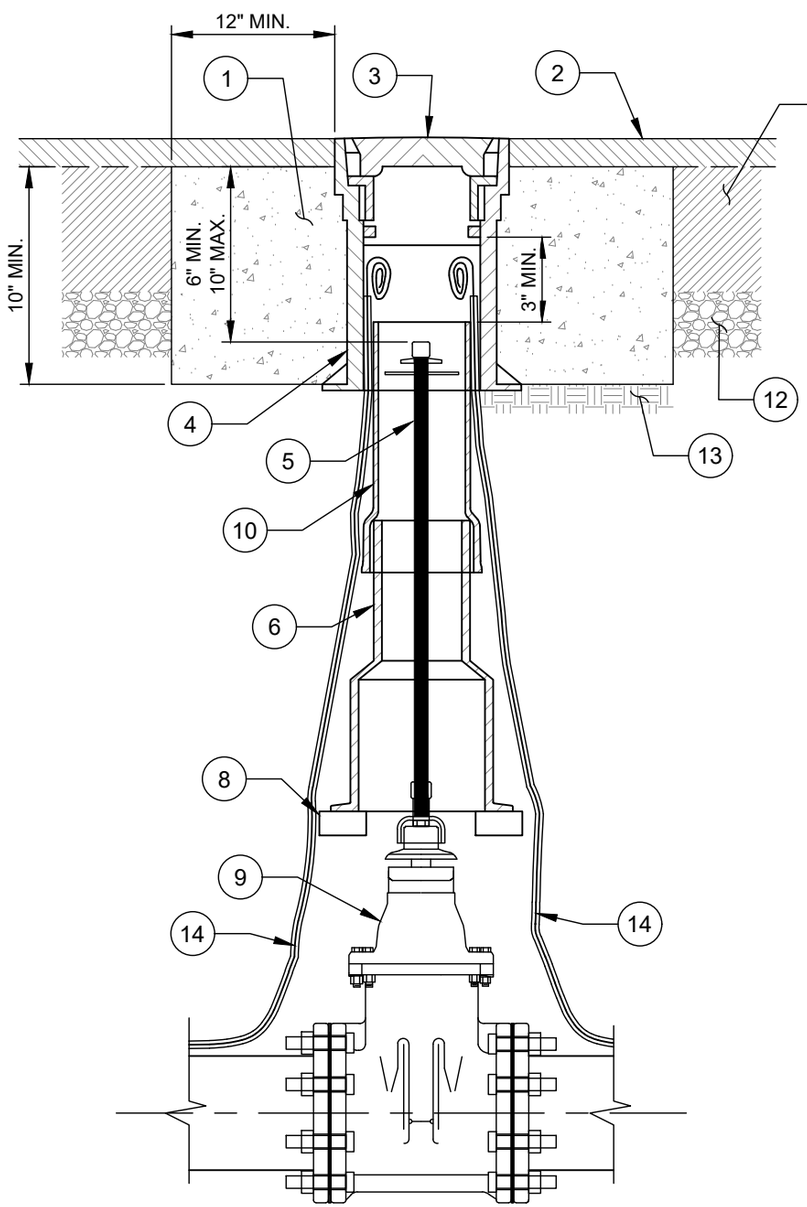
CAST IRON VALVE BOX (12" AND SMALLER VALVES - ONLY)

NO SCALE

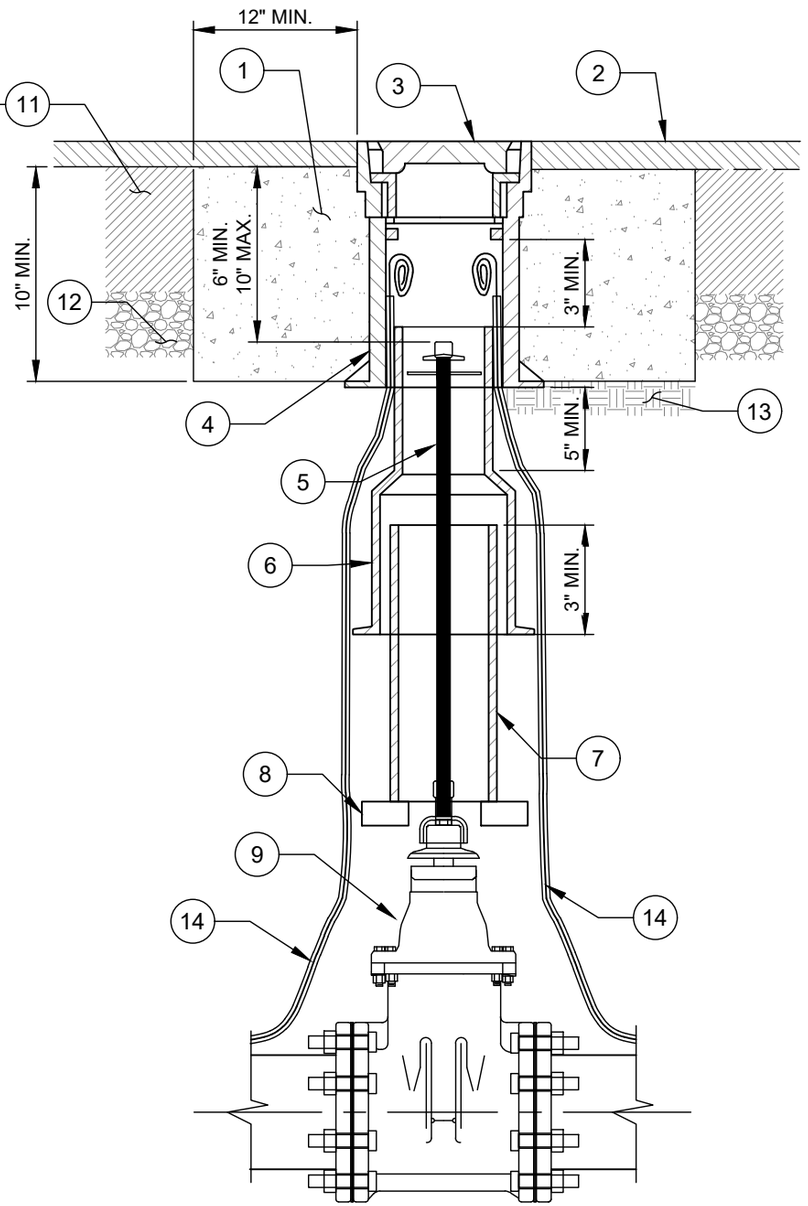
VERSION 1.0

DATE 04/2024

DETAIL 10.1.1



TYPE A
USING CAST IRON SOIL PIPE



TYPE B
USING PVC PIPE

NO. DESCRIPTION:

1. CONCRETE PAD - CAST IN PLACE.
2. FINAL ASPHALT SURFACE COURSE.
3. VALVE BOX COVER.
4. TOP SECTION VALVE BOX.
5. EXTENSION STEM AS REQUIRED.
6. BOTTOM SECTION VALVE BOX.
7. 6" PVC PIPE (C900 OR SDR26).
8. STANDARD CONCRETE BRICK - 2 EACH.
9. GATE VALVE (OR BALL VALVE, AS APPLICABLE).
10. 5" DIAMETER CAST IRON SOIL PIPE - BELL OF PIPE WILL RECEIVE BOTTOM SECTION OF VALVE BOX.
11. EXISTING OR NEW PAVEMENT.
12. COMPACTED AGGREGATE BASE COURSE (CABC).
13. COMPACTED SUBGRADE.
14. AWG #12 GAUGE SOLID COPPER HDPE TRACER WIRE WITH 30 MILS HDPE BLUE INSULATION, TERMINATE WITH 24" EXCESS WIRE (COILED) AT METER BOX AND VALVE BOX (TYP.).

NOTES:

A. WATER VALVE ADJUSTMENTS WILL BE COMPLETED AT LEAST 36 HOURS BEFORE RESURFACING.
B. 12" MINIMUM WIDTH OF EXCAVATION AROUND VALVE BOX.
C. DISTURBED AREAS AROUND STRUCTURE ADJUSTMENTS ARE TO BE TAMPED AND FILLED WITH 4,000 PSI "HIGH EARLY" PORTLAND CEMENT CONCRETE.
D. ALL DAMAGED OR MISALIGNED VALVE BOXES ARE TO BE REPORTED TO INSPECTOR, OTHERWISE CONTRACTOR ASSUMES RESPONSIBILITY FOR DAMAGE OR MISALIGNMENT.
E. IF THE VERTICAL ADJUSTMENT CAUSES LESS THAN ONE INCH OVERLAP BETWEEN TOP SECTION AND RISER PIPE, CONTRACTOR WILL REMOVE AND REPLACE RISER PIPE FROM BOTTOM SECTION TO TOP TO PROVIDE 3" OF OVERLAP IN TOP SECTION FOR TYPE A OR IF THE VERTICAL ADJUSTMENT CAUSES LESS THAN ONE INCH OVERLAP BETWEEN TOP SECTION AND BOTTOM SECTION, CONTRACTOR WILL REMOVE AND RESET BOTTOM SECTION TO PROVIDE A MINIMUM OF 3" OVERLAP AT TOP SECTION/BOTTOM SECTION JOINT SECTION & BOTTOM SECTION/RISER PIPE JOINT FOR TYPE B.
F. ALL CONCRETE SHALL BE VIBRATED IN ACCORDANCE WITH N.C. DEPARTMENT OF TRANSPORTATION SPECIFICATIONS.
G. TOP & BOTTOM SECTION TO BE CENTERED OVER NUT, NOT TO BEAR ON VALVE BODY.
H. PROVIDE CLEARANCE BETWEEN VALVE BOX/BRICK AND THE VALVE.
I. VALVE BOX ASSEMBLY SHALL CONSIST OF NO MORE THAN 3 VERTICAL SECTIONS - 1 TOP SECTION, 1 - BOTTOM SECTION AND 1 - PIPE RISER SECTION.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

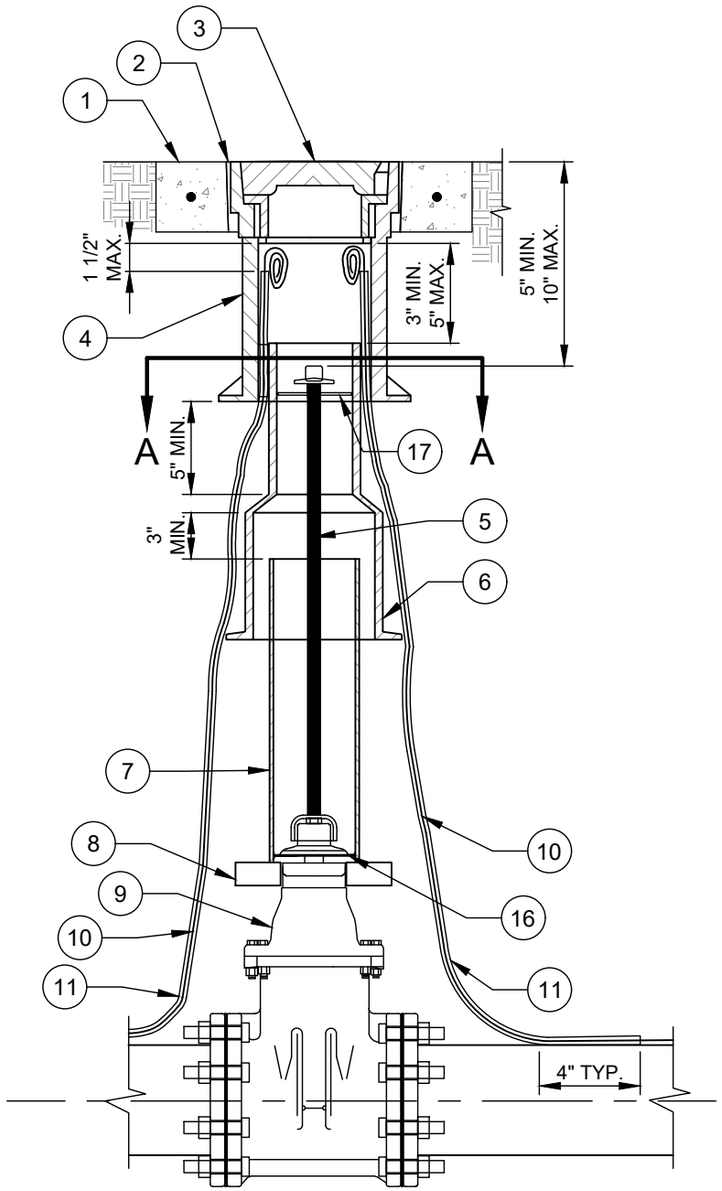
VERTICAL VALVE BOX ADJUSTMENT FOR PAVEMENT RESURFACING

NO SCALE

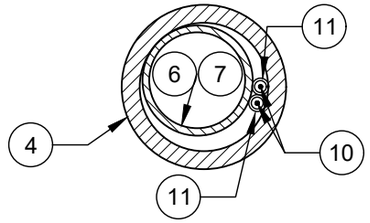
VERSION 1.0

DATE 04/2024

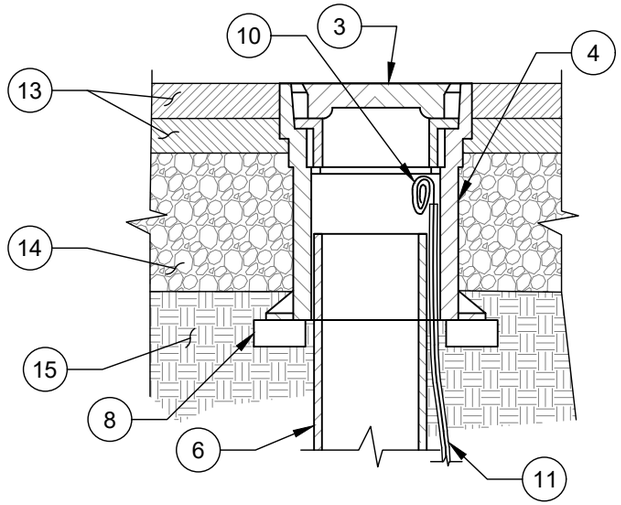
DETAIL 10.1.2



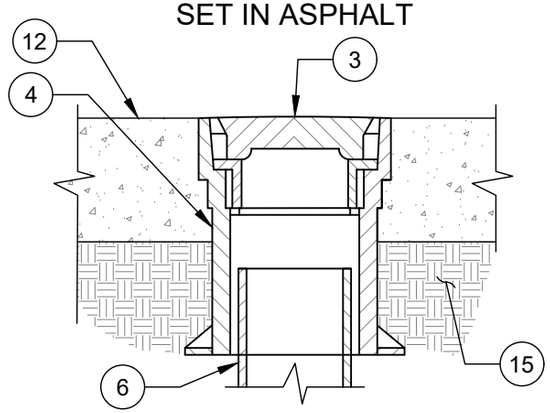
USING PVC OR DIP STANDPIPE



SECTION A-A



ALTERNATE A
SET IN ASPHALT



ALTERNATE B
CAST IN CONCRETE

NO. DESCRIPTION:

1. 24" X 24" PRECAST (OR CAST IN PLACE) CONCRETE PAD OR 24" DIAMETER PRECAST PAD.
2. NON - SHRINK GROUT - FILL ANNULAR SPACE.
3. VALVE BOX COVER.
4. CAST IRON VALVE BOX.
5. EXTENSION STEM AS REQUIRED. SEE NOTES.
6. VALVE BOX BOTTOM SECTION.
7. 6" DIP OR C900 PVC STANDPIPE.
8. STANDARD CONCRETE BRICK - 2 EACH.
9. GATE VALVE (OR BALL VALVE, AS APPLICABLE).
10. AWG #12 GAUGE COPPER TRACER WIRE WITH 30 MIL HDPE BLUE INSULATION, TERMINATE WITH 24 INCH EXCESS WIRE (COILED) AT VALVE BOX (TYP.).
11. 1/4" OR 3/8" ID CONDUIT - SDR 10 PEX TUBING - ASTM F 976.
12. CONCRETE (ROADWAY, DRIVEWAY OR SIDEWALK).
13. ASPHALT PAVEMENT.
14. COMPACTED AGGREGATE BASE COURSE (CABC) OR ASPHALT BASE COURSE.
15. COMPACTED SUBGRADE.
16. PLASTIC VALVE CENTERING DISK (EX: PLASTIC POSI-CAP VALVE BOX ALIGNER DISK) REQUIRED TO KEEP VALVE BOX ALIGNED DURING BACK FILLING.
17. ALUM OR STEEL CENTERING DISK.

NOTES:

A. STANDPIPE TO BE CENTERED OVER VALVE NUT AND SHALL NOT BEAR ON VALVE BODY.
B. PROVIDE CLEARANCE BETWEEN BRICK AND THE VALVE.
C. WHEN OPERATING NUT DEPTH EXCEEDS 3' BELOW FINISHED GRADE, PROVIDE EXTENSION STEM WITH STANDARD 2" SQUARE OPERATING NUT IN TOP SECTION OF VALVE BOX. SEE STANDARD DETAIL.
D. VALVE BOX ASSEMBLY SHALL CONSIST OF NO MORE THAN 2 VERTICAL SECTIONS - 1 VALVE BOX, AND 1 - STANDPIPE RISER SECTION.
E. CONCRETE PADS SHALL NOT BE USED IN PAVEMENT (CONCRETE OR ASPHALT), SIDEWALKS OR DRIVEWAYS.
F. VALVE BOX ASSEMBLY SHALL BE INSTALLED SO IT DOES NOT APPLY IMPACT LOADING TO THE VALVE.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

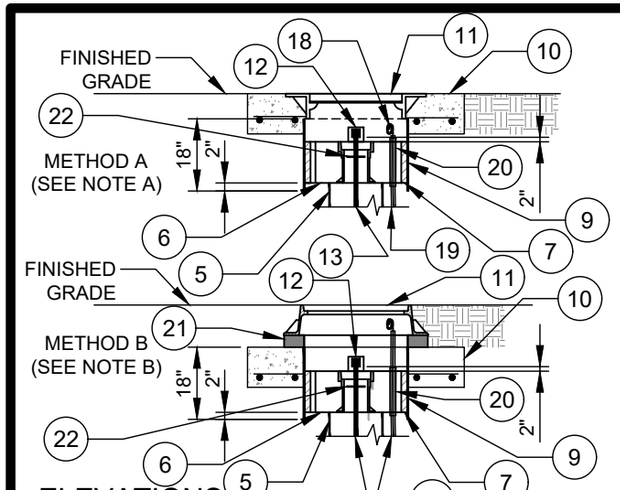
VALVE BOX ASSEMBLY INSTALLATION- 12" AND SMALLER VALVES

NO SCALE

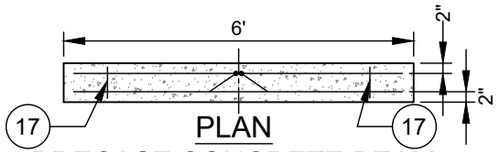
VERSION 1.0

DATE 04/2024

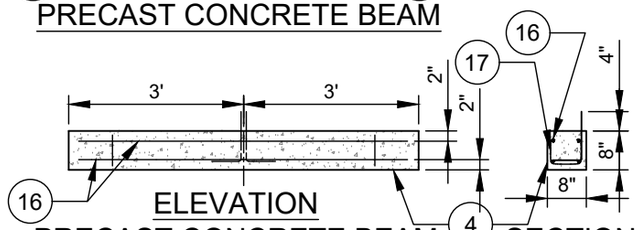
DETAIL 10.1.3



ELEVATIONS

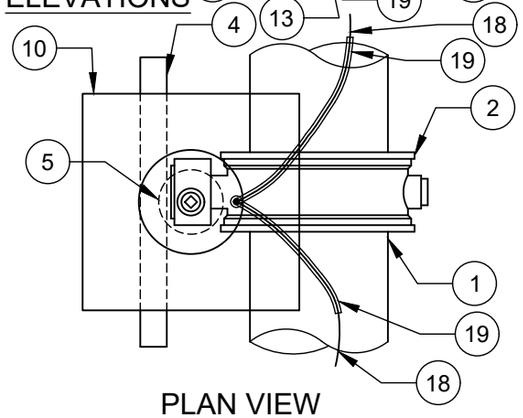


PLAN
PRECAST CONCRETE BEAM

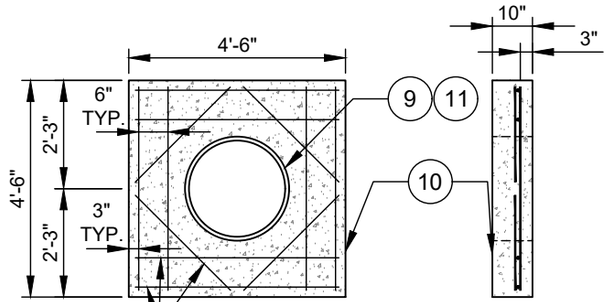


ELEVATION
PRECAST CONCRETE BEAM

SECTION

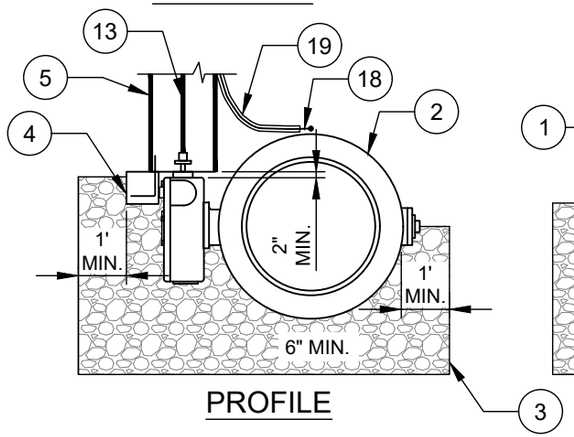


PLAN VIEW

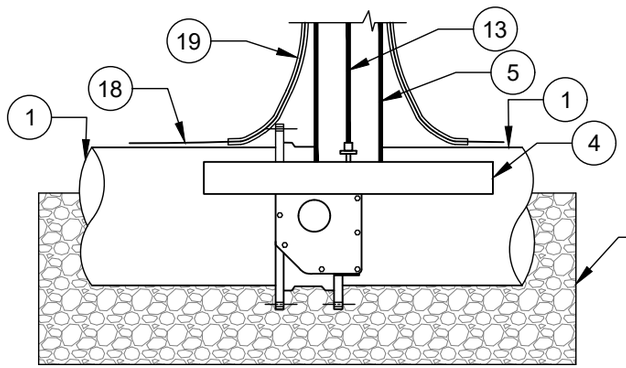


PLAN
PRECAST CONCRETE PAD

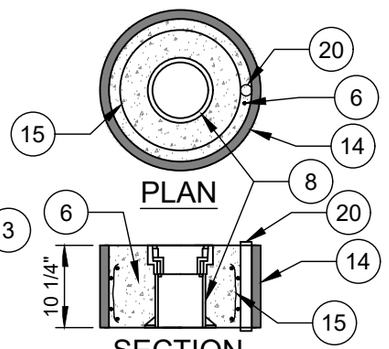
SECTION



PROFILE



SIDE



PLAN

SECTION
PRECAST CONCRETE FLOOR

NO. DESCRIPTION:

1. WATER MAIN.
2. DIRECT BURY BUTTERFLY VALVE.
3. WASHED #57 STONE - MINIMUM 6' EACH SIDE OF VALVE.
4. PRECAST CONCRETE BEAM (REINFORCED).
5. 12" (MIN.) DIP (OR C900 PVC) RISER PIPE 20" MAXIMUM.
6. PRECAST CONCRETE FLOOR (REINFORCED).
7. 1/2-INCH EXPANSION MATERIAL (CONSTRUCTION JOINT).
8. STANDARD VALVE BOX (W/COVER), CAST IN CONCRETE FLOOR NO. 6.
9. 24" PVC PIPE - C900 - DR18, OR DIP - CAST IN.
10. PRECAST CONCRETE PAD (REINFORCED).
11. FRAME AND COVER - SEE CLTW STD. DETAILS.
12. VALVE LOCK BOX - FURNISHED BY CLTW.
13. EXTENSION STEM ASSEMBLY - SEE CLTW STD. DETAIL.
14. 20" PVC PIPE - C900 - DR18, DR21, OR DR25.
15. WELDED WIRE FABRIC (WWF) - 6 X 6, W2.9/W2.9, 16" DIAMETER, OR 2 EACH #3 REBARS - 16" DIAMETER.
16. #4 REBARS - AS SHOWN.
17. #2 OR #3 REBARS - STIRRUPS - AS SHOWN.
18. AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS HDPE BLUE INSULATION, TERMINATE WITH 24" EXCESS WIRE (COILED) IN VALVE BOX (TYP.).
19. 1/4" OR 3/8" ID CONDUIT - SDR 9 PEX TUBING - ASTM F876.
20. 3/4" DIAMETER X 12" SCH 40 PVC CONDUIT.
21. GRADE / SLOPE ADJUSTMENT RING - PRECAST CONCRETE OR RECYCLED RUBBER.
22. ALUM OR STEEL CENTERING DISK.

NOTES:

A. METHOD A SHALL BE REQUIRED IN WATER MAIN EASEMENTS, OR WHEN VALVE IS BACK OF ROAD DITCH.
B. METHOD B SHALL BE REQUIRED WHEN VALVE IS IN MAINTAINED LAWNS, ON ROAD SHOULDER, IN PAVEMENT DRIVEWAYS OR SIDEWALKS.
C. DIAMETER OF RISER MAY VARY AS REQUIRED BY VALVE ACTUATOR, AS APPROVED BY CLTW.
D. EXTENSION STEM REQUIRED REGARDLESS OF DEPTH. SEE CLTW STD. EXTENSION STEM DETAIL.
E. PROVIDE 2" CLEARANCE IN ALL DIRECTIONS BETWEEN RISER AND VALVE/ACTUATOR (SEE NOTE C).
F. DIRECT BURY BUTTERFLY VALVES SHALL ONLY BE USED WHEN APPROVED BY CLTW.
G. VALVE BOX ASSEMBLY SHALL BE INSTALLED SO IT DOES NOT APPLY IMPACT LOADING TO THE VALVE.

DESIGN REQUIREMENTS:

a. CONCRETE - f'c = 3,600 PSI (MIN.)
b. REBARS - GRADE 60, ASTM A615
c. WELDED WIRE FABRIC - ASTM A185, A82

CHARLOTTE WATER

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STANDARD DETAILS
WATER

VALVE BOX ASSEMBLY INSTALLATION
DIRECT BURY BUTTERFLY VALVES
36-INCH AND LARGER MAINS

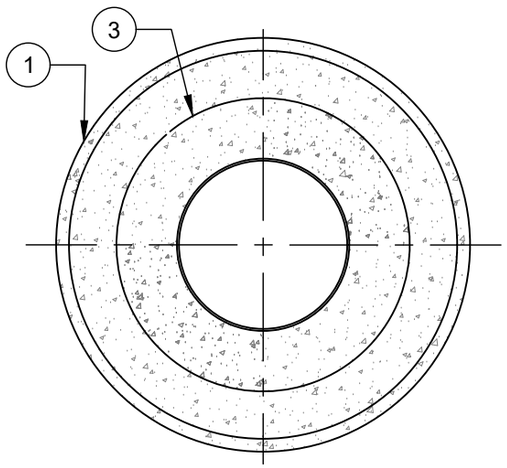
NO SCALE

VERSION 1.0

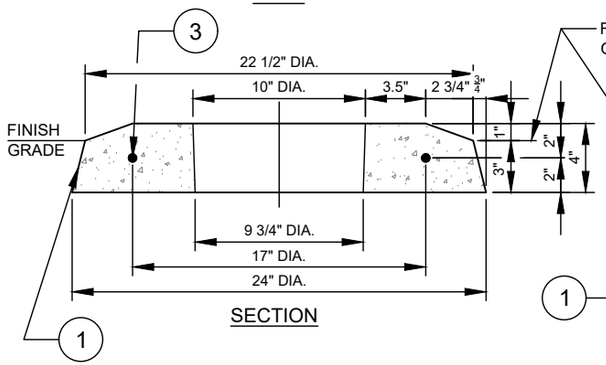
DATE 04/2024

DETAIL 10.1.4

TYPE A - GRADE RING
PRECAST ONLY

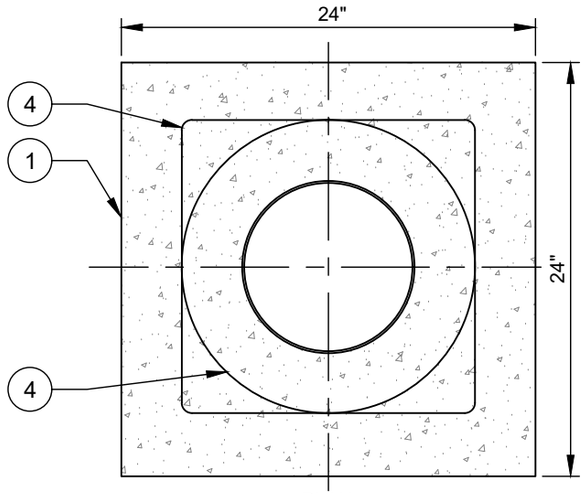


PLAN

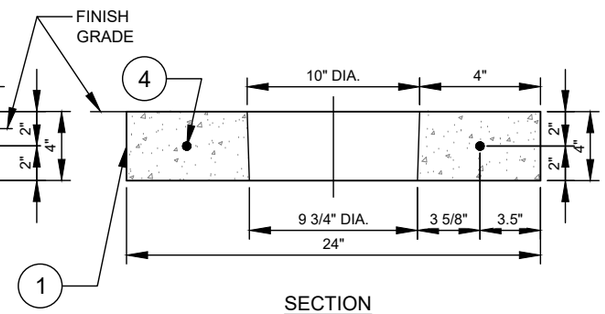


SECTION

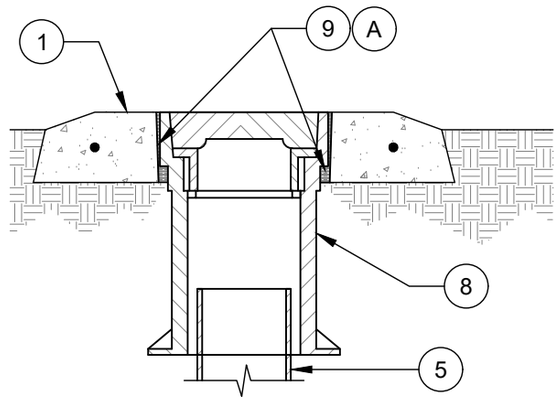
TYPE B - GRADE RING
PRECAST OR CAST IN PLACE



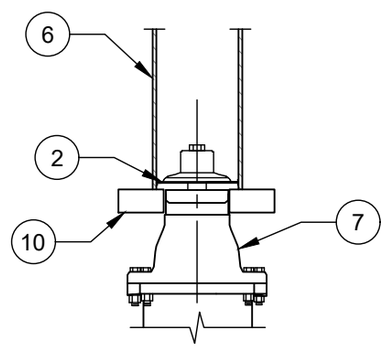
PLAN



SECTION



INSTALLATION DETAIL ONE
SECTION VIEW



INSTALLATION DETAIL TWO
SECTION VIEW

NO.	DESCRIPTION:
1.	CONCRETE GRADE RING.
2.	PLASTIC VALVE CENTERING DISK (EX: PLASTIC POSI-CAP VALVE BOX ALIGNER DISK) REQUIRED TO KEEP VALVE BOX ALIGNED DURING BACK FILLING. REQUIRED FOR ALL VALVES.
3.	#4 REBAR – 17" DIAMETER.
4.	#4 REBAR – LENGTH = 68", OR (ALTERNATE -17" DIAMETER).
5.	VALVE BOX BOTTOM SECTION.
6.	6" DIAMETER C900 PVC PIPE.
7.	GATE VALVE – 12" OR SMALLER.
8.	TOP SECTION OF VALVE BOX.
9.	FILL ANNULAR SPACE WITH NON SHRINK GROUT.
10.	CONCRETE SUPPORT BRICK - 2 EACH.

NOTES:

A. FOR PRECAST GRADE RINGS – FILL VOID BETWEEN GRADE RING AND CAST IRON VALVE BOX TOP SECTION WITH NON-SHRINK GROUT.
B. FOR CAST-IN-PLACE GRADE RINGS – TOP SECTION OF CAST IRON VALVE BOX SHALL BE CAST IN THE CONCRETE.
C. TYPE A GRADE RINGS SHALL BE REQUIRED ON ROAD SHOULDERS WITHOUT CURB.
D. FOR INSTALLATION DETAIL TWO – ONLY ONE VALVE BOX ASSEMBLY (NO. 5 OR NO. 6) SHALL BE REQUIRED. VALVE BOX ASSEMBLY SHALL NOT REST ON THE VALVE, AND SHALL BE CENTERED ON THE VALVE OPERATING NUT AS SHOWN.
E. TOP SECTION/LID SHALL BE FLUSH WITH GRADE RING TO AVOID TRIPPING HAZARD.
F. FOR LOCATIONS WHERE A STANDARD PRECAST GRADE RING DOES NOT FIT, IT CANNOT BE CUT TO FIT AND A CAST IN PLACE CONCRETE PAD MUST BE POURED IN PLACE.

DESIGN REQUIREMENTS:

a. CONCRETE – f'c = 4,000 PSI (PRECAST), OR 3,600 PSI (CAST-IN-PLACE).
b. STEEL REINFORCEMENT – REBARS – GRADE 60 (60,000 PSI) – ASTM A-615, OR WELDED WIRE FABRIC – ASTM A-185.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

VALVE BOX - CONCRETE GRADE RINGS (12" AND SMALLER VALVES - ONLY) (2" AIR RELEASES AND BLOW OFFS)

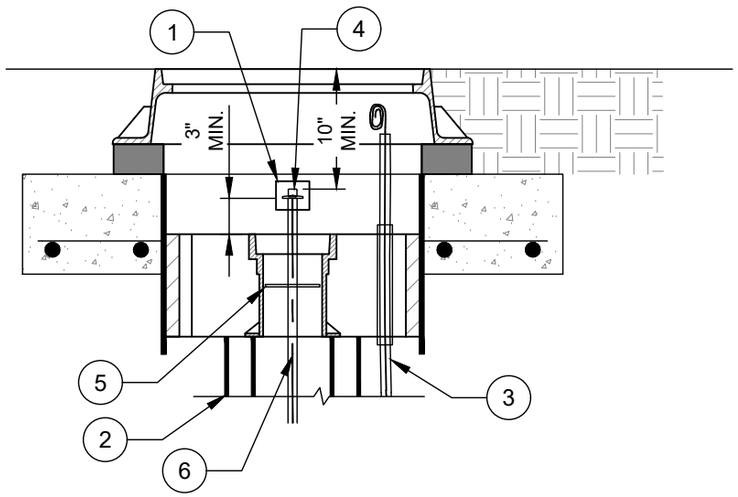
NO SCALE

VERSION
1.0

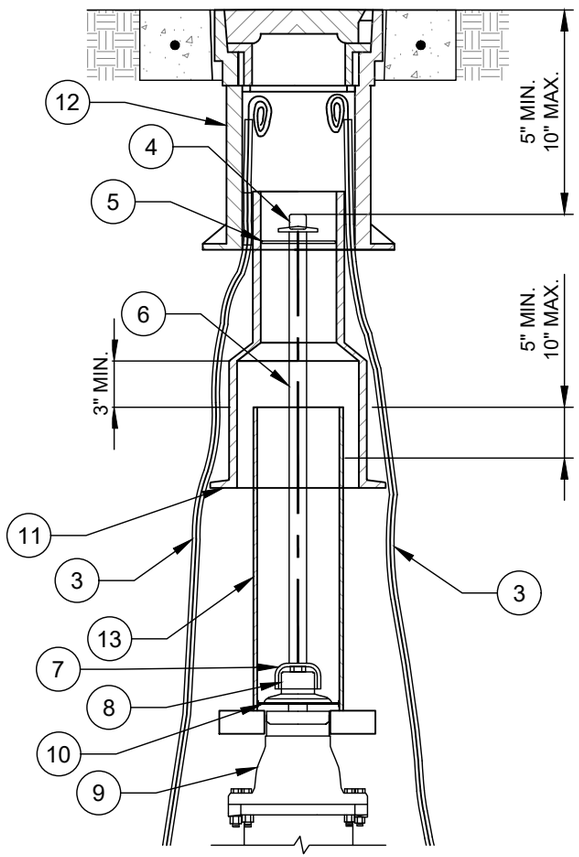
DATE
04/2024

DETAIL
10.1.5

16" AND LARGER GATE VALVE EXTENSION STEMS



12" AND SMALLER GATE VALVE EXTENSION STEM ASSEMBLY



NO.	DESCRIPTION:
1.	VALVE LOCK BOX - FURNISHED BY CLTW.
2.	12"-20" DIP STANDPIPE.
3.	TRACER WIRE CONDUIT.
4.	STANDARD VALVE OPERATING NUT (2" SQUARE OPERATING NUT) PAINTED RED FOR OPEN RIGHT OR BLACK FOR OPEN LEFT, WITH OPEN OPERATION ARROW.
5.	ALUMINUM 1/4" S.S. PLATE, 4 1/2" DIAMETER CENTERING COLLAR. LOCATE THE CENTERING COLLAR INTO THE VALVE BOX AS SHOWN.
6.	1 1/4" SQUARE S.S. STEM (LENGTH VARIES, NO JOINTS ALLOWED).
7.	STANDARD OR S.S. OPERATING SOCKET WITH FOUR 3/8" SET SCREWS.
8.	VALVE OPERATING NUT WITH SET SCREW DIMPLES.
9.	VALVE.
10.	PLASTIC VALVE CENTERING COLLAR. PLASTIC VALVE CENTERING DISK (EX: PLASTIC POSI-CAP VALVE BOX ALIGNER DISK) REQUIRED TO KEEP VALVE BOX ALIGNED DURING BACK FILLING.
11.	BOTTOM SECTION VALVE BOX.
12.	TOP SECTION OF VALVE BOX.
13.	6" C900 PVC OR DIP STANDPIPE.

NOTES:

A. EXTENSION REQUIRED IF DEPTH IS GREATER THAN THREE FEET.

B. EXTENSION MUST BE ONE SOLID PIECE FROM NUT TO COUPLING.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

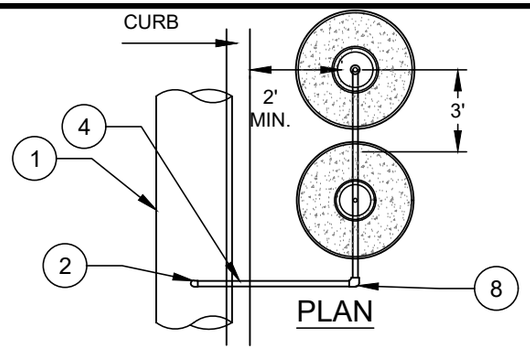
DIRECT BURY VALVE EXTENSION STEM ASSEMBLY

NO SCALE

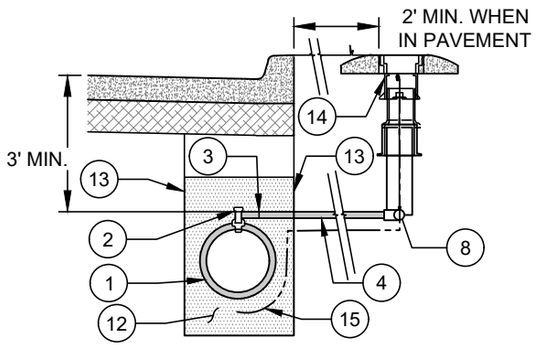
VERSION
1.0

DATE
04/2024

DETAIL
10.1.6

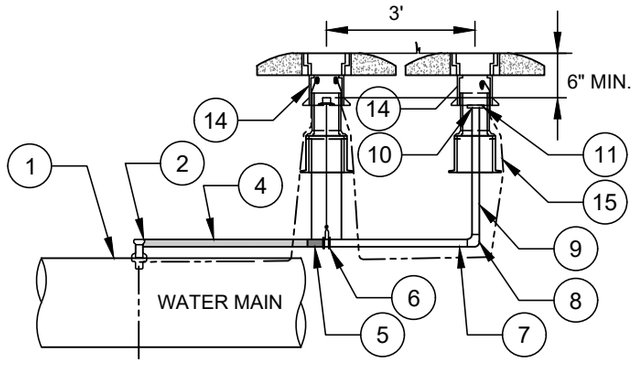


PLAN



FRONT ELEVATION

6"-16" MAIN



SIDE ELEVATION

ITEM LIST FOR 2" AIR RELEASE

NO. DESCRIPTION:

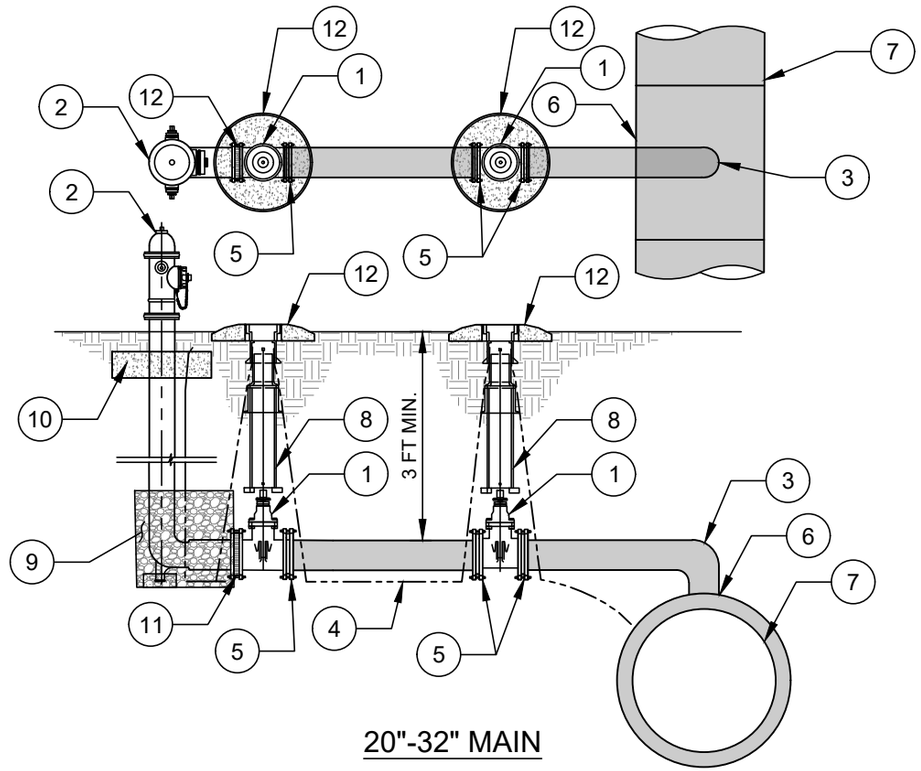
1. HDPE WATER MAIN.
2. 2" HDPE TAPPING TEE BY ELECTROFUSION ONLY.
3. HDPE BUTT FUSION JOINT.
4. 2" SDR-9 HDPE TUBING (IPS).
5. 2" HDPE PLAIN END X S.S. MNPT ADAPTOR.
6. 2" GATE VALVE (FNPT X FNPT).
7. 2" RED BRASS NIPPLE - SCH 40 - (MNPT X MNPT), MINIMUM 30" LONG.
8. 2" RED BRASS 90° BEND (FNPT X FNPT).
9. 2" RED BRASS NIPPLE - SCH 40 - (MNPT X MNPT), LENGTH AS REQUIRED.
10. 2" DUCTILE IRON (FUSION BONDED EPOXY COATED), RED BRASS, OR S.S. THREADED COUPLING (FNPT).
11. 2" MNPT PVC PLUG (HAND TIGHT).
12. HDPE EMBEDMENT MATERIAL.
13. TRENCH LIMITS.
14. VALVE BOX ASSEMBLY - SEE STANDARD DETAIL.
15. TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK BLUE HDPE INSULATION.

NOTES:

A. AIR RELEASE VALVE ASSEMBLIES FOR 20" AND LARGER MAINS SHALL BE 6".
B. 2" BALL VALVES MAY NOT BE SUBSTITUTED FOR GATE VALVES.

NOTES TO DESIGNER

A. INSTALL AIR RELEASE VALVES AT ALL HIGH POINTS AS APPROVED BY SEALING ENGINEER.
B. INSTALL AIR RELEASE VALVES ON THE LOW SIDE OF 16" AND LARGER VALVES AS APPROVED BY SEALING ENGINEER.
C. VALVE AND B.O. SHALL NOT BE PLACED IN ROAD DITCH.
D. AIR RELEASE SHALL NOT BE LOCATED IN ROADWAY PAVEMENT.



20"-32" MAIN

ITEM LIST FOR 6" AIR RELEASE

NO. DESCRIPTION:

1. 6" GATE VALVE. SEE STANDARD DETAIL.
2. STANDARD FIRE HYDRANT ASSEMBLY PER STANDARD DETAIL (PAINTED BLUE).
3. 6" HDPE PIPE (90° BEND).
4. TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK BLUE HDPE INSULATION.
5. RESTRAINED MJ ADAPTER WITH STAINLESS STEEL STIFFENER AND ACCESSORY KIT. SEE STANDARD DETAIL FOR TRANSITION DETAIL.
6. HDPE BUTT FUSION TEE.
7. HDPE WATER MAIN.
8. VALVE BOX ASSEMBLY. SEE STANDARD DETAIL.
9. #57 WASHED STONE-ENCASEMENT. ENCAPSULATE STONE WITH FILTER FABRIC.
10. CONCRETE HYDRANT COLLAR. CAST IN PLACE. 3' DIAMETER BY 8" THICK.
11. FOSTER ADAPTER.
12. 24-INCH DIAMETER REINFORCED CONCRETE PAD.

NOTES:

A. ALL PIPE, FITTINGS, ETC. SHALL BE RESTRAINED JOINT. BUTT FUSED AND ELECTROFUSED HDPE IS FULLY RESTRAINED.
B. SEE CONSTRUCTION PLANS FOR EXACT LOCATIONS OF VALVES AND FIRE HYDRANT.
C. HYDRANT EXTENSIONS SHALL BE LIMITED TO 1 EACH PER FIRE HYDRANT.
D. SEE FIRE HYDRANT STD DETAIL FOR INSTALLATION REQUIREMENTS.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

2" AND 6" AIR RELEASE VALVES FOR HDPE PIPE

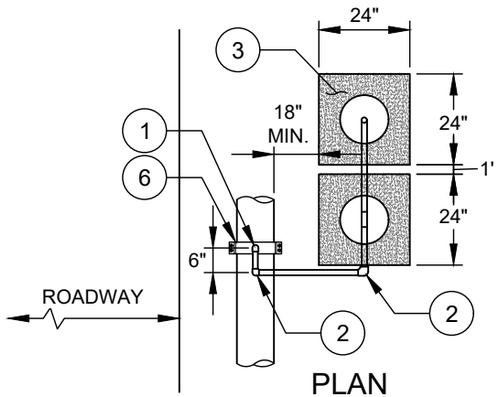
NO SCALE

VERSION 1.0

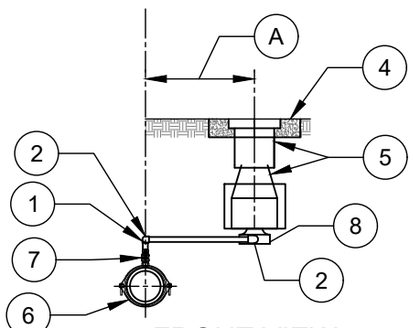
DATE 04/2024

DETAIL 10.2.1

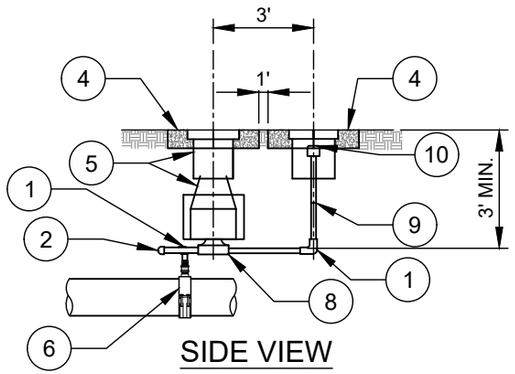
16" AND SMALLER MAIN



PLAN



FRONT VIEW ELEVATION



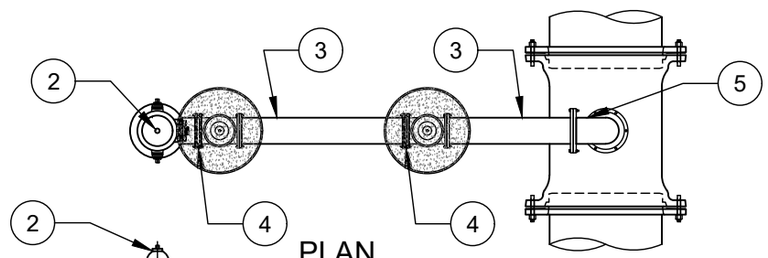
SIDE VIEW ELEVATION

NO.	DESCRIPTION:
1.	90° VERTICAL BEND - BRASS OR S.S..
2.	90° HORIZONTAL BEND - BRASS OR S.S..
3.	(2)-24" PADS OR PRECAST 24" CIRCULAR PADS.
4.	24" X 24" X 6" CONCRETE PAD VALVE OR 24" DIAMETER PRECAST PAD.
5.	VALVE BOX ASSEMBLY. SEE STANDARD DETAIL.
6.	2" SERVICE SADDLE W/ CC TAPER TREAD OUTLET.
7.	2" BALL CORPORATION STOP WITH TEE HEAD OPERATING NUT.
8.	2" GATE VALVE FOR 2" AIR RELEASE.
9.	2" PIPING - SCHEDULE 40 RED BRASS OR STAINLESS STEEL.
10.	2" DUCTILE IRON (FUSION BONDED EPOXY COATED) THREADED COUPLING (FNPT).

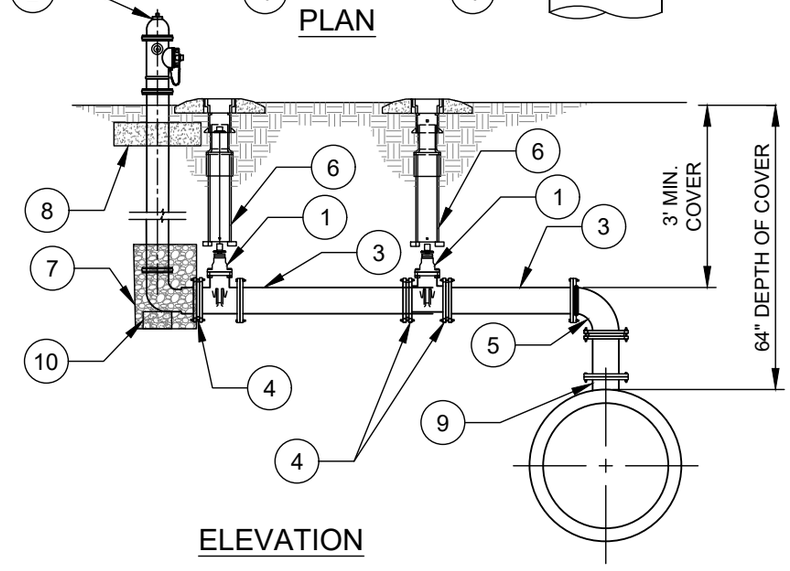
NOTES:

A. ARV TO BE PLACED A MIN. OF 18" OFFSET FROM THE WATER MAIN, AND SHALL BE BOC, IN PLANTING STRIP OR IN ROAD SHOULDER OR SIDEWALK, AND WITH VALVE BOX ASSEMBLIES PARALLEL TO THE ROAD.
B. AIR RELEASES TO BE INSTALLED AT ALL HIGH POINTS AS DIRECTED BY THE ENGINEER.
C. AIR RELEASE SHALL NOT BE LOCATED IN ROADWAY PAVEMENT.
D. ON 16" AND SMALLER PIPE, 2" ASSEMBLY REQUIRED.
E. ON 24" TO 30" PIPE, USE 6" AIR RELEASE HYDRANT. AT LEAST TWO VALVES REQUIRED - ONE AT TEE AND ONE AT. SEE ASSEMBLY ON RIGHT.
F. VALVE & B.O. SHALL NOT BE PLACED IN ROAD DITCH.
G. TRACER WIRE INSTALLED PER CLTW TRACER WIRE DETAIL AS APPLICABLE.

24"-30" MAIN



PLAN



ELEVATION

NO.	DESCRIPTION:
1.	6" MJ X MJ GATE VALVE.
2.	STANDARD 3 WAY FIRE HYDRANT ASSEMBLY PER STANDARD DETAIL (PAINTED BLUE).
3.	6" RJ DIP.
4.	FOSTER ADAPTER.
5.	6" RMJ 90° BEND (VERTICAL).
6.	VALVE BOX ASSEMBLY. SEE STANDARD DETAIL.
7.	#57 WASHED STONE-ENCASEMENT.
8.	CONCRETE HYDRANT COLLAR. CAST IN PLACE. 3' DIAMETER BY 8" THICK. REINFORCE WITH #4 REBARS.
9.	6" SWIVEL OUTLET FIRE HYDRANT TEE.
10.	CONCRETE BLOCK - 8" X 16" SOLID CONCRETE BLOCK.

NOTES:

A. AIR RELEASE HYDRANT SHALL BE PLACED PER THE FIRE HYDRANT STANDARD DETAIL REQUIREMENTS.
B. AIR RELEASES TO BE INSTALLED AT ALL HIGH POINTS AS DIRECTED BY THE ENGINEER.
C. ON 24" AND 30" PIPE, USE 6" AIR RELEASE HYDRANT.
D. TRACER WIRE INSTALLED PER CLTW TRACER WIRE DETAIL AS APPLICABLE.
E. SEE FIRE HYDRANT STD DETAIL FOR INSTALLATION REQUIREMENTS.
F. HYDRANT EXTENSIONS SHALL BE LIMITED TO 1 EACH PER HYDRANT.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

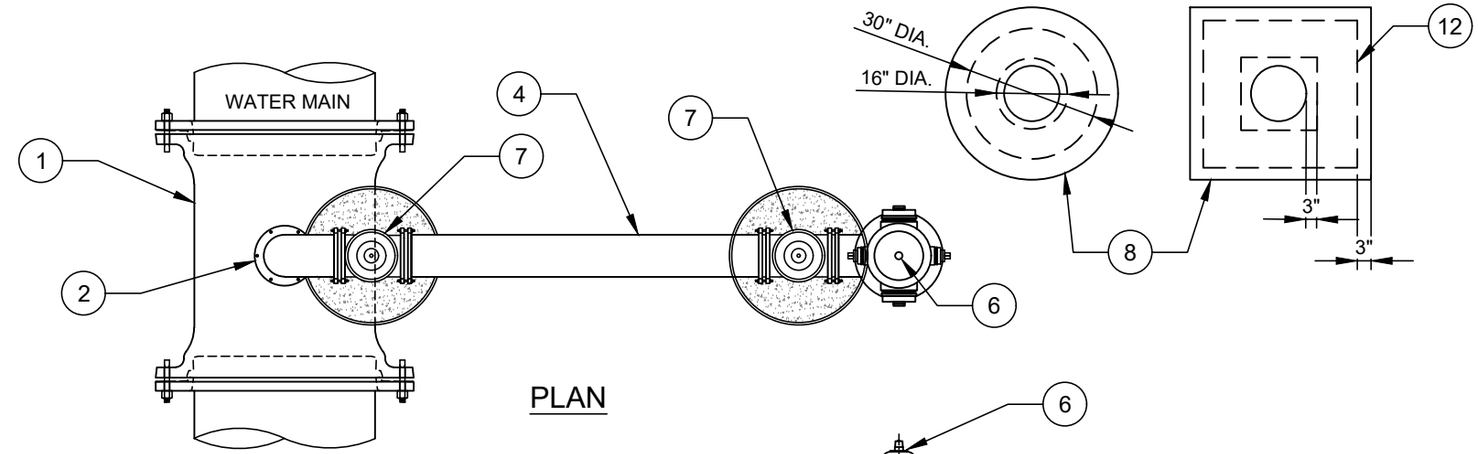
MANUAL 2" AND 6" AIR RELEASE FOR 6-INCH THROUGH 30-INCH DIAMETER MAINS

NO SCALE

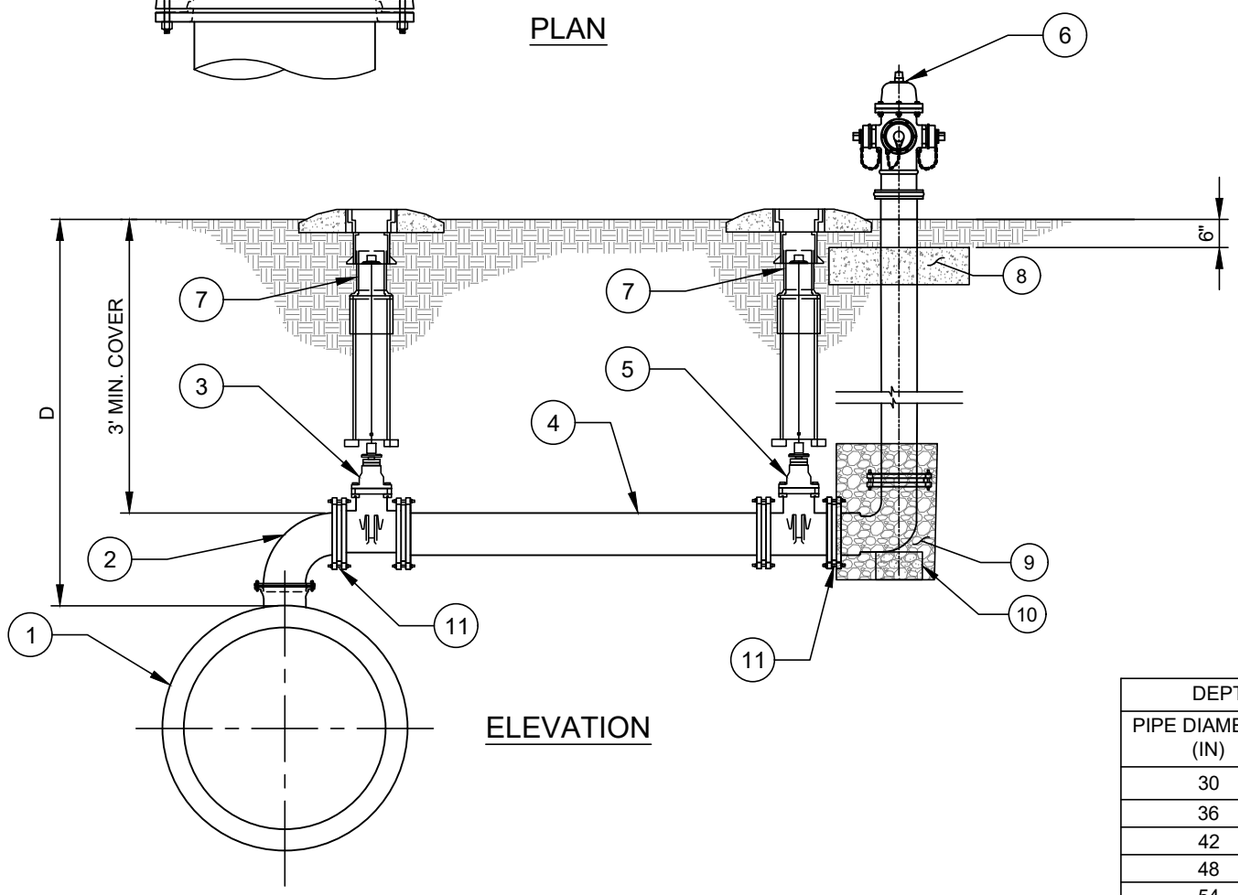
VERSION 1.0

DATE 04/2024

DETAIL 10.2.2



PLAN



ELEVATION

DEPTH OF COVER (D)	
PIPE DIAMETER (IN)	MINIMUM DEPTH (FT)
30	5.0
36	5.0
42	5.5
48	5.5
54	5.5
60	5.5
64	5.5

NO.	DESCRIPTION:
1.	RUN X 8" SWIVEL OR RMJ OUTLET TEE.
2.	8" 90° BEND (RMJ).
3.	8" RMJ GATE VALVE WITH FOSTER ADAPTOR.
4.	8" RJ DIP.
5.	8" RMJ GATE VALVE AT FH WITH FOSTER ADAPTOR.
6.	HIGH VELOCITY FIRE HYDRANT, 6' BOC OR 4' BACK OF DITCH CENTERLINE. FIRE HYDRANT SHALL BE PAINTED OSHA SAFETY BLUE. PUMP NOZZLES SHALL BE PARALLEL TO THE ROADWAY / CURB.
7.	VALVE BOX ASSEMBLY. SEE STANDARD DETAIL.
8.	CONCRETE HYDRANT COLLAR. CAST IN PLACE. 3' DIAMETER BY 8" THICK. REINFORCE WITH #4 REBARS.
9.	MINIMUM 9 CUBIC FEET OF #57 WASHED STONE PROPORTIONALLY AROUND FH SHOE. DO NOT COVER WEEP HOLE. ENCAPSULATE WASHED STONE WITH FILTER FABRIC.
10.	8" X 16" SOLID CONCRETE BLOCK.
11.	FOSTER ADAPTER.
12.	#4 REBARS

NOTES:

A. ALL PIPE AND FITTINGS TO BE RESTRAINED JOINT DIP WITH FACTORY RESTRAINED JOINT FITTINGS OR MJ FITTINGS WITH WEDGE ACTION RESTRAINT.

