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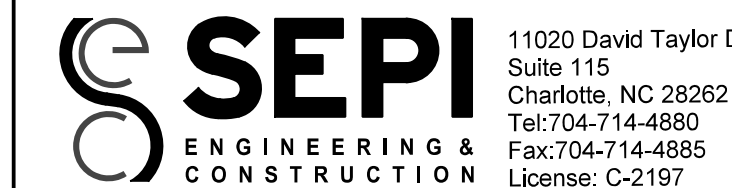
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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS



T.I.P. NO.	SHEET NO.
U-5008	UC-1



11020 David Taylor Dr.
Suite 115
Charlotte, NC 28262
Tel: 704-714-4880
Fax: 704-714-4885
License: C-2197

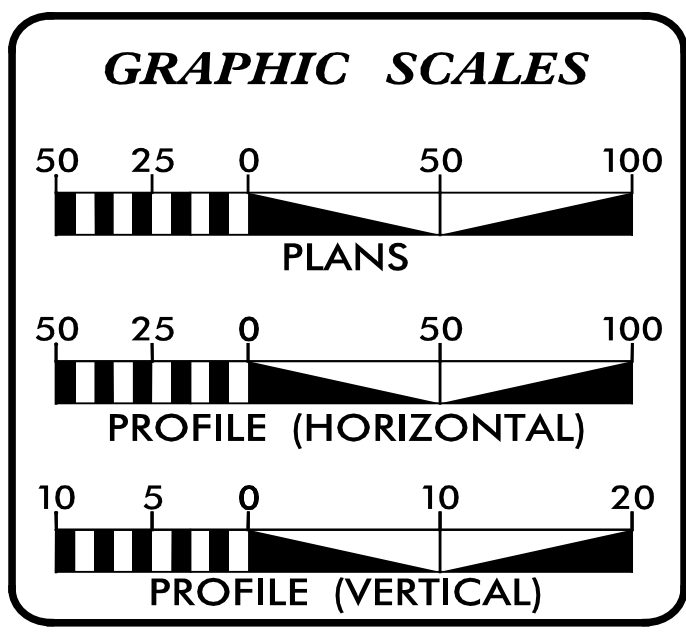
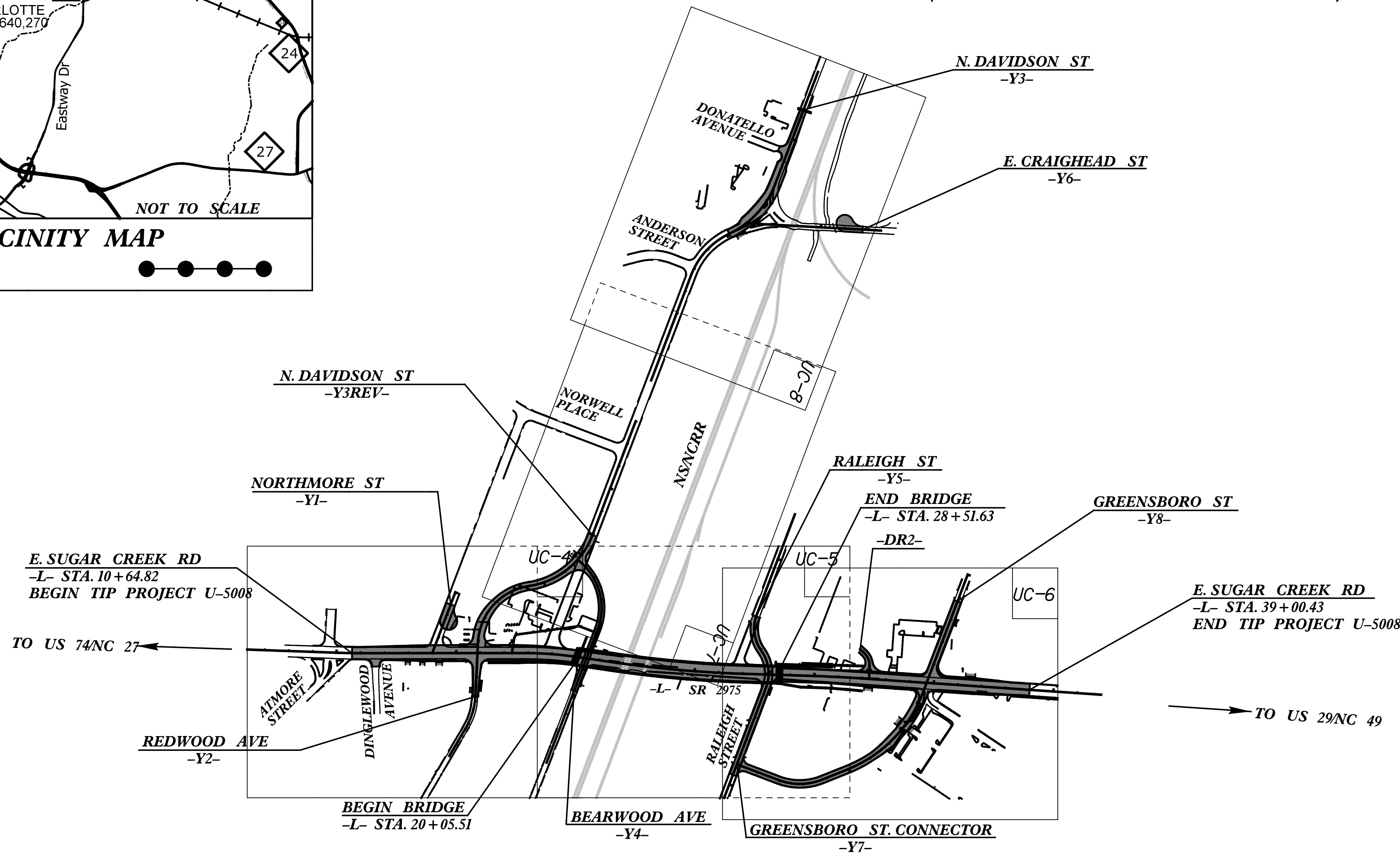
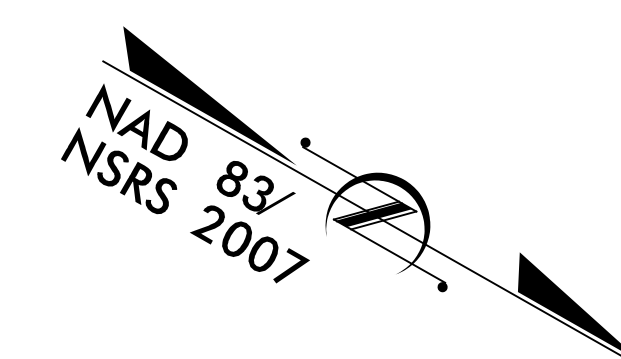
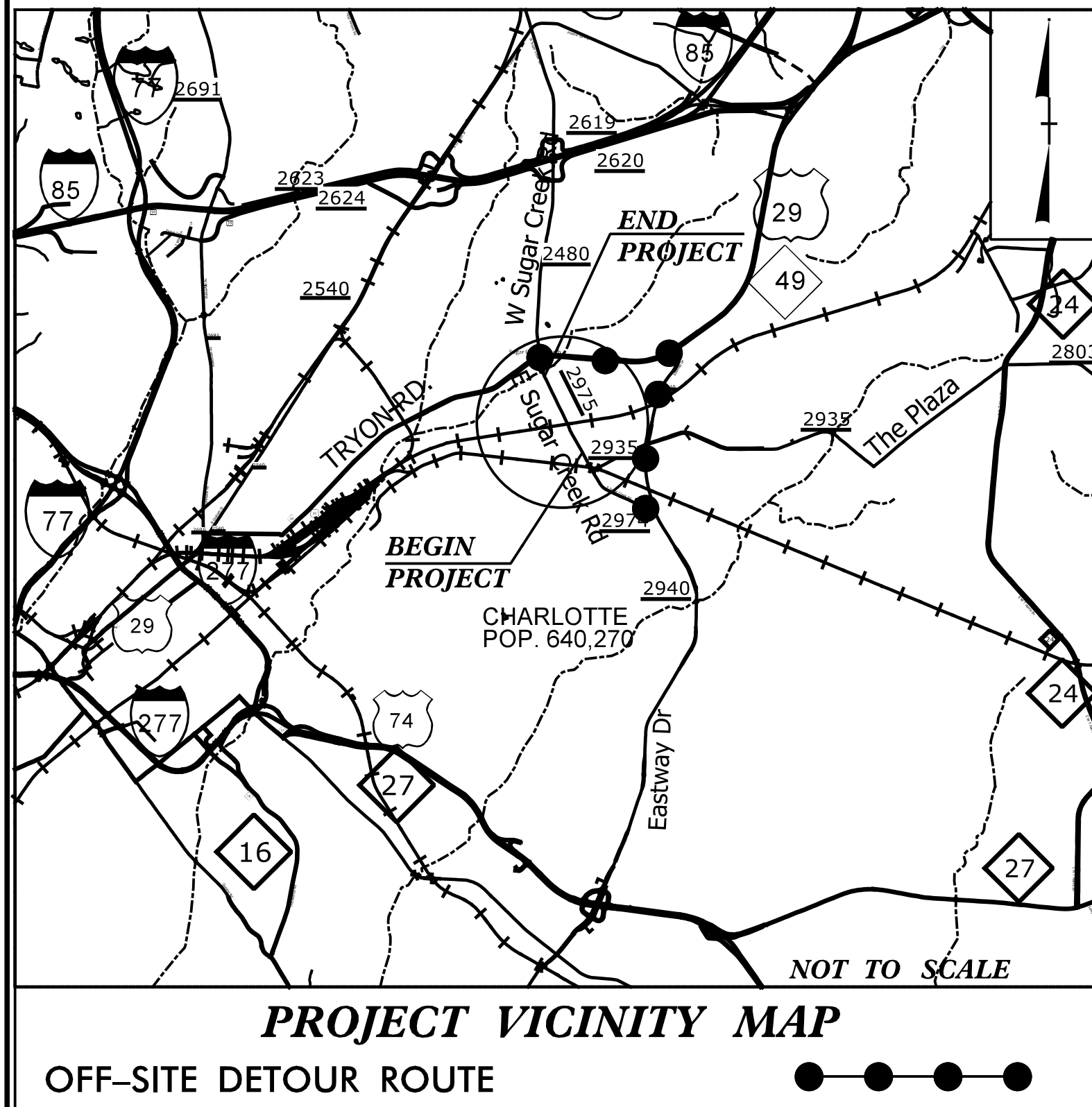
CLTWATER PROJECT NUMBER: 529-15-033 (WATER)
CLTWATER PROJECT NUMBER: 324-15-542 (SEWER)



UTILITY CONSTRUCTION PLANS
MECKLENBURG COUNTY

LOCATION: SR 2975 (EAST SUGAR CREEK ROAD) OVER NSNCRR
CROSSING NO. 715 352H-GRADE SEPARATION

TYPE OF WORK: UTILITY CONSTRUCTION (WATER & SANITARY SEWER)



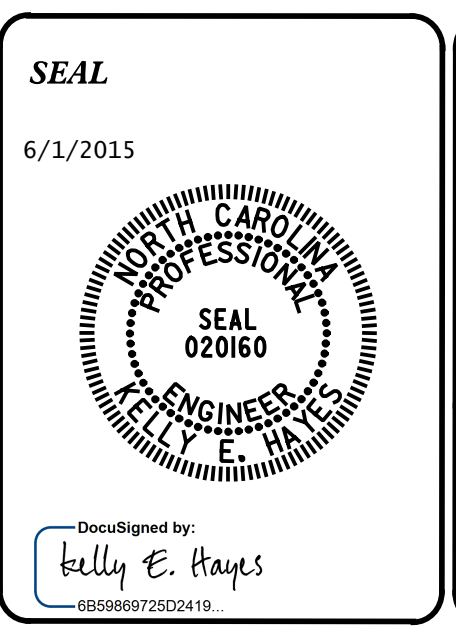
INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY SHEET
UC-3	PERMIT SHEET
UC-4 THRU UC-8	UTILITY CONSTRUCTION PLAN SHEETS
UC-9 THRU UC-13	UTILITY PROFILE SHEETS
UC-14 THRU UC-39	UTILITY DETAIL SHEETS

WATER AND SEWER OWNERS ON PROJECT

(1) WATER - CHARLOTTE WATER (CLTWATER)

(2) SANITARY SEWER - CHARLOTTE WATER (CLTWATER)



PREPARED IN THE OFFICE OF:
DIVISION OF HIGHWAYS
UTILITIES UNIT
UTILITIES ENGINEERING

1555 MAIL SERVICES CENTER
RALEIGH NC 27699-1555
PHONE (919) 707-6690
FAX (919) 250-4151

Roger Worthington, P.E. UTILITIES SECTION ENGINEER

Xxxxx Xxxxx, P.E. UTILITIES SQUAD LEADER PROJECT ENGINEER

Kelly E. Hayes, PE, PLS UTILITIES PROJECT DESIGNER

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	
11¼ Degree Bend	
22½ Degree Bend	
45 Degree Bend	
90 Degree Bend	
Plug	
Tee	
Cross	
Reducer	
Gate Valve	
Butterfly Valve	
Tapping Valve	
Line Stop	
Line Stop with Bypass	
Blow Off	
Fire Hydrant	
Relocate Fire Hydrant	
Remove Fire Hydrant	
Water Meter	
Relocate Water Meter	
Remove Water Meter	
Water Pump Station	
RPZ Backflow Preventer	
DCV Backflow Preventer	
Relocate RPZ Backflow Preventer	
Relocate DCV Backflow Preventer	

PROPOSED SEWER SYMBOLS

Gravity Sewer Line (Sized as Shown)	
Force Main Sewer Line (Sized as Shown)	
Manhole (Sized per Note)	
Sewer Pump Station	

PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	
Utility Line by Others (Type as Shown)	
Trenchless Installation	
Encasement by Open Cut	
Encasement	

Thrust Block	
Air Release Valve	
Utility Vault	
Concrete Pier	
Steel Pier	
Plan Note	
Pay Item Note	

NOTE
PAY ITEM

EXISTING UTILITIES SYMBOLS

Power Pole		*Underground Power Line	
Telephone Pole		*Underground Telephone Cable	
Joint Use Pole		*Underground Telephone Conduit	
Utility Pole		*Underground Fiber Optics Telephone Cable	
Utility Pole with Base		*Underground TV Cable	
H-Frame Pole		*Underground Fiber Optics TV Cable	
Power Transmission Line Tower		*Underground Gas Pipeline	
Water Manhole		Aboveground Gas Pipeline	
Power Manhole		*Underground Water Line	
Telephone Manhole		Aboveground Water Line	
Sanitary Sewer Manhole		*Underground Gravity Sanitary Sewer Line	
Hand Hole for Cable		Aboveground Gravity Sanitary Sewer Line	
Power Transformer		*Underground SS Forced Main Line	
Telephone Pedestal		Underground Unknown Utility Line	
CATV Pedestal		SUE Test Hole	
Gas Valve		Water Meter	
Gas Meter		Water Valve	
Located Miscellaneous Utility Object		Fire Hydrant	
Abandoned According to Utility Records		Sanitary Sewer Cleanout	
End of Information			

*For Existing Utilities
Utility Line Drawn from Record _____
(Type as Shown)
Designated Utility Line _____
(Type as Shown)

0400DEL_P30

PROJECT REFERENCE NO.	SHEET NO.
U-5008	UC-3

CLTWater PROJECT NUMBER: 529-15-033 (WATER)
 CLTWater PROJECT NUMBER: 324-15-542 (SEWER)

APPLICATION FOR PERMIT FOR WATER MAIN EXTENSION

PROJECT NAME: SUGAR CREEK ROAD GRADE SEPARATION - WATER MAIN RELOCATIONS

CLTWater PROJECT NO.: 529-15-033

PROJECT DESCRIPTION: PROPOSED 310 L. F. OF 6" D. I. P. WATER MAIN WITH IT'S ASSOCIATED FITTINGS
PROPOSED 3,875 L. F. OF 8" D. I. P. WATER MAIN WITH IT'S ASSOCIATED FITTINGS
PROPOSED 300 L. F. OF 12" D. I. P. WATER MAIN WITH IT'S ASSOCIATED FITTINGS

DESIGNED BY: FIRM: SEPI ENGINEERING & CONSTRUCTION, INC.

ENGINEER: KELLY E. HAYES, PE, PLS

ADDRESS: 11020 DAVID TAYLOR DRIVE, SUITE 115
CHARLOTTE, N. C. 28262

PHONE: (704) 714-4880

THIS APPLICATION IS MADE UNDER AND IN FULL ACCORD WITH THE PROVISIONS OF CHAPTER 130A-317 OF THE NORTH CAROLINA GENERAL STATUTES, AND SUCH OTHER STATUTES AS RELATED TO PUBLIC WATER SYSTEMS. CLTWater HAS BEEN GRANTED AUTHORITY TO ISSUE PERMITS FOR EXTENSION OF WATER MAINS PURSUANT TO 15A NCAC 18C.1801. THE APPLICANT AGREES THAT NO SIGNIFICANT CHANGE OR DEVIATION FROM THE PLANS AND SPECIFICATIONS APPROVED BY CLTWater WILL BE MADE WITHOUT THE WRITTEN CONSENT AND APPROVAL OF CLTWater OR ITS AUTHORIZED REPRESENTATIVE. A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF NORTH CAROLINA SHALL SUBMIT A STATEMENT REFLECTING THAT ADEQUATE OBSERVATIONS DURING AND UPON COMPLETION OF CONSTRUCTION INDICATES THAT CONSTRUCTION WAS COMPLETED IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS.

PERMIT NO. 215-054

APPROVED: [Signature] DATE 6.1.15

JOSEPH C WILSON, PE, CHIEF ENGINEER
 CHARLOTTE WATER
 5100 BROOKSHIRE BLVD.
 CHARLOTTE, NORTH CAROLINA 28216

APPLICATION FOR NON-DISCHARGE PERMIT
 GRAVITY SEWER MAIN EXTENSION
 CHARLOTTE WATER

PROJECT NAME SUGAR CREEK ROAD GRADE SEPARATIONS - SEWER CREEK BASIN UPPER LITTLE
MAIN RELOCATIONS SUGAR CREEK

CLTWater PROJECT NO.: 324-15-542

PROJECT TYPE: NEW CONSTRUCTION RELOCATION MODIFICATION OF PERMIT NO. _____
 OTHER _____

VOLUME OF WASTEWATER GENERATED BY THIS PROJECT: NOT APPLICABLE GALLONS PER DAY BASED ON 190 GAL/DAY/SINGLE FAMILY HOUSEHOLD X NOT APPLICABLE HOUSEHOLDS OR

135 GAL/DAY/MULTI-FAMILY UNIT X NOT APPLICABLE UNITS OR IS BASED ON: _____

WASTEWATER TREATMENT PLANT RECEIVING WASTEWATER:

McALPINE CR. (NC0024970) IRWIN CR. (NC0024945) McDOWELL CR. (NC0036277)

SUGAR CR. (NC0024937) MALLARD CR. (NC0030210) ROCKY CR. (NC0036269)

NATURE OF WASTEWATER _____ % DOMESTIC _____ % INDUSTRIAL

_____ % COMMERCIAL _____ % OTHER _____

ORIGIN OF WASTEWATER SUBDIVISION COMMERCIAL
 SCHOOL INDUSTRIAL
 APARTMENTS/CONDO'S OTHER _____

LIST ANY PARAMETER AND ITS CONCENTRATION THAT WILL BE GREATER THAN NORMAL DOMESTIC LEVELS:
 NONE KNOWN

IF WASTEWATER IS NON-DOMESTIC, DESCRIBE LEVEL OF PRETREATMENT:
 NOT APPLICABLE

IF A PRETREATMENT PERMIT IS REQUIRED, HAS ONE BEEN ISSUED? YES NO

HAS ENGINEER DETERMINED THAT DOWNSTREAM SEWERS ARE CAPABLE TO HANDLE THIS FLOW? YES NO
 PERMIT NO. FOR SEWERS IMMEDIATELY DOWNSTREAM UNAVAILABLE
 PIPE DIAMETER OF SEWERS IMMEDIATELY DOWNSTREAM 8 INCH AND 12 INCH

HAS ENGINEER DETERMINED THAT NC DEM AND CLTWater MINIMUM DESIGN STANDARDS ARE MET BY THIS PROJECT? YES NO

COMPLETE NAME AND ADDRESS OF ENGINEERING DESIGN FIRM:
SEPI ENGINEERING & CONSTRUCTION, INC.
11020 DAVID TAYLOR DRIVE
CHARLOTTE, NORTH CAROLINA 28262

TELEPHONE 704 - 714 - 4880

PROFESSIONAL ENGINEER'S CERTIFICATION:
 I, KELLY E. HAYES, PE, PLS, ATTEST THAT THIS APPLICATION FOR PROP. 8" AND 12" SANITARY SEWER TO SERVE EAST SUGAR CREEK ROAD, TIP PROJECT: U-5008 HAS BEEN REVIEWED BY ME AND IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE. I FURTHER ATTEST THAT TO THE BEST OF MY KNOWLEDGE THE PROPOSED DESIGN HAS BEEN PREPARED IN ACCORDANCE WITH THE APPLICABLE REGULATIONS. ALTHOUGH CERTAIN PORTIONS OF THIS SUBMITTAL PACKAGE MAY HAVE BEEN DEVELOPED BY OTHER PROFESSIONALS, INCLUSION OF THESE MATERIALS UNDER MY SIGNATURE AND SEAL SIGNIFIES THAT I HAVE REVIEWED THIS MATERIAL AND HAVE JUDGED IT TO BE CONSISTENT WITH THE PROPOSED DESIGN.

NORTH CAROLINA PROFESSIONAL ENGINEER'S SEAL, SIGNATURE, AND DATE:



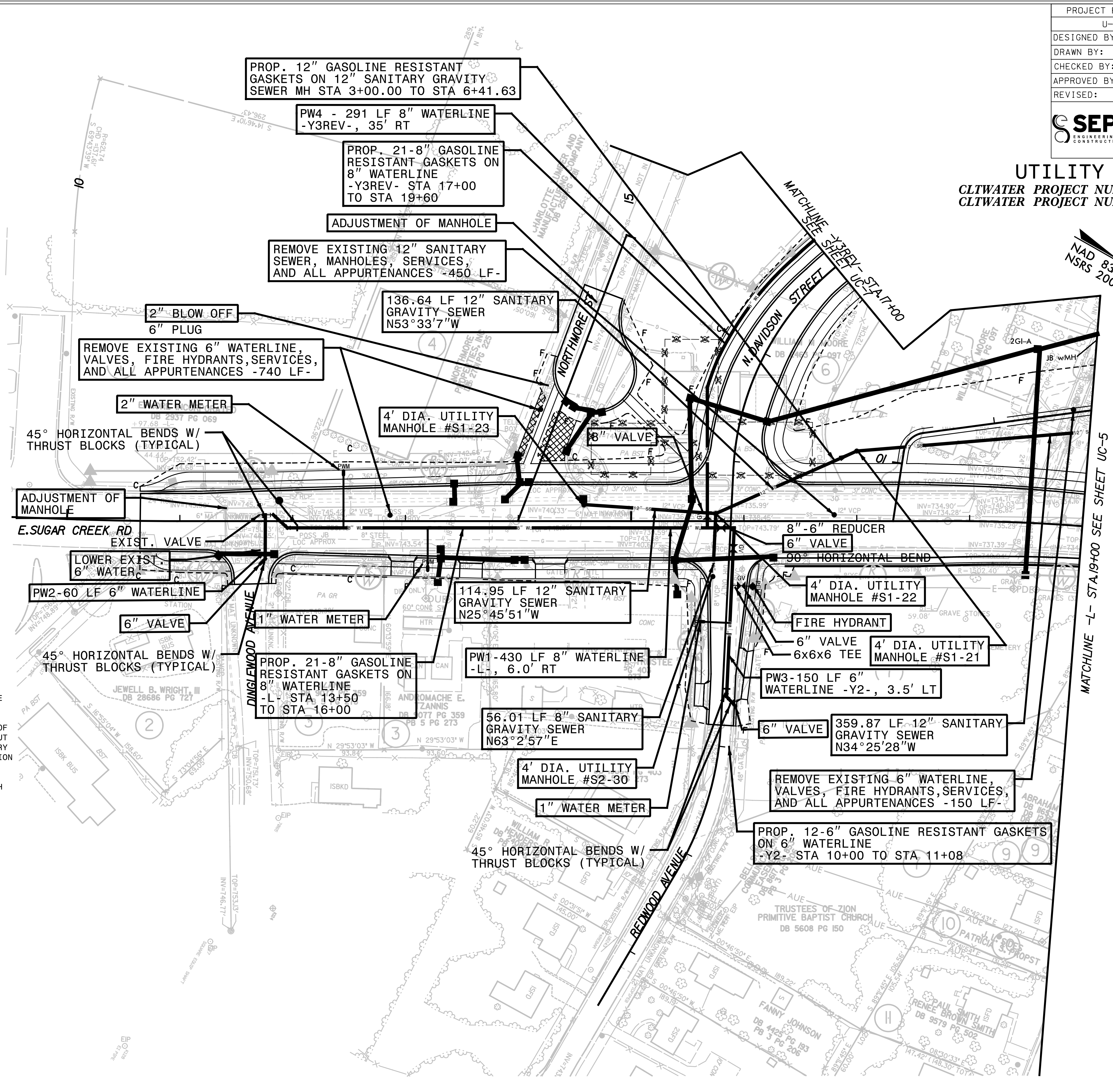
CLTWater PERMIT NO. 215-569 ISSUED 6.1.15

PLANT FLOW ALLOCATION RECORDED BY: [Signature]

PERMIT APPROVED BY: [Signature]
 JOSEPH C WILSON, P.E., CHIEF ENGINEER

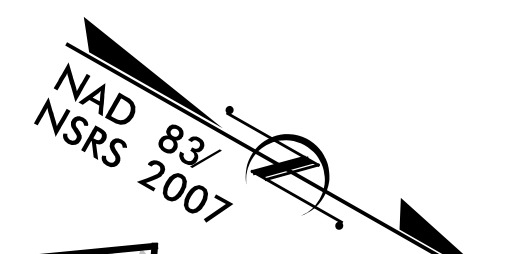
CWB 06/01/15

- NOTES: 1. CONSTRUCTION SHALL BE IN ACCORDANCE WITH CHARLOTTE WATER STANDARD SPECIFICATIONS AND DETAILS, AND NCDOT SPECIFICATIONS AND STANDARD DRAWINGS.
2. THE CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION.
3. ALL SHORING SHALL BE IN ACCORDANCE TO OSHA TRENCHING STANDARDS PART 1926, SUBPART P, AS AMENDED TO DATE.
4. ANY NECESSARY LANE CLOSURES SHALL FOLLOW GUIDELINES OUTLINED IN THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND/OR THE C.D.O.T. WORK AREA TRAFFIC CONTROL HANDBOOK (WATCH) AND THE U-5008 PROJECT TRANSPORTATION MANAGEMENT PLAN AND TRAFFIC CONTROL PLANS.
5. IF THE PROPOSED WATER MAIN IS INSTALLED WITHIN 12" IN ANY DIRECTION (VERTICALLY OR HORIZONTALLY) FROM A GAS MAIN AND/OR UNDERGROUND POWER LINE, THEN THE CONTRACTOR SHALL CALL THE APPROPRIATE UTILITY COMPANY AND INFORM THEM.
6. ALL 6", 8", AND 12" WATERLINE IS TO BE DI RESTRAINED JOINT PIPE, PC 350.
7. ALL 8" AND 12" SANITARY SEWER IS TO BE DI PIPE, PC 350.
8. WATER MAIN TO BE INSTALLED WITH A MINIMUM OF 36" OF COVER.
9. ALL WATER MAIN MATERIAL SUBJECT TO LEAKAGE TESTING SHALL BE RATED TO AT LEAST 200 PSI.
10. ALL SERVICES SHALL BE TRANSFERRED FROM THE EXISTING WATER MAIN TO THE PROPOSED WATER MAIN AFTER THE PROPOSED MAIN HAS BEEN TESTED, CHLORINATED, AND ACTIVATED.
11. MINIMUM HORIZONTAL PIPE SEPARATION: 10' HORIZONTAL SEPARATION OR 18" VERTICAL SEPARATION SHALL BE MAINTAINED BETWEEN WATER MAINS OVER SEWER MAINS. WHEN WATER MAINS ARE BELOW SEWER MAINS OR THE ABOVE MINIMUM SEPARATIONS CANNOT BE MAINTAINED, DUCTILE IRON PIPE SHALL BE USED FOR BOTH MAINS TO 10' EITHER SIDE OF CROSSING, AND ALL ALONG THE LENGTH OF MAINS WHERE MINIMUM SEPARATION CANNOT BE MAINTAINED.
12. 12-INCH VERTICAL SEPARATION SHALL BE MAINTAINED BETWEEN PROPOSED WATER MAINS AND EXISTING STORM CONDUITS.
13. PRIOR TO PERFORMING WORK IN THE CITY OF CHARLOTTE, CONTACT THE CLT WATER PROJECT MANAGER, BILL DEAL (704-391-5150) AT LEAST 48 HOURS IN ADVANCE OF WORK.
14. ON -L- LINE STREET (I.E. NCDOT STREET), FIRE HYDRANTS ARE TO BE PLACED AT THE R/W LINE.
15. ON -Y- LINE STREETS (I.E. CITY STREETS) FIRE HYDRANTS ARE TO BE PLACED A MINIMUM OF 2' BEHIND CURB AND GUTTER OR 4' BEHIND A DITCH LINE.
16. ALL DRIVEWAY CUTS SHALL BE BACKFILLED WITH TEMPORARY INCIDENTAL STONE.
17. ALL DRIVEWAYS SHALL BE DRY BORED WITHOUT ENCASEMENT. DRY BORE UNDER PRIVATE SIDEWALK CROSSINGS.
18. ALL PAVEMENT SHALL BE CUT WITH A SAW.
19. ALL PAVEMENT REPAIRS ARE SUBJECT TO APPROVAL BY THE CITY OF CHARLOTTE.
20. CONTRACTOR SHALL ADHERE TO THE PROVISIONS OF "ARTICLE 19-A OVERHEAD HIGH VOLTAGE LINE SAFETY ACT-NC STATE STATUTE 95-229".
21. EROSION CONTROL MEASURES SHALL BE PROVIDED IN ACCORDANCE WITH THE U-5008 PROJECT PLAN.
22. ALL WORK MUST BE PERFORMED WITHOUT DISRUPTING THE OPERATION OF ANY EXISTING SANITARY SEWER OR WATER SERVICE.
23. THIS PROJECT INVOLVES CONSTRUCTION WITH LIVE SANITARY SEWER LINES. MEASURES MUST BE TAKEN BY THE CONTRACTOR TO REROUTE FLOW IN THE SYSTEMS DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING PUMPING OR BYPASS FACILITIES AROUND CONSTRUCTION LOCATIONS PRIOR TO STARTING THE WORK. SANITARY SEWAGE CANNOT BE BYPASSED OR PUMPED INTO ANY STREAM, DITCH, OR WATER COURSE. THE CONTRACTOR SHALL SUBMIT A PROPOSED PLAN FOR BYPASSING SANITARY SEWAGE FLOW TO THE ENGINEER BEFORE STARTING WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY HANDLING THE FLOWS DURING CONSTRUCTION AND ALL MEASURES TAKEN WILL BE SUBJECT TO REVIEW. AS APPROVED IN ADVANCE BY THE ENGINEER, BYPASS PUMPING MAY NOT BE REQUIRED IF THE EXPECTED FLOWS ARE MINIMAL AND SEWER SERVICE CAN BE PROMPTLY RESTORED WITH OUT CAUSING BACKUPS, OVERFLOWS, OR OTHER SERVICE ISSUES.
24. ALL EXISTING SANITARY SEWER SERVICES ENCOUNTERED ON THE PROJECT SHALL BE CONNECTED TO THE PROPOSED SANITARY SEWER MAINS AND REPLACED TO THE RIGHT-OF-WAY INE UNLESS NOTED OTHERWISE ON THE PLANS OR DIRECTED BY THE ENGINEER. NEW CLEANOUTS SHALL BE INSTALLED AT THE RIGHT-OF-WAY LINE UNLESS OTHERWISE NOTED.
25. CONTRACTOR SHALL SCHEDULE INSPECTION BY THE ENGINEER FOR EACH SECTION OF NEWLY INSTALLED SANITARY SEWER PIPE BEFORE TAKING THE FLOW DIVERSION OUT OF SERVICE AND PLACING THE NEW SECTION IN SERVICE. THE PROPOSED SANITARY SEWER CONSTRUCTION WILL BE LAID, TESTED, AND ACCEPTED FOR SERVICE SECTION BY SECTION, WHICH TYPICALLY WILL BE MANHOLE TO MANHOLE.
26. RECONNECT EXISTING SANITARY SEWER TO NEW MANHOLE WITH MINIMUM 9' OF NEW D.I.P. TO MATCH EXISTING PIPE SIZE. USE RUBBER SLEEVE COUPLING WITH STAINLESS STEEL COMPRESSION BANDS AND RINGS FOR THE CONNECTION.
27. EXISTING SANITARY SEWER MAINS AND EXISTING MANHOLES IN CONFLICT WITH THE PROPOSED SANITARY SEWER AND PROPOSED STORM DRAINAGE INSTALLATIONS SHALL BE COMPLETELY REMOVED.



PROJECT REFERENCE NO.	SHEET NO.
U-5008	UC-4
DESIGNED BY: JWW	6/1/2015
DRAWN BY: JWW	
CHECKED BY: KEH	
APPROVED BY:	
REVISED:	

UTILITY CONSTRUCTION
 CLT WATER PROJECT NUMBER: 529-15-033 (WATER)
 CLT WATER PROJECT NUMBER: 324-15-542 (SEWER)

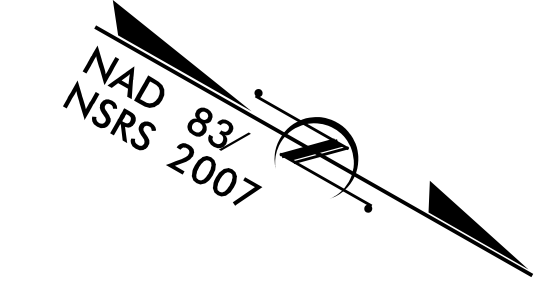
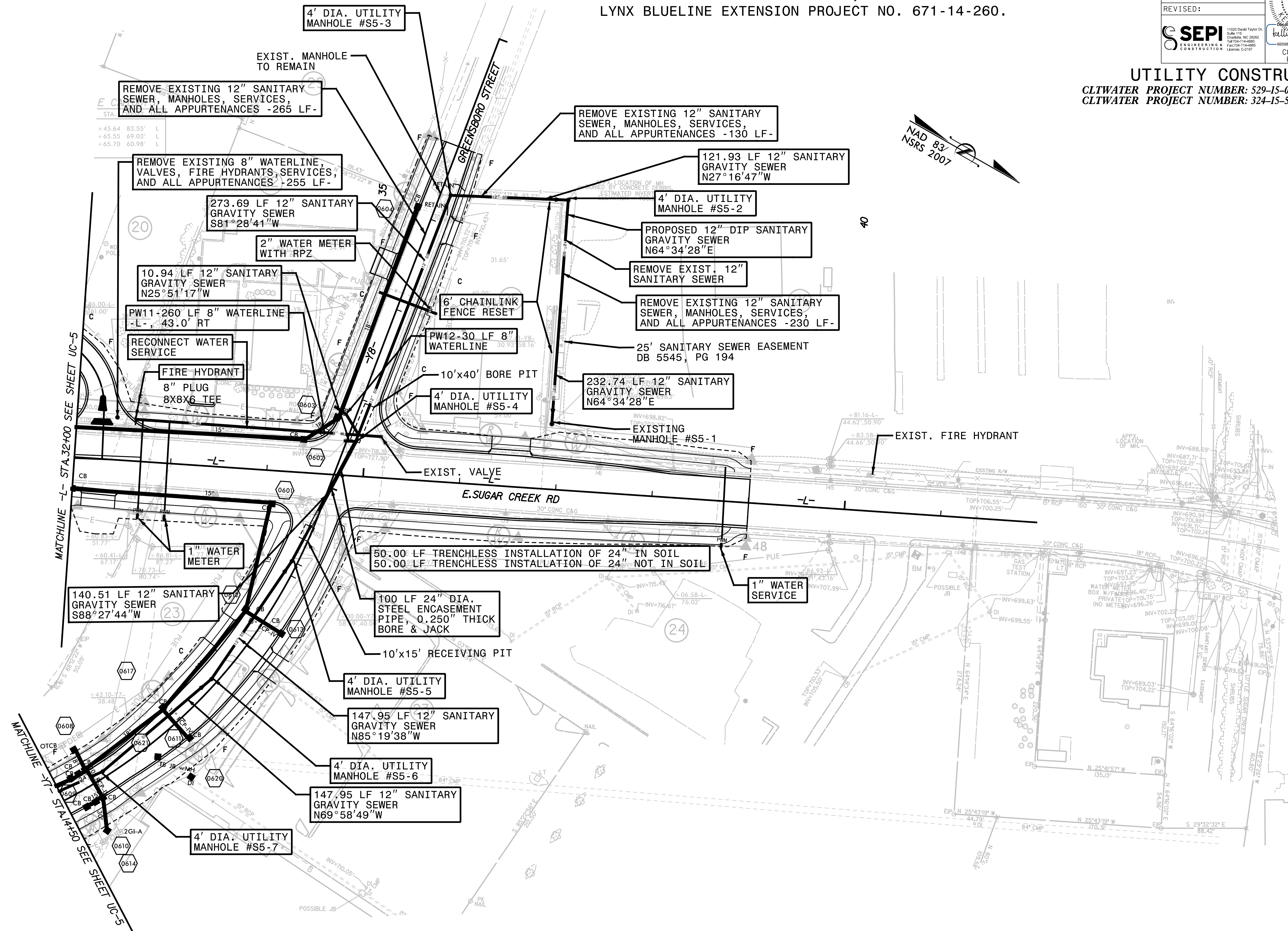


MATCHLINE -L- STA 19+00 SEE SHEET UC-5

NOTE: CLTWater IS TO DESIGN, BID, AWARD, AND CONSTRUCT THE 12" WATERLINE (i.e. GAP CLOSURE) ALONG GREENSBORO STREET, ALONG THE FRONTAGE OF TAX PARCELS 09107101 AND 09107102, AS PART OF THE LYNX BLUELINE EXTENSION PROJECT NO. 671-14-260.

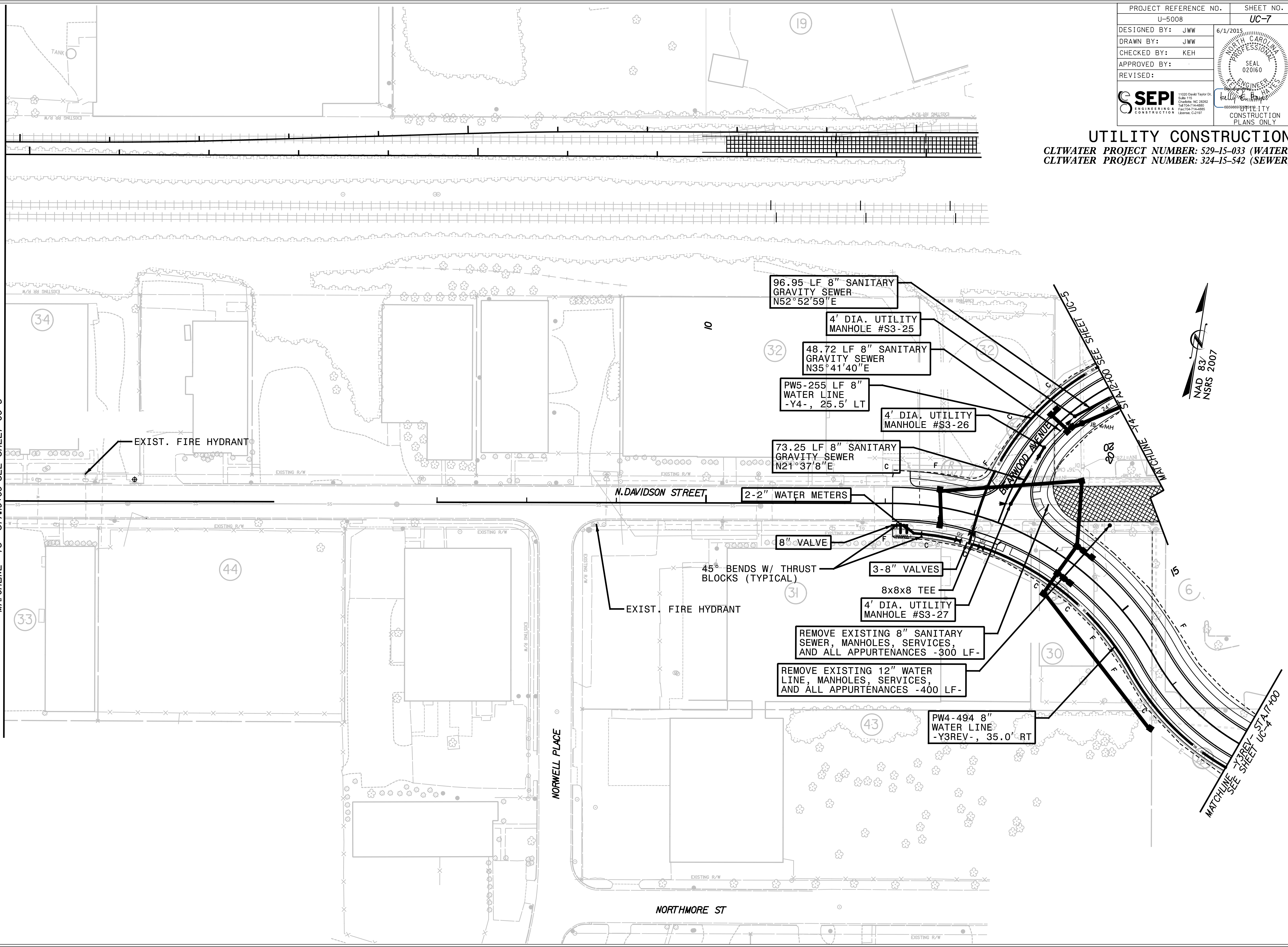
PROJECT REFERENCE NO.	SHEET NO.
U-5008	UC-6
DESIGNED BY: JWW	6/1/2015
DRAWN BY: JWW	
CHECKED BY: KEH	
APPROVED BY:	
REVISED:	

UTILITY CONSTRUCTION
 CLTWater PROJECT NUMBER: 529-15-033 (WATER)
 CLTWater PROJECT NUMBER: 324-15-542 (SEWER)



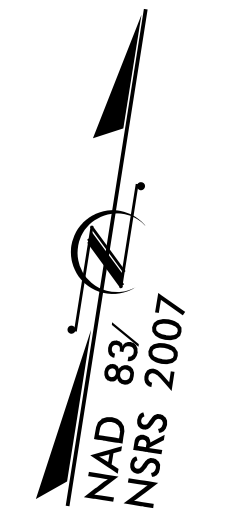
0400DEL_P30

PROJECT REFERENCE NO.	SHEET NO.
U-5008	UC-7
DESIGNED BY: JWW	6/1/2011
DRAWN BY: JWW	
CHECKED BY: KEH	
APPROVED BY:	
REVISED:	
UTILITY CONSTRUCTION CLT WATER PROJECT NUMBER: 529-15-033 (WATER) CLT WATER PROJECT NUMBER: 324-15-542 (SEWER)	



MATCHLINE -Y3- STA.19+00 SEE SHEET UC-8

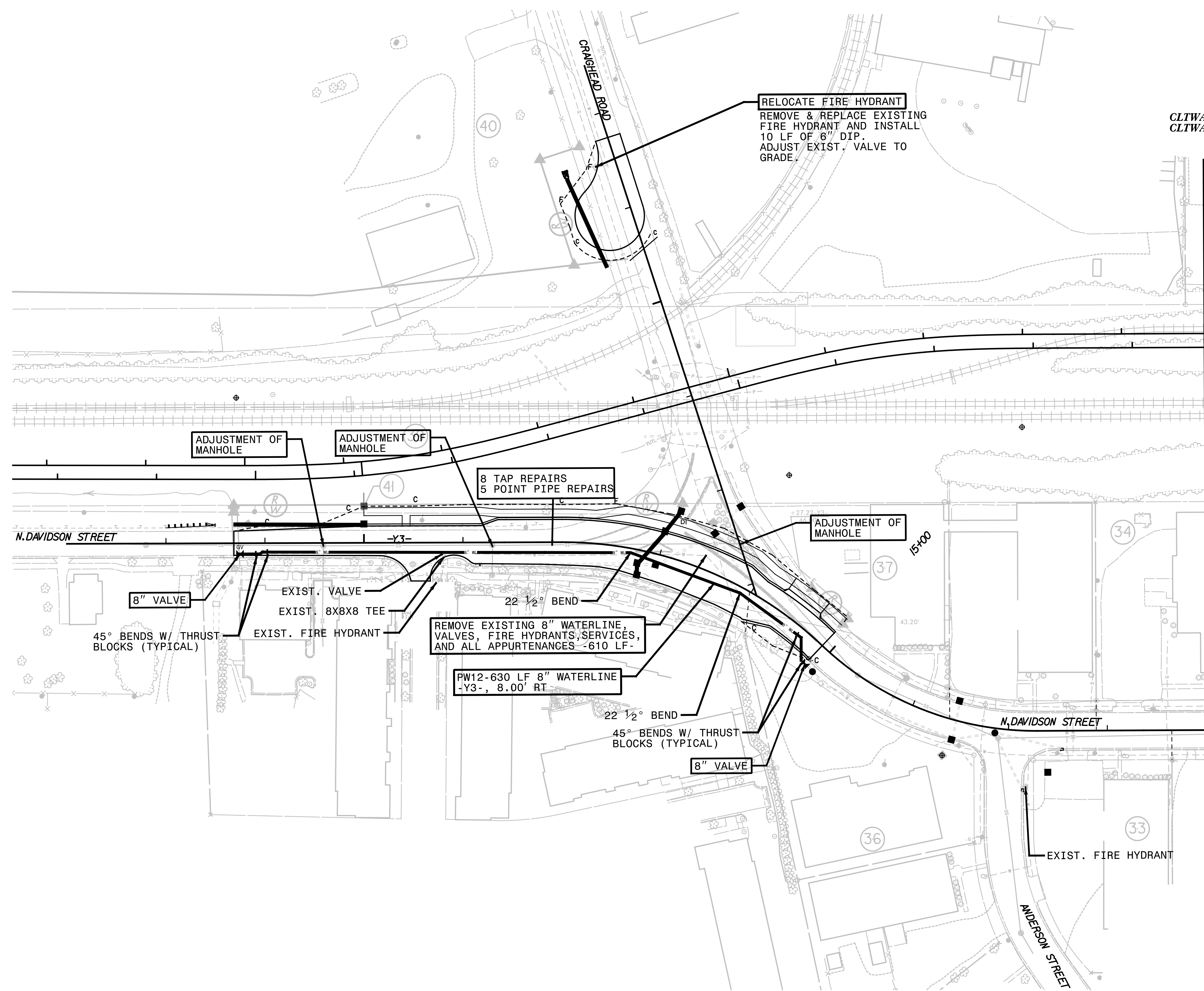
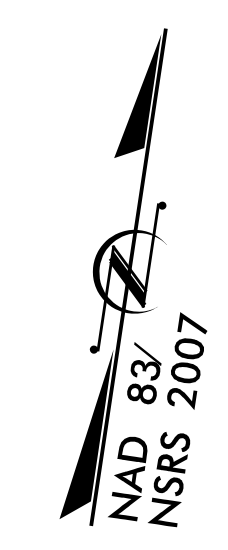
MATCHLINE -Y3REV- STA.17+00 SEE SHEET UC-4



6/1/2015
 c:\transportation\TR11.036.00 (U-5008)\Utilities\280_007_U5008.dgn
 jwiles

PROJECT REFERENCE NO.	SHEET NO.
U-5008	UC-8
DESIGNED BY: JWW	6/1/2015
DRAWN BY: JWW	
CHECKED BY: KEH	
APPROVED BY:	
REVISED:	

UTILITY CONSTRUCTION
 CLT WATER PROJECT NUMBER: 529-15-033 (WATER)
 CLT WATER PROJECT NUMBER: 324-15-542 (SEWER)



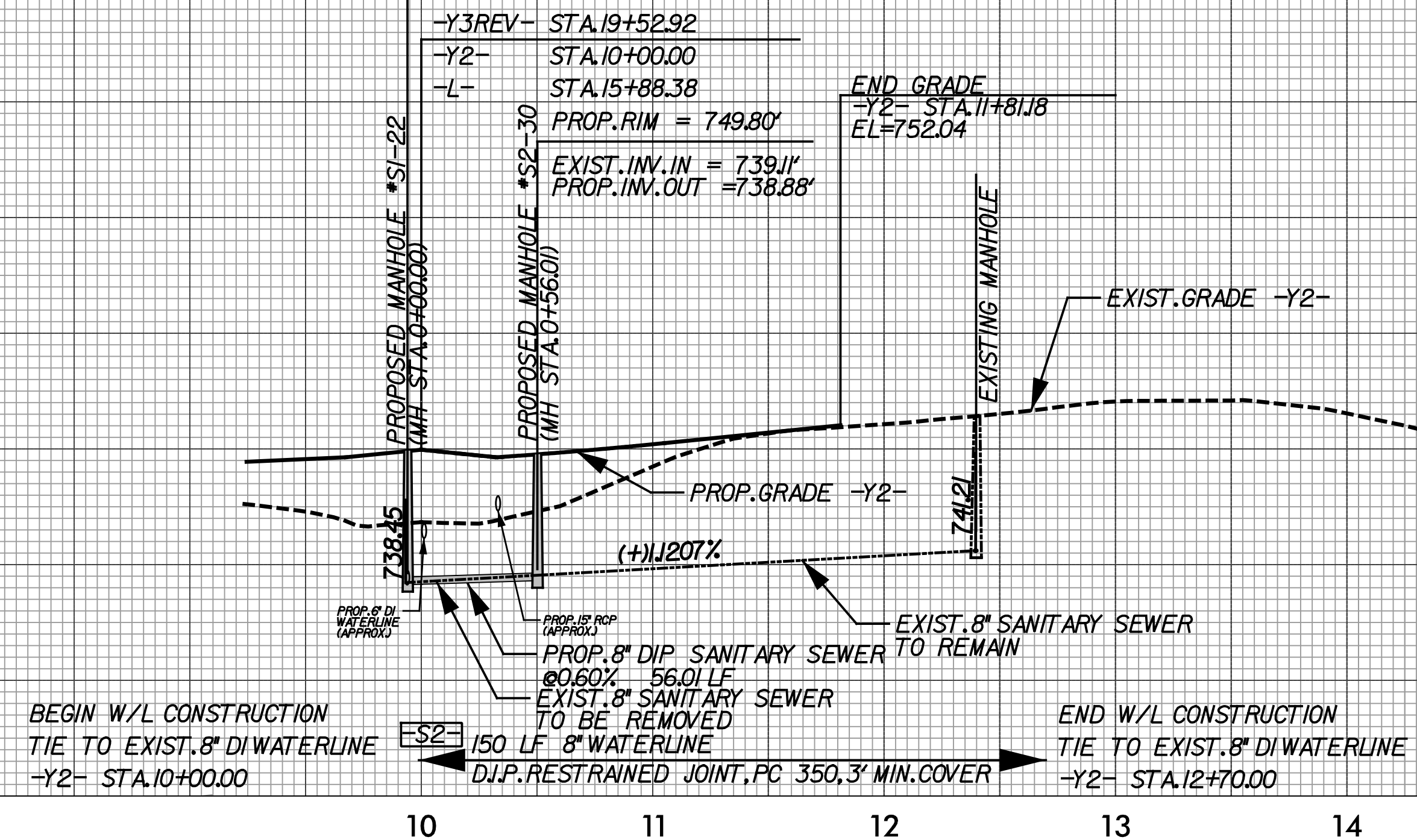
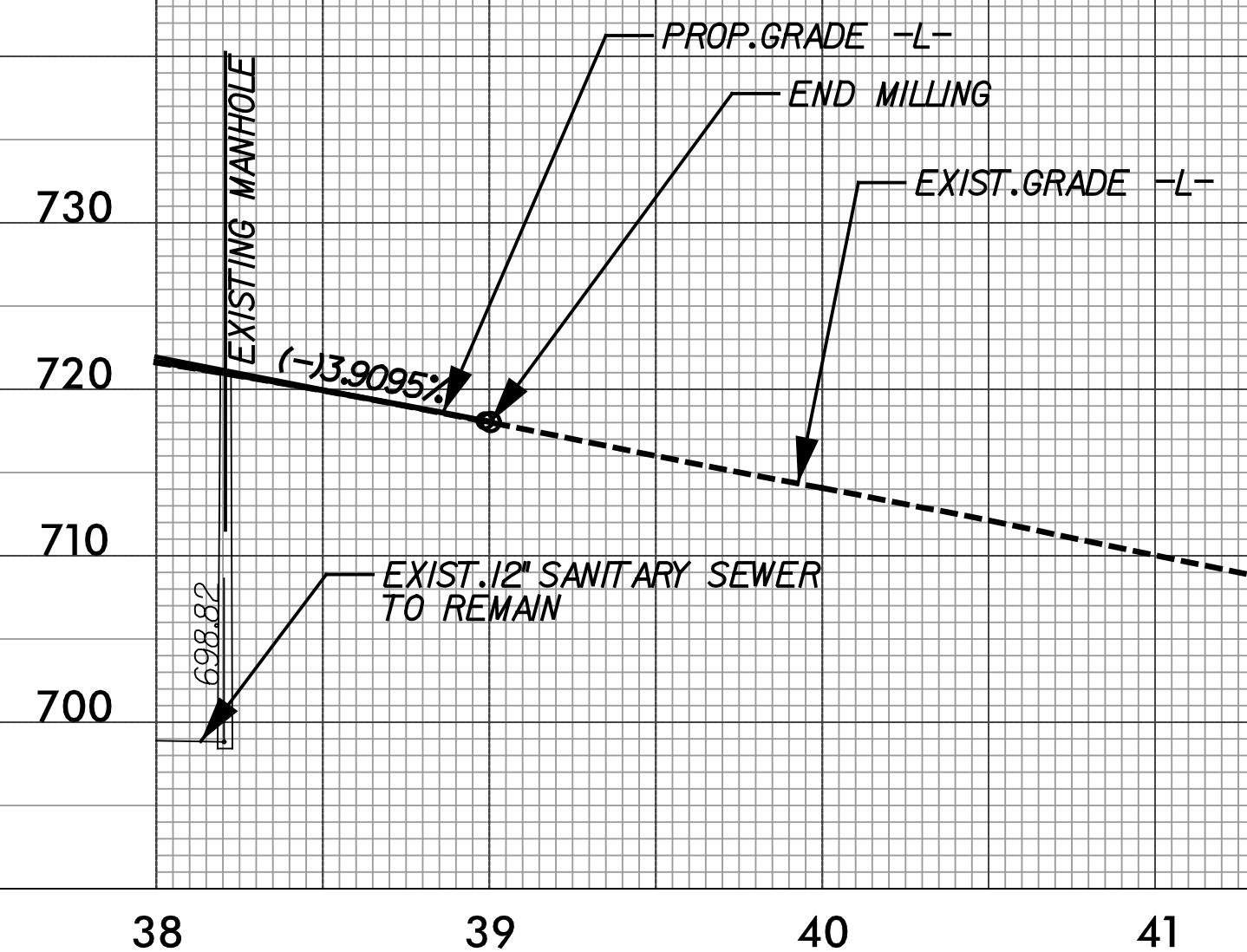
MATCHLINE -Y3- STA.19+00 SEE SHEET UC-7