B. REFERENCE STANDARD DETAIL FOR AWG. #12 GAUGE SOLID COPPER TRACER WIRE WITH BLUE 30 MILS HDPE INSULATION.

C. SEE CONSTRUCTION PLANS FOR LOCATION OF HYDRANTS.

D. AIR RELEASE HYDRANTS SHALL BE INSTALLED AT ALL HIGH POINTS AS DIRECTED BY THE ENGINEER.

E. EXTENSION KITS REQUIRE THE APPROVAL OF THE ENGINEER. HYDRANT EXTENSION KITS SHALL BE LIMITED TO 1 EACH PER HYDRANT. DO NOT CAST THE CONRETE COLLAR ON THE EXTENSION JOINT.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

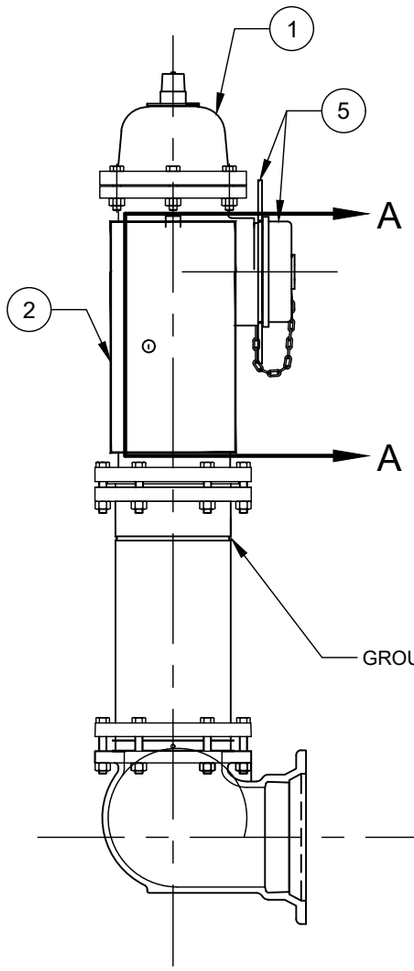
8-INCH MANUAL AIR RELEASE AND FH FOR 30-INCH THROUGH 64-INCH DIAMETER MAINS

NO SCALE

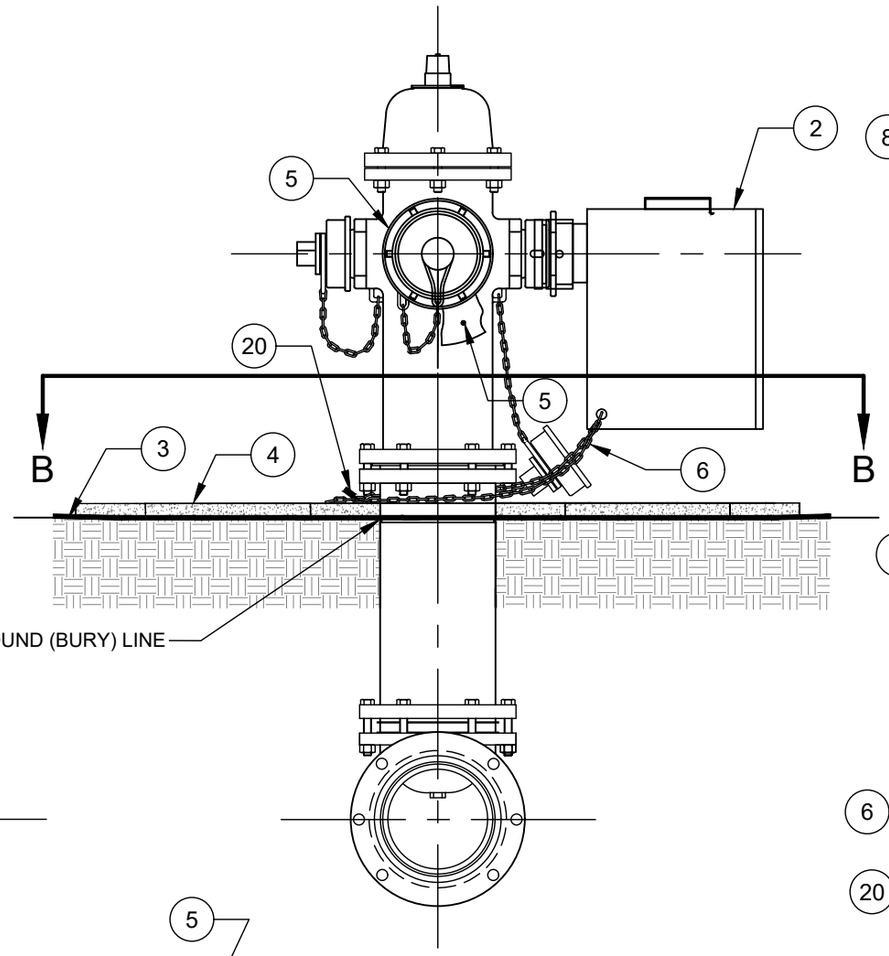
VERSION 1.0

DATE 04/2024

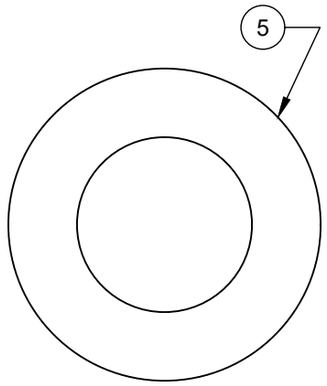
DETAIL 10.2.3



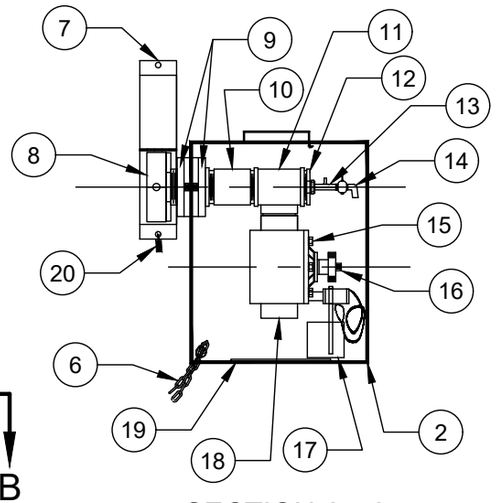
SIDE ELEVATION



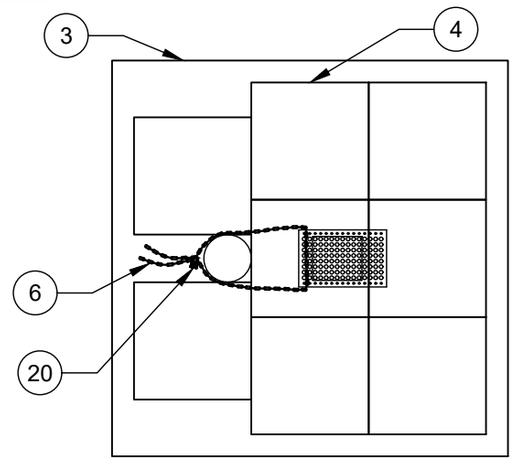
FRONT ELEVATION



RING DETAIL



SECTION A - A



SECTION B - B

NOTES:

A. AUTO FLUSHER IS INTENDED FOR WARM WEATHER USE. ASSEMBLY SHOULD BE REMOVED DURING COLD WEATHER MONTHS TO AVOID DAMAGE DUE TO FREEZING.

B. MANUAL FLUSHING REQUIRED TO MAINTAIN WATER QUALITY DURING COLD WEATHER MONTHS.

C. SHOWN AS TEMPORARY APPLICATION - IF PERMANENT INSTALLATION - REPLACE NO. 3 AND NO. 4 WITH CAST IN PLACE CONCRETE PAD - MIN. 4' X 4' X 4" THICK WITH WIRE REINFORCEMENT, FLUSH WITH FINISH GRADE.

NO.	DESCRIPTION:
1.	FIRE HYDRANT.
2.	KUPFERLE #9700-Y HYDRANT AUTO FLUSHER (YELLOW) (INCLUDING #8-19).
3.	6 MILS HDPE PLASTIC FILM (54" X 54") - SEE NOTE C.
4.	16" X 16" X 2" PATIO PAVERS - CONCRETE - 8 EA - SEE NOTE C.
5.	HYDRANT STORZ NOZZLE W/RED OUT-OF-SERVICE RING (O.D. = 12.5", I.D. = 7.0", t = 0.05").
6.	CAMPBELL BLU-KROME 1/4" PROOF COIL CHAIN 5 LF.
7.	LOCKING NOZZLE COLLAR - KUPFERLE #9708-Y WITH PADLOCK.
8.	2 1/2" FIRE HYDRANT NOZZLE COUPLING.
9.	KUPFERLE ADAPTER.
10.	2" THREADED NIPPLE.
11.	2" X 2" X 2" TEE FIP THREAD.
12.	PLUG/TAP.
13.	WATER SAMPLE VALVE.
14.	BRASS WATER SAMPLING BIBB.
15.	2" SOLENOID CONTROL VALVE; P-220 SERIES.
16.	MANUAL FLOW CONTROL KNOB.
17.	HUNTER DIGITAL PROGRAMMABLE CONTROLLER WITH 9 VOLT LITHIUM BATTERY.
18.	2" FIP OUTLET (MAY BE HARD PIPED FOR DISCHARGE).
19.	REMOVABLE DIFFUSER PLATE WITH 4 BOLTS/NUTS.
20.	PADLOCK (PROVIDED BY CLTW).

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

AUTOMATIC FLUSHER-HYDRANT

NO SCALE

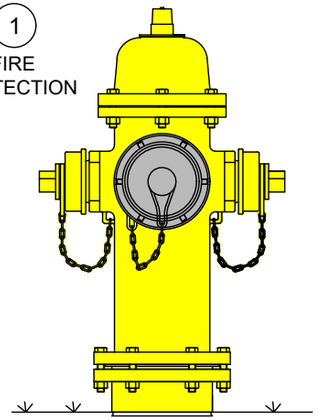
VERSION 1.0

DATE 04/2024

DETAIL 10.3.1

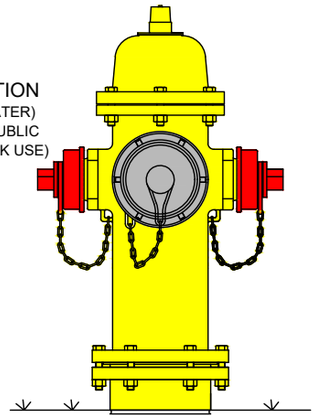
CLTW PUBLIC FIRE HYDRANTS

1
FIRE PROTECTION



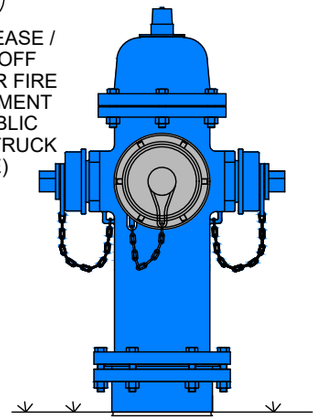
YELLOW / YELLOW

2
FIRE PROTECTION
(MUDDY WATER)
(NOT FOR PUBLIC WATER TRUCK USE)



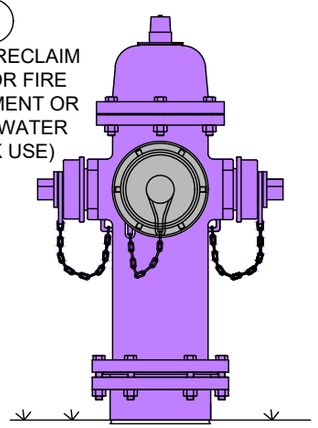
YELLOW / RED

3
AIR RELEASE / BLOW-OFF (NOT FOR FIRE DEPARTMENT OR PUBLIC WATER TRUCK USE)



BLUE / BLUE

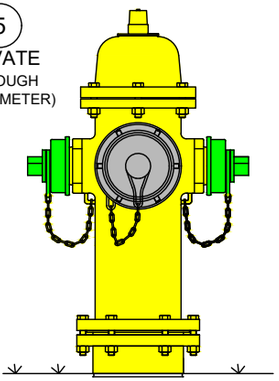
4
REUSE / RECLAIM (NOT FOR FIRE DEPARTMENT OR PUBLIC WATER TRUCK USE)



PURPLE / PURPLE
(PUMPER NOZZLE FACES AWAY FROM STREET)

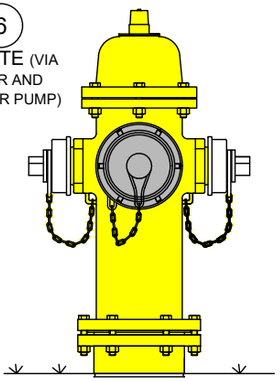
PRIVATE FIRE HYDRANTS (NOT FOR PUBLIC WATER TRUCK USE)

5
PRIVATE
(THROUGH WATER METER)



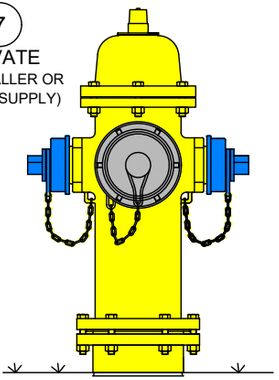
YELLOW / GREEN

6
PRIVATE (VIA METER AND BOOSTER PUMP)



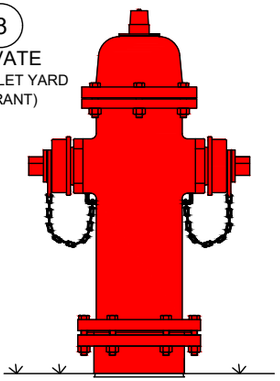
YELLOW / WHITE

7
PRIVATE
(6" & SMALLER OR LIMITED SUPPLY)



YELLOW / BLUE

8
PRIVATE
(2.5" OUTLET YARD HYDRANT)



RED / RED

CLTW / CFD COLOR LEGEND	
COLOR:	SHADE:
OSHA SAFETY YELLOW	
OSHA SAFETY BLUE	
OSHA SAFETY PURPLE	
OSHA SAFETY RED	
OSHA SAFETY GREEN	
OSHA SAFETY WHITE	

NOTES:
A. PUBLIC FIRE HYDRANTS ARE (1) CONNECTED DIRECTLY TO CLTW DISTRIBUTION SYSTEM, (2) OWNED AND MAINTAINED BY CLTW, AND (3) LOCATED WITHIN THE ROAD RIGHT-OF-WAY OR CLTW MAIN EASEMENT.
B. PRIVATE FIRE HYDRANTS ARE NON-PUBLIC FIRE HYDRANTS, INCLUDING HYDRANTS (1) SERVED VIA CLTW METER, (2) SERVED VIA PRIVATE WATER SYSTEM, AND ARE (3) LOCATED OUTSIDE THE ROAD RIGHT-OF-WAY AND (4) PRIVATELY OWNED AND MAINTAINED.

CLTW AND CHARLOTTE FIRE DEPARTMENT STANDARDS
COLOR SCHEME FOR CLTW PUBLIC FIRE HYDRANTS

FIRE HYDRANT CLASSIFICATION:	BARREL	SQUARE TOP / BONNET	STORZ PUMPER NOZZLE	IRON PUMPER NOZZLE	IRON HOSE NOZZLE
1 - FIRE PROTECTION	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	NOT PAINTED	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW
2 - FIRE PROTECTION MUDDY FLOW	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	NOT PAINTED	OSHA SAFETY RED	OSHA SAFETY RED
3 - AIR RELEASE	OSHA SAFETY BLUE	OSHA SAFETY BLUE	NOT PAINTED	OSHA SAFETY BLUE	OSHA SAFETY BLUE
3 - BLOW-OFF	OSHA SAFETY BLUE	OSHA SAFETY BLUE	NOT PAINTED	OSHA SAFETY BLUE	OSHA SAFETY BLUE
4 - REUSE / RECLAIM	OSHA SAFETY PURPLE	OSHA SAFETY PURPLE	NOT PAINTED	OSHA SAFETY PURPLE	OSHA SAFETY PURPLE

CHARLOTTE FIRE DEPARTMENT STANDARDS
COLOR SCHEME FOR PRIVATE FIRE HYDRANTS

CLASSIFICATION:	BARREL	TOP / BONNET	STORZ PUMPER NOZZLE	IRON PUMPER NOZZLE	IRON HOSE NOZZLE
5 - PRIVATE THROUGH WATER METER	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	NOT PAINTED	OSHA SAFETY GREEN	OSHA SAFETY GREEN
6 - PRIVATE via METER AND FIRE BOOSTER PUMP	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	NOT PAINTED	OSHA SAFETY WHITE	OSHA SAFETY WHITE
7 - PRIVATE (6-INCH AND SMALLER MAIN OR LIMITED SUPPLY)	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	NOT PAINTED	OSHA SAFETY BLUE	OSHA SAFETY BLUE
8 - PRIVATE (2.5-INCH OUTLET YARD HYDRANT)	OSHA SAFETY RED	OSHA SAFETY RED	N/A	N/A	OSHA SAFETY RED

INDUSTRY STANDARD - **NOT** ADOPTED OR USED BY CLTW/CFD
AWWA C-502 UNIFORM COLOR SCHEME FOR FIRE HYDRANTS
NFPA 291 RECOMMENDED PRACTICE FOR MARKING FIRE HYDRANTS

CLASSIFICATION:	FLOW CAPACITY (GPM AT 20 PSI RESIDUAL)	BARREL	TOP / BONNET	PUMPER NOZZLE	HOSE NOZZLE
CLASS AA	1500 OR GREATER	CHROME YELLOW	LIGHT BLUE	LIGHT BLUE	LIGHT BLUE
CLASS A	1000 TO 1499	CHROME YELLOW	GREEN	GREEN	GREEN
CLASS B	500 TO 999	CHROME YELLOW	ORANGE	ORANGE	ORANGE
CLASS C	LESS TO 500	CHROME YELLOW	RED	RED	RED

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

FIRE HYDRANT PAINT / COLOR SCHEMES
CLTW / CHARLOTTE FIRE DEPT. STANDARDS
PUBLIC AND PRIVATE HYDRANTS

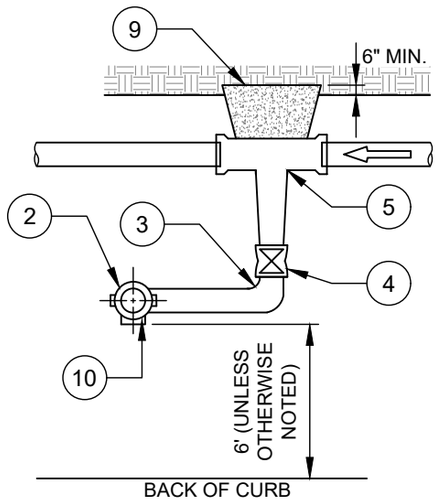
NO SCALE

VERSION 1.0

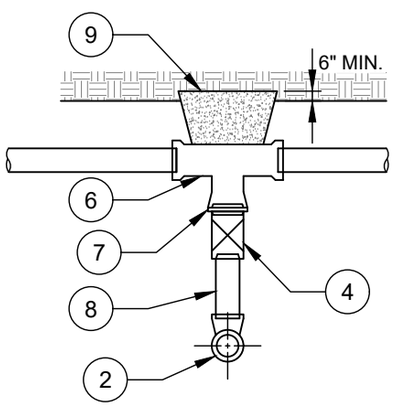
DATE 04/2024

DETAIL 10.3.2

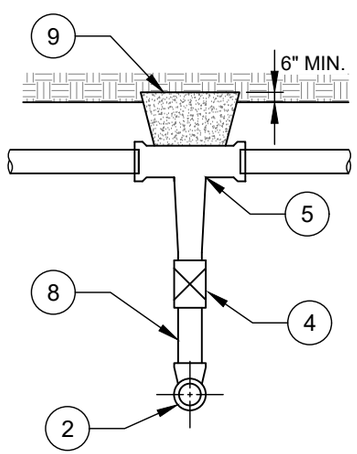
STANDARD FIRE HYDRANT WITH 8" PIPE



(1) PLAN VIEW

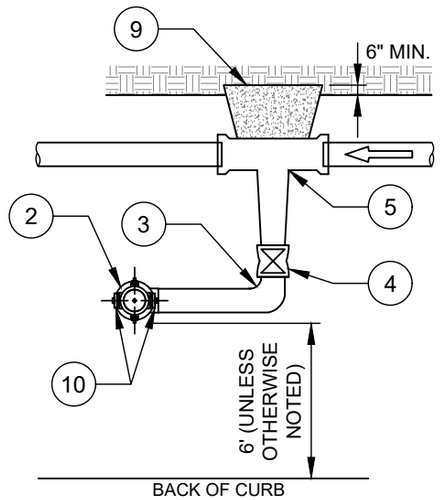


(2) PLAN VIEW

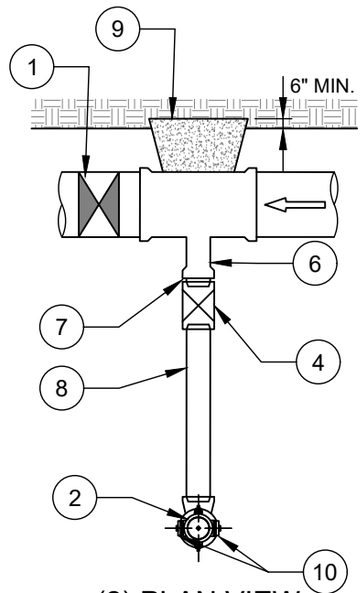


(3) PLAN VIEW

HIGH VELOCITY FIRE HYDRANT WITH 8" PIPE



(1) PLAN VIEW



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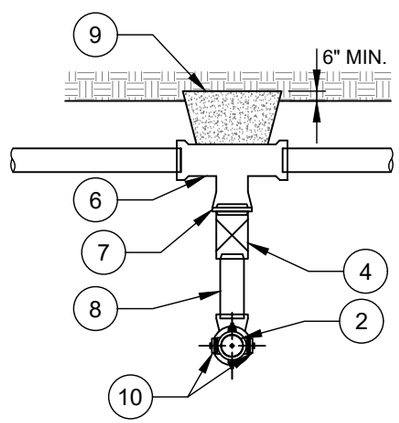
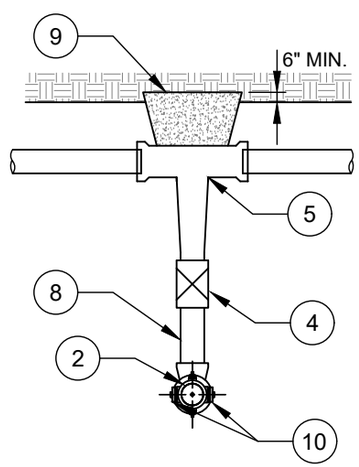


(3) PLAN VIEW



(4) PLAN VIEW

NO.	DESCRIPTION:
1.	MAIN LINE VALVE.
2.	STANDARD FIRE HYDRANT ON 8" MAINS AND HIGH VELOCITY FIRE HYDRANT ON 12" AND LARGER MAINS.
3.	8" SWIVEL 90° BEND.
4.	8" RMJ GATE VALVE.
5.	8" OUTLET SWIVEL HYDRANT TEE.
6.	8" OUTLET RMJ TEE.
7.	8" FOSTER ADAPTER WHICH BOLTS VALVE DIRECTLY TO TEE OR FH.
8.	DIP WITH MJ RESTRAINED JOINTS.
9.	3,600 PSI CONCRETE THRUST BLOCKING.
10.	PUMPER NOZZLE.

NOTES:

A. HYDRANT LOCATION: ON ROADS WITH CURB AND GUTTER, USE DETAIL (1) (THIS SHEET) IN ALL CASES UNLESS OTHERWISE APPROVED BY ENGINEER.

B. HYDRANT BURIAL TO BE MINIMUM 3'-6" UNLESS OTHERWISE APPROVED BY THE ENGINEER.

C. FOR HYDRANTS ON DEAD END LINES, MAIN LINE VALVES ARE LOCATED DOWNSTREAM OF HYDRANT.

D. EXTENSIONS REQUIRED AS APPROVED BY THE ENGINEER. NO MORE THAN ONE HYDRANT EXTENSION IS ALLOWED. IF EXTENSION IS USED, DO NOT CAST HYDRANT COLLAR ON EXTENSION JOINT.

E. PUMPER NOZZLE TO FACE THE ROADWAY ON STANDARD FIRE HYDRANTS. PUMPER NOZZLES SHALL BE PARALLEL WITH ROAD ON HIGH VELOCITY FIRE HYDRANTS.

F. CONCRETE BLOCKING TO EXTEND TO UNDISTURBED EARTH, AMOUNT APPROVED BY THE ENGINEER.

G. SEE CLTW STANDARD DETAIL FOR PLACEMENT OF FIRE HYDRANT IN NCDOT R/W.

H. ALL HYDRANT PIPING SHALL BE RESTRAINED JOINT DIP.

I. FLOW DIRECTION ARROW IS THE PRIMARY WATER FLOW DIRECTION BASED ON HYDRAULICS OR DEAD END PIPE AND CONTROLS THE VALVE LOCATION.

J. HIGH VELOCITY MAINS ARE CLASSIFIED AS 12" MAINS OR LARGER.

K. MAIN LINE VALVES ARE FOR MAINS 30" AND LARGER.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

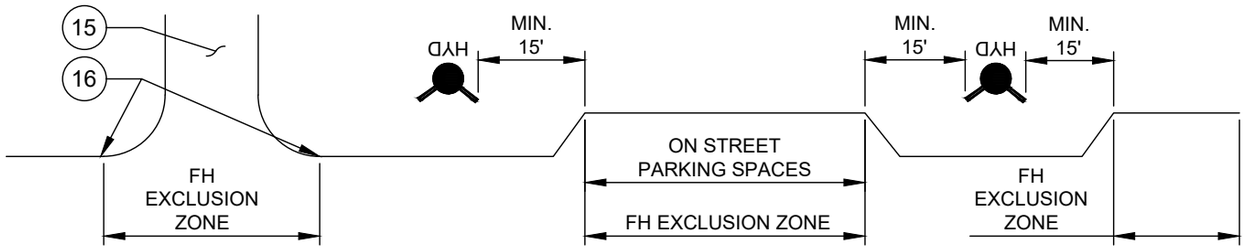
FIRE HYDRANT DETAIL

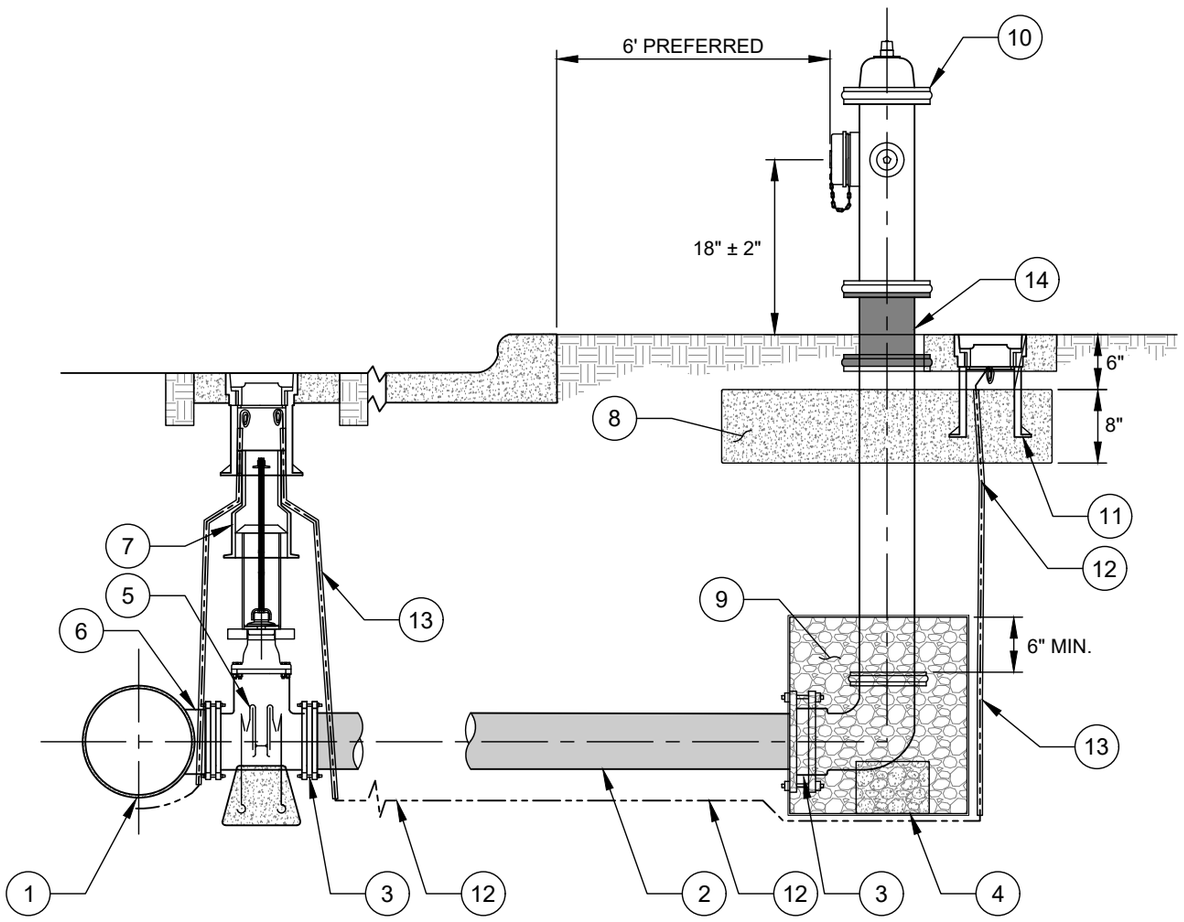
NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.3.3





NOTES:

A. HYDRANT LOCATION: ON ROADS WITH CURB AND GUTTER, USE EXISTING CLTW STANDARD DETAIL FOR FIRE HYDRANTS IN ALL CASES UNLESS OTHERWISE NOTED BY THE ENGINEER.

B. HYDRANT BURIAL TO BE MINIMUM 3'-6" UNLESS OTHERWISE APPROVED BY THE ENGINEER.

C. EXTENSIONS REQUIRED AS APPROVED BY THE ENGINEER. NO MORE THAN ONE HYDRANT EXTENSION IS ALLOWED. IF EXTENSION IS USED, DO NOT CAST HYDRANT COLLAR ON EXTENSION JOINT.

D. ON ROADS WITHOUT SIDE DITCH OR CURB, HYDRANT SHALL BE LOCATED ONE FOOT INSIDE THE ROAD RIGHT OF WAY OR 1 FT OUTSIDE THE DOT CLEAR RECOVERY ZONE.

E. ON ROADS WITH SIDE DITCH, FIRE HYDRANT SHALL BE LOCATED A MINIMUM OF FOUR FEET BACK OF SIDE DITCH CENTERLINE.

NO.	DESCRIPTION:
1.	HDPE WATER MAIN.
2.	HDPE PIPE.
3.	ELECTROFUSION COUPLING OR RESTRAINED MJ ADAPTER WITH STAINLESS STEEL STIFFENER AND ACCESSORY KIT. SEE STANDARD DETAIL FOR TRANSITION DETAIL.
4.	CONCRETE BLOCK - 8" X 16" SOLID CONCRETE BLOCK.
5.	RESILIENT SEAT GATE VALVE WITH CONCRETE SUPPORT.
6.	FOR CONNECTION TO NEW CONSTRUCTION, REFER TO APPROPRIATE STANDARD DETAIL. FOR CONNECTION TO EXISTING MAIN, REFER TO APPROPRIATE STANDARD DETAIL.
7.	VALVE BOX ASSEMBLY - SEE CLTW STANDARD DETAIL.
8.	CONCRETE LATERAL THRUST COLLAR. CAST IN PLACE. 3' DIAMETER BY 8" THICK. REINFORCE WITH #4 REBARS.
9.	MINIMUM 9 CUBIC FEET OF #57 WASHED STONE PROPORTIONALLY AROUND BASE. DO NOT COVER WEEP HOLE. ENCAPSULATE FILTER FABRIC AROUND WASHED STONE.
10.	STANDARD HYDRANT PER CLTW SPECIFICATIONS.
11.	SEE CLTW TRACER WIRE STANDARD DETAILS FOR TERMINATION METHOD.
12.	AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH BLUE 30 MILS HDPE INSULATION.
13.	ALL VERTICAL WIRE SHALL BE PLACED IN 1/4" OR 3/8" ID CONDUIT SDR 9 PEX TUBING - ASTM F876 (TYP.).
14.	EXTENSION KIT FROM FIRE HYDRANT MANUFACTURER.
15.	STREET OR DRIVEWAY.
16.	CURB/PAVEMENT RADIUS POINT.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

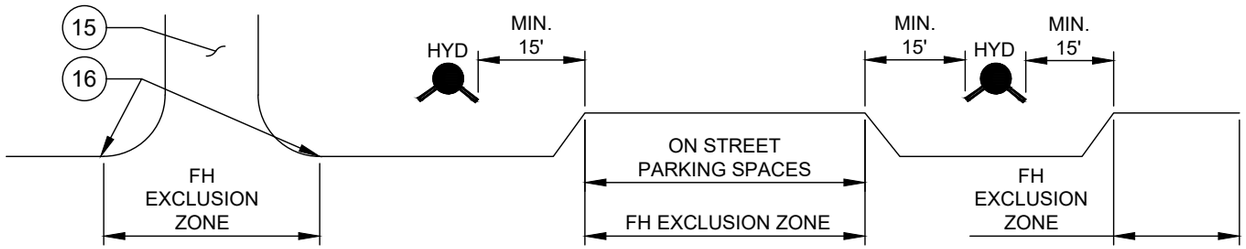
HYDRANT CONNECTION FOR HDPE PIPE

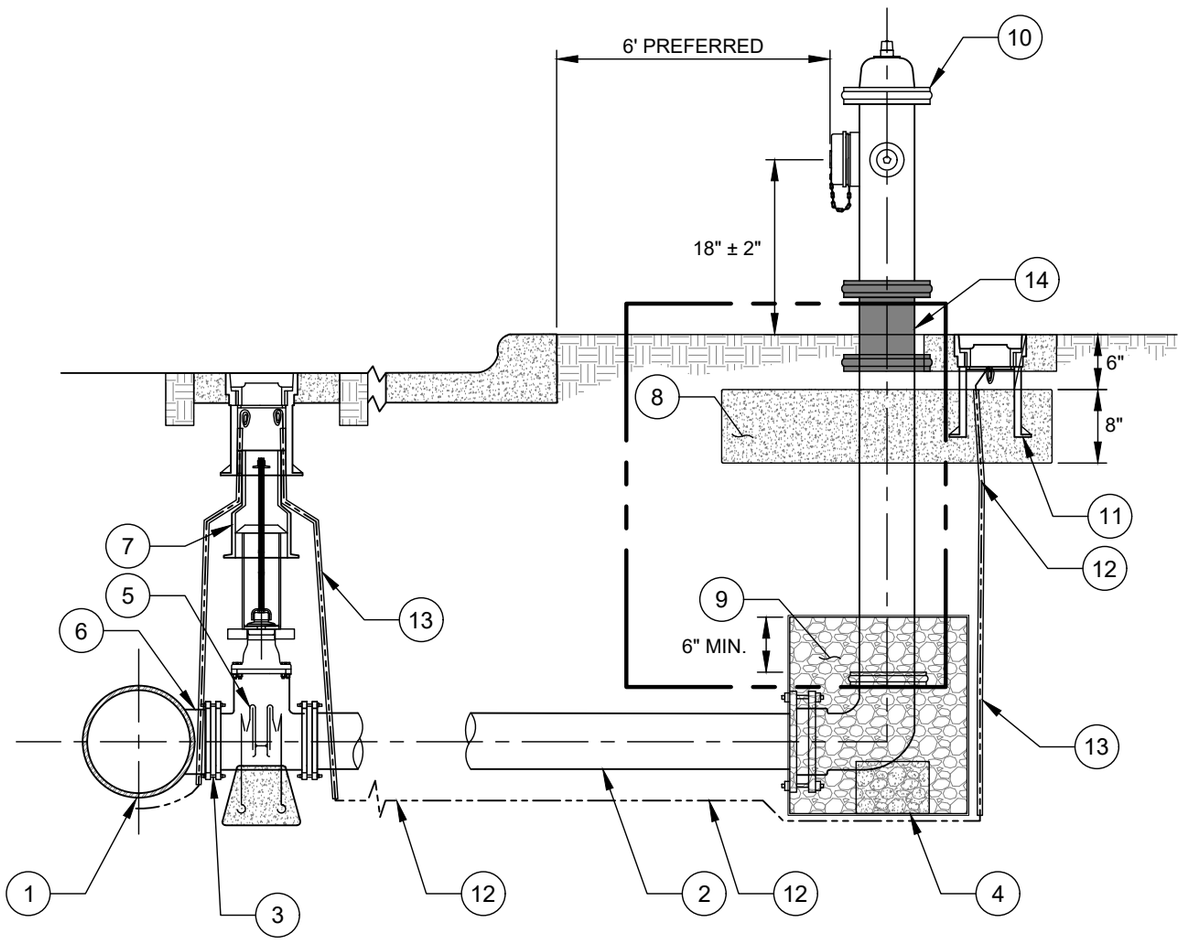
NO SCALE

VERSION
1.0

DATE
04/2024

DETAIL
10.3.4





NOTES:

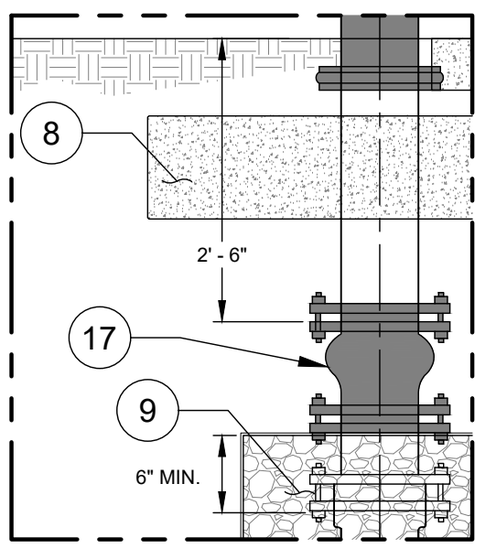
A. HYDRANT LOCATION: ON ROADS WITH CURB AND GUTTER, USE EXISTING CLTW STANDARD DETAIL FOR FIRE HYDRANTS IN ALL CASES UNLESS OTHERWISE NOTED BY THE ENGINEER.

B. HYDRANT BURIAL TO BE MINIMUM 3'-6" UNLESS OTHERWISE APPROVED BY THE ENGINEER.

C. EXTENSIONS REQUIRED AS APPROVED BY THE ENGINEER. NO MORE THAN ONE HYDRANT EXTENSION IS ALLOWED. IF EXTENSION IS USED, DO NOT CAST HYDRANT COLLAR ON EXTENSION JOINT.

D. ON ROADS WITHOUT SIDE DITCH OR CURB, HYDRANT SHALL BE LOCATED ONE FOOT INSIDE THE ROAD RIGHT OF WAY OR 1 FT OUTSIDE THE DOT CLEAR RECOVERY ZONE.

E. ON ROADS WITH SIDE DITCH, FIRE HYDRANT SHALL BE LOCATED A MINIMUM OF FOUR FEET BACK OF SIDE DITCH CENTERLINE.



OPTIONAL

NO.	DESCRIPTION:
1.	WATER MAIN.
2.	DIP WITH MJ RESTRAINED JOINTS.
3.	FOSTER ADAPTER.
4.	CONCRETE BLOCK - 8" X 16" SOLID CONCRETE BLOCK.
5.	RESILIENT SEAT GATE VALVE WITH CONCRETE SUPPORT.
6.	FOR CONNECTION TO NEW CONSTRUCTION, REFER TO APPROPRIATE STANDARD DETAIL. FOR CONNECTION TO EXISTING MAIN, REFER TO APPROPRIATE STANDARD DETAIL.
7.	VALVE BOX ASSEMBLY - SEE CLTW STANDARD DETAIL.
8.	CONCRETE LATERAL THRUST COLLAR. CAST IN PLACE. 3' DIAMETER BY 8" THICK. REINFORCE WITH #4 REBARS.
9.	MINIMUM 9 CUBIC FEET OF #57 WASHED STONE PROPORTIONALLY AROUND BASE. DO NOT COVER WEEP HOLE. ENCAPSULATE FILTER FABRIC AROUND WASHED STONE.
10.	STANDARD HYDRANT PER CLTW SPECIFICATIONS.
11.	SEE CLTW TRACER WIRE STANDARD DETAILS FOR TERMINATION METHOD.
12.	AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH BLUE 30 MILS HDPE INSULATION.
13.	ALL VERTICAL WIRE SHALL BE PLACED IN 1/4" OR 3/8" ID CONDUIT SDR 9 PEX TUBING - ASTM F876 (TYP.).
14.	EXTENSION KIT FROM FIRE HYDRANT MANUFACTURER.
15.	STREET OR DRIVEWAY.
16.	CURB/PAVEMENT RADIUS POINT.
17.	VERTICAL FLANGE SHOE (OPTIONAL).

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

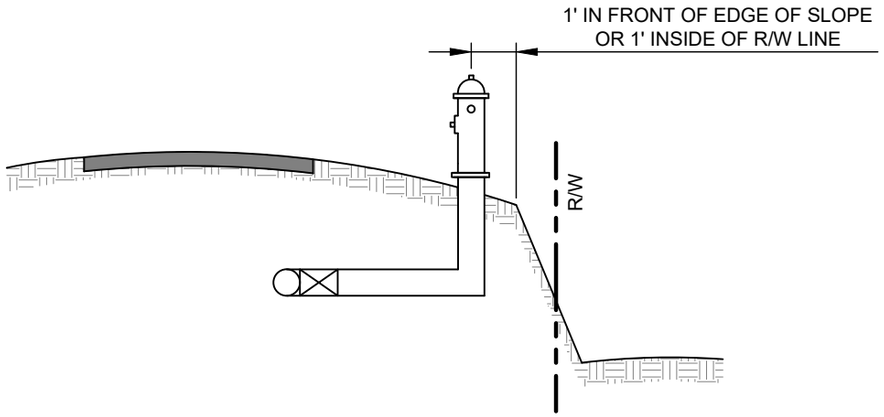
STANDARD HYDRANT CONNECTION

NO SCALE

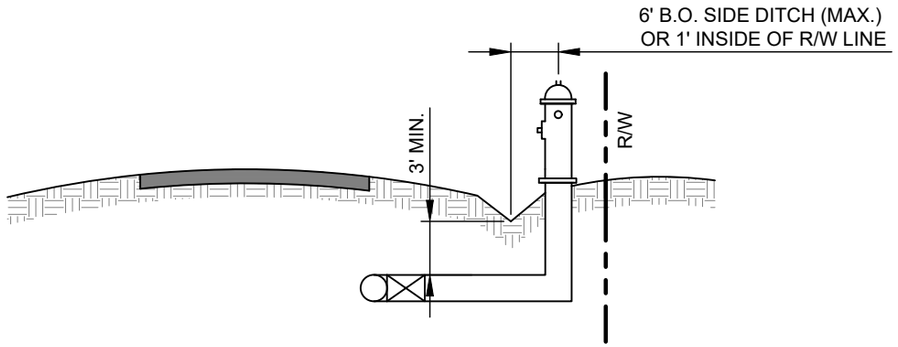
VERSION
1.0

DATE
04/2024

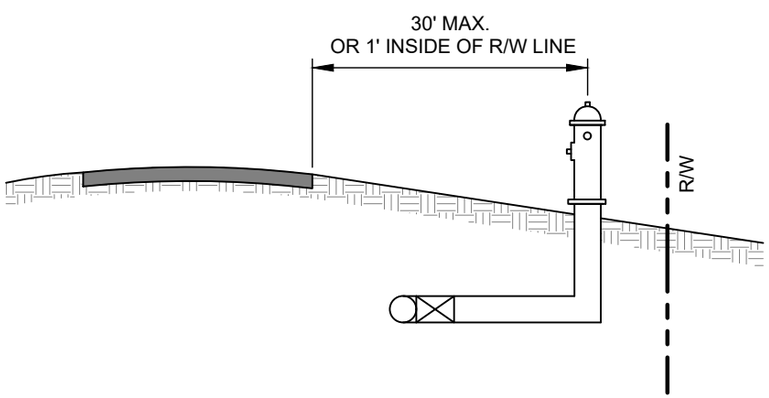
DETAIL
10.3.5



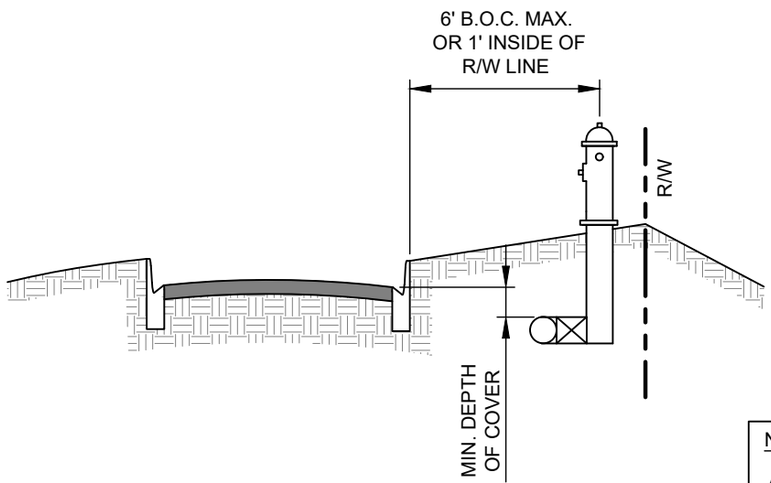
ROAD IN FILL SECTION



ROAD WITH SIDE DITCH



ROAD WITH NO SIDE DITCH



ROAD WITH CURB AND GUTTER

NOTES:

A. IN ALL CASES FIRE HYDRANT SHALL BE A MINIMUM OF 1' INSIDE ROAD R/W.

B. MAINLINE VALVES, GUARD VALVE, AND FIRE HYDRANT SHALL NOT BE PLACED IN DITCHLINE.

C. HYDRANT SHALL BE UNOBSTRUCTED.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

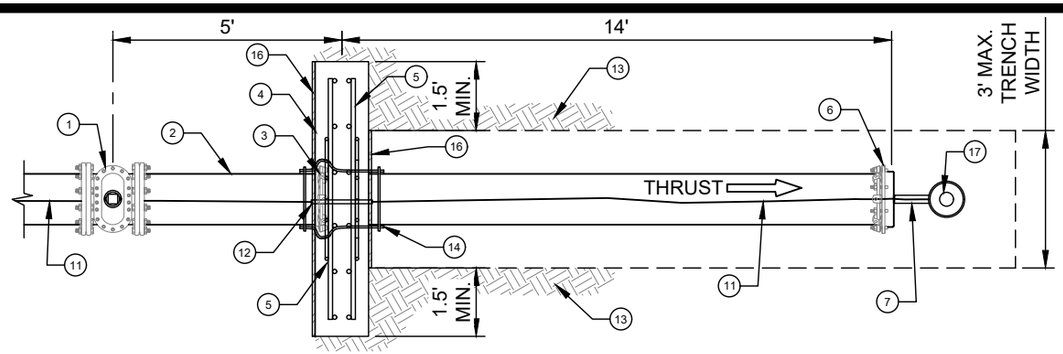
FIRE HYDRANT IN NCDOT R/W

NO SCALE

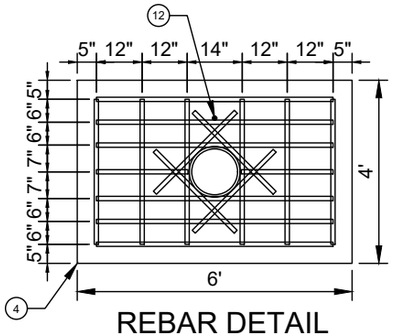
VERSION 1.0

DATE 04/2024

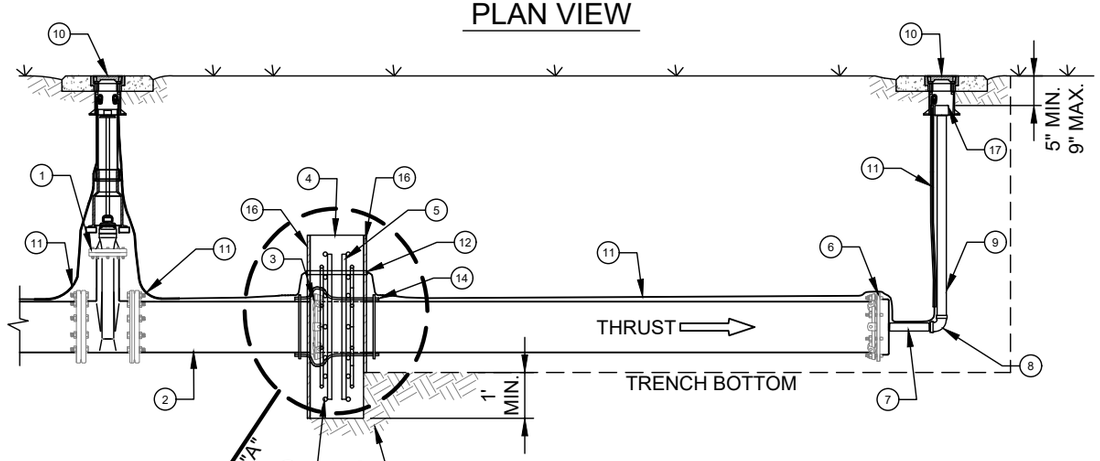
DETAIL 10.3.6



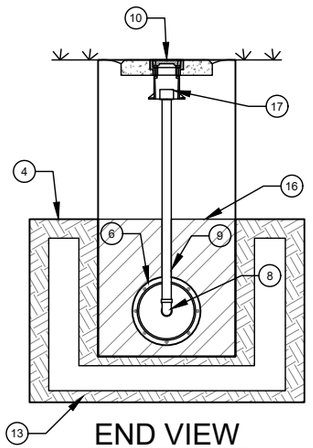
PLAN VIEW



REBAR DETAIL



ELEVATION VIEW

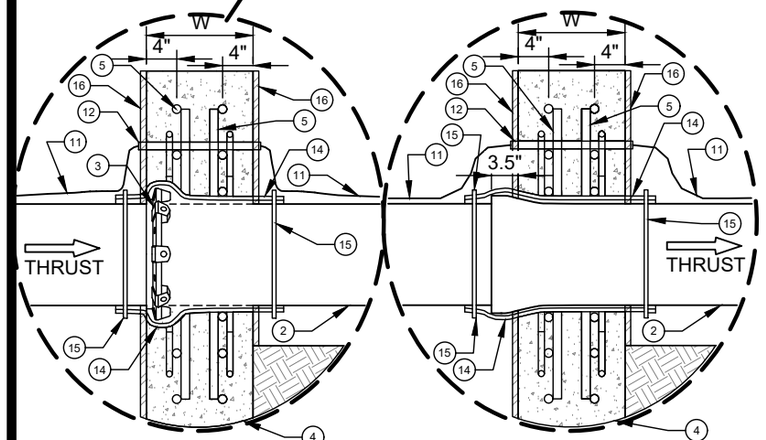


END VIEW

NO.	DESCRIPTION:
1.	END OF LINE GATE VALVE (MJ X MJ).
2.	DIP - (PE X PE) - REMOVE BELL - LENGTH = 19 FT.
3.	WEDGE ACTION THRUST RESTRAINT GLAND.
4.	CONCRETE WALL BLOCK (f'c = 3,600 PSI MIN.) 6' X 4' X WIDTH (W).
5.	REBARS - GRADE 60 PER ASTM A615 - SEE REBAR SCHEDULES.
6.	MJ CAP - WITH WEDGE ACTION RESTRAINT GLAND, TAP 2" THREADED OUTLET (FNPT).
7.	2" RED BRASS (OR STAINLESS STEEL (S.S.)) NIPPLE SCH 40 (MNPT X MNPT) - LENGTH = 12 INCH.
8.	2" RED BRASS (OR S.S.) 90° BEND (FNPT X FNPT).
9.	2" RED BRASS (OR S.S.) NIPPLE SCH 40 (MNPT X MNPT) - LENGTH AS REQUIRED.
10.	STANDARD VALVE BOX ASSEMBLY - SEE DETAIL.
11.	AWG #12 GAUGE COPPER TRACER WIRE - WITH BLUE INSULATION (30 MILS HDPE) TERMINATE WITH 24" EXCESS WIRE (COILED) IN VALVE BOX (TYP.).
12.	1" SCH 40 PVC ELECTRICAL CONDUIT - LENGTH AS REQUIRED.
13.	UNDISTURBED SOIL.
14.	HIGH DENSITY CROSS LAMINATED POLYETHYLENE FILM TUBE (HDCLPE) AWWA C105 - 4 MILS EACH X 2 LAYER - 8 MILS TOTAL.
15.	HDPE ADHESIVE TAPE OR HDPE ZIP LOCK TIES.
16.	PLYWOOD FORM.
17.	2" SCH. 40 RED BRASS OR 2" DUCTILE IRON (FUSION BONDED EPOXY COATED) THREADED COUPLING (FNPT) OR S.S. THREADED COUPLING.

NOTES:

A. WHEN DIRECTED BY THE ENGINEER, THE CONCRETE WALL BLOCK SIZE MAY BE ADJUSTED, BASED ON ACTUAL SOIL CLASSIFICATION AND PIPE DIAMETER.
B. FULLY RESTRAINED JOINT PIPE MAY BE USED IN LIEU OF THIS DETAIL AS CALCULATED BY ENGINEER. LENGTH OF RESTRAINT SHALL BE BASED UPON ACTUAL SOIL CONDITIONS. LENGTH OF RESTRAINT SHALL BE CALLED OUT ON PLANS - SEE RESTRAINED JOINT PIPE DETAILS.
C. ALTERNATE DETAIL "A" (USING A REVERSED BELL) MAY BE USED IN LIEU OF DETAIL "A".



DETAIL "A"

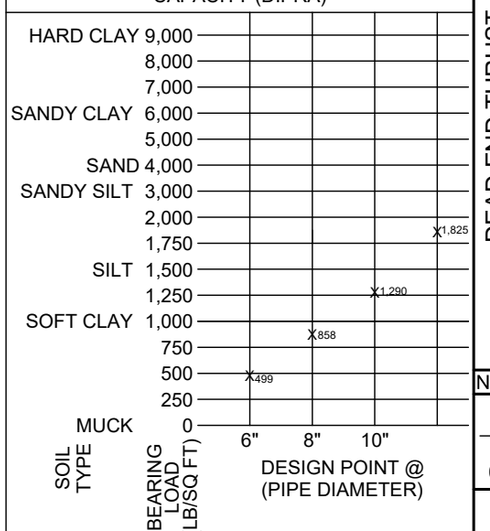
DETAIL "A" (ALT)

APPROX. DEAD END THRUST (DIPRA) AT 200 PSI WATER PRESSURE		UNDISTURBED SOIL BEARING AREA	APPROX. SOIL PRESSURE	W (WIDTH) (MINIMUM)	CONCRETE VOLUME (APPROXIMATE)	
PIPE DIAMETER (INCHES)	TOTAL THRUST (POUNDS)	SQUARE FEET	BEARING LOAD (LB/SQ FT)	INCHES	FT^3	CY
6	7,478	15	499	10	20	0.74
8	12,866	15	858	12	24	0.89
10	19,354	15	1,290	12	24	0.89
12	27,370	15	1,825	14	28	1.04

REBAR SCHEDULE		
TYPE	LENGTH (INCHES)	NUMBER REQUIRED
VERTICAL	38	6
HORIZONTAL	62	6
HORIZONTAL	24	2
DIAGONAL	30	4

REBAR DIAMETER SCHEDULE				
PIPE DIAMETER	BAR SIZE	TOTAL REBAR LENGTH (FT)	TOTAL REBAR WEIGHT (LB) ONE MAT	TOTAL REBAR WEIGHT (LB) TWO MATS
6"	#5	64	67	134
8"	#5	64	67	134
10"	#5	64	67	134
12"	#5	64	67	134

APPROXIMATE SOIL BEARING CAPACITY (DIPRA)



CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

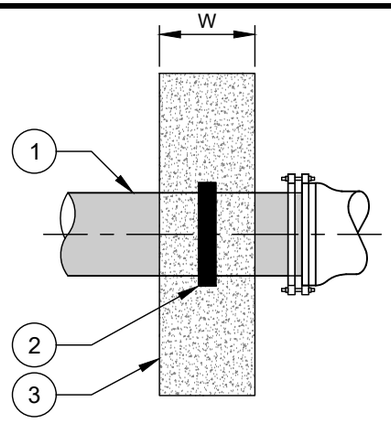
DEAD END THRUST - WALL BLOCKING AND 2-INCH BLOW-OFF ASSEMBLY 6-INCH THROUGH 12-INCH MAINS

NO SCALE

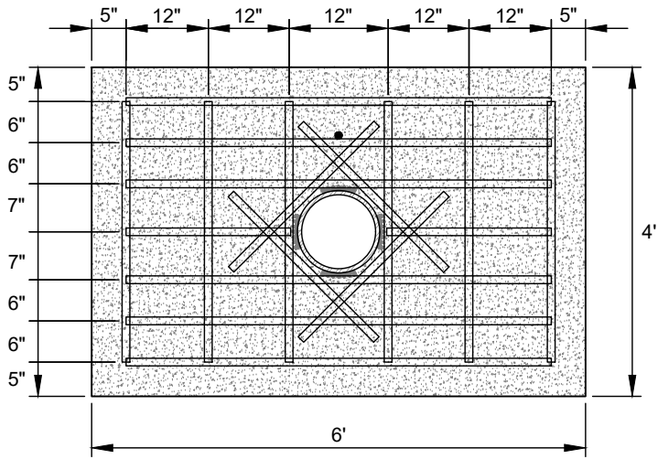
VERSION 1.0

DATE 04/2024

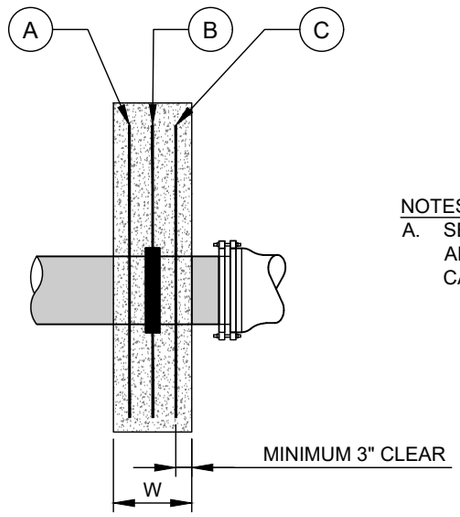
DETAIL 10.4.1



ELEVATION VIEW



REBAR DETAIL: FRONT VIEW



REBAR DETAIL: SIDE VIEW

MINIMUM NUMBER OF FLEX RESTRAINTS BY PIPE SIZE	
HDPE NOMINAL PIPE SIZE (INCHES)	NUMBER OF FLEX RESTRAINTS
4 THROUGH 8	2
10 THROUGH 12	3

NOTES TO DESIGNER

A. SEALING ENGINEER TO CONFIRM ADEQUATE SOIL PRESSURE BEARING CAPACITY FOR THRUST BLOCK.

NO.	DESCRIPTION:
1.	HDPE PIPE.
2.	ELECTROFUSED HDPE FLEX RESTRAINT OR WALL ANCHOR.
3.	CONCRETE WALL BLOCKING - f'c = MINIMUM 3,600 PSI.
4.	FLEX RESTRAINTS FOR HDPE PIPE. SEE TABLE FOR REQUIRED NUMBER OF FLEX RESTRAINTS BY PIPE SIZE. COMPLY WITH MANUFACTURERS INSTRUCTIONS FOR NUMBER OF FLEX RESTRAINTS IF GREATER THAN SHOWN IN TABLE.
5.	AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH BLUE 30 MILS HDPE INSULATION.

NOTES:

A. WHEN DIRECTED BY THE SEALING ENGINEER, THE CONCRETE WALL BLOCK SIZE MAY BE ADJUSTED, BASED ON ACTUAL SOIL CLASSIFICATION AND PIPE DIAMETER.

B. FLEX RESTRAINTS MUST BE RATED AT 8,000 LBS OF FORCE OR HIGHER.

REBAR NOTES:

a. FOR 4" TO 10" PIPE, PLACE ONE REBAR MAT AT LOCATION B ON THE REBAR DETAIL: SIDE VIEW.

b. FOR 12" PIPE, PLACE TWO REBAR MATS - ONE AT LOCATION "A" AND ONE AT LOCATION "C" ON THE REBAR DETAIL: SIDE VIEW.

REBAR SCHEDULE			
TYPE	LENGTH (INCHES)	NUMBER REQUIRED FOR ONE MAT	NUMBER REQUIRED FOR TWO MATS
VERTICAL	38	6	12
HORIZONTAL	62	6	12
DIAGONAL	30	4	8
HORIZONTAL	24	2	4

REBAR DIAMETER SCHEDULE				
HDPE NOMINAL PIPE DIAMETER (INCHES)	BAR SIZE	TOTAL REBAR LENGTH (FT)	TOTAL REBAR WEIGHT (LB) ONE MAT	TOTAL REBAR WEIGHT (LB) TWO MATS
4	#5	64	67	134
6	#5	64	67	134
8	#5	64	67	134
10	#5	64	67	134
12	#5	64	67	134

APPROX. DEAD END THRUST AT 200 PSI WATER PRESSURE		UNDISTURBED SOIL BEARING AREA (SQUARE FEET)	APPROX. SOIL PRESSURE	W MINIMUM WIDTH (INCHES)	APPROXIMATE CONCRETE VOLUME	
HDPE NOMINAL PIPE DIAMETER (INCHES)	TOTAL THRUST (POUNDS)		BEARING LOAD (LB/SQ FT)		(CUBIC FEET)	(CUBIC YARD)
4	2,130	15	142	10	20	0.74
6	4,616	15	308	10	20	0.74
8	7,823	15	522	12	24	0.89
10	12,153	15	810	12	24	0.89
12	17,094	15	1,140	14	28	1.04

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

CONCRETE WALL BLOCKING FOR HDPE PIPE (4-INCH TO 12-INCH)

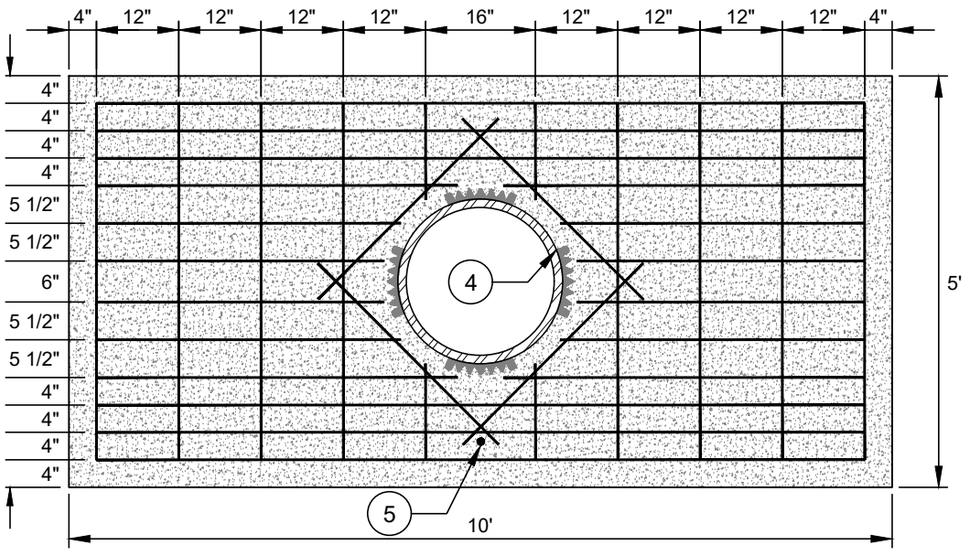
NO SCALE

VERSION 1.0

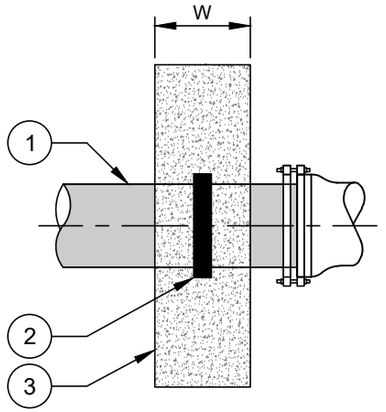
DATE 04/2024

DETAIL 10.4.2

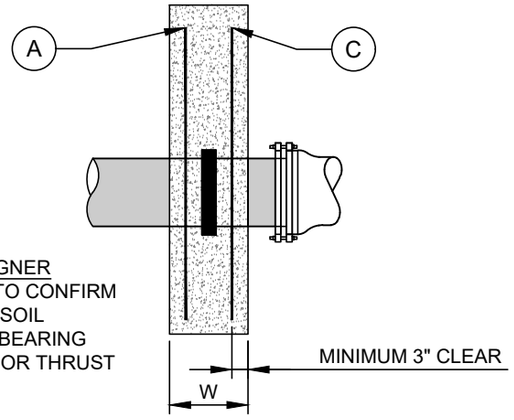
MINIMUM NUMBER OF FLEX RESTRAINTS BY PIPE SIZE	
HDPE NOMINAL PIPE SIZE (INCHES)	NUMBER OF FLEX RESTRAINTS
14	4
16	6
18	7
24	10
32	17



REBAR DETAIL: FRONT VIEW



ELEVATION VIEW



NOTES TO DESIGNER

A. ENGINEER TO CONFIRM ADEQUATE SOIL PRESSURE BEARING CAPACITY FOR THRUST BLOCK.

REBAR DETAIL: SIDE VIEW

NO.	DESCRIPTION:
1.	HDPE PIPE.
2.	ELECTROFUSED HDPE FLEX RESTRAINT OR WALL ANCHOR.
3.	CONCRETE WALL BLOCKING - f'c = MINIMUM 3,600 PSI.
4.	FLEX RESTRAINTS FOR HDPE PIPE. SEE TABLE FOR REQUIRED NUMBER OF FLEX RESTRAINTS BY PIPE SIZE. COMPLY WITH MANUFACTURERS INSTRUCTIONS FOR NUMBER OF FLEX RESTRAINTS IF GREATER THAN SHOWN IN TABLE.
5.	AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH BLUE 30 MIL HDPE INSULATION.

NOTES:

A. WHEN DIRECTED BY THE SEALING ENGINEER, THE CONCRETE WALL BLOCK SIZE MAY BE ADJUSTED, BASED ON ACTUAL SOIL CLASSIFICATION AND PIPE DIAMETER.

B. FLEX RESTRAINTS MUST BE RATED AT 8,000 LBS OF FORCE OR HIGHER.

REBAR NOTES:

a. FOR 14" TO 32" PIPE, PLACE REBAR MATS BOTH AT LOCATION "A" AND LOCATION "C" ON THE REBAR DETAIL: SIDE VIEW.