PROJECT REFERENCE NO.	U-5008	SHEET NO.	UC-10
DESIGNED BY:	JWW	DATE:	6/1/2015
DRAWN BY:	JWW	PROFESSIONAL SEAL	020160
CHECKED BY:	KEH	ENGINEER	
APPROVED BY:		UTILITY CONSTRUCTION PLANS ONLY	
REVISED:			

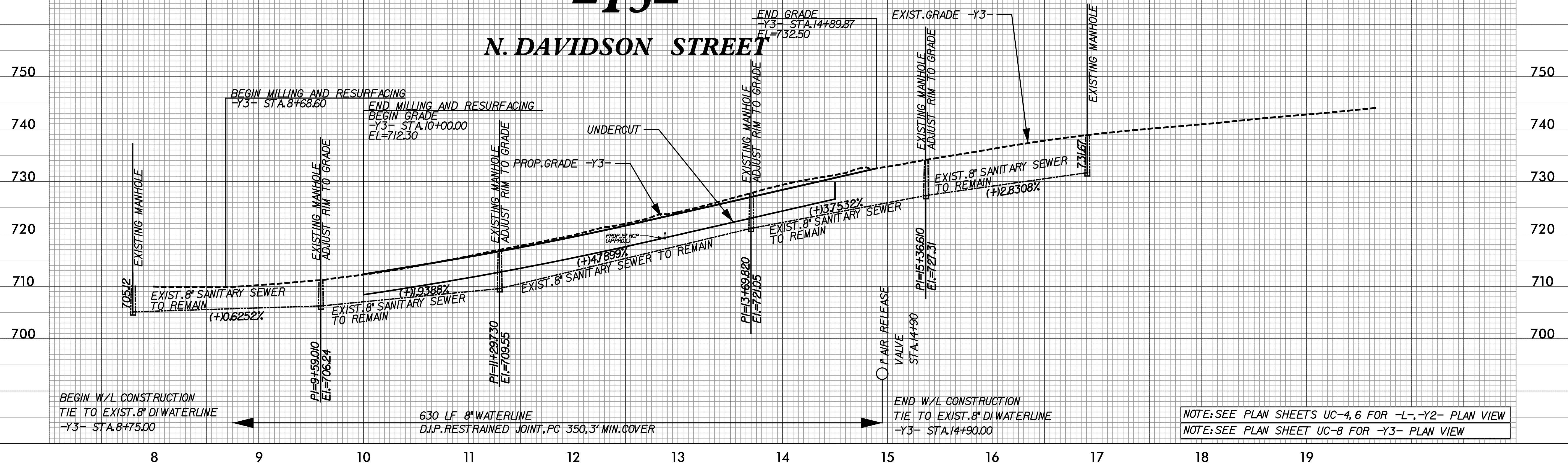
-Y2- REDWOOD AVENUE

PROP. RIM = 749.80'
 PROP. INV. IN = 738.54' (S)
 PROP. INV. IN = 738.54' (E)
 PROP. INV. OUT = 738.34'

-L- E. SUGAR CREEK ROAD



-Y3- N. DAVIDSON STREET



NOTE: SEE PLAN SHEETS UC-4, 6 FOR -L-, -Y2- PLAN VIEW
 NOTE: SEE PLAN SHEET UC-8 FOR -Y3- PLAN VIEW

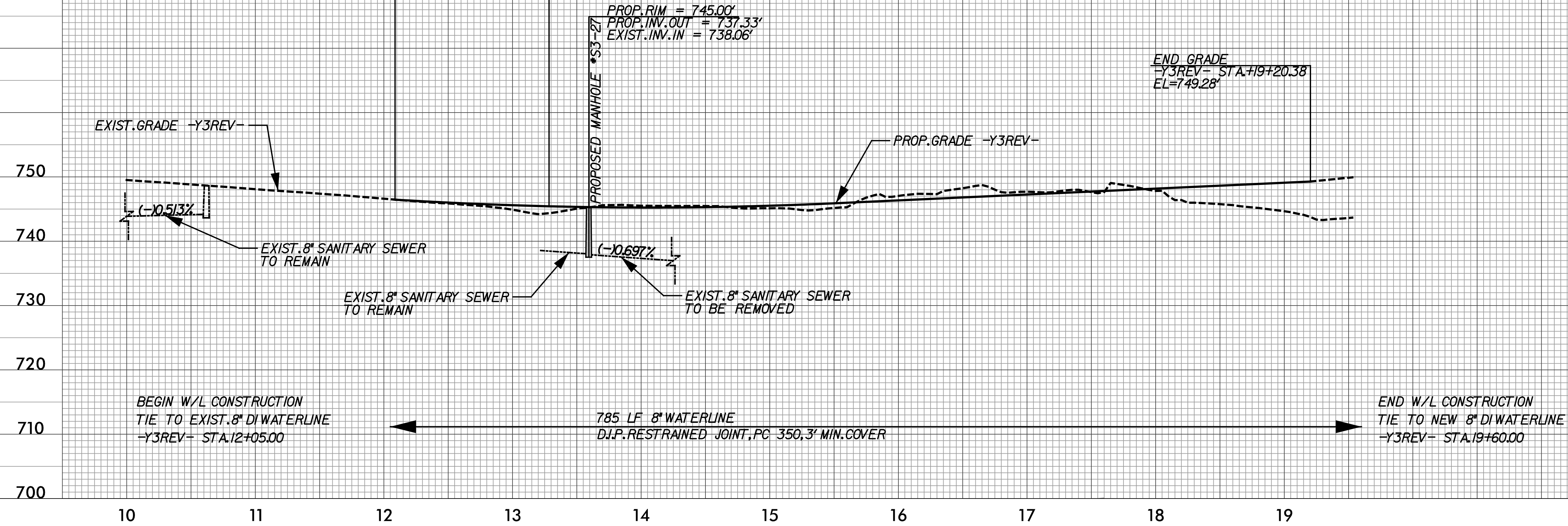
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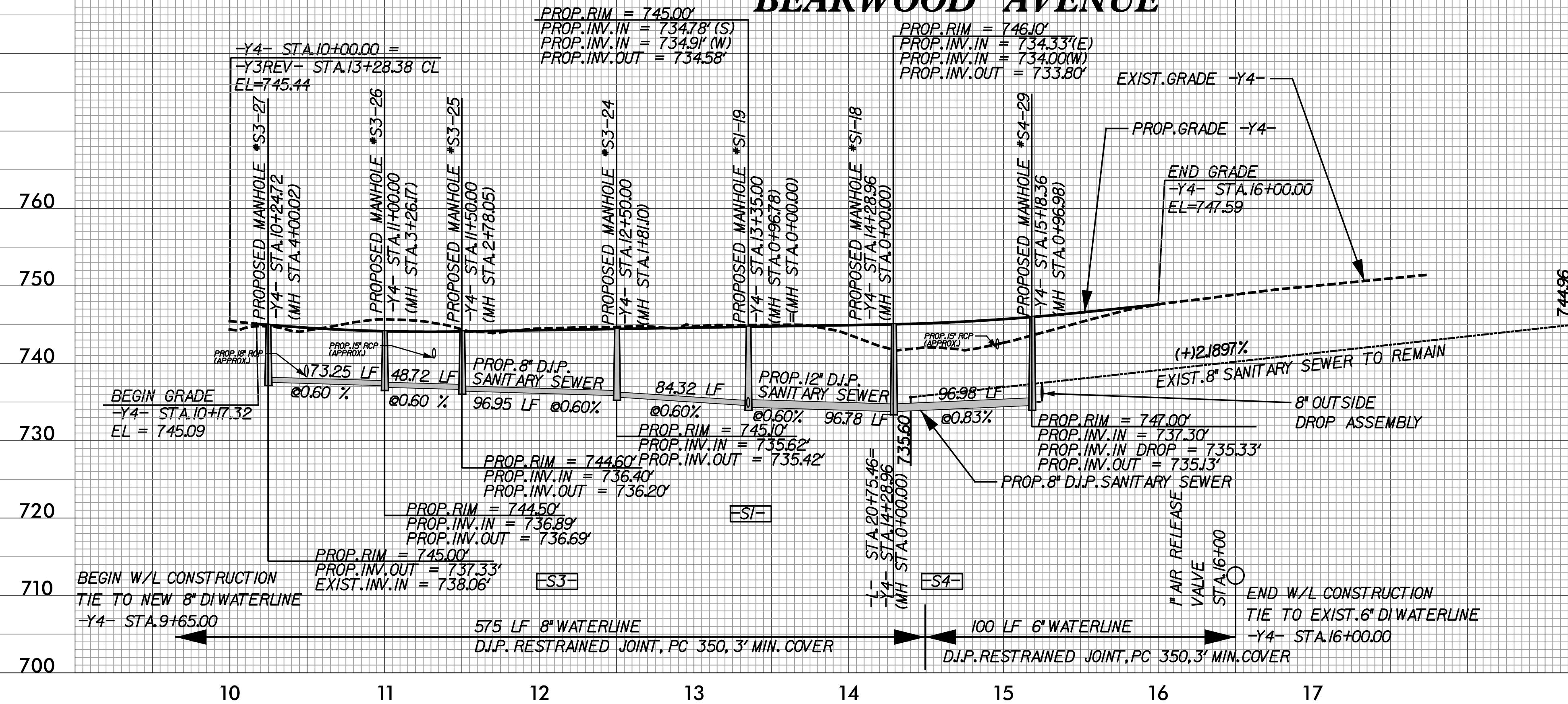
PROJECT REFERENCE NO.	U-5008	SHEET NO.	UC-II
DESIGNED BY:	JWW	DATE	6/1/2015
DRAWN BY:	JWW	PROFESSIONAL SEAL	020160
CHECKED BY:	KEH	ENGINEER	6/1/2015
APPROVED BY:		SEAL	020160
REVISED:		CONSTRUCTION PLANS ONLY	

SEPI ENGINEERING & CONSTRUCTION
11020 Danks Taylor Ct.
Suite 110
Charlotte, NC 28262
Tel: 704-714-6983
Fax: 704-714-6985
License: CC-2197

-Y3REV- N. DAVIDSON STREET



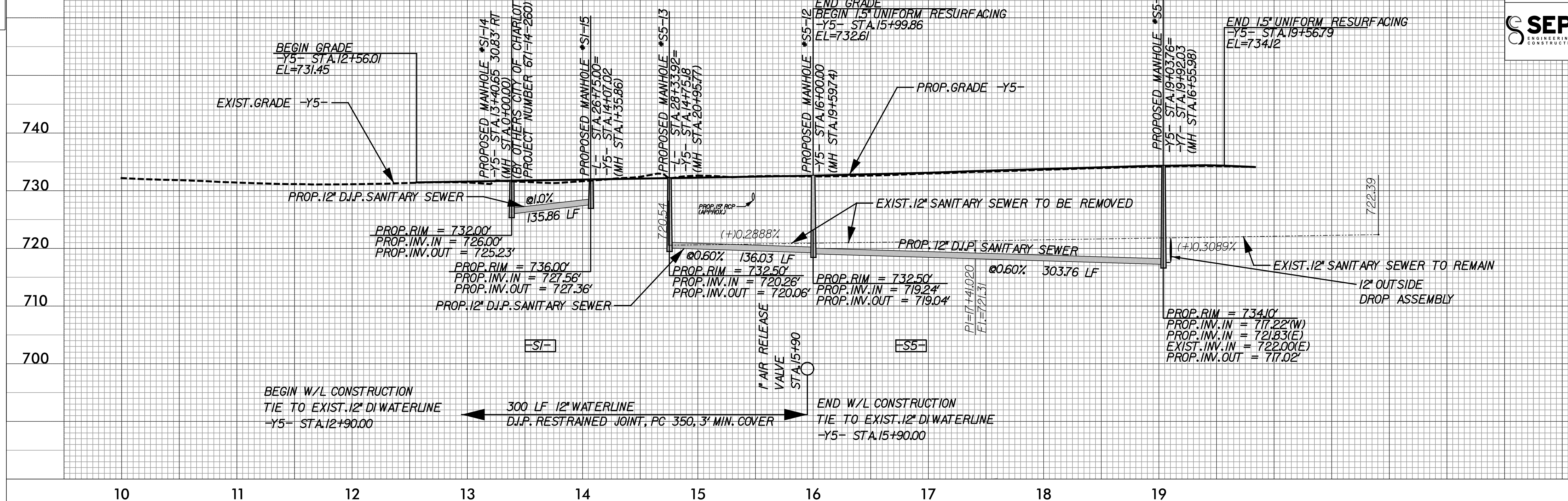
-Y4- BEARWOOD AVENUE



NOTE: SEE PLAN SHEETS UC-4, 7 FOR -Y3REV- PLAN VIEW
NOTE: SEE PLAN SHEET UC-5, 7 FOR -Y4- PLAN VIEW

PROJECT REFERENCE NO. U-5008	SHEET NO. UC-12
DESIGNED BY: JWW	6/1/2015
DRAWN BY: JWW	
CHECKED BY: KEH	
APPROVED BY:	
REVISED:	

-Y5- RALEIGH STREET

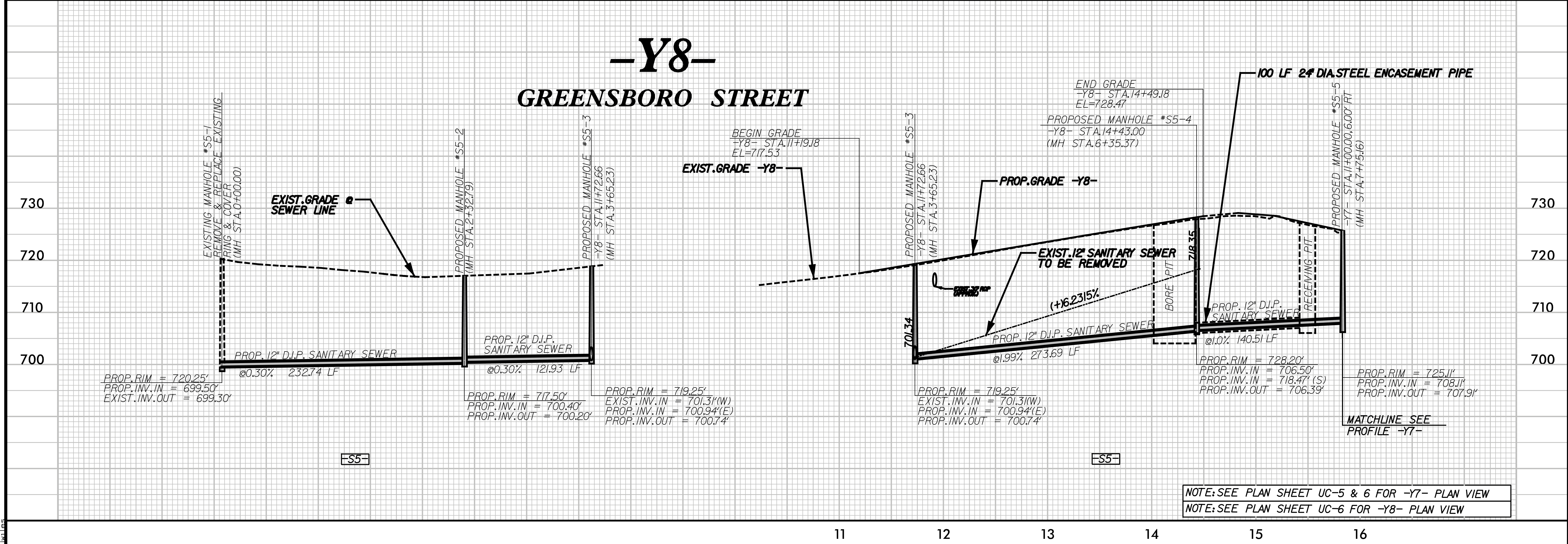
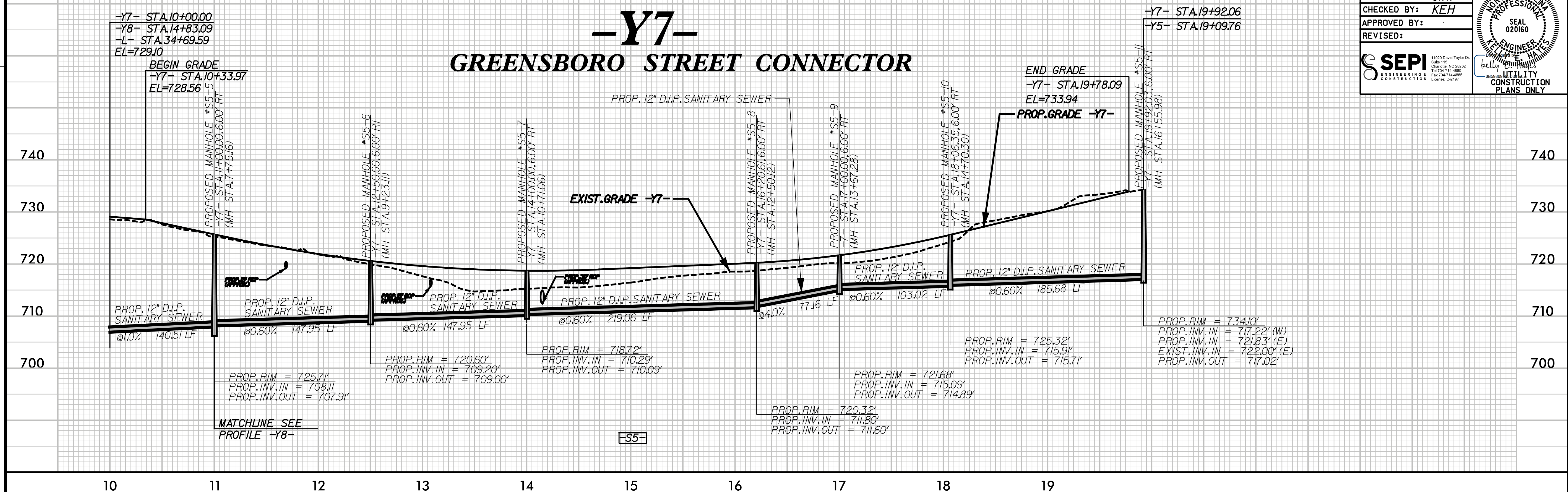


-Y6- CRAIGHEAD ROAD



NOTE: SEE PLAN SHEET UC-5 FOR -Y5- PLAN VIEW
 NOTE: SEE PLAN SHEET UC-8 FOR -Y6- PLAN VIEW

PROJECT REFERENCE NO.	SHEET NO.
U-5008	UC-13
DESIGNED BY: JMW	6/1/2015
DRAWN BY: JMW	
CHECKED BY: KEH	
APPROVED BY:	
REVISED:	



NOTE: SEE PLAN SHEET UC-5 & 6 FOR -Y7- PLAN VIEW
NOTE: SEE PLAN SHEET UC-6 FOR -Y8- PLAN VIEW

6/1/2015 1:25:05 P:\transportation\TR111036.00 (U-5008)\Utilities\280_013_U5008.dgn
 J. Williams

NCDOT STANDARD DRAWINGS

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR WATER METER

1. THIS DETAIL SHOWS THE TYPICAL FINAL WATER METER CONFIGURATION AFTER INSTALLATION OF A PROPOSED WATER METER, RECONNECTION OF AN EXISTING WATER METER, OR RELOCATION OF A WATER METER.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR WATER METER

SHEET 1 OF 1 1515.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR FIRE HYDRANT

NOTES:

- THIS DETAIL SHOWS THE TYPICAL FINAL FIRE HYDRANT CONFIGURATION AFTER INSTALLATION OF A PROPOSED FIRE HYDRANT, RECONNECTION OF AN EXISTING FIRE HYDRANT, OR RELOCATION OF A FIRE HYDRANT.
- KEEP DRAIN PORTS FREE FROM OBSTRUCTION.
- RESTRAIN ALL PIPE JOINTS AND FITTINGS. ACCEPTABLE TYPES OF RESTRAINT INCLUDE RESTRAINING GLANDS; RESTRAINED, PUSH-ON JOINTS; AND 3/4" BITUMINOUS COATED, ALL-THREAD RESTRAINING RODS. THRUST BLOCKS ARE NOT AN ACCEPTABLE TYPE OF RESTRAINT.
- FOR RELOCATED OR RECONNECTED FIRE HYDRANTS, VERIFY THE VALVE IS RESTRAINED TO THE MAIN. PROVIDE APPROPRIATE RESTRAINT.
- HYDRANT LOCATION APPLIES TO PROPOSED AND RELOCATED FIRE HYDRANTS.
- LOCATE FIRE HYDRANT WITH 3' HORIZONTAL CLEARANCE FROM ABOVE GROUND OBJECTS.
- PROVIDE A MINIMUM OF 3' COVER OVER ALL SECTIONS OF HORIZONTAL PIPE. USE FITTINGS AS NECESSARY.
- TAPPING SLEEVES MAY BE USED ON EXISTING MAINS IN LIEU OF DI TEES.
- LOCATE FIRE HYDRANT OUTSIDE OF THE VEHICLE RECOVERY AREA, ADJACENT TO THE R/W LINE, OR IN A PROTECTED AREA.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR FIRE HYDRANT

SHEET 1 OF 1 1515.02

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR SEWER CLEAN OUT

1. THIS DETAIL SHOWS THE TYPICAL FINAL CONFIGURATION OF A PROPOSED SEWER CLEAN OUT, A RELOCATED SEWER CLEAN OUT, OR A RECONNECTED SEWER CLEAN OUT.

2. USE 45 DEGREE VERTICAL BEND AT INLET IF GRADE ALLOWS.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR SEWER CLEAN OUT

SHEET 1 OF 1 1520.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR PRECAST CONCRETE SANITARY SEWER MANHOLE WITH CAST-IN-PLACE BOTTOM

GENERAL NOTES:

- THIS STANDARD DETAIL DESCRIBES THE USE OF HORSESHOE TYPE and CORED MANHOLES WITH A CAST-IN-PLACE BOTTOM.
- USE HORSESHOE TYPE MANHOLE ONLY WITH THE PERMISSION OF THE ENGINEER.
- FOR HORSESHOE TYPE MANHOLES, WRAP THE PIPE WITH BUTYL RUBBER GASKET, AND SEAL WITH NONSHRINKING GROUT.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR PRECAST CONCRETE SANITARY SEWER MANHOLE WITH CAST-IN-PLACE BOTTOM

SHEET 1 OF 2 1525.06

NCDOT STANDARD DRAWINGS

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**PRECAST CONCRETE
SANITARY SEWER MANHOLE -
OUTSIDE DROP**

SHEET 1 OF 1
1525.02

SECTION X-X

PLAN

NOTES:

- THIS DETAIL SHOWS THE CONFIGURATION OF AN OUTSIDE DROP WITH A PRECAST CONCRETE MANHOLE.
- INSERT THREE #6 DOWELS INTO THE BASE OF THE PRECAST MANHOLE BEFORE POURING CAST IN PLACE TONGUE. FACTORY DRILL OR CAST THE DOWEL HOLES IN THE BASE. EPOXY THE DOWELS INTO PLACE. EMBED DOWELS A MINIMUM OF 6" INTO THE MANHOLE BASE AND THE TONGUE. CENTER DOWELS VERTICALLY AND HORIZONTALLY. PLACE DOWELS 12" ON CENTER.
- BLOCK WALL TO SPRING LINE OF HORIZONTAL PIPE.
- USE FOR DROP INLET PIPES UP TO 12".
- USE PC 350 DUCTILE IRON PIPE AND FITTINGS FOR THE DROP ASSEMBLY. THE DROP ASSEMBLY SHALL BE THE SAME PIPE DIAMETER AS THE INLET PIPE.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**PRECAST CONCRETE
SANITARY SEWER MANHOLE -
OUTSIDE DROP**

SHEET 1 OF 1
1525.02

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**PRECAST CONCRETE
SANITARY SEWER MANHOLE
WITH CAST-IN-PLACE BOTTOM**

SHEET 2 OF 2
1525.06

**REINFORCED CONCRETE FOOTING
FOR 5' PRECAST MANHOLE OR
4' PRECAST MANHOLE**

BILL OF MATERIAL FOR 6'-0" FOOTING				
BAR	SIZE	LENGTH	NO.	WT. lbs.
T1	#5	5'-6"	18	103
CLASS "A" CONC. YD ³ 9" THICK 1.00				
BILL OF MATERIAL FOR 7'-0" FOOTING				
BAR	SIZE	LENGTH	NO.	WT. lbs.
T2	#5	6'-6"	20	136
CLASS "A" CONC. YD ³ 9" THICK 1.36				
CLASS "A" CONC. YD ³ 12" THICK 1.82				
BILL OF MATERIAL FOR 8'-0" FOOTING				
BAR	SIZE	LENGTH	NO.	WT. lbs.
T3	#5	7'-6"	24	188
CLASS "A" CONC. YD ³ 12" THICK 2.37				

PLACE REINFORCING STEEL SO THAT STEEL IS PLACED A MIN. OF 2" AND A MAX. OF 4" FROM THE TOP OF THE SLAB.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**PRECAST CONCRETE
SANITARY SEWER MANHOLE
WITH CAST-IN-PLACE BOTTOM**

SHEET 2 OF 2
1525.06

CLTWater STANDARD DETAILS

MANUFACTURERS:
 SOUTHERN METER C.H. 5/8" x 3/4" METER BOX BODY
 BROOKS #36MB METER BOX BODY
 OLDCASTLE #MB36 METER BOX BODY
 BES #C09W METER BOX BODY
 CHRISTY B9 METER BOX BODY

NOTES:
 A. METER BOX SHALL ACCOMMODATE COMPANION PLASTIC METER BOX LID - SEE STANDARD DETAIL.
 B. MINOR DIMENSION VARIATIONS ARE PERMITTED, BASED ON MANUFACTURER'S PRODUCT LINES, PROVIDED THE CMUD STANDARD PLASTIC LID FITS PROPERLY.
 C. CONCRETE SHALL BE MINIMUM 1" c = 3000 PSI COMPRESSIVE STRENGTH.
 D. DESIGN SHALL CONFORM TO ASTM C858-SPECIFICATIONS FOR "UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURE".
 E. STEEL REINFORCING DESIGN SHALL CONFORM TO ASTM C 857.
 F. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 AND A 82.

NO SCALE
 STANDARD NO. AA
 PREPARED BY: [REDACTED]
 CHECKED BY: [REDACTED]
 DATE: 8/23/11

CHARLOTTE-MECKLENBURG UTILITIES
 STANDARD DETAILS
 WATER

PRECAST CONCRETE METER BOX FOR 3/4 - INCH DOMESTIC WATER SERVICE

WEIGHT - 70 LB. (MIN.) - 85 LB (MAX.)

MANUFACTURERS:
 SOUTHERN METER #C.H. 2 METER BOX BODY
 BROOKS #65MB METER BOX BODY
 OLDCASTLE PRECAST #MB65 METER BOX BODY

NOTES:
 A. METER BOX SHALL ACCOMMODATE COMPANION PLASTIC METER BOX LID - SEE STANDARD DETAIL.
 B. MINOR DIMENSION VARIATIONS ARE PERMITTED BASED ON MANUFACTURER'S PRODUCT LINES, PROVIDED THE CMUD STANDARD PLASTIC LID FITS PROPERLY.
 C. CONCRETE SHALL BE MINIMUM 1" c = 3000 PSI COMPRESSIVE STRENGTH.
 D. DESIGN SHALL CONFORM TO ASTM C858-SPECIFICATIONS FOR "UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURE".
 E. STEEL REINFORCING DESIGN SHALL CONFORM TO ASTM C 857.
 F. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 AND A 82.