REBAR SCHEDULE			
TYPE	LENGTH (INCHES)	NUMBER REQUIRED FOR ONE MAT	NUMBER REQUIRED FOR TWO MATS
VERTICAL	52	8	16
VERTICAL	10	4	8
HORIZONTAL	112	6	12
HORIZONTAL	48	4	8
DIAGONAL	48	4	8

REBAR DIAMETER SCHEDULE				
HDPE NOMINAL PIPE DIAMETER (INCHES)	BAR SIZE	TOTAL LENGTH OF REBAR (FT)	TOTAL REBAR WEIGHT (LB) ONE MAT	TOTAL REBAR WEIGHT (LB) TWO MATS
14	#5	126	131	262
16	#5	126	131	262
18	#5	126	131	262
20	#5	126	131	262
24	#5	126	131	262
30	#7	126	257	514
32	#7	126	257	514

APPROX. DEAD END THRUST AT 200 PSI WATER PRESSURE		UNDISTURBED SOIL BEARING AREA (SQUARE FEET)	APPROX. SOIL PRESSURE	W MINIMUM WIDTH (INCHES)	APPROXIMATE CONCRETE VOLUME	
HDPE NOMINAL PIPE DIAMETER (INCHES)	TOTAL THRUST (POUNDS)		BEARING LOAD (LB/SQ FT)		(CUBIC FEET)	(CUBIC YARD)
14	20,608	30	687	14	58	2.16
16	26,915	30	897	16	67	2.47
18	34,073	30	1,136	16	67	2.47
20	42,063	30	1,402	18	75	2.78
24	60,566	30	2,019	18	75	2.78
30	94,641	30	3,155	22	92	3.40
32	107,678	30	3,589	22	92	3.40

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

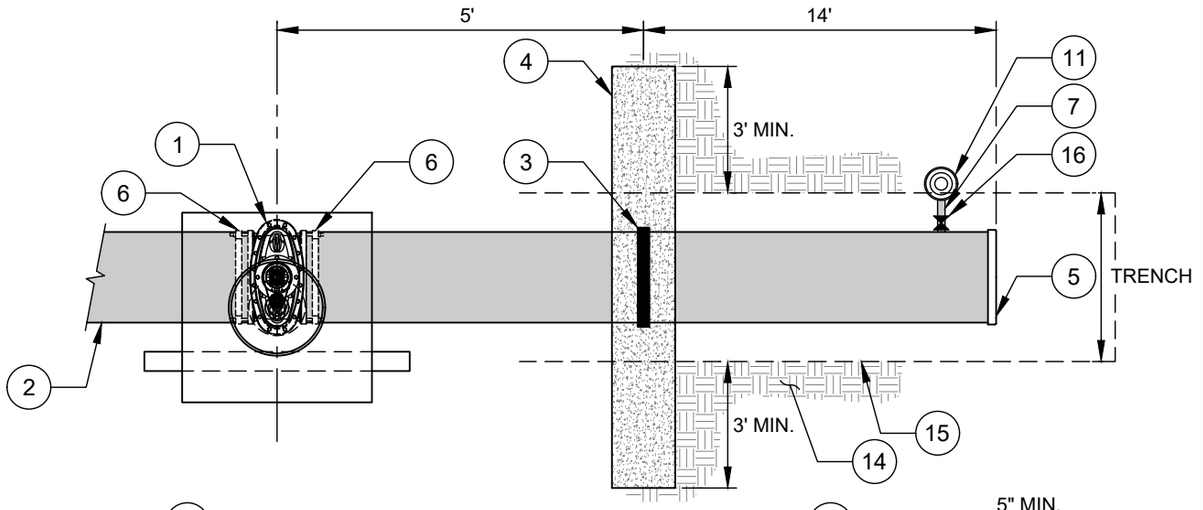
CONCRETE WALL BLOCKING FOR HDPE PIPE (14-INCH TO 32-INCH)

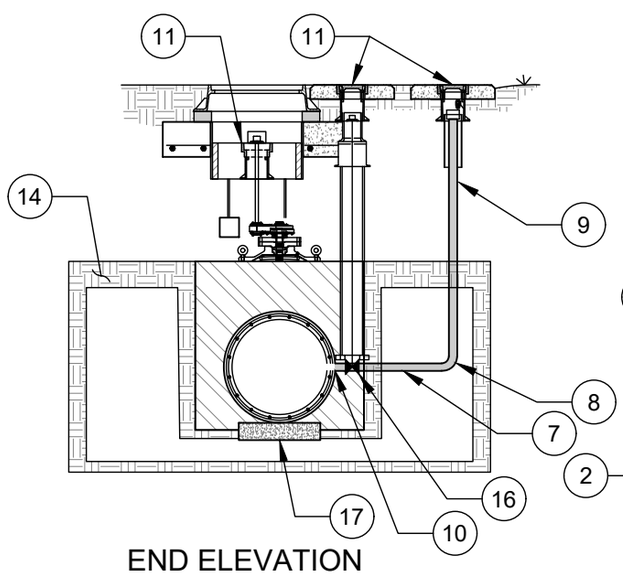
NO SCALE

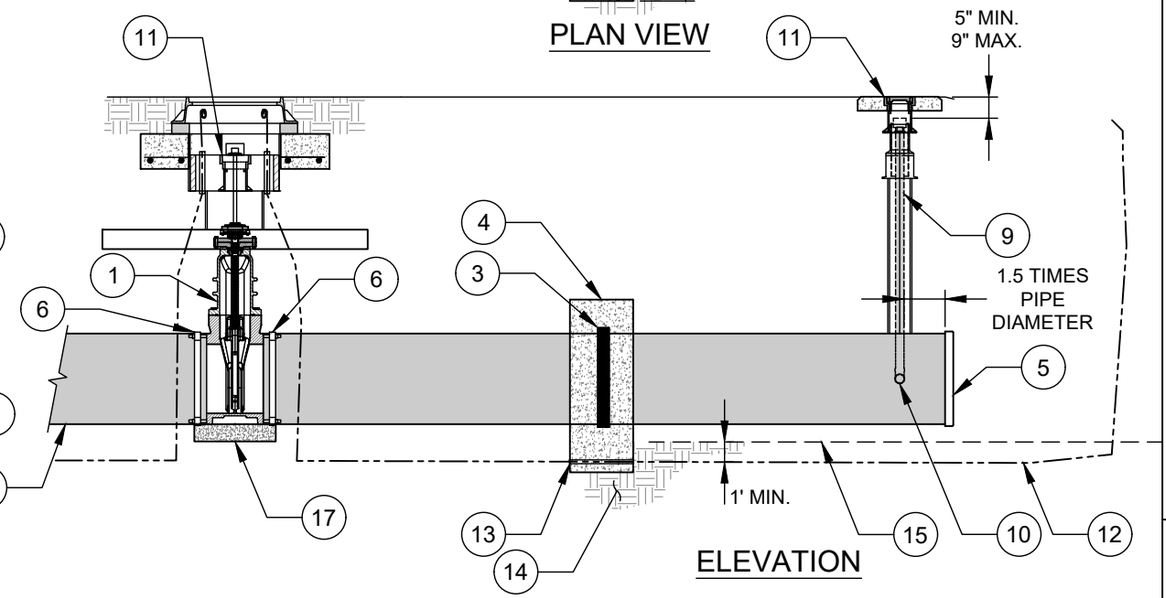
VERSION 1.0

DATE 04/2024

DETAIL 10.4.3







NOTES TO DESIGNER

A. SEALING ENGINEER TO CONFIRM ADEQUATE SOIL PRESSURE BEARING CAPACITY FOR THRUST BLOCK.
B. AUTOMATIC FLUSHING DEVICE AS DIRECTED BY CLTW MAY BE REQUIRED.

OUTLET SIZE TABLE		
MAIN DIAMETER (INCH)	OUTLET NOMINAL DIAMETER (INCH)	CONTROL VALVE
6 to 20	2"	2" GATE VALVE
22 to 32	4"	4" GATE VALVE

NO.	DESCRIPTION:
1.	GATE VALVE.
2.	HDPE WATER MAIN.
3.	FLEX RESTRAINTS FOR HDPE PIPE. SEE STANDARD DETAIL.
4.	REINFORCED CONCRETE WALL BLOCKING - f'c = MINIMUM 3,600 PSI. SEE APPROPRIATE STANDARD DETAIL.
5.	BUTT FUSED HDPE END CAP.
6.	BUTT FUSED MALE HDPE MJ ADAPTER WITH STAINLESS STEEL STIFFENER AND ACCESSORY KIT OR BUTT FUSION JOINT AS APPROPRIATE TO VALVE.
7.	2" OR 4" HDPE PIPE.
8.	2" OR 4" HDPE 90° BEND.
9.	2" OR 4" HDPE NIPPLE - LOCATE BACK OF CURB OR IN SHOULDER - LENGTH AS REQUIRED.
10.	2" OR 4" TAPPING TEE OR 4" SADDLE.
11.	VALVE BOX ASSEMBLY - SEE CLTW STANDARD DETAIL.
12.	TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK BLUE HDPE INSULATION.
13.	1-INCH SCH 40 PVC ELECTRICAL CONDUIT. LENGTH AS REQUIRED.
14.	UNDISTURBED SOIL.
15.	TRENCH LIMITS.
16.	2" OR 4" GATE VALVE.
17.	CONCRETE BEARING BLOCK.

NOTES:

A. SEALING ENGINEER MAY MODIFY WALL BLOCK SIZE BASED ON ACTUAL SOIL CLASSIFICATION AND PIPE DIAMETER.

B. FOR IN-DITCH FUSION, MINIMUM TRENCH WIDTH TO ACCOMMODATE EQUIPMENT ALLOWED.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

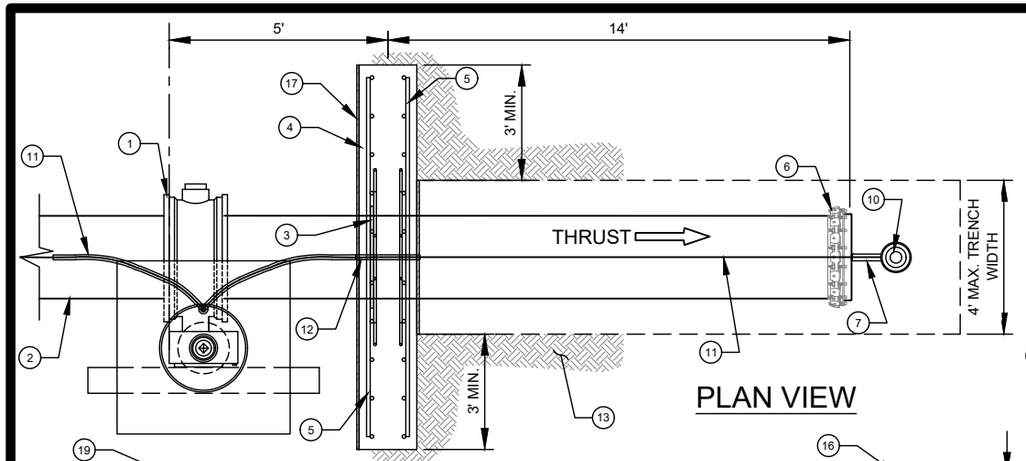
DEAD END WALL BLOCKING FOR HDPE PIPE

NO SCALE

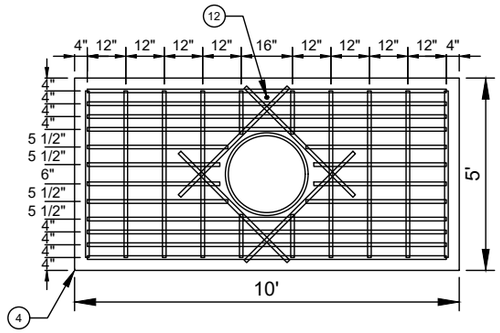
VERSION 1.0

DATE 04/2024

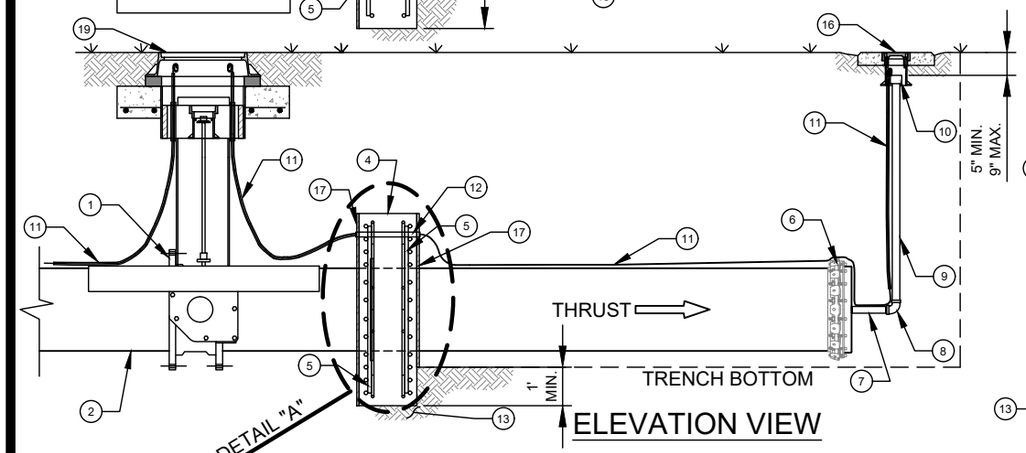
DETAIL 10.4.4



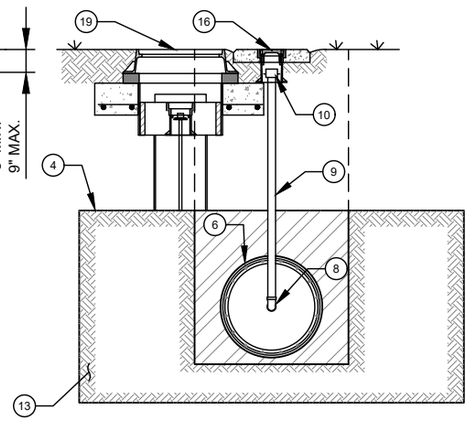
PLAN VIEW



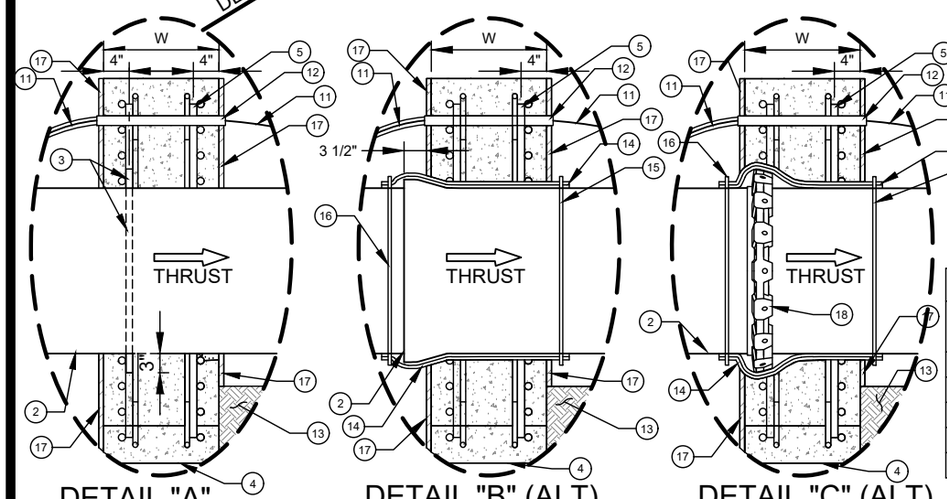
REBAR DETAIL



ELEVATION VIEW



END VIEW



DETAIL "A"

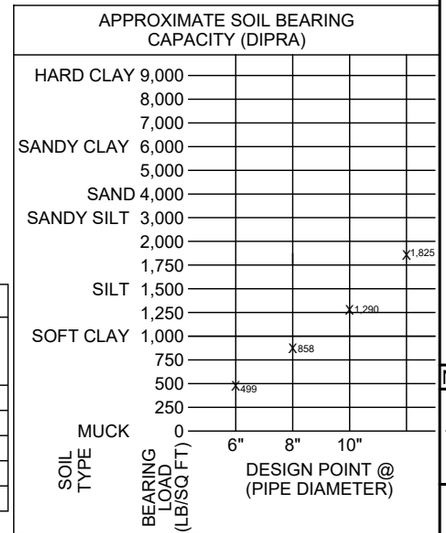
DETAIL "B" (ALT)

DETAIL "C" (ALT)

APPROX. DEAD END THRUST (DIPRA) AT 200 PSI WATER PRESSURE		UNDISTURBED SOIL BEARING AREA	APPROX. SOIL PRESSURE	W (WIDTH) (MINIMUM)	CONCRETE VOLUME (APPROXIMATE)	
PIPE DIAMETER (INCHES)	TOTAL THRUST (POUNDS)	SQUARE FEET	BEARING LOAD (LB/SQ FT)	INCHES	FT^3	CY
16	47,558	30	1,585	16	32	1.19
18	59,730	30	1,991	16	32	1.19
20	73,288	30	2,443	18	36	1.33
24	104,558	30	3,485	18	36	1.33
30	160,850	30	5,362	20	40	1.48

REBAR SCHEDULE PER MAT		
TYPE	LENGTH (INCHES)	NUMBER REQUIRED
VERTICAL	52	6
VERTICAL	20	4
HORIZONTAL	112	10
HORIZONTAL	48	4
DIAGONAL	48	4

REBAR DIAMETER SCHEDULE				
PIPE DIAMETER	BAR SIZE	TOTAL REBAR LENGTH (FT)	TOTAL REBAR WEIGHT (LB) ONE MAT	TOTAL REBAR WEIGHT (LB) TWO MATS
16"	#5	158	165	330
18"	#5	158	165	330
20"	#5	158	165	330
24"	#5	158	165	330
30"	#7	158	323	646



NO. DESCRIPTION:

1. END OF LINE VALVE - GATE VALVE (MJ X MJ).
2. DIP - (PE X PE) - REMOVE BELL - LENGTH = 17' ~ 19'.
3. 1" THICK X 3" WIDE STEEL THRUST RING - FACTORY WELDED TO PIPE.
4. CONCRETE WALL BLOCK (F'c = 3,600 PSI MIN.) 10' X 5' X WIDTH (W).
5. REBARS - GRADE 60 PER ASTM A615 - SEE REBAR SCHEDULES, CUT WHEN REQUIRED.
6. MJ CAP - WITH WEDGE ACTION RESTRAINT GLAND, TAP 2" THREADED OUTLET (FNPT).
7. 2" RED BRASS (OR STAINLESS STEEL (S.S.)) NIPPLE SCH 40 (MNPT X MNPT) - LENGTH = 12".
8. 2" RED BRASS (OR S.S.) 90° BEND (FNPT X FNPT).
9. 2" RED BRASS (OR S.S.) NIPPLE SCH 40 (MNPT X MNPT) - LENGTH AS REQUIRED.
10. 2" SCH 40 RED BRASS OR 2" DUCTILE IRON (FUSION BONDED EPOXY COATED) THREADED COUPLING (FNPT).
11. AWG #12 GAUGE SOLID COPPER TRACER WIRE - WITH BLUE INSULATION (30 MILS HDPE) TERMINATE WITH 24" EXCESS WIRE (COILED) IN VALVE BOX (TYP.).
12. 1" SCH 40 PVC ELECTRICAL CONDUIT - LENGTH AS REQUIRED.
13. UNDISTURBED SOIL.
14. HIGH DENSITY CROSS LAMINATED POLYETHYLENE FILM TUBE (HDCLPE) AWWA C105 - 4 MILS EACH X 2 LAYER - 8 MILS TOTAL.
15. HDPE ADHESIVE TAPE OR HDPE ZIP LOCK TIES.
16. STANDARD VALVE BOX ASSEMBLY - SEE DETAIL.
17. PLYWOOD FORM.
18. WEDGE ACTION THRUST RESTRAINT GLAND.
19. LARGE VALVE BOX FRAME AND COVER ASSEMBLY, PER STD DETAIL.

NOTES:

A. WHEN DIRECTED BY THE ENGINEER, THE CONCRETE WALL BLOCK SIZE MAY BE ADJUSTED, BASED ON ACTUAL SOIL CLASSIFICATION AND PIPE DIAMETER.
B. FULLY RESTRAINED JOINT PIPE MAY BE USED IN LIEU OF THIS DETAIL AS CALCULATED BY ENGINEER. LENGTH OF RESTRAINT SHALL BE BASED UPON ACTUAL SOIL CONDITIONS. LENGTH OF RESTRAINT SHALL BE CALLED OUT ON PLANS - SEE RESTRAINED JOINT PIPE DETAILS.
C. ALTERNATE DETAIL "B" (USING A REVERSED BELL) MAY BE USED IN LIEU OF DETAIL "A".
D. ALTERNATE DETAIL "C" (USING WEDGE ACTION RESTRAINT GLAND) MAY BE USED IN LIEU OF DETAIL "A".

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

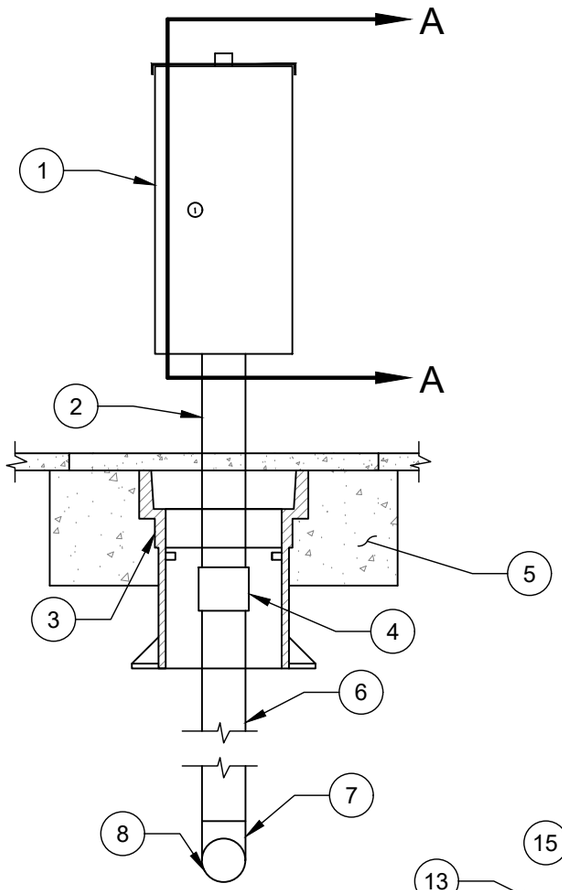
DEAD END THRUST - WALL BLOCKING AND 2-INCH BLOW-OFF ASSEMBLY 14-INCH THROUGH 30-INCH MAINS

NO SCALE

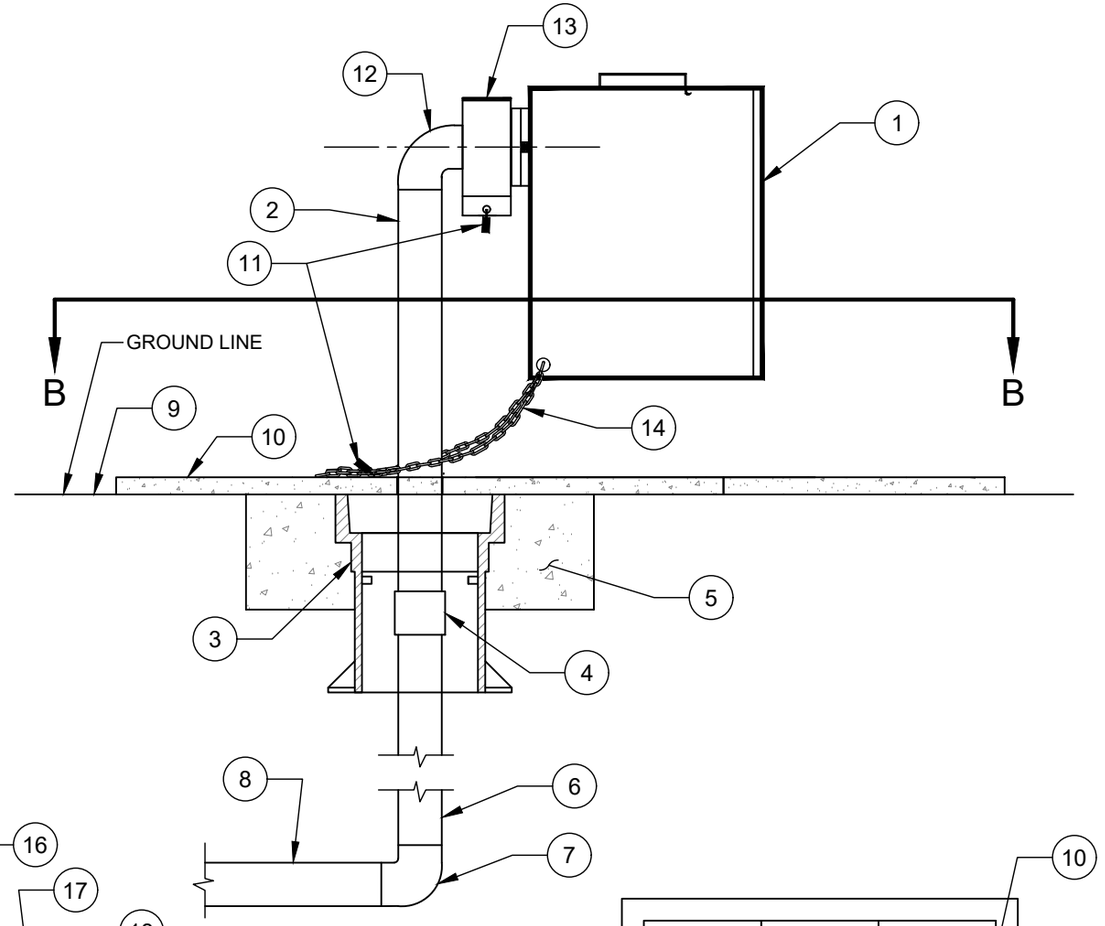
VERSION 1.0

DATE 04/2024

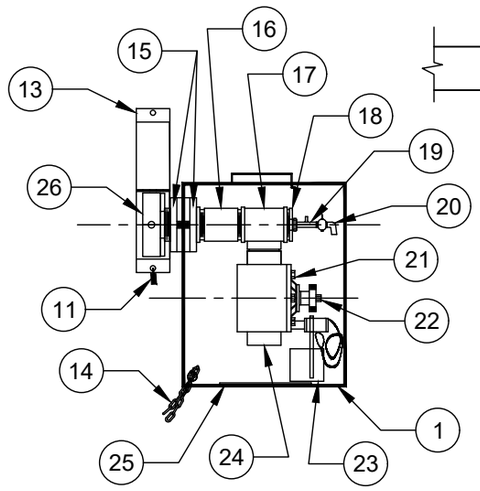
DETAIL 10.4.5



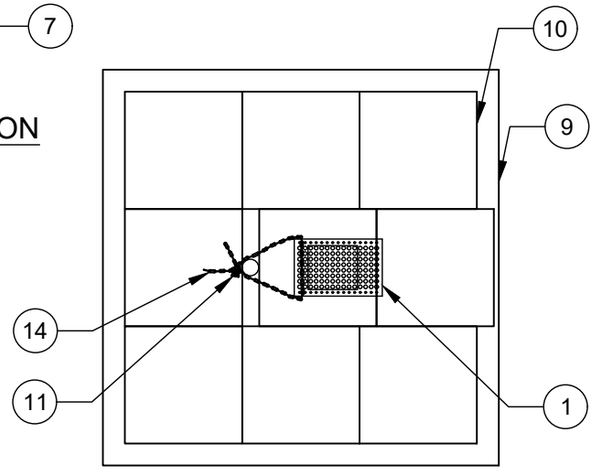
SIDE ELEVATION



FRONT ELEVATION



SECTION A - A



SECTION B - B

NO.	DESCRIPTION:
1.	KUPFERLE #9700-Y HYDRANT AUTO FLUSHER - YELLOW (INCLUDES #15-26).
2.	2" GALVANIZED STEEL PIPE (SCH 80).
3.	TOP SECTION WATER VALVE BOX.
4.	2" S.S. OR RED BRASS (SCH 40), OR 2" DUCTILE IRON (FUSION BONDED EPOXY COATED) THREADED COUPLING (FNPT).
5.	18" X 18" X 6" CONCRETE PAD.
6.	2" S.S. OR RED BRASS PIPE (SCH 40).
7.	2" 90° S.S. OR RED BRASS BEND (SCH 40).
8.	2" S.S. OR RED BRASS PIPE (SCH 40).
9.	6 MIL HDPE PLASTIC FILM (54"X54").
10.	16" X 16" X 2" PATIO PAVERS CONCRETE (9 EACH).
11.	PAD LOCK (PROVIDED BY CLTW).
12.	KUPFERLE #X707 BRASS 2" FNPT X 2 1/2" MNST HOSE NOZZLE.
13.	LOCKING NOZZLE COLLAR - KUPFERLE #9708-Y.
14.	CAMPBELL BLU-KROME 1/4" PROOF COIL CHAIN 5 LF.
15.	KUPFERLE ADAPTOR.
16.	2" THREADED NIPPLE.
17.	2" X 2" X 2" TEE FIP THREAD.
18.	PLUG/TAP.
19.	WATER SAMPLE VALVE.
20.	BRASS SAMPLING BIBB.
21.	2" SOLENOID CONTROL VALVE; P-220 SERIES.
22.	MANUAL FLOW CONTROL KNOB.
23.	HUNTER DIGITAL PROGRAMMABLE CONTROLLER WITH 9 VOLT LITHIUM BATTERY.
24.	2" FIP OUTLET (MAY BE HARD PIPE FOR DISCHARGES).
25.	REMOVABLE DIFFUSER PLATE WITH 4 BOLTS/NUTS.
26.	2 1/2" FIRE HYDRANT NOZZLE COUPLING.

NOTES:

A. AUTO FLUSHER IS INTENDED FOR WARM WEATHER USE. ASSEMBLY SHOULD BE REMOVED DURING COLD WEATHER MONTHS TO AVOID DAMAGE DUE TO FREEZING.

B. MANUAL FLUSHING REQUIRED TO MAINTAIN WATER QUALITY DURING COLD WEATHER MONTHS.

C. PADLOCK PROVIDED BY CLTW.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

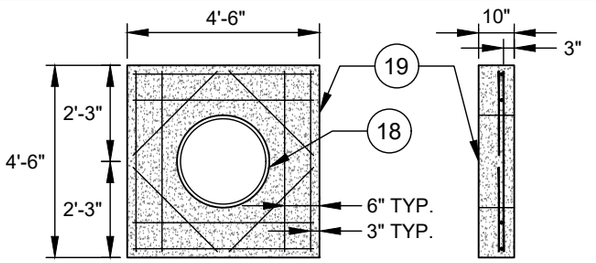
AUTOMATIC FLUSHER - 2" BLOW-OFF

NO SCALE

VERSION 1.0

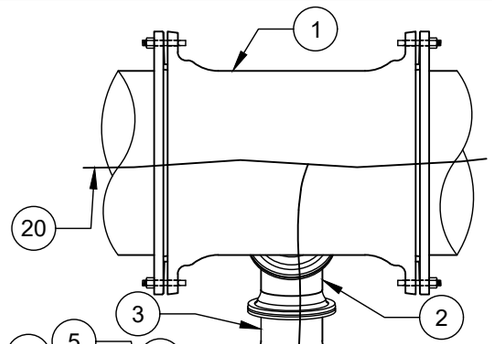
DATE 04/2024

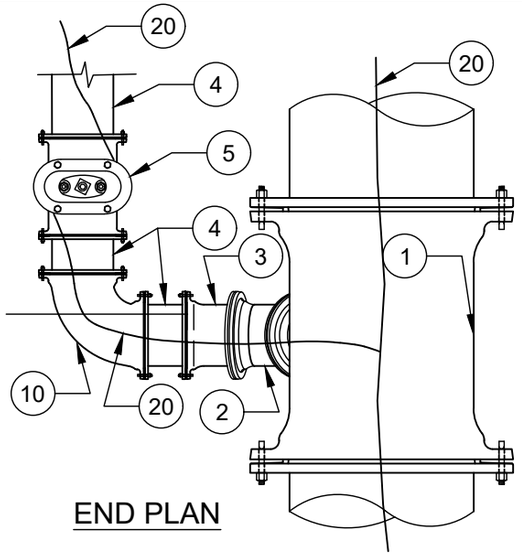
DETAIL 10.5.1



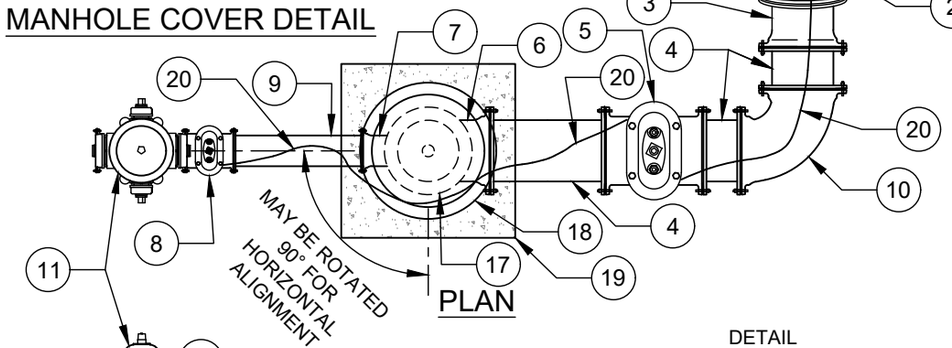
PLAN VIEW SECTION VIEW

MANHOLE COVER DETAIL

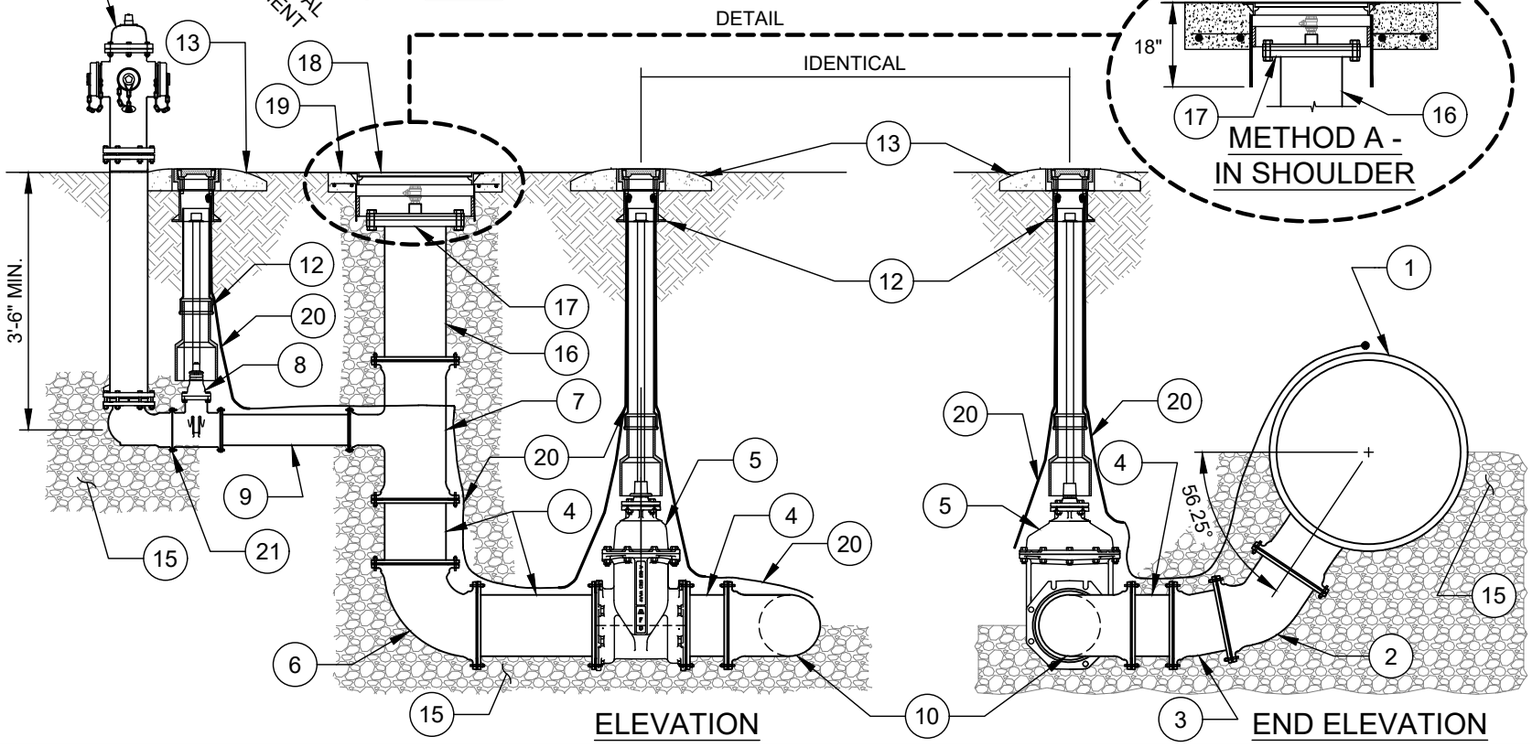




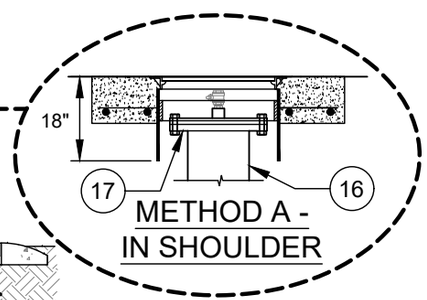
END PLAN



PLAN



ELEVATION END ELEVATION

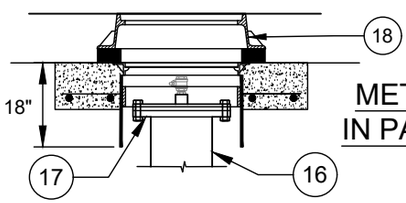


METHOD A - IN SHOULDER

NO.	DESCRIPTION:
1.	RUN X 12" TEE (MJ - MJ) - ROTATE DOWN 56°.
2.	12" 45° BEND (MJ - PE).
3.	12" 11 1/4° BEND (MJ - PE).
4.	12" DIP (PE-PE) LENGTHS AS REQ'D.
5.	12" GATE VALVE (MJ - MJ).
6.	12" 90° BEND (MJ - MJ) - VERTICAL.
7.	12" X 12" X 8" TEE (MJ - MJ) - VERTICAL.
8.	8" GATE VALVE (MJ - MJ).
9.	8" DIP (PE-PE) LENGTHS AS REQ'D.
10.	12" 90° BEND (MJ - MJ) - HORIZONTAL - MAY BE DELETED FOR STRAIGHT INSTALLATION.
11.	HIGH VELOCITY HYDRANT PAINTED OSHA SAFETY BLUE. INSTALLATION PER THE FIRE HYDRANT STD DETAIL.
12.	STANDARD VALVE BOX ASSEMBLY W/VALVE EXTENSION / STEM (AS REQUIRED) PER CLTW STANDARD DETAILS.
13.	REINFORCED CONCRETE VALVE PAD - 24" DIA.
14.	#57 WASHED STONE AT FH BASE - 10 CUBIC FEET.
15.	#57 WASHED STONE - TYPE II BEDDING FOR PIPE & COMPLETE VERTICAL PIPE ENCASEMENT TO UNDERSIDE OF FRAME AND COVER.
16.	12" DIP - FLANGE X PLAIN END.
17.	BLIND FLANGE TAPPED WITH A 2" BALL CORPORATION STOP.
18.	20.5" CLEAR OPENING MANHOLE FRAME AND COVER.
19.	PRECAST CONCRETE PAD (REINFORCED).
20.	AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS BLUE HDPE INSULATION, TERMINATE WITH 24 INCH EXCESS WIRE (COILED) AT VALVE BOX (TYP.).
21.	FOSTER ADAPTOR.

NOTES:

A. ALL FITTINGS SHALL BE FACTORY RESTRAINED JOINTS OR RMJ FITTINGS WITH FOSTER ADAPTERS.
B. ALL FLANGED HARDWARE (BOLT/WASHER/NUT) SHALL BE TYPE 304 STAINLESS STEEL WITH ANTI SEIZE COMPOUND.
C. 90° BEND NO. 10 MAY BE OMITTED FOR STRAIGHT INSTALLATION.
D. TEE NO. 7 MAY BE ROTATED 90° FOR HORIZONTAL ALIGNMENT WITH FH NO. 11 AT ROAD RIGHT-OF-WAY.
E. SEE CONSTRUCTION PLANS FOR EXACT LOCATIONS OF VALVES, CLTW ACCESS POINT, AND FIRE HYDRANT.
F. HYDRANT EXTENSIONS SHALL BE LIMITED TO ONE EACH PER FIRE HYDRANT.
G. SEE FIRE HYDRANT STD DETAIL FOR INSTALLATION REQUIREMENTS.



METHOD B - IN PAVEMENT

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

12" BLOW-OFF ASSEMBLY (24" - 64" MAINS) MANUAL STAND PIPE WITH FIRE HYDRANT

NO SCALE

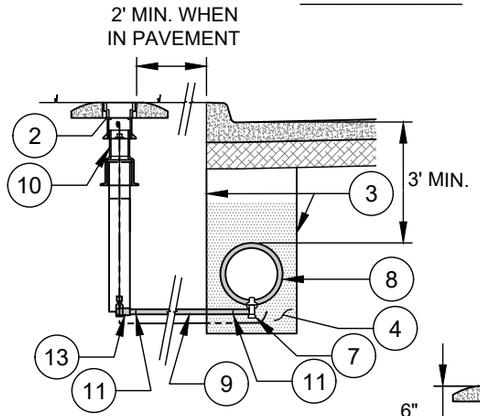
VERSION 1.0

DATE 04/2024

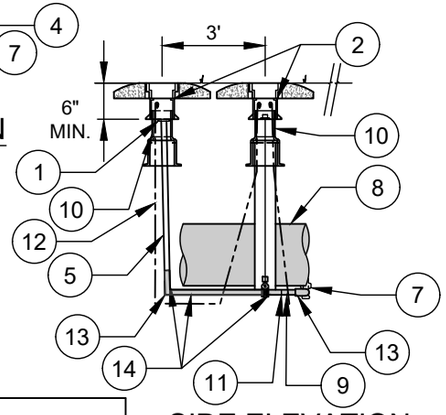
DETAIL 10.5.2

NO.	DESCRIPTION:
1.	2" NPT CAP (HAND TIGHT).
2.	VALVE BOX (TOP SECTION) - ASSEMBLY.
3.	TRENCH LIMITS.
4.	HDPE EMBEDMENT MATERIAL.
5.	2" RED BRASS NIPPLE - SCH 40 - (MNPT X MNPT).
6.	2" GATE VALVE (FNPT X FNPT).
7.	HDPE TAPPING TEE BY ELECTROFUSION ONLY.
8.	HDPE WATER MAIN.
9.	2" SDR-9 HDPE PIPE (IPS).
10.	VALVE BOX ASSEMBLY. SEE STANDARD DETAIL.
11.	HDPE BUTT FUSION JOINT.
12.	TRACER WIRE-CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK BLUE HDPE INSULATION.
13.	2" SDR-9 HDPE 90° BEND.
14.	2" HDPE PLAIN END X S.S. MNPT ADAPTOR.

6"-20" MAIN

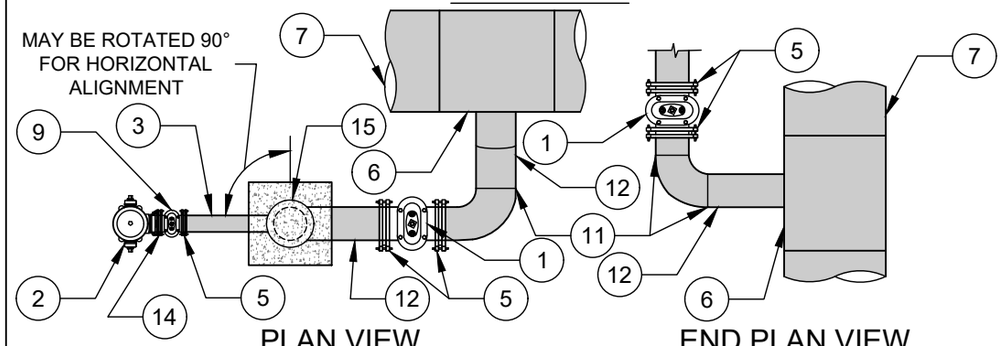


FRONT ELEVATION



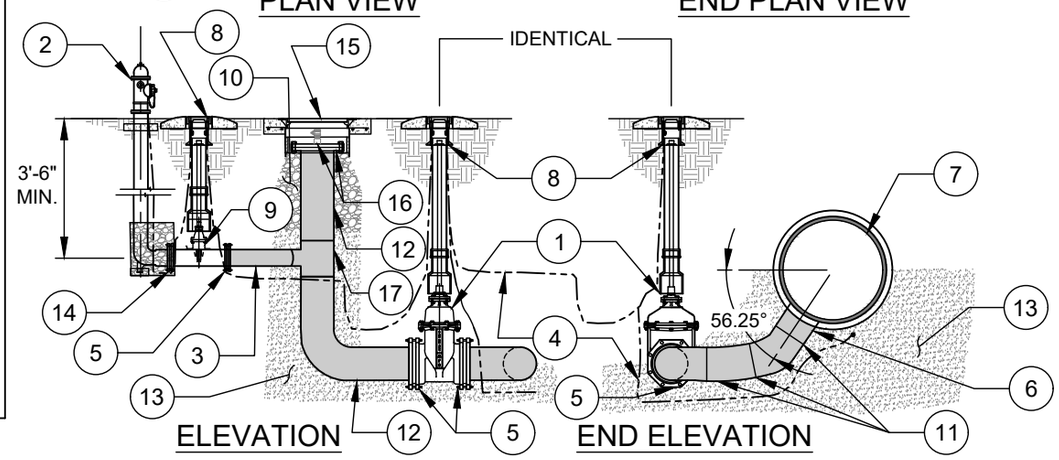
SIDE ELEVATION

22"-32" MAIN



PLAN VIEW

END PLAN VIEW



ELEVATION

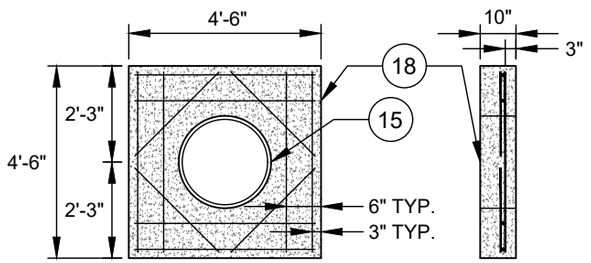
END ELEVATION

NO.	DESCRIPTION:
1.	12" GATE VALVE. SEE STANDARD DETAIL.
2.	STANDARD FIRE HYDRANT ASSEMBLY PER STANDARD DETAIL.
3.	6" HDPE PIPE.
4.	TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK BLUE HDPE INSULATION.
5.	MALE MJ ADAPTER WITH STAINLESS STEEL STIFFENER AND ACCESSORY KIT. SEE STANDARD DETAIL FOR TRANSITION DETAIL.
6.	HDPE TEE - 12" OUTLET.
7.	HDPE WATER MAIN.
8.	VALVE BOX ASSEMBLY. SEE STANDARD DETAIL.
9.	6" GATE VALVE. SEE STANDARD DETAIL.
10.	#57 WASHED STONE-ENCASEMENT.
11.	HDPE FITTING BUTT FUSION JOINT.
12.	12" HDPE PIPE.
13.	HDPE EMBEDMENT MATERIAL.
14.	FOSTER ADAPTOR.
15.	20.5" CLEAR OPENING MANHOLE FRAME AND COVER.
16.	BLIND FLANGE TAPPED WITH A 2" BALL CORPORATION STOP.
17.	12" X 12" X 6" HDPE BUTT FUSED TEE.
18.	PRECAST CONCRETE PAD (REINFORCED).

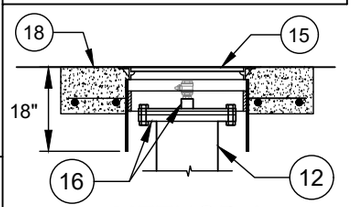
NOTES:
- A. ALL PIPE, FITTINGS, ETC. SHALL BE RESTRAINED JOINT. BUTT FUSED AND ELECTROFUSED HDPE IS FULLY RESTRAINED.
- B. ALL VALVES OPEN RIGHT (CLOCKWISE).
- C. SEE CONSTRUCTION PLANS FOR EXACT LOCATIONS OF VALVES, CLTW ACCESS POINT, AND FIRE HYDRANT.
- D. HYDRANT EXTENSIONS SHALL BE LIMITED TO 1 EACH PER FIRE HYDRANT.
- E. SEE FIRE HYDRANT STD DETAIL FOR INSTALLATION REQUIREMENTS.

NOTES TO DESIGNER
- A. BLOW OFFS TO BE INSTALLED AT LOW POINTS IF REQUIRED BY SEALING ENGINEER.
- B. VALVE AND B.O. SHALL NOT BE PLACED IN ROAD DITCH.

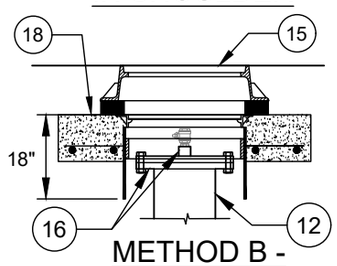
CONCRETE PAD DETAIL



PLAN VIEW SECTION VIEW



METHOD A - IN SHOULDER



METHOD B - IN PAVEMENT

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

BLOW OFF ASSEMBLIES FOR HDPE PIPE

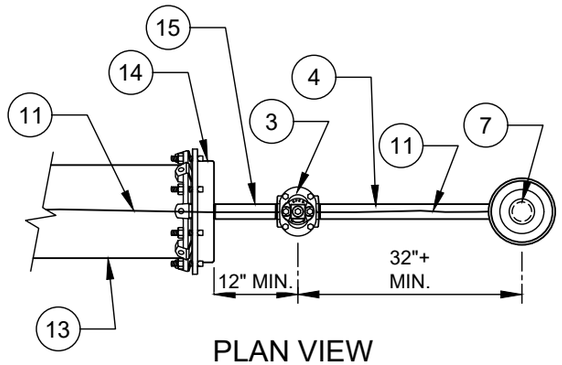
NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.5.3

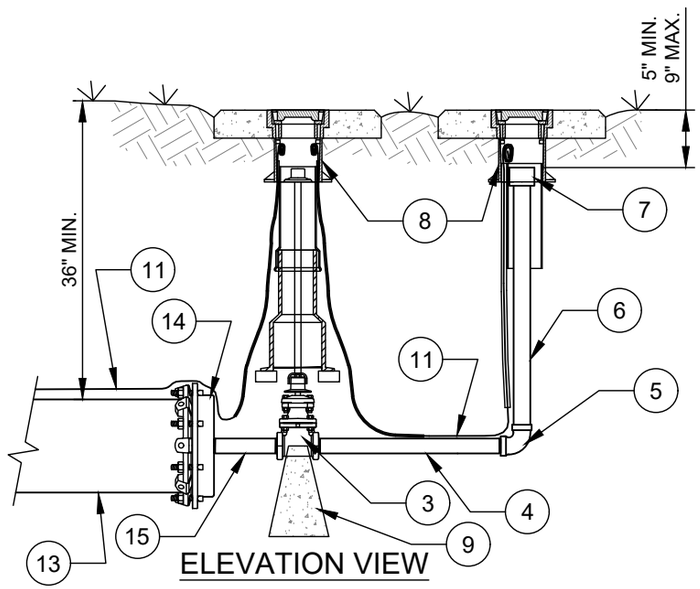
6" THROUGH 12" WATER MAINS



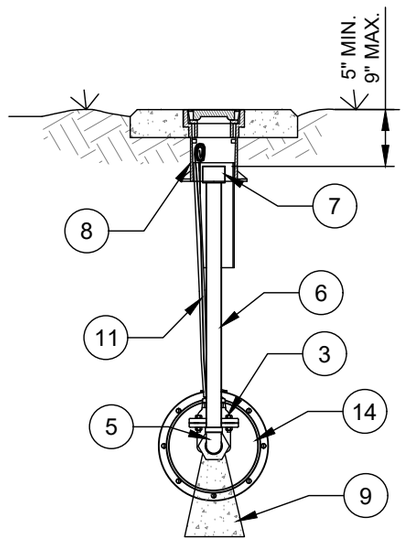
PLAN VIEW

RESTRAINED PIPE LENGTH REQUIREMENTS		
PIPE DIAMETER (INCHES)	REQUIRED RESTRAINED LENGTH:	
	BARE DIP (FEET)	POLYWRAPPED DIP (FEET)
6	169	242
8	219	312
10	264	377
12	309	441

DESIGN BASIS:
DIPRA "THRUST RESTRAINT DESIGN FOR DIP"
VERSION 3.3 DATED 05/09/2003
LAYING CONDITION: TYPE 2
SOIL DESIGNATION: SILT 1
DEPTH OF COVER: 3' MINIMUM
DESIGN PRESSURE: 200 PSI
SAFETY FACTOR: 2.0



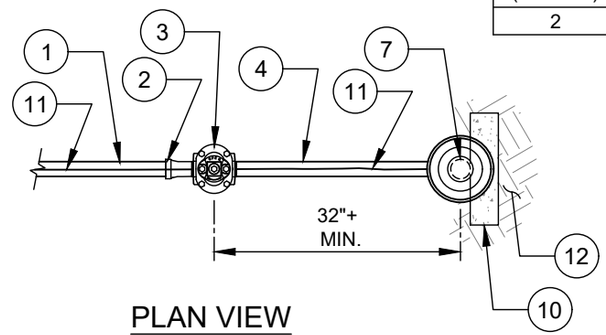
ELEVATION VIEW



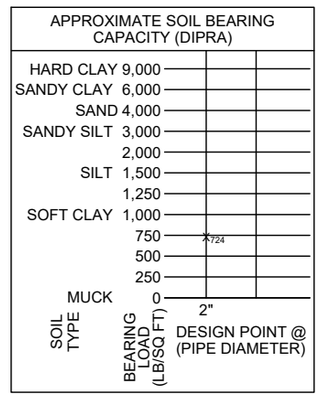
END VIEW

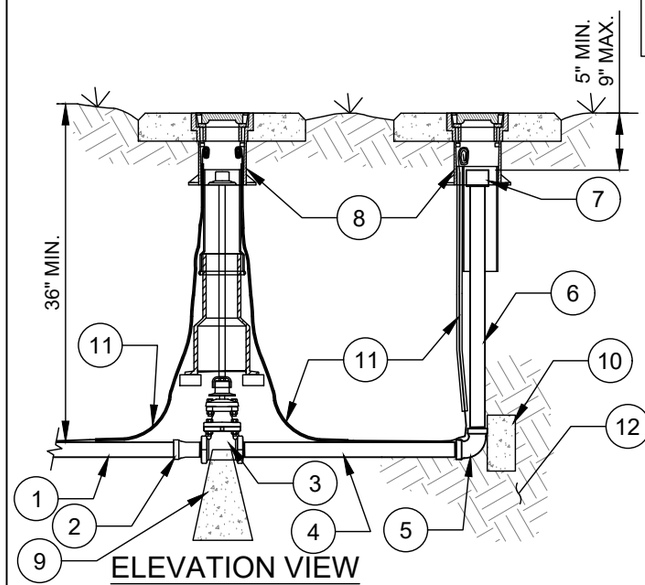
2" WATER MAINS

APPROX. DEAD END THRUST (DIPRA) AT 200 PSI WATER PRESSURE		UNDISTURBED SOIL BEARING AREA	APPROX. SOIL PRESSURE
PIPE DIAMETER (INCHES)	TOTAL THRUST (POUNDS)	SQUARE FEET	BEARING LOAD (LBS/SQ FT)
2	724	0.89	813

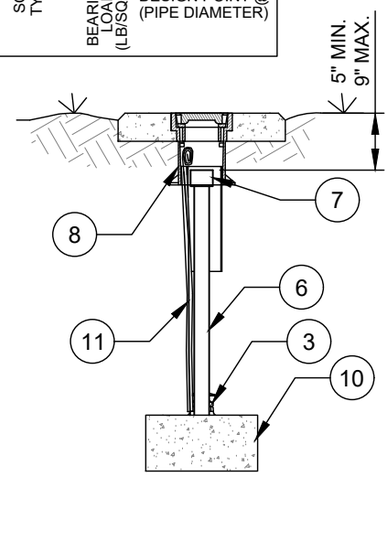


PLAN VIEW





ELEVATION VIEW



END VIEW

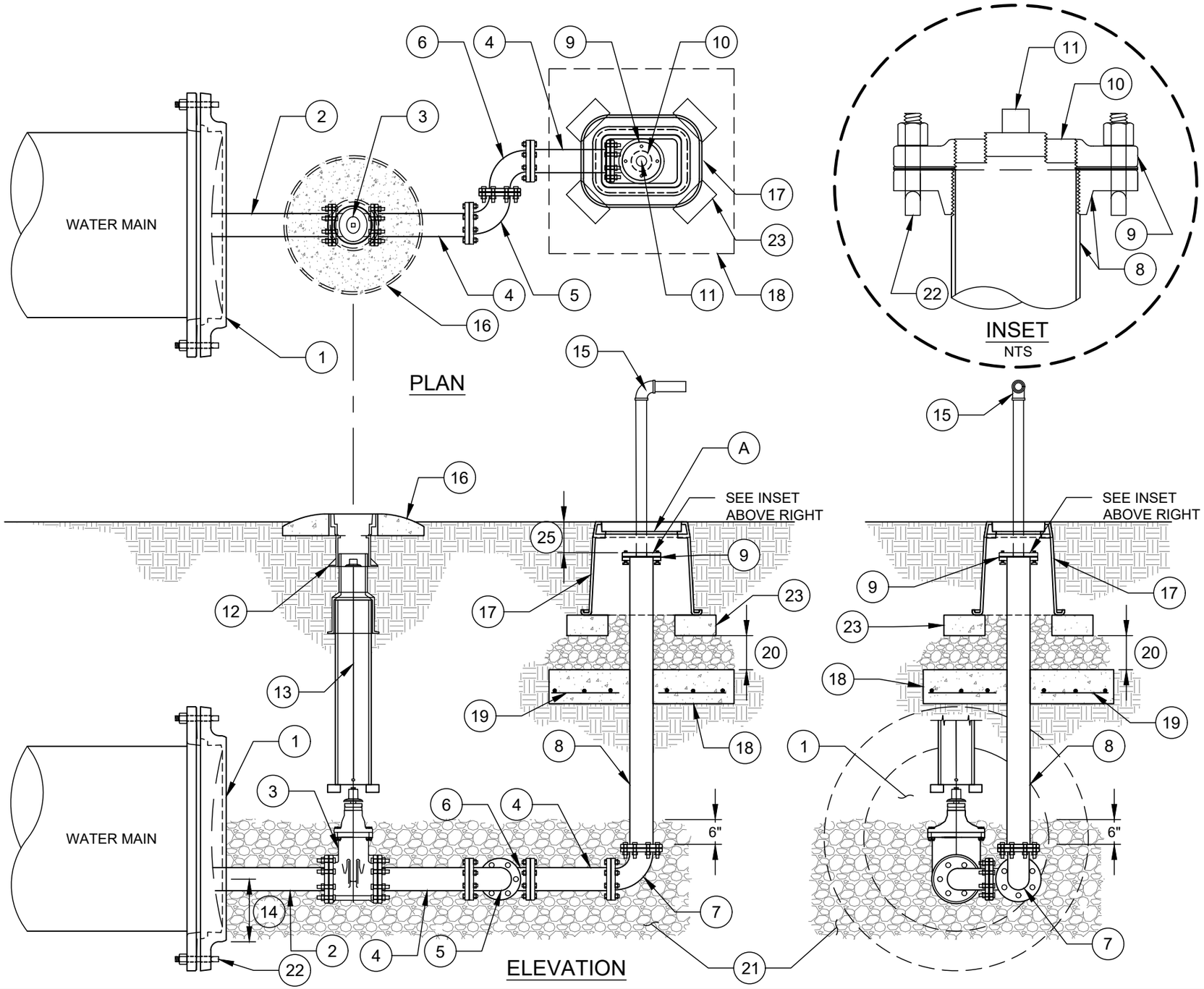
NO. DESCRIPTION:

1. 2" SDR 9 HDPE PIPE (IPS).
2. 2" BUTT FUSED HDPE X S.S. THREADED ADAPTOR.
3. 2" GATE VALVE (FNPT X FNPT).
4. 2" RED BRASS OR S.S. NIPPLE - SCH 40 - (MNPT X MNPT), L = 36" (MIN).
5. 2" RED BRASS OR S.S. 90° BEND (FNPT X FNPT).
6. 2" RED BRASS OR S.S. NIPPLE - SCH 40 - (MNPT X MNPT) - LENGTH AS REQUIRED.
7. 2" THREADED COUPLING (FNPT X FNPT) - RED BRASS OR S.S. OR DUCTILE IRON (F.B.E.).
8. STANDARD VALVE BOX ASSEMBLY - SEE CLTW STD. DETAIL.
9. CAST-IN-PLACE CONCRETE SUPPORT PAD.
10. PRECAST CONCRETE SOLID BLOCK (16" X 8" X 4").
11. AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH BLUE INSULATION (30MIL HDPE) - TERMINATE WITH 24" EXCESS WIRE (COILED) IN VALVE BOX (TYP.).
12. UNDISTURBED OR COMPACTED SOIL - 100% STANDARD PROCTOR.
13. DUCTILE IRON PIPE - RESTRAINED - LENGTH AS REQUIRED - SEE CLTW STD. DETAILS.
14. MJ CAP WITH WEDGE ACTION RESTRAINT GLAND, TAP 2" THREADED OUTLET (FNPT).
15. 2" RED BRASS OR S.S. NIPPLE - SCH 40 (MNPT X MNPT), L = 12" (MIN).

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

2-INCH BLOW OFF ASSEMBLY (DEAD END OF MAIN) WITH 2-INCH GATE VALVE
2-INCH THROUGH 12-INCH MAINS

NO SCALE
VERSION 1.0
DATE 04/2024
DETAIL 10.5.4



NO.	DESCRIPTION:
1.	RESTRAINED MJ CAP W/4" NPT THREADED OUTLET.
2.	4" SCH 40 S.S. NIPPLE (NPT THREADED-FL) 12".
3.	4" GATE VALVE (FL-MJ) RESTRAINED.
4.	4" DIP SHORT (PE-PE) 12".
5.	4" 90° BEND (MJ-PE) RESTRAINED.
6.	4" 90° BEND (MJ-MJ) RESTRAINED.
7.	4" 90° BEND (MJ-MJ) RESTRAINED.
8.	4" DIP (PE- SCREW-ON FL) RESTRAINED.
9.	4" FLANGE W/4" NPT THREADED OUTLET.
10.	4" X 2" NPT THREADED BRASS BUSHING.
11.	2" PVC SCREW-IN PLUG-NPT THREADED.
12.	STD VALVE BOX ASSEMBLY.
13.	VALVE EXTENSION AS REQUIRED (SEE APPROPRIATE STD. DETAILS).
14.	DISTANCE TO CENTERLINE OF 4" THREADED OUTLET MAY VARY FROM CENTER WITH SIZE, MANUFACTURER, AND TYPE OF CAP OR PLUG.
15.	2" GSP STAND PIPE 90° BEND W/ 6" SHORT THREADED PIPE.
16.	CONCRETE PAD (SEE APPROPRIATE STD. DETAIL) - OMIT WHEN IN PAVEMENT.
17.	PLASTIC METER BOX PER STD. DETAIL - RELACE W/ REINFORCED CONCRETE PAD W/ WATER FRAME & COVER PER APPROPRIATE STD. DETAILS WHEN IN PAVEMENT.
18.	CONCRETE THRUST COLLAR (3' X 3' X 6").
19.	REINFORCE W/ #4 BARS @ 6" O.C. EACH WAY.
20.	6" #57 CRUSHED STONE.
21.	#57 CRUSHED STONE BEDDING.
22.	ALL THREAD T-HEAD BOLT (LOOKING UP).
23.	4 (QTY.) NCDOT STD. CONCRETE BRICK ON DIAGONAL AT EA. MB CORNER - OMIT WHEN FRAME & COVER IS USED.
24.	PIPE & FITTINGS SHALL BE RESTRAINED.
25.	5" (MIN.) - 9" (MAX.).

#10 THROUGH #25, EXCLUDING #22, SHALL BE "SAME" ON ALTERNATE MATERIALS LIST.

NO.	HDPE ALTERNATE MATERIALS:
1.	SAME.
2.	4" SDR9 NIPPLE (S.S. NPT THREADED-MALE MJ ADAPTOR) 12".
3.	4" GATE VALVE (MJ-MJ).
4.	4" SDR9 NIPPLE (MALE MJ ADAPTOR-MALE MJ ADAPTOR) 24".
5.	OMIT.
6.	OMIT.
7.	4" 90° BEND (MJ-MJ) RESTRAINED.
8.	4" SDR9 SHORT (MALE MJ ADAPTOR - FEMALE S.S. NPT THREADED ADAPTOR).
9.	OMIT.