NO SCALE
 STANDARD NO. BB
 PREPARED BY: [REDACTED]
 CHECKED BY: [REDACTED]
 DATE: 8/23/11

CHARLOTTE-MECKLENBURG UTILITIES
 STANDARD DETAILS
 WATER

PRECAST CONCRETE METER BOX FOR 1 - INCH WATER SERVICE

WEIGHT - 150 LB. (MIN.) - 170 LB (MAX.)

NO. DESCRIPTION

- END OF LINE GATE VALVE (MJ x MJ)
- DIP - (PE x PE) - REMOVE BELL - LENGTH = 17 FT - 19 FT
- WEDGE ACTION THRUST RESTRAINT GLAND
- CONCRETE WALL BLOCK (P = 3600 PSI MIN) 6 FT x 4 FT x WIDTH (W)
- REBAR - GRADE 60 PER ASTM A615 - SEE REBAR SCHEDULES
- MJ CAP - WITH WEDGE ACTION RESTRAINT GLAND, TAP 2" THREADED OUTLET (FNPT)
- 2" RED BRASS NIPPLE SCH 40 (MNPT x MNPT) - LENGTH = 12 INCH
- 2" RED BRASS 90° BEND (FNPT x FNPT)
- 2" RED BRASS NIPPLE SCH 40 (MNPT x MNPT) - LENGTH AS REQUIRED
- 2" GALVANIZED MALLEABLE IRON COUPLING (FNPT x FNPT)
- STANDARD VALVE BOX ASSEMBLY - SEE DETAIL
- AWG #12 GAUGE COPPER TRACER WIRE - WITH BLUE INSULATION (SOME HOPE) TERMINATE WITH 4-INCH EXCESS WIRE (COILED) IN VALVE BOX (TYP)
- 1" SCH 40 PVC ELECTRICAL CONDUIT - LENGTH AS REQUIRED
- UNDISTURBED SOIL
- HIGH DENSITY CROSS LAMINATED POLYETHYLENE FILM TUBE (HDCLPE) AWWA C105 - 4 MILS EACH x 2 LAYER x MILS TOTAL
- HDPE ADHESIVE TAPE OR HDPE ZIP LOCK TIES
- PLYWOOD FORM
- 5" CAST IRON SOIL PIPE (L = 15') OR VALVE BOX BOTTOM SECTION

NOTES:
 A. 12-INCH MAINS REQUIRE THIS INSTALLATION.
 B. 6-INCH THROUGH 10-INCH MAINS REQUIRE THIS INSTALLATION WHEN SOFT SOILS ARE ENCOUNTERED, OR WHEN REQUIRED BY THE ENGINEER.
 C. WHEN DIRECTED BY THE ENGINEER, THE CONCRETE WALL BLOCK SIZE MAY BE ADJUSTED, BASED ON ACTUAL SOIL CLASSIFICATION AND PIPE DIAMETER.
 D. FULLY RESTRAINED JOINT PIPE MAY BE USED IN LIEU OF THIS DETAIL - SEE RESTRAINED JOINT PIPE DETAILS.
 E. ALTERNATE DETAIL "A" (USING A REVERSED BELL) MAY BE USED IN LIEU OF DETAIL "A".

NO. ALTERNATE DESCRIPTION
 WHEN USING 2-INCH HOPE (IPS) BLOW-OFF PIPE WITH STAINLESS STEEL, BRASS OR BRONZE MNPT ENDS, USE THE FOLLOWING PRODUCTS:
 7. 2" SDR 9 HOPE (POLY) - IPS PIPE (MNPT x MNPT) - LENGTH AS REQUIRED - 12-INCH MINIMUM.
 9. 2" SDR 9 HOPE (POLY) - IPS PIPE (MNPT x MNPT) - LENGTH AS REQUIRED.

APPROXIMATE SOIL BEARING CAPACITY (DIPRA)

SOIL TYPE	BEARING CAPACITY (LB/SQ FT)
HARD CLAY	9,000
7,000	
SANDY CLAY	6,000
5,000	
SAND	4,000
2,000	
SANDY SILT	3,000
2,000	
SILT	1,500
1,250	
SOFT CLAY	1,000
750	
MUCK	500
250	

REBAR SCHEDULE

TYPE	LENGTH (INCHES)	NUMBER REQUIRED
VERTICAL	36	6
HORIZONTAL	82	6
HORIZONTAL	24	2
DIAGONAL	30	4

REBAR SCHEDULE

PIPE DIAMETER (INCHES)	BAR SIZE	TOTAL REBAR LENGTH (FT)	TOTAL REBAR WEIGHT (LB)
6"	#7	64	86
8"	#7	64	131
10"	#8	64	171
12"	#9	64	218

SCALE
 1" = 12'-0" (PIPE DIAMETER)

CHARLOTTE-MECKLENBURG UTILITIES
 STANDARD DETAILS
 WATER

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

REBAR DETAIL

END VIEW

DETAIL "A"

DETAIL "A" (ALT)

NOTES:
 A. ALL FLANGE HARDWARE (BOLT/WASHER/NUT) SHALL BE STAINLESS STEEL - TYPE 304 WITH ANTI-SEIZE COMPOUND.
 B. ALL PIPE SHALL BE RESTRAINED JOINT DUCTILE IRON FROM TAP TO PROPERTY LINE VALVE.
 C. METER CONFIGURATION AND LENGTH MAY VARY DUE TO BRAND - VERIFY LENGTH TO DETERMINE MINIMUM VAULT LENGTH.
 D. VAULT SHALL BE SIZED AS NEEDED FOR PIPE (7.5" MINIMUM) AND RATED FOR NCDOT HS-20 LOADING - SUBMIT SHOP DRAWINGS / P.E. SEALED FOR REVIEW.
 E. ALL CONCRETE SHALL BE MINIMUM 4000 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 CONNECTORS (MAN-HOLE BOOT) OR WITH 8-INCHES OF BRICK & MORTAR (AND 1/2 INCH THICK CONSTRUCTION EXPANSION MATERIAL).
 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.
 N. ALL VALVES SHALL BE OPEN RIGHT - CLOCKWISE, EXCEPT NO. 13.

NO. DESCRIPTION

- 4" TAPPING SLEEVE AND 4" FLANGE x MJ TAPPING VALVE ON EXISTING MAIN, 3" MJ TEE AND 2" MJ GATE VALVE ON NEW MAIN
- STANDARD VALVE BOX ASSEMBLY (TYP) - ALL VALVES
- 4" x 3" REDUCER (RJ) REQUIRED ON EXISTING MAIN INSTALLATIONS. (REDUCER NOT REQUIRED ON NEW MAIN INSTALLATIONS)
- FLANGE DUCTILE IRON TEE WITH ADJUSTABLE FLANGE SUPPORT
- FLANGE DUCTILE IRON 90° BEND
- FLANGE x FLANGE DUCTILE IRON PIPE (MIN. SPECIAL CLASS 53)
- MJ LONG PATTERN SOLID SLEEVE WITH RESTRAINED JOINTS
- 3/4" BALL CORPORATION STOP WITH TAPPING SADDLE
- FLANGE GATE VALVE WITH 2" OPERATING NUT - OPEN RIGHT AND WITH ADJUSTABLE FLANGE SUPPORT ON BYPASS VALVE
- FLANGE STRAINER
- FLANGE COMPOUND METER ASSEMBLY (W/AMR TRANSMITTERS, METER CONFIGURATION MAY VARY DUE TO BRAND SUPPLIED)
- FLANGE CHECK VALVE W/BLIND FLANGE-2" TAP/THREADED BRASS PLUG
- MECHANICAL JOINT (RJ) GATE VALVE-2" OPERATING NUT - OPEN LEFT @ PROPERTY LINE
- MECHANICAL JOINT PLUG WITH 2" TAP
- 2" PIPE GALVANIZED STEEL (SCH 80), RED BRASS (SCH 40), HDPE (DR 9) OR DIP WITH STANDARD VALVE BOX CONCRETE PAD
- 2" THREADED COUPLING
- ADJUSTABLE FLANGE SUPPORTS (3 REQUIRED)
- AMR TRANSMITTERS
- 4" x 5" DOUBLE-LEAF ACCESS DOOR - SEE STANDARD DETAIL
- PRECAST REINFORCED CONCRETE VAULT
- MINIMUM OF (3) STANDARD SOLID CONCRETE BRICK COURSES UNDER ACCESS DOOR FRAME, MAXIMUM 2 FT.
- JOINT REQUIRED AT FLAT TOP SECTION
- 3/8" DIA. GALV. STEEL EYE BOLT (ADHESIVE ANCHOR) - TYPICAL
- AWG #12 GAUGE COPPER TRACER WIRE (TWN) - WITH BLUE INSULATION - TERMINATE WITH 24" EXCESS WIRE (COILED) @ EYE BOLT AND VALVE BOX (TYPICAL)
- CAST IN PLACE CONCRETE SIDEWALK - BRICKWORK SHALL NOT EXTEND TO SURFACE. ACCESS DOOR FRAME SHALL REST ON SIDEWALK.
- VALVE LOCK (FURNISHED BY CMUD) - LOCK VALVE CLOSED
- PLASTIC STEP - 12" OR 16" O.C. VERTICAL SPACING

SCALE
 1" = 12'-0" (PIPE DIAMETER)

CHARLOTTE-MECKLENBURG UTILITIES
 STANDARD DETAILS
 WATER

3 - inch COMPOUND WATER METER AND PRECAST CONCRETE VAULT

PLAN

ELEVATION

SECTION VIEW

ALTERNATE IN CONCRETE SIDEWALK

2/6/2015
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 Utilities

CLTWater STANDARD DETAILS

NOTES:

- ALL FLANGE HARDWARE (BOLT/WASHER/NUT) SHALL BE STAINLESS STEEL - TYPE 304 WITH ANTI-SEIZE COMPOUND.
- ALL PIPE SHALL BE RESTRAINED JOINT DUCTILE IRON FROM TAP TO PROPERTY LINE VALVE.
- METER CONFIGURATION AND LENGTH MAY VARY DUE TO BRAND - VERIFY LENGTH TO DETERMINE MINIMUM VAULT LENGTH.
- VAULT SHALL BE SIZED AS NEEDED FOR PIPE (8.5" MINIMUM) AND RATED FOR NCDOT HS-20 LOADING - SUBMIT SHOP DRAWINGS / P.E. SEALED FOR REVIEW.
- ALL CONCRETE SHALL BE MINIMUM 4000 PSI COMPRESSIVE STRENGTH.
- DESIGN SHALL CONFORM TO ASTM C859 - SPECIFICATIONS FOR "UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURE".
- STEEL REINFORCING DESIGN SHALL CONFORM TO ASTM C857
- REBARS SHALL BE GRADE 60 PER ASTM A615
- WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185
- DIAGONAL REINFORCING SHALL BE ADDED AT ALL OPENINGS
- PIPE PENETRATIONS SHALL BE SEALED WITH FLEXIBLE CONNECTORS (MAN-HOLE BOOTS) OR WITH BUNCHES OF BRICK & MORTAR (AND 1/2 INCH THICK CONSTRUCTION EXPANSION MATERIAL)
- FRAME TO BE FLUSH WITH GROUND OR CONCRETE SIDEWALK, GROUND SHALL SLOPE AWAY FROM VAULT.
- ALL JOINTS SHALL BE MADE WATERTIGHT USING 2 RINGS OF BUTYL RUBBER JOINT MASTIC.
- ALL VALVES SHALL BE OPEN RIGHT - CLOCKWISE, EXCEPT NO. 13

NO. DESCRIPTION

- 4" TAPPING SLEEVE AND 4" FLANGE x MJ TAPPING VALVE ON EXISTING MAIN, 4" MJ TEE AND 4" MJ GATE VALVE ON NEW MAIN.
- STANDARD VALVE BOX ASSEMBLY (TYP.) - ALL VALVES
- 4" RESTRAINED JOINT DUCTILE IRON PIPE
- FLANGE DUCTILE IRON TEE WITH ADJUSTABLE FLANGE SUPPORT
- FLANGE DUCTILE IRON 90°-BEND
- FLANGE x PLAIN END DUCTILE IRON PIPE (MIN. SPECIAL CLASS S3)
- 1/2" LONG PATTERN SOLID SLEEVE WITH RESTRAINED JOINTS
- 3/4" BALL CORPORATION STOP WITH TAPPING SADDLE
- FLANGE GATE VALVE; WITH 2" OPERATING NUT - OPEN RIGHT AND WITH ADJUSTABLE FLANGE SUPPORT ON BYPASS VALVE
- FLANGE STRAINER
- FLANGE COMPOUND METER ASSEMBLY W/AMR TRANSMITTERS, METER CONFIGURATION MAY VARY DUE TO BRAND SUPPLIED.
- FLANGE CHECK VALVE W/1/2" FLANGE-2" TAPIThreaded BRASS PLUG
- MECHANICAL JOINT (RJ) GATE VALVE-2" OPERATING NUT - OPEN LEFT @ PROPERTY LINE.
- MECHANICAL JOINT PLUG WITH 2" TAP
- 2" PIPE GALVANIZED STEEL (SCH 80), RED BRASS (SCH 40), HDPE (DR 9) OR DIP WITH STANDARD VALVE BOX/CONCRETE PAD
- 2" THREADED COUPLING
- ADJUSTABLE FLANGE SUPPORTS (3 REQUIRED)
- AMR TRANSMITTERS
- 4" x 9" DOUBLE LEAF ACCESS DOOR, SEE STANDARD DETAIL
- PRECAST REINFORCED CONCRETE VAULT
- MINIMUM OF (3) STANDARD SOLID CONCRETE BRICK COURSES UNDER ACCESS DOOR FRAME, MAXIMUM 2FT.
- JOINT REQUIRED AT FLAT TOP SECTION.
- 3/8" DIA. GALV. STEEL EYE BOLT (ADHESIVE ANCHOR) - TYPICAL
- AWG #12 GAUGE COPPER TRACER WIRE (THWN) - WITH BLUE INSULATION - TERMINATE WITH 24" EXCESS WIRE (COILED) @ EYE BOLT AND VALVE BOX (TYPICAL)
- CAST IN PLACE CONCRETE SIDEWALK - BRICKWORK SHALL NOT EXTEND TO SURFACE, ACCESS DOOR FRAME SHALL REST ON SIDEWALK.
- VALVE LOCK (FURNISHED BY CMUD) - LOCK VALVE CLOSED
- PLASTIC STEP - 12" OR 18" O.C. VERTICAL SPACING

PLAN

ELEVATION

SECTION VIEW

DETAIL

ALTERNATE IN CONCRETE SIDEWALK

CHARLOTTE-MECKLENBURG UTILITIES STANDARD DETAILS WATER

NO. DESCRIPTION

- TYPE I ADJUSTMENT RISER.
- VALVE BOX - TOP SECTION.
- 18 - 8 SS 3/8"-16 x 3/8" HEX SET SCREW WITH PERMANENT THREAD LOCK (RED) - LOCITITE # 271, PERMABOND HM128, OR APPROVED EQUAL.
- 1/2" DIA. x 1/16" - FIELD DRILL HOLE.

WATER COVER - TOP VIEW

SEWER COVER - TOP VIEW

RECLAIMED WATER - TOP VIEW

CATHODIC PROTECTION COVER TOP VIEW

TYPE I CROSS SECTION - ASSEMBLY

TYPE I - ADJUSTMENT RISER TOP VIEW

TYPE II - ADJUSTMENT RISER SECTION VIEW

TYPE I - ADJUSTMENT RISER SECTION VIEW

TYPE II - ADJUSTMENT RISER		TYPE I - 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 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

NOTES:

- LOAD RATING - HEAVY DUTY.
- FERROUS CASTINGS MATERIAL - ASTM A48 - CLASS 35 GRAY IRON.
- COATING - UNDIPPED OR ASPHALT VARNISH.
- WEIGHT - 0% MINUS TOLERANCE.
- CASTINGS SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.
- TYPE II ADJUSTMENT RISERS MAY BE STACKED.
- TYPE I ADJUSTMENT RISERS MAY NOT BE STACKED.

CHARLOTTE-MECKLENBURG UTILITIES STANDARD DETAILS WATER

NOTES:

- NO BRANCHES, OUTLETS OR TAPS SHALL BE PERMITTED BETWEEN (1) AND (2).
- RP BACKFLOW ASSEMBLY MUST BE TESTED AND APPROVED BY CMU
- APPROVED TESTER PRIOR TO MOVING ANY WATER TO THE NEW MAIN.
- FLEXIBLE HOSE (3) SHALL BE REMOVED DURING PRESSURE / LEAKAGE TESTS.
- CMU FURNISHED PRESSURE GAUGE (4) AND METER (5) SHALL BE REMOVED DURING CHLORINATION.
- CMU METER SHALL BE INSTALLED AT PRIMARY LOCATION (6) AS SHOWN, UNLESS SPECIFICALLY APPROVED AT ALTERNATE LOCATION (7).
- CMU PRESSURE GAUGES SHALL BE INSTALLED AT LOWEST POINT IN NEW MAIN AND AT OPPOSITE END OF NEW MAIN.
- CMU PRESSURE GAUGE (8) SHALL BE INSTALLED WHILE NEW MAIN IS NOT UNDER PRESSURE. MAIN SHALL THEN BE PUMPED UP TO TEST PRESSURE.
- ALL TEMPORARY JUMPER PIPING FROM EXISTING BLOW-OFF TO NEW MAIN SHALL BE SAME DIAMETER AS EXISTING BLOW-OFF - 2" OR 4" DIAMETER.
- BRANCH PIPING TO AND FROM TANK AND INJECTOR PUMP SHALL BE SIZED AS DETERMINED BY CONTRACTOR.
- ALL WATER USED TO FILL, FLUSH, CHLORINATE, DE-CHLORINATE, REFLUSH, OR ACTIVATE NEW MAIN SHALL PASS THROUGH TURBINE METER (9).
- CMU INSPECTOR AND CONTRACTOR SHALL READ AND RECORD METER READING WHEN INSTALLED AND PRIOR TO REMOVAL OF METER (4).
- DURING COLD WEATHER MONTHS, PROVIDE FREEZE PROTECTION AS NECESSARY.

NO. DESCRIPTION

- EXISTING BLOW-OFF ASSEMBLY AND CONTROL VALVE ON EXISTING WATER MAIN
- 2" OR 4" RIGID HARD PIPING
- BALL VALVE (OPTIONAL)
- 2" OR 4" TURBINE METER - (GALS)
- CMU APPROVED 2" OR 4" REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY.
- RIGID MECHANICAL SUPPORT
- QUICK CONNECT COUPLING
- FLEXIBLE HOSE WITH QUICK CONNECT COUPLINGS
- TEE
- 300 PSI INLINE SPRING LOADED CHECK VALVE (OPTIONAL)
- 300 PSI BALL VALVE
- CROSS WITH 1/4" OUTLET
- 300 PSI BRASS (OR STAINLESS STEEL) 1/4" QUICK CONNECT COUPLER (FEMALE)
- CMU FURNISHED 300 PSI PRESSURE GAUGE WITH BRASS (OR STAINLESS STEEL) 1/4" COUPLER PLUG (MALE)
- TEMPORARY BLOW-OFF ASSEMBLY AND CONTROL VALVE ON NEW WATER MAIN
- FLEXIBLE HOSE
- TANK - LIQUID CHLORINE (DURING CHLORINATION) OR FRESH WATER (DURING PRESSURE / LEAKAGE TESTS)
- SUCTION PIPE (FLEXIBLE HOSE OR RIGID PIPE)
- CMU FURNISHED 5/8" METER (GALS) - (PRIMARY LOCATION)
- CMU FURNISHED 5/8" METER (GALS) - (ALTERNATE LOCATION)
- INJECTOR PUMP

ACTIVE CMU WATER SYSTEM FROM POTABLE WATER SOURCE (CMU)

NEW WATER MAIN TO PIPING THAT IS TO BE TESTED

LEGEND

CHARLOTTE-MECKLENBURG UTILITIES STANDARD DETAILS WATER

NO. DESCRIPTION

- CONCRETE PAD - CAST IN PLACE.
- FINAL ASPHALT SURFACE COURSE.
- VALVE BOX COVER.
- TOP SECTION VALVE BOX.
- EXTENSION STEM AS REQUIRED.
- BOTTOM SECTION VALVE BOX.
- 6" PVC PIPE (C900 OR SDR35)
- STANDARD CONCRETE BRICK - 2 EACH.
- GATE VALVE (OR BALL VALVE AS APPLICABLE), 5" DIA. CAST IRON SOIL PIPE - BELL OF PIPE WILL RECEIVE BOTTOM SECTION OF VALVE BOX.
- EXISTING OR NEW PAVEMENT.
- COMPACTED AGGREGATE BASE COURSE (CABC).
- EXISTING OR NEW PAVEMENT.
- COMPACTED SUBGRADE.
- AWG #12 GAUGE COPPER TRACER WIRE (THWN) WITH BLUE INSULATION, TERMINATE WITH 24 INCH EXCESS WIRE (COILED) AT METER BOX AND VALVE BOX (TYP.).

NOTES:

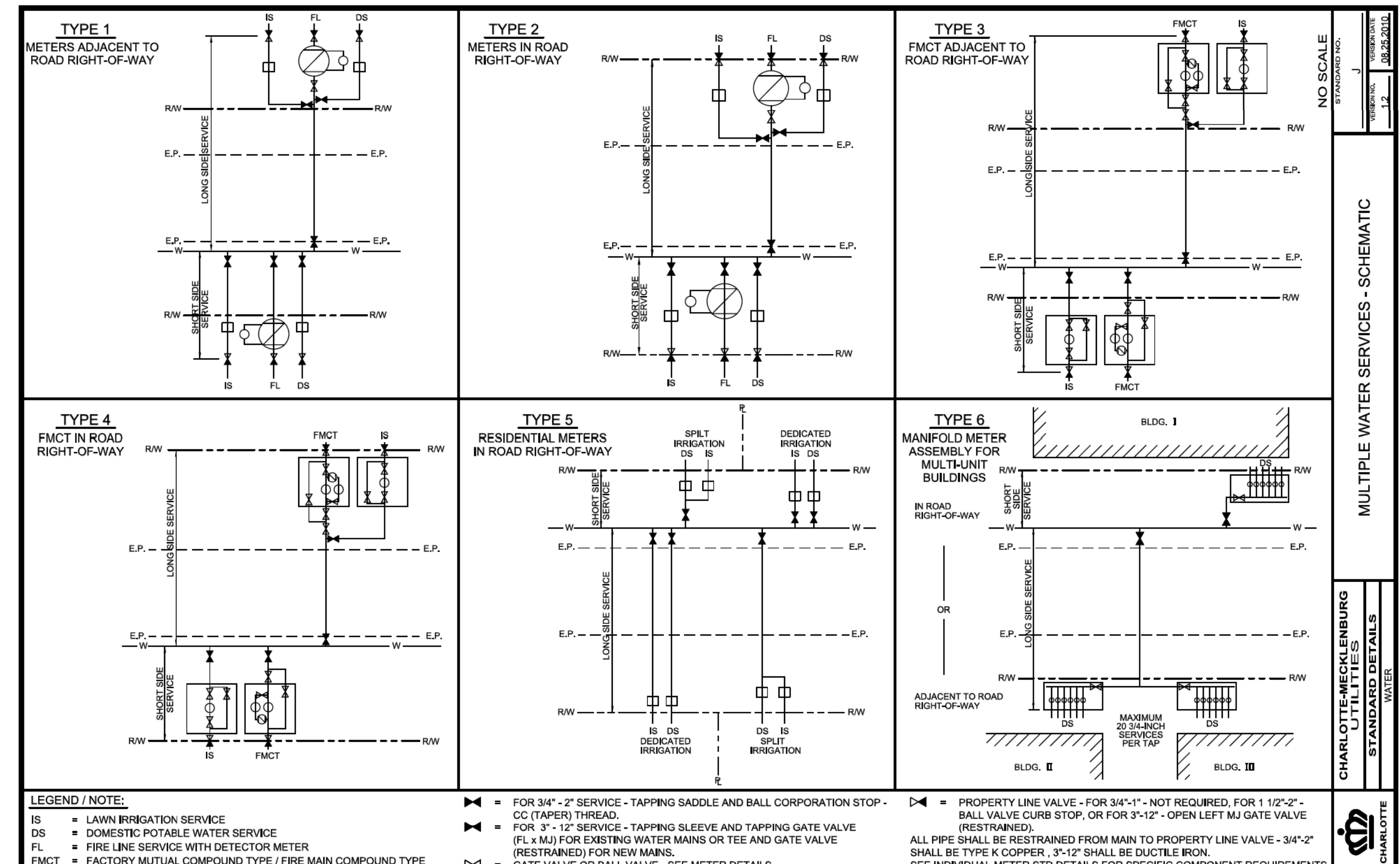
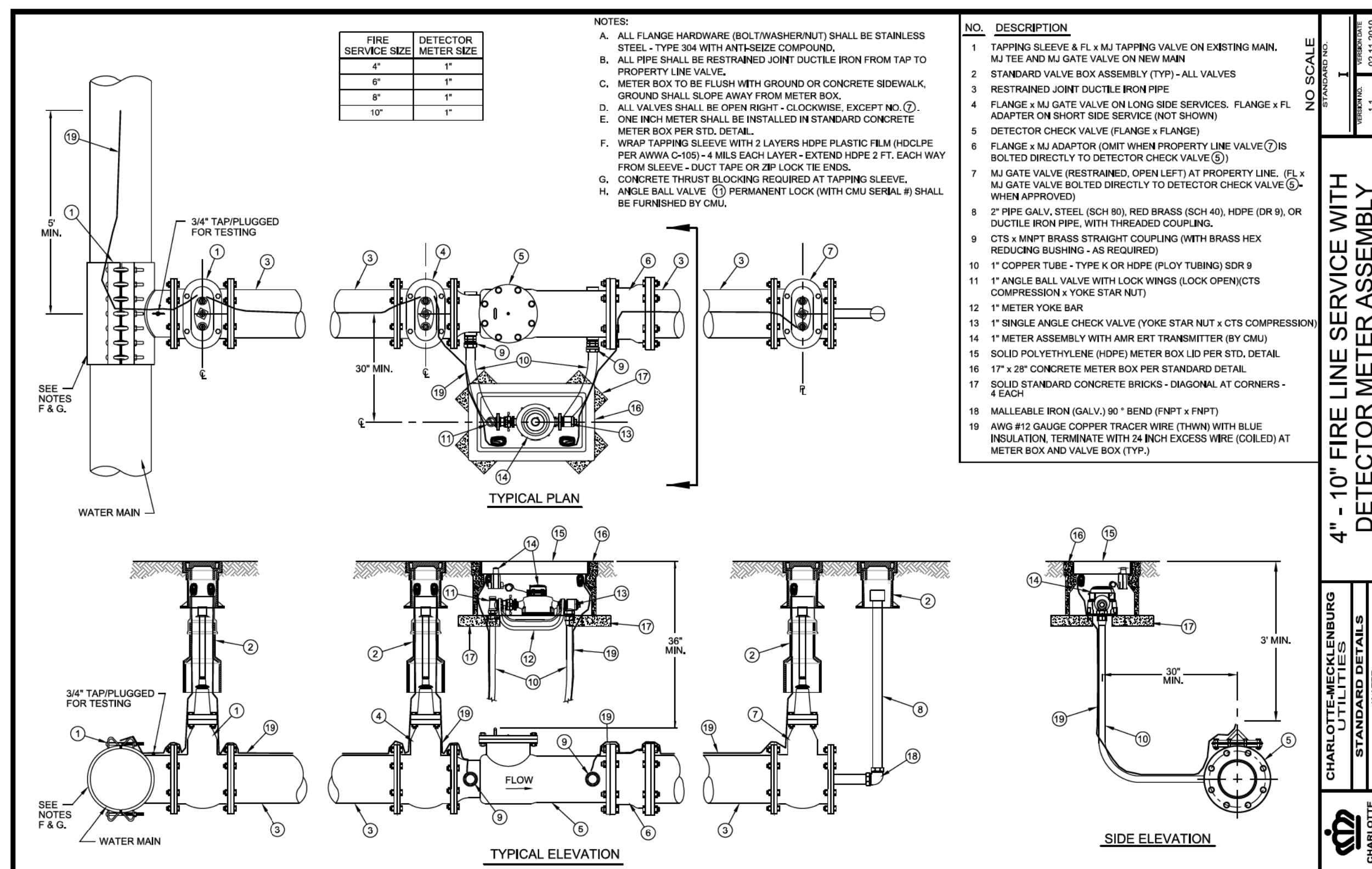
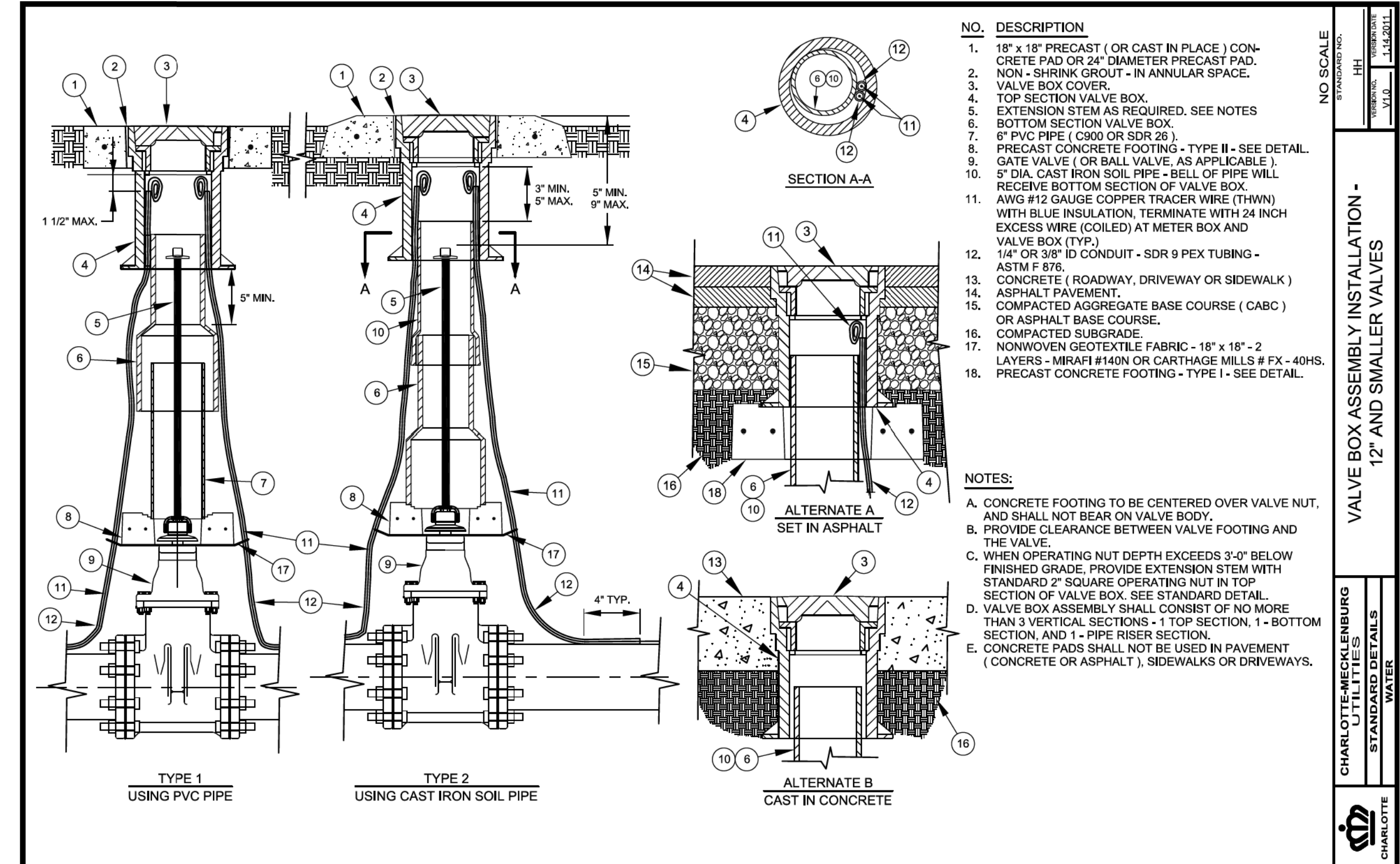
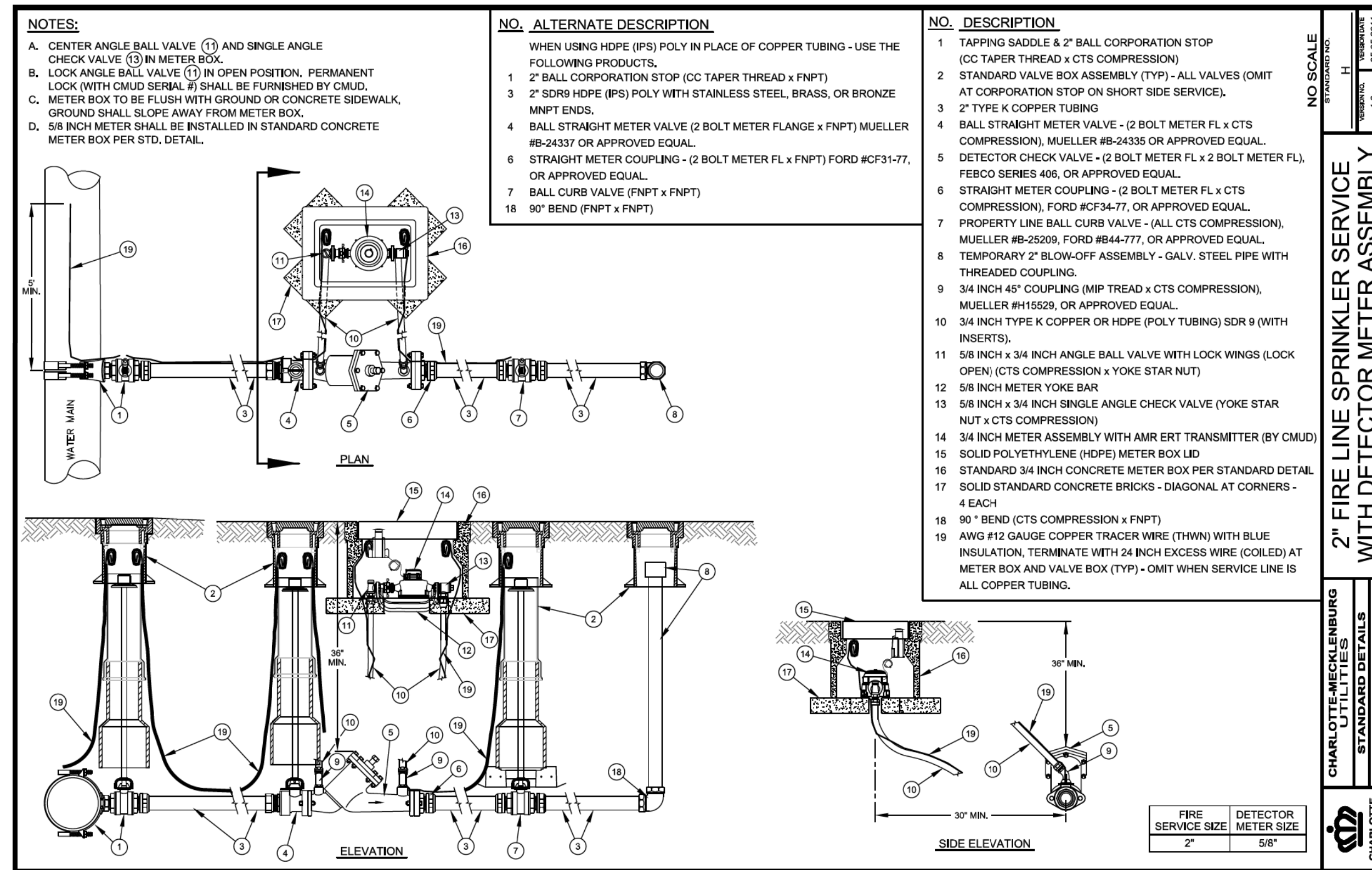
- WATER VALVE ADJUSTMENTS WILL BE COMPLETED AT LEAST 36 HOURS BEFORE RESURFACING.
- MINIMUM WIDTH OF EXCAVATION AROUND VALVE BOX.
- DISTURBED AREAS AROUND STRUCTURE ADJUSTMENTS ARE TO BE TAMPED AND FILLED WITH 4000 PSI HIGH EARLY PORTLAND CEMENT CONCRETE.
- ALL DAMAGED OR MISALIGNED VALVE BOXES ARE TO BE REPORTED TO INSPECTOR, OTHERWISE CONTRACTOR ASSUMES RESPONSIBILITY FOR DAMAGE OR MISALIGNMENT.
- 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 INCHES 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 INCHES OVERLAP AT TOP SECTION/BOTTOM SECTION JOINT SECTION & BOTTOM SECTION RISER PIPE JOINT FOR TYPE B.
- ALL CONCRETE SHALL BE VIBRATED IN ACCORDANCE WITH N.C. DEPARTMENT OF TRANSPORTATION SPECIFICATIONS.
- TOP & BOTTOM SECTION TO BE CENTERED OVER NUT, NOT TO BEAR ON VALVE BODY.
- PROVIDE CLEARANCE BETWEEN VALVE BOX/BRICK AND THE VALVE.
- VALVE BOX ASSEMBLY SHALL CONSIST OF NO MORE THAN 3 VERTICAL SECTIONS - 1 TOP SECTION, 1 - BOTTOM SECTION AND 1 - PIPE RISER SECTION.

TYPE A USING CAST IRON SOIL PIPE

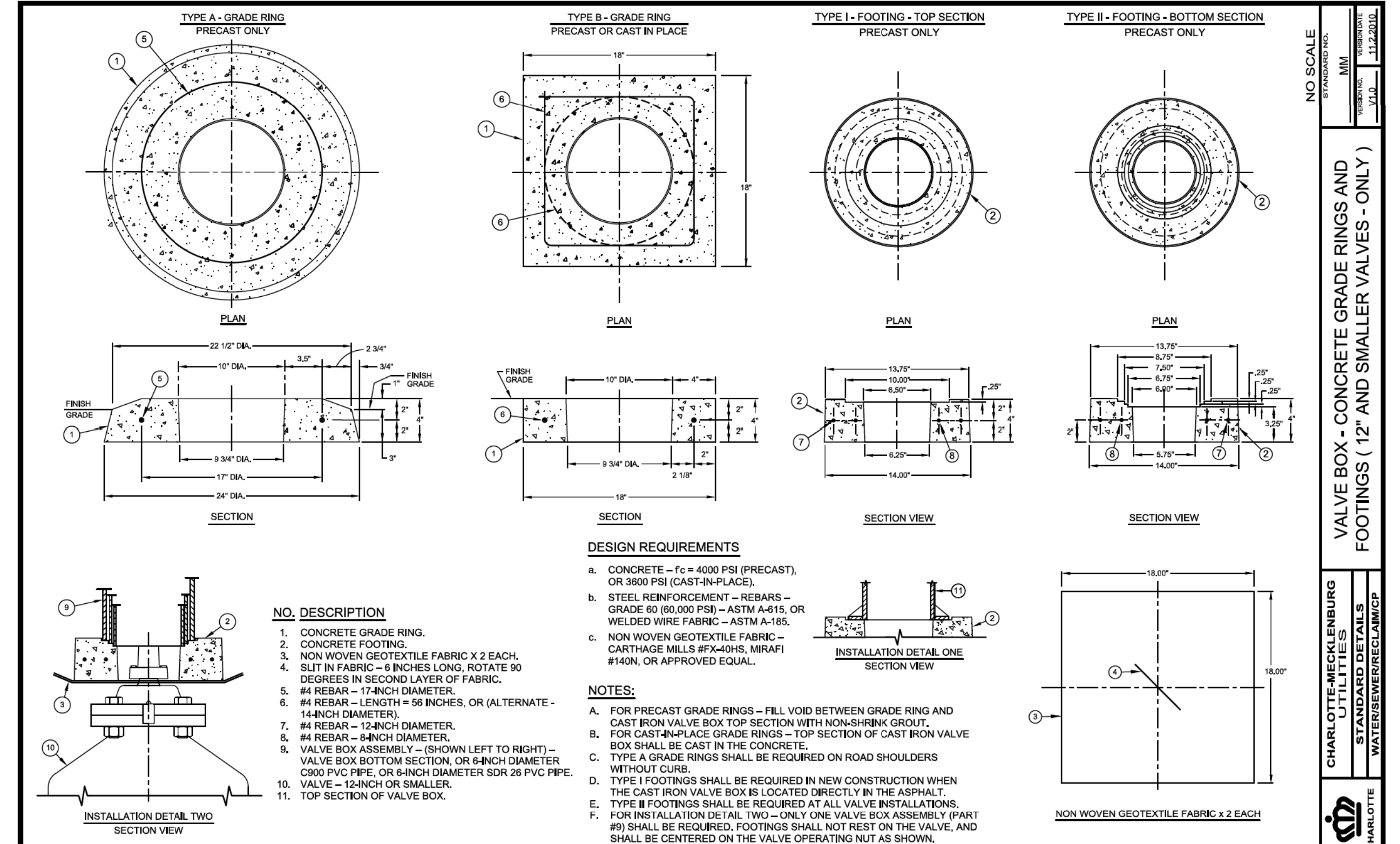
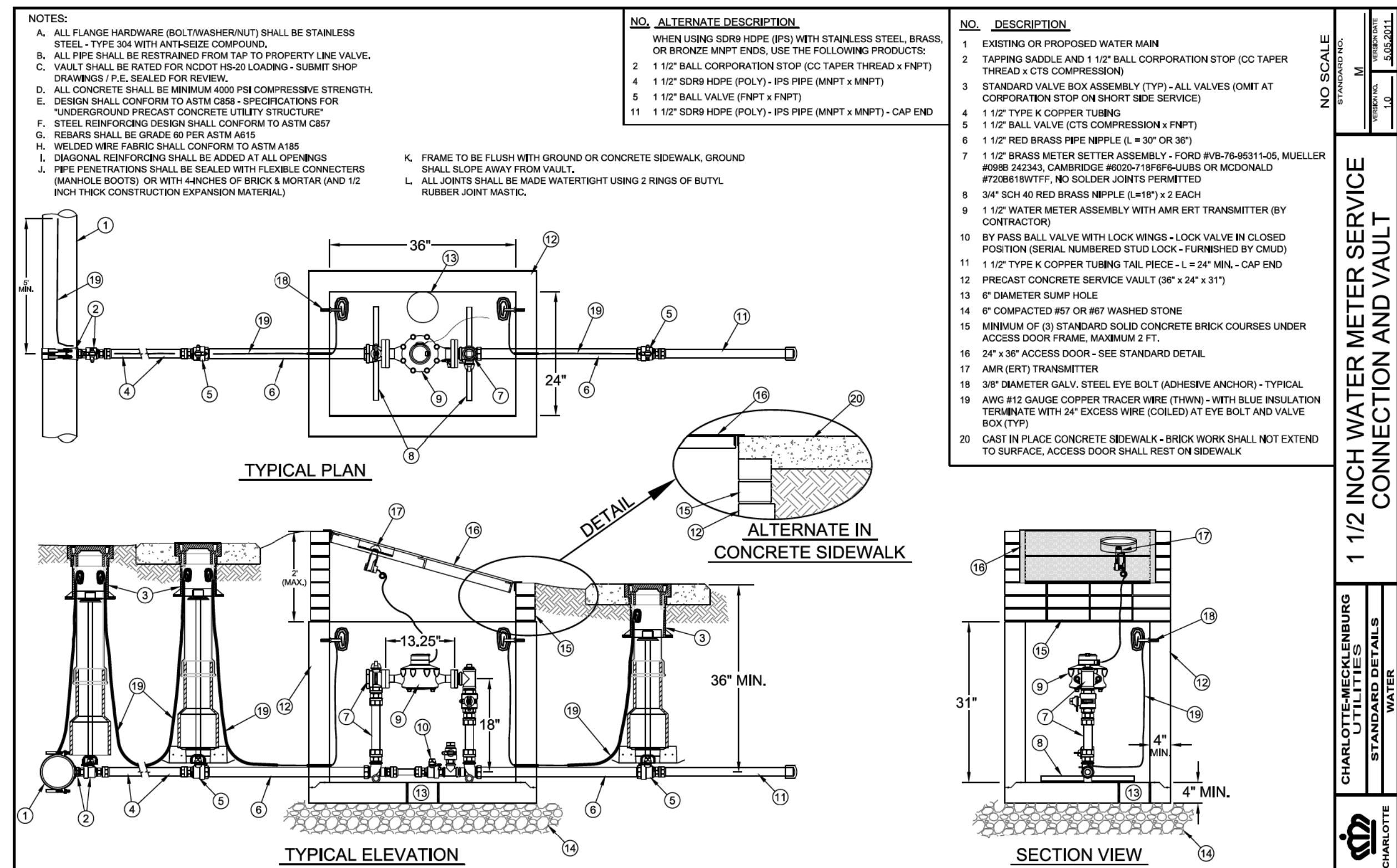
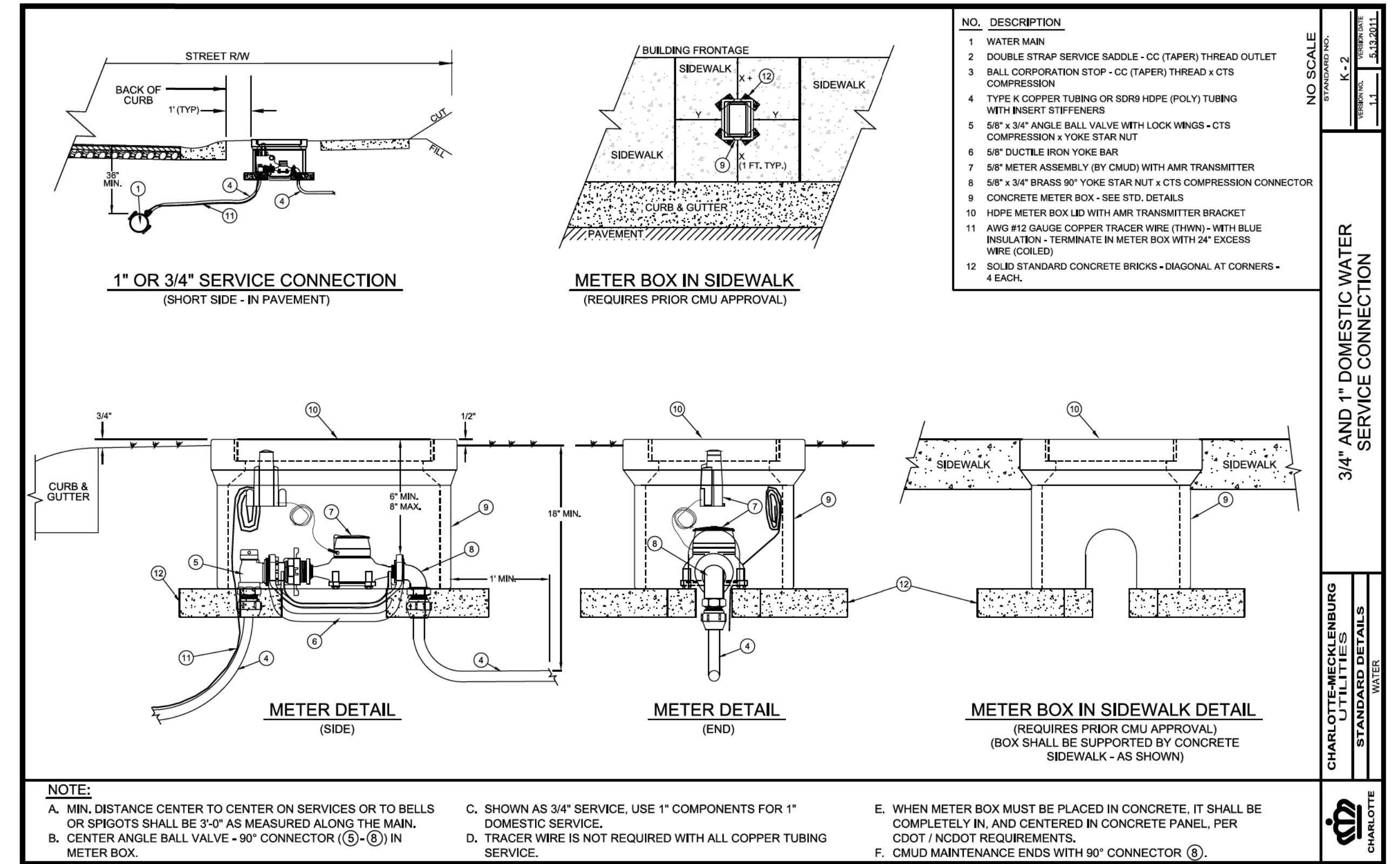
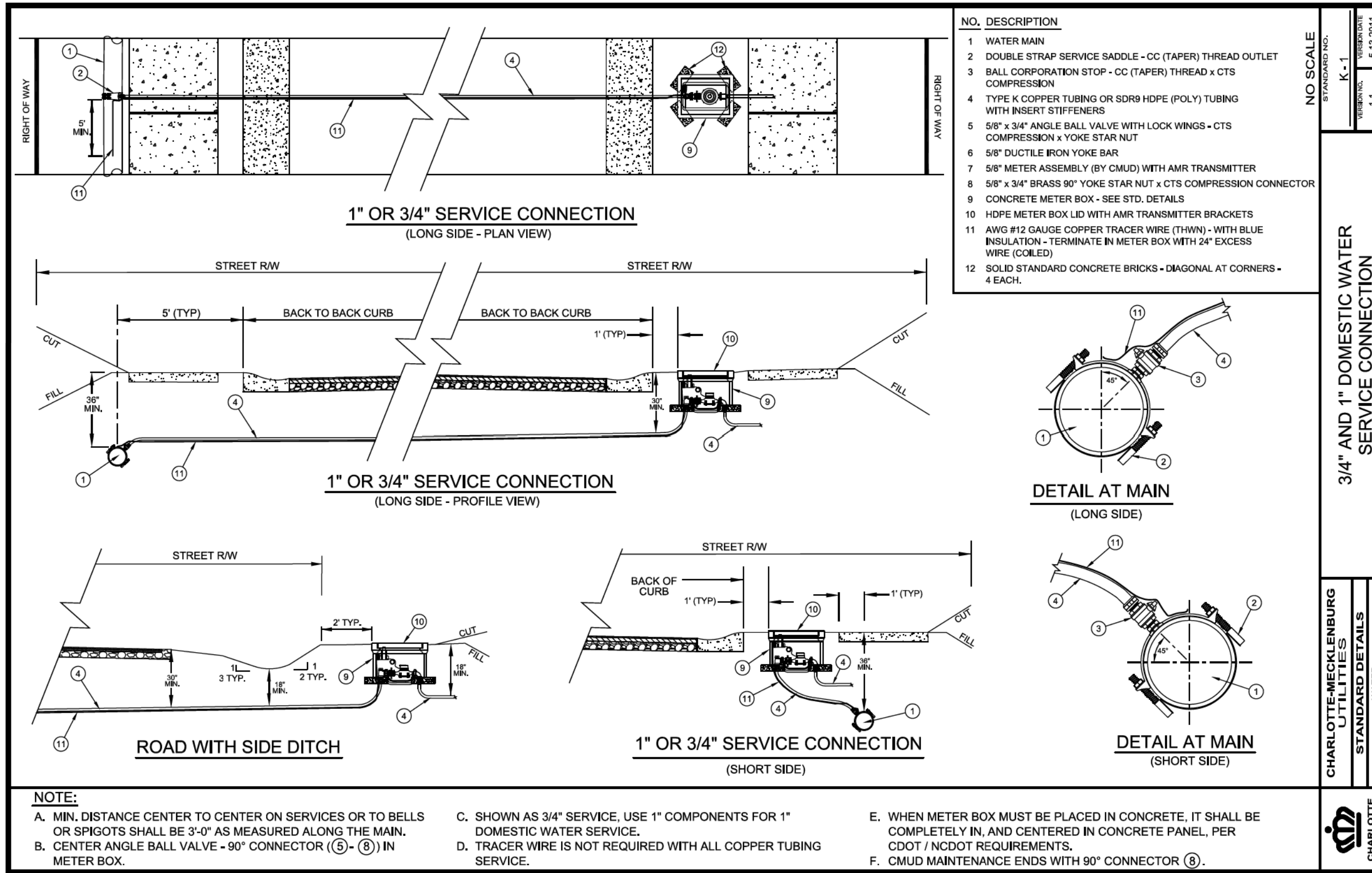
TYPE B USING PVC PIPE

CHARLOTTE-MECKLENBURG UTILITIES STANDARD DETAILS WATER

CLTWater STANDARD DETAILS



CLTWater STANDARD DETAILS



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NO SCALE
STANDARD NO. K-1
CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
WATER

NO SCALE
STANDARD NO. M
CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
WATER

NO SCALE
STANDARD NO. K-2
CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
WATER

NO SCALE
STANDARD NO. N
CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
WATER

CLTWater STANDARD DETAILS

NOTES:

- ALL FLANGE HARDWARE (BOLT/WASHER/NUT) SHALL BE STAINLESS STEEL - TYPE 304 WITH ANTI-SEIZE COMPOUND.
- ALL PIPE SHALL BE RESTRAINED JOINT DUCTILE IRON FROM TAP TO PROPERTY LINE VALVE.
- METER CONFIGURATION AND LENGTH / WIDTH MAY VARY DUE TO BRAND - VERIFY DIMENSIONS TO DETERMINE MINIMUM VAULT SIZE.
- VAULT SHALL BE SIZED AS NEEDED FOR MINIMUM CLEARANCE AS SHOWN AND RATED FOR NOT TO HOLOD - LOADING - SUBMIT SHOP DRAWINGS / P.E. SEALED FOR REVIEW.
- ALL CONCRETE SHALL BE MINIMUM 4000 PSI COMPRESSIVE STRENGTH. DESIGN SHALL CONFORM TO ASTM C888 - SPECIFICATIONS FOR "UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURE"
- STEEL REINFORCING DESIGN SHALL CONFORM TO ASTM C87 REBARS SHALL BE GRADE 60 PER ASTM A615
- WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185
- DIAGONAL REINFORCING SHALL BE ADDED AT ALL OPENINGS
- PIPE PENETRATIONS SHALL BE SEALED WITH FLEXIBLE CONNECTORS (MANHOLE BOOTS) OR WITH HANGES OF BRICK & MORTAR (AND 1/2 INCH THICK CONSTRUCTION EXPANSION MATERIAL)
- FRAME TO BE FLUSH WITH GROUND OR CONCRETE SIDEWALK, GROUND SHALL SLOPE AWAY FROM VAULT.
- ALL JOINTS SHALL BE MADE WATERTIGHT USING 2 RINGS OF BUTYL RUBBER JOINT MASTIC.
- ALL VALVES SHALL BE OPEN RIGHT - CLOCKWISE, EXCEPT NO. 11

NO. DESCRIPTION

- 6" TAPPING SLEEVE AND 6" FL x MJ TAPPING VALVE ON EXISTING MAIN.
- 6" MECHANICAL JOINT OUTLET TEE AND 6" MJ GATE VALVE ON NEW MAIN.
- STANDARD VALVE BOX ASSEMBLY (TYPICAL) - ALL VALVES
- 6" DUCTILE IRON PIPE - RESTRAINED
- 6" MJ x FL DUCTILE IRON ADAPTER ON SHORT SIDE SERVICE (NOT SHOWN), 6" MJ x FL GATE VALVE ON LONG SIDE SERVICE (SHOWN)
- 6" ALL FLANGE DUCTILE IRON TEE
- 6" ALL FLANGE GATE VALVE
- 6" ALL FLANGE DUCTILE IRON PIPE SPOOL - L = 30" (MIN.) (SPECIAL CLASS S3)
- 6" FMCT METER ASSEMBLY (FLANGE x FLANGE) - SHOWN AS 6" x 2", MAY ALSO BE 6" x 1 1/2" - AS DETERMINED BY MANUFACTURER.
- STRAINER
- METER WITH AMR / TRANSMITTER
- CHECK VALVE
- 2" BRASS BALL VALVE WITH HANDLE (FNPT x FNPT)
- 2" BRASS 90° BEND (FNPT x FNPT)
- 2" METER (2 BOLT METER FL - EACH END) WITH AMR / TRANSMITTER
- 2" BRONZE CHECK VALVE (FNPT x FNPT)
- 2" BRONZE TEE (FNPT x FNPT x FNPT)
- 2" BRONZE PLUG (MNPT)
- 2" RED BRASS PIPE NIPPLES (TYP - AS READ) - (MNPT x MNPT)
- 2" (MIN.) SQUARE HEAD BRASS PLUG (MNPT)
- 6" DUCTILE IRON 90° BEND FLANGE x FLANGE
- 6" DUCTILE IRON PIPE - FLANGE x FLANGE SPOOL - L = 42" (MIN.) (SPECIAL CLASS S3)
- 6" x 1 1/2" SERVICE SADDLE WITH 1 1/2" BALL CORPORATION STOP - CC - TAPER TREAD
- 6" DUCTILE IRON PIPE - FLANGE x PE - L = 24" (MIN.) (SPECIAL CLASS S3)
- 6" MECHANICAL JOINT DUCTILE IRON LONG PATTERN SOLID SLEEVE WITH RESTRAINED JOINT
- 6" DUCTILE IRON PIPE - FLANGE x PE - L = 18" (MIN.) (SPECIAL CLASS S3)
- 6" DUCTILE IRON PIPE - FLANGE x PE - L = 30" (MIN.) (SPECIAL CLASS S3)
- 6" MECHANICAL JOINT (RJ) GATE VALVE - OPEN LEFT AT PROPERTY LINE
- 6" MECHANICAL JOINT PLUG WITH 2" TAP (FNPT)
- 2" TEMPORARY BLOW OFF ASSEMBLY (GALV. STEEL (SCH 80), RED BRASS (SCH 40), HOPE (DR9) OR DIP - END WITH THREADED COUPLING)
- GALV. STEEL OR S.S. ADJUSTABLE FLANGE PIPE SUPPORTS (NUMBER REQ'D = 3) (WITH STAINLESS STEEL ADHESIVE ANCHORS)
- AMR TRANSMITTERS (ERT)
- 5 FT x 5 FT ACCESS DOOR - SEE STD. DETAIL
- PRECAST REINFORCED CONCRETE VAULT - 8 FT x 6 FT x 5 FT (MIN.) SEE NOTES C AND D.
- JOINT REQUIRED AT FLAT TOP SECTION
- MINIMUM OF (3) STD. SOLID CONCRETE BRICK COURSES UNDER ACCESS DOOR FRAME - MAX. 2 FT.
- 3/8" DIA. GALV. STEEL EYE BOLT (EPOXY ADHESIVE ANCHOR) - TYPICAL
- AWG #12 GAUGE COPPER TRACER WIRE (THWN) - WITH BLUE INSULATION - TERMINATE WITH 24" EXCESS WIRE (COILED) AT EYE BOLT AND VALVE BOX (TYPICAL)
- CAST IN PLACE CONCRETE SIDEWALK - BRICKWORK SHALL NOT EXTEND TO SURFACE. ACCESS DOOR FRAME SHALL REST ON SIDEWALK.
- VALVE LOCK (FURNISHED BY CM/ID) - LOCK VALVE CLOSED.
- PLASTIC STEP - 12" OR 16" O.C. VERTICAL SPACING.

TYPICAL PLAN

TYPICAL ELEVATION

SECTION VIEW

ALTERNATE SCHEMATIC (FOR LIMITED SPACE INSTALLATIONS)

METER SIZE	A	B	C	D	E	F	G	H	8.11	J
6"	45"	11 1/16"	11 3/8"	21 1/4"	20"	19 1/2"	9 1/2"	16"	2"	3"

DIMENSION B - H VARY SLIGHTLY - AS DETERMINED BY MANUFACTURER.

RESTRAINED PIPE LENGTH REQUIREMENTS:

PIPE DIAMETER (INCHES)	REQUIRED RESTRAINED LENGTH: BARE DIP (FEET)	POLYWRAPPED DIP (FEET)
6	169	242
8	219	312
10	284	377
12	309	441

DESIGN BASIS:
 DIPRA THRUST RESTRAINT DESIGN FOR DIP[®] VERSION 3.3 DATED 05/08/2003
 LAYING CONDITION: TYPE 2
 SOIL DESIGNATION: SILT
 DEPTH OF COVER: 3.0 FT. MINIMUM
 DESIGN PRESSURE: 200 PSI
 SAFETY FACTOR: 2.0

APPROX. DEAD END THRUST SOIL BEARING PRESSURE

SOIL TYPE	APPROX. DEAD END THRUST SOIL BEARING PRESSURE (PSF)	UNDISTURBED SOIL BEARING PRESSURE (PSF)	APPROX. SOIL BEARING PRESSURE (PSF)
HARD CLAY	9,000	1,500	1,500
SANDY CLAY	6,000	1,500	1,500
SAND 4,000	4,000	1,500	1,500
SANDY SILT	3,000	1,500	1,500
SILT	2,000	1,500	1,500
CLAY	1,500	1,500	1,500
SOFT CLAY	1,000	1,500	1,500
MUCK	500	1,500	1,500

APPROXIMATE SOIL BEARING CAPACITY (GPA)

SOIL TYPE	APPROXIMATE SOIL BEARING CAPACITY (GPA)
HARD CLAY	9,000
SANDY CLAY	6,000
SAND 4,000	4,000
SANDY SILT	3,000
SILT	2,000
CLAY	1,500
SOFT CLAY	1,000
MUCK	500

NO. DESCRIPTION

- 2-1/2" DR 13.5 PVC WATER MAIN (IPS)
- 2-1/2" DR 13.5 PVC ADAPTER (BELL x MNPT) - FUSION BONDED EPOXY - HARCO OR APPROVED EQUAL.
- 2-1/2" GATE VALVE (FNPT x FNPT)
- 2-1/2" DR BRASS NIPPLE - SCH 40 - (MNPT x MNPT), L = 30-INCH (MIN)
- 2-1/2" DR BRASS 90° BEND (FNPT x FNPT)
- 2-1/2" DR BRASS NIPPLE - SCH 40 - (MNPT x MNPT) - LENGTH AS REQUIRED
- 2-1/2" DR BRASS NIPPLE - SCH 40 (MNPT x MNPT), L = 12-INCH (MIN)
- 2-1/2" THREADED COUPLING (FNPT x FNPT) - GALV. MALLEABLE IRON OR DUCTILE IRON (I & L)
- STANDARD VALVE BOX ASSEMBLY - SEE DETAIL
- 5-INCH CAST IRON SOL. PIPE, L = 15-INCHES, OR VALVE BOX BOTTOM SECTION
- PRECAST CONCRETE SOLID BLOCK (16" x 8" x 4")

NO. ALTERNATE DESCRIPTION

WHEN USING 2-INCH SDR 9 PIPE (IPS) BLOW-OFF PIPE WITH STAINLESS STEEL BRASS OR BRONZE MNPT ENDS, USE THE FOLLOWING PRODUCTS:

- 2-1/2" SDR 9 HOPE (POLY) - IPS PIPE (MNPT x MNPT) - L = 30-INCH (MIN)
- 2-1/2" SDR 9 HOPE (POLY) - IPS PIPE (MNPT x MNPT) - LENGTH AS REQ'D.
- 2-1/2" SDR 9 HOPE (POLY) - IPS PIPE (MNPT x MNPT) - L = 12-INCH (MIN)

2-INCH WATER MAINS

PLAN VIEW

ELEVATION VIEW

END VIEW

SECTION VIEW

ALTERNATE SCHEMATIC (FOR LIMITED SPACE INSTALLATIONS)

TYPICAL PLAN

TYPICAL ELEVATION

SECTION VIEW

ALTERNATE SCHEMATIC (FOR LIMITED SPACE INSTALLATIONS)

METER SIZE	A	B	C	D	E	F	G	H	8.11	J
6"	50"	11 13/16"	13 29/64"	25 7/8"	34 1/4"	21 3/4"	12 1/2"	17"	3"	3"

DIMENSION B - H VARY SLIGHTLY - AS DETERMINED BY MANUFACTURER.

3/4 - INCH SERVICE LID

1 - INCH SERVICE LID

NOTES:

- MATERIAL - HIGH DENSITY POLYETHYLENE (HDPE) - RECYCLED
- COLOR - CHARLOTTE GREY
- LOAD RATING - HEAVY DUTY
- MANUFACTURER - DFW PLASTICS INC. OR APPROVED EQUAL

NO. DESCRIPTION

- OUTLET TAPPING SLEEVE AND 6" FL x MJ TAPPING VALVE ON EXISTING MAIN.
- 6" MECHANICAL JOINT OUTLET TEE AND 6" MJ GATE VALVE ON NEW MAIN.
- STANDARD VALVE BOX ASSEMBLY (TYPICAL) - ALL VALVES
- 6" DUCTILE IRON PIPE - RESTRAINED
- 6" MJ x FL DUCTILE IRON ADAPTER ON SHORT SIDE SERVICE (NOT SHOWN), 6" MJ x FL GATE VALVE ON LONG SIDE SERVICE (SHOWN)
- 6" ALL FLANGE DUCTILE IRON TEE
- 6" ALL FLANGE GATE VALVE
- 6" ALL FLANGE DUCTILE IRON PIPE SPOOL - L = 30" (MIN.) (SPECIAL CLASS S3)
- 6" FMCT METER ASSEMBLY (FLANGE x FLANGE)
- STRAINER
- METER WITH AMR / TRANSMITTER
- CHECK VALVE
- 2" BRASS BALL VALVE WITH HANDLE (FNPT x FNPT)
- 2" BRASS 90° BEND (FNPT x FNPT)
- 2" METER (2 BOLT METER FL - EACH END) WITH AMR / TRANSMITTER
- 2" BRONZE CHECK VALVE (FNPT x FNPT)
- 2" BRONZE TEE (FNPT x FNPT x FNPT)
- 2" BRONZE PLUG (MNPT)
- 2" RED BRASS PIPE NIPPLES (TYP - AS READ) - (MNPT x MNPT)
- 2" (MIN.) SQUARE HEAD BRASS PLUG (MNPT)
- 6" DUCTILE IRON 90° BEND FLANGE x FLANGE
- 6" DUCTILE IRON PIPE - FLANGE x FLANGE SPOOL - L = 60" (MIN.) (SPECIAL CLASS S3)
- 6" x 1 1/2" SERVICE SADDLE WITH 1 1/2" BALL CORPORATION STOP - CC - TAPER TREAD
- 6" DUCTILE IRON PIPE - FLANGE x PE - L = 20" (MIN.) (SPECIAL CLASS S3)
- 6" MECHANICAL JOINT DUCTILE IRON LONG PATTERN SOLID SLEEVE WITH RESTRAINED JOINT
- 6" DUCTILE IRON PIPE - FLANGE x PE - L = 14" (MIN.) (SPECIAL CLASS S3)
- 6" DUCTILE IRON PIPE - FLANGE x PE - L = 30" (MIN.) (SPECIAL CLASS S3)
- 6" MECHANICAL JOINT (RJ) GATE VALVE - OPEN LEFT AT PROPERTY LINE
- 6" MECHANICAL JOINT PLUG WITH 2" TAP (FNPT)
- 2" TEMPORARY BLOW OFF ASSEMBLY (GALV. STEEL (SCH 80), RED BRASS (SCH 40), HOPE (DR9) OR DIP - END WITH THREADED COUPLING)
- GALV. STEEL OR S.S. ADJUSTABLE FLANGE PIPE SUPPORT (NUMBER REQ'D = 4) (WITH STAINLESS STEEL ADHESIVE ANCHORS)
- AMR TRANSMITTERS (ERT)
- 5 FT x 5 FT ACCESS DOOR - SEE STD. DETAIL
- PRECAST REINFORCED CONCRETE VAULT - 8 FT x 6 FT x 5 FT (MIN.) SEE NOTES C AND D.
- JOINT REQUIRED AT FLAT TOP SECTION
- 3/8" DIA. GALV. STEEL EYE BOLT (EPOXY ADHESIVE ANCHOR) - TYPICAL
- AWG #12 GAUGE COPPER TRACER WIRE (THWN) - WITH BLUE INSULATION - TERMINATE WITH 24" EXCESS WIRE (COILED) AT EYE BOLT AND VALVE BOX (TYPICAL)
- CAST IN PLACE CONCRETE SIDEWALK - BRICKWORK SHALL NOT EXTEND TO SURFACE. ACCESS DOOR FRAME SHALL REST ON SIDEWALK.
- VALVE LOCK (FURNISHED BY CM/ID) - LOCK VALVE CLOSED.
- PLASTIC STEP - 12" OR 16" O.C. VERTICAL SPACING.

WATER METER BOX - PLASTIC LID FOR 3/4 - INCH AND 1 - INCH WATER SERVICES

TYPICAL PLAN

TYPICAL ELEVATION

SECTION VIEW

ALTERNATE SCHEMATIC (FOR LIMITED SPACE INSTALLATIONS)

METER SIZE	A	B	C	D	E	F	G	H	8.11	J
6"	50"	11 13/16"	13 29/64"	25 7/8"	34 1/4"	21 3/4"	12 1/2"	17"	3"	3"

DIMENSION B - H VARY SLIGHTLY - AS DETERMINED BY MANUFACTURER.

NOTES:

- ALL FLANGE HARDWARE (BOLT/WASHER/NUT) SHALL BE STAINLESS STEEL - TYPE 304 WITH ANTI-SEIZE COMPOUND.
- ALL PIPE SHALL BE RESTRAINED JOINT DUCTILE IRON FROM TAP TO PROPERTY LINE VALVE.
- METER CONFIGURATION AND LENGTH / WIDTH MAY VARY DUE TO BRAND - VERIFY DIMENSIONS TO DETERMINE MINIMUM VAULT SIZE.
- VAULT SHALL BE SIZED AS NEEDED FOR MINIMUM CLEARANCE AS SHOWN AND RATED FOR NOT TO HOLOD - LOADING - SUBMIT SHOP DRAWINGS / P.E. SEALED FOR REVIEW.
- ALL CONCRETE SHALL BE MINIMUM 4000 PSI COMPRESSIVE STRENGTH. DESIGN SHALL CONFORM TO ASTM C888 - SPECIFICATIONS FOR "UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURE"
- STEEL REINFORCING DESIGN SHALL CONFORM TO ASTM C87 REBARS SHALL BE GRADE 60 PER ASTM A615
- WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185
- DIAGONAL REINFORCING SHALL BE ADDED AT ALL OPENINGS
- PIPE PENETRATIONS SHALL BE SEALED WITH FLEXIBLE CONNECTORS (MANHOLE BOOTS) OR WITH HANGES OF BRICK & MORTAR (AND 1/2 INCH THICK CONSTRUCTION EXPANSION MATERIAL)
- FRAME TO BE FLUSH WITH GROUND OR CONCRETE SIDEWALK, GROUND SHALL SLOPE AWAY FROM VAULT.
- ALL JOINTS SHALL BE MADE WATERTIGHT USING 2 RINGS OF BUTYL RUBBER JOINT MASTIC.
- ALL VALVES SHALL BE OPEN RIGHT - CLOCKWISE, EXCEPT NO. 11

NO. DESCRIPTION

- 8" OUTLET TAPPING SLEEVE AND 8" FL x MJ TAPPING VALVE ON EXISTING MAIN.
- 8" MECHANICAL JOINT OUTLET TEE AND 8" MJ GATE VALVE ON NEW MAIN.
- STANDARD VALVE BOX ASSEMBLY (TYPICAL) - ALL VALVES
- 8" DUCTILE IRON PIPE - RESTRAINED
- 8" MJ x FL DUCTILE IRON ADAPTER ON SHORT SIDE SERVICE (NOT SHOWN), 8" MJ x FL GATE VALVE ON LONG SIDE SERVICE (SHOWN)
- 8" ALL FLANGE DUCTILE IRON TEE
- 8" ALL FLANGE GATE VALVE
- 8" ALL FLANGE DUCTILE IRON PIPE SPOOL - L = 30" (MIN.) (SPECIAL CLASS S3)
- 8" FMCT METER ASSEMBLY (FLANGE x FLANGE)
- STRAINER
- METER WITH AMR / TRANSMITTER
- CHECK VALVE
- 2" BRASS BALL VALVE WITH HANDLE (FNPT x FNPT)
- 2" BRASS 90° BEND (FNPT x FNPT)
- 2" METER (2 BOLT METER FL - EACH END) WITH AMR / TRANSMITTER
- 2" BRONZE CHECK VALVE (FNPT x FNPT)
- 2" BRONZE TEE (FNPT x FNPT x FNPT)
- 2" BRONZE PLUG (MNPT)
- 2" RED BRASS PIPE NIPPLES (TYP - AS READ) - (MNPT x MNPT)
- 2" (MIN.) SQUARE HEAD BRASS PLUG (MNPT)
- 6" DUCTILE IRON 90° BEND FLANGE x FLANGE
- 6" DUCTILE IRON PIPE - FLANGE x FLANGE SPOOL - L = 60" (MIN.) (SPECIAL CLASS S3)
- 6" x 1 1/2" SERVICE SADDLE WITH 1 1/2" BALL CORPORATION STOP - CC - TAPER TREAD
- 6" DUCTILE IRON PIPE - FLANGE x PE - L = 20" (MIN.) (SPECIAL CLASS S3)
- 6" MECHANICAL JOINT DUCTILE IRON LONG PATTERN SOLID SLEEVE WITH RESTRAINED JOINT
- 6" DUCTILE IRON PIPE - FLANGE x PE - L = 14" (MIN.) (SPECIAL CLASS S3)
- 6" DUCTILE IRON PIPE - FLANGE x PE - L = 30" (MIN.) (SPECIAL CLASS S3)
- 6" MECHANICAL JOINT (RJ) GATE VALVE - OPEN LEFT AT PROPERTY LINE
- 6" MECHANICAL JOINT PLUG WITH 2" TAP (FNPT)
- 2" TEMPORARY BLOW OFF ASSEMBLY (GALV. STEEL (SCH 80), RED BRASS (SCH 40), HOPE (DR9) OR DIP - END WITH THREADED COUPLING)
- GALV. STEEL OR S.S. ADJUSTABLE FLANGE PIPE SUPPORT (NUMBER REQ'D = 4) (WITH STAINLESS STEEL ADHESIVE ANCHORS)
- AMR TRANSMITTERS (ERT)
- 5 FT x 5 FT ACCESS DOOR - SEE STD. DETAIL
- PRECAST REINFORCED CONCRETE VAULT - 8 FT x 6 FT x 5 FT (MIN.) SEE NOTES C AND D.
- JOINT REQUIRED AT FLAT TOP SECTION
- 3/8" DIA. GALV. STEEL EYE BOLT (EPOXY ADHESIVE ANCHOR) - TYPICAL
- AWG #12 GAUGE COPPER TRACER WIRE (THWN) - WITH BLUE INSULATION - TERMINATE WITH 24" EXCESS WIRE (COILED) AT EYE BOLT AND VALVE BOX (TYPICAL)
- CAST IN PLACE CONCRETE SIDEWALK - BRICKWORK SHALL NOT EXTEND TO SURFACE. ACCESS DOOR FRAME SHALL REST ON SIDEWALK.
- VALVE LOCK (FURNISHED BY CM/ID) - LOCK VALVE CLOSED.
- PLASTIC STEP - 12" OR 16" O.C. VERTICAL SPACING.