NOTES:

A. BASED ON PROJECT SPECIFIC REQUIREMENT, TEMPORARY FIRE HYDRANT TO BE PAINTED BLUE. IF PERMANENT FIRE HYDRANT INSTALLED WITH TEE PER STANDARD DETAIL.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

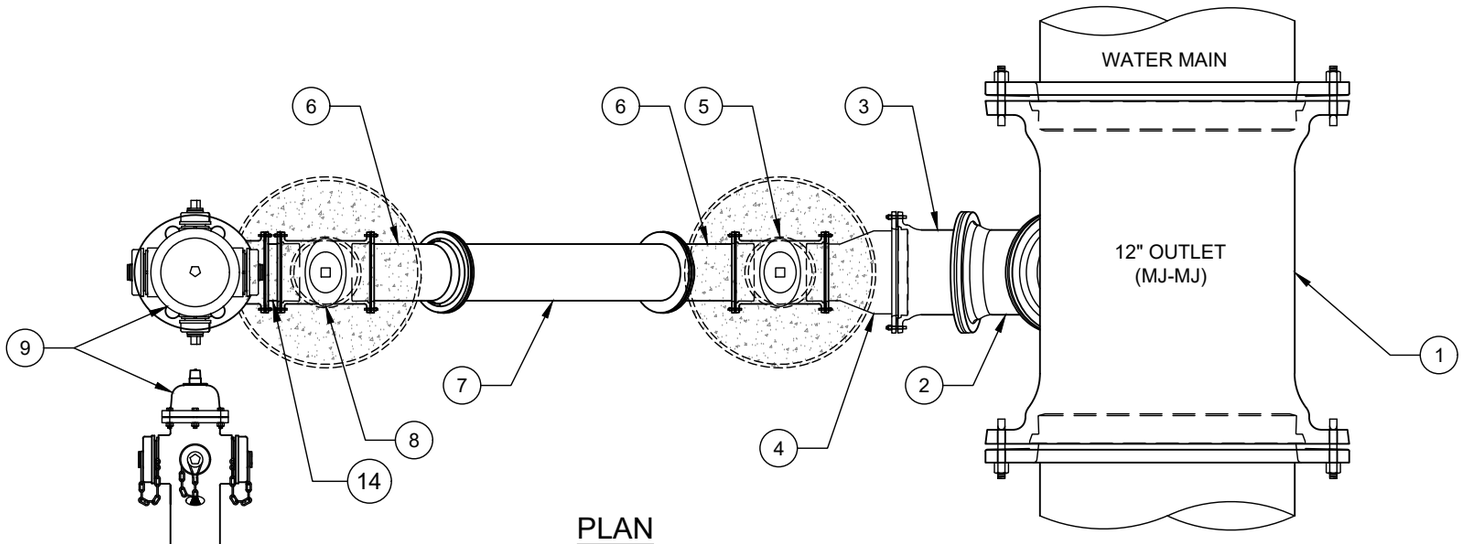
4-INCH BLOWOFF ASSEMBLY FOR 16-INCH THROUGH 24-INCH DIAMETER MAINS

NO SCALE

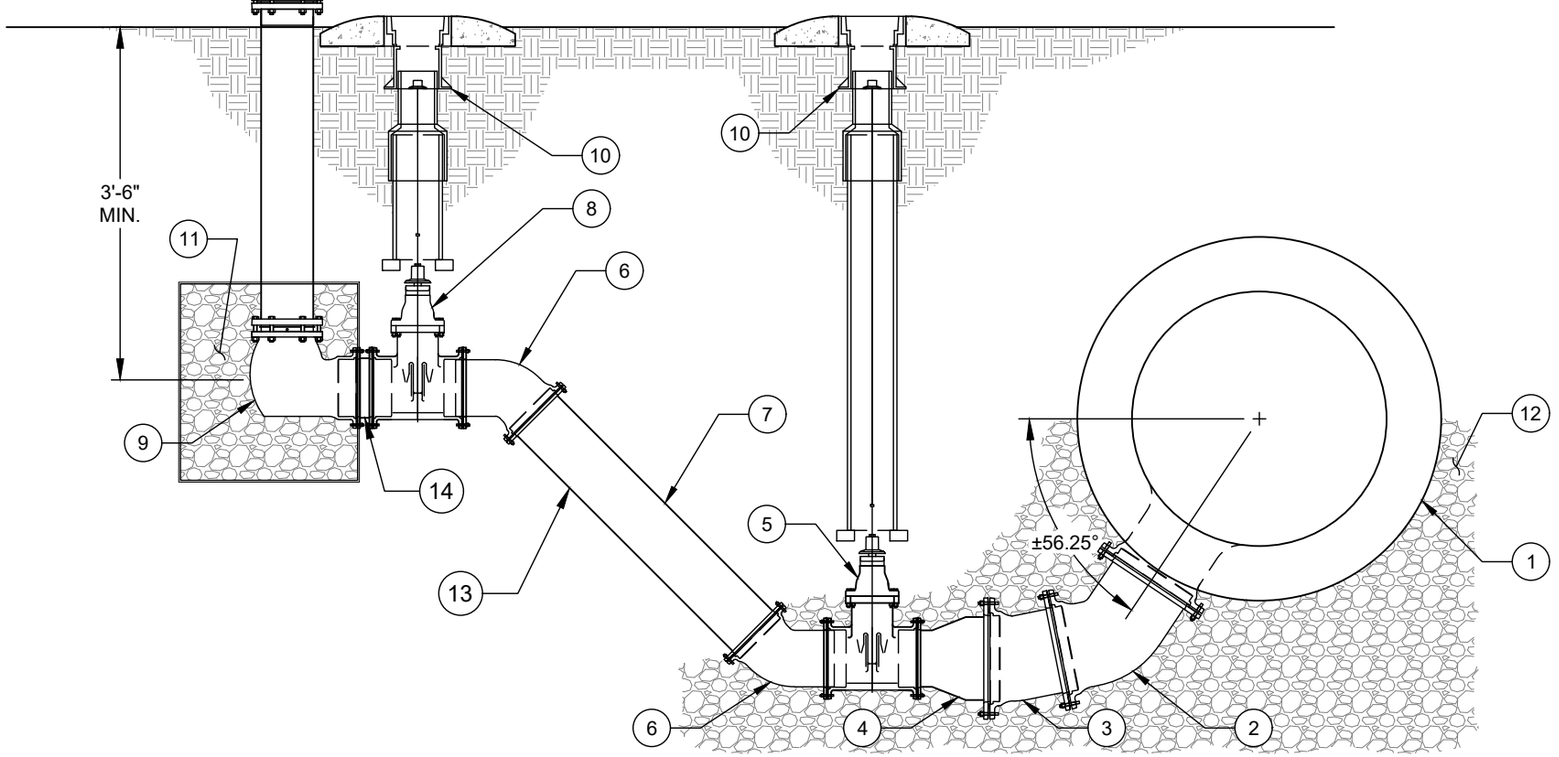
VERSION 1.0

DATE 04/2024

DETAIL 10.5.5



PLAN



ELEVATION

NO.	DESCRIPTION:
1.	RUN X 12" RMJ TEE.
2.	12" 45° BEND MJ-MJ FITTINGS WITH FOSTER ADAPTORS (ROTATE AS REQ'D).
3.	12" 11¼° BEND MJ-MJ FITTINGS WITH FOSTER ADAPTORS.
4.	12" X 8" REDUCER MJ-MJ FITTINGS WITH FOSTER ADAPTORS (OR) 8" X 18" DIP SHORT (OR) 8" X 13" SWIVEL ADAPTER.
5.	8" GATE VALVE (RMJ-RMJ).
6.	8" 45° BEND MJ-MJ FITTINGS WITH FOSTER ADAPTOR.
7.	8" RJ DIP (PE-PE) LENGTH AS REQ'D.
8.	8" GATE VALVE (RMJ-RMJ).
9.	HIGH VELOCITY FIRE HYDRANT PAINTED OSHA SAFETY BLUE - W/TWO HOSE & TWO STORZ PUMPER NOZZLES AND 8" SHOE CONNECTION (INSTALLATION PER THE FH STANDARD DETAIL).
10.	VALVE BOX ASSEMBLY W/ VALVE EXTENSION ASSEMBLY (AS REQ'D) PER CLTW STD. DETAILS.
11.	MINIMUM 9 CUBIC FEET OF #57 WASHED STONE PROPORTIONALLY AROUND BASE. DO NOT COVER WEEP HOLE. ENCAPSULATE FILTER FABRIC AROUND WASHED STONE.
12.	COMPACTED BEDDING STONE - #57 WASHED STONE TO MIDPOINT OF MAIN & 6" ABOVE B.O. PIPING.
13.	ALL PIPE & FITTINGS SHALL BE RESTRAINED. FITTINGS 12" & SMALLER SHALL CONFORM TO AWWA C-153 FOR COMPACT FITTINGS.
14.	FOSTER ADAPTOR.

NOTES:

A. RJ PIPE AND FITTINGS MAY BE FACTORY RESTRAINED JOINTS IN PLACE OF MJ FITTINGS.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

BLOW-OFF ASSEMBLY WITH FIRE HYDRANT FOR 30-INCH THROUGH 48-INCH MAINS

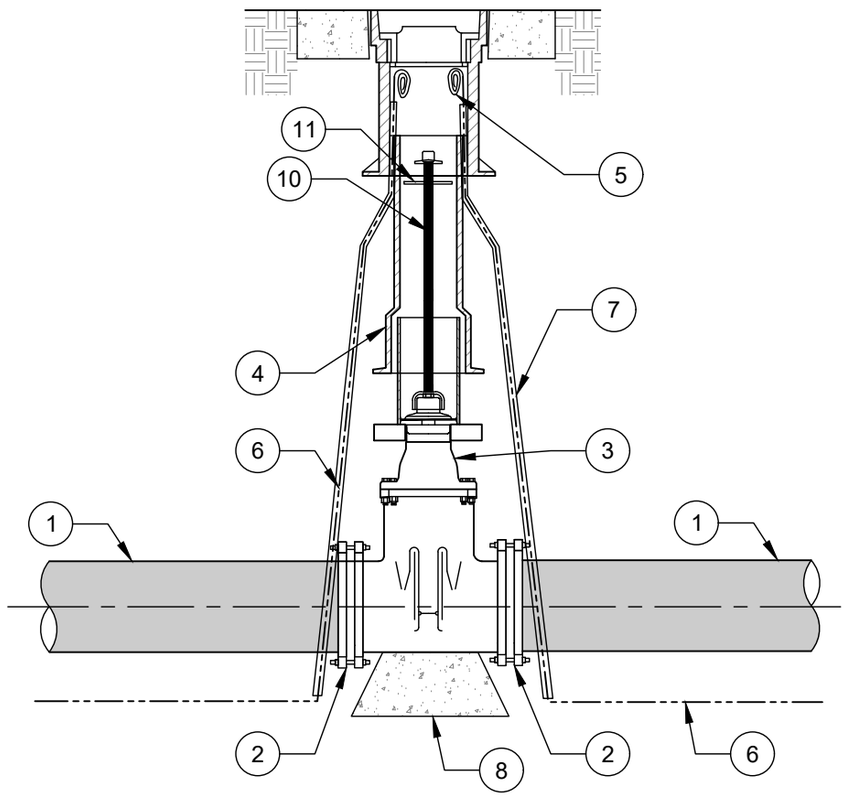
NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.5.6

1.5"-12" PIPE



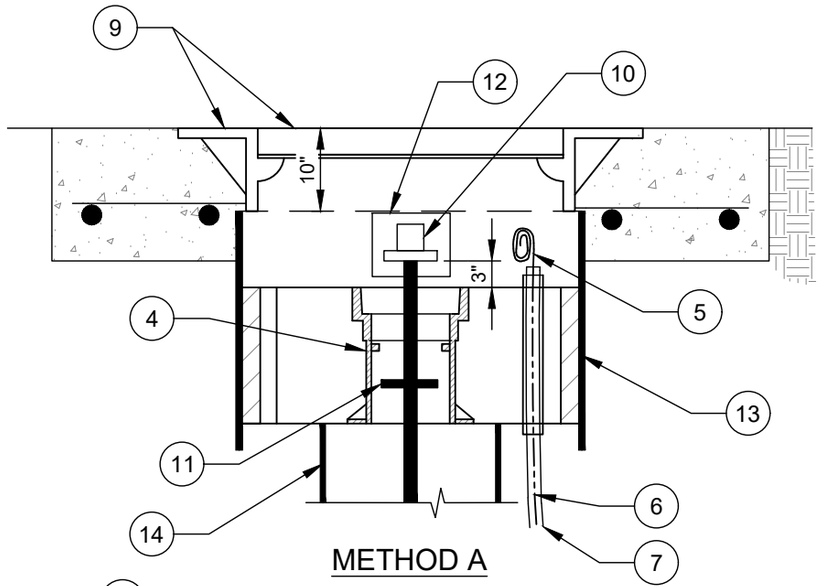
NOTES TO DESIGNER

A. SEALING ENGINEER IS RESPONSIBLE FOR DESIGN OF PAVEMENT REPAIR AND FOR A DESIGN THAT DOES NOT ALLOW LOADING TRANSFER TO VALVE.

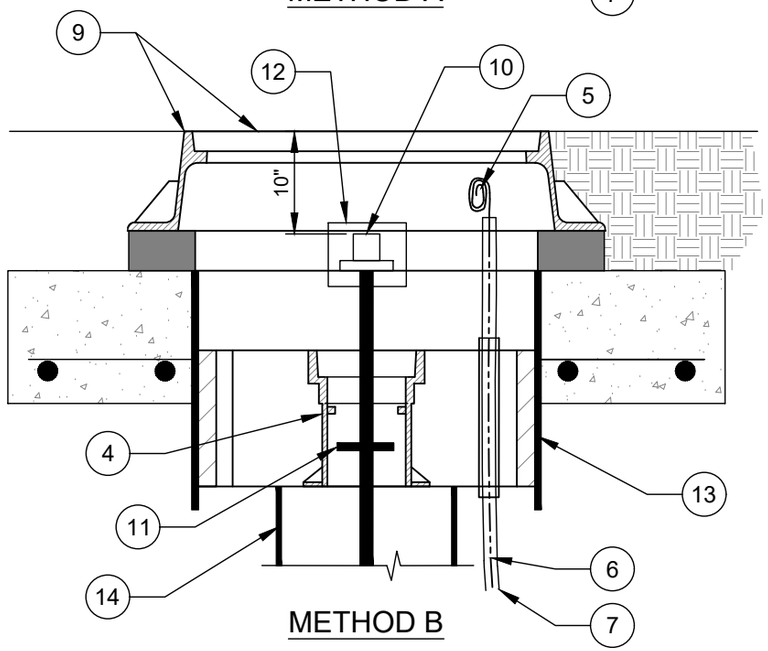
B. SEALING ENGINEER TO SPECIFY SIZE OF BEARING PAD BASED ON GEOTECHNICAL REPORT OF SOIL CONDITIONS.

16" AND LARGER PIPE

(USE FRAME AND COVER)



METHOD A



METHOD B

NO.	DESCRIPTION:
1.	HDPE WATER MAIN.
2.	BUTT FUSED JOINT OR RESTRAINED MJ ADAPTER WITH STAINLESS STEEL STIFFENER AND ACCESSORY KIT. SEE APPROPRIATE STANDARD DETAIL FOR TRANSITION.
3.	GATE VALVE/BALL VALVE.
4.	VALVE BOX ASSEMBLY - SEE CLTW STANDARD DETAIL.
5.	TRACER WIRE TERMINATION WITH 24" NEATLY COILED WIRE.
6.	TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK BLUE HDPE INSULATION.
7.	ALL VERTICAL WIRE SHALL BE PLACED IN 1/4" OR 3/8" ID CONDUIT SDR 9 PEX TUBING - ASTM F876 (TYP.).
8.	CONCRETE BEARING BLOCK FOR 10-INCH AND LARGER GATE VALVES. POLYETHYLENE WRAP BARRIER SHALL BE PRESENT BETWEEN BEARING BLOCK AND VALVE. WRAP SHALL BE MINIMUM TWO LAYERS OF 4 MILS THICK HDCLPE.
9.	FRAME AND COVER. REFER TO APPROPRIATE STANDARD DETAILS.
10.	EXTENSION STEM ASSEMBLY. SEE APPROPRIATE STANDARD DETAIL.
11.	CENTERING COLLAR.
12.	VALVE LOCK BOX - FURNISHED BY CLTWATER.
13.	24" PVC PIPE - C900 - DR19, OR DIP - CAST IN.
14.	12" (MIN.) DIP (OR C900 PVC) RISER PIPE 20" MAXIMUM.

NOTES:

A. MJ ADAPTER KIT SHALL INCLUDE BOLTS AND NUTS, GRADE 3 OR HIGHER AND LONG ENOUGH TO ACCOMMODATE THE ADDED LENGTH OF HDPE FITTING TO ATTACH TO VALVES.

B. CLTW ALLOWS THE INSTALLATION OF DIFFERENT PIPE MATERIALS ON EITHER SIDE OF THE GATE VALVE. INSTALL TRANSITIONS PER APPROPRIATE STANDARD DETAIL FOR HDPE.

C. IF VALVE OPERATING NUT IS MORE THAN 3' BELOW FINISHED GRADE, PROVIDE EXTENSION STEM WITH STANDARD 2" SQUARE OPERATING NUT IN TOP SECTION OF VALVE BOX. SEE STANDARD DETAIL.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

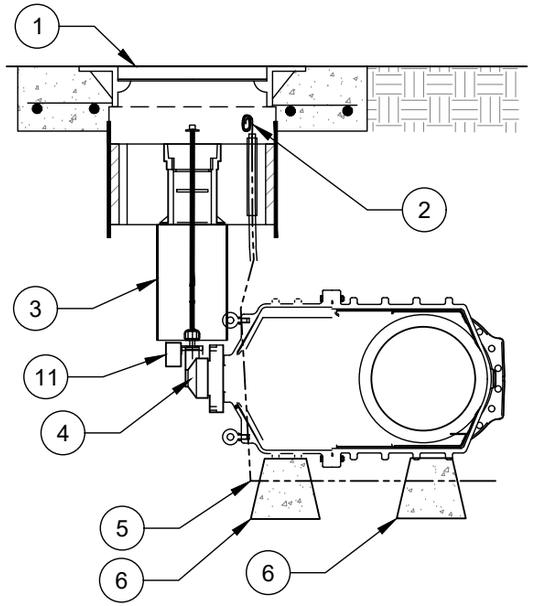
GATE VALVE FOR HDPE PIPE (1.5-INCH TO 32-INCH)

NO SCALE

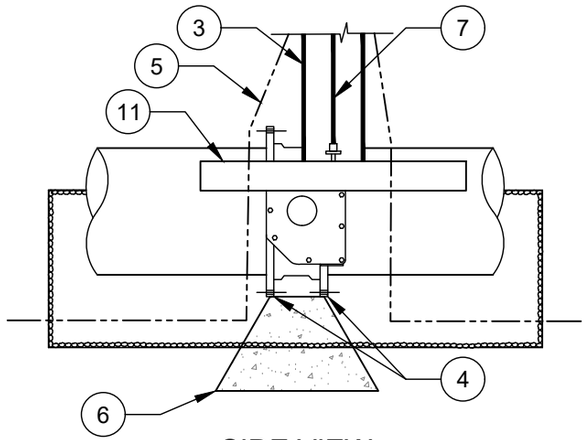
VERSION 1.0

DATE 04/2024

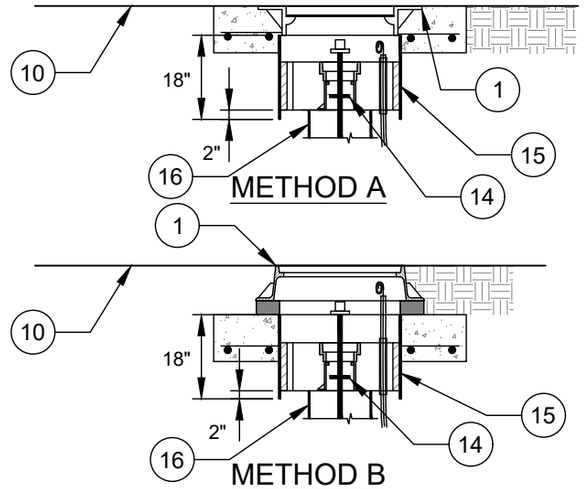
DETAIL 10.6.1



PROFILE VIEW



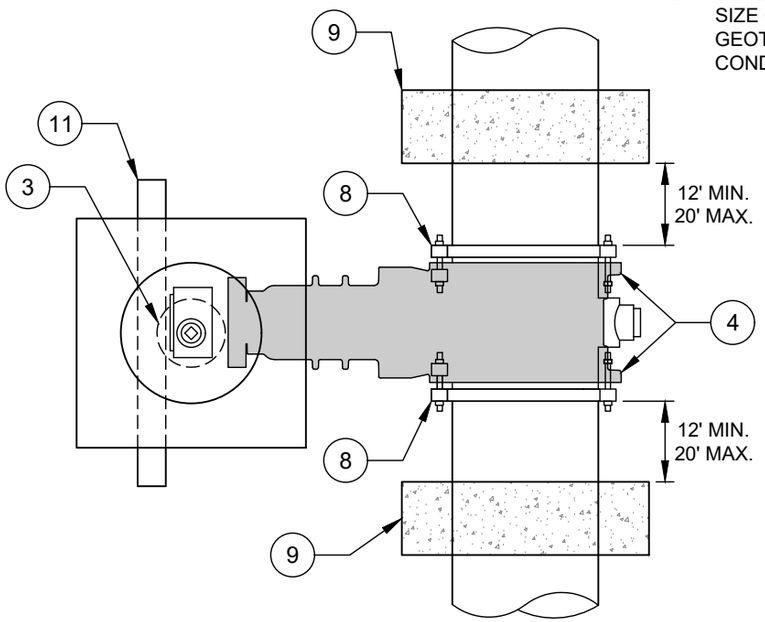
SIDE VIEW



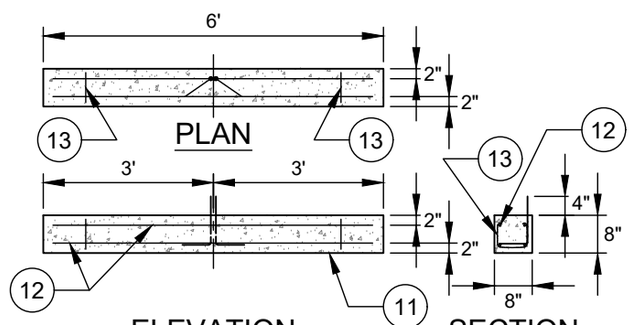
ELEVATIONS

NOTES TO DESIGNER

A. SEALING ENGINEER IS RESPONSIBLE FOR DEPTH REQUIREMENTS.
B. SEALING ENGINEER TO SPECIFY SIZE OF BEARING PAD BASED ON GEOTECHNICAL REPORT OF SOIL CONDITIONS.

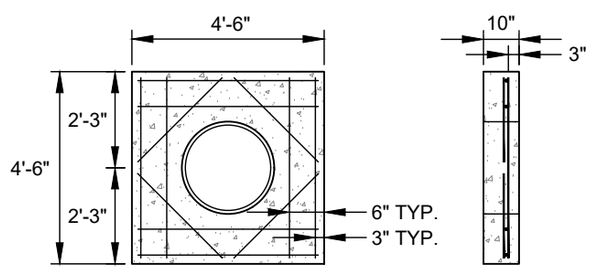


PLAN VIEW



ELEVATION SECTION

PRECAST CONCRETE BEAM



PLAN VIEW SECTION VIEW

PRECAST CONCRETE PAD

NO.	DESCRIPTION:
1.	FRAME AND COVER ASSEMBLY. SEE APPROPRIATE STANDARD DETAILS.
2.	TRACER WIRE TERMINATION WITH 24" NEATLY COILED WIRE.
3.	DUCTILE IRON STANDPIPE, MIN. 10" DIAMETER.
4.	GATE VALVE WITH 90° BEVEL GEAR OPERATOR.
5.	TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK BLUE HDPE INSULATION.
6.	CONCRETE BEARING BLOCK FOR 10" AND LARGER GATE VALVES. POLYETHYLENE WRAP BARRIER SHALL BE PRESENT BETWEEN BEARING BLOCK AND VALVE. WRAP SHALL BE TWO LAYERS OF 4 MILS THICK HDCLPE.
7.	EXTENSION STEM ASSEMBLY. SEE APPROPRIATE STANDARD DETAIL.
8.	RESTRAINED MJ ADAPTER WITH STAINLESS STEEL STIFFENER AND ACCESSORY KIT.
9.	THRUST BLOCK. SEE APPROPRIATE STANDARD DETAIL.
10.	FINISHED GRADE.
11.	REINFORCED CONCRETE SUPPORT BEAM.
12.	#4 REBARS - AS SHOWN.
13.	#2 OR #3 REBARS - STIRRUPS - AS SHOWN.
14.	CENTERING COLLAR.
15.	24" PVC PIPE - C900 - DR18, OR DIP - CAST IN.
16.	12" (MIN.) DIP (OR C900 PVC) RISER PIPE 20" MAXIMUM.

NOTES:

A. CONNECT VALVE TO HDPE LINE WITH RESTRAINED MJ ADAPTER WITH STAINLESS STEEL STIFFENER AND ACCESSORY KIT. SEE STANDARD DETAIL FOR TRANSITION DETAIL.

B. MJ ADAPTER KIT SHALL INCLUDE BOLTS AND NUTS, GRADE 3 OR HIGHER AND LONG ENOUGH TO ACCOMMODATE THE ADDED LENGTH OF HDPE FITTING TO ATTACH TO VALVES.

C. CLTW ALLOWS THE INSTALLATION OF DIFFERENT PIPE MATERIALS ON EITHER SIDE OF THE GATE VALVE. INSTALL TRANSITIONS PER STANDARD DETAIL FOR HDPE.

D. IF VALVE OPERATING NUT IS MORE THAN 3' BELOW FINISHED GRADE, PROVIDE EXTENSION STEM WITH STANDARD 2" SQUARE OPERATING NUT IN TOP SECTION OF VALVE BOX. SEE STANDARD DETAIL.

E. STANDPIPE SHALL NOT INDUCE LOADING ON THE VALVE.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

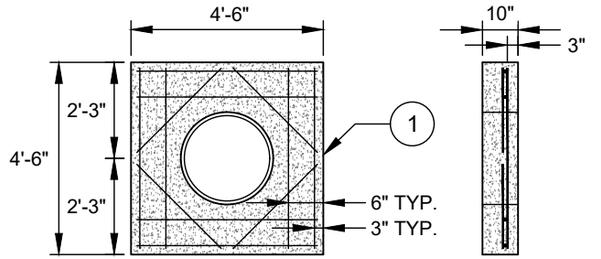
HORIZONTAL INSTALLATION OF GATE VALVES FOR HDPE PIPE (16-INCH TO 30-INCH)

NO SCALE

VERSION 1.0

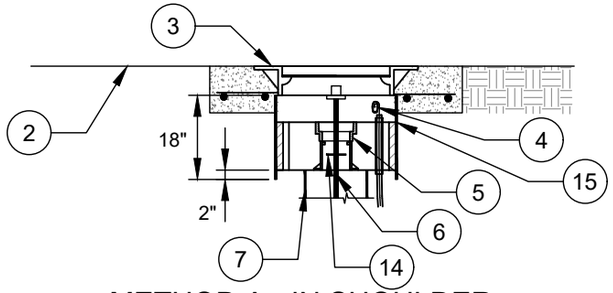
DATE 04/2024

DETAIL 10.6.2

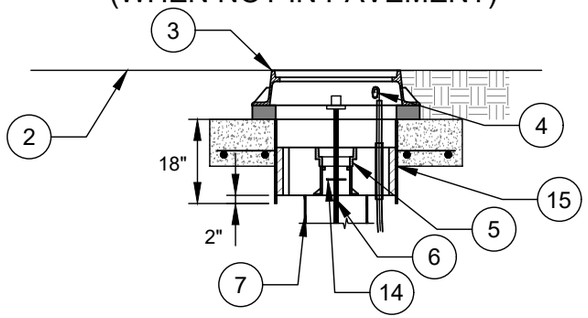


PLAN VIEW SECTION VIEW

PRECAST CONCRETE PAD

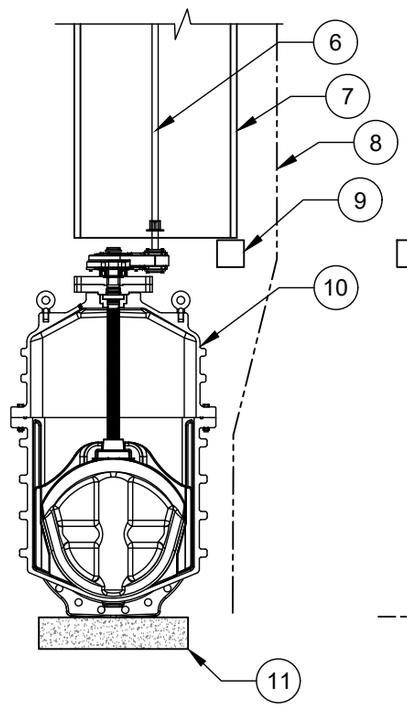


METHOD A - IN SHOULDER
(WHEN NOT IN PAVEMENT)

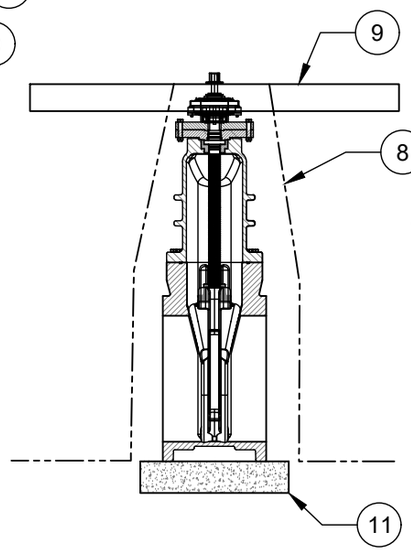


METHOD B - IN PAVEMENT

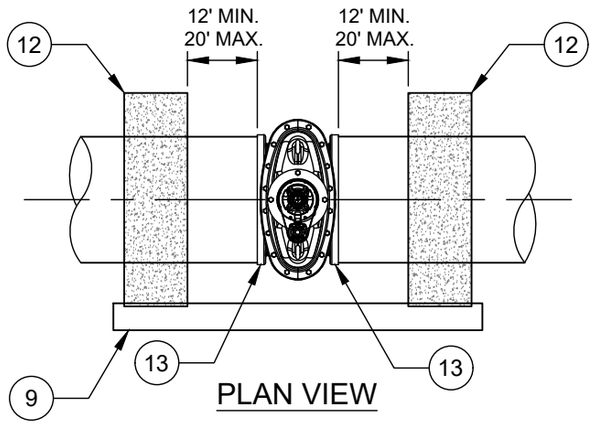
ELEVATIONS



PROFILE VIEW



SIDE VIEW



PLAN VIEW

NO.	DESCRIPTION:
1.	PRECAST CONCRETE PAD (REINFORCED). SEE STANDARD DETAIL.
2.	FINISHED GRADE.
3.	FRAME AND COVER ASSEMBLY. SEE APPROPRIATE STANDARD DETAILS.
4.	TRACER WIRE TERMINATION WITH 24" NEATLY COILED WIRE.
5.	VALVE BOX ASSEMBLY - SEE CLTW STANDARD DETAIL.
6.	EXTENSION STEM ASSEMBLY. REFER TO STANDARD DETAIL.
7.	12" (MINIMUM) DIP RISER PIPE 20" MAXIMUM.
8.	TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK BLUE HDPE INSULATION.
9.	PRECAST CONCRETE SUPPORT BEAM.
10.	GATE VALVE - VERTICALLY ORIENTED.
11.	BEARING BLOCK FOR VALVE.
12.	THRUST BLOCK. REFER TO STANDARD DETAIL.
13.	RESTRAINED MJ ADAPTER WITH STAINLESS STEEL STIFFENER AND ACCESSORY KIT.
14.	CENTERING COLLAR.
15.	24" PVC PIPE - C900 - DR18, OR DIP - CAST IN.

NOTES:

A. CONNECT VALVE TO HDPE LINE WITH RESTRAINED MJ ADAPTER WITH STAINLESS STEEL STIFFENER AND ACCESSORY KIT. SEE STANDARD DETAIL FOR TRANSITION DETAIL.
B. CLTW ALLOWS THE INSTALLATION OF DIFFERENT PIPE MATERIALS ON EITHER SIDE OF THE GATE VALVE. INSTALL TRANSITIONS PER STANDARD DETAIL FOR HDPE.
C. IF VALVE OPERATING NUT IS MORE THAN 3' BELOW FINISHED GRADE, PROVIDE EXTENSION STEM ASSEMBLY. SEE STANDARD DETAIL.
D. REFER TO STANDARD DETAIL FOR MANHOLE FRAME AND COVER.
E. RISER PIPE SHALL NOT INDUCE LOADING ON THE VALVE.

NOTES TO DESIGNER

A. SEALING ENGINEER IS RESPONSIBLE FOR DEPTH REQUIREMENTS.
B. SEALING ENGINEER IS RESPONSIBLE FOR BEARING BLOCK STRUCTURAL DESIGN.
C. SEALING ENGINEER TO SPECIFY SIZE OF BEARING BLOCK BASED ON GEOTECHNICAL REPORT OF SOIL CONDITIONS.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

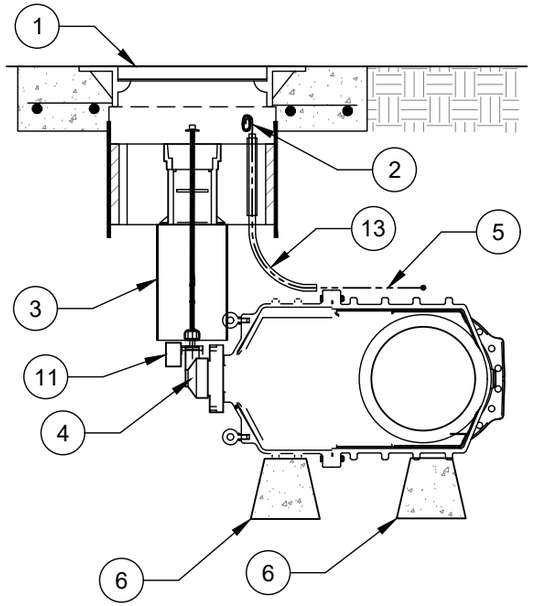
VERTICAL INSTALLATION OF GATE VALVES FOR HDPE PIPE (16-INCH TO 30-INCH)

NO SCALE

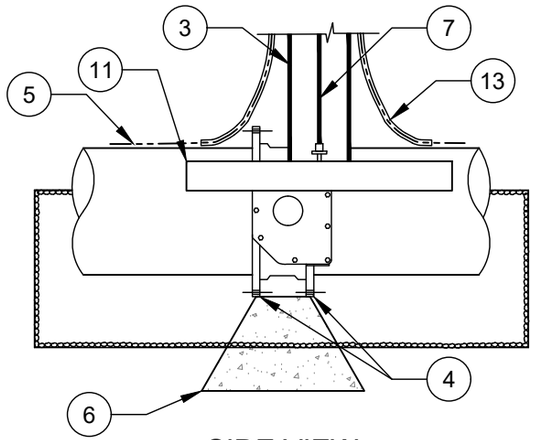
VERSION 1.0

DATE 04/2024

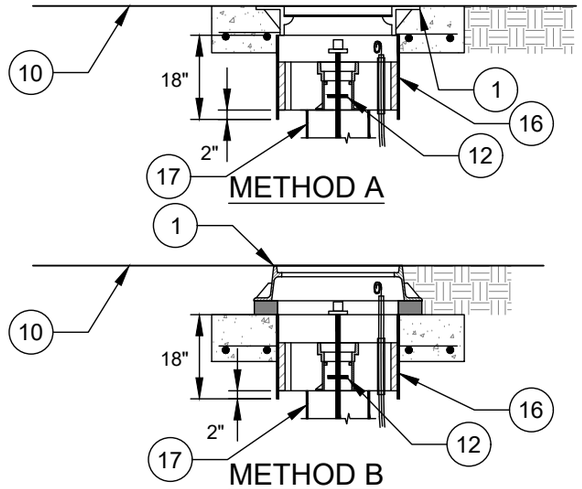
DETAIL 10.6.3



PROFILE VIEW



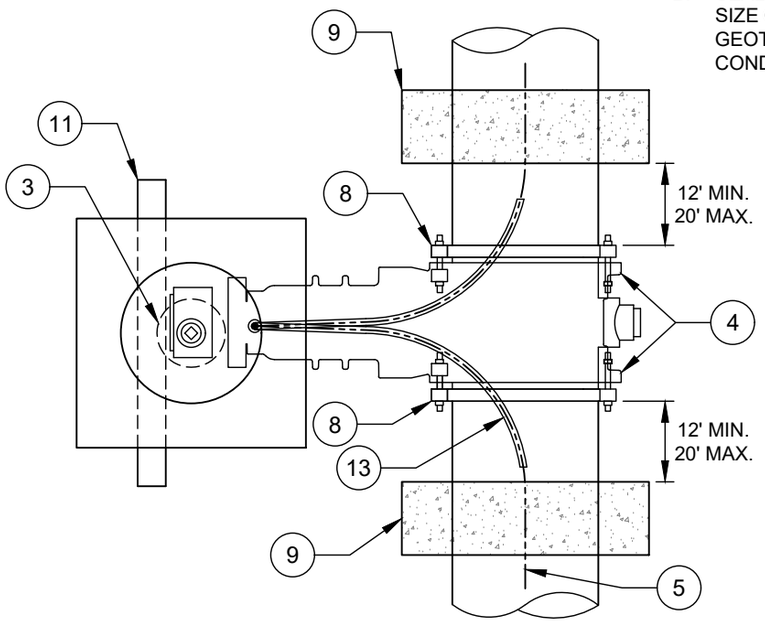
SIDE VIEW



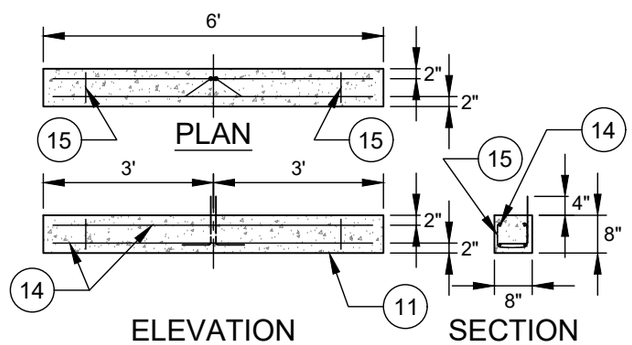
ELEVATIONS

NOTES TO DESIGNER

A. SEALING ENGINEER IS RESPONSIBLE FOR DEPTH REQUIREMENTS.
B. SEALING ENGINEER TO SPECIFY SIZE OF BEARING PAD BASED ON GEOTECHNICAL REPORT OF SOIL CONDITIONS.

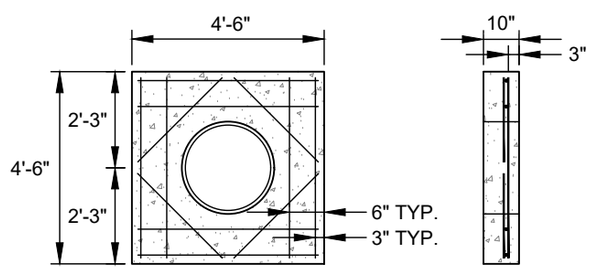


PLAN VIEW



ELEVATION SECTION

PRECAST CONCRETE BEAM



PLAN VIEW SECTION VIEW

PRECAST CONCRETE PAD

NO. DESCRIPTION:

1. 20.5" CLEAR OPENING FRAME AND COVER ASSEMBLY. SEE APPROPRIATE STANDARD DETAILS.
2. TRACER WIRE TERMINATION WITH 24" NEATLY COILED WIRE.
3. DUCTILE IRON STANDPIPE, MIN. 10" DIAMETER.
4. GATE VALVE WITH 90° BEVEL GEAR OPERATOR.
5. TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK BLUE HDPE INSULATION.
6. CONCRETE BEARING BLOCK FOR 10" AND LARGER GATE VALVES. POLYETHYLENE WRAP BARRIER SHALL BE PRESENT BETWEEN BEARING BLOCK AND VALVE. WRAP SHALL BE TWO LAYERS OF 4 MILS THICK HDCLPE.
7. EXTENSION STEM ASSEMBLY. SEE APPROPRIATE STANDARD DETAIL.
8. MECHANICAL JOINT ENDS.
9. THRUST BLOCK. SEE APPROPRIATE STANDARD DETAIL.
10. FINISHED GRADE.
11. REINFORCED CONCRETE SUPPORT BEAM.
12. CENTERING COLLAR.
13. 1/4" OR 3/8" ID CONDUIT - SDR 9 PEX TUBING - ASTM F876.
14. #4 REBARS - AS SHOWN.
15. #2 OR #3 REBARS - STIRRUPS - AS SHOWN.
16. 24" PVC PIPE - C900 - DR18, OR DIP - CAST IN.
17. 12" (MIN.) DIP (OR C900 PVC) RISER PIPE 20" MAXIMUM.

NOTES:

A. CLTW ALLOWS THE INSTALLATION OF DIFFERENT PIPE MATERIALS ON EITHER SIDE OF THE GATE VALVE. INSTALL TRANSITIONS PER STANDARD DETAIL.

B. IF VALVE OPERATING NUT IS MORE THAN 3' BELOW FINISHED GRADE, PROVIDE EXTENSION STEM WITH STANDARD 2" SQUARE OPERATING NUT IN TOP SECTION OF VALVE BOX. SEE STANDARD DETAIL.

C. STANDPIPE SHALL NOT INDUCE LOADING ON THE VALVE.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

HORIZONTAL INSTALLATION OF GATE VALVES FOR NON-HDPE PIPE (16-INCH TO 30-INCH)

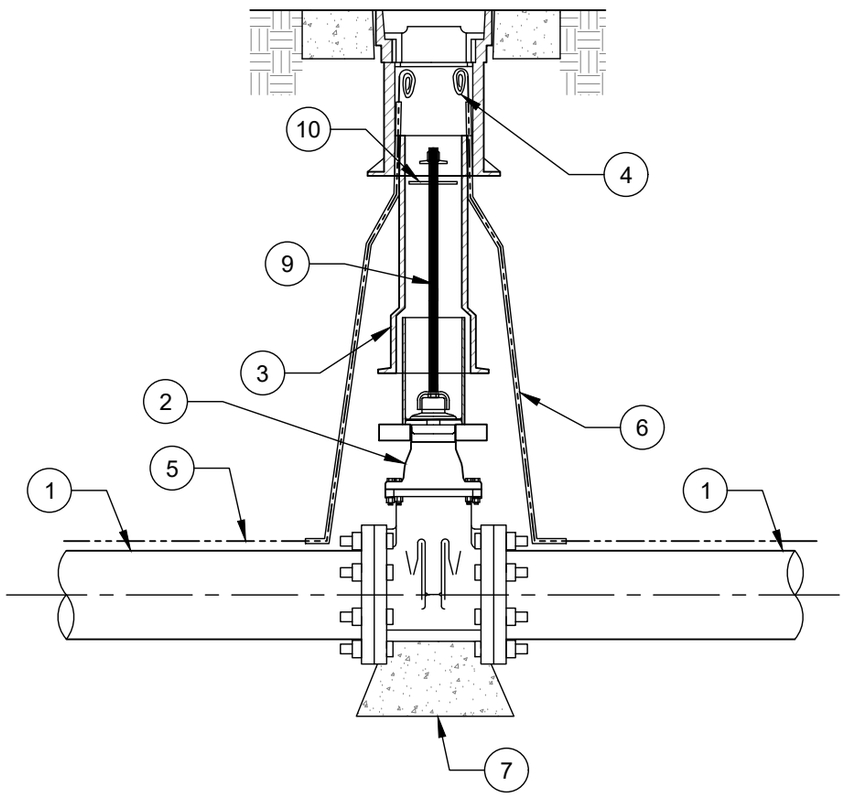
NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.6.4

1.5"-12" PIPE



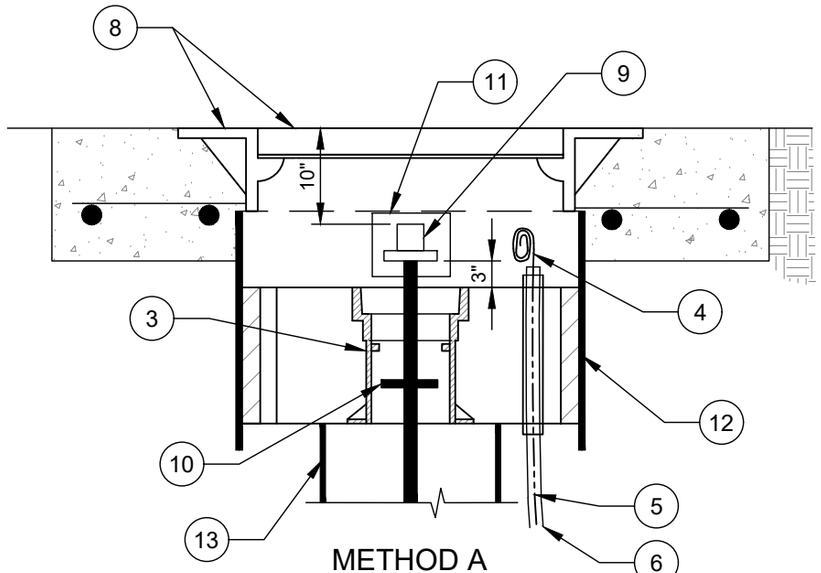
NOTES TO DESIGNER

A. SEALING ENGINEER IS RESPONSIBLE FOR DESIGN OF PAVEMENT REPAIR AND FOR A DESIGN THAT DOES NOT ALLOW LOADING TRANSFER TO VALVE.

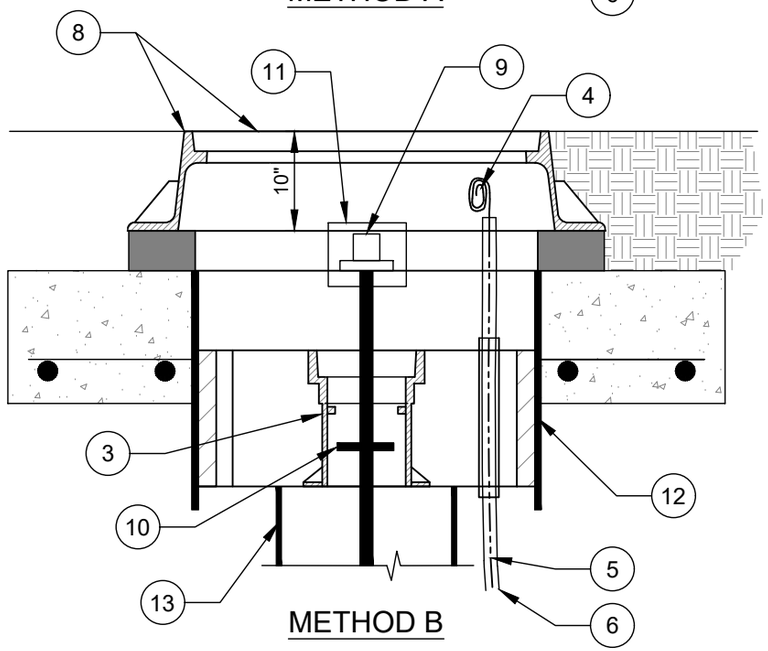
B. SEALING ENGINEER TO SPECIFY SIZE OF BEARING PAD BASED ON GEOTECHNICAL REPORT OF SOIL CONDITIONS.

16" AND LARGER PIPE

(USE FRAME AND COVER)



METHOD A



METHOD B

NO.	DESCRIPTION:
1.	WATER MAIN.
2.	GATE VALVE (OR BALL VALVE, AS APPLICABLE) FOR 1.5"-2" WATER LINES.
3.	VALVE BOX ASSEMBLY - SEE CLTW STANDARD DETAIL.
4.	TRACER WIRE TERMINATION WITH 24" NEATLY COILED WIRE.
5.	TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER HDPE INSTALLATION TRACER WIRE WITH 30 MILS BLUE INSULATION.
6.	ALL VERTICAL WIRE SHALL BE PLACED IN 1/4" OR 3/8" ID CONDUIT SDR 9 PEX TUBING - ASTM F876 (TYP.).
7.	CONCRETE BEARING BLOCK FOR 10-INCH AND LARGER GATE VALVES. POLYETHYLENE WRAP BARRIER SHALL BE PRESENT BETWEEN BEARING BLOCK AND VALVE. WRAP SHALL BE MINIMUM TWO LAYERS OF 4 MILS THICK HDCLPE.
8.	FRAME AND COVER. REFER TO APPROPRIATE STANDARD DETAILS.
9.	EXTENSION STEM ASSEMBLY. SEE APPROPRIATE STANDARD DETAIL.
10.	CENTERING COLLAR.
11.	VALVE LOCK BOX - FURNISHED BY CLTWATER.
12.	24" PVC PIPE - C905 - DR18, OR DIP - CAST IN.
13.	12" (MIN.) DIP (OR C900 PVC0 RISER PIPE 20" MAXIMUM.

NOTES:

A. MJ ADAPTER KIT SHALL INCLUDE BOLTS AND NUTS, GRADE 3 OR HIGHER.

B. CLTW ALLOWS THE INSTALLATION OF DIFFERENT PIPE MATERIALS ON EITHER SIDE OF THE GATE VALVE. INSTALL TRANSITIONS PER APPROPRIATE STANDARD DETAIL.

C. IF VALVE OPERATING NUT IS MORE THAN 3' BELOW FINISHED GRADE, PROVIDE EXTENSION STEM WITH STANDARD 2" SQUARE OPERATING NUT IN TOP SECTION OF VALVE BOX. SEE STANDARD DETAIL.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

GATE VALVE FOR NON-HDPE PIPE (1.5-INCH TO 30-INCH)

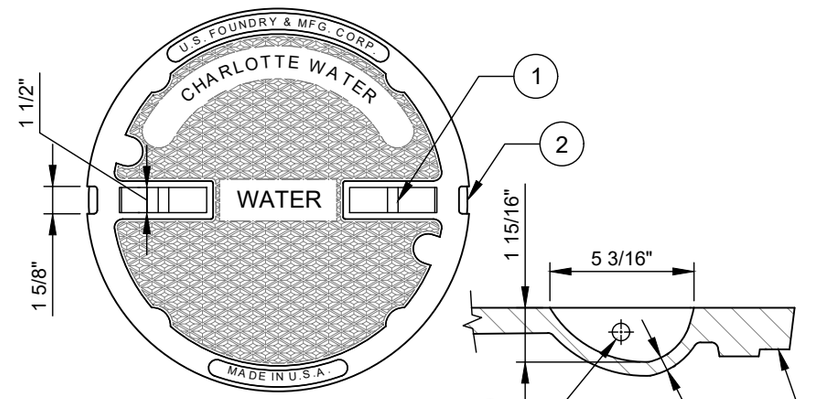
NO SCALE

VERSION 1.0

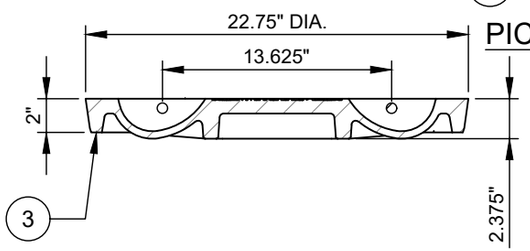
DATE 04/2024

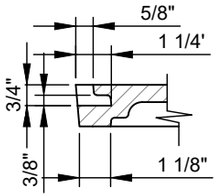
DETAIL 10.6.5

U.S. FOUNDRY & MFG. CORP.

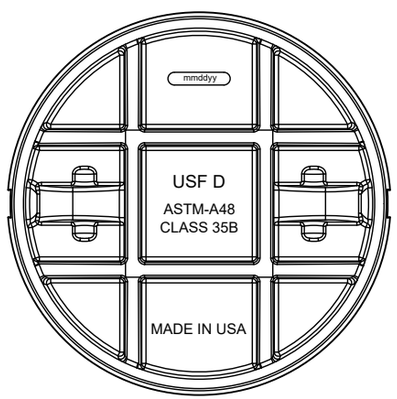


PICK BAR DETAIL



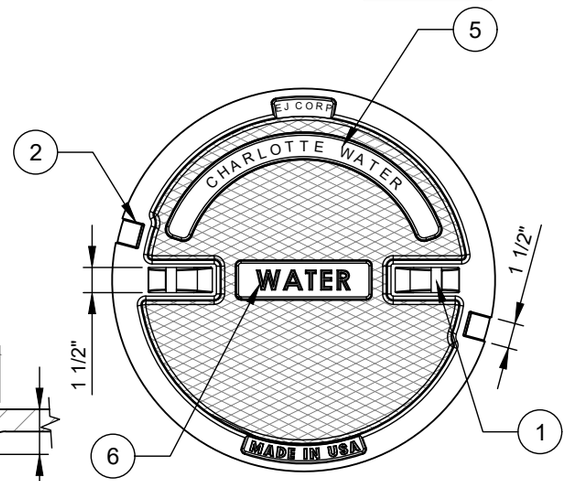


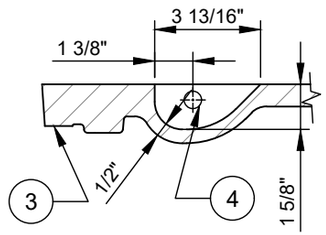
PICK HOLE DETAIL



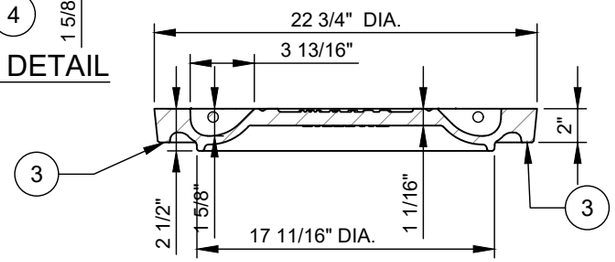
WEIGHT - 130 LB. MIN., 0% MINUS TOLERANCE

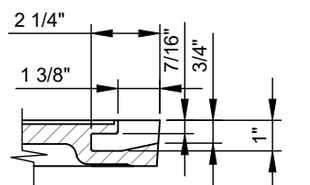
EJ CORP



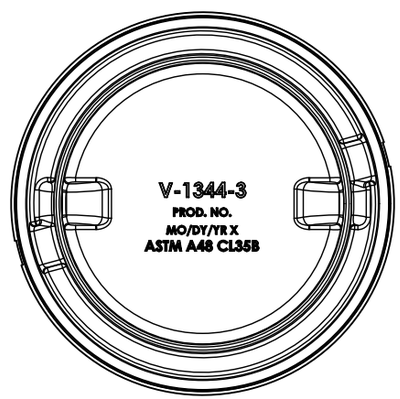


PICK BAR DETAIL





PICK HOLE DETAIL



WEIGHT - 130 LB. MIN., 0% MINUS TOLERANCE

NO.	DESCRIPTION:
1.	(2) - LIFTING S.S. BARS.
2.	(2) - NONPENETRATING PICK HOLES.
3.	MACHINED SURFACE.
4.	5/8" TYPE 304 S.S. ROD.
5.	1/2" RAISED LETTERING (RECESSED).
6.	1" RAISED LETTERING (RECESSED).

NOTES:

A. LOAD RATING - HEAVY DUTY.

B. MATERIAL - ASTM A48 - CLASS 35 GRAY IRON.

C. COATING - UNDIPPED.

D. COVER SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.

E. COVER SHALL NOT BE OUT OF ROUND.

F. THIS SHALL NOT BE USED ON VALVES IN VAULTS.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

TYPE 7 MANHOLE COVER
20.5-INCH DIAMETER (CLEAR OPENING)
USE WITH 16-30 INCH DIRECT BURY GATE VALVES

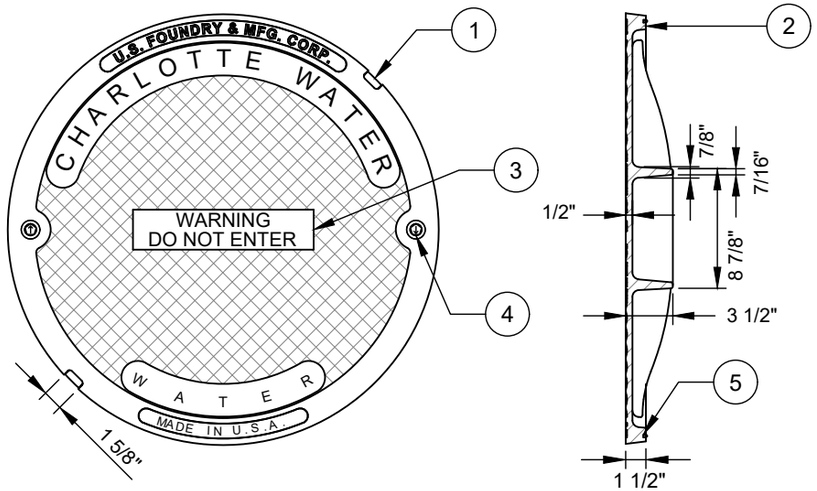
NO SCALE

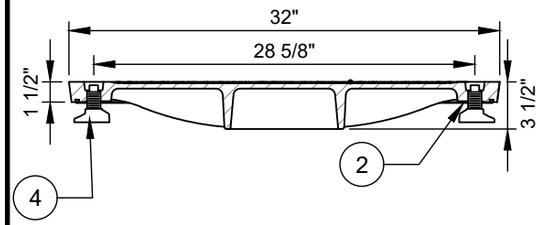
VERSION
1.0

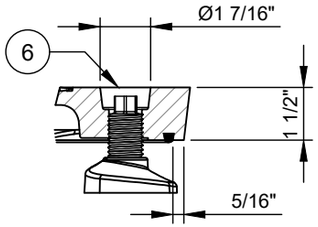
DATE
04/2024

DETAIL
10.7.1

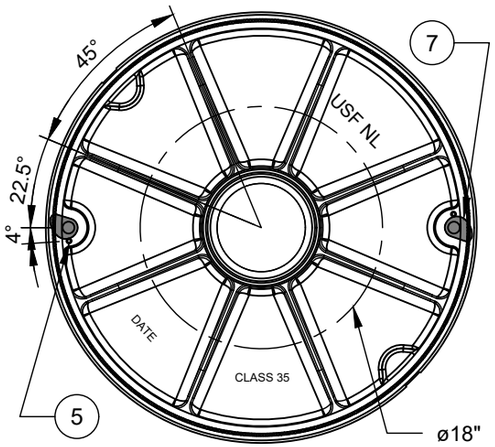
U.S. FOUNDRY & MFG. CORP.

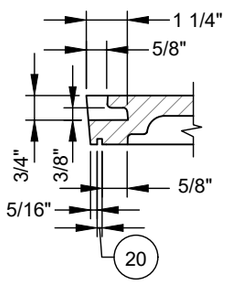






CAM ASSEMBLY DETAIL



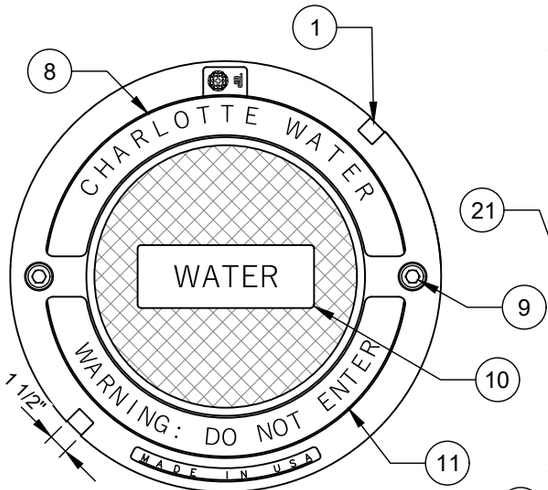


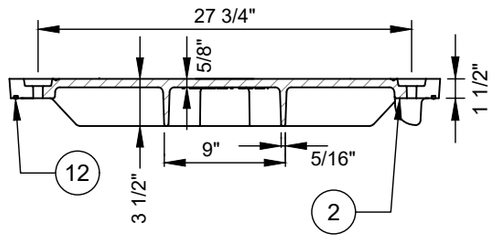
PICK HOLE DETAIL

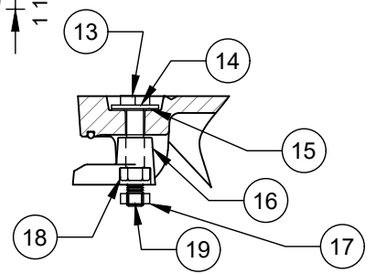
WEIGHT - 165 LB. MIN., 0% MINUS TOLERANCE

MATERIAL - ASTM A48 CLASS 35 - CAST IRON

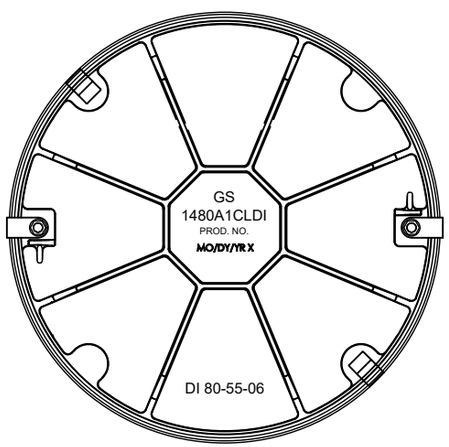
EJ CORP

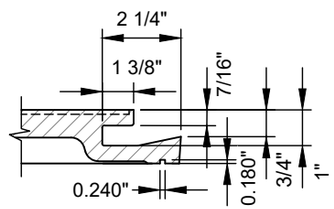






CAM ASSEMBLY DETAIL





PICK HOLE DETAIL

WEIGHT - 150 LB. MIN., 0% MINUS TOLERANCE

MATERIAL - ASTM A536 DUCTILE IRON - GRADE 80-55-06

NO.	DESCRIPTION:
1.	(2)-NON PENETRATING PICKHOLES.
2.	MACHINED SURFACE.
3.	1 INCH ARIAL STYLE TEXT TYP.
4.	WEDGE CAM LOCK. SEE ASSEMBLY DETAIL.
5.	ORS GASKET NEOPRENE RUBBER 60 DUROMETER.
6.	USF WEDGE LOC 5/8" HEX HEAD BOLT ALL GRADE S.S. TYPE 304.
7.	7/8" DIAMETER CAM LOCK HOLE @ 28 5/8" DIAMETER.
8.	1 INCH SHARP FACE GOTHIC TEXT.
9.	(2) CAMS (SEE DETAIL).
10.	1 3/4" SHARP FACE GOTHIC TEXT.
11.	1 INCH SHARP FACE GOTHIC TEXT.
12.	1/4" NEOPRENE GASKET.
13.	5/8"-11 X 3 1/2" LG TYPE 304 SS HEX BOLT.
14.	5/8" I.D. 1 1/2" O.D. TYPE 304 SS FLAT WASHER.
15.	5/8" I.D. 1 1/2" O.D. RUBBER WASHER.
16.	BRONZE LOCK LUG.
17.	5/8" HEX JAM NUT TYPE 304 SS.
18.	5/8"-11 TYPE 304 SS NYLOK NUT.
19.	WELD ON JAM NUT OR PEEN END THREADS ON BOLT.
20.	3/16" DOVETAIL GROOVE.
21.	31 1/4" (OUTSIDE OF GROOVE).

NOTES:

A. LOAD RATING - HEAVY DUTY.

B. MATERIAL - DUCTILE IRON OR CAST IRON AS INDICATED IN THE DETAIL.

C. COATING - UNDIPPED.

D. COVER SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.

E. COVER SHALL NOT BE OUT OF ROUND.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

TYPE 8 MANHOLE COVER
30-INCH DIAMETER (CLEAR OPENING)

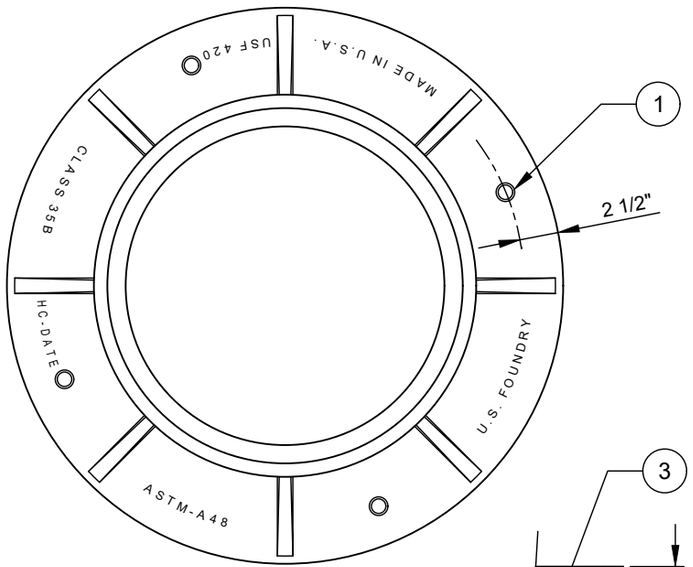
NO SCALE

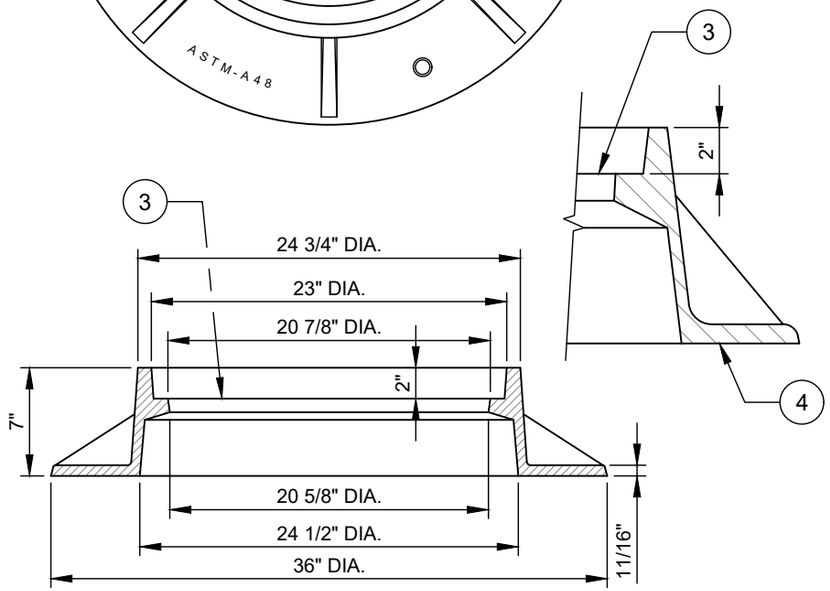
VERSION 1.0

DATE 04/2024

DETAIL 10.7.2

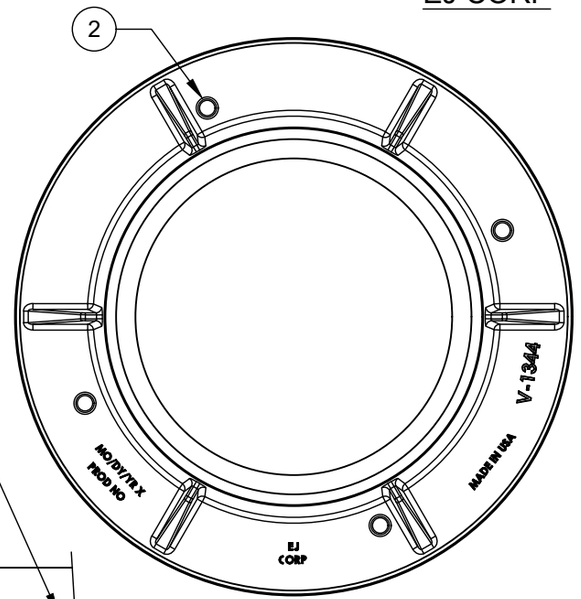
U.S. FOUNDRY & MFG. CORP.

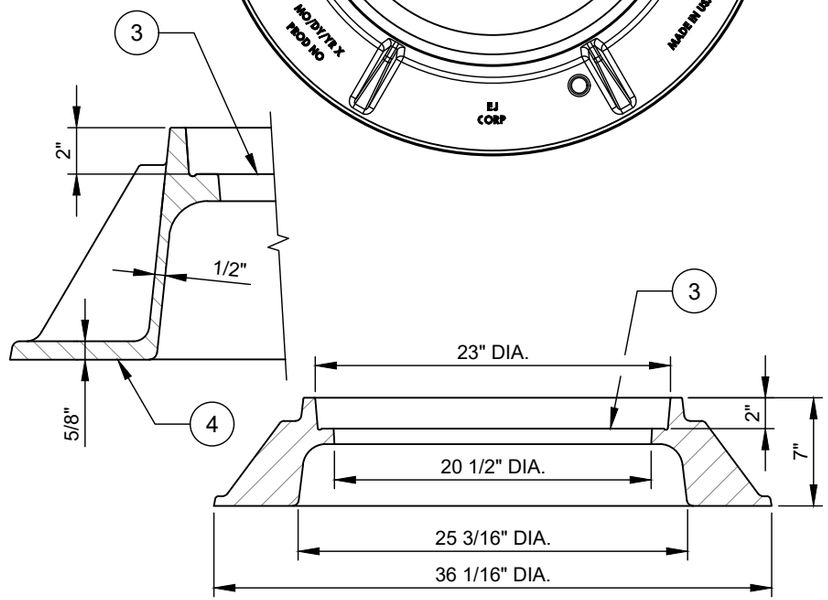




WEIGHT - 240 LB. MIN., 0% MINUS TOLERANCE

EJ CORP





WEIGHT - 164.50 LB. MIN., 0% MINUS TOLERANCE

NO.	DESCRIPTION:
1.	(4)-1" DIAMETER ANCHOR HOLES ON A 31" BOLT CIRCLE DIAMETER (B.C.D.).
2.	(4)-1" DIAMETER HOLES ON 29 1/4" B.C.D..
3.	MACHINED SURFACE.
4.	FRAME.

NOTES:

A. LOAD RATING - HEAVY DUTY.

B. MATERIAL - ASTM A48 - CLASS 35 GRAY IRON.

C. COATING - UNDIPPED.

D. FRAME SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.

E. FRAME SHALL NOT BE OUT OF ROUND.

F. THIS SHALL NOT BE USED ON VAULTS.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

TYPE F MANHOLE FRAME
20.5-INCH DIAMETER (CLEAR OPENING) 7-INCH TALL
USE WITH 16-30 INCH GATE VALVES

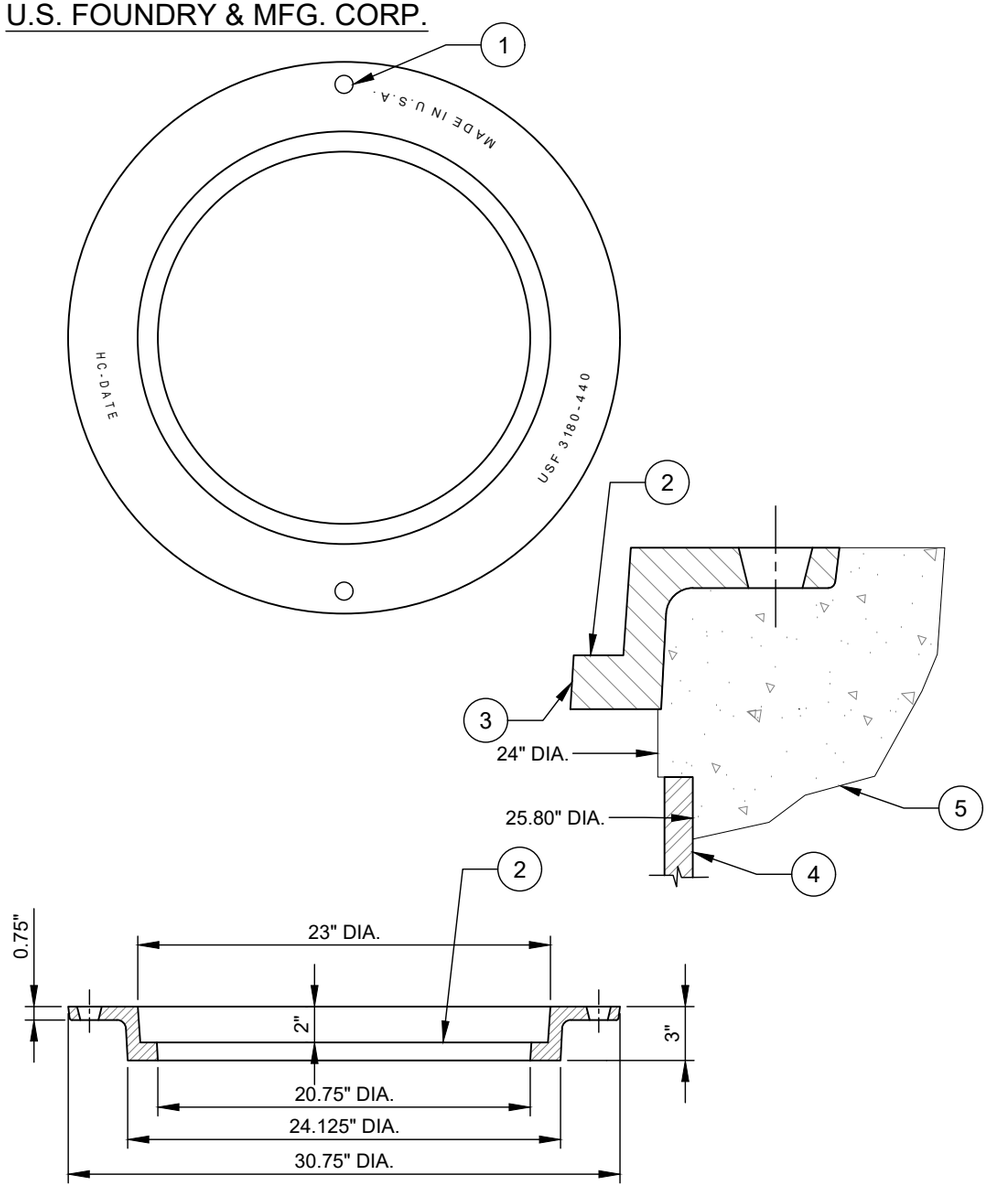
NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.7.3

U.S. FOUNDRY & MFG. CORP.



WEIGHT - 105 LB. MIN., 0% MINUS TOLERANCE

EJ CORP

TO BE DETERMINED

NO.	DESCRIPTION:
1.	(2)-1" DIAMETER ANCHOR HOLES.
2.	MACHINED SURFACE.
3.	TYPE G FRAME.
4.	24" DIP - SEE INSTALLATION STANDARD DETAIL.
5.	CONCRETE VALVE PAD - SEE INSTALLATION STANDARD DETAIL.

NOTES:

A. ROAD RATING - HEAVY DUTY.

B. MATERIAL - ASTM A48 - CLASS 35 GRAY IRON.

C. COATING - UNDIPPED.

D. FRAME SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.

E. FRAME SHALL NOT BE OUT OF ROUND.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

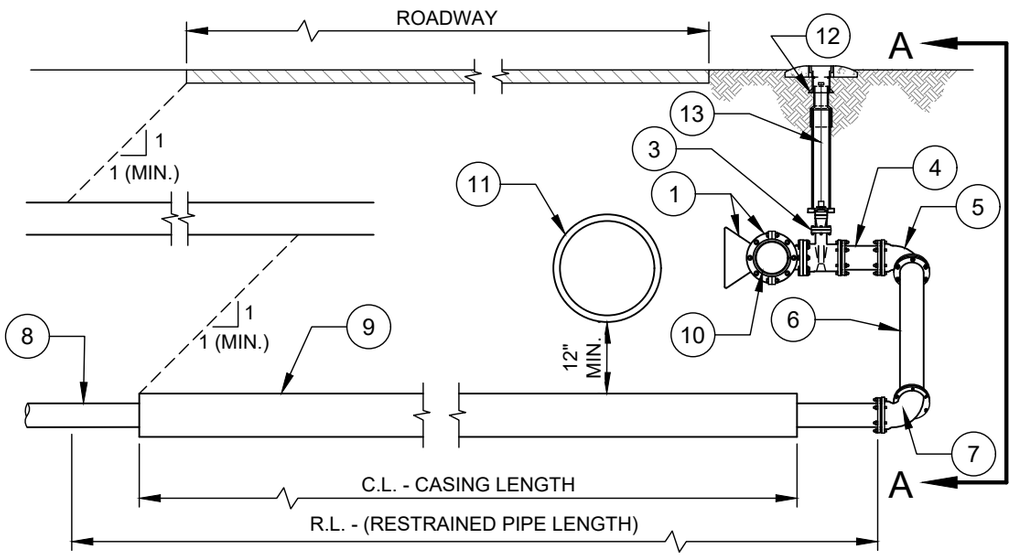
TYPE G MANHOLE FRAME
20.5-INCH DIAMETER (CLEAR OPENING)
3-INCH TALL - INVERTED (CAST-IN-PLACE)

NO SCALE

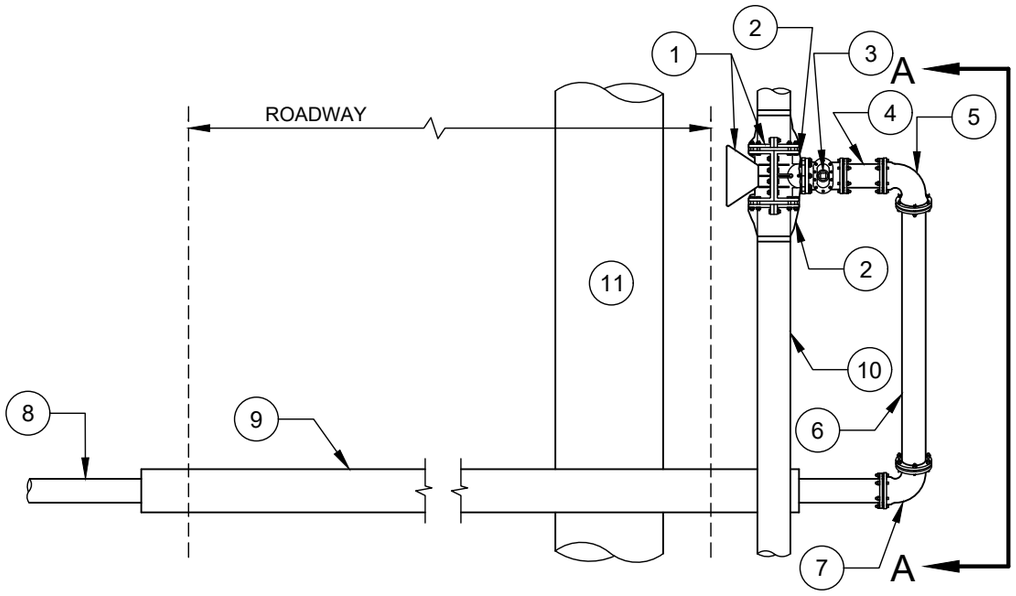
VERSION
1.0

DATE
04/2024

DETAIL
10.7.4



PROFILE



PLAN

CHART A - RESTRAINED LENGTH REQUIREMENTS

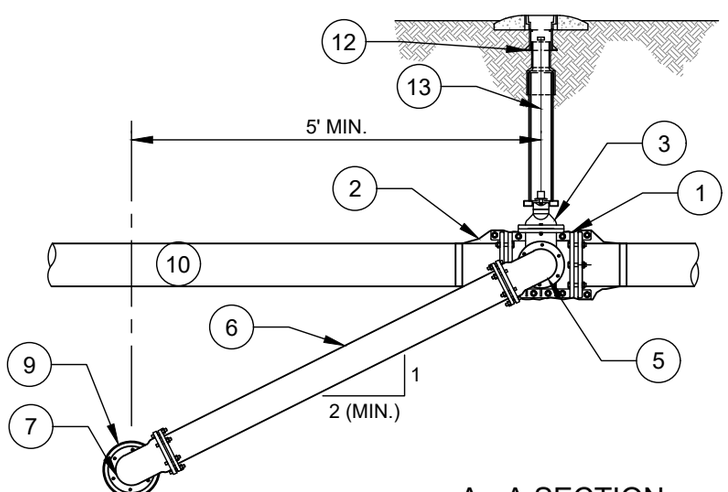
PIPE DIA. (INCHES)	TOTAL RESTRAINED LENGTH - R.L. - (FT)
3"	64' + CASING LENGTH (C.L.)
4"	77' + CASING LENGTH (C.L.)
6"	109' + CASING LENGTH (C.L.)
8"	140' + CASING LENGTH (C.L.)
10"	169' + CASING LENGTH (C.L.)
12"	196' + CASING LENGTH (C.L.)
16"	249' + CASING LENGTH (C.L.)

CONCRETE THRUST BLOCK (WRAP BEND PER NO. 2) REQUIRED AT BOTTOM BEND NO. 7, IF REQUIRED RESTRAINED LENGTH (R.L.) CAN NOT BE COMPLETELY INSTALLED.

CHART B - ROADWAY CASING REQUIREMENTS

PIPE DIA. (INCHES)	CASING MIN. DIA. (INCHES)	CASING WALL THICKNESS MIN. (INCHES)
3"	8"	0.25"
4"	8"	0.25"
6"	12.75"	0.25"
8"	16"	0.25"
10"	18"	0.25"
12"	20"	0.25"
16"	24"	0.25"

LARGER DIAMETER CASING MAY BE REQUIRED DUE TO LENGTH OF CROSSINGS AND RESTRAINED JOINT DIMENSIONS. SEE PLANS AND SPECIFICATIONS.



A - A SECTION

NO. DESCRIPTION:

1. TAPPING SLEEVE WITH CONCRETE THRUST BLOCKING (REQUIRED). SEE SPECIFICATIONS FOR APPROVED MODELS. SIZE ON SIZE TAPPING SLEEVES SHALL BE MECHANICAL JOINT FULL BODY DUCTILE ONLY.
2. WRAP TAPPING SLEEVE WITH 2 LAYERS HDPE PLASTIC FILM (HDCLPE PER AWWA C-105) - 4 MILS. EACH LAYER - EXTEND HDPE 3' EACH WAY FROM FITTINGS - DUCT TAPE ENDS.
3. TAPPING VALVE - FLANGE X RMJ.
4. DUCTILE IRON PIPE SHORT L ≥18".
5. RMJ DUCTILE IRON 90° BEND - ROTATE DOWN, AS APPROVED.
6. DUCTILE IRON PIPE - RESTRAINED.
7. RMJ DUCTILE IRON 90° BEND - ROTATE UP, AS APPROVED, CONCRETE THRUST BLOCKING MAY ALSO BE REQUIRED. SEE NOTE IN CHART A.
8. DUCTILE IRON PIPE - RESTRAINED - SEE CHART A.
9. STEEL CASING - SEE CHART B.
10. EXISTING WATER MAIN.
11. EXISTING INFRASTRUCTURE THAT PREVENTS FRONT SIDE TAP - BACKSIDE TAP WILL BE PERMITTED ONLY WHERE EXISTING INFRASTRUCTURE PREVENTS FRONT SIDE TAP, AND REQUIRES CLTW APPROVAL.
12. VALVE BOX ASSEMBLY PER CLTW STD. DETAIL.
13. VALVE EXTENSION (WHEN OPERATING NUT IS GREATER THAN 3' DEEP).

NOTE:

A. TRACER WIRE INSTALLED PER CLTW TRACER WIRE DETAIL.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

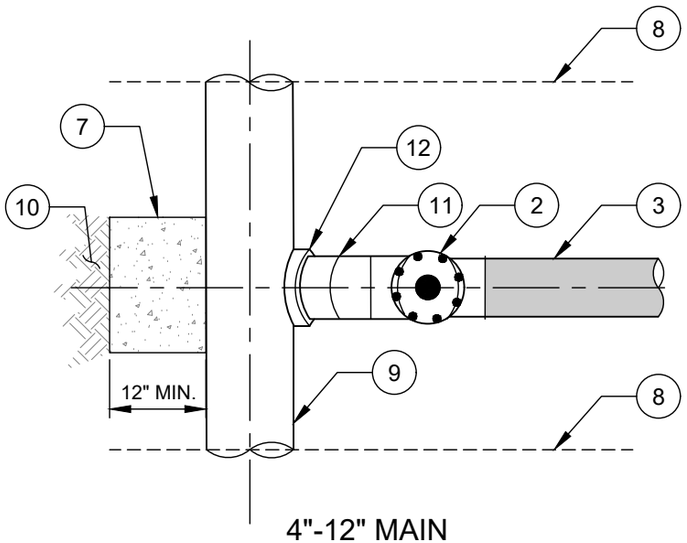
BACK SIDE TAP
16" AND SMALLER MAINS

NO SCALE

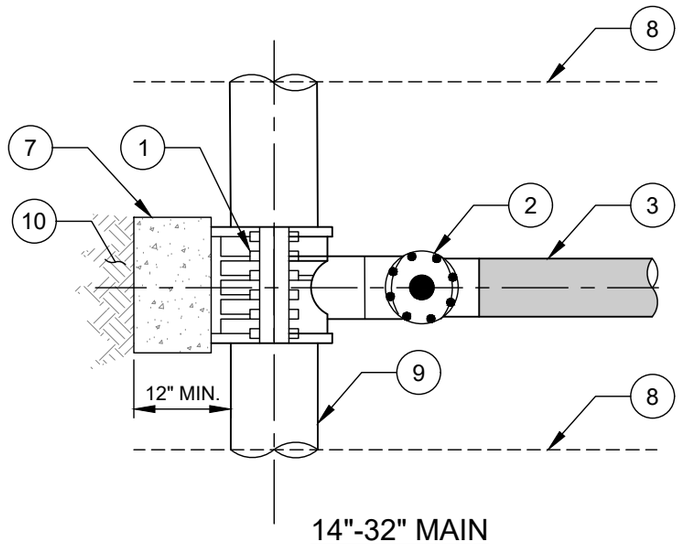
VERSION 1.0

DATE 04/2024

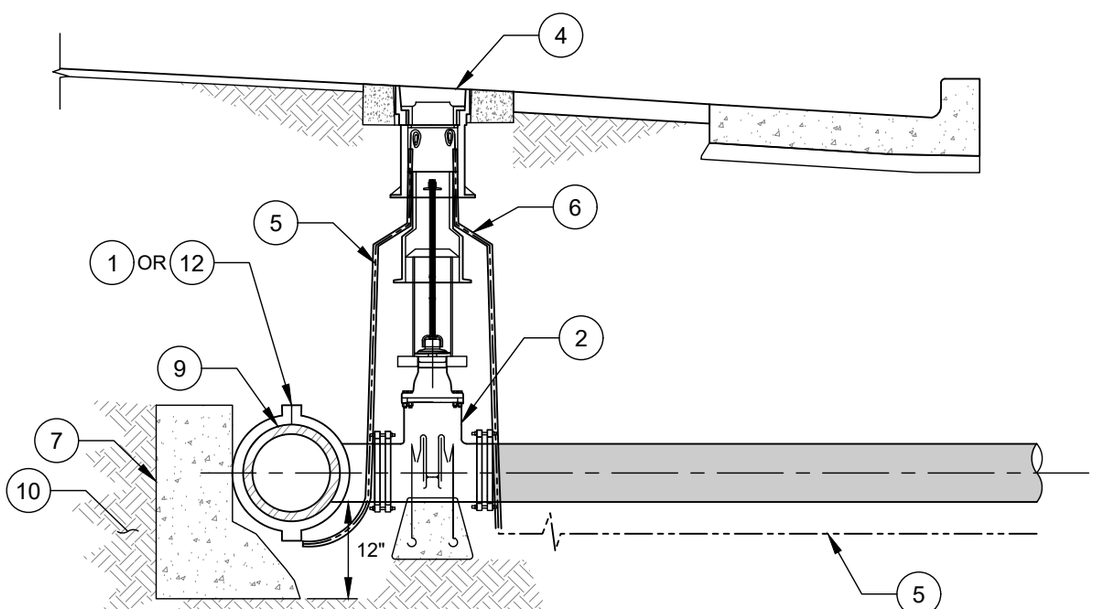
DETAIL 10.8.1



4"-12" MAIN



14"-32" MAIN



THRUST BLOCK TABLE	
TYPE OF FITTING	TEE OR DEAD END
TAP SIZE (INCHES)	TOTAL REQUIRED BEARING AREA (FT^2)
4	1.3
6	2.9
8	5.1
10	7.9
12	11.4
14	15.7
16	20.1
18	25.8
20	31.4
24	45.3
30	70.7
32	80.4

NO. DESCRIPTION:

1. ELECTROFUSION TAPPING SADDLE OR STAINLESS STEEL TAPPING SLEEVE WITH OUTLET SEAL GASKET.
2. FL X MJ TAPPING VALVE. REFER TO APPROPRIATE STANDARD DETAIL WITH CONCRETE SUPPORT.
3. HDPE PIPE.
4. STANDARD VALVE BOX ASSEMBLY.
5. AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH BLUE 30 MILS HDPE INSULATION.
6. ALL VERTICAL WIRE SHALL BE PLACED IN 1/4" OR 3/8" ID CONDUIT SDR 9 PEX TUBING - ASTM F876 (TYP.).
7. CONCRETE THRUST BLOCK (SEE TABLE FOR SIZING).
8. TRENCH LIMITS.
9. EXISTING HDPE WATER MAIN.
10. UNDISTURBED NATIVE SOIL.
11. HDPE PIPE BUTT FUSION JOINT.
12. BUTT FUSED BRANCH SADDLE.

NOTES:

A. BRANCH LARGER THAN THE EXISTING MAIN IS NOT ALLOWED.

B. FOR EXISTING HDPE MAIN, USE ELECTROFUSION TAPPING SADDLE OR BUTT FUSED BRANCH SADDLE.

THRUST BLOCK NOTES:

A. THRUST BLOCKS TO BE 3,600 PSI CONCRETE.
B. THRUST BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL.
C. JOINTS TO BE KEPT FREE OF CONCRETE. ALLOW WORKING ROOM AROUND NUTS AND BOLTS. WRAP FITTING WITH 2 LAYERS HDPE FILM (HDCLPE PER AWWA C-105). EACH LAYER MINIMUM 4 MILS THICK.
D. AREAS GIVEN ARE FOR DR 9 PIPE AT TEST PRESSURE OF 200 PSI IN SOIL WITH 2,000 PSI BEARING CAPACITY. CHANGES SUBJECT TO FIELD CONDITIONS AND APPROVAL OF THE SEALING ENGINEER.
E. TAPPING SLEEVES SHALL HAVE THRUST BLOCKS SIZED BASED ON TAP SIZE.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

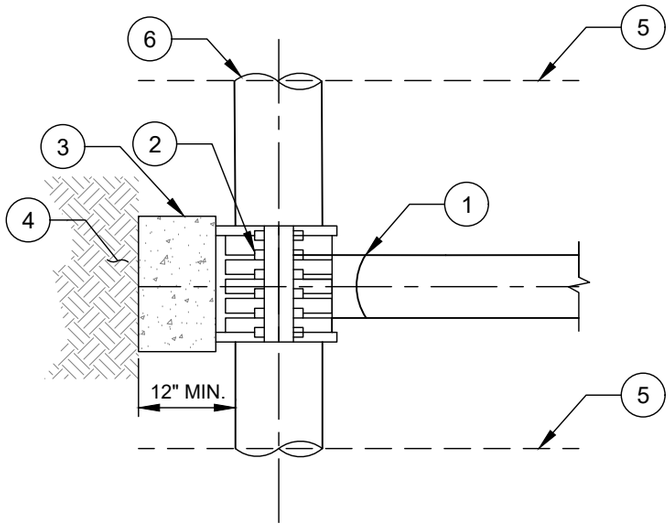
TAPPING SLEEVE AND VALVE FOR HDPE PIPE (4-INCH TO 32-INCH)

NO SCALE

VERSION 1.0

DATE 04/2024

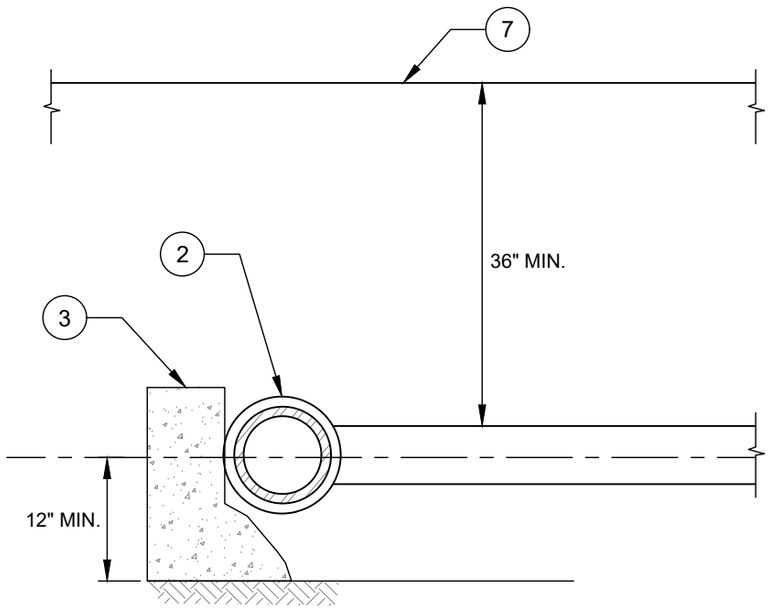
DETAIL 10.8.2

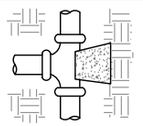


MECHANICAL JOINT TEE PLAN VIEW
NTS

NOTES TO DESIGNER

A. SEALING ENGINEER WILL SPECIFY EITHER ROUND BASE BRANCH SADDLE OR MECHANICAL JOINT SADDLE.



THRUST BLOCK TABLE	
TYPE OF FITTING	TEE OR DEAD END
TYPICAL PLAN VIEW	
MAIN SIZE (INCHES)	TOTAL REQUIRED BEARING AREA (FT^2)
4	2
6	3
8	5.5
10	8
12	11.5
14	14
16	18
18	22.5
20	27.5
24	40
30	62

NO. DESCRIPTION:

1. HDPE PIPE BUTT FUSION JOINT.
2. FULL BODY STAINLESS STEEL MJ BRANCH SLEEVE WITH OUTLET SEAL GASKET.
3. CONCRETE THRUST BLOCK (SEE TABLE FOR SIZING).
4. UNDISTURBED NATIVE SOIL.
5. TRENCH LIMITS.
6. EXISTING HDPE WATER MAIN.
7. PROPOSED GROUND SURFACE.

NOTES:

A. BRANCH LARGER THAN MAIN IS NOT ALLOWED.

B. IF COMPLETE SHUT OFF IS POSSIBLE ON EXISTING HDPE MAIN, USE BUTT FUSION MOLDED TEE. IF SHUT OFF IS NOT POSSIBLE, CONFIRM WITH CLTW INSPECTOR THAT MECHANICAL JOINT TEE OPTION IS ALLOWED.

THRUST BLOCK NOTES:

A. THRUST BLOCKS TO BE 3,600 PSI CONCRETE.

B. THRUST BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL.

C. JOINTS TO BE KEPT FREE OF CONCRETE. ALLOW WORKING ROOM AROUND NUTS AND BOLTS. WRAP FITTING WITH 2 LAYERS HDPE FILE (HDCLPE PER AWWA C-105). EACH LAYER MINIMUM 4 MILS THICK.

D. AREAS GIVEN ARE FOR SDR 9 PIPE AT TEST PRESSURE OF 200 PSI IN SOIL WITH 2,000 PSF BEARING CAPACITY. A SAFETY FACTOR OF 1.5 IS INCLUDED IN CALCULATIONS. CHANGES SUBJECT TO FIELD CONDITIONS AND APPROVAL OF THE SEALING ENGINEER.

E. TAPPING SLEEVES SHALL HAVE THRUST BLOCKS SIZED THE SAME AS TEES.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

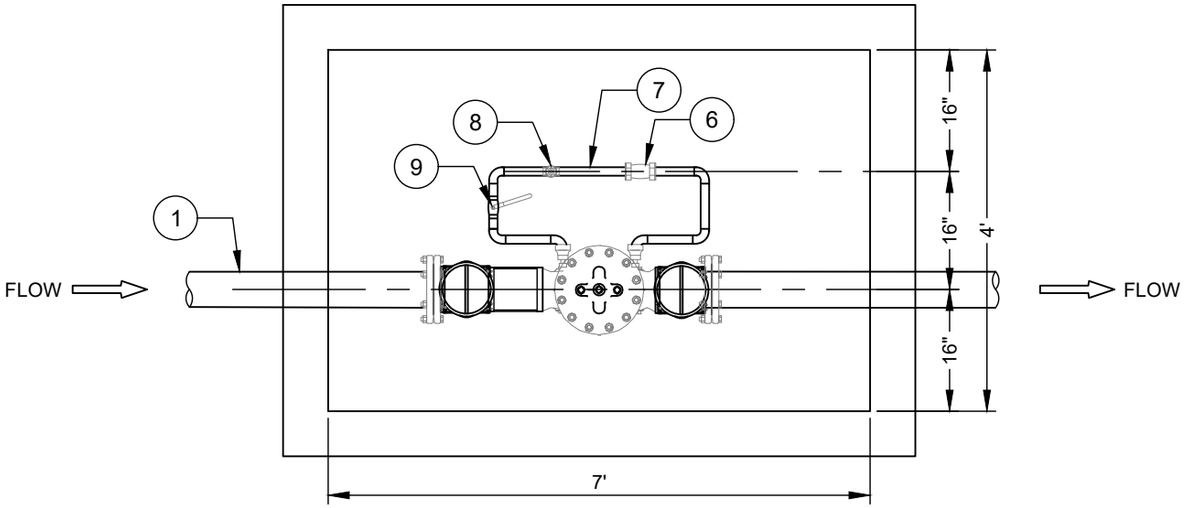
CUT-IN TEE FOR EXISTING HDPE PIPE (4-INCH TO 32-INCH)

NO SCALE

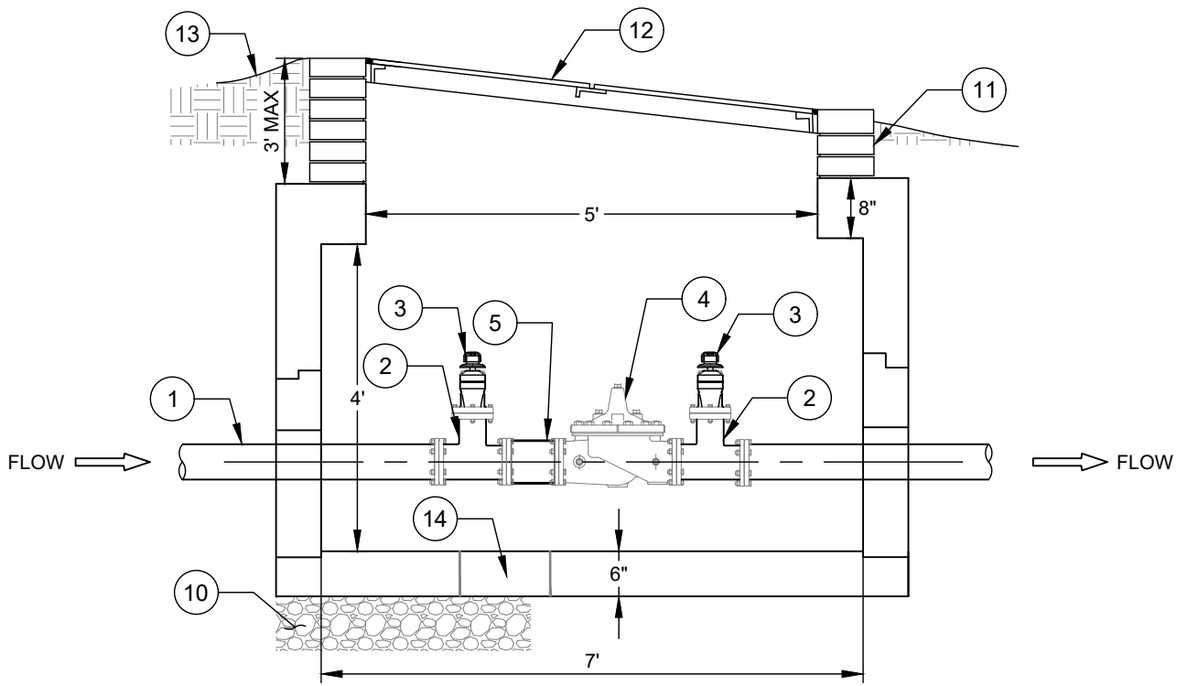
VERSION 1.0

DATE 04/2024

DETAIL 10.8.3



PLAN VIEW



ELEVATION VIEW

NO.	DESCRIPTION:
1.	4" WATER MAIN.
2.	4" X 4" TEE (TYP.).
3.	4" GATE VALVE (TYP.).
4.	4" PRV.
5.	4" DISMANTLING JOINT.
6.	1" GATE VALVE (TYP.).
7.	1" BRASS PIPE.
8.	1" PRV.
9.	1" BALL VALVE.
10.	#57 WASHED STONE.
11.	MINIMUM OF 3 STANDARD BRICK COURSES LOCATED UNDER FRAME, OR UNDER FLAT SLAB TOP.
12.	5' X 4' DOUBLE LEAF STEEL COVER, HINGED & LOCKABLE. SEE STD. DETAIL.
13.	FINISHED GRADE TO DRAIN AWAY FROM COVER.
14.	12" DIAMETER SUMP.

NOTES:

A. ALL PIPING SHALL BE MINIMUM CLASS 53 FLANGE DUCTILE IRON WITH FULL FACE GASKETS.
B. ALL FLANGE HARDWARE (BOLT/WASHER/NUT) SHALL BE STAINLESS STEEL - TYPE 304 WITH ANTI-SEIZE COMPOUND.
C. ALL PIPE SHALL BE RESTRAINED FROM TAP TO PROPERTY LINE VALVE.
D. VAULT SHALL BE RATED FOR NCDOT HS-20 LOADING - SUBMIT SHOP DRAWINGS/P.E. SEALED FOR REVIEW.
E. ALL CONCRETE SHALL BE MINIMUM 3,600 PSI COMPRESSIVE STRENGTH.
F. DESIGN SHALL CONFORM TO ASTM C858 - SPECIFICATIONS FOR "UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURE".
G. STEEL REINFORCING DESIGN SHALL CONFORM TO ASTM C857.
H. REBARS SHALL BE GRADE 60 PER ASTM A615.
I. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
J. DIAGONAL REINFORCING SHALL BE ADDED AT ALL OPENINGS.
K. PIPE PENETRATIONS SHALL BE SEALED WITH FLEXIBLE CONNECTERS (MANHOLE BOOTS) OR WITH 4" OF BRICK & MORTAR (AND 1/2-INCH THICK CONSTRUCTION EXPANSION MATERIAL AROUND THE PIPE).
L. FRAME TO BE FLUSH WITH GROUND OR CONCRETE SIDEWALK, GROUND SHALL SLOPE AWAY FROM VAULT.
M. ALL JOINTS SHALL BE MADE WATERTIGHT USING 2 RINGS OF BUTYL RUBBER JOINT MASTIC.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

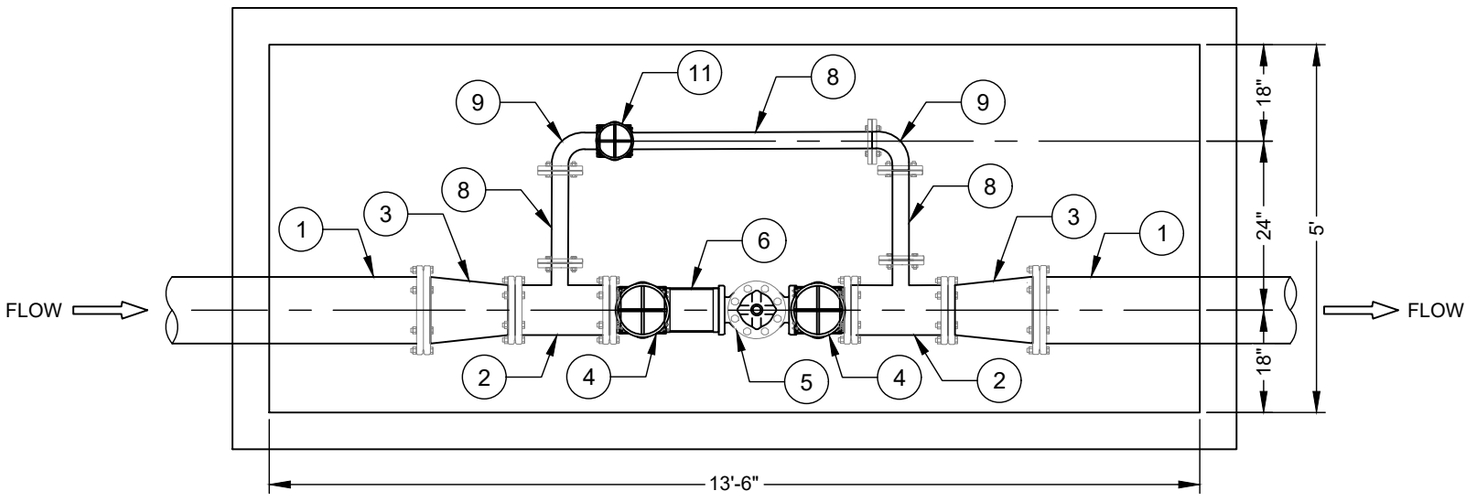
4-INCH PRESSURE REDUCER VALVE

NO SCALE

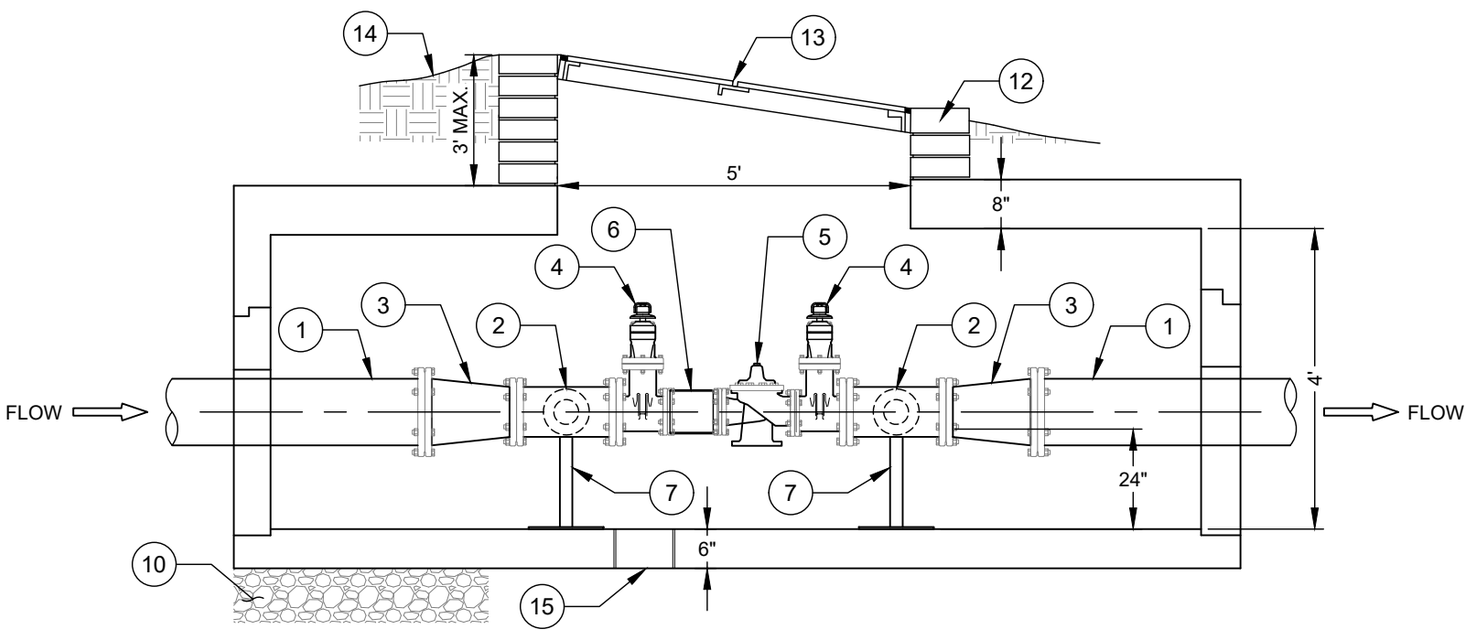
VERSION 1.0

DATE 04/2024

DETAIL 10.8.4



PLAN VIEW



ELEVATION VIEW

NO.	DESCRIPTION:
1.	6" OR 8" WATER MAIN.
2.	6" X 2" TEE (TYP.).
3.	8" X 6" REDUCER (TYP.).
4.	6" GATE VALVE (TYP.).
5.	6" PRV WITH 2" BYPASS CLA-VAL MODEL 6" 90-99.
6.	6" DISMANTLING JOINT.
7.	2"/3" SUPPORT (TYP.).
8.	6" SPOOL PIECE.
9.	6" 90° BEND (TYP.).
10.	#57 WASHED STONE.
11.	2" GATE VALVE (TYP.).
12.	MINIMUM OF 3 STANDARD BRICK COURSES LOCATED UNDER FRAME, OR UNDER FLAT SLAB TOP.
13.	5' X 5' DOUBLE LEAF STEEL COVER, HINGED & LOCKABLE. SEE STD. DETAIL.
14.	FINISHED GRADE TO DRAIN AWAY FROM COVER.
15.	12" DIAMETER SUMP.

NOTES:

A. ALL PIPING SHALL BE MINIMUM CLASS 53 FLANGE DUCTILE IRON WITH FULL FACE GASKETS.
B. ALL FLANGE HARDWARE (BOLT/WASHER/NUT) SHALL BE STAINLESS STEEL - TYPE 304 WITH ANTI-SEIZE COMPOUND.
C. ALL PIPE SHALL BE RESTRAINED FROM TAP TO PROPERTY LINE VALVE.
D. VAULT SHALL BE RATED FOR NCDOT HS-20 LOADING - SUBMIT SHOP DRAWINGS/P.E. SEALED FOR REVIEW.
E. ALL CONCRETE SHALL BE MINIMUM 3,600 PSI COMPRESSIVE STRENGTH.
F. DESIGN SHALL CONFORM TO ASTM C858 - SPECIFICATIONS FOR "UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURE".
G. STEEL REINFORCING DESIGN SHALL CONFORM TO ASTM C857.
H. REBARS SHALL BE GRADE 60 PER ASTM A615.
I. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
J. DIAGONAL REINFORCING SHALL BE ADDED AT ALL OPENINGS.
K. PIPE PENETRATIONS SHALL BE SEALED WITH FLEXIBLE CONNECTERS (MANHOLE BOOTS) OR WITH 4" OF BRICK & MORTAR (AND 1/2-INCH THICK CONSTRUCTION EXPANSION MATERIAL AROUND THE PIPE).
L. FRAME TO BE FLUSH WITH GROUND OR CONCRETE SIDEWALK, GROUND SHALL SLOPE AWAY FROM VAULT.
M. ALL JOINTS SHALL BE MADE WATERTIGHT USING 2 RINGS OF BUTYL RUBBER JOINT MASTIC.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

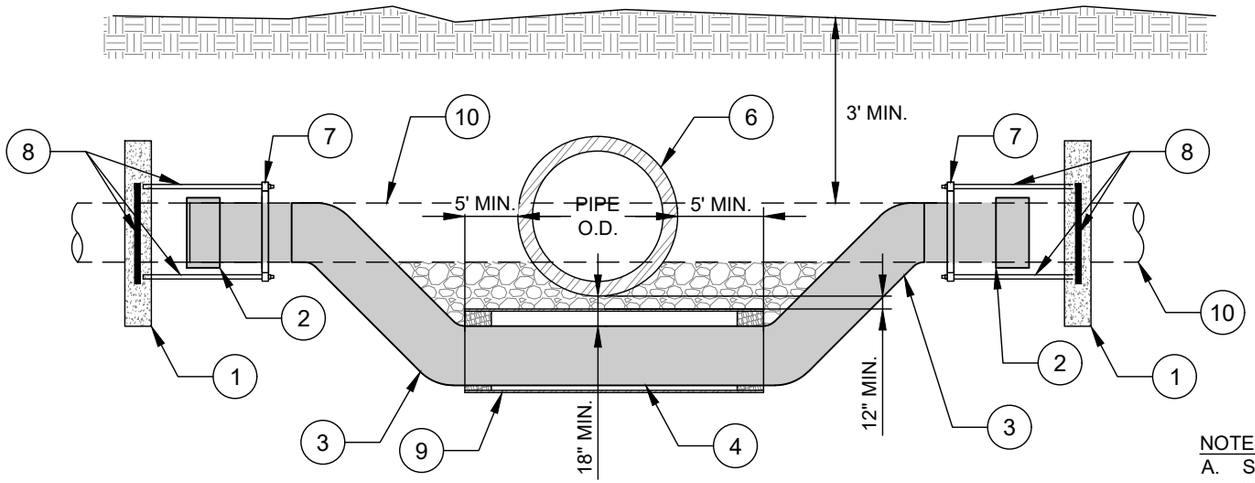
6-INCH PRESSURE REDUCER VALVE

NO SCALE

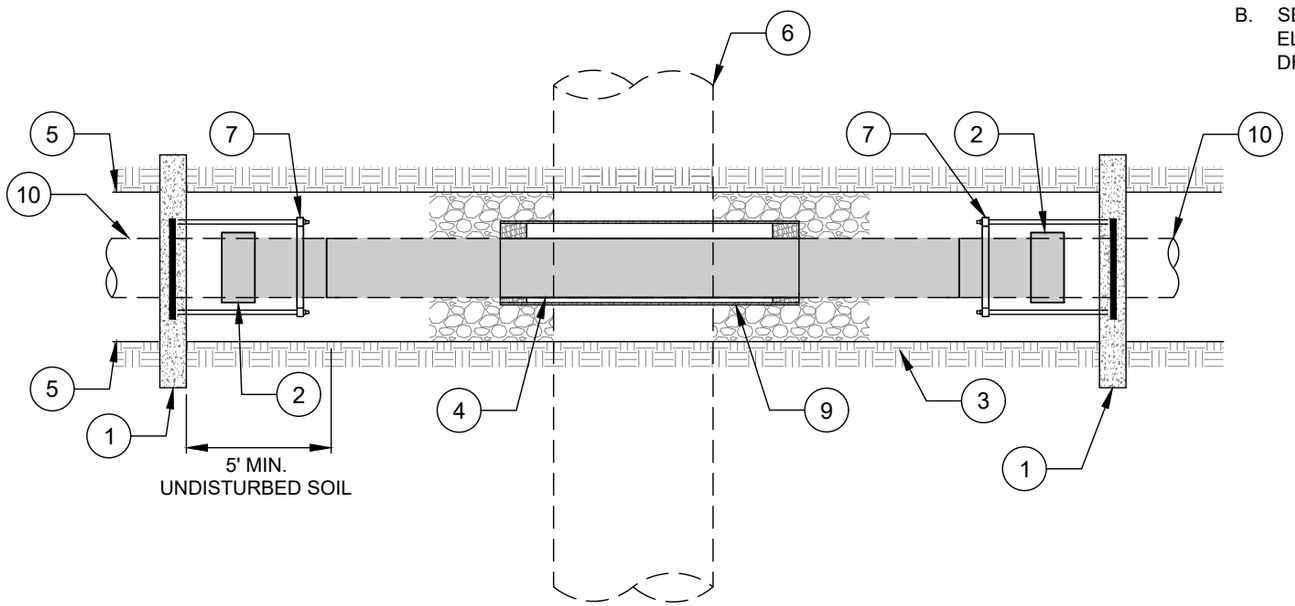
VERSION 1.0

DATE 04/2024

DETAIL 10.8.5



PROFILE VIEW



PLAN VIEW

NOTES TO DESIGNER

A. SEALING ENGINEER SHALL CONFIRM WATER LINE SEPARATION IS IN ACCORDANCE WITH GOVERNING BODY REGULATIONS. MODIFY DETAIL ACCORDINGLY.

B. SEALING ENGINEER TO ADD FINISH ELEVATIONS OF THE GROUND, STORM DRAIN, AND NEW WATER LINE.

BEND RADIUS TABLE	
MAIN SIZE (INCHES)	MINIMUM BEND RADIUS (FEET)
6	133
8	173
10	215
12	255
16	320

S.S. TIE ROD TABLE	
MAIN SIZE (INCHES)	TIE ROD SIZE (COUNT - DIA. X INCH LENGTH)
6	6 - 3/4 X 13
8	6 - 3/4 X 13
10	8 - 3/4 X 18
12	8 - 3/4 X 18
16	10 - 3/4 X 18

NO. DESCRIPTION:

1. CONCRETE WALL BLOCKING (REFER TO APPROPRIATE STANDARD DETAIL).
2. TRANSITION COUPLING IF REQUIRED (REFER TO APPROPRIATE STANDARD DETAIL).
3. TO PREVENT THE OVER-BENDING OF HDPE, A MINIMUM 1.5 TIMES THE MANUFACTURER SPECIFIED BEND RADIUS IS ALLOWED. IF BEND RADIUS REQUIREMENTS CANNOT BE MET, THEN BUTT FUSED LONG RADIUS BEND FITTINGS ARE ALLOWED.
4. NEW HDPE PIPE - MINIMUM LENGTH IS 10' PLUS DIAMETER OF STORM PIPE OF STRAIGHT RUN OF PIPE AND CENTERED UNDER STORM DRAIN PIPE.
5. TRENCH LIMITS.
6. STORM DRAIN (OR PROPOSED CONFLICT).
7. ROD BEND TO WALL BLOCK IF TRANSITION IS NOT SELF-RESTRAINED. TIE ROD MUST BE CORROSION-RESISTANT (S.S.) AND COVERED IN CORROSION INHIBITING SUBSTANCE.
8. THE CONNECTING TIE RODS THAT JOIN THE TWO ANCHOR RINGS SHALL BE MADE OF LOW ALLOY STEEL THAT CONFORMS TO ANSI/AWWA C111/A21.11.
9. STEEL CASING PIPE - REQUIRED IF STORM PIPE IS 72" DIAMETER OR LARGER OR REQUIRED IF STORM CONFLICT IS A BOX CULVERT. REFER TO STEEL CASING FOR HDPE PIPE STANDARD DETAIL.
10. EXISTING PIPE.

NOTES:

A. ALL HDPE PIPE SHALL HAVE BUTT FUSED JOINT OR ELECTROFUSED FITTINGS.

B. EMBEDMENT OF WATER MAIN SHALL BE PER APPROPRIATE STANDARD DETAIL.

C. IF THE EXISTING PIPE IS HDPE, CONTRACTOR MAY NOT DEFLECT PIPE AS-IS TO ACHIEVE LOWERING. HDPE FITTINGS OR NEW HDPE PIPE MUST BE INSTALLED TO PROVIDE THE EXTRA PIPE LENGTH NEEDED TO ACCOMMODATE A WATER MAIN LOWERING.

D. LOWERED PIPE MUST BE NEW MATERIAL. REUSE OF EXISTING PIPE IS NOT ALLOWED.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

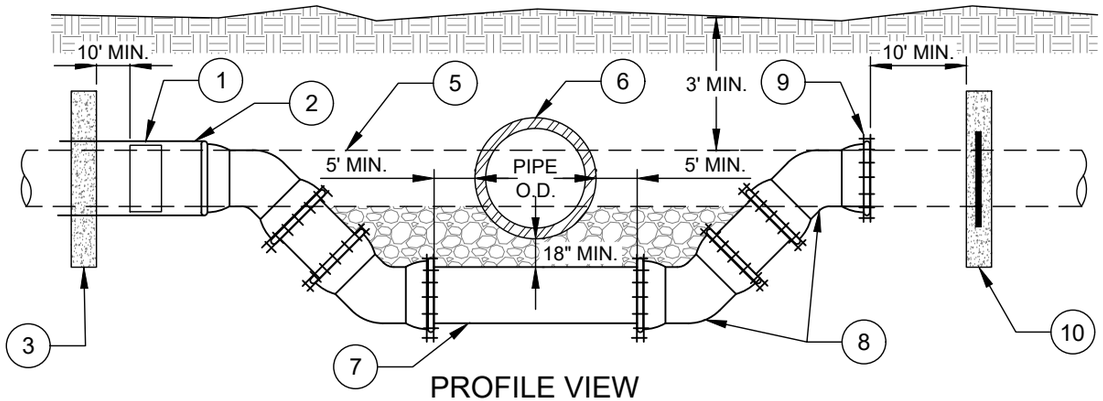
LOWERING OF 6-INCH TO 16-INCH WATER MAIN USING HDPE

NO SCALE

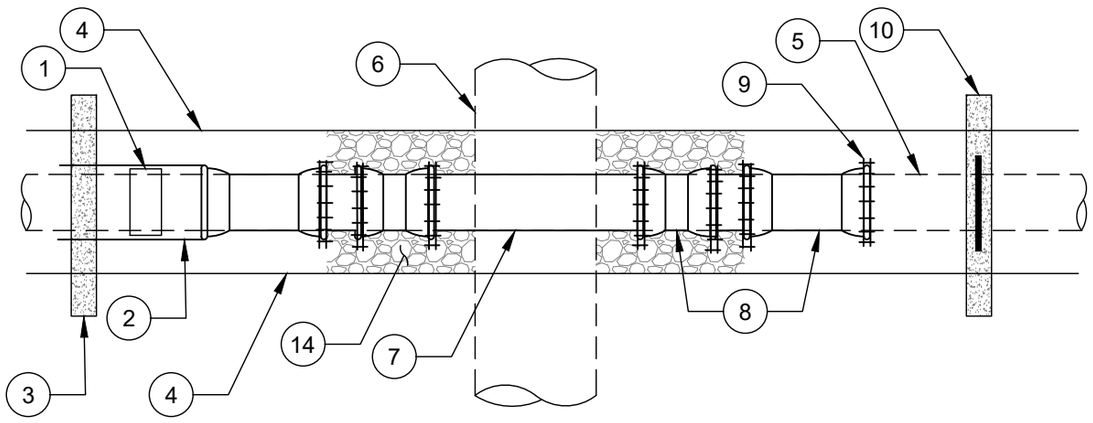
VERSION 1.0

DATE 04/2024

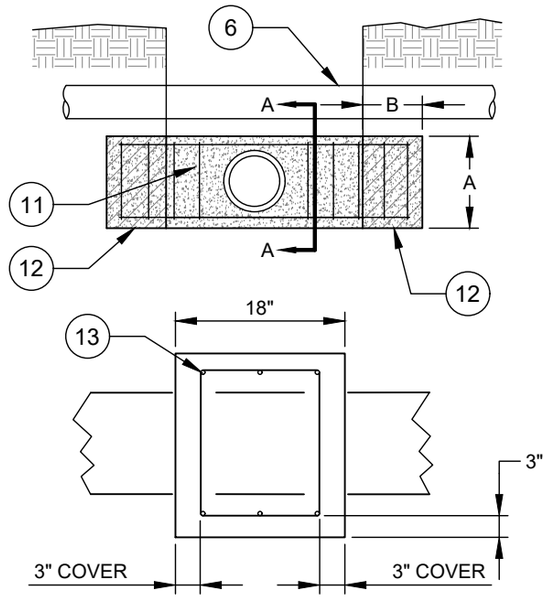
DETAIL 10.9.1



PROFILE VIEW



PLAN VIEW



SECTION A-A

THRUST BLOCK DETAIL

NO.	DESCRIPTION:
1.	TRANSITION COUPLING (IF REQUIRED).
2.	ROD BEND TO THRUST BLOCK.
3.	CONCRETE THRUST WALL BLOCKING.
4.	TRENCH LIMITS.
5.	EXISTING PIPE.
6.	STORM PIPE.
7.	NEW DUCTILE IRON PIPE, WITH LENGTH CENTERED UNDER STORM DRAIN PIPE.
8.	11.25° OR 22.5° RJ BENDS ROTATE AS REQUIRED.
9.	WEDGE ACTION RESTRAINT GLANDS.
10.	CONCRETE THRUST WALL BLOCKING WITH ANCHOR RING. SEE NOTE C.
11.	STIRRUPS (TYPICAL) SPACING 6" MINIMUM, 12" MAXIMUM.
12.	BEARING AREA.
13.	#4 BAR (TYPICAL).
14.	BACKFILL WITH WASHED STONE (#57) BETWEEN TWO PIPES.

NOTES:

A. FITTINGS SHALL BE RESTRAINED USING WEDGE ACTION RESTRAINT, STAINLESS STEEL TIE RODS, OR RESTRAINED JOINT PIPE, AS APPROVED BY ENGINEER.

B. BEARING AREAS (A X B) DETERMINED BY ACTUAL SOIL CONDITIONS. SHOULD BE BASED ON 200 PSI TEST PRESSURE. SEE CHART BELOW.

C. DO NOT USE ANCHOR RING ON PVC, CIP, OR AC PIPE. ANCHOR RING NOT REQUIRED IF THE TOP BEND IS RODDED.

RESULTANT THRUST AT FITTINGS AT 200 PSI WATER PRESSURE.
TOTAL POUNDS,

NOM. PIPE DIAMETER	11.25° BEND	22.5° BEND
6 INCH	1466	2918
8 INCH	2522	5020
10 INCH	3793	7552
12 INCH	5364	10680

THE FOLLOWING OFTEN-USED SOIL VALUES FOR THE DEPTHS OF 4' ARE LISTED ONLY AS A GUIDE*. THE ENGINEER SHOULD SELECT THESE BEARING VALUES FOR EACH SOIL TYPE AND DEPTH OF COVER ENCOUNTERED ON THE SPECIFIC PIPELINE PROJECT. APPROPRIATE SAFETY FACTORS SHOULD BE APPLIED TO COVER FUTURE CHANGES IN PIPE DEPTH, SOIL BEARING CAPACITIES, ETC.

SOIL	BEARING LOAD (LBS/SQ.FT.)
MUCK	0
SOFT CLAY	1,000
SILT	1,500
SANDY SILT	3,000
SAND	4,000
SANDY CLAY	6,000
HARD CLAY	9,000

*NO RESPONSIBILITY CAN BE ASSUMED FOR THE ACCURACY OF THE DATA IN THIS TABLE DUE TO THE WIDE VARIATION OF BEARING LOAD CAPABILITIES FOR EACH SOIL TYPE.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

LOWERING OF 6-INCH TO 12-INCH WATER MAIN

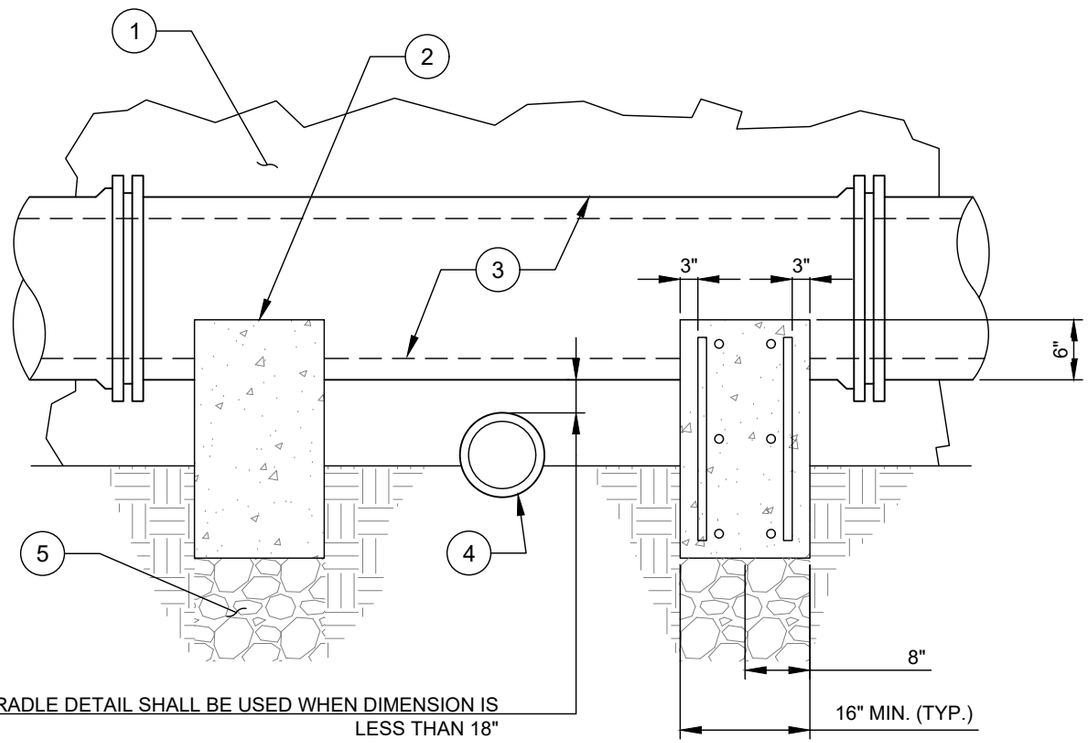
NO SCALE

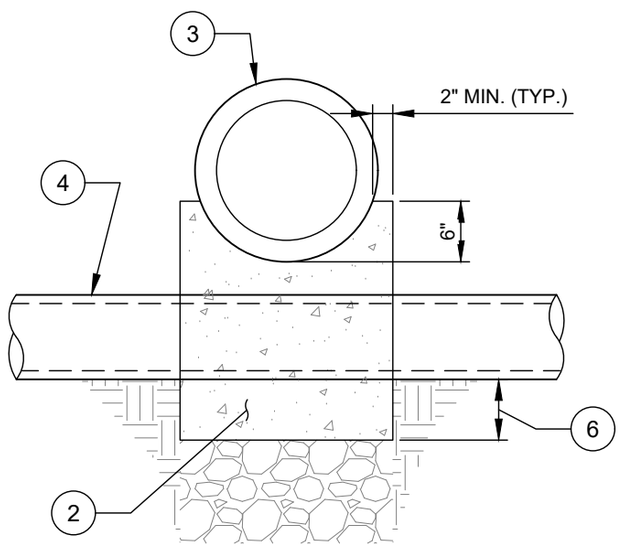
VERSION 1.0

DATE 04/2024

DETAIL 10.9.2

NO.	DESCRIPTION:
1.	CONTROLLED DENSITY FILL SURROUNDING BOT PIPES, MIN. 6" THICK.
2.	PROPOSED CONCRETE CRADLE NEAR JOINT (EACH SIDE). MINIMUM REBAR REINFORCEMENT (#4 REBAR). #4 BARS AT 12" CENTER-TO-CENTER EACH WAY, TYPICAL. 3" CLEAR FROM FACE OF CONCRETE.
3.	PIPE (ABOVE).
4.	PIPE (BELOW).
5.	MIN. 8" COMPACTED STONE BEDDING (#57).
6.	BOTTOM OF CRADLE TO BE AT LEAST 6" BELOW THE BOTTOM PIPE.