8-INCH FIRE METER COMPOUND TYPE (FMCT) WATER METER AND PRECAST CONCRETE VAULT

TYPICAL PLAN

TYPICAL ELEVATION

SECTION VIEW

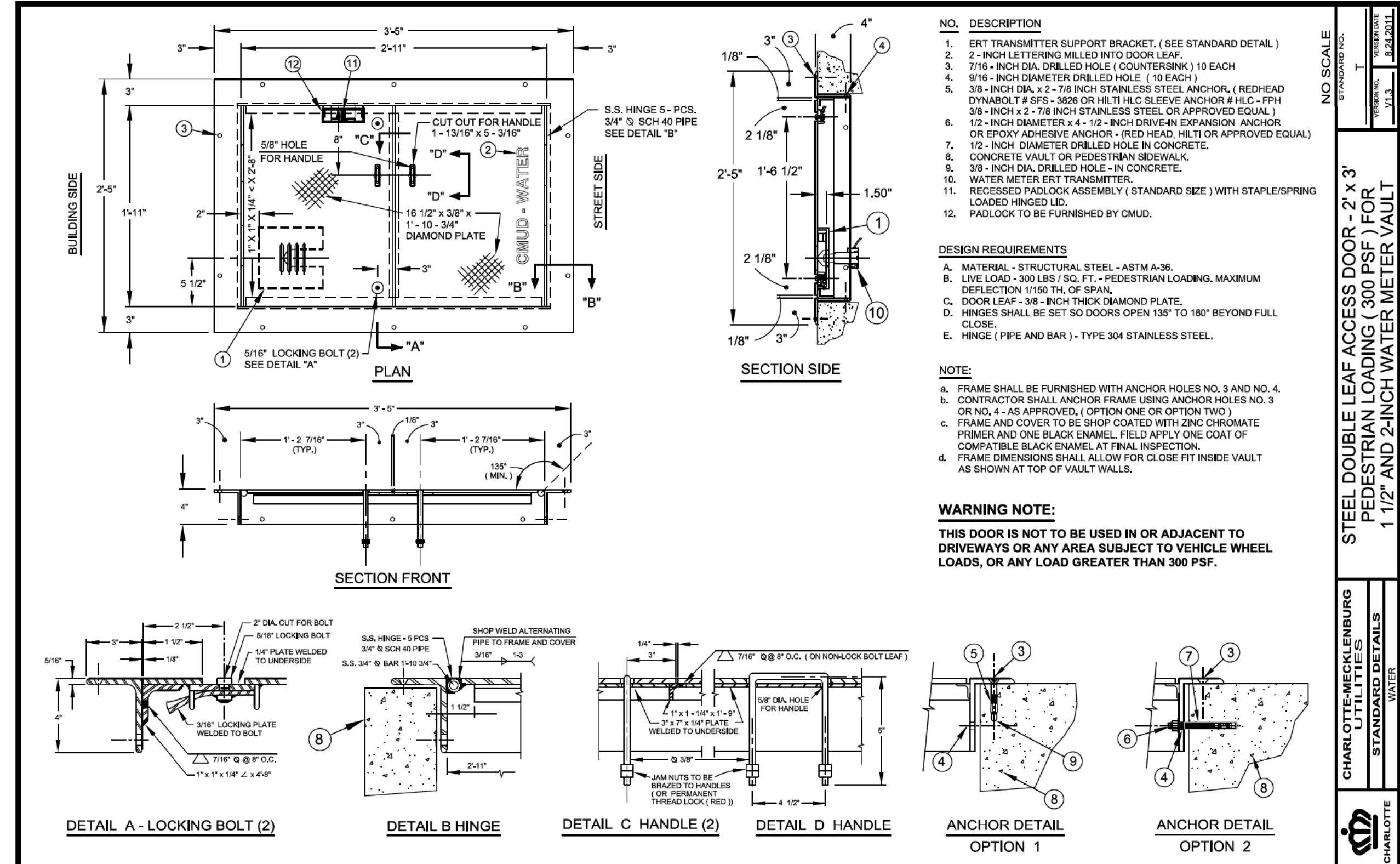
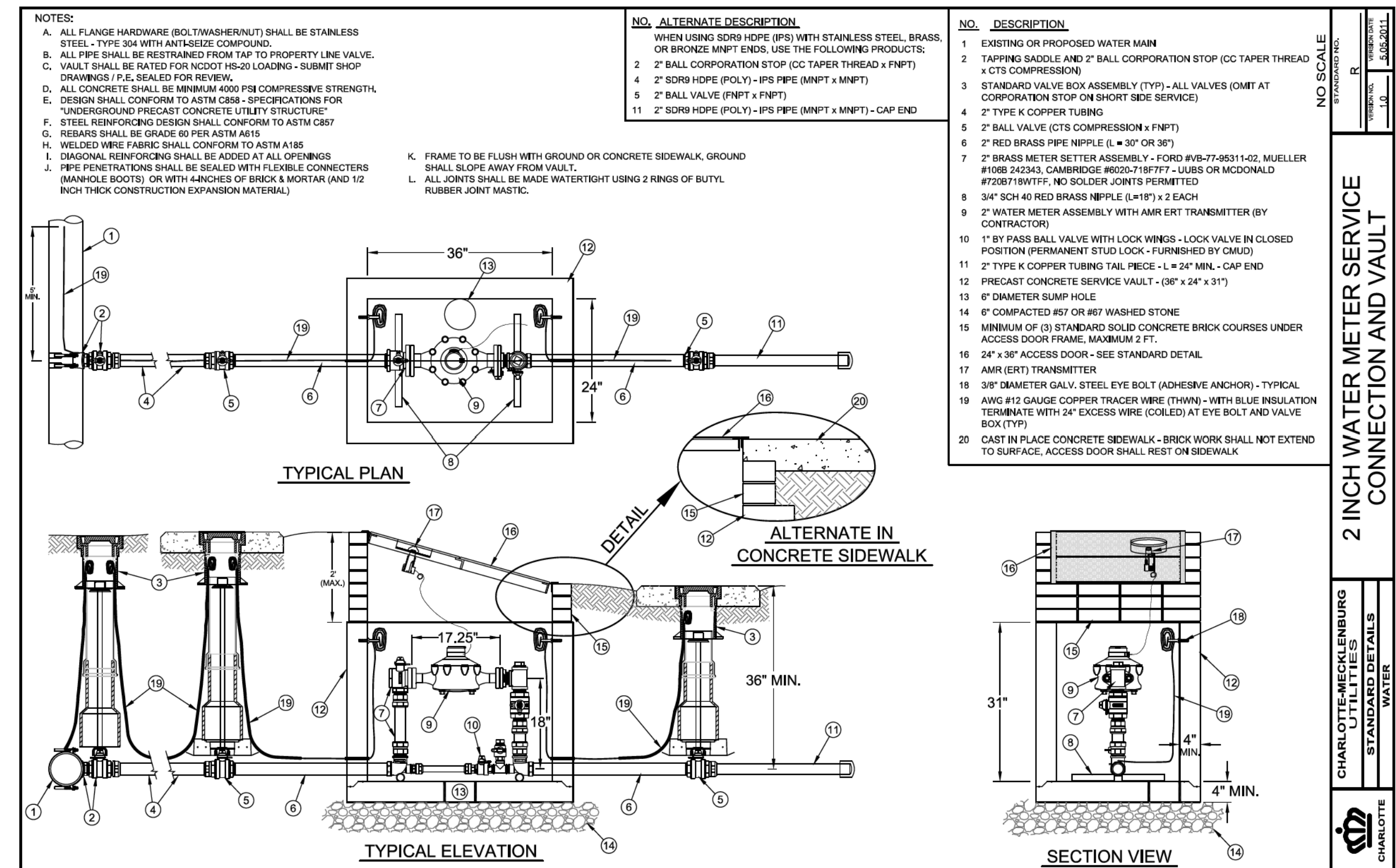
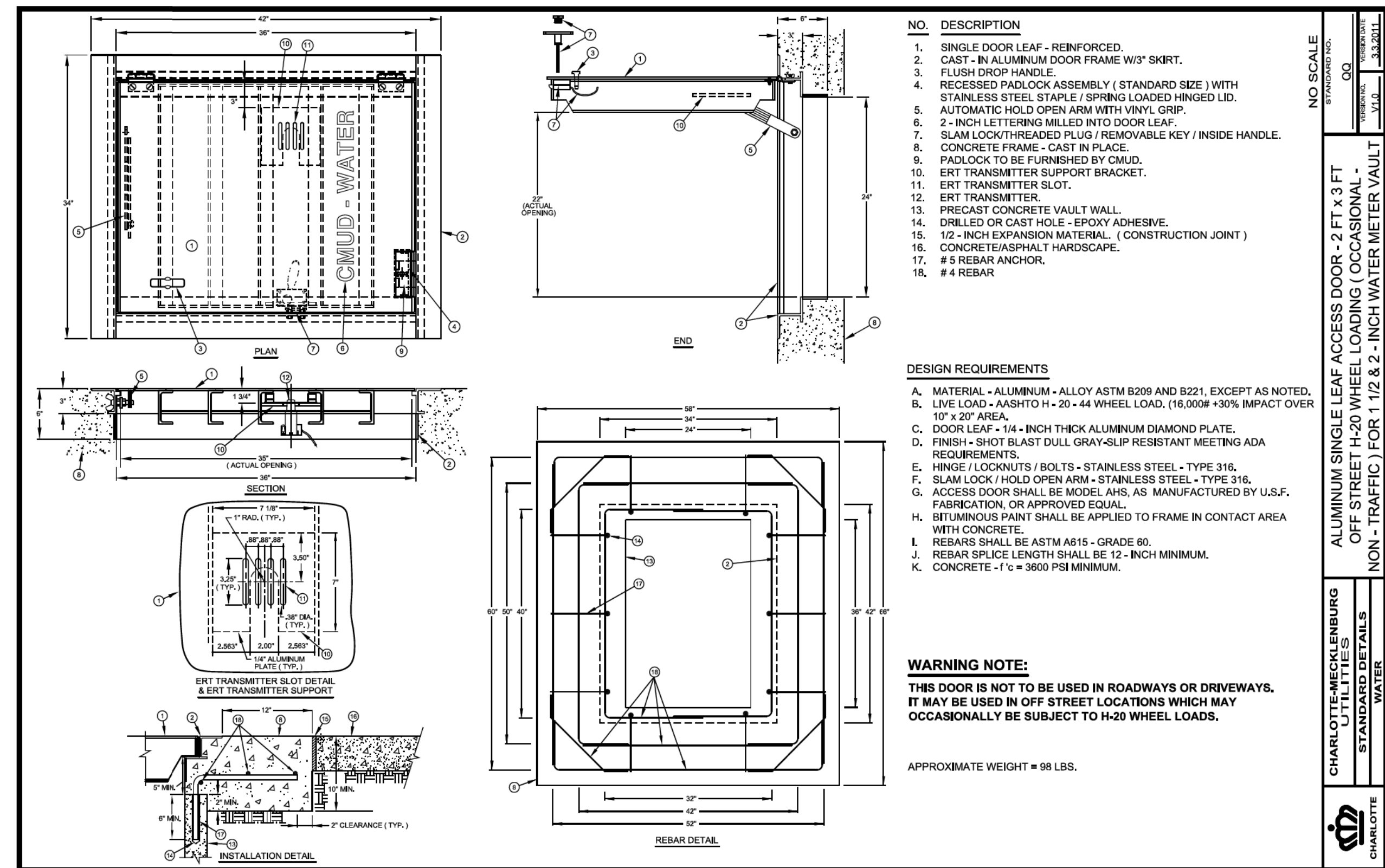
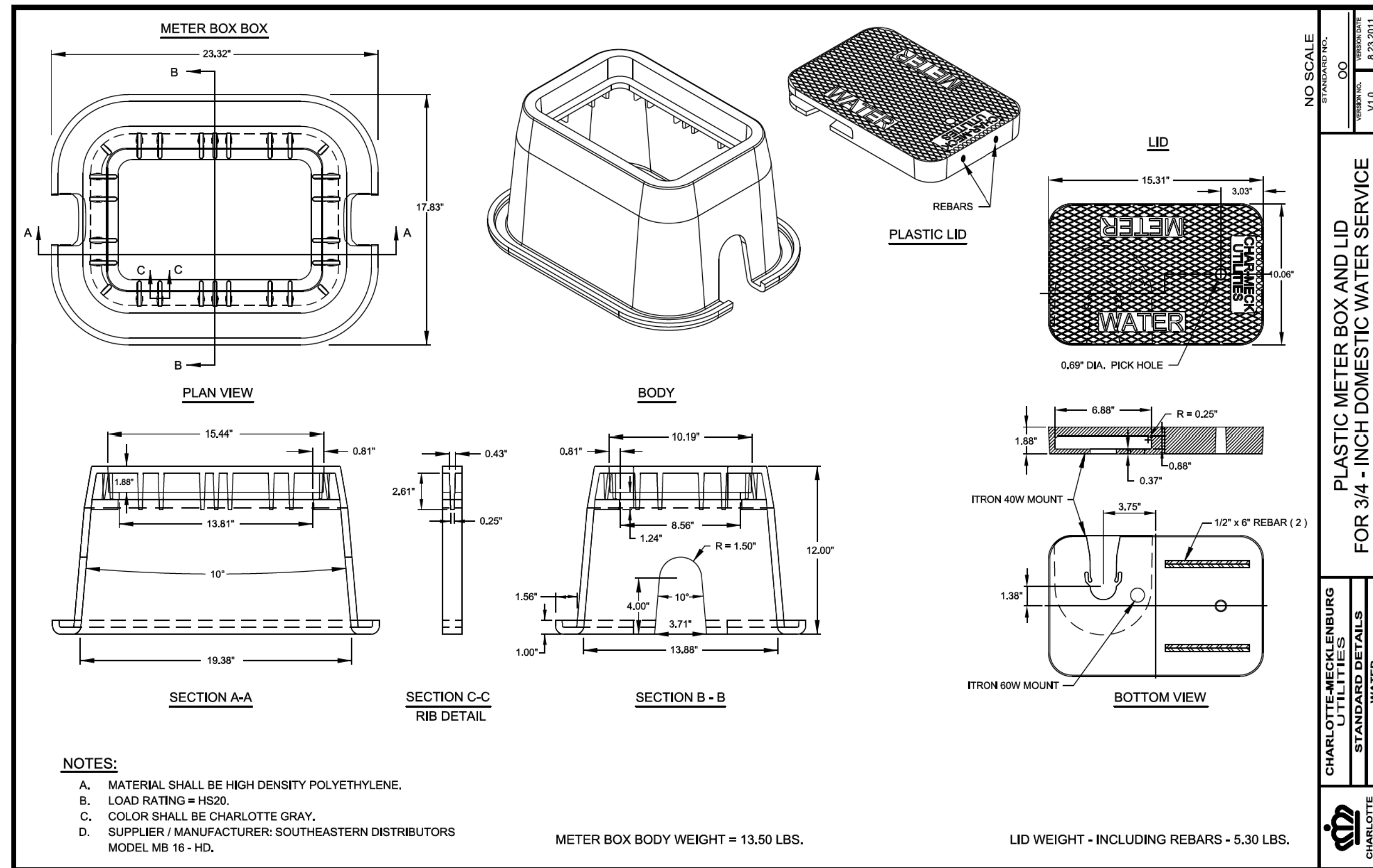
ALTERNATE SCHEMATIC (FOR LIMITED SPACE INSTALLATIONS)

METER SIZE	A	B	C	D	E	F	G	H	8.11	J
6"	50"	11 13/16"	13 29/64"	25 7/8"	34 1/4"	21 3/4"	12 1/2"	17"	3"	3"

DIMENSION B - H VARY SLIGHTLY - AS DETERMINED BY MANUFACTURER.

2/6/2015
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 REV: 2/1/2012

CLTWater STANDARD DETAILS



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REV: 2/1/2012

CLTWater STANDARD DETAILS

CMUD PUBLIC FIRE HYDRANTS

PRIVATE FIRE HYDRANTS

COLOR	SHADE
OSHA SAFETY YELLOW	
OSHA SAFETY BLUE	
OSHA SAFETY PURPLE	
OSHA SAFETY RED	
OSHA SAFETY GREEN	
OSHA SAFETY WHITE	

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 / 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

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 1/2 METER AND FIRE BOOSTER PUMP	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	NOT PAINTED	OSHA SAFETY WHITE	OSHA SAFETY WHITE
7-PRIVATE (8-INCH AND SMALLER MAIN OR LIMITED SUPPLY)	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	NOT PAINTED	OSHA SAFETY BLUE	OSHA SAFETY BLUE
8-PRIVATE (2-1/2 INCH OUTLET YARD HYDRANT)	OSHA SAFETY RED	OSHA SAFETY RED	N/A	N/A	OSHA SAFETY RED

CLASSIFICATION	RESIDUAL	BARREL	TOP / BONNET	PUMPER NOZZLE	HOSE NOZZLE
CLASS AA	100 OR GREATER	CHROME YELLOW	LIGHT BLUE	LIGHT BLUE	LIGHT BLUE
CLASS A	100 TO 400	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

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

NO. DESCRIPTION

1. ITRON 6.7" DIA. SHELF MOUNT ADAPTOR W/FOAM SPACERS
2. FOAM SPACERS 2 EA. (TYPICAL)
3. ITRON ERT TRANSMITTER
4. SUPPORT BRACKET (1/4" STEEL OR ALUMINUM PLATE)
5. DIAMOND PLATE DOOR LEAF
6. FILLET WELD SUPPORT BRACKET AT CORNERS
7. TRANSMITTER SLOTS - 4 EA. AS SHOWN

NOTES:
 A. ONE SUPPORT BRACKET REQUIRED FOR EACH METER IN VAULT.
 B. SELF MOUNT ADAPTER SHALL BE SNAPPED ONTO ERT TRANSMITTER.
 C. TRANSMITTER/MOUNT ADAPTER SHALL BE INSERTED INTO SUPPORT BRACKET AS SHOWN.
 D. DOOR LEAF AND SUPPORT BRACKET SHALL BE OF LIKE MATERIALS.
 E. SEE ACCESS DOOR STANDARD DETAILS FOR SUPPORT BRACKET LOCATIONS.

NO. DESCRIPTION

1. SINGLE DOOR LEAF - REINFORCED.
2. ANGLE DOOR FRAME.
3. FLUSH DROP HANDLE.
4. RECESSED PADLOCK ASSEMBLY (STANDARD SIZE) WITH STAINLESS STEEL STAPLE / SPRING LOADED HINGED LID.
5. AUTOMATIC HOLD OPEN ARM WITH VINYL GRIP.
6. 2-INCH LETTERING MILLED INTO DOOR LEAF.
7. 7/16-INCH DIA. DRILLED HOLE (COUNTERSINK) (# AS REQUIRED)
8. 3/8-INCH DIA. DRILLED HOLE - IN CONCRETE.
9. 3/8-INCH DIA. x 2-7/8 INCH STAINLESS STEEL ANCHOR, (RED HEAD DYNABOLT # SFS - 3826 OR HILTI HLC SLEEVE ANCHOR # HLC - FPH 3/8-INCH x 2-7/8 INCH STAINLESS STEEL OR APPROVED EQUAL)
10. CONCRETE VAULT OR PEDESTRIAN SIDEWALK.
11. PADLOCK TO BE FURNISHED BY CMUD.
12. ERT TRANSMITTER SUPPORT BRACKET.
13. 9/16-INCH DIAMETER DRILLED HOLE (# AS REQUIRED)
14. 1/2-INCH DIAMETER DRILLED HOLE IN CONCRETE.
15. 1/2-INCH DIAMETER x 4-1/2-INCH DRIVE-IN EXPANSION ANCHOR OR EPOXY ADHESIVE ANCHOR - (RED HEAD, HILTI OR APPROVED EQUAL)
16. ERT TRANSMITTER.
17. ERT TRANSMITTER SLOT.

DESIGN REQUIREMENTS

- MATERIAL - ALUMINUM - ALLOY TYPE 3004-H35, ASTM B209 AND B221, EXCEPT AS NOTED.
- LIVE LOAD - 300 LBS / SQ. FT. - PEDESTRIAN LOADINGS, MAXIMUM DEFLECTION 1/150 TH. OF SPAN.
- DOOR LEAF - 1/4-INCH THICK ALUMINUM DIAMOND PLATE.
- FINISH - SHOT BLAST DULL GRAY-SLIP RESISTANT MEETING ADA REQUIREMENTS.
- HINGE / LOCKNUTS / BOLTS - STAINLESS STEEL - TYPE 316.
- HOLD OPEN ARM - STAINLESS STEEL - TYPE 316.
- FORCE REQUIRED TO OPEN LEAF SHALL BE 35 LBS, MAXIMUM, WITHOUT SPRING ASSIST.
- ACCESS DOOR SHALL BE MODEL APS 300 RETROFIT, AS MANUFACTURED BY U.S.F. FABRICATION, OR APPROVED EQUAL.

NOTE:
 A. FRAME SHALL BE FURNISHED WITH ANCHOR HOLES NO. 7 AND NO. 13.
 B. CONTRACTOR SHALL ANCHOR FRAME USING ANCHOR HOLES NO. 7 OR NO. 13 - AS APPROVED, (OPTION ONE OR OPTION TWO)

WARNING NOTE:
 THIS DOOR IS NOT TO BE USED IN OR ADJACENT TO DRIVEWAYS OR ANY AREA SUBJECT TO VEHICLE WHEEL LOADS, OR ANY LOAD GREATER THAN 300 PSF.

CONC. CLEAR OPENING	FRAME OPENING	FRAME OPENING	OVERALL FRAME SIZE	BRACKET LENGTH	BRACKET WIDTH	BASE WT. W/O OPTIONS
L	W	L2	L3	W3	L5	W5
36	24	35	23	34	20	43
						31
						7.125
						7
						54

U.S. FOUNDRY & MFG. CORP.

EAST JORDAN IRON WORKS

TYPE 2 MANHOLE COVER (CLEAR OPENING)
 24-INCHES DIAMETER (CLEAR OPENING)
 SOLID - NO VENT HOLE, NO GASKET, NO CAM LOCK

NOTES:
 LOAD RATING - HEAVY DUTY MATERIAL - ASTM A48 - CLASS 35 GRAY IRON COATING - UNDIPPED

USE WITH TYPE A, B, OR C FRAME COVER SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS. COVER SHALL NOT BE OUT OF ROUND.

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CLTWater STANDARD DETAILS

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1" ARIAL TEXT
5/8" ARIAL STYLE TEXT
CAM LOCK SEE ASSEMBLY DETAIL
1 1/2"
1 5/8"
1 1/2"
(2) - NON PENETRATING PICK HOLES
(2) - LIFTING BARS
SANITARY SEWER
MADE IN U.S.A.
USF NL
DATE
CLASS 35
Ø 7/8" CAM LOCK HOLE @ Ø 22"
1 1/2"
26"
6 1/4"
22"
15 1/16"
3 1/4"
1 1/2"
1 15/16"
5 3/16"
3/16"
15 1/16"
5/8" TYPE 304 S.S. ROD
1/2"
3/16" DOVETAIL GROOVE
MACHINED SURFACE
3/4"
1 1/4"
3/8"
5/8"
3/16"
3/16" DOVETAIL GROOVE
PICK HOLE DETAIL
WEIGHT - 150 LB. MIN., 0% MINUS TOLERANCE

NOTES:
LOAD RATING - HEAVY DUTY
MATERIAL - ASTM A48 - CLASS 35 GRAY IRON
COATING - UNDIPPED

EAST JORDAN IRON WORKS

EAST JORDAN IRON WORKS

3/4" LETTERS (RECESSED FLUSH)
(2) NON PENETRATING PICK HOLES
(2) CORED PICKBARS
CAM LOCK SEE ASSEMBLY DETAIL
1 1/2"
1 1/2"
3/4" LETTERS (RECESSED FLUSH)
1 1/2"
1 1/8" BOSS
Ø 26"
13 1/16"
1 1/2"
3 1/8"
Ø 22 13/16"
1/2"
1/4" NEOPRENE GASKET
Ø 36"
2 1/8"
3 13/16"
1 3/8"
1 5/8"
Ø 11 1/16"
1/2"
5/8" TYPE 304 S.S. ROD
MACHINED SURFACE
1800"
2400"
2 1/4"
1 3/8"
7 1/16"
1"
3/4"
Ø 26"
Ø 36"
EAST JORDAN IRON WORKS
1040AGS
MADE IN U.S.A.
ASTM A48 CLASS 35
WEIGHT - 145 LB. MIN., 0% MINUS TOLERANCE

U.S. FOUNDRY & MFG. CORP.

BOLT HEX 5/8"-11x4" TYPE 304 S.S.
WASHER 1 1/8" x 5/8" x 1 1/2" RUBBER
WASHER 5/8" ID 1.50 OD TYPE 304 S.S.
LOCK LUG
NUT HEX 5/8"-11 TYPE 304 S.S. NYLK
NUT HEX JAM 5/8"-11 TYPE 304 S.S.

U.S. FOUNDRY & MFG. CORP.

USF CAMLOCK 5/8" HEX HEAD BOLT ALL GRADE S.S. TYPE 304
2 3/8"
3/8"
2 1/8"

U.S. FOUNDRY & MFG. CORP.

NO SCALE
STANDARD NO. 1040AGS
REVISED BY: [REDACTED]
DATE: 8/18/2002
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CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
GRAVITY SEWER

TYPE 3 MANHOLE COVER (CLEAR OPENING)
24-INCHES DIAMETER (CLEAR OPENING)
WATERTIGHT - NO VENT HOLE, GASKET, CAM LOCK

CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
GRAVITY SEWER

U.S. FOUNDRY & MFG. CORP.

USE WITH TYPE A, B, OR C FRAME
COVER SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.
COVER SHALL NOT BE OUT OF ROUND.

U.S. FOUNDRY & MFG. CORP.

U.S. FOUNDRY & MFG. CORP.

1 1/2"
1 5/8"
1 1/2"
(4) - Ø 1" ANCHOR HOLES ON A Ø 32 3/4" B.C.D.
DATE
Ø 26"
27 7/16"
26 1/4"
24"
1 1/2"
7 1/2"
28 3/8"
36"
MACHINED SURFACE
FRAME
WEIGHT - 170 LB. MIN., 0% MINUS TOLERANCE

NOTES:
LOAD RATING - HEAVY DUTY
MATERIAL - ASTM A48 - CLASS 35 GRAY IRON
COATING - UNDIPPED

EAST JORDAN IRON WORKS

EAST JORDAN IRON WORKS

(4) - Ø 1" ANCHOR HOLES ON A Ø 31" B.C.D.
Ø 26"
27 1/2"
26 1/4"
1 1/2"
7 1/2"
24"
28 3/16"
36"
MACHINED SURFACE
FRAME
WEIGHT - 173 LB. MIN., 0% MINUS TOLERANCE

U.S. FOUNDRY & MFG. CORP.

NO SCALE
STANDARD NO. 1040AGS
REVISED BY: [REDACTED]
DATE: 8/18/2002
V.1.1

CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
GRAVITY SEWER

TYPE A MANHOLE FRAME (CLEAR OPENING)
24-INCHES DIAMETER (CLEAR OPENING)
7 1/2-INCHES TALL

CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
GRAVITY SEWER

U.S. FOUNDRY & MFG. CORP.

USE WITH TYPE 1, 2, OR 3 COVER
FRAME SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.
FRAME SHALL NOT BE OUT OF ROUND.

U.S. FOUNDRY & MFG. CORP.

U.S. FOUNDRY & MFG. CORP.

1 1/2"
1 5/8"
1 1/2"
(4) - Ø 1" ANCHOR HOLES ON A Ø 32 3/4" B.C.D.
DATE
Ø 26"
27 7/16"
26 1/4"
24"
1 1/2"
4"
27"
36"
MACHINED SURFACE
FRAME
WEIGHT - 155 LB. MIN., 0% MINUS TOLERANCE

NOTES:
LOAD RATING - HEAVY DUTY
MATERIAL - ASTM A48 - CLASS 35 GRAY IRON
COATING - UNDIPPED

EAST JORDAN IRON WORKS

EAST JORDAN IRON WORKS

(4) - Ø 1" ANCHOR HOLES ON A Ø 33 3/4" B.C.D.
Ø 26"
27 1/4"
26 1/4"
1 1/2"
1"
4"
24"
27 15/16"
36"
MACHINED SURFACE
FRAME
WEIGHT - 135 LB. MIN., 0% MINUS TOLERANCE

U.S. FOUNDRY & MFG. CORP.

NO SCALE
STANDARD NO. 1040AGS
REVISED BY: [REDACTED]
DATE: 8/18/2002
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CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
GRAVITY SEWER

TYPE B MANHOLE FRAME (CLEAR OPENING)
24-INCHES DIAMETER (CLEAR OPENING)
4-INCHES TALL

CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
GRAVITY SEWER

U.S. FOUNDRY & MFG. CORP.

USE WITH TYPE 1, 2, OR 3 COVER
FRAME SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.
FRAME SHALL NOT BE OUT OF ROUND.

U.S. FOUNDRY & MFG. CORP.

U.S. FOUNDRY & MFG. CORP.

1 1/2"
1 5/8"
1 1/2"
(4) - Ø 1" ANCHOR HOLES ON A Ø 31" B.C.D.
DATE
Ø 26"
36"
26 1/4"
24"
1 1/2"
26 1/4"
36"
MACHINED SURFACE
FRAME
WEIGHT - 150 LB. MIN., 0% MINUS TOLERANCE

NOTES:
LOAD RATING - HEAVY DUTY
MATERIAL - ASTM A48 - CLASS 35 GRAY IRON
COATING - UNDIPPED

EAST JORDAN IRON WORKS

EAST JORDAN IRON WORKS

(4) - Ø 1" ANCHOR HOLES ON A Ø 31" B.C.D.
Ø 26"
34"
26 1/4"
1 1/2"
4"
24"
26 1/4"
27 1/4"
MACHINED SURFACE
FRAME
WEIGHT - 121 LB. MIN., 0% MINUS TOLERANCE

U.S. FOUNDRY & MFG. CORP.

NO SCALE
STANDARD NO. 1040AGS
REVISED BY: [REDACTED]
DATE: 8/18/2002
V.1.1

CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
GRAVITY SEWER

TYPE C MANHOLE FRAME (CLEAR OPENING)
24-INCHES DIAMETER (CLEAR OPENING)
4-INCHES TALL - INVERTED/REVERSIBLE (CAST IN)

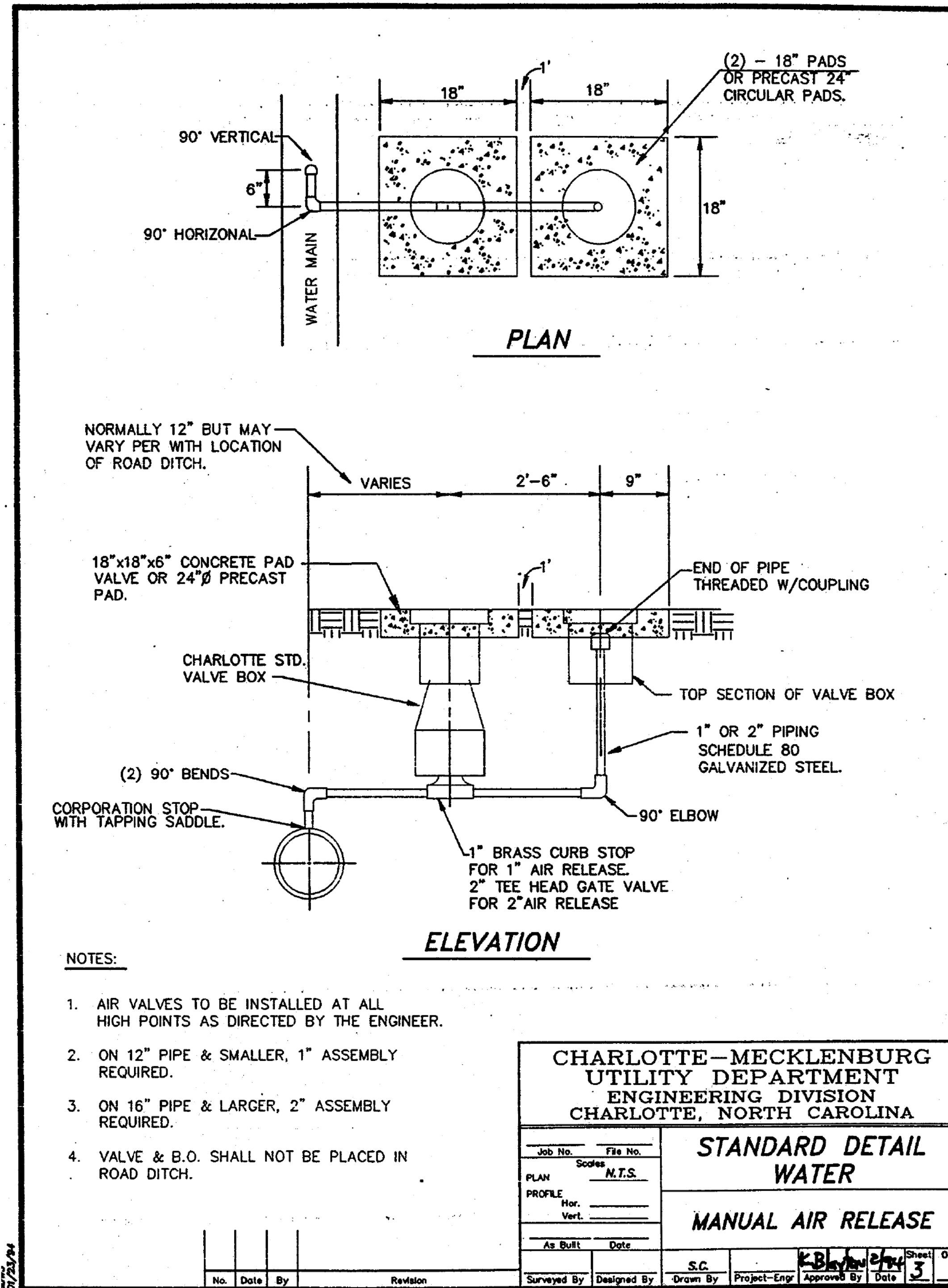
CHARLOTTE-MECKLENBURG UTILITIES
STANDARD DETAILS
GRAVITY SEWER

U.S. FOUNDRY & MFG. CORP.

USE WITH TYPE 1, 2, OR 3 COVER
FRAME SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.
FRAME SHALL NOT BE OUT OF ROUND.