THIS CONCRETE CRADLE DETAIL SHALL BE USED WHEN DIMENSION IS LESS THAN 18"

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

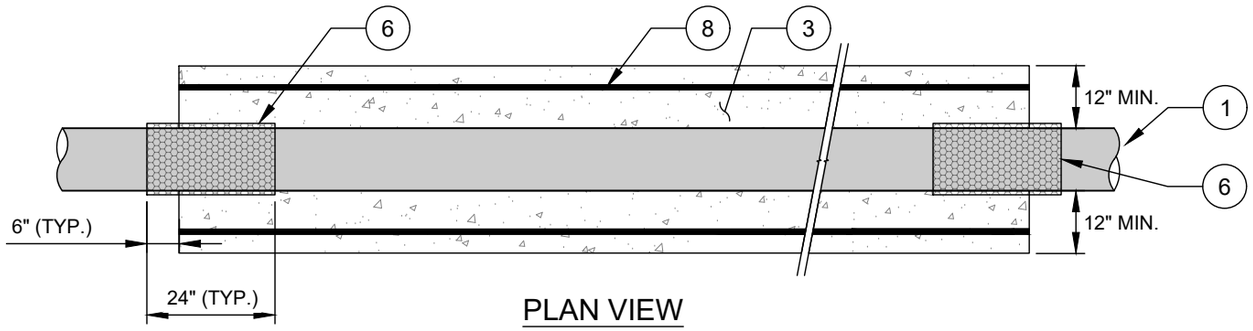
CONCRETE CRADLE DETAIL

NO SCALE

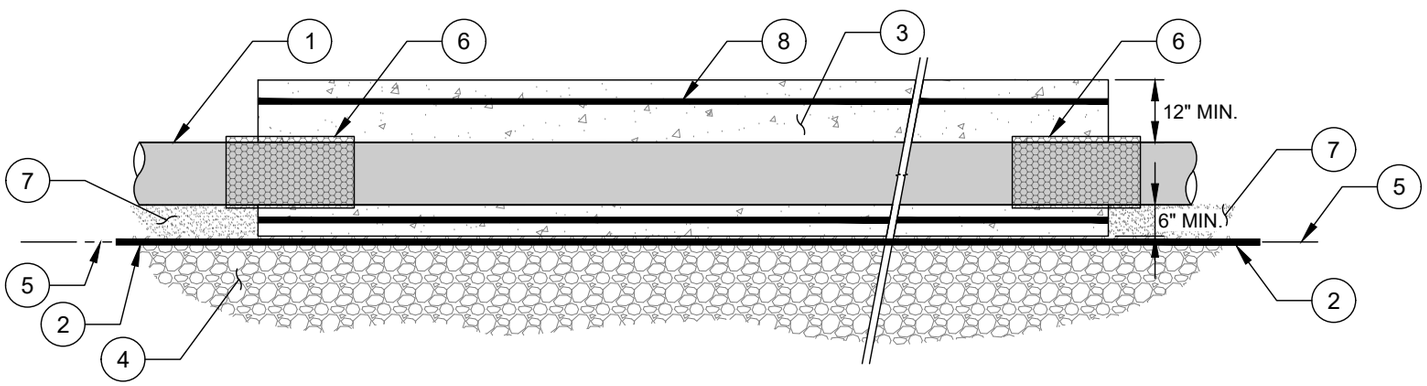
VERSION
1.0

DATE
04/2024

DETAIL
10.9.3



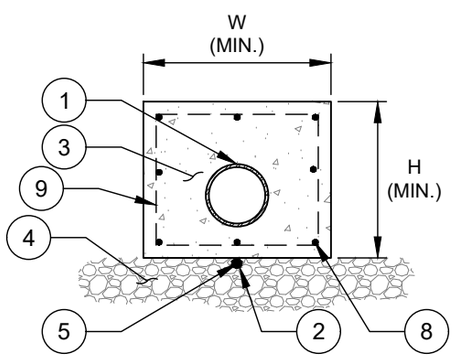
PLAN VIEW



ELEVATION VIEW

NOTES TO DESIGNER

A. CONCRETE AND REINFORCEMENT IS MINIMUM REQUIRED. SEALING ENGINEER SHALL DESIGN REINFORCEMENT APPROPRIATE TO SPECIFIC CONDITIONS AND LOADS.



SECTION VIEW

PIPE DIAMETER (INCHES)	MIN. W (INCHES)	MIN. H (INCHES)	CONCRETE VOLUME PER LF	
			FT^3 / LF	CY / LF
4	31	25	5.29	0.20
6	33	27	5.99	0.22
8	36	30	7.15	0.26
10	38	32	7.90	0.29
12	40	34	8.66	0.32
14	42	36	9.43	0.35
16	44	38	10.21	0.38
18	46	40	11.01	0.41
20	48	42	11.82	0.44
22	50	44	12.64	0.47
24	52	46	13.47	0.50
26	54	48	14.31	0.53
28	56	50	15.17	0.56
30	58	52	16.04	0.59
32	60	54	16.91	0.63

NO.	DESCRIPTION:
1.	HDPE PIPE.
2.	CONDUIT - 1 INCH STEEL ELECTRICAL CONDUIT TO CONTAIN TRACER WIRE.
3.	CONCRETE ENCASEMENT (f'c = 3,600 PSI MIN.).
4.	STONE STABILIZATION MATERIAL AS REQUIRED.
5.	TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK, BLUE HDPE INSULATION AT THE BOTTOM OF THE UTILITY SAND EMBEDMENT LAYER.
6.	NEOPRENE FOAM PROTECTIVE WRAPPING, 1/4 TO 3/4-INCH THICKNESS.
7.	HDPE EMBEDMENT MATERIAL - FINE AGGREGATE ACCORDING TO ASTM C33 TABLE 1.
8.	#5 REBAR LONG (TYP.).
9.	#4 REBAR TIES (MAXIMUM SPACING OF 12") - MINIMUM 1.5" CLEARANCE TO PIPE, MINIMUM 3" COVER.

NOTES:

A. CONCRETE ENCASEMENT SHALL ONLY BE INSTALLED WHERE SHOWN ON APPROVED PLANS OR WITH PRIOR APPROVAL BY CLTW ENGINEER.

B. THIS RESTRICTION IS IN PLACE DUE TO THE INABILITY TO EASILY MAINTAIN/REPAIR OR TAP A MAIN ENCASED IN CONCRETE.

C. SEALING ENGINEER TO CONFIRM TEMPERATURE FROM CONCRETE CURING AT SITE WILL BE LESS THAN 260°F.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

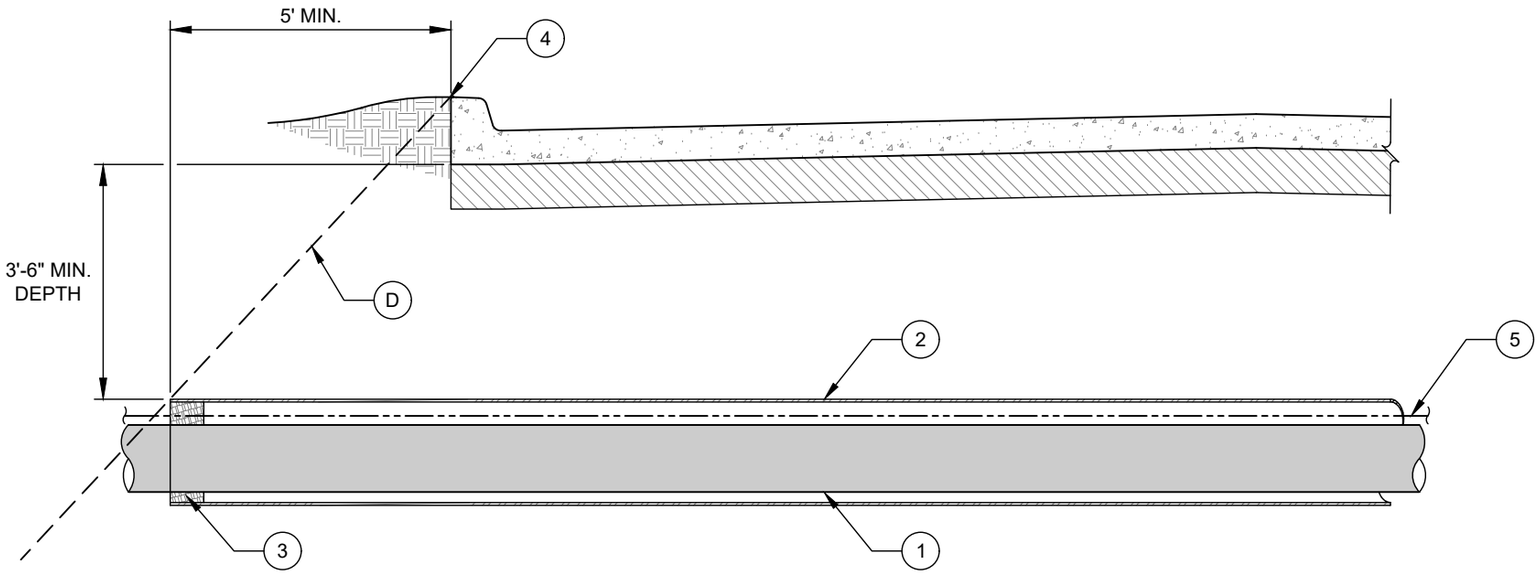
CONCRETE ENCASEMENT FOR HDPE PIPE

NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.10.1



MINIMUM SIZE AND THICKNESS STANDARDS FOR CASING PIPE				
NOMINAL CARRIER PIPE (INCHES)	DOT CASING DIAMETER (INCHES)	DOT CASING MIN. THICKNESS (INCHES)	RAILROAD CASING DIAMETER (INCHES)	RAILROAD MIN. THICKNESS (INCHES)
2	8	0.250	N/A	N/A
3	8	0.250	N/A	N/A
4	8	0.250	N/A	N/A
6	12.75	0.250	16	0.281
8	16	0.250	18	0.312
10	18	0.250	20	0.344
12	20	0.250	24	0.406
14	20	0.250	30	0.469
16	24	0.250	30	0.469
18	24	0.375	36	0.562
20	36	0.375	36	0.562
22	36	0.375	36	0.562
24	36	0.375	36	0.562
26	42	0.500	48	0.750
30	42	0.500	48	0.750
32	42	0.500	48	0.750

NO. DESCRIPTION:

1. HDPE WATER MAIN CARRIER PIPE.
2. STEEL CASING PIPE, MINIMUM 35,000 PSI MINIMUM YIELD STRENGTH STEEL. SEE TABLE FOR THICKNESS.
3. PLUG ENDS OF CASING WITH GROUT (8" MINIMUM WIDTH).
4. EDGE OF PAVEMENT OR BACK OF CURB.
5. TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK COLOR-CODED HDPE INSULATION AT THE TOP OF CASING PIPE. ADD 3/4" ELECTRICAL CONDUIT SO TRACER WIRE IS NOT IN CONTACT WITH THE CARRIER PIPE.

NOTES:

A. CASING SPACERS ARE NOT ALLOWED FOR USE ON HDPE PIPE IN STEEL CASING.

B. SKIDS ARE ALLOWED FOR LONG INSTALLATIONS WITH APPROVAL OF THE SEALING ENGINEER.

C. ALLOWABLE TENSILE LOAD FOR PIPE MAY NOT BE EXCEEDED WHEN PULLING CARRIER PIPE THROUGH CASING.

D. 1:1 SLOPE LINE REQUIREMENT.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

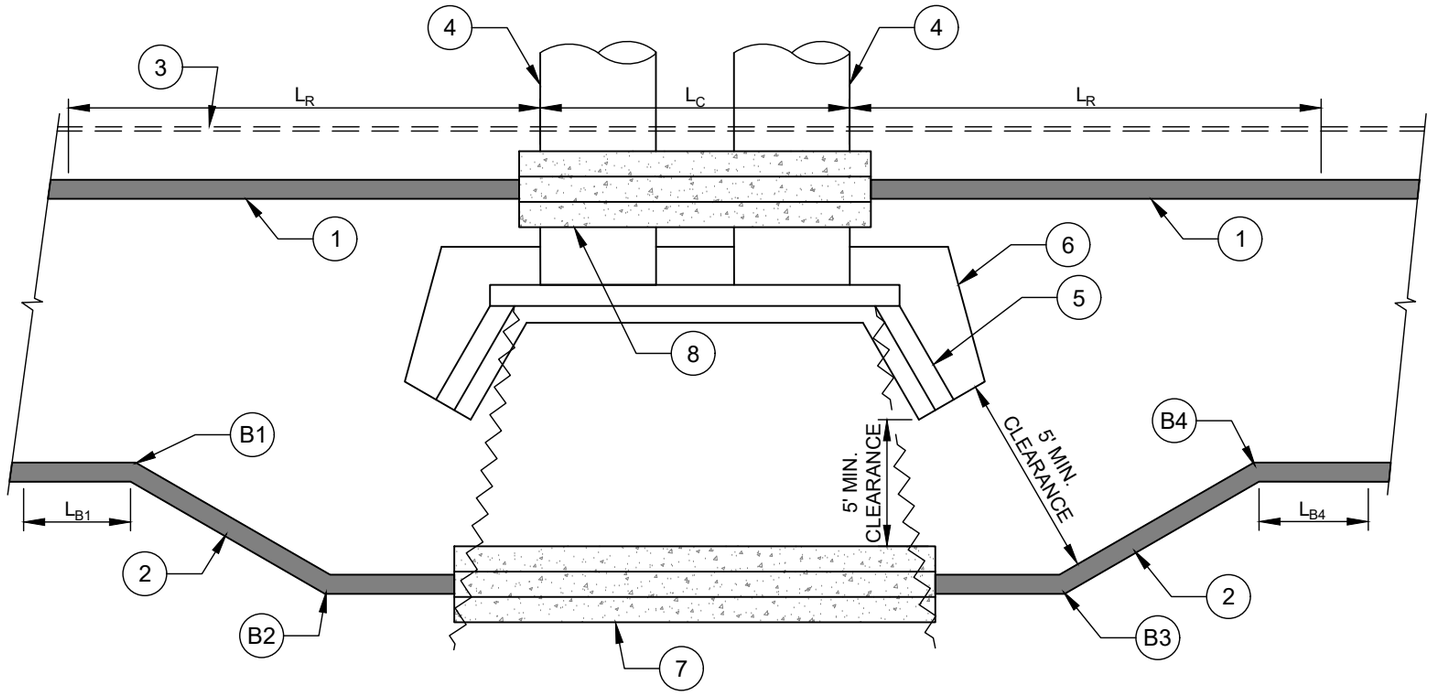
STEEL CASING FOR HDPE PIPE

NO SCALE

VERSION
1.0

DATE
04/2024

DETAIL
10.10.2



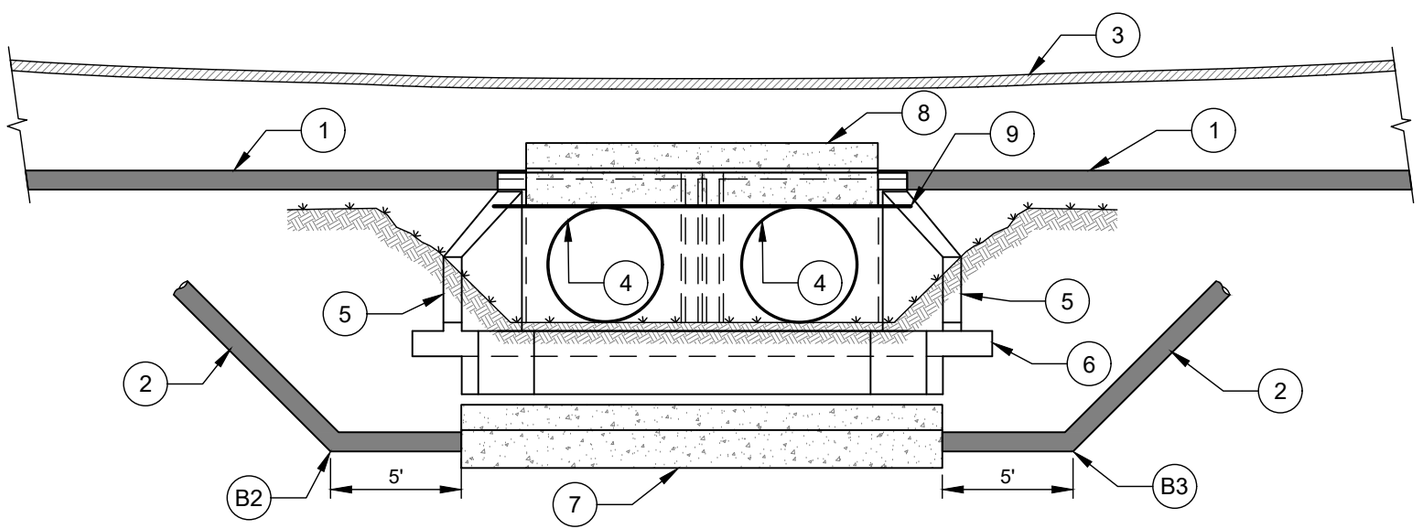
TYPICAL PLAN VIEW

NO.	DESCRIPTION:
1.	PROPOSED RJ DIP WATER MAIN - PREFERRED LOCATION.
2.	PROPOSED RJ DIP WATER MAIN - OPTIONAL LOCATION.
3.	ROAD WITH CURB AND GUTTER OR EDGE OF PAVEMENT.
4.	CULVERT - PIPE OR BOX.
5.	CULVERT WING WALL (CULVERT AND HEADWALL).
6.	CULVERT FOOTING.
7.	CONCRETE ENCASEMENT - SEE STANDARD DETAIL - REQUIRED.
8.	CONCRETE ENCASEMENT - SEE STANDARD DETAIL - REQUIRED WHEN 30" COVER ON PIPE CAN NOT BE MAINTAINED Lc (MIN.) OR AS DETERMINED BY THE ENGINEER.
9.	8 MILS HDPE PLASTIC FILM (HDCLPE PER ASTM C105-4MILS EACH LAYER) - SEPARATE CONCRETE ENCASEMENT FROM CULVERT AND HEADWALL.
10.	DISTANCE AS INDICATED ON CONSTRUCTION PLANS.
11.	PIPE MAY BE LOCATED TO 12" OF HEADWALL - CONCRETE ENCASEMENT SHALL NOT BOND TO CULVERT OR HEADWALL - SEE NO. 9.
12.	5' MINIMUM BELOW CREEK BED.
Bx.	BENDS - AS REQUIRED.

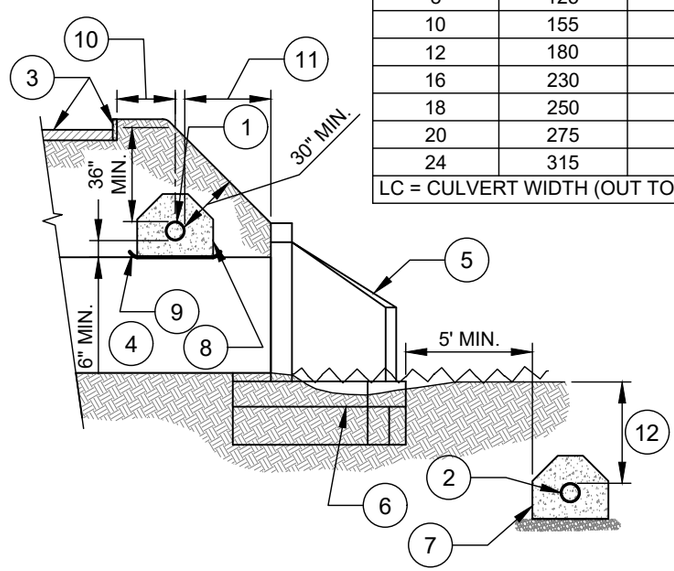
NOTES:

A. ALL PIPE SHALL BE RESTRAINED JOINT DUCTILE IRON PIPE FROM BEND B1 TO B4.
B. RESTRAINED LENGTHS LB1 AND LB4 SHALL BE DETERMINED BY THE ENGINEER.
C. CONCRETE ENCASEMENT NO. 8 MAY NOT BE REQUIRED WHEN MINIMUM COVERS ARE PROVIDED AS SHOWN IN SECTION VIEW.

MINIMUM RESTRAINED LENGTH FOR PREFERRED LOCATION #1		
PIPE DIAMETER (INCHES)	LR (FEET)	TOTAL RESTRAINED LENGTH (FEET)
6	100	200 + LC
8	125	250 + LC
10	155	310 + LC
12	180	360 + LC
16	230	460 + LC
18	250	500 + LC
20	275	550 + LC
24	315	630 + LC
LC = CULVERT WIDTH (OUT TO OUT) - FEET		



TYPICAL ELEVATION VIEW



SECTION VIEW

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

WATER MAIN LOCATIONS AT CULVERTS USING CONCRETE ENCASEMENT
6-INCH THROUGH 24-INCH MAINS

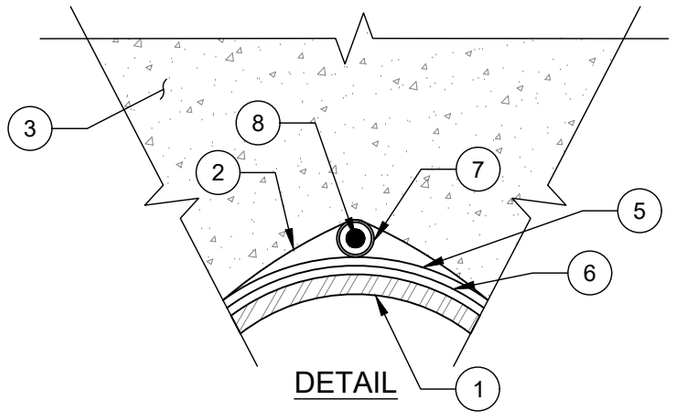
NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.10.3

PIPE DIAMETER (INCHES)	WIDTH (W) (MINIMUM) (INCHES)	HEIGHT (H) (MINIMUM) (INCHES)	CONCRETE VOLUME APPROX. PER L.F.	
			FT^3 / LF	CY / LF
4	31	25	4.26	0.16
6	33	27	4.93	0.18
8	36	30	6.05	0.22
10	38	32	6.77	0.25
12	40	34	7.49	0.28
16	44	38	8.96	0.33
20	49	43	11.09	0.41
24	53	47	12.67	0.47
30	60	54	15.91	0.59
36	66	60	18.50	0.69
42	74	68	23.14	0.86
48	80	74	26.04	0.96
54	88	82	31.04	1.15
60	92	86	33.24	1.23
64	96	90	35.48	1.31



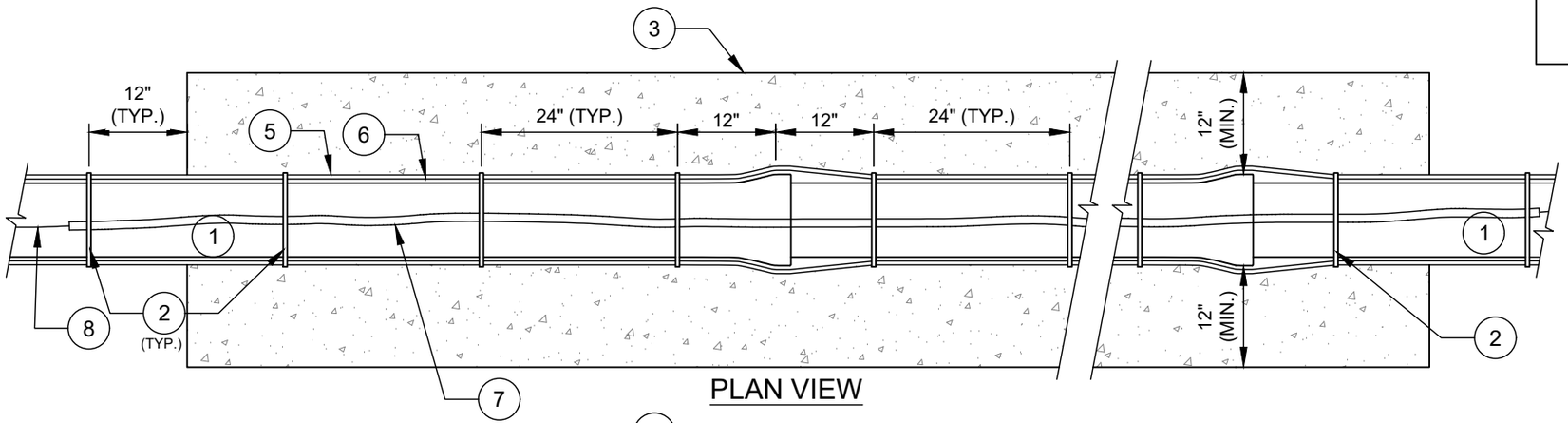
DETAIL

NO. DESCRIPTION:

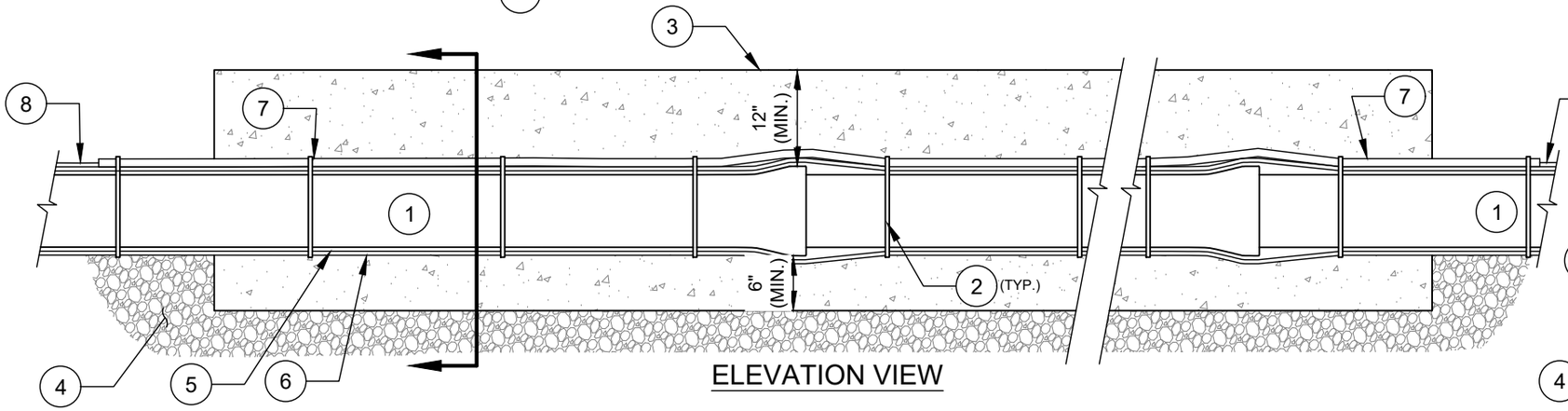
1. DUCTILE IRON PIPE.
2. HDPE ADHESIVE TAPE OR HDPE ZIPLOCK TIE.
3. CONCRETE ENCASEMENT (f 'c = 3,600 PSI MIN.).
4. STONE STABILIZATION MATERIAL - AS REQUIRED.
5. HIGH DENSITY CROSS LAMINATED POLYETHYLENE FILM (HDCLPE) - 4 MILS - TUBE - AWWA C105.
6. HIGH DENSITY CROSS LAMINATED POLYETHYLENE FILM (HDCLPE) - 4 MILS - TUBE - AWWA C105.
7. 1" DIAMETER SCH. 40 STEEL ELECTRICAL CONDUIT.
8. AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH BLUE INSULATION - (30 MILS HDPE).

NOTES:

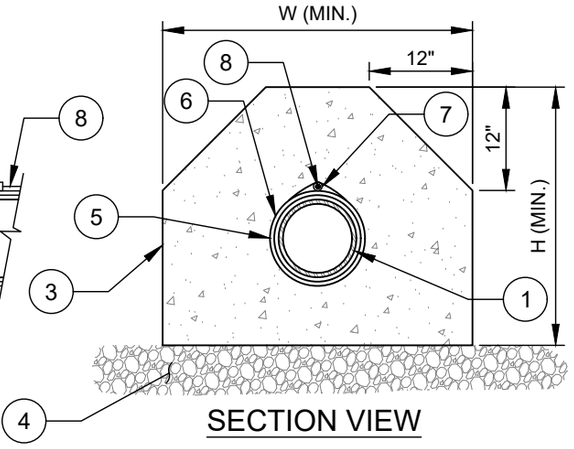
A. CONCRETE ENCASEMENT SHALL ONLY BE INSTALLED WHERE SHOWN ON APPROVED PLANS OR WITH PRIOR APPROVAL BY CLTW ENGINEER.
B. THIS RESTRICTION IS IN PLACE DUE TO THE INABILITY TO EASILY MAINTAIN / REPAIR OR TAP A MAIN ENCASED IN CONCRETE.



PLAN VIEW



ELEVATION VIEW



SECTION VIEW

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

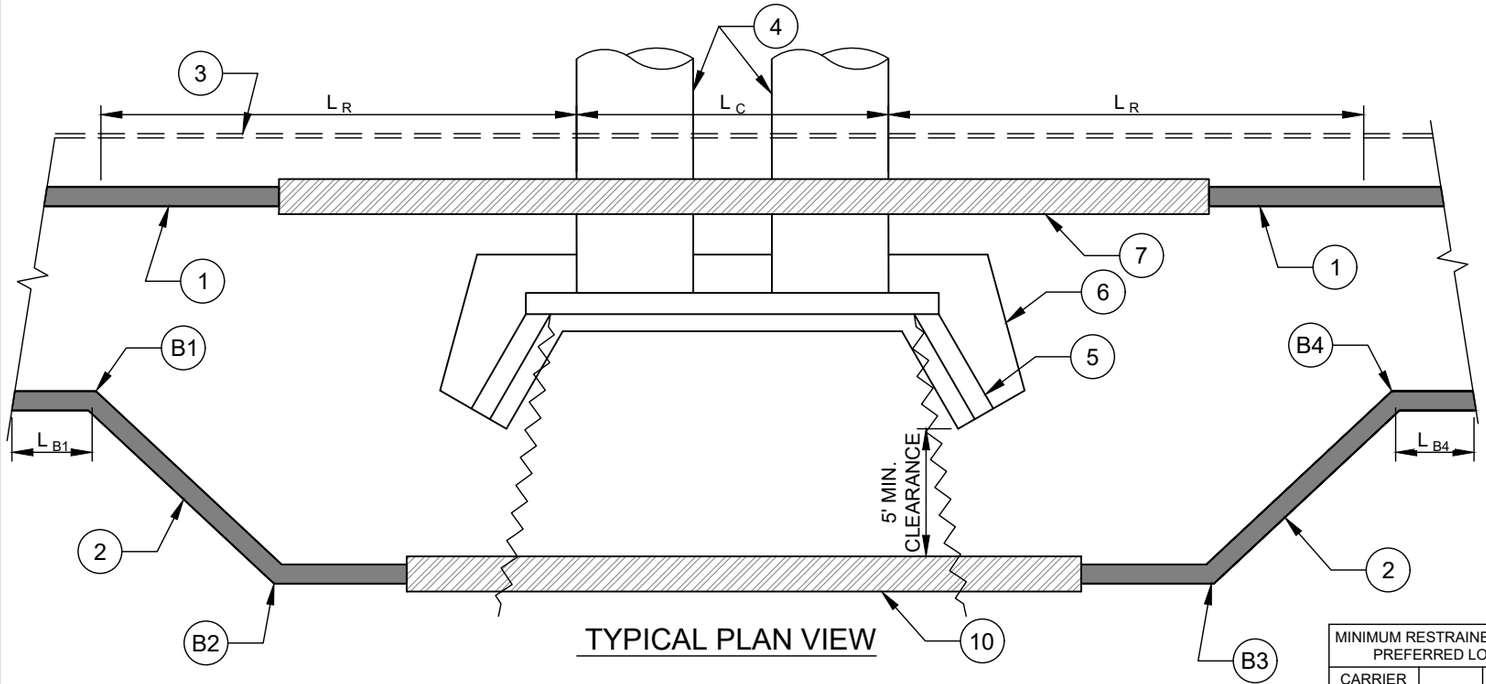
CONCRETE ENCASEMENT 6-INCH THROUGH 64-INCH MAINS

NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.10.4



TYPICAL PLAN VIEW

NO.	DESCRIPTION:
1.	PROPOSED RJ DIP WATER MAIN - PREFERRED LOCATION.
2.	PROPOSED RJ DIP WATER MAIN - OPTIONAL LOCATION.
3.	ROAD WITH CURB AND GUTTER OR EDGE OF PAVEMENT.
4.	CULVERT - PIPE OR BOX.
5.	CULVERT WING WALL.
6.	CULVERT FOOTING.
7.	STEEL ENCASEMENT PIPE.
8.	DISTANCE AS INDICATED ON CONSTRUCTION PLANS.
9.	5' MIN. BELOW CREEK BED - MINIMUM.
10.	STEEL ENCASEMENT PIPE - INSTALLATION BY DRY BORE METHOD OR HORIZONTAL DIRECTIONAL DRILL METHOD.
Bx.	BENDS - AS REQUIRED.

NOTES:

A. IN PREFERRED LOCATION (NO. 1), CASING PIPE (NO. 7) IS REQUIRED WITH LESS THAN 36" COVER AT PIPE CENTER LINE. MINIMUM COVER BASED ON PAVEMENT ELEVATION SHALL BE 24".

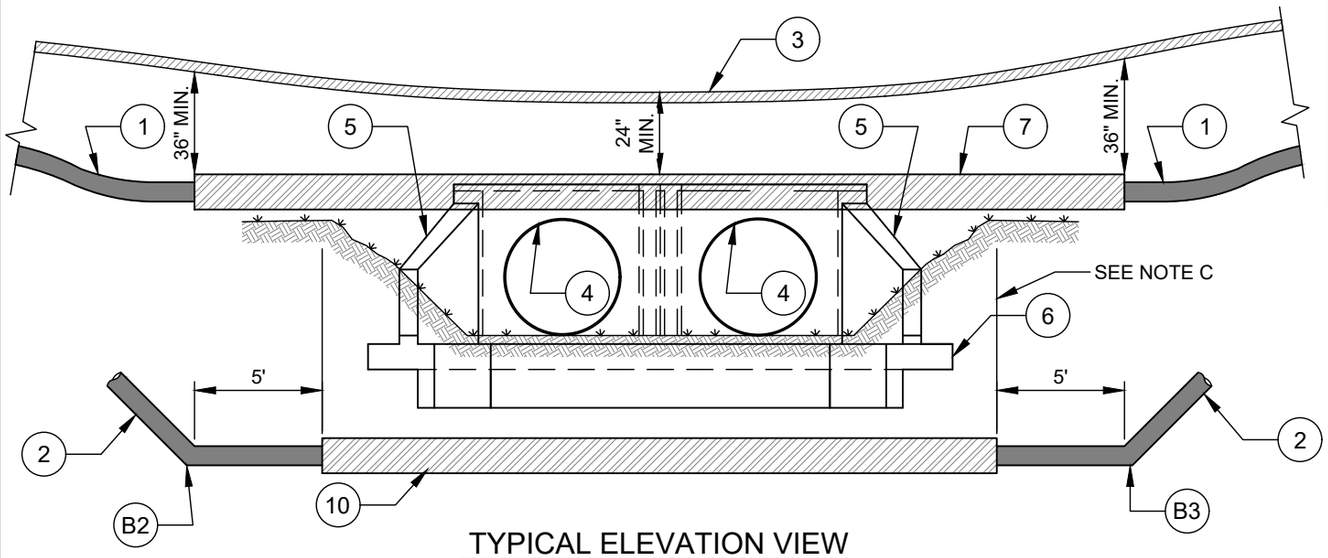
B. STEEL CASING PIPE (NO. 7) MAY NOT BE REQUIRED WHEN MINIMUM COVERS ARE PROVIDED FOR NORMAL PIPE INSTALLATION.

C. IN OPTIONAL LOCATION (NO. 2), CASING PIPE (NO. 10) SHALL EXTEND FROM TOP OF BANK TO TOP OF BANK - MINIMUM.

D. ALL PIPE SHALL BE RESTRAINED JOINT DIP FROM BEND B1 TO B4.

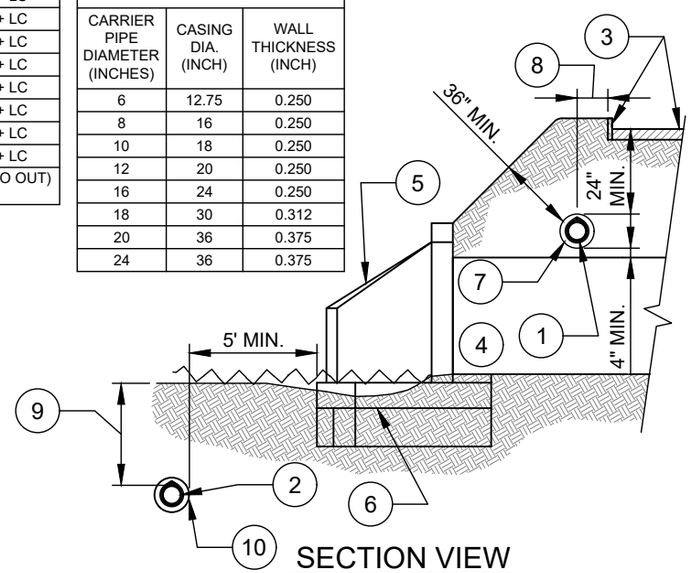
E. RESTRAINED LENGTHS LB1 AND LB4 SHALL BE DETERMINED BY THE ENGINEER.

MINIMUM RESTRAINED LENGTH FOR PREFERRED LOCATION #1		
CARRIER PIPE DIAMETER (INCHES)	LR (FEET)	TOTAL RESTRAINED LENGTH (FEET)
6	100	200 + LC
8	125	250 + LC
10	155	310 + LC
12	180	360 + LC
16	230	460 + LC
18	250	500 + LC
20	275	550 + LC
24	315	630 + LC
LC = CULVERT WIDTH (OUT TO OUT) - FEET		



TYPICAL ELEVATION VIEW

STEEL CASING PIPE		
CARRIER PIPE DIAMETER (INCHES)	CASING DIA. (INCH)	WALL THICKNESS (INCH)
6	12.75	0.250
8	16	0.250
10	18	0.250
12	20	0.250
16	24	0.250
18	30	0.312
20	36	0.375
24	36	0.375



SECTION VIEW

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

WATER MAIN LOCATIONS AT CULVERTS
USING STEEL CASING PIPE
6-INCH THROUGH 24-INCH MAINS

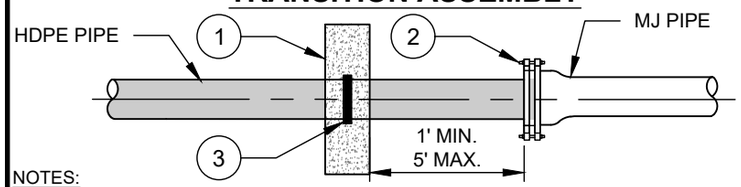
NO SCALE

VERSION
1.0

DATE
04/2024

DETAIL
10.10.5

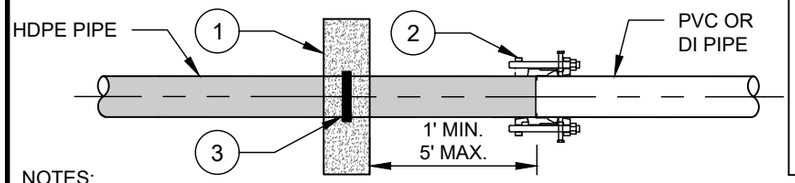
A HDPE TO DUCTILE IRON (4" TO 32" ONLY) TRANSITION ASSEMBLY



NO. DESCRIPTION:
1. WALL BLOCKING, REFER TO APPROPRIATE DETAILS.
2. IPS X DIPS RESTRAINED MJ ADAPTER WITH STEEL PIPE STIFFENER AND KIT.
3. WALL ANCHOR OR FLEX RESTRAINT, REFER TO APPROPRIATE DETAILS.

NOTES:
A. HIGH DENSITY POLYETHYLENE (HDPE) FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C906.
B. MECHANICAL FITTINGS SHALL BE SPECIFICALLY DESIGNED FOR USE WITH HDPE PIPE.
C. INSTALL STAINLESS STEEL INTERNAL STIFFENER IN THE END OF THE HDPE PIPE WHEN HDPE PIPE IS INSERTED INTO THE BELL END OF NON-HDPE PIPE, VALVE, FITTING, OR INTO THE HUB OF A MECHANICAL COUPLING.
D. INTERNAL STIFFENER CAN BE WEDGE TYPE OR SOLID BODY. STIFFENER WILL BE RATED FOR DR AND ID OF PIPE. FOR WATER, 304 OR 316 STAINLESS STEEL IS ALLOWED. FOR WASTEWATER, 316 SS IS REQUIRED.
E. MECHANICAL JOINT ADAPTERS SHALL BE PE4710 AND CAN BE MADE TO ASTM D 3261. IF MACHINED, ADAPTERS MUST MEET THE REQUIREMENTS OF ASTM F 2206. ADAPTERS SHALL HAVE A PRESSURE RATING EQUAL TO THE PIPE.
F. FIGURE ABOVE SHOWS TRANSITION TO BELL END OF DIP. FOR TRANSITION TO PLAIN END OF DIP, SEE PVC FIGURE.
G. EXTERNAL RESTRAINT DEVICES ARE NOT ALLOWED.

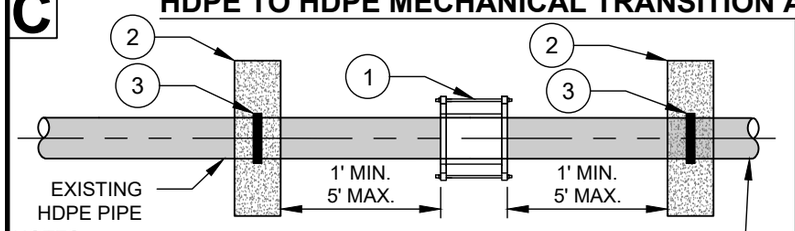
B HDPE TO PVC OR DI (4" TO 32" ONLY) TRANSITION ASSEMBLY



NO. DESCRIPTION:
1. WALL BLOCKING, REFER TO APPROPRIATE DETAILS.
2. BELL MJ ADAPTER WITH MECHANICAL RESTRAINT KIT.
3. WALL ANCHOR OR FLEX RESTRAINT, REFER TO APPROPRIATE DETAILS.

NOTES:
A. FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C906.
B. MECHANICAL FITTINGS USED SHALL BE SPECIFICALLY DESIGNED FOR USE WITH HDPE PIPE.
C. STAINLESS STEEL INTERNAL STIFFENERS SHALL BE INSTALLED IN THE END OF THE HDPE PIPE WHEN HDPE PIPE IS INSERTED INTO THE BELL END OF NON-HDPE PIPE, VALVE, FITTING, OR INTO THE HUB OF A BOLTED COUPLING
D. RESTRAINT COUPLER SLEEVE SHALL BE ASTM A513 WITH FUSION BONDED EPOXY. LOW ALLOY STEEL BOLTS CONFORM TO AWWA C111.4.
E. WHEN PVC BELL END IS ENCOUNTERED, FIELD CUT PVC TO FORM PLAIN END PER MANUFACTURER'S INSTRUCTIONS. WHEN DI BELL END IS ENCOUNTERED, USE DETAIL A ON THIS SHEET.

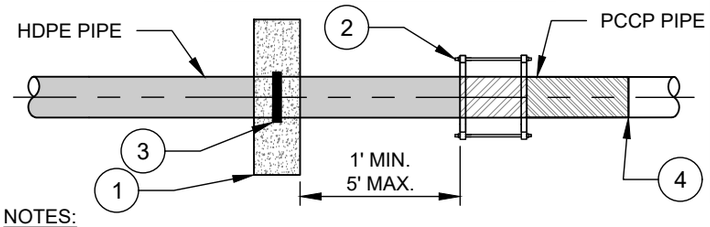
C HDPE TO HDPE MECHANICAL TRANSITION ASSEMBLY



NO. DESCRIPTION:
1. MECHANICAL HDPE COUPLING.
2. WALL BLOCKING, REFER TO APPROPRIATE DETAILS.
3. WALL ANCHOR OR FLEX RESTRAINT, REFER TO APPROPRIATE DETAIL.

NOTES:
A. ONLY ALLOWED WHEN BUTT FUSION IS NOT POSSIBLE.
B. FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C906.
C. MECHANICAL FITTINGS SHALL BE SPECIFICALLY DESIGNED FOR USE WITH HDPE PIPE.
D. INTERNAL STIFFENER CAN BE WEDGE TYPE OR SOLID BODY. STIFFENER WILL BE RATED FOR DR AND ID OF PIPE. FOR WATER, 304 OR 316 STAINLESS STEEL IS ALLOWED. FOR WASTEWATER 316 SS IS REQUIRED.

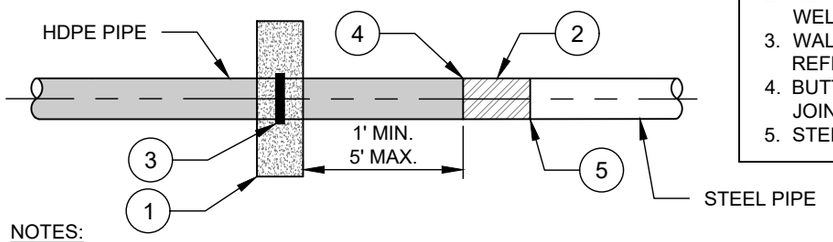
D HDPE TO PCCP (16" TO 32" ONLY) TRANSITION ASSEMBLY



NO. DESCRIPTION:
1. WALL BLOCKING, REFER TO APPROPRIATE DETAILS.
2. RESTRAINT COUPLER WITH STEEL PIPE STIFFENER.
3. WALL ANCHOR OR FLEX RESTRAINT, REFER TO APPROPRIATE DETAIL.
4. PCCP DEEP JOINT ADAPTER. INSTALL AT EXISTING JOINT. FIELD WELD PER MANUFACTURERS INSTRUCTIONS, IF PCCP IS RESTRAINED JOINT.

NOTES:
A. FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C906.
B. MECHANICAL FITTINGS SHALL BE SPECIFICALLY DESIGNED FOR USE WITH HDPE PIPE.
C. STAINLESS STEEL INTERNAL STIFFENERS SHALL BE INSTALLED IN THE END OF THE HDPE PIPE WHEN HDPE PIPE IS INSERTED INTO THE BELL END OF NON-HDPE PIPE, VALVE, FITTING, OR INTO THE HUB OF A BOLTED COUPLING.
D. INTERNAL STIFFENER CAN BE WEDGE TYPE OR SOLID BODY. STIFFENER WILL BE RATED FOR DR AND ID OF PIPE. FOR WATER, 304 OR 316 STAINLESS STEEL IS ALLOWED. FOR WASTEWATER 316 SS IS REQUIRED.
E. RESTRAINT COUPLER SLEEVE SHALL BE ASTM A513 WITH FUSION BONDED EPOXY. LOW ALLOY STEEL BOLTS CONFORM TO AWWA C111.4.

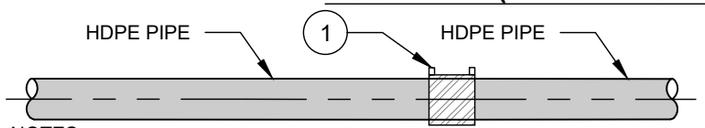
E HDPE TO STEEL (4" TO 32" ONLY) TRANSITION ASSEMBLY



NO. DESCRIPTION:
1. THRUST BLOCK, REFER TO APPROPRIATE DETAILS.
2. HDPE PLAIN END X STEEL PLAIN END WELD-ON TRANSITION FOR WATER.
3. WALL ANCHOR OR FLEX RESTRAINT, REFER TO APPROPRIATE DETAIL.
4. BUTT FUSION OR ELECTROFUSION JOINT.
5. STEEL WELD.

NOTES:
A. FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C906.
B. TRANSITION SHALL BE MANUFACTURED TO ASTM D2513 CATEGORY 1.
C. COAT INTERIOR AND EXTERIOR OF WELD PER MANUFACTURER'S INSTRUCTIONS.

F HDPE TO HDPE ELECTROFUSION TRANSITION ASSEMBLY (4" TO 24" ONLY)



NO. DESCRIPTION:
1. ELECTROFUSION COUPLING.

NOTES:
A. ONLY ALLOWED WHEN BUTT FUSION IS NOT POSSIBLE.
B. FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C906.
C. PROVIDE ELECTROFUSION RECORD TO CLTW INSPECTOR WITHIN ONE HOUR OF FUSION PER STANDARD SPECIFICATION.

NOTES TO DESIGNER
A. CLTW PREFERS JOINING HDPE USING BUTT FUSION. IF BUTT FUSION IS NOT POSSIBLE THEN ELECTROFUSION FITTINGS ARE ALLOWED. IF ELECTROFUSION FITTINGS ARE NOT POSSIBLE, THEN MECHANICAL FITTINGS ARE ALLOWED. CLTW DOES NOT ALLOW BURIED FLANGED JOINTS.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

TRANSITION FROM HDPE TO OTHER MATERIAL (4-INCH TO 32-INCH)

NO SCALE

VERSION 1.0

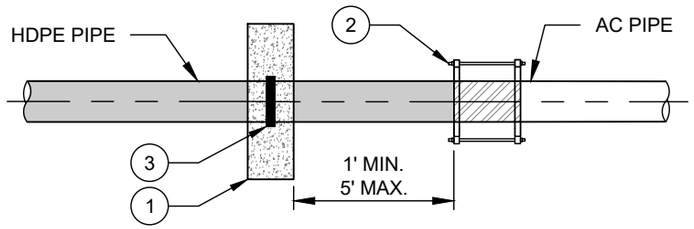
DATE 04/2024

DETAIL 10.11.1

NOTES TO DESIGNER

A. THIS DETAIL APPLIES ONLY TO 4" THROUGH 12" PIPE TRANSITIONS. LARGER DIAMETER TRANSITIONS REQUIRE SPECIFIC DESIGN AND APPROVAL.
B. CLTW PREFERS JOINING HDPE USING BUTT FUSION JOINING. IF BUTT FUSION IS NOT POSSIBLE THEN ELECTROFUSION FITTNGS ARE ALLOWED. IF ELECTROFUSION FITTINGS ARE NOT POSSIBLE, THEN MECHANICAL FITTINGS ARE ALLOWED. CLTW DOES NOT ALLOW BURIED FLANGED JOINTS.

HDPE TO ASBESTOS CEMENT PIPE (4" TO 12" ONLY) TRANSITION ASSEMBLY



NO. DESCRIPTION:

1. WALL BLOCKING, REFER TO APPROPRIATE STANDARD DETAIL.
2. RESTRAINED MECHANICAL COUPLING OR REDUCING MECHANICAL COUPLING. STEEL PIPE STIFFENER REQUIRED ON HDPE.
3. WALL ANCHOR OR FLEX RESTRAINT, REFER TO APPROPRIATE STANDARD DETAIL.

TRANSITION NOTES:

A. FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C906.
B. HIGH DENSITY POLYETHYLENE (HDPE) FITTINGS SHALL BE MOLDED OR FABRICATED BY PIPE MANUFACTURER.
C. MECHANICAL FITTINGS SHALL BE SPECIFICALLY DESIGNED FOR USE WITH HDPE PIPE.
D. STAINLESS STEEL INTERNAL STIFFENERS SHALL BE INSTALLED IN THE END OF THE HDPE PIPE WHEN HDPE PIPE IS INSERTED INTO THE BELL END OF NON-HDPE PIPE, VALVE, FITTING, OR INTO THE HUB OF A BOLTED COUPLING. INTERNAL STIFFENER CAN BE WEDGE TYPE OR SOLID BODY. STIFFENER WILL BE RATED FOR DR AND ID OF PIPE. FOR WATER, 304 OR 316 STAINLESS STEEL IS ALLOWED. FOR WASTEWATER, 316 IS REQUIRED.
E. MECHANICAL JOINT ADAPTERS SHALL BE PE4710 AND CAN BE MADE TO ASTM D3261. IF MACHINED, ADAPTERS MUST MEET THE REQUIREMENTS OF ASTM F2206. ADAPTERS SHALL HAVE A PRESSURE RATING EQUAL TO THE PIPE.
F. WHEN BELL END IS ENCOUNTERED, FIELD CUT PIPE TO FORM A PLAIN END.

ASBESTOS NOTES:

A. ASBESTOS CEMENT (AC) PIPE, ALSO KNOWN AS TRANSITE PIPE, IS KNOWN TO CONTAIN ASBESTOS CONTAINING MATERIAL (ACM). SPECIAL WASTE MANAGEMENT PROCEDURES AND HEALTH AND SAFETY REQUIREMENTS WILL BE APPLICABLE WHEN REMOVAL AND/OR DISTURBANCE OF THIS PIPE OCCURS.
B. WRITTEN NOTIFICATION TO THE NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES OR THE DEPARTMENT OF ENVIRONMENTAL PROTECTION OF MECKLENBURG COUNTY 10 DAYS PRIOR COMMENCING WITH THE REMOVAL OF AC PIPE IS REQUIRED. AT EACH LOCATION SHOWN IN THE PLANS AND/OR IDENTIFIED BY THE CONTRACTOR TO INVOLVE AC PIPE, THE CONTRACTOR WILL BE REQUIRED TO REMOVE THE NECESSARY AMOUNT OF AC PIPE TO MAKE THE CONNECTION WITHOUT CREATING ANY FRIABLE MATERIAL. THE CONTRACTOR SHALL REMOVE WHOLE SECTIONS OF AC PIPE AND MAKE THE TIE-IN AT THE NEAREST JOINT. CONTRACTOR WILL UNCOVER NO MORE THAN 20-FEET OF AC PIPE AT ANY TIME. CUTTING OF AC PIPE SHALL BE MINIMIZED. THE CONTRACTOR SHALL REMOVE ANY CUT AC PIPE AND STORE IT IN A SECURE, ENGINEER APPROVED LOCATION FOR EVENTUAL DISPOSAL BY CONTRACTOR. PRIOR TO PERFORMING THIS WORK, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND THE OWNER OF THE UTILITY OF THE WORK SCHEDULE 72 HOURS IN ADVANCE OF BEGINNING THE WORK.
C. WHEN WORKING WITH AC PIPES, CONTRACTOR WILL COMPLY WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP) REGULATIONS, INCLUDING BUT NOT LIMITED TO USE OF PERSONAL PROTECTIVE EQUIPMENT, SPECIALIZED TRAINING, ACCREDITATION, USE OF WET WORK PROCEDURES TO CUT AND REMOVE AC PIPE, AND HANDLING AND DISPOSAL OF AC PIPE AND MATERIAL INCLUDING CONTAMINATED SOIL.
D. AC PIPE WILL BE ABANDONED BY REMOVAL OR ABANDON IN PLACE BY GROUTING. ALL AC PIPE AND MATERIALS REMOVED WILL BECOME THE PROPERTY OF THE CONTRACTOR. THE CONTRACTOR WILL PROVIDE THE OWNER WITH DISPOSAL RECEIPTS SHOWING PROPER DISPOSAL AT AN AUTHORIZED FACILITY.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

TRANSITION FROM HDPE TO AC PIPE (4-INCH TO 12-INCH)

NO SCALE

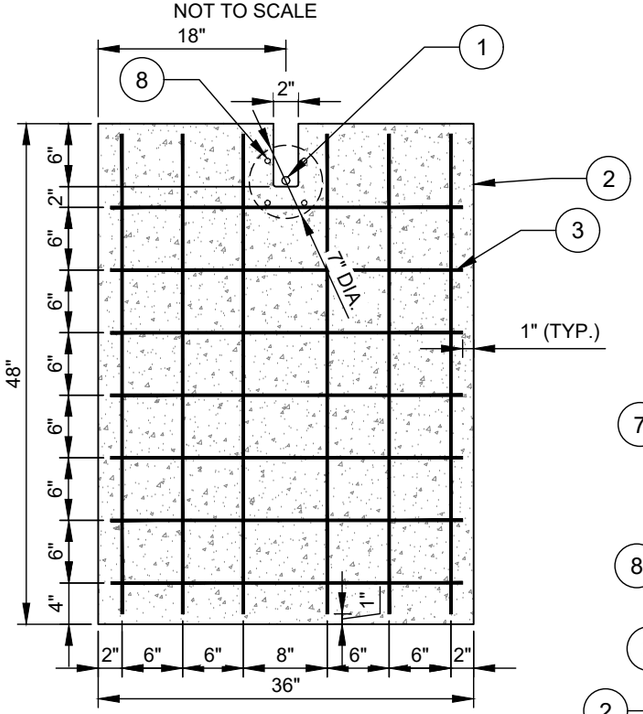
VERSION 1.0

DATE 04/2024

DETAIL 10.11.2

CONCRETE PAD WITH NOTCH

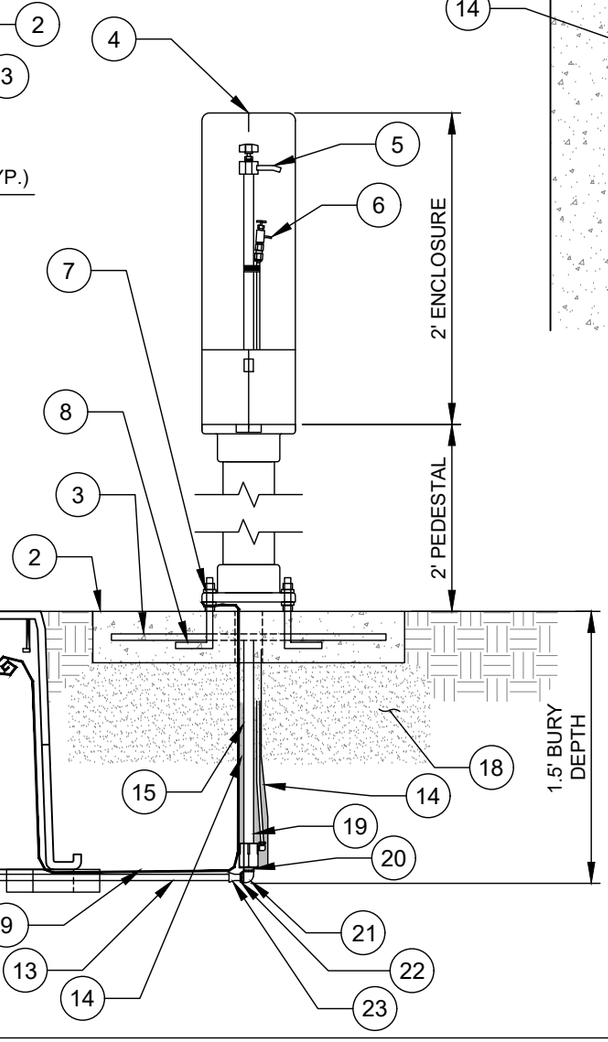
NOT TO SCALE



#4 REBARS TO TERMINATE 1" FROM EDGE OF PAD

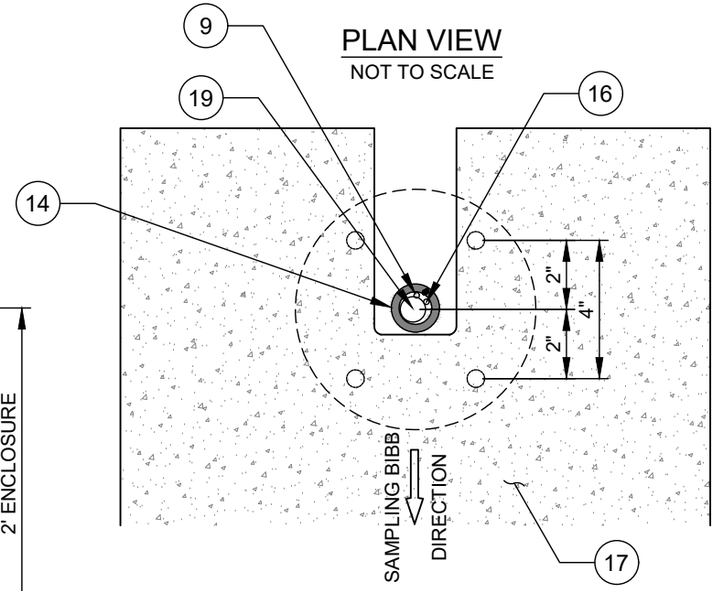
SECTION VIEW

NOT TO SCALE



PLAN VIEW

NOT TO SCALE



*TAP SHALL ONLY BE CONNECTED DIRECTLY TO A CLTW PUBLIC MAIN AND MAY NOT BE CONNECTED TO WATER SERVICE PIPING, FIRE HYDRANT FEEDER LEG, AIR RELEASE OR BLOW-OFF PIPING.

NO. DESCRIPTION:

1. 3/4" PIPE TO BE LOCATED AS CLOSE AS POSSIBLE TO INSIDE OF NOTCH. ANCHOR BOLTS TO BE LOCATED APPROPRIATELY.
2. PRECAST CONCRETE PAD (4' LONG X 3' WIDE X 4" THICK).
3. #4 REBAR, GRADE 60 (TYP.).
4. SAMPLE STATION SHALL BE TRUE TO PLUMB USING LEVELING BOLTS/NUTS.
5. SAMPLING BIBB.
6. PETCOCK.
7. STAINLESS STEEL 1/2" CLIPPED WASHER, STAINLESS STEEL 1/2" NUT, 2 EACH REQUIRED/BOLT.
8. STAINLESS STEEL ANCHOR BOLT (1/2" DIAMETER X 4" L).
9. TRACER WIRE.
10. SOLID STANDARD CONCRETE, BRICK-DIAGONAL AT CORNERS - 4 EACH (SEE IRRIGATION SERVICE DETAIL).
11. CLTW PLASTIC METER BOX AND LID PER STANDARD DETAIL.
12. SEE SHEET 2 OF 2 FOR SAMPLING STATION PLUMBING.
13. 3/4" TYPE K COPPER.
14. SELF SEALING P.E. FOAM PIPE INSULATION - FLANGE TO 90° BEND.
15. 3/4" S.S. DROP PIPE.
16. 1/4" S.S. TUBING.
17. CONCRETE.
18. 8" #57 WASHED STONE.
19. 3/4" S.S. STANDPIPE (MIPT).
20. 3/4" S.S. STANDPIPE (FIPT).
21. 3/4" SCH 80 PVC 90° BEND (FIP X FIP).
22. 3/4" X 2" SCH 80 PVC NIPPLE (MIP X MIP).
23. 3/4" BRASS STRAIGHT CONNECTOR (FIP X CTS COMPRESSION) MUELLER #H-15438N OR APPROVED EQUAL.

NOTES:

A. IN CORROSIVE SOILS, THE BURIED PIPE SHOULD BE PREPARED FOR ADDITIONAL RESISTANCE TO CORROSION. SPRAY ALL UNDERGROUND PIPING AND FITTINGS WITH BITUMINOUS SPRAY TAR, ALLOWING PROPER TIME TO DRY, AND THEN WRAPPING THE PARTS.
B. SAMPLING STATION SHALL BE 1.5' BURY, INSTALLED ON CONCRETE PAD WITH A 3/4" FIPT INLET, AND 7/16" UNTHREADED BLOW OFF AND 1/4" SAMPLING BIBB.
C. STATION SHALL BE ENCLOSED IN A LOCKABLE, NON-REMOVABLE ALUMINUM BOX WITH HINGED OPENINGS.
D. WHEN OPEN, THE STATION SHALL REQUIRE NO KEY FOR OPERATION, AND ALL WATER FLOW SHALL PASS THRU AN ALL STAINLESS STEEL WATERWAY.
E. ALL WORKING PARTS SHALL BE OF STAINLESS STEEL AND SERVICEABLE FROM ABOVE GROUND WITH NO DIGGING OR REPLACEMENT NEEDED.
F. A STAINLESS STEEL PETCOCK VALVE WILL BE LOCATED BELOW THE SAMPLING BIBB TO ALLOW PUMPING OF ANY WATER REMAINING INSIDE THE STATION TO ENSURE NON-FREEZING.
G. CONCRETE PAD SHALL DRAIN AWAY FROM SAMPLE STATION AND SHALL BE FLUSH WITH FINISHED GRADE #57 STONE BASE TO A DEPTH OF 8" UNDER PAD.
H. THE STATION SHALL BE MODEL #88-SS WITH 2' STEEL PEDESTAL AND EPOXY COATING WITHIN BOX FOR CORROSION PROTECTION AS MANUFACTURED BY THE KUPFERLE FOUNDRY, OR APPROVED EQUAL.
I. ANCHOR BOLTS - 304 STAINLESS STEEL, WITH NUTS AND CLIPPED WASHERS - 316 STAINLESS STEEL.
J. AWG #12 GAUGE SOLID COPPER TRACER WIRE-WITH 30 MILS BLUE HDPE INSULATION - TERMINATE IN METER BOX WITH 24" EXCESS WIRE (COILED), AND TERMINATE AT ANCHOR BOLT.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

WATER QUALITY SAMPLING STATION (1 OF 2)

NO SCALE

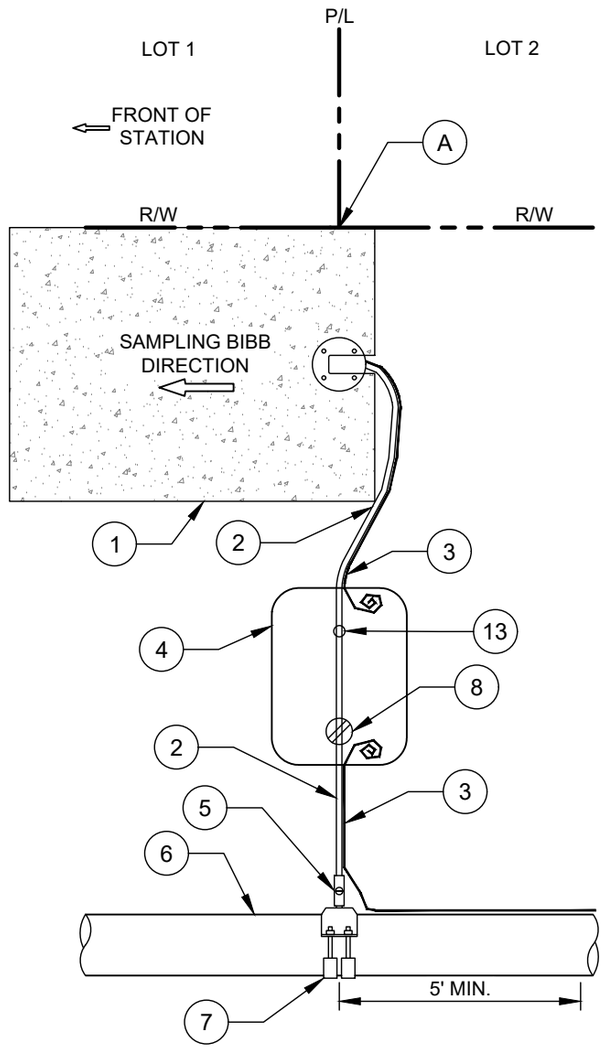
VERSION 1.0

DATE 04/2024

DETAIL 10.12.1

WATER MAIN CONNECTIONS

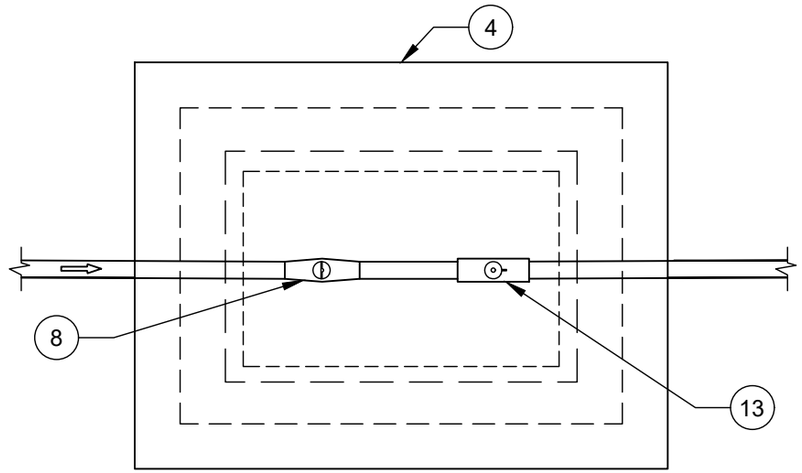
PLAN VIEW
NOT TO SCALE



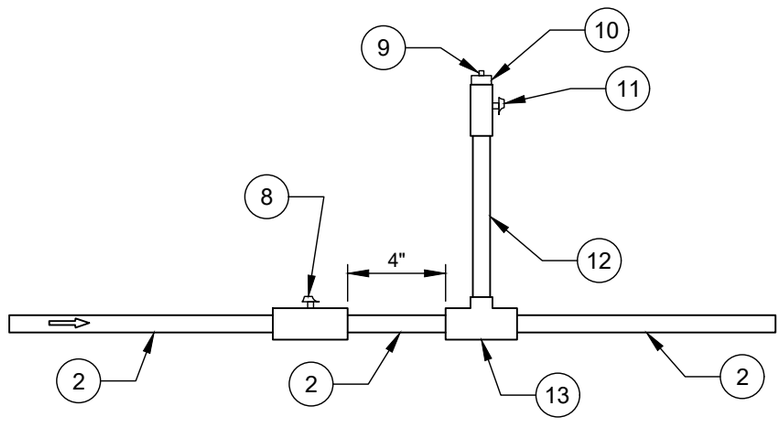
PRIMARY

*TAP SHALL ONLY BE CONNECTED DIRECTLY TO A CLTW PUBLIC MAIN AND MAY NOT BE CONNECTED TO WATER SERVICE PIPING, FIRE HYDRANT FEEDER LEG, AIR RELEASE OR BLOW-OFF PIPING.

SAMPLING STATION PLUMBING
NOT TO SCALE



PLAN VIEW
NOT TO SCALE



ELEVATION VIEW
NOT TO SCALE

NO.	DESCRIPTION:
1.	PRECAST CONCRETE PAD (4' LONG X 3' WIDE X 4" THICK) RESTING ON 8" WASHED STONE #57.
2.	3/4" COPPER TUBING, TYPE K.
3.	TRACER WIRE.
4.	CLTW PLASTIC METER BOX AND LID PER STANDARD DETAIL.
5.	3/4" BALL VALVE CORPORATION STOP.
6.	PUBLIC WATER MAIN.
7.	SERVICE SADDLE.
8.	3/4" BALL VALVE WITH LOCK WING (CTS COMP. X CTS COMP.) MUELLER #B-25146N OR APPROVED EQUAL. APPROX. 4" LENGTH.
9.	SOLID RED BRASS PLUG 1/4" MNPT GRAINGER 6RCZ4 OR APPROVED EQUAL.
10.	BRASS HEX BUSHING 3/4" X 1/4" FNPT GRAINGER 22UL39 OR APPROVED EQUAL.
11.	3/4" FIPT BALL VALVE WITH LOCK WING MUELLER B20200N OR APPROVED EQUAL LOCK VALVE IN CLOSED POSITION (SERIAL NUMBERED STUD LOCK - FURNISHED BY CLTW).
12.	3/4" x 4" BRASS NIPPLE (MIP X MIP).
13.	3/4" SERVICE TEE (CTS COMP. X CTS COMP. X FIPT) MUELLER #H-15391N, FORD #T444-333NL, OR MCDONALD #74764Q).

NOTES:

A. SAMPLING STATION TO BE LOCATED ON PROPERTY LINE BETWEEN TWO LOTS.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

WATER QUALITY SAMPLING STATION (2 OF 2)

NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.12.2

NOTES:

A. ANY USE OF WATER REQUIRES THIS FULL ASSEMBLY (STATE STATUTE #143-355.4)(CHARLOTTE CITY CODE CHAPTER 23, ARTICLE 5).

B. NO BRANCHES, OUTLETS OR TAPS SHALL BE PERMITTED BETWEEN NO. 1 AND NO. 5.

C. RP BACKFLOW ASSEMBLY MUST BE TESTED AND APPROVED BY CLTW APPROVED TESTER PRIOR TO MOVING ANY WATER TO THE NEW MAIN.

D. FLEXIBLE HOSE NO. 8 SHALL BE REMOVED DURING PRESSURE / LEAKAGE TESTS.

E. CLTW FURNISHED PRESSURE GAUGE NO. 14 AND METER NO. 19, 20 SHALL BE REMOVED DURING CHLORINATION.

F. CLTW METER SHALL BE INSTALLED AT PRIMARY LOCATION NO. 19 AS SHOWN, UNLESS SPECIFICALLY APPROVED AT ALTERNATE LOCATION NO. 20.

G. CLTW PRESSURE GAUGES SHALL BE INSTALLED AT LOWEST POINT IN NEW MAIN AND AT OPPOSITE END OF NEW MAIN.

H. CLTW PRESSURE GAUGE NO. 14 SHALL BE INSTALLED WHILE NEW MAIN IS NOT UNDER PRESSURE. MAIN SHALL THEN BE PUMPED UP TO TEST PRESSURE.

I. ALL TEMPORARY JUMPER PIPING FROM EXISTING BLOW-OFF TO NEW MAIN SHALL BE SAME DIAMETER AS EXISTING BLOW-OFF - 2" OR 4" DIAMETER.

J. BRANCH PIPING TO AND FROM TANK AND INJECTOR PUMP SHALL BE SIZED AS DETERMINED BY CONTRACTOR.

K. ALL DISCHARGE WATER TO GROUND SERVICE SHALL BE 0.02 PARTS PER MILLION OR LESS.

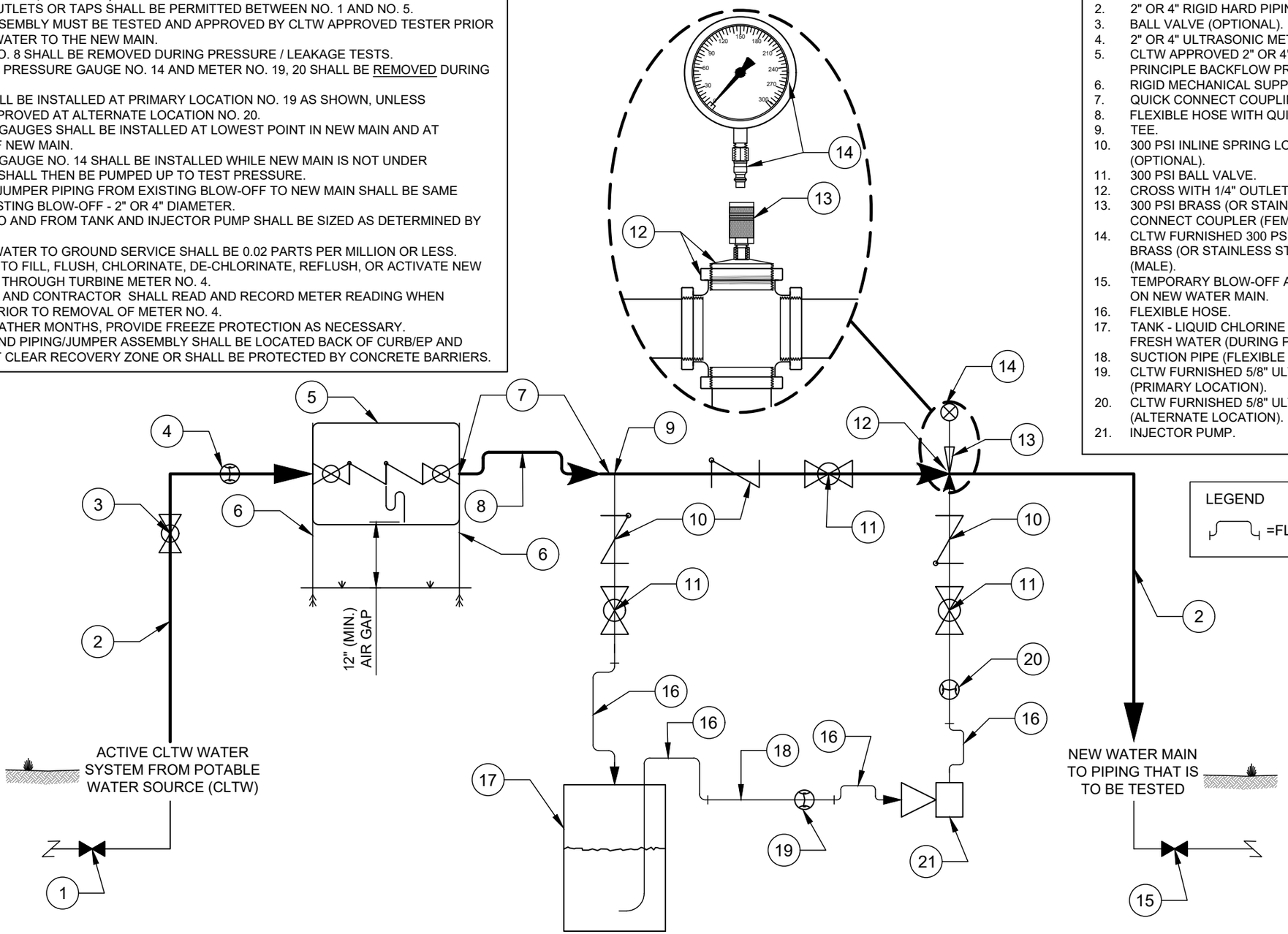
L. ALL WATER USED TO FILL, FLUSH, CHLORINATE, DE-CHLORINATE, REFLUSH, OR ACTIVATE NEW MAIN SHALL PASS THROUGH TURBINE METER NO. 4.

M. CLTW INSPECTOR AND CONTRACTOR SHALL READ AND RECORD METER READING WHEN INSTALLED AND PRIOR TO REMOVAL OF METER NO. 4.

N. DURING COLD WEATHER MONTHS, PROVIDE FREEZE PROTECTION AS NECESSARY.

O. ALL ABOVE GROUND PIPING/JUMPER ASSEMBLY SHALL BE LOCATED BACK OF CURB/EP AND OUTSIDE THE DOT CLEAR RECOVERY ZONE OR SHALL BE PROTECTED BY CONCRETE BARRIERS.

NO.	DESCRIPTION:
1.	EXISTING BLOW-OFF ASSEMBLY AND CONTROL VALVE ON EXISTING WATER MAIN.
2.	2" OR 4" RIGID HARD PIPING.
3.	BALL VALVE (OPTIONAL).
4.	2" OR 4" ULTRASONIC METER - (GALS).
5.	CLTW APPROVED 2" OR 4" REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY.
6.	RIGID MECHANICAL SUPPORT.
7.	QUICK CONNECT COUPLING.
8.	FLEXIBLE HOSE WITH QUICK CONNECT COUPLINGS.
9.	TEE.
10.	300 PSI INLINE SPRING LOADED CHECK VALVE (OPTIONAL).
11.	300 PSI BALL VALVE.
12.	CROSS WITH 1/4" OUTLET.
13.	300 PSI BRASS (OR STAINLESS STEEL) 1/4" QUICK CONNECT COUPLER (FEMALE).
14.	CLTW FURNISHED 300 PSI PRESSURE GAUGE WITH BRASS (OR STAINLESS STEEL) 1/4" COUPLER PLUG (MALE).
15.	TEMPORARY BLOW-OFF ASSEMBLY AND CONTROL VALVE ON NEW WATER MAIN.
16.	FLEXIBLE HOSE.
17.	TANK - LIQUID CHLORINE (DURING CHLORINATION) OR FRESH WATER (DURING PRESSURE / LEAKAGE TESTS).
18.	SUCTION PIPE (FLEXIBLE HOSE OR RIGID PIPE).
19.	CLTW FURNISHED 5/8" ULTRASONIC METER (GALS) - (PRIMARY LOCATION).
20.	CLTW FURNISHED 5/8" ULTRASONIC METER (GALS) - (ALTERNATE LOCATION).
21.	INJECTOR PUMP.



CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

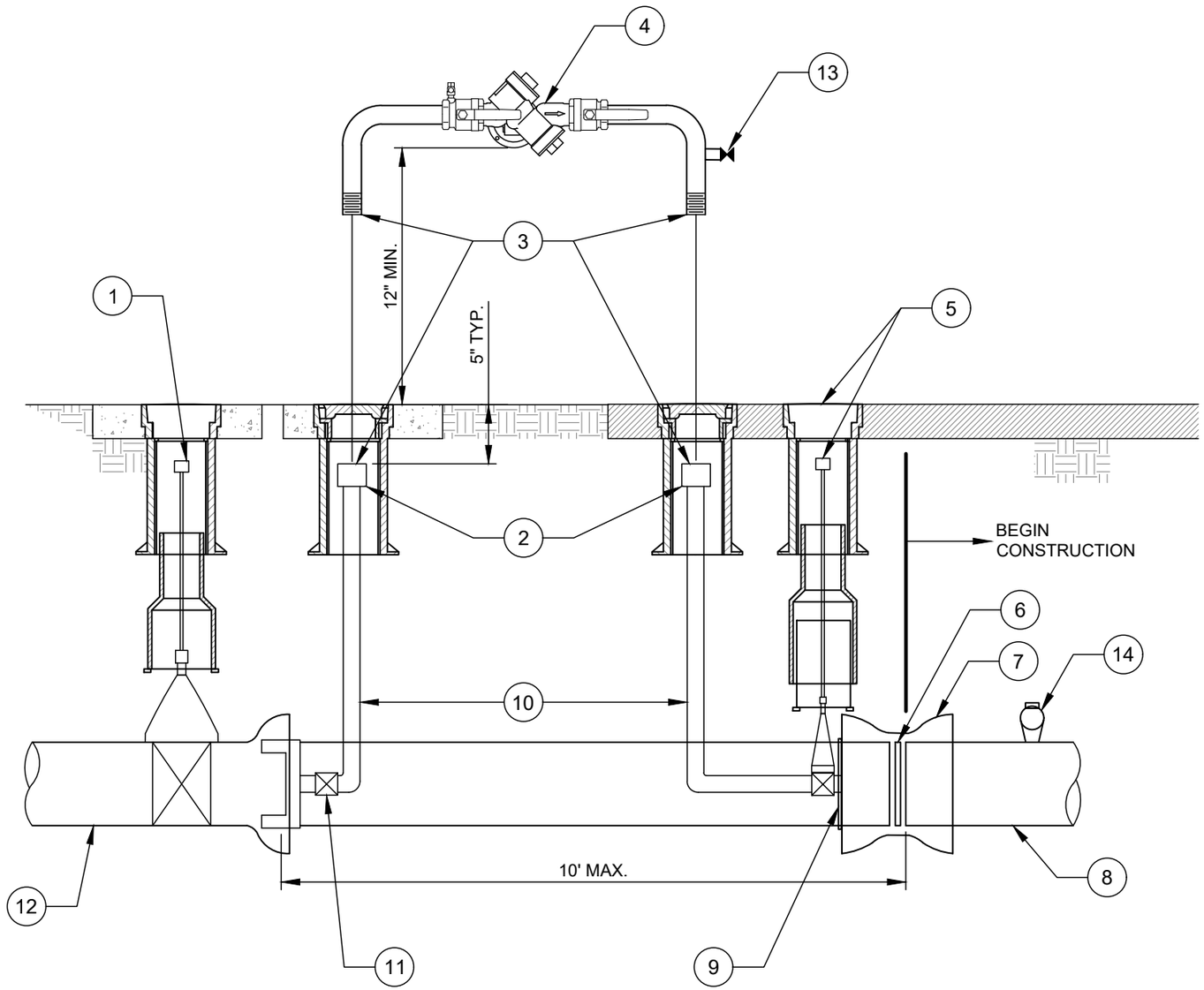
NEW WATER MAIN JUMPER SCHEMATIC FOR 2" - 24" MAINS

NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.13.1



NO. DESCRIPTION:

1. EXISTING MAIN LINE GATE VALVE. VERIFY AND IMPROVE BLOCKING AS NECESSARY.
2. 2" COUPLING.
3. WATERTIGHT CAPS/PLUGS REQUIRED WHEN RP IS NOT IN PLACE.
4. 2" REDUCED PRESSURE (RP) PRINCIPLE BACKFLOW PREVENTER.
5. 2" GATE VALVE AND VALVE BOX.
6. PIPE SPACER AS REQUIRED. MAX OPEN GAP IN PIPE IS 0.25 INCHES.
7. MJ LONG PATTERN SOLID SLEEVE.
8. PROPOSED WATER MAIN.
9. MJ PLUG, TAPPED FOR 2". PROVIDE THRUST RESTRAINT OR BLOCKING BETWEEN PLUGS.
10. 2" PIPE.
11. 2" GATE VALVE AND VALVE BOX REQUIRED IF EXISTING STUB-OUT HAS BEEN ACTIVATED.
12. EXISTING 2" THROUGH 12" WATER MAIN.
13. TEE AND BALL VALVE - SOURCE WATER FOR CHLORINATION.
14. SERVICE SADDLE AND CORPORATION STOP - CHLORINE INJECTION POINT.

NOTES:

A. THIS IS THE ONLY CONNECTION ALLOWED BETWEEN EXISTING WATER SYSTEM AND PROPOSED MAIN UNTIL ACTIVATION AND FINAL CONNECTIONS ARE APPROVED BY THE ENGINEER.
B. VALVES ON EXISTING WATER SYSTEM TO BE OPERATED BY CLTW EMPLOYEES ONLY.
C. ALL PIPE AND FITTINGS ON JUMPER SHALL BE OF RESTRAINED JOINT TYPE.
D. THIS DRAWING IS A SCHEMATIC FOR INTENT ONLY. PIPING AND CONFIGURATION MAY BE ALTERED BY THE CONTRACTOR, SUBJECT TO ENGINEER APPROVAL.
E. REFER TO APPROPRIATE STANDARD DETAIL WITH NEW WATER MAIN JUMPER SCHEMATIC FOR MORE INFORMATION ON INSTALLING AN OPERATION OF THE JUMPER.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

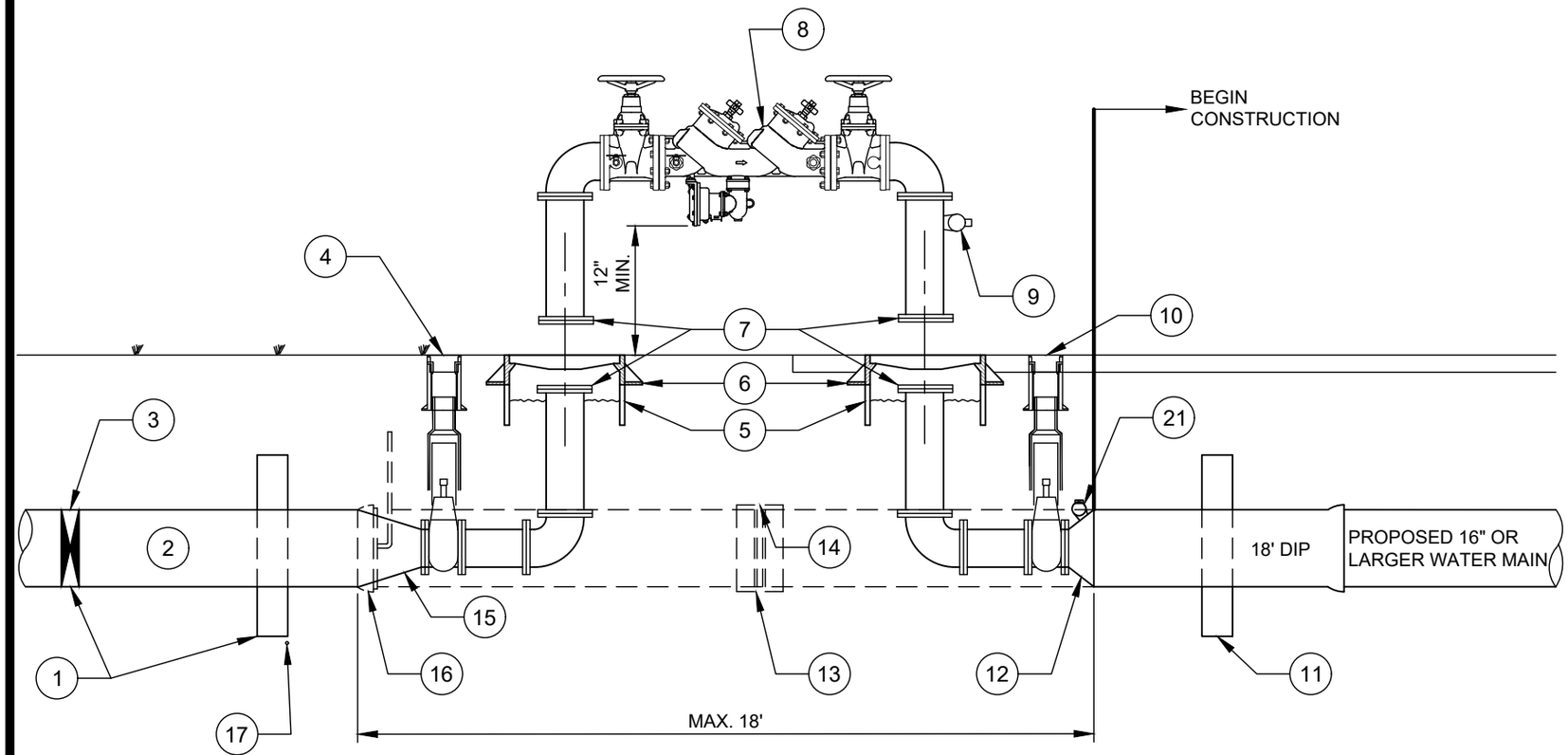
JUMPER CONNECTION DETAIL FOR 12-INCH AND SMALLER WATER MAINS

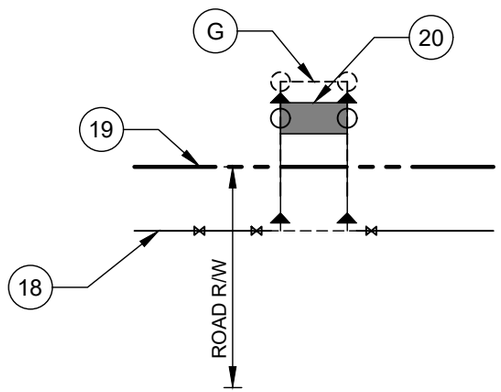
NO SCALE

VERSION
1.0

DATE
04/2024

DETAIL
10.13.2





TYPICAL LOCATION SCHEMATIC FOR LARGER MAINS

N.T.S.

NO.	DESCRIPTION:
1.	VERIFY THRUST RESTRAINT AND IMPROVE AS NECESSARY.
2.	EXISTING WATER MAIN.
3.	EXISTING MAINLINE VALVE.
4.	GATE VALVE AND VALVE BOX REQUIRED IF EXISTING STUB OUT HAS BEEN ACTIVATED.
5.	24" PVC PIPE OR PRECAST CONC. GRADE RINGS.
6.	FRAME AND COVER.
7.	WATERTIGHT CAPS REQUIRED WHEN RP IS NOT IN PLACE.
8.	4" TO 10" (VARIES WITH PIPE SIZE) REDUCED PRESSURE (RP) PRINCIPLE BACK FLOW PREVENTER.
9.	WATER SOURCE CORPORATION STOP.
10.	GATE VALVE AND VALVE BOX REQUIRED.
11.	PROP. CONC. BLOCKING PER STD. DETAIL.
12.	RESTRAINED JOINT REDUCER.
13.	CLOSE WITH LONG PATTERN SOLID SLEEVE.
14.	PIPE SPACERS AS REQUIRED MAX OPEN GAP IN PIPE IS 0.25 INCHES.
15.	RESTRAINED JOINT REDUCERS.
16.	CUT EXISTING PIPE - REMOVE BELL, PLUG AND BLOW OFF.
17.	EXISTING CONC. BLOCKING ON 16" AND LARGER MAINS ONLY.
18.	PUBLIC WATER MAIN.
19.	PROPERTY LINE OR R/W.
20.	CLTW REQUIRED BPA ABOVE GROUND.
21.	CHLORINE INJECTION CORPORATION STOP.

NOTES:

A. THIS IS THE ONLY CONNECTION ALLOWED BETWEEN EXISTING WATER SYSTEM AND PROPOSED MAIN UNTIL ACTIVATION AND FINAL CONNECTIONS ARE APPROVED BY THE SEALING ENGINEER.

B. VALVES ON EXISTING WATER SYSTEM TO BE OPERATED BY CLTW EMPLOYEES ONLY.

C. ALL PIPE AND FITTINGS SHALL BE OF RESTRAINED JOINT TYPE AS DETERMINED BY THE CONTRACTOR. (PIPE SHOWN AS FLANGE FOR EASE OF DRAWING ONLY).

D. THIS DRAWING IS A SCHEMATIC FOR INTENT ONLY. PIPING AND CONFIGURATION MAY BE ALTERED BY THE CONTRACTOR, SUBJECT TO SEALING ENGINEER APPROVAL.

E. PIPE AND FITTINGS SHALL BE SAME SIZE AS REQUIRED RP.

F. REFER TO APPROPRIATE STANDARD DETAIL WITH NEW WATER MAIN JUMPER SCHEMATIC FOR MORE INFORMATION ON INSTALLING AN OPERATION OF THE JUMPER.

G. LARGE DIAMETER MAINS MAY REQUIRE MULTIPLE PARALLEL JUMPER/BACKFLOW ASSEMBLIES TO OBTAIN MINIMUM FLUSHING VELOCITIES. THE SEALING ENGINEER SHALL RUN HYDRAULIC CALCULATIONS TO DETERMINE THE REQUIRED SIZE AND NUMBER OF ASSEMBLIES REQUIRED FOR FLUSHING.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

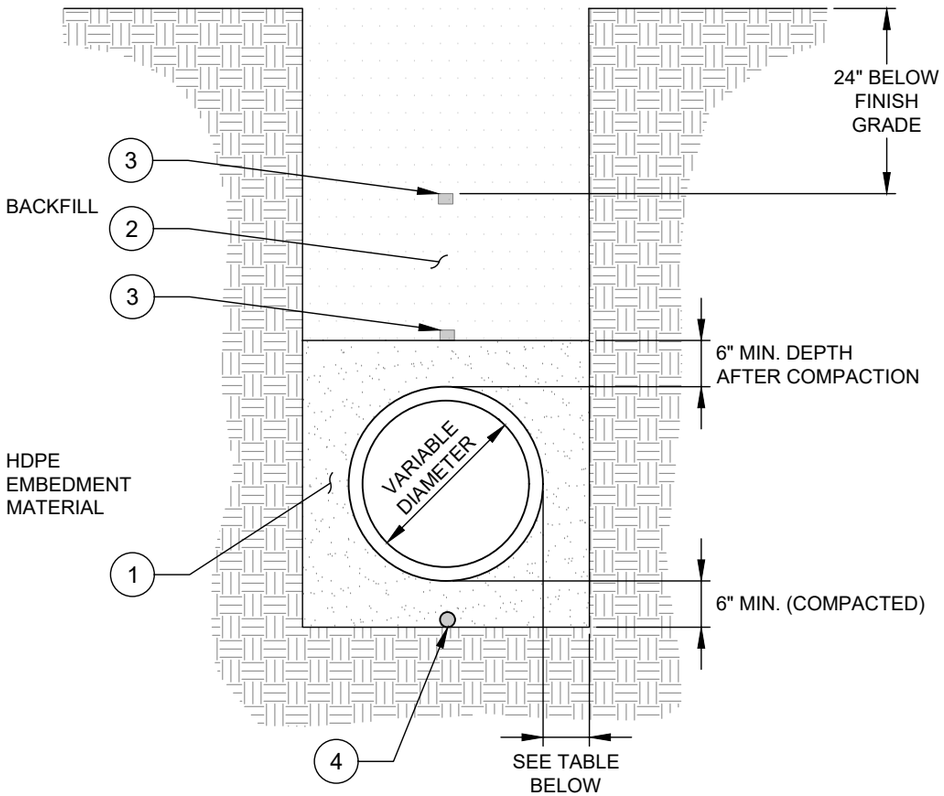
JUMPER CONNECTION DETAIL FOR 16-INCH AND LARGER WATER MAINS

NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.13.3



REQUIRED TRENCH WIDTH		
PIPE SIZE (INCHES)	MINIMUM TRENCH WIDTH (INCHES)	MAXIMUM TRENCH WIDTH (INCHES)
<18	PIPE OD + 12	PIPE OD + 30
18 to 23	PIPE OD + 12	PIPE OD + 36
24 to 32	PIPE OD + 24	PIPE OD + 36

MAXIMUM TRENCH WIDTH NOTES:

A. LARGER TRENCH WIDTH ALLOWED TO ACCOMMODATE BUTT FUSION EQUIPMENT AT FUSION LOCATIONS.

NO. DESCRIPTION:

1. HDPE EMBEDMENT MATERIAL – FINE AGGREGATE #57 WASHED STONE.

2. BACKFILL - COMPACT BACKFILL PER ASTM D 698 AND AASHTO T-99 AS MODIFIED BY NCDOT TO 95% MAXIMUM DENSITY WITHIN A ROAD RIGHT-OF-WAY. FINAL 12" OF SUBGRADE SHALL BE COMPACTED TO 100%. 85% MAXIMUM DRY DENSITY REQUIRED OUTSIDE ROAD R/W.

3. WARNING TAPE - 6" WIDE WARNING TAPE INSTALLED DIRECTLY ABOVE HDPE EMBEDMENT MATERIAL AND 24" BELOW FINISH GRADE.

4. TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH 30 MILS THICK BLUE HDPE INSULATION AT THE BOTTOM OF THE EMBEDMENT LAYER. DO NOT ATTACH TRACER WIRE TO PIPE.

NOTES:

A. WHERE PIPE IS INSTALLED DEEPER THAN 15', INSTALL ADDITIONAL TRACER WIRE AT A DEPTH OF 4' BELOW FINISH GRADE.

B. EMBEDMENT SHOULD BE PLACED IN LIFTS, NOT EXCEEDING 6" IN THICKNESS, AND THEN TAMPED. TAMPING SHOULD BE ACCOMPLISHED WITH A MECHANICAL TAMPER.

C. A MAXIMUM OF 100' OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE ENGINEER.

D. PERFORM CONDUCTIVITY TEST ON THE TRACER WIRE AT FINAL INSPECTION. CONTRACTOR TO TEST ON A DAILY BASIS.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

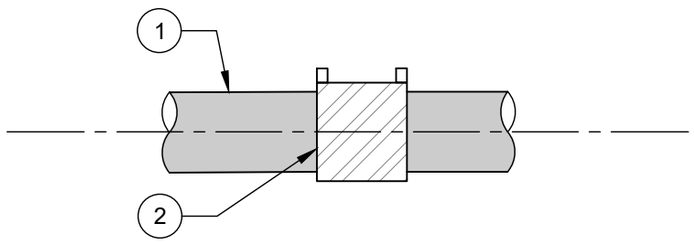
EMBEDMENT AND BACKFILL FOR HDPE PIPE

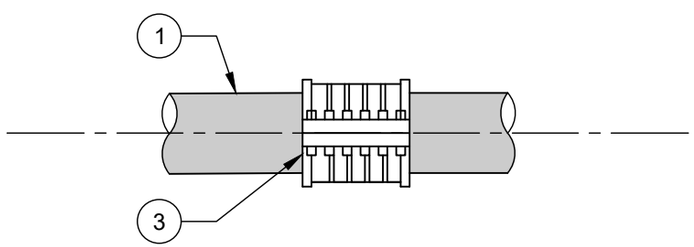
NO SCALE

VERSION
1.0

DATE
04/2024

DETAIL
10.13.4





SMALL PUNCTURE REPAIR

NO.	DESCRIPTION:
1.	EXISTING HDPE WATER MAIN.
2.	WRAP AROUND REPAIR CLAMP.
3.	SOLID RESTRAINED SLEEVE.

NOTES:

A. DETAIL NOT INTENDED FOR USE FOR NEW HDPE INSTALLATIONS.

SMALL PUNCTURE REPAIR NOTES:

a. SMALL PUNCTURE DAMAGE IS DEFINED AS ONE INCH OR SMALLER PUNCTURE IN ONE PIPE WALL.

b. PREFERRED REPAIR METHOD FOR SMALL PUNCTURE IS ELECTROFUSION PATCH. MECHANICAL COUPLING IS ALLOWED WHEN PIPE CAN NOT BE DRIED, UPON APPROVAL OF CLTW INSPECTOR.

c. BEFORE ADDING FITTING, DRILL SMALL HOLE AT EACH END OF DAMAGE TO PREVENT CRACK PROPAGATING.

d. FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C906.

e. MECHANICAL FITTINGS USED WITH HDPE PIPE SHALL BE SPECIFICALLY DESIGNED FOR USE WITH HDPE PIPE.

f. MINIMUM CLAMP LENGTH IS 12". MINIMUM CLAMP LENGTH IS 5" ON EITHER SIDE OF PUNCTURE, FOR 10" NOMINAL DIAMETER PIPE AND LARGER.

NOTES TO DESIGNER

A. REFER TO PPI TN-34 (INSTALLATION GUIDELINES FOR ELECTROFUSION COUPLINGS 14” AND LARGER).

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

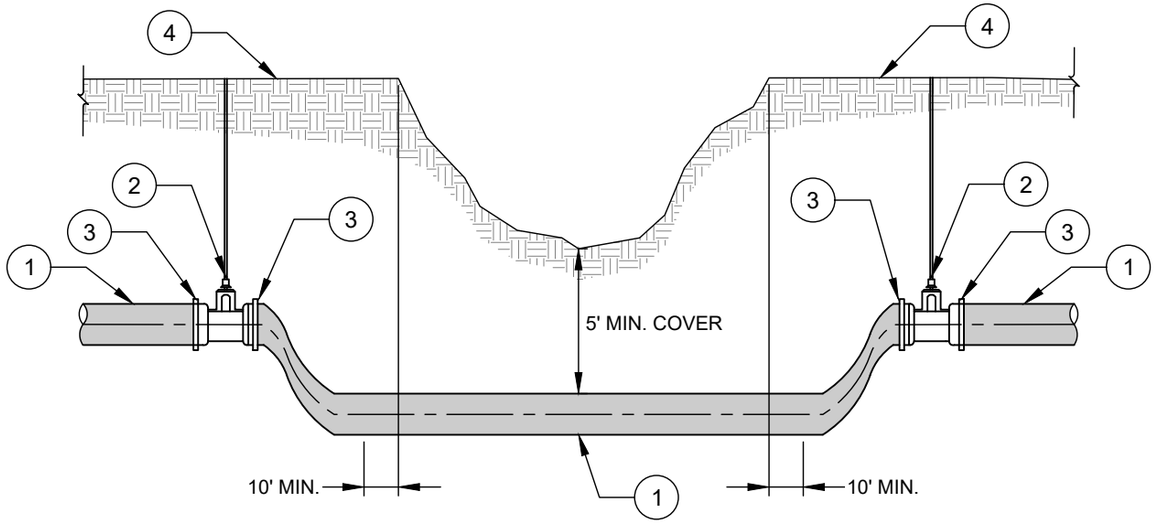
EXISTING HDPE PIPE REPAIR (MAINTENANCE REPAIRS ONLY)

NO SCALE

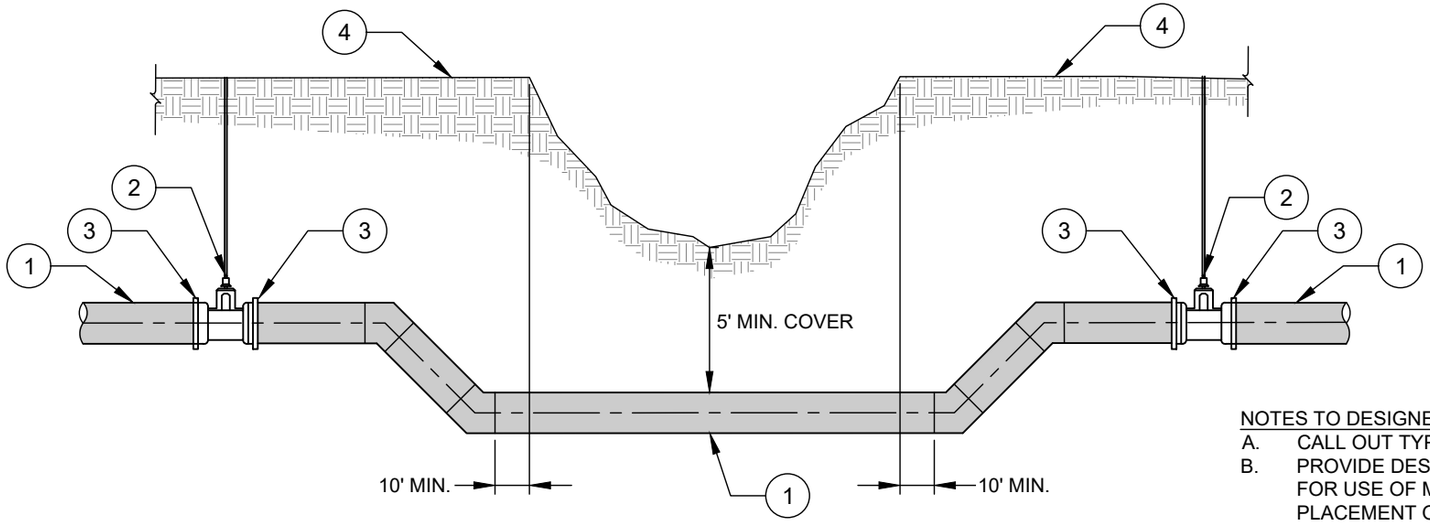
VERSION 1.0

DATE 04/2024

DETAIL 10.13.5



CREEK CROSSING BY DIRECTIONAL DRILL



CREEK CROSSING WITH FITTINGS
OPEN CUT OR CONVENTIONAL BORE

NO.	DESCRIPTION:
1.	HDPE WATER MAIN CARRIER PIPE.
2.	VALVE.
3.	MALE HDPE RESTRAINED JOINT ADAPTER WITH STEEL PIPE STIFFENER.
4.	TOP OF BANK.

NOTES:

A. FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C906.

B. MECHANICAL FITTINGS USED WITH HDPE PIPE SHALL BE SPECIFICALLY DESIGNED FOR USE WITH HDPE PIPE.

C. STAINLESS STEEL INTERNAL STIFFENERS SHALL BE INSTALLED IN THE END OF THE HDPE PIPE WHEN HDPE PIPE IS INSERTED INTO THE BELL END OF NON-HDPE PIPE, VALVE, FITTING, OR INTO THE HUB OF A BOLTED COUPLING.

D. ALLOWABLE TENSILE LOAD FOR PIPE MAY NOT BE EXCEEDED WHEN PULLING CARRIER PIPE THROUGH HORIZONTAL DIRECTIONAL DRILL (HDD). PROVIDE SEALED CALCULATIONS.

E. LOCATE VALVES IN ACCESSIBLE LOCATION AT TOP OF BANK WITHIN 100 TO 1,000 LINEAR FEET OF TOP OF BANK ON BOTH SIDES OF CENTERLINE OF CREEK.

NOTES TO DESIGNER

A. CALL OUT TYPE OF VALVE ON PLANS.

B. PROVIDE DESIGN CALCULATIONS PER ASTM F1962, STANDARD GUIDE FOR USE OF MAXI-HORIZONTAL DIRECTIONAL DRILLING FOR PLACEMENT OF PE PIPE OR CONDUIT UNDER OBSTACLES, INCLUDING RIVER CROSSINGS. PROVIDE SEALED CALCULATIONS FOR PULLBACK FORCE, TENSILE STRESS, EXTERNAL PRESSURE, BENDING STRESS, THERMAL STRESSES AND STRAINS, AND TORSION STRESS.

C. PROVIDE PE SEALED FLOTATION DESIGN CALCULATIONS COMPLYING WITH THE MINIMUM REQUIREMENTS OF CHAPTER 6 SECTION 3 OF "THE HANDBOOK OF POLYETHYLENE PIPE" REVISION 3 OR LATER BY PPI.

D. VALVES SHOULD BE PLACED IN AN ACCESSIBLE MAINTAINED AREAS.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

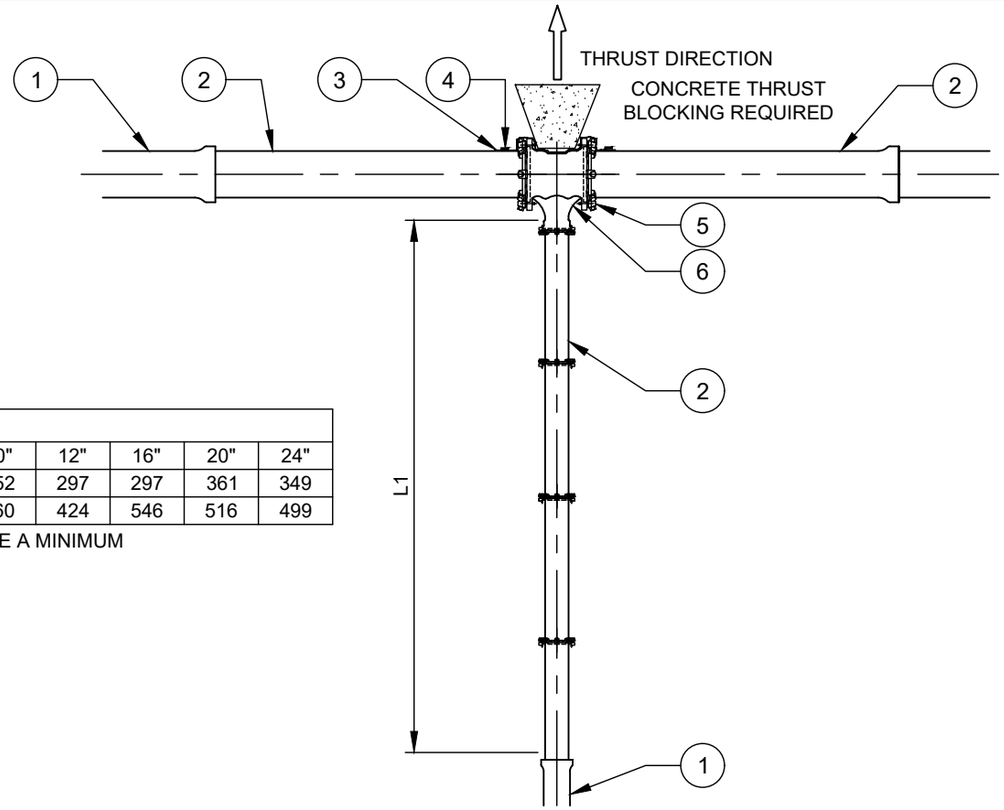
HDPE CREEK CROSSING

NO SCALE

VERSION
1.0

DATE
04/2024

DETAIL
10.13.6



TEE - **L1 (FEET)**							
DIAMETER OF BRANCH (INCHES)	6"	8"	10"	12"	16"	20"	24"
DIP	158	207	252	297	297	361	349
POLYWRAPPED DIP OR PVC	226	296	360	424	546	516	499

FIRST JOINT ON EACH SIDE OF TEE ON RUN SHALL BE A MINIMUM OF 10' FROM THE TEE.

NO.	DESCRIPTION:
1.	SLIP JOINT PIPE.
2.	RESTRAINED JOINT PIPE.
3.	HDPE WRAPPED AROUND FITTING AND WEDGE ACTION RESTRAINT GLAND.
4.	2 EACH x 2" CIRCUMFERENTIAL DUCT TAPE OR HDPE ZIP TIES.
5.	MECHANICAL JOINT DUCTILE IRON COMPACT FITTING.
6.	ALL FLANGE DUCTILE IRON TEE.

DESIGN BASIS:

DIPRA "THRUST RESTRAINT DESIGN FOR DIP"
LAYING CONDITION: TYPE 2
SOIL DESIGNATION: SILT 1
DEPTH OF COVER: 3' MINIMUM (SEE NOTE c.)
DESIGN PRESSURE: 200 PSI
SAFETY FACTOR: 2.0

NOTES:

a. 12" AND SMALLER DIP MAY BE SLIP JOINT PIPE WITH GRIP RESTRAINT GASKETS.
b. 16" AND LARGER DIP SHALL BE FACTORY RESTRAINT JOINT PIPE AND FITTINGS.
c. DEPTH OF COVER FOR 16" AND 20" PIPE IS 4' AND FOR 24" PIPE IS 5'.
d. DESIGN ENGINEER CAN SUBMIT ALTERNATIVE DESIGN BASIS FOR RESTRAINED JOINT LENGTH CALCULATIONS FOR OWNER REVIEW.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

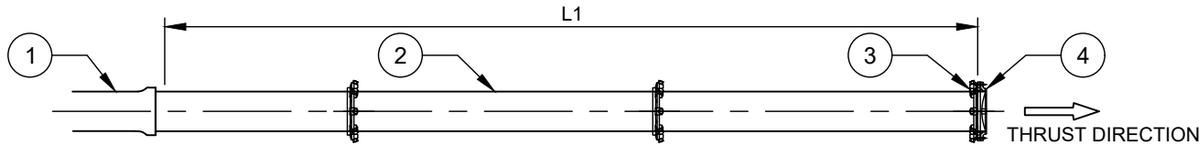
RESTRAINT LENGTH - TEE

NO SCALE

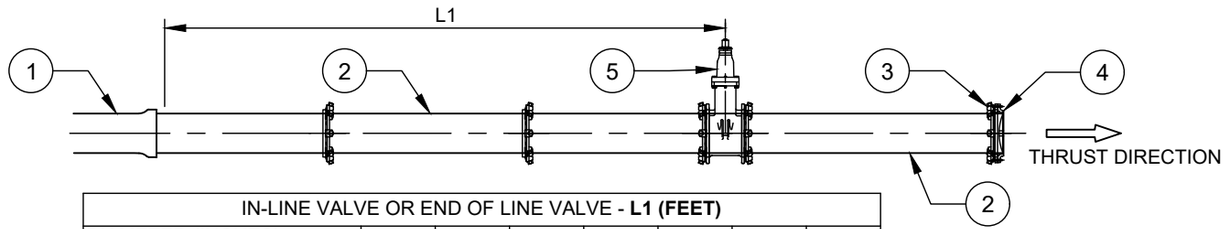
VERSION
1.0

DATE
04/2024

DETAIL
10.14.1



DEAD END, PLUG, OR CAP - **L1 (FEET)**							
DIAMETER (INCHES)	6"	8"	10"	12"	16"	20"	24"
DIP	169	219	264	309	308	373	361
POLYWRAPPED DIP OR PVC	242	312	377	441	440	532	516



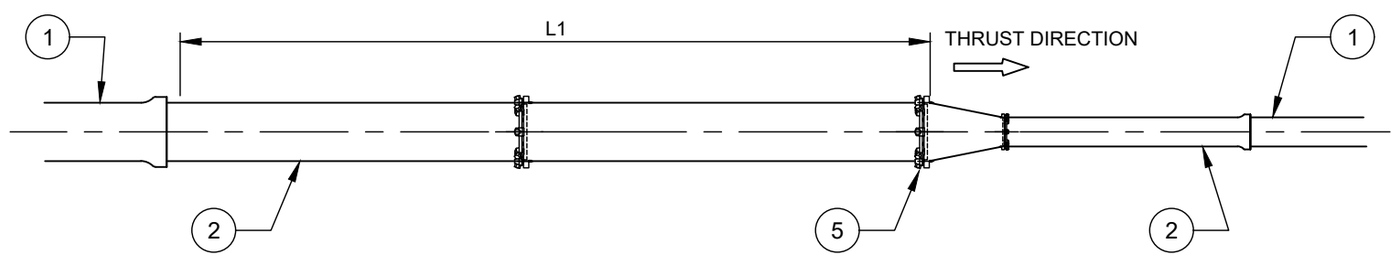
IN-LINE VALVE OR END OF LINE VALVE - **L1 (FEET)**							
DIAMETER (INCHES)	6"	8"	10"	12"	16"	20"	24"
DIP	169	219	264	309	308	373	361
POLYWRAPPED DIP OR PVC	242	312	377	441	440	532	516

FOR IN-LINE VALVE, PROVIDE RJ FOR A DISTANCE OF L1 ON EACH SIDE OF VALVE.

REDUCER - **L1 (FEET)**

	LARGE END DIAMETER	SMALL END DIAMETER						
		6"	8"	10"	12"	16"	20"	24"
DIP	6"							
	8"	92						
	10"	162	88					
	12"	224	164	90				
	16"	259	225	183	131			
	20"	335	307	274	234	131		
	24"		317	294	266	197	108	

	LARGE END DIAMETER	SMALL END DIAMETER						
		6"	8"	10"	12"	16"	20"	24"
POLYWRAPPED DIP OR PVC	6"							
	8"	131						
	10"	231	126					
	12"	320	234	129				
	16"	371	321	261	187			
	20"	478	439	392	334	187		
	24"		452	420	381	281	154	



NO. DESCRIPTION:

1. SLIP JOINT PIPE.
2. RESTRAINED JOINT PIPE.
3. RESTRAINED JOINT.
4. RESTRAINED MJ CAP WITH BLOW-OFF.
5. GATE VALVE (MJ X MJ) RESTRAINED.

DESIGN BASIS:

DIPRA "THRUST RESTRAINT DESIGN FOR DIP"
LAYING CONDITION: TYPE 2
SOIL DESIGNATION: SILT 1
DEPTH OF COVER: 3' MINIMUM (SEE NOTE c)
DESIGN PRESSURE: 200 PSI
SAFETY FACTOR: 2.0

NOTES:

a. 12" AND SMALLER DIP MAY BE SLIP JOINT PIPE WITH GRIP RESTRAINT GASKETS.
b. 16" AND LARGER DIP SHALL BE FACTORY RESTRAINT JOINT PIPE AND FITTINGS.
c. DEPTH OF COVER FOR 16" AND 20" PIPE IS 4' AND FOR 24" PIPE IS 5'.
d. DESIGN ENGINEER CAN SUBMIT ALTERNATIVE DESIGN BASIS FOR RESTRAINED JOINT LENGTH CALCULATIONS FOR OWNER REVIEW.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

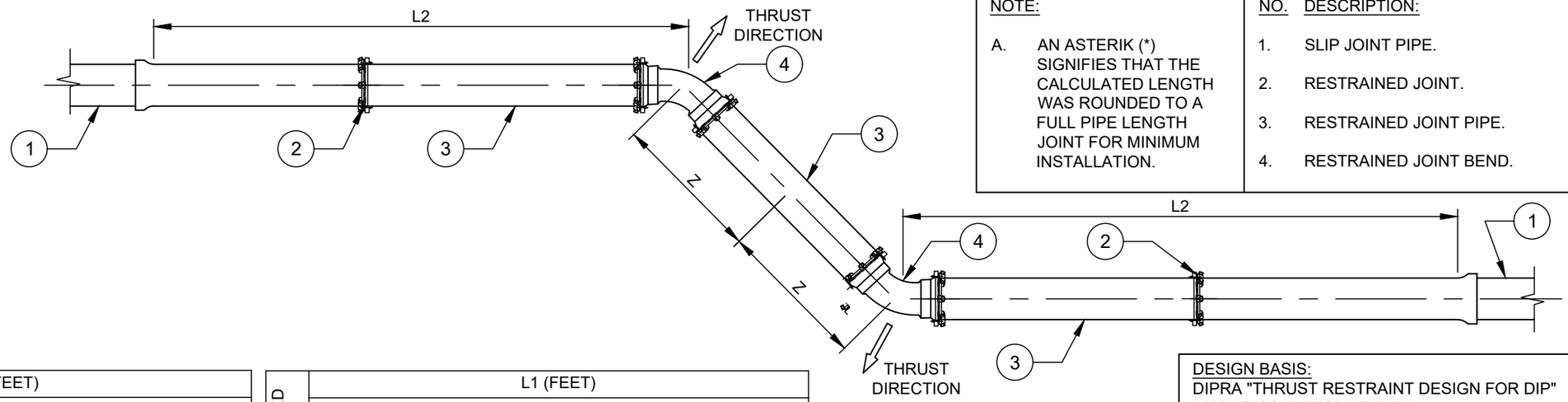
RESTRAINT LENGTH - DEAD END, PLUG, CAP, IN-LINE VALVE, END OF LINE VALVE AND REDUCER

NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.14.2



NOTE:

A. AN ASTERIK (*) SIGNIFIES THAT THE CALCULATED LENGTH WAS ROUNDED TO A FULL PIPE LENGTH JOINT FOR MINIMUM INSTALLATION.

NO.	DESCRIPTION:
1.	SLIP JOINT PIPE.
2.	RESTRAINED JOINT.
3.	RESTRAINED JOINT PIPE.
4.	RESTRAINED JOINT BEND.

HORIZONTAL OFFSET - **L2 (FEET)**

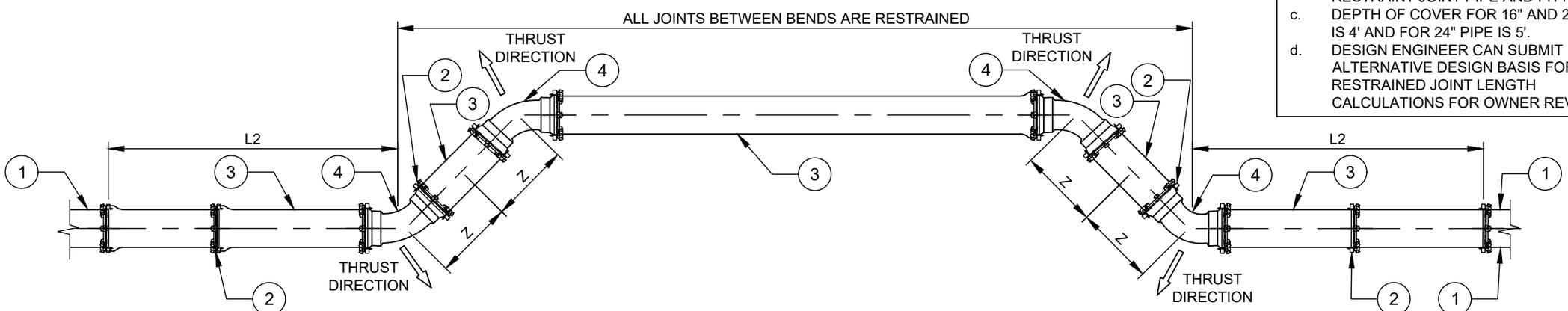
L2 = L1 MINUS Z

DIP	L1 (FEET)							
	DIAMETER							
	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
	45	90	116	140	163	162	195	189
	22.5	54*	56	67	78	78	94	91
	11.25	36*	36*	36*	54*	39	46	45

POLYWRAPPED DIP/PVC	L1 (FEET)							
	DIAMETER							
	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
	45	112	144	173	201	200	241	233
	22.5	54	69	83	97	96	116	112
	11.25	36*	36*	54*	54*	48	57	55

DESIGN BASIS:
DIPRA "THRUST RESTRAINT DESIGN FOR DIP"
LAYING CONDITION: TYPE 2
SOIL DESIGNATION: SILT 1
DEPTH OF COVER: 3' MINIMUM (SEE NOTE c)
DESIGN PRESSURE: 200 PSI
SAFETY FACTOR: 2.0
NOTES:

a. 12" AND SMALLER DIP MAY BE SLIP JOINT PIPE WITH GRIP RESTRAINT GASKETS.
b. 16" AND LARGER DIP SHALL BE FACTORY RESTRAINT JOINT PIPE AND FITTINGS.
c. DEPTH OF COVER FOR 16" AND 20" PIPE IS 4' AND FOR 24" PIPE IS 5'.
d. DESIGN ENGINEER CAN SUBMIT ALTERNATIVE DESIGN BASIS FOR RESTRAINED JOINT LENGTH CALCULATIONS FOR OWNER REVIEW.