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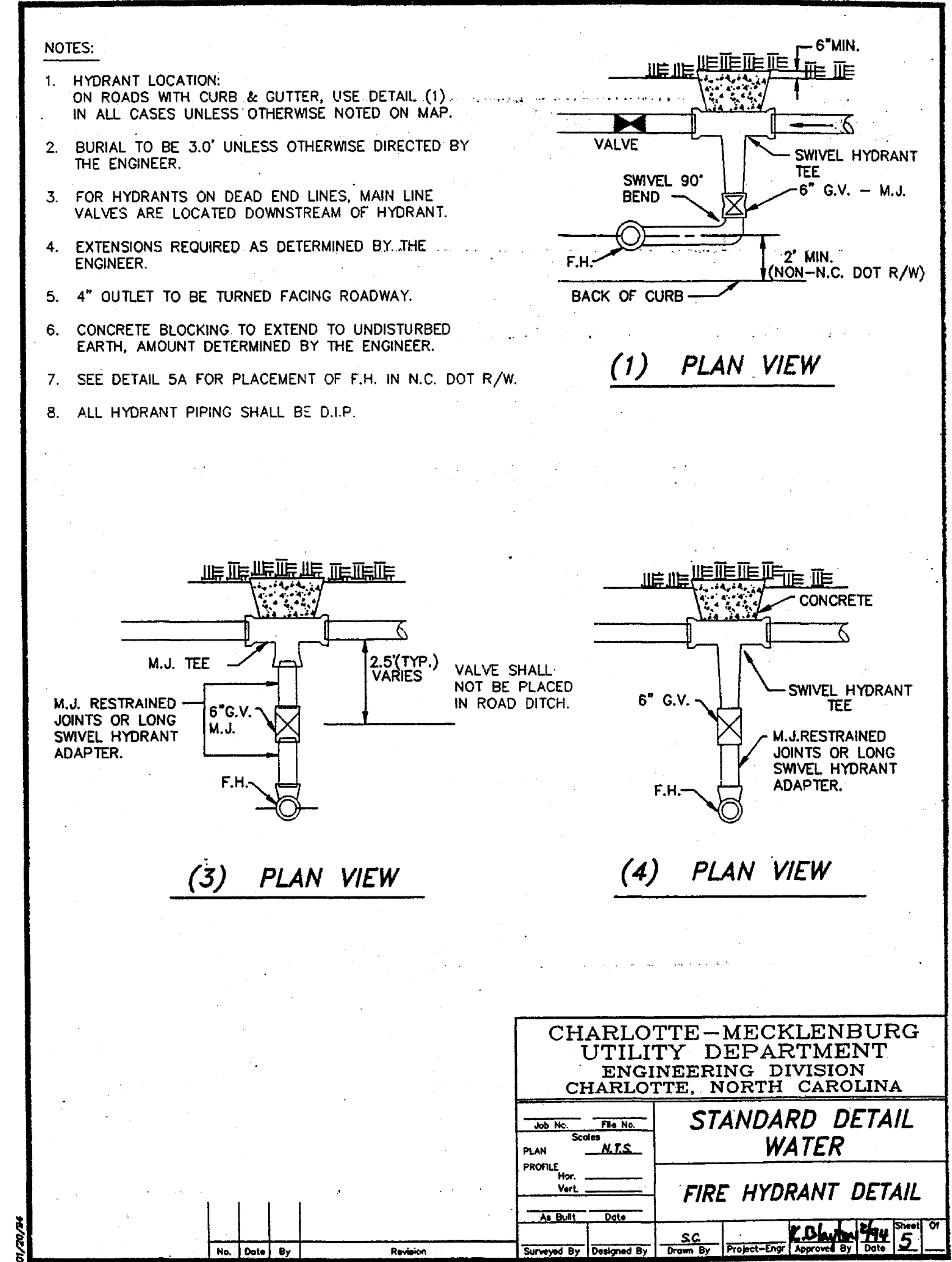
CLTWater STANDARD DETAILS



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Water Specifications/Details (SD)



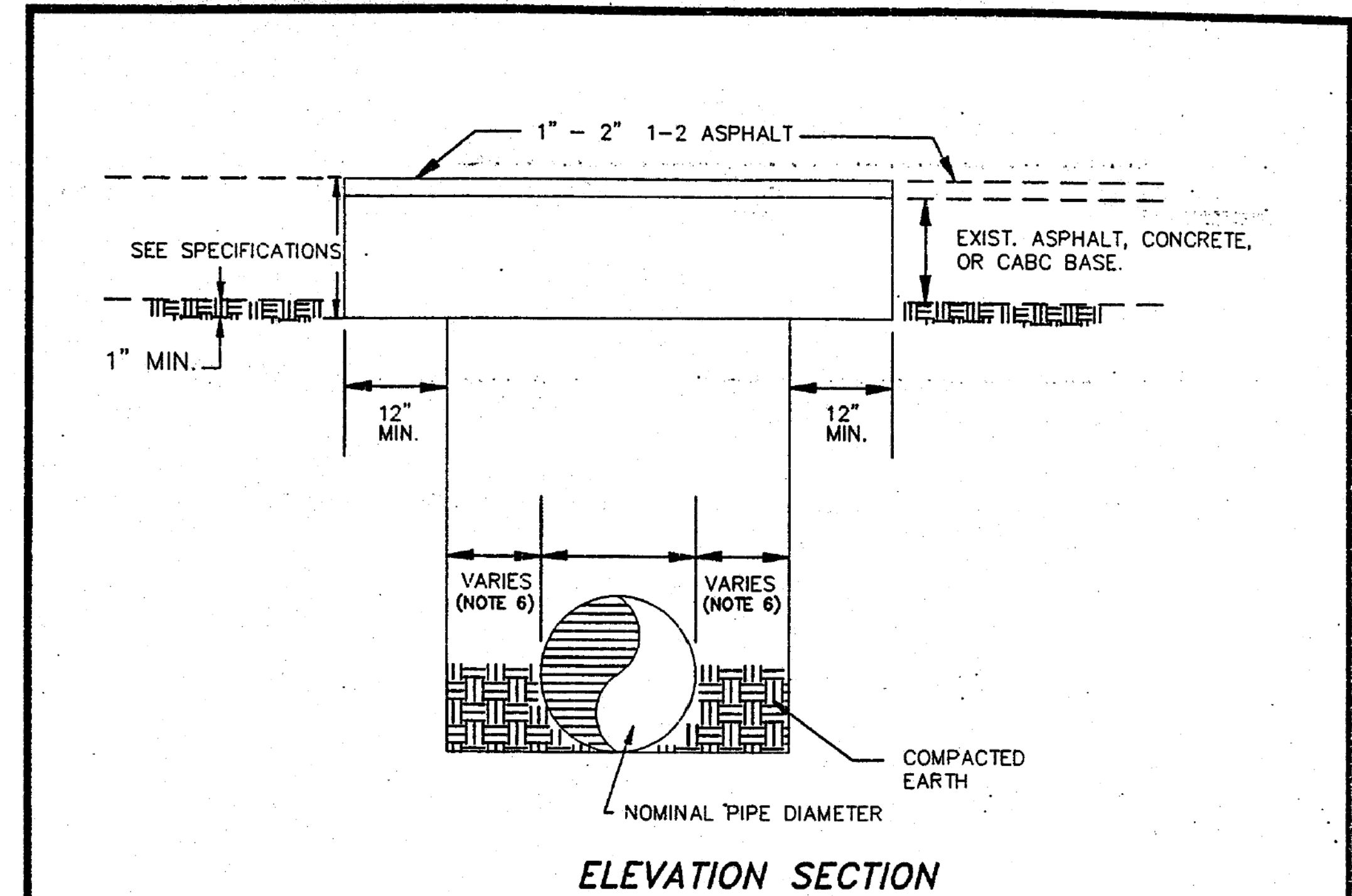
July 27, 1995

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Water Specifications/Details (SD)

CLTWater STANDARD DETAILS

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ELEVATION SECTION

NOTES:

1. ALL CONCRETE AND ASPHALT PAVEMENT, INCLUDING DRIVEWAYS, TO BE CUT WITH A SAW.
2. WHERE CONCRETE PAVEMENT IS OVERLAID WITH ASPHALT H- BINDER MAY BE SUBSTITUTED FOR CONCRETE, AS A BASE MATERIAL, WITH THE APPROVAL OF THE CONTROLLING AGENCY.
3. ALL PAVEMENT REPAIRS ARE SUBJECT TO APPROVAL BY CITY OF CHARLOTTE DOT OR N.C. DOT AS APPLICABLE.
4. 12-INCH MIN. MINIMUM CUT OUTSIDE TRENCH IS ALSO REQUIRED FOR SLOPED TRENCH WALLS.
5. SHORING REQUIRED IN ACCORDANCE WITH OSHA STANDARDS PART 1926, SUBPART P.
6. SEE DETAILED SPECIFICATIONS FOR TRENCH WIDTH.

CHARLOTTE-MECKLENBURG UTILITY DEPARTMENT ENGINEERING DIVISION CHARLOTTE, NORTH CAROLINA			
STANDARD DETAIL WATER		PAVEMENT REPAIR DETAIL	
Job No.	File No.	Scales	
PLAN	NTS	NTS	
PROFILE	Hor.	Date	
	Vert.	As Built	
No.		Date	
By		Revision	
Surveyed By	Designed By	Drawn By	Project-Eng
K. D. Dwyer		T. J. 9	
Approved By		Date	

07/27/95

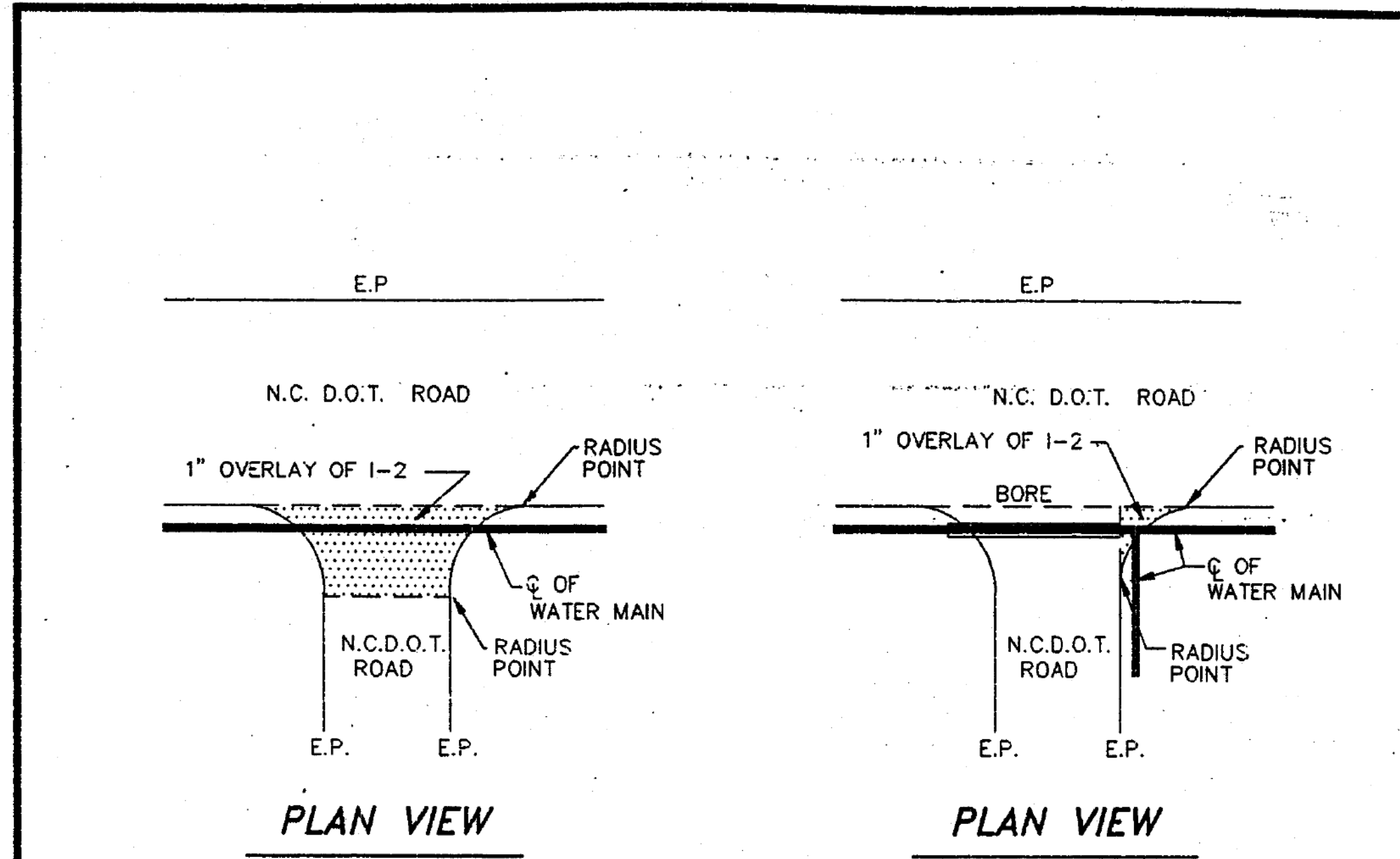
July 27, 1995

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Water Specifications/Details (SD)

CLTWater STANDARD DETAILS

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NOTES:

1. ALL SHORING WILL BE ACCORDING TO OSHA TRENCHING STANDARDS PART 1926 SUBPART P.
2. PAVEMENT OVERLAY IS IN ADDITION TO PAVEMENT REPAIR PER STANDARD DETAIL 9.
3. FEATHER OVERLAY SMOOTHLY INTO EXISTING PAVEMENT.
4. THIS DETAIL APPLIES TO N.C. DEPARTMENT OF TRANSPORTATION ROADS ONLY, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

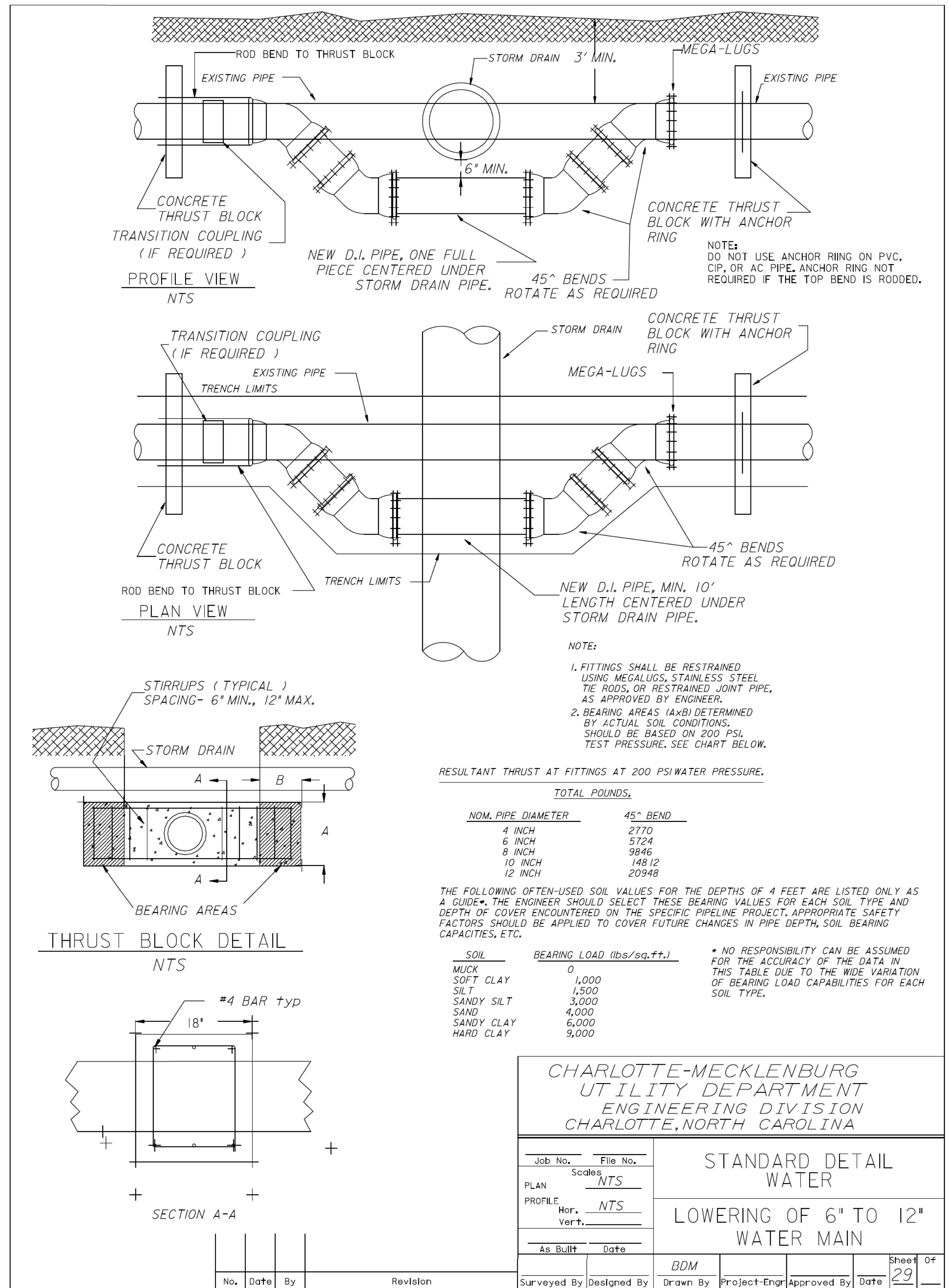
CHARLOTTE-MECKLENBURG
UTILITY DEPARTMENT
ENGINEERING DIVISION
CHARLOTTE, NORTH CAROLINA

Job No.	File No.	Scale	NTS
PLAN	NTS		
PROFILE	Hor.		
	Vert.		
As Built	Date		
Surveyed By	Designed By	SC	Project-Eng
Drawn By	Approved By		
			Sheet 94 of 94

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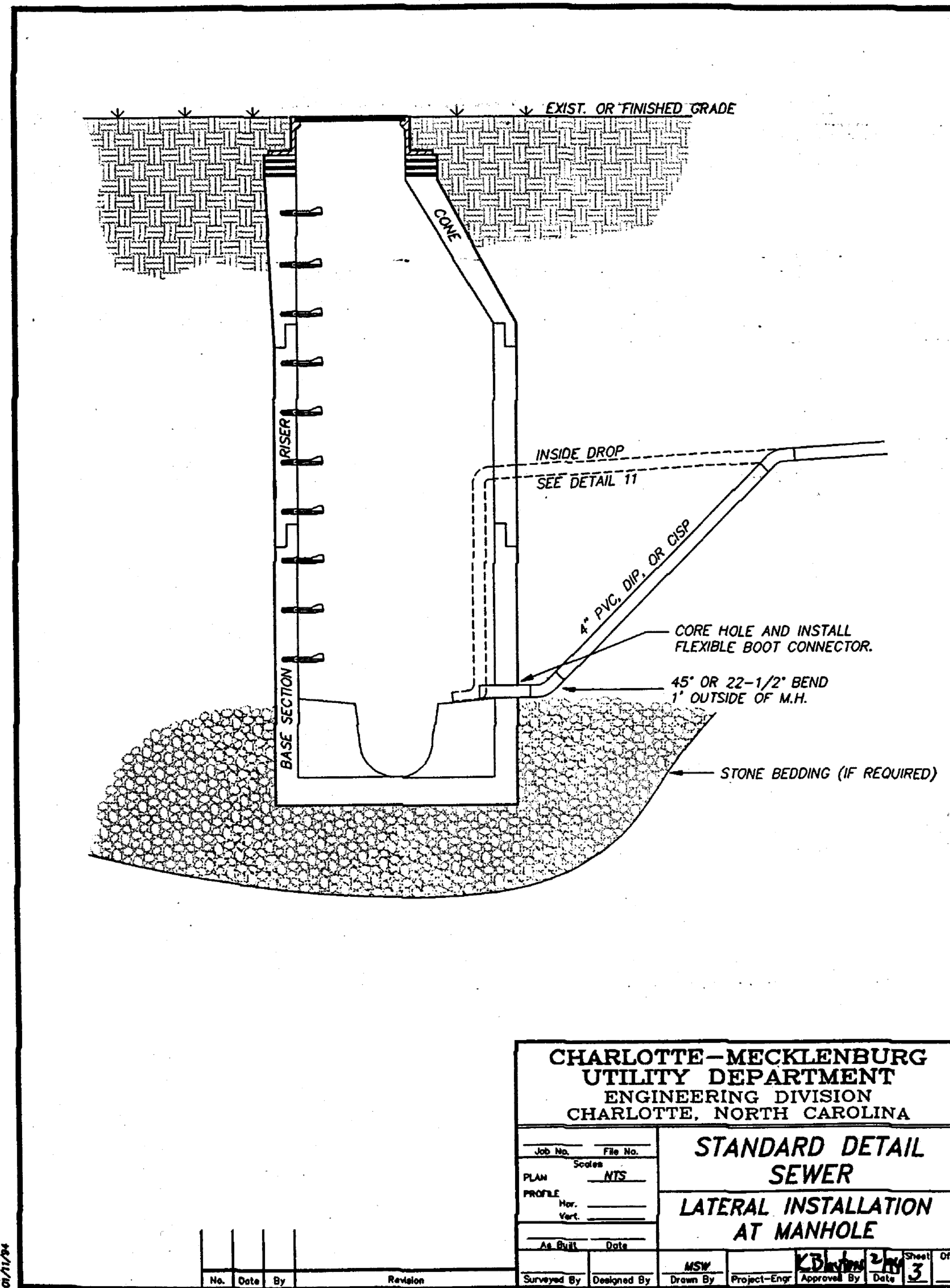
Water Specifications/Details (SD)



NOTE: USE THIS DETAIL ALSO AT LOCATIONS WHERE EXISTING 6" TO 12" WATER LINES ARE RELOCATED.

CLTWater STANDARD DETAILS

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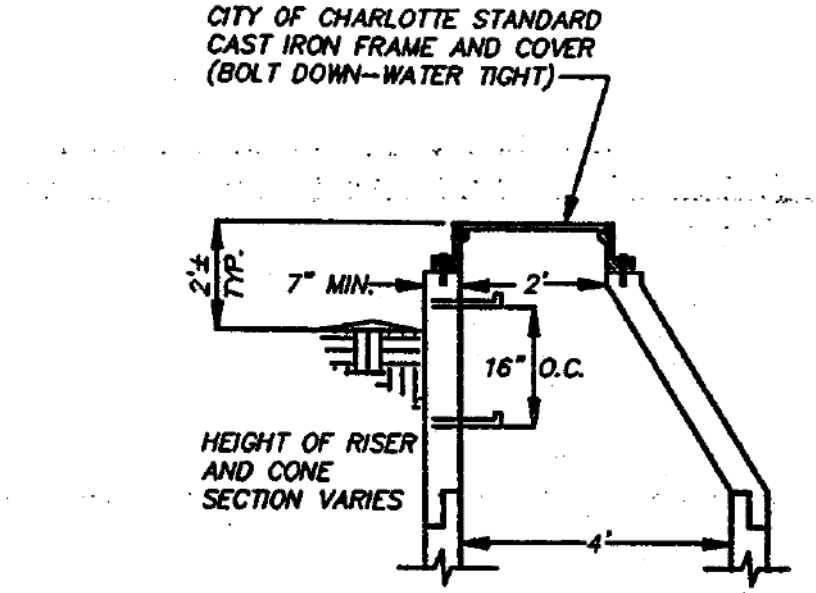
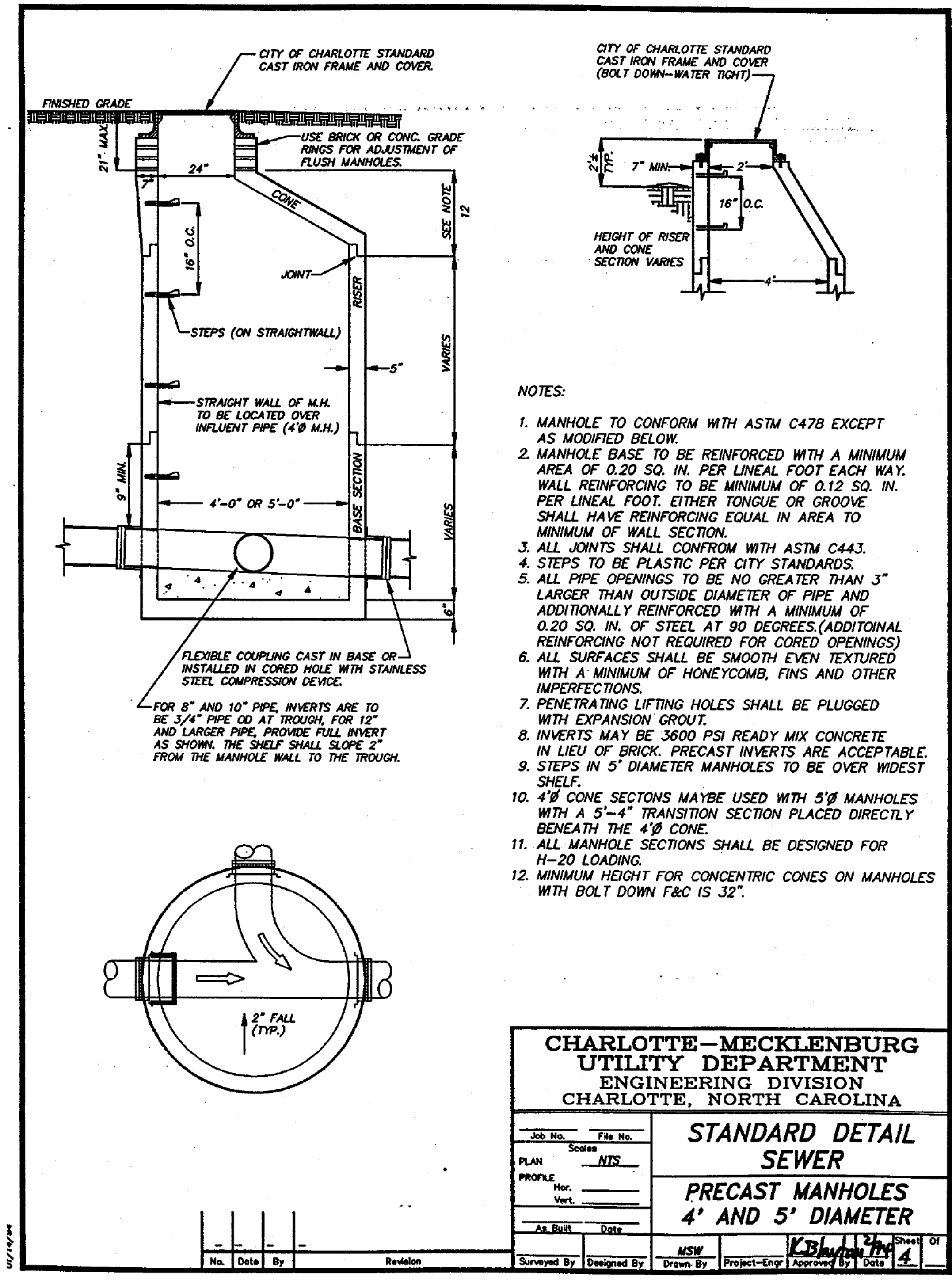
**CHARLOTTE-MECKLENBURG
UTILITY DEPARTMENT
ENGINEERING DIVISION
CHARLOTTE, NORTH CAROLINA**

**STANDARD DETAIL
SEWER
LATERAL INSTALLATION
AT MANHOLE**

Job No.	File No.
PLAN	Scales NTS
PROFILE	Hor. Vert.
As Built	Date
MSW	Project-Eng
Approved By	Date

No.	Date	By	Revision

July 27, 1995 XV-59 Sewer Specifications/Details (SD)



- NOTES:**
- MANHOLE TO CONFORM WITH ASTM C478 EXCEPT AS MODIFIED BELOW.
 - MANHOLE BASE TO BE REINFORCED WITH A MINIMUM AREA OF 0.20 SQ. IN. PER LINEAL FOOT EACH WAY. WALL REINFORCING TO BE MINIMUM OF 0.12 SQ. IN. PER LINEAL FOOT. EITHER TONGUE OR GROOVE SHALL HAVE REINFORCING EQUAL IN AREA TO MINIMUM OF WALL SECTION.
 - ALL JOINTS SHALL CONFORM WITH ASTM C443.
 - STEPS TO BE PLASTIC PER CITY STANDARDS.
 - ALL PIPE OPENINGS TO BE NO