COMBINED HORIZONTAL OFFSET - **L2 (FEET)**

L2 = L1 MINUS Z

DIP	L1 (FEET)							
	DIAMETER							
	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
	45	90	116	140	163	162	195	189
	22.5	54*	56	67	78	78	94	91
	11.25	36*	36*	36*	54*	39	46	45

POLYWRAPPED DIP/PVC	L1 (FEET)							
	DIAMETER							
	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
	45	112	144	173	201	200	241	233
	22.5	54	69	83	97	96	116	112
	11.25	36*	36*	54*	54*	48	57	55

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

RESTRAINT LENGTH - HORIZONTAL OFFSET AND COMBINED HORIZONTAL OFFSET

NO SCALE

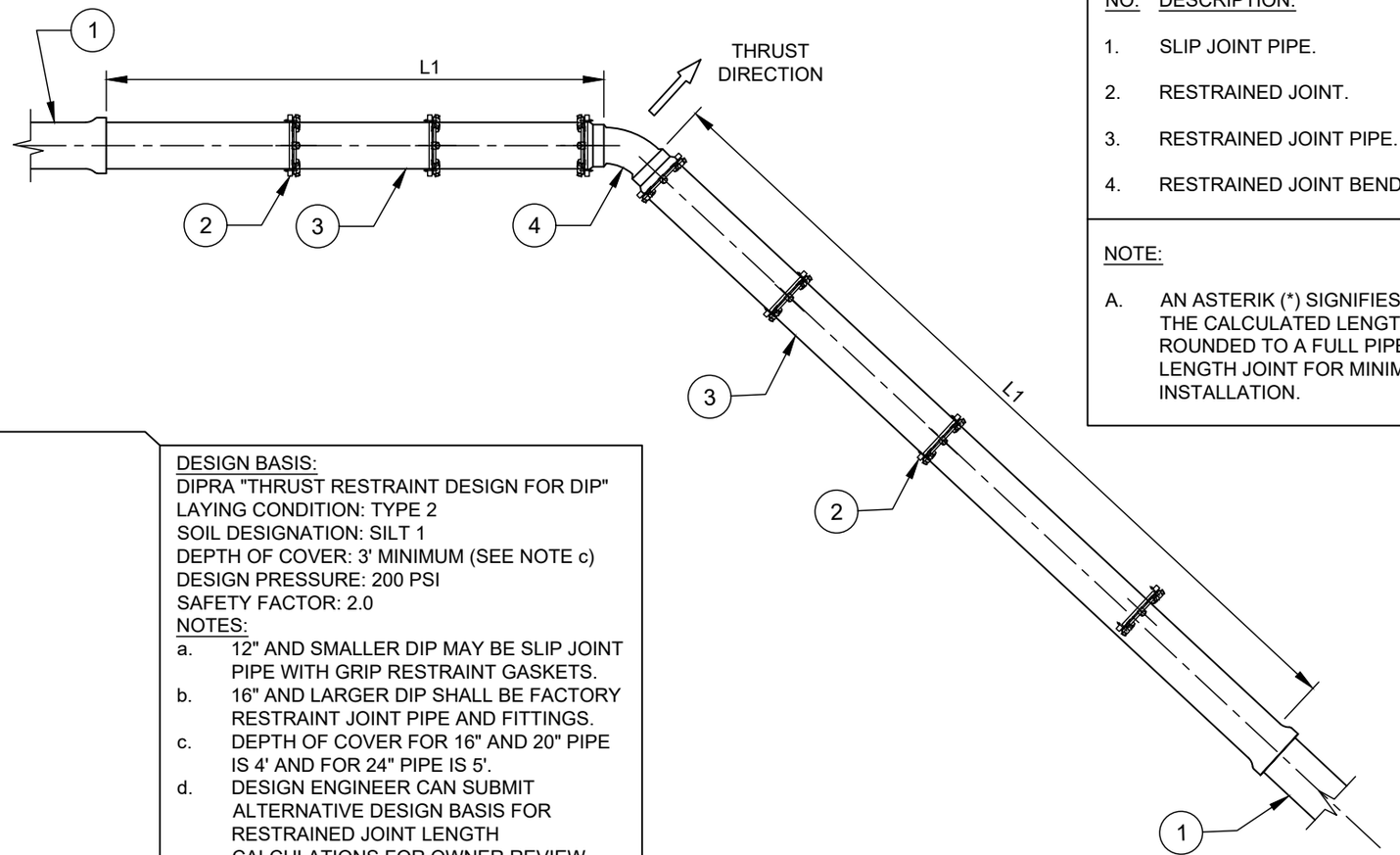
VERSION 1.0

DATE 04/2024

DETAIL 10.14.3

DIP	VERTICAL BEND DOWN (TOP BEND) - **L1 (FEET)**						
	DIAMETER						
BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
45	70	91	109	128	128	154	150
22.5	36*	54*	54*	61	61	74	72
11.25	18*	36*	36*	36*	36*	54*	36*

POLYWRAPPED DIP/PVC	VERTICAL BEND DOWN (TOP BEND) - **L1 (FEET)**						
	DIAMETER						
BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
45	100	129	156	183	182	221	214
22.5	54*	62	75	88	88	106	103
11.25	36*	36*	54*	54*	54*	54*	54*



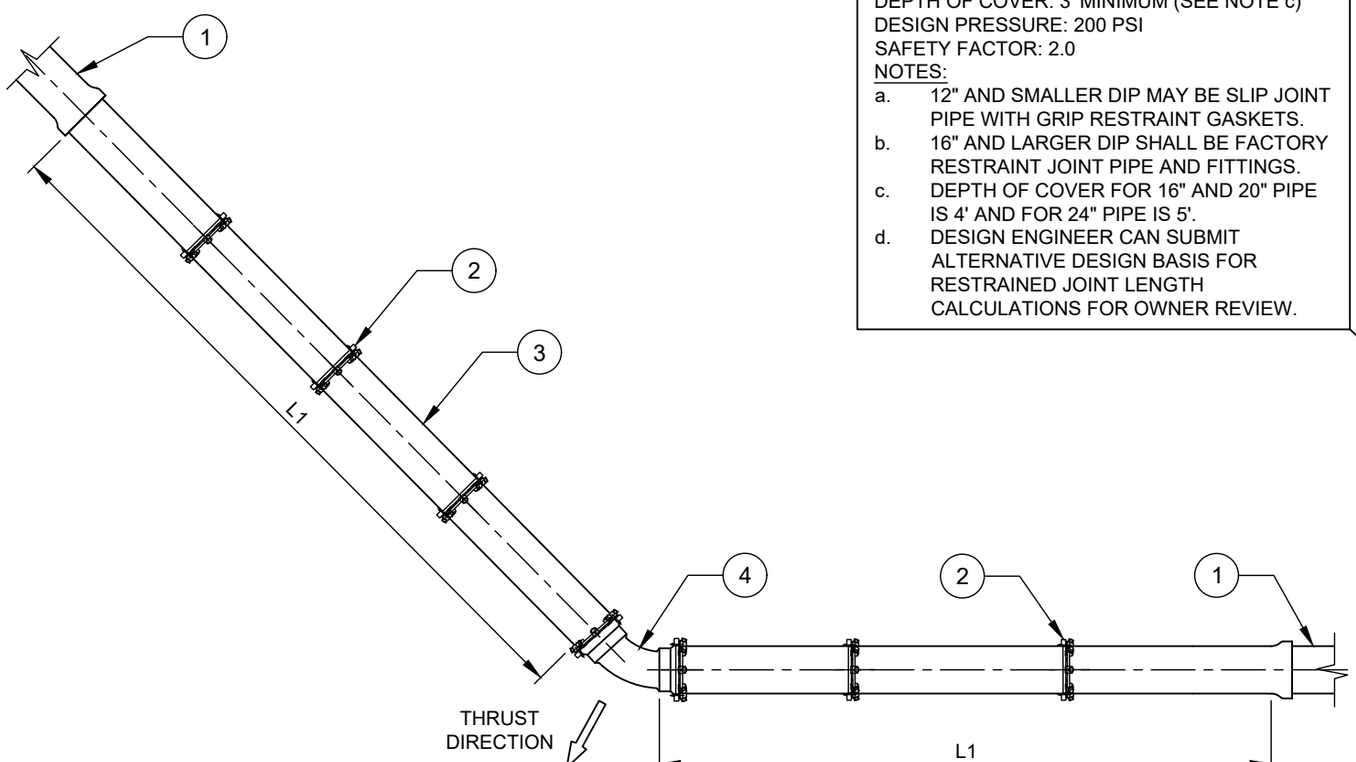
NO.	DESCRIPTION:
1.	SLIP JOINT PIPE.
2.	RESTRAINED JOINT.
3.	RESTRAINED JOINT PIPE.
4.	RESTRAINED JOINT BEND.

NOTE:

A. AN ASTERIK (*) SIGNIFIES THAT THE CALCULATED LENGTH WAS ROUNDED TO A FULL PIPE LENGTH JOINT FOR MINIMUM INSTALLATION.

DESIGN BASIS:
DIPRA "THRUST RESTRAINT DESIGN FOR DIP"
LAYING CONDITION: TYPE 2
SOIL DESIGNATION: SILT 1
DEPTH OF COVER: 3' MINIMUM (SEE NOTE c)
DESIGN PRESSURE: 200 PSI
SAFETY FACTOR: 2.0
NOTES:

a. 12" AND SMALLER DIP MAY BE SLIP JOINT PIPE WITH GRIP RESTRAINT GASKETS.
b. 16" AND LARGER DIP SHALL BE FACTORY RESTRAINT JOINT PIPE AND FITTINGS.
c. DEPTH OF COVER FOR 16" AND 20" PIPE IS 4' AND FOR 24" PIPE IS 5'.
d. DESIGN ENGINEER CAN SUBMIT ALTERNATIVE DESIGN BASIS FOR RESTRAINED JOINT LENGTH CALCULATIONS FOR OWNER REVIEW.



DIP	VERTICAL BEND UP (BOTTOM BEND) - **L1 (FEET)**							
	DIAMETER							
BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
45	54*	58	70	81	81	98	94
22.5	36*	36*	36*	54*	54*	54*	54*
11.25	18*	18*	18*	36*	36*	36*	36*

POLYWRAPPED DIP/PVC	VERTICAL BEND UP (BOTTOM BEND) - **L1 (FEET)**							
	DIAMETER							
BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
45	56	72	86	101	100	120	116
22.5	36*	36*	54*	54*	54*	58	56
11.25	18*	18*	36*	36*	36*	36*	36*

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

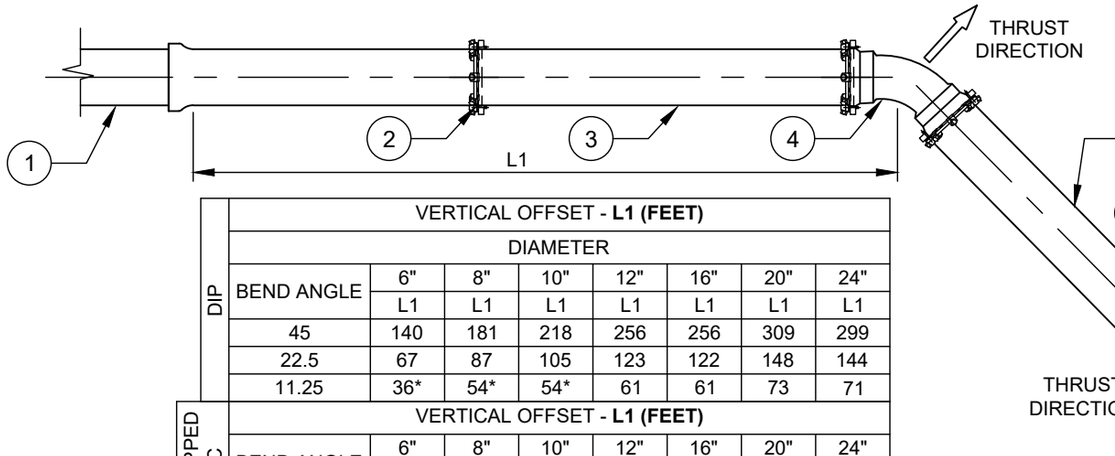
RESTRAINT LENGTH - VERTICAL BEND DOWN AND VERTICAL BEND UP

NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.14.4



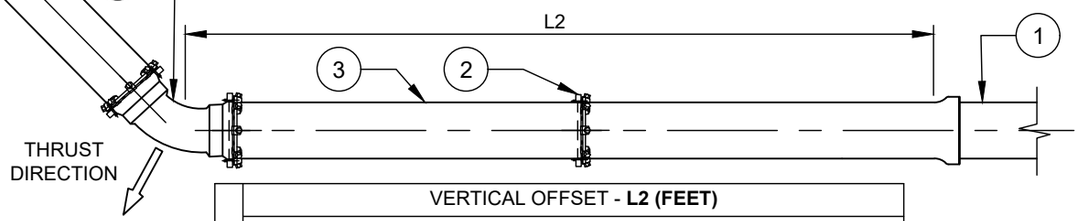
		VERTICAL OFFSET - **L1 (FEET)**						
		DIAMETER						
DIP	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
		L1	L1	L1	L1	L1	L1	L1
	45	140	181	218	256	256	309	299
	22.5	67	87	105	123	122	148	144
	11.25	36*	54*	54*	61	61	73	71

		VERTICAL OFFSET - **L1 (FEET)**						
POLYWRAPPED DIP/PVC	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
		L1	L1	L1	L1	L1	L1	L1
	45	200	259	312	365	364	441	427
	22.5	96	124	150	175	175	212	205
	11.25	54*	62	74	87	87	105	102

NOTE:

A. AN ASTERIK (*) SIGNIFIES THAT THE CALCULATED LENGTH WAS ROUNDED TO A FULL PIPE LENGTH JOINT FOR MINIMUM INSTALLATION.

NO.	DESCRIPTION:
1.	SLIP JOINT PIPE.
2.	RESTRAINED JOINT.
3.	RESTRAINED JOINT PIPE.
4.	RESTRAINED JOINT BEND.



		VERTICAL OFFSET - **L2 (FEET)**						
		DIAMETER						
DIP	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
		L2	L2	L2	L2	L2	L2	L2
	45	90	116	139	163	162	195	189
	22.5	54*	56	67	78	78	94	91
	11.25	36*	36*	36*	54*	54*	54*	54

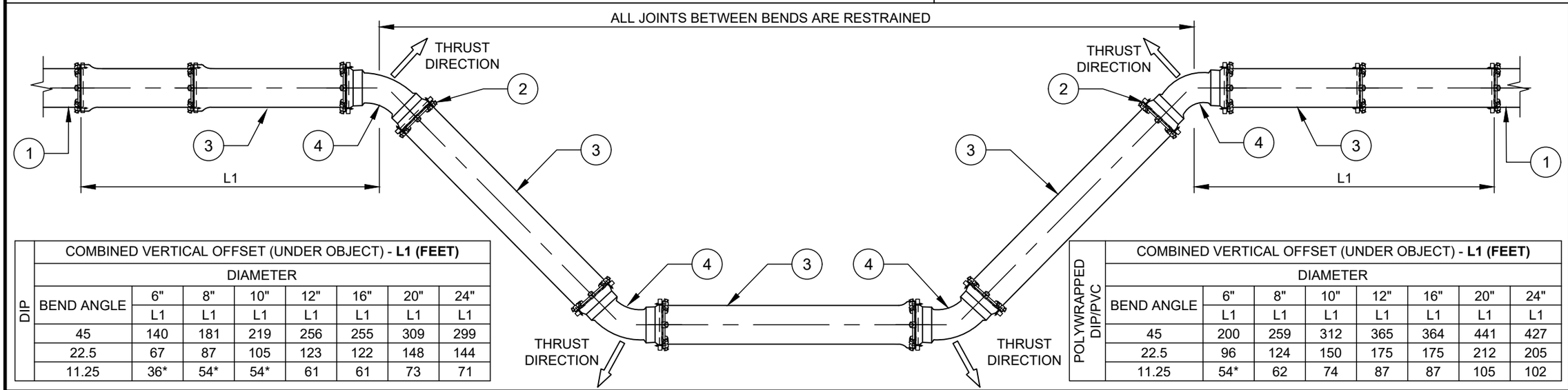
		VERTICAL OFFSET - **L2 (FEET)**						
POLYWRAPPED DIP/PVC	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
		L2	L2	L2	L2	L2	L2	L2
	45	112	144	173	201	200	241	233
	22.5	54*	69	83	97	96	116	112
	11.25	36*	36*	54*	54*	54*	57	55

DESIGN BASIS:

DIPRA "THRUST RESTRAINT DESIGN FOR DIP"
LAYING CONDITION: TYPE 2
SOIL DESIGNATION: SILT 1
DEPTH OF COVER: 3' MINIMUM (SEE NOTE c)
DESIGN PRESSURE: 200 PSI
SAFETY FACTOR: 2.0

NOTES:

a. 12" AND SMALLER DIP MAY BE SLIP JOINT PIPE WITH GRIP RESTRAINT GASKETS.
b. 16" AND LARGER DIP SHALL BE FACTORY RESTRAINT JOINT PIPE AND FITTINGS.
c. DEPTH OF COVER FOR 16" AND 20" PIPE IS 4' AND FOR 24" PIPE IS 5'.
d. DESIGN ENGINEER CAN SUBMIT ALTERNATIVE DESIGN BASIS FOR RESTRAINED JOINT LENGTH CALCULATIONS FOR OWNER REVIEW.



		COMBINED VERTICAL OFFSET (UNDER OBJECT) - **L1 (FEET)**						
		DIAMETER						
DIP	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
		L1	L1	L1	L1	L1	L1	L1
	45	140	181	219	256	255	309	299
	22.5	67	87	105	123	122	148	144
	11.25	36*	54*	54*	61	61	73	71

		COMBINED VERTICAL OFFSET (UNDER OBJECT) - **L1 (FEET)**						
		DIAMETER						
POLYWRAPPED DIP/PVC	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
		L1	L1	L1	L1	L1	L1	L1
	45	200	259	312	365	364	441	427
	22.5	96	124	150	175	175	212	205
	11.25	54*	62	74	87	87	105	102

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

RESTRAINT LENGTH - VERTICAL OFFSET AND COMBINED VERTICAL OFFSET (UNDER OBJECT)

NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.14.5

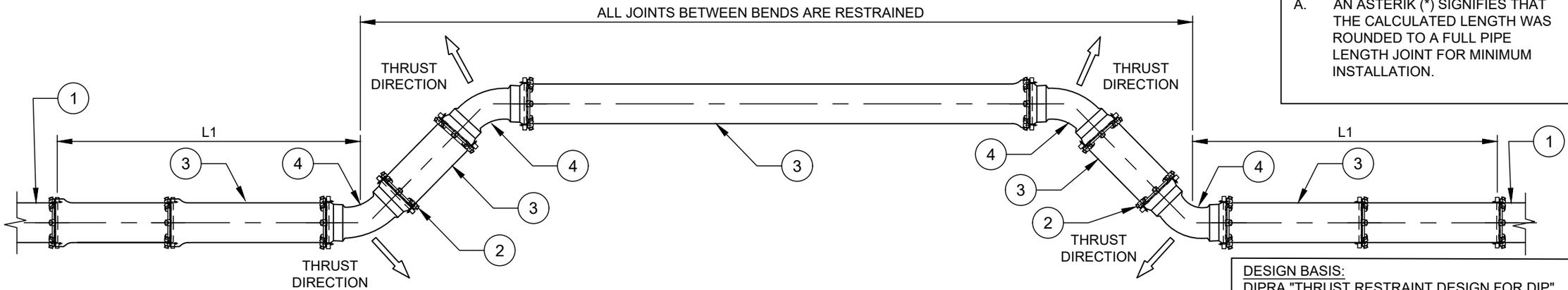
DIP	COMBINED VERTICAL OFFSET (OVER OBJECT) - **L1 (FEET)**							
	DIAMETER							
	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
		L1	L1	L1	L1	L1	L1	L1
	45	90	116	140	163	162	195	189
	22.5	54*	56	67	78	78	94	91
	11.25	36*	36*	36*	54*	54*	54*	54*

POLYWRAPPED DIP/PVC	COMBINED VERTICAL OFFSET (OVER OBJECT) - **L1 (FEET)**						
	DIAMETER						
BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
	L1	L1	L1	L1	L1	L1	L1
45	112	144	173	201	200	241	233
22.5	54*	69	83	97	96	116	112
11.25	36*	36*	54*	54*	48	57	55

NO.	DESCRIPTION:
1.	SLIP JOINT PIPE.
2.	RESTRAINED JOINT.
3.	RESTRAINED JOINT PIPE.
4.	RESTRAINED JOINT BEND.

NOTE:

A. AN ASTERIK (*) SIGNIFIES THAT THE CALCULATED LENGTH WAS ROUNDED TO A FULL PIPE LENGTH JOINT FOR MINIMUM INSTALLATION.

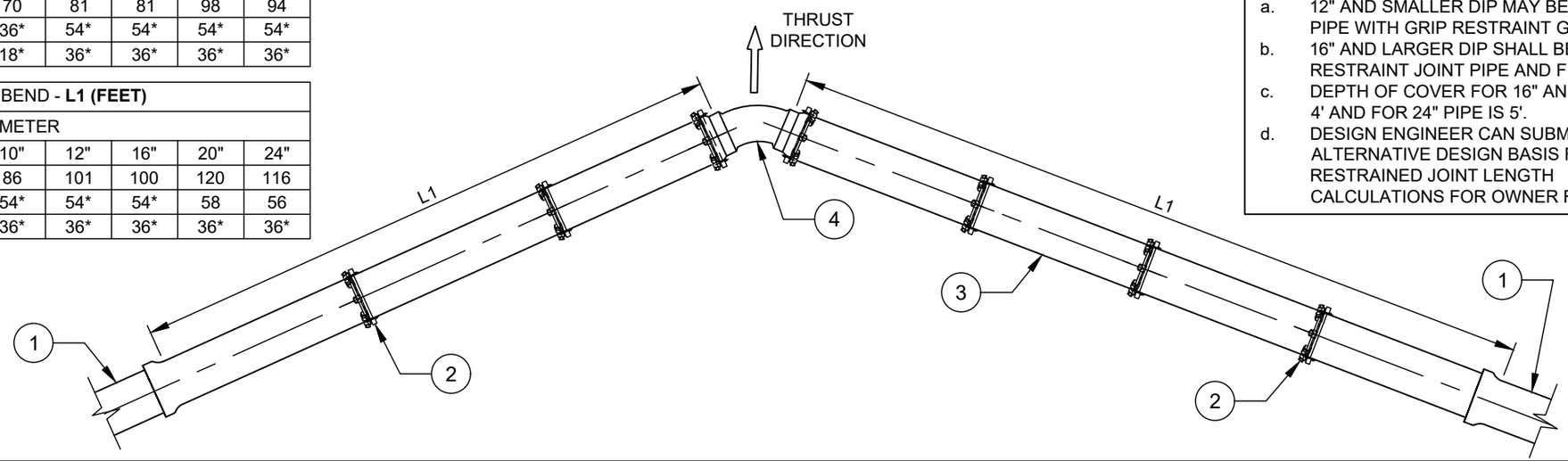


DESIGN BASIS:
DIPRA "THRUST RESTRAINT DESIGN FOR DIP"
LAYING CONDITION: TYPE 2
SOIL DESIGNATION: SILT 1
DEPTH OF COVER: 3' MINIMUM (SEE NOTE c)
DESIGN PRESSURE: 200 PSI
SAFETY FACTOR: 2.0
NOTES:

a. 12" AND SMALLER DIP MAY BE SLIP JOINT PIPE WITH GRIP RESTRAINT GASKETS.
b. 16" AND LARGER DIP SHALL BE FACTORY RESTRAINT JOINT PIPE AND FITTINGS.
c. DEPTH OF COVER FOR 16" AND 20" PIPE IS 4' AND FOR 24" PIPE IS 5'.
d. DESIGN ENGINEER CAN SUBMIT ALTERNATIVE DESIGN BASIS FOR RESTRAINED JOINT LENGTH CALCULATIONS FOR OWNER REVIEW.

DIP	HORIZONTAL BEND - **L1 (FEET)**							
	DIAMETER							
	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
	45	54*	58	70	81	81	98	94
	22.5	36*	36*	36*	54*	54*	54*	54*
	11.25	18*	18*	18*	36*	36*	36*	36*

POLYWRAPPED DIP/PVC	HORIZONTAL BEND - **L1 (FEET)**							
	DIAMETER							
	BEND ANGLE	6"	8"	10"	12"	16"	20"	24"
	45	56	72	86	101	100	120	116
	22.5	36*	36*	54*	54*	54*	58	56
	11.25	18*	18*	36*	36*	36*	36*	36*



CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

RESTRAINT LENGTH - COMBINED VERTICAL OFFSET (OVER OBJECT) AND HORIZONTAL BEND

NO SCALE

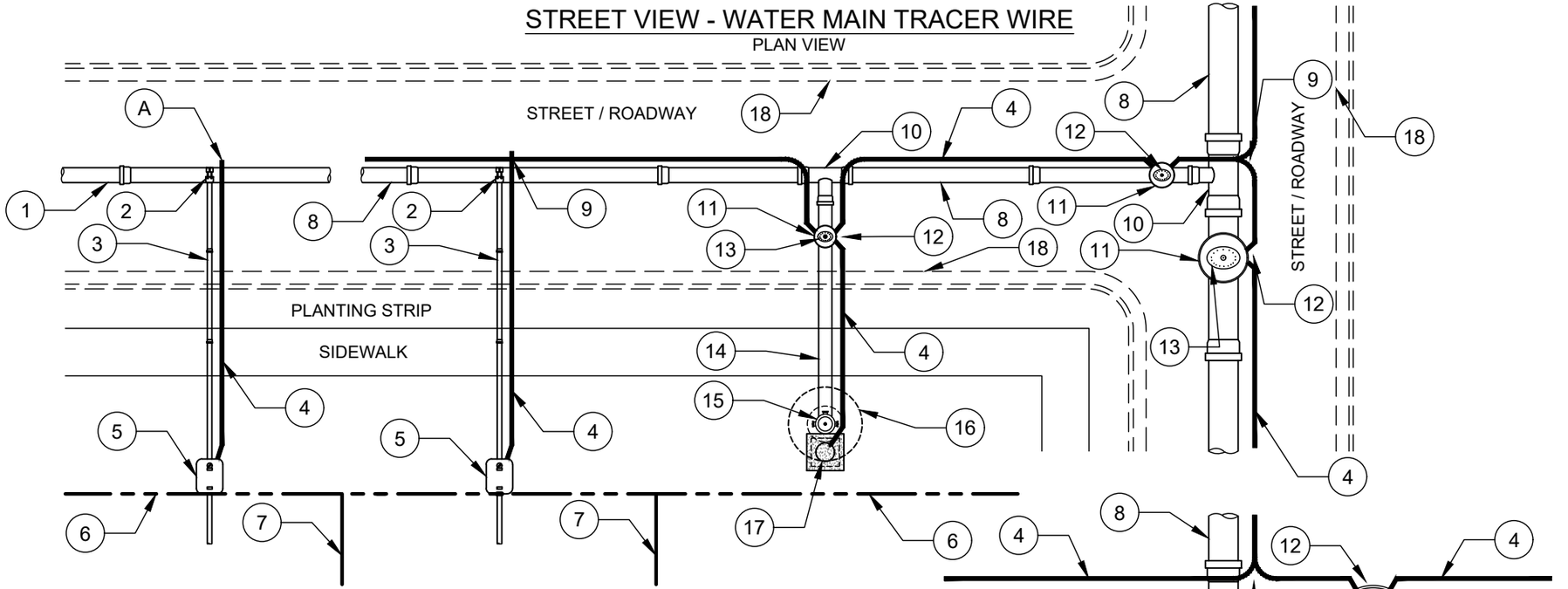
VERSION 1.0

DATE 04/2024

DETAIL 10.14.6

STREET VIEW - WATER MAIN TRACER WIRE

PLAN VIEW

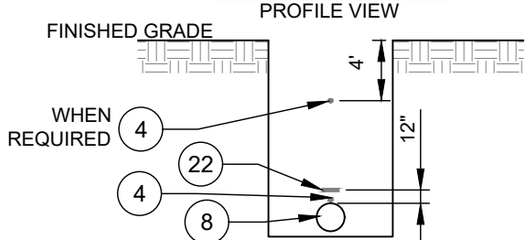


TRACER WIRE FOR WATER MAIN DEEPER THAN 15'

SECTION VIEW

TRENCH DETAIL

PROFILE VIEW



NO.	DESCRIPTION:
1.	EXISTING WATER MAIN LINE WITHOUT TRACER WIRE.
2.	SERVICE SADDLE.
3.	WATER SERVICE LINE.
4.	AWG #12 GAUGE SOLID COPPER TRACER WIRE (TYP.).
5.	METER BOX & LID (SEE CLTW STD. DETAIL).
6.	R/W / EASEMENT LINE.
7.	PROPERTY LINE.
8.	NEW WATER MAIN.
9.	SPLICE (SEE CLTW STD. DETAIL).
10.	TEE.
11.	VALVE BOX ASSEMBLY (SEE CLTW STD. DETAIL).
12.	NO SPLICE.
13.	GATE VALVE.
14.	FIRE HYDRANT BRANCH.
15.	FIRE HYDRANT.
16.	CONCRETE HYDRANT COLLAR. CAST-IN-PLACE. 3' DIAMETER BY 8" THICK. REINFORCE WITH #4 REBARS.
17.	VALVE BOX ASSEMBLY IN SLAB (SEE CLTW STD. DETAIL).
18.	CURB.
19.	WATER TRANSMISSION MAIN LINE.
20.	BUTTERFLY VALVE.
21.	BEND.
22.	6" WIDE WARNING TAPE.

NOTES:

A. FOR NEW SERVICE ON EXISTING MAIN WHERE NO TRACER WIRE IS LOCATED ON WATER MAIN, PLACE TRACER WIRE END AT BOTTOM EDGE OF TRENCH AWAY FROM MAIN AND SERVICE.

B. WATER MAIN LESS THAN 15' DEPTH OF COVER - TRACING WIRE SHALL BE ATTACHED TO PIPE.

C. WATER MAIN GREATER THAN 15' DEPTH OF COVER - TRACER WIRE SHALL BE ATTACHED TO PIPE AND PLACED AT A DEPTH OF 4' BELOW FINISH GRADE.

D. TRACER WIRE SHOWN AWAY FROM PIPE FOR CLARITY. TRACER WIRE SHALL BE INSTALLED IMMEDIATELY ADJACENT TO THE WATER PIPE. TRACER WIRE SHALL BE FASTENED TO THE PIPE WITH ZIP TIES OR DUCT TAPE AT 10' INTERVALS.

E. TRACER WIRE PLACEMENT NEXT TO PIPE FOR PIPE MATERIALS OTHER THAN HDPE. TRACER WIRE PLACEMENT IN RELATION TO HDPE PIPE IS UNDER PIPE IN CASE OF WEATHER.

F. TRACER WIRE SHALL BE SOLID COPPER #12 WITH 30 MILS BLUE HDPE INSULATION.

G. SPLICED CONNECTIONS SHALL BE ALLOWED BETWEEN THE MAIN LINE TRACER WIRE AND THE SERVICE TRACER WIRE.

H. TRACER WIRE SHALL BE PROTECTED FROM DAMAGE DURING THE EXECUTION OF THE WORK. NO BREAKS OR CUTS IN THE TRACER WIRE OR INSULATION SHALL BE PERMITTED.

I. PRIOR TO ACCEPTANCE (POST PUNCH LIST) EACH WIRE SEGMENT SHALL PASS A CONDUCTIVITY TEST, WITNESSED BY THE ENGINEER OR ENGINEER'S REPRESENTATIVE.

J. FOR INSTALLING A NEW SERVICE LINE ON AN EXISTING OR NEW MAIN WITH TRACER WIRE, INCLUDE 2' OF SLACK IN NEW TRACER WIRE AT THE SPLICE. THE METER BOX SHALL SERVE AS THE TEST PORT.

K. MAXIMUM DISTANCE BETWEEN TEST PORTS SHALL BE 750 LINEAR FEET.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

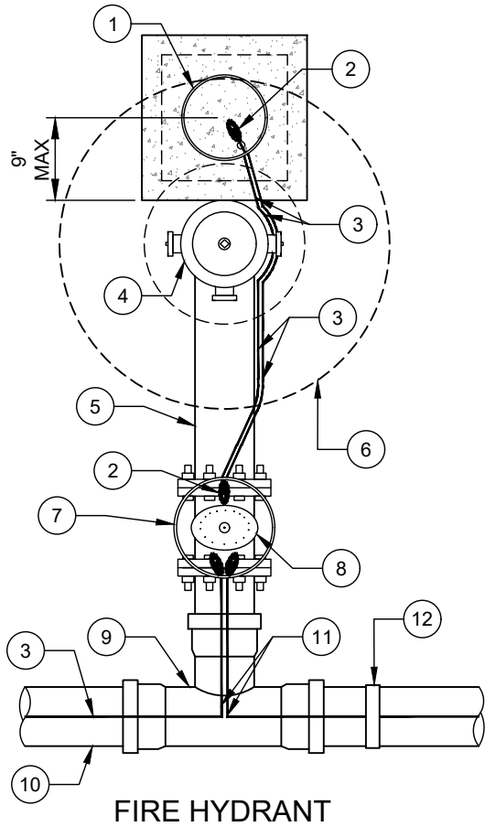
TRACER WIRE - WATER MAIN

NO SCALE

VERSION 1.0

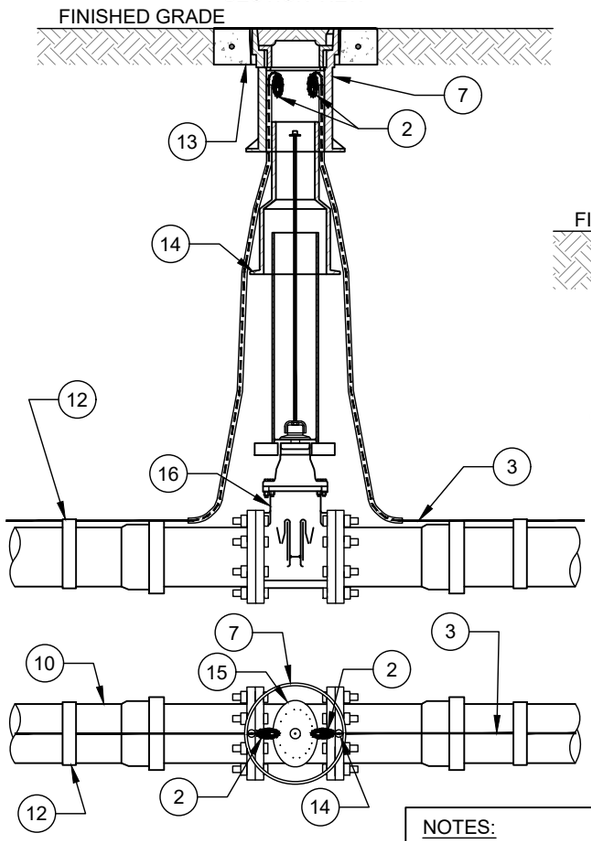
DATE 04/2024

DETAIL 10.5.1

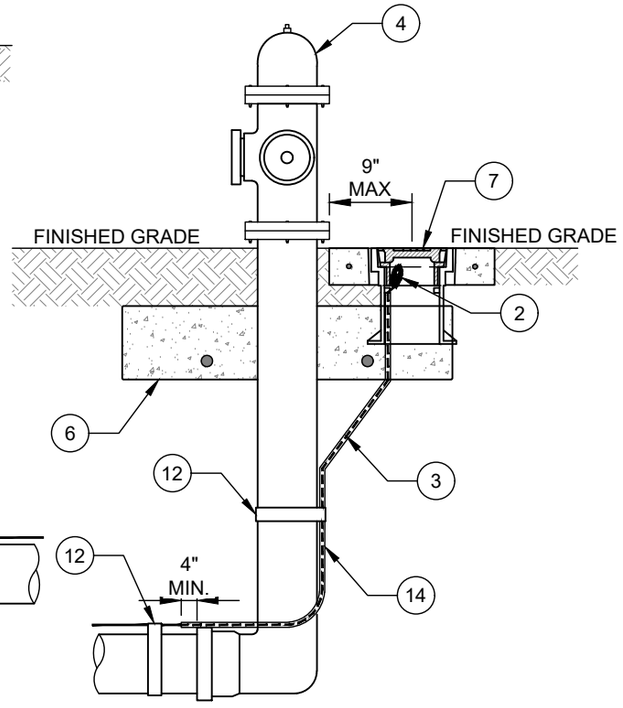


FIRE HYDRANT
PLAN VIEW

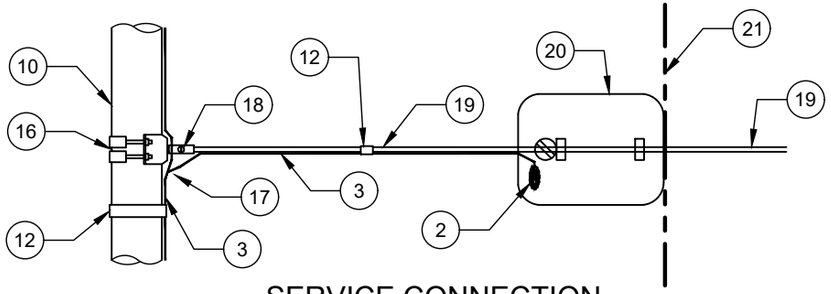
MAIN LINE VALVE
SECTION VIEW



MAIN LINE VALVE
PLAN VIEW



FIRE HYDRANT
SECTION VIEW



SERVICE CONNECTION
PLAN VIEW

NO.	DESCRIPTION:
1.	VALVE BOX ASSEMBLY IN CONCRETE PAD (SEE CLTW STD. DETAIL).
2.	PROVIDE 24" NEATLY COILED WIRE IN BOX.
3.	AWG #12 GAUGE SOLID COPPER TRACER WIRE (TYP.) WITH 30 MILS BLUE HDPE INSULATION.
4.	FIRE HYDRANT.
5.	FIRE HYDRANT BRANCH.
6.	CONCRETE HYDRANT COLLAR. CAST IN PLACE. 3' DIAMETER BY 8" THICK. REINFORCED WITH #4 REBAR.
7.	VALVE BOX ASSEMBLY (SEE CLTW STD. DETAIL).
8.	GATE VALVE.
9.	TEE.
10.	WATER MAIN.
11.	NO SPLICE (RUN TWO WIRES SEPARATELY).
12.	FASTEN TRACER WIRE TO PIPE WITH ZIP TIES OR DUCT TAPE AROUND THE CIRCUMFERENCE OF PIPE AT 10' INTERVALS (TYP.).
13.	CONCRETE PAD (SEE CLTW STD. DETAIL).
14.	ALL VERTICAL WIRE SHALL BE PLACED IN 1/4" OR 3/8" ID CONDUIT SDR 9 PEX TUBING - ASTM F876 (TYP.).
15.	MAIN LINE VALVE.
16.	SERVICE SADDLE.
17.	SPLICE (SEE CLTW STD. DETAIL).
18.	BALL VALVE CORPORATION STOP.
19.	WATER SERVICE.
20.	METER BOX AND LID (SEE CLTW STD. DETAIL).
21.	R/W / PROPERTY LINE.

NOTES:

A. TRACER WIRE SHALL BE AWG #12 GUAGE SOLID COPPER WITH 30 MILS BLUE HDPE INSULATION.

B. THE TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. WHERE SPLICES ARE NECESSITATED IN THE WIRE, THE SPLICES SHALL BE SECURLEY BONDED TOGETHER WITH AN APPROVED INDUSTRIAL CONNECTOR TO PROVIDE ELECTRICAL CONTINUITY. CONNECTOR SHALL BE COPPER AND INSULATION SHALL BE REPAIRED AS DETAILED TO SEAL OUT MOISTURE AND CORROSION AND SHALL BE INSTALLED SO AS TO PREVENT ANY UNINSULATED WIRE EXPOSURE. SEE APPROPRIATE STD. DETAIL.

C. SPLICED CONNECTIONS SHALL BE ALLOWED BETWEEN THE MAIN TRACER WIRE AND THE WATER SERVICE TRACER WIRE.

D. TRACER WIRE SHALL BE PROTECTED FROM DAMAGE DURING THE EXECUTION OF THE WORK. NO BREAKS OR CUTS IN THE TRACER WIRE OR INSULATION SHALL BE PERMITTED.

E. PRIOR TO ACCEPTANCE (POST PUNCH LIST) EACH WIRE SEGMENT SHALL PASS A CONDUCTIVITY TEST, WITNESSED BY THE ENGINEER OR ENGINEER'S REPRESENTITIVE.

F. WHERE 2 OR MORE WIRES ENTER A VALVE BOX ASSEMBLY, (PROVIDE 24" OF NEATLY COILED WIRE) AFTER ACCEPTANCE TESTING, CONNECT ENDS OF ALL WIRES WITH WATER PROOF WIRE CONNECTOR NUT AND 3" BARE #12 PIGTAIL.

G. SPLICES IN THE PRIMARY TRACER WIRE ALONG THE WATER MAIN SHALL INCLUDE 2' OF SLACK WIRE ON EACH SIDE OF EACH SPLICE.

H. FOR INSTALLING A NEW SERVICE LINE ON AN EXISTING MAIN WITH TRACER WIRE, ONLY SPLICE TO EXISTING WIRE WITH 2' OF SLACK ON NEW SERVICE LINE.

I. TRACER WIRE PLACEMENT NEXT TO PIPE FOR PIPE MATERIALS OTHER THAN HDPE. TRACER WIRE PLACEMENT IN RELATION TO HDPE PIPE IS UNDER PIPE IN CASE OF WEATHER.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

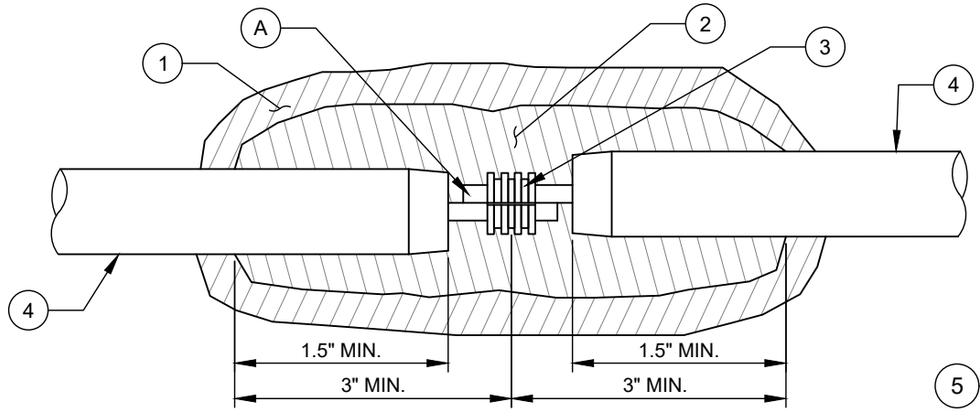
TRACER WIRE - WATER MAIN

NO SCALE

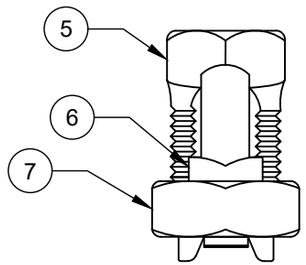
VERSION 1.0

DATE 04/2024

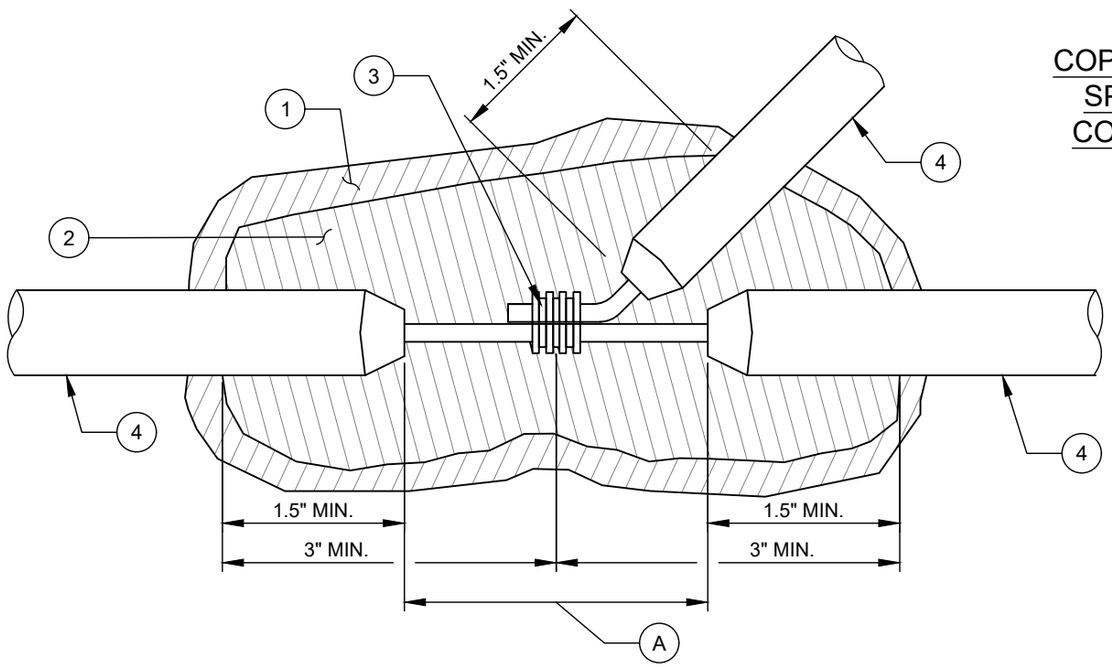
DETAIL 10.15.2



IN-LINE OR REPAIR SPLICE



COPPER ALLOY SPLIT BOLT CONNECTOR



BRANCH IN-LINE SPLICE FOR SERVICE/LATERAL, TEE, CROSS OR AIR RELEASE

NO.	DESCRIPTION:
1.	3-LAYERS OF HALF LAPPED VINYL TAPE.
2.	3-LAYERS OF HALF LAPPED RUBBER TAPE.
3.	COPPER CRIMP CONNECTOR OR COPPER ALLOY SPLIT BOLT CONNECTOR.
4.	SOLID COPPER WITH 30 MILS BLUE HDPE INSULATION (AWG #12 TRACER WIRE).
5.	SPLIT BOLT.
6.	PRESSURE BAR.
7.	HEX NUT.

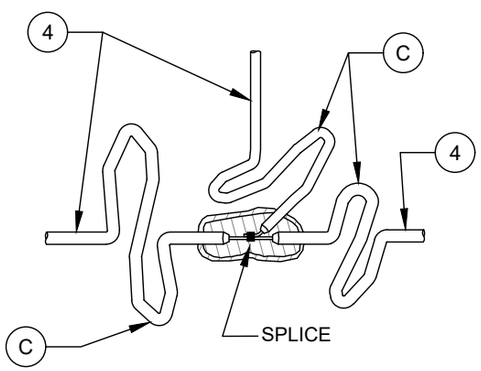
NOTES:

A. REMOVE MAINLINE TRACER WIRE INSULATION MATERIAL TO EXPOSE COPPER CORE WIRE.

B. IN LINE SPLICES SHALL BE LIMITED TO THE GREATEST EXTENT POSSIBLE. TRACER WIRE SHALL BE AS CONTINUOUS AS POSSIBLE WITHOUT SPLICES.

C. SPLICES SHALL INCLUDE 2' OF SLACK WIRE ON EACH SIDE OF EACH SPLICE (SEE DETAIL ON THIS SHEET).

D. TRACER WIRE PLACEMENT NEXT TO PIPE FOR PIPE MATERIALS OTHER THAN HDPE. TRACER WIRE PLACEMENT IN RELATION TO HDPE PIPE IS UNDER PIPE IN CASE OF WEATHER.



SPLICES WITH 2' OF SLACK WIRE

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

TRACER WIRE - WATER MAIN - SPLICE

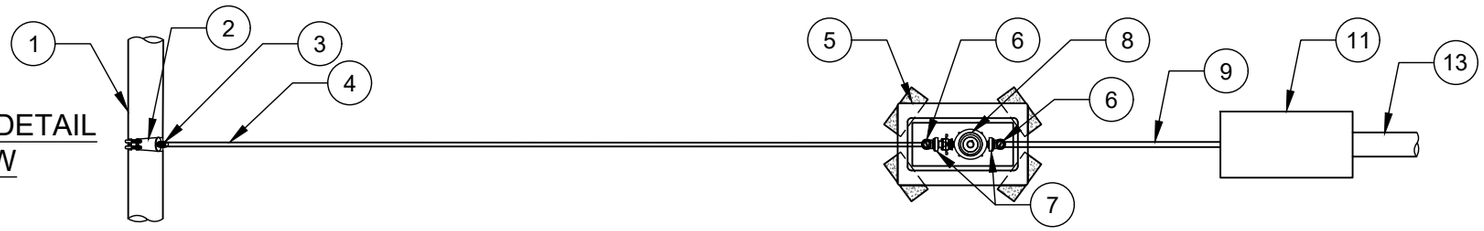
NO SCALE

VERSION 1.0

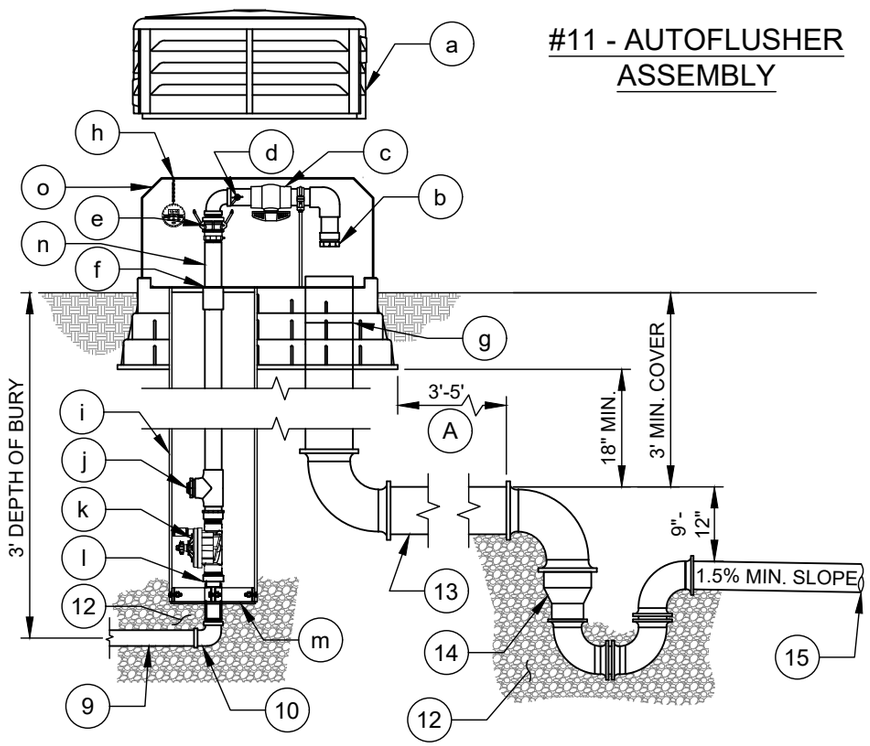
DATE 04/2024

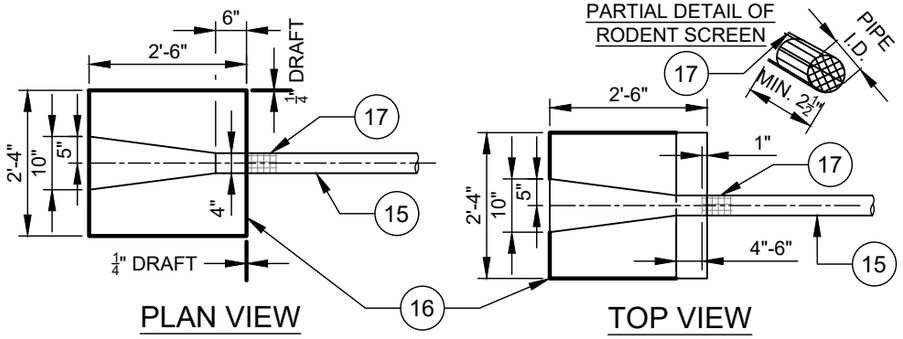
DETAIL 10.15.3

INSTALLATION DETAIL
PLAN VIEW



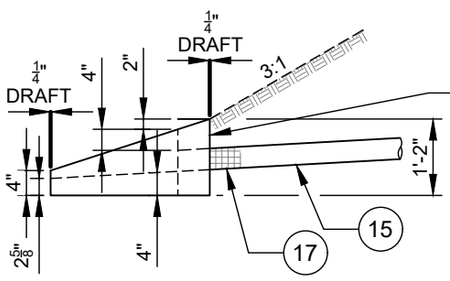
#11 - AUTOFLUSHER ASSEMBLY

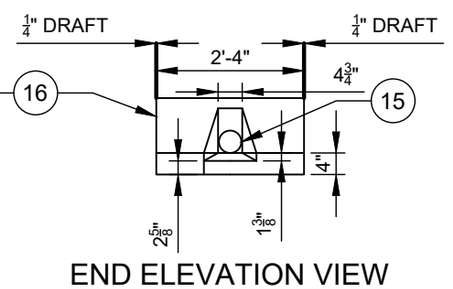




PLAN VIEW

TOP VIEW





ELEVATION VIEW

END ELEVATION VIEW

THE CONCRETE PAD CONSISTS OF 0.137 CUBIC YARDS - 3,600 PSI.

CONCRETE FLAIRED END FOR SHOULDER DRAIN

NOTES:

A. INSTALL TRAP 3'-5' DOWNSTREAM FROM EDGE OF UNIT WITH A 6" SERVICE LINE.
B. FLUSH WATER LINES FREE OF DEBRIS BEFORE INSTALLATION OF AUTO-FLUSHER.
C. DISCHARGE WATER FROM THE AUTO-FLUSHER UNIT MAY BE MANAGED IN ONE OF THREE WAYS:
   1. DISCHARGE INTO AN EXISTING SANITARY SEWER MAIN WITH A 4" SERVICE LINE.
   2. DISCHARGE INTO AN EXISTING STORM WATER MAIN. THIS CONNECTION MUST TAKE INTO ACCOUNT THE DOWNSTREAM IMPACTS OF THE CONNECTION, AND BE APPROVED BY CHARLOTTE OR MECKLENBURG COUNTY STORMWATER SERVICES AND/OR LOCAL MUNICIPAL STORMWATER REQUIREMENTS, IF APPLICABLE.
   3. SURFACE DISCHARGE THROUGH PIPING AND AN OUTLET STRUCTURE, PERMITTING OVERLAND FLOW TO A DITCH OR STREAM. DETAIL FOR THE OUTLET STRUCTURE IS SHOWN ON THIS SHEET.
D. BASED ON ACTUAL METER READINGS, ADJUST ANGLE BALL VALVE TO RESTRICT ACTUAL MAXIMUM FLOW TO 25 GPM.
E. TRACER WIRE INSTALLED PER CLTW TRACER WIRE DETAIL AS APPLICABLE.

NO.	DESCRIPTION:
1.	WATER MAIN.
2.	1" DOUBLE STRAP SERVICE SADDLE.
3.	1" BALL CORPORATION STOP - (CC THREAD X CTS COMPRESSION OUTLET).
4.	1" TYPE K COPPER TUBING OR SDR 9 HDPE (CTS) TUBING, W/ INSERT STIFFENERS.
5.	1" PLASTIC METER BOX W/PLASTIC LID (CONCRETE BOX REQUIRED IN HARDSCAPE) W/ 4 SUPPORT BRICKS.
6.	1" ANGLE BALL VALVE WITH LOCK WINGS - CTS COMPRESSION X YOKE STAR NUT.
7.	1" DUCTILE IRON YOKE BAR.
8.	1" WATER METER ASSEMBLY (BY CLTW) WITH ARM TRANSMITTER.
9.	1" TYPE K COPPER OR SDR 9 HDPE (CTS) TUBING, W/ INSERT STIFFENERS, 36" LAY LENGTH.
10.	1" BRASS 90° BEND - CTS COMPRESSION X FIPT.
11.	1" AUTOFLUSHER UNIT - MODEL 9800A AS MANUFACTURED BY KUPFERLE FOUNDRY COMPANY.
	a. UV RESISTANT LOCKABLE LID.
	b. DIFFUSER/TRAP.
	c. 1" PVC BALL VALVE.
	d. SAMPLING POINT.
	e. 1" STAINLESS STEEL QUICK DISCONNECT.
	f. REMOVABLE ACCESS PLATE.
	g. 6" SEWER PIPE CONNECTION.
	h. CONTROLLER. HANG FROM LID SUPPORT BRACKET.
	i. SDR 35 PVC PIPE.
	j. AUTOMATIC DRAIN.
	k. 1" AUTOMATIC VALVE.
	l. O-RING CONNECTOR.
	m. DEBRIS PLATE.
	n. 1" SCH 80 PVC PIPE.
	o. STEEL LID SUPPORT BRACKET.
12.	CLEAN #57 WASHED STONE.
13.	6" PVC SCH 80 PIPE.
14.	6" X 4" REDUCER - SCH 80 PVC.
15.	4" PVC SCH 80 DISCHARGE PIPING.
16.	PRECAST CONCRETE FLAIRED END SECTION.
17.	RODENT SCREEN. 2" X 2" TO 4" X 4" GALV. HARDWARE CLOTH 0.063 WIRE OR EQUAL INSTALLED 4" TO 6" INSIDE DRAIN PIPE.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

WATER QUALITY AUTOMATIC FLUSHER - 1-INCH AUTOFLUSHER - (MAX. FLOW RATE - 25 GPM)

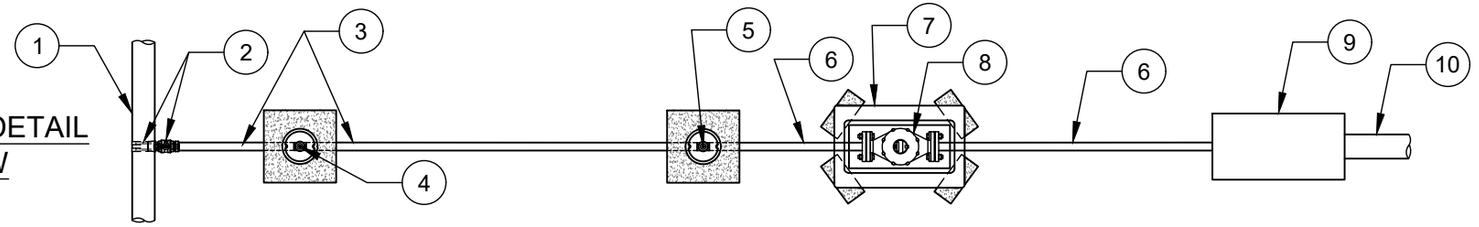
NO SCALE

VERSION 1.0

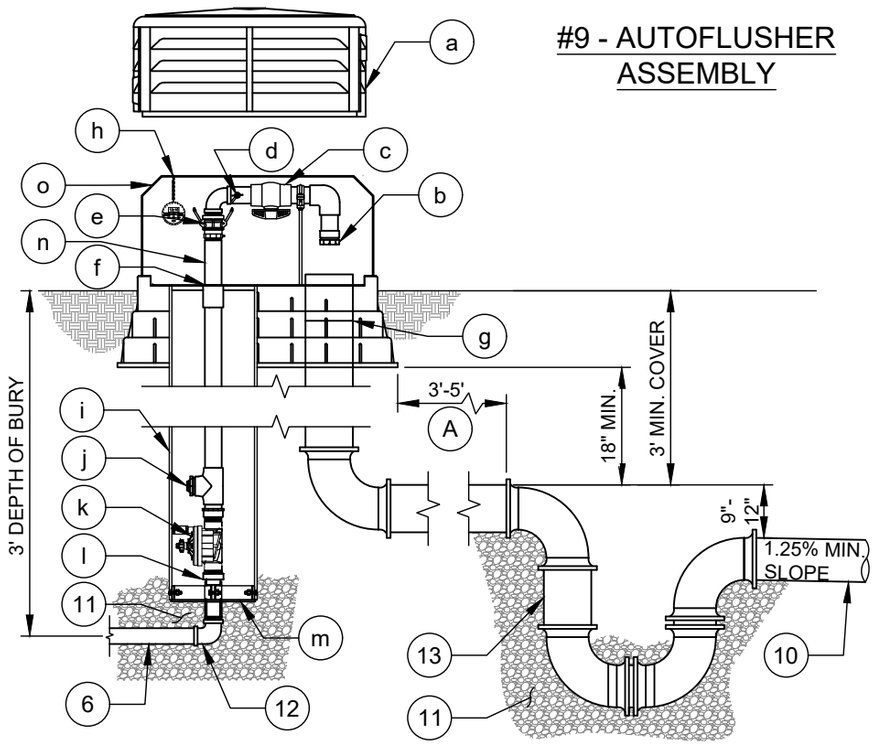
DATE 04/2024

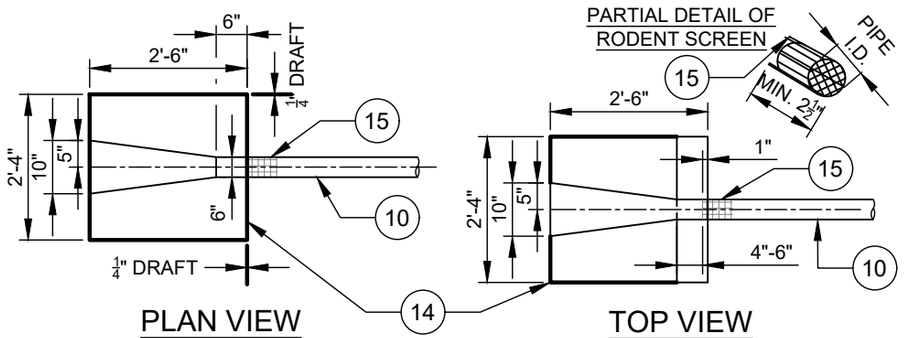
DETAIL 10.16.1

INSTALLATION DETAIL
PLAN VIEW



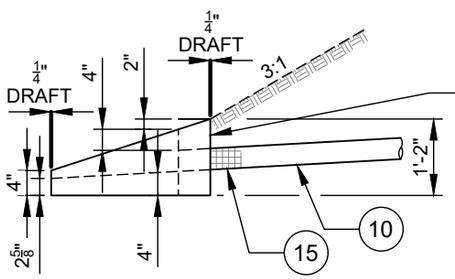
#9 - AUTOFLUSHER ASSEMBLY



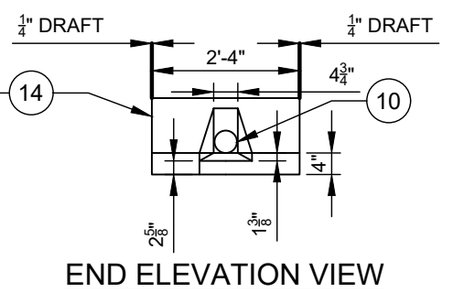


PLAN VIEW

TOP VIEW



ELEVATION VIEW



END ELEVATION VIEW

THE CONCRETE PAD CONSISTS OF 0.137 CUBIC YARDS - 3,600 PSI.

CONCRETE FLAIRED END FOR SHOULDER DRAIN

NOTES:

A. INSTALL TRAP 3'-5' DOWNSTREAM FROM EDGE OF UNIT WITH A 6" SERVICE LINE.
B. FLUSH WATER LINES FREE OF DEBRIS BEFORE INSTALLATION OF AUTO-FLUSHER.
C. DISCHARGE WATER FROM THE AUTO-FLUSHER UNIT MAY BE MANAGED IN ONE OF THREE WAYS:
   1. DISCHARGE INTO AN EXISTING SANITARY SEWER MAIN WITH A 6" SERVICE LINE.
   2. DISCHARGE INTO AN EXISTING STORM WATER MAIN. THIS CONNECTION MUST TAKE INTO ACCOUNT THE DOWNSTREAM IMPACTS OF THE CONNECTION, AND BE APPROVED BY CHARLOTTE OR MECKLENBURG COUNTY STORMWATER SERVICES AND/OR LOCAL MUNICIPAL STORMWATER REQUIREMENTS, IF APPLICABLE.
   3. SURFACE DISCHARGE THROUGH PIPING AND AN OUTLET STRUCTURE, PERMITTING OVERLAND FLOW TO A DITCH OR STREAM. DETAIL FOR THE OUTLET STRUCTURE IS SHOWN ON THIS SHEET.
D. BASED ON ACTUAL METER READINGS, ADJUST GATE VALVE TO RESTRICT ACTUAL MAXIMUM FLOW TO 80 GPM.
E. TRACER WIRE INSTALLED PER CLTW TRACER WIRE DETAIL AS APPLICABLE.

NO.	DESCRIPTION:
1.	WATER MAIN.
2.	2" DOUBLE STRAP SERVICE SADDLE W/CORPORATION STOP - (CC THREAD X CTS COMPRESSION OUTLET).
3.	2" TYPE K COPPER TUBING.
4.	2" GATE VALVE (FIPT X FIPT) W/ BRASS MIPT X CTS COMPRESSION ADAPTOR, EACH END, W/ STD VALVE BOX ASSEMBLY.
5.	2" GATE VALVE (FIPT X FIPT). WHEN REQUIRED BY CLTW, W/ BRASS MIPT X CTS COMPRESSION ADAPTOR-FRONT SIDE, W/ STD VALVE BOX ASSEMBLY.
6.	2" BRASS NIPPLE (MIPT X MIPT) 30" OR 36" LAY LENGTH.
7.	1" PLASTIC METER BOX W/PLASTIC LID (CONCRETE BOX REQUIRED IN HARDSCAPE) WITH 4 SUPPORT BRICKS.
8.	2" WATER METER (2-BOLT METER FLANGE X 2-BOLT METER FLANGE) (W/ BRASS 2-BOLT METER FLANGE X FIPT ADAPTOR, EACH END) (W/ S.S. TYPE 304 BOLTS/NUTS).
9.	2" AUTOFLUSHER UNIT - MODEL 9800 AS MANUFACTURED BY KUPFERLE FOUNDRY COMPANY.
	a. UV RESISTANT LOCKABLE LID.
	b. DIFFUSER/TRAP.
	c. 2" PVC BALL VALVE.
	d. SAMPLING POINT.
	e. 2" STAINLESS STEEL QUICK DISCONNECT.
	f. REMOVABLE ACCESS PLATE.
	g. 6" SEWER PIPE CONNECTION.
	h. CONTROLLER. HANG FROM LID SUPPORT BRACKET.
	i. SDR 35 PVC PIPE.
	j. AUTOMATIC DRAIN.
	k. 2" AUTOMATIC VALVE.
	l. O-RING CONNECTOR.
	m. DEBRIS PLATE.
	n. 2" SCH 80 PVC PIPE.
	o. STEEL LID SUPPORT BRACKET.
10.	6" PVC SCH 80 DISCHARGE PIPING.
11.	CLEAN #57 WASHED STONE.
12.	2" S.S. TYPE 304 OR 316 FIPT X FIPT 90° BEND.
13.	6" PVC SCH 80 PIPE & P TRAP.
14.	PRECAST CONCRETE FLAIRED END SECTION.
15.	RODENT SCREEN. 2" X 2" TO 4" X 4" GALV. HARDWARE CLOTH 0.063 WIRE OR EQUAL INSTALLED 4" TO 6" INSIDE DRAIN PIPE.

NO. ALTERNATE DESCRIPTION:

WHEN USING HDPE (IPS) POLY IN PLACE OF COPPER TUBING, USE THE FOLLOWING PRODUCTS:

2.	2" BALL CORPORATION STOP - (CC THREAD X FIPT OUTLET).
3.	2" SDR 9 (IPS) HDPE PIPE, WITH BUTT FUSED HDPE X S.S. THREADED ADAPTOR, EACH END.
4.	2" GATE VALVE (FIPT X FIPT), W/STD VALVE BOX ASSEMBLY.
5.	2" GATE VALVE (FIPT X FIPT), WHEN REQ'D BY CLTW, W/ STD VALVE BOX ASSEMBLY.
6.	2" SDR 9 (IPS) HDPE PIPE, WITH BUTT FUSED HDPE X S.S. THREADED ADAPTOR, EACH END, 30" OR 36" LAY LENGTH.

CHARLOTTE WATER

CHARLOTTE WATER
A CITY OF CHARLOTTE DEPARTMENT
STANDARD DETAILS
WATER

WATER QUALITY AUTOMATIC FLUSHER - 2-INCH AUTOFLUSHER - (MAX. FLOW RATE - 80 GPM)

NO SCALE

VERSION 1.0

DATE 04/2024

DETAIL 10.16.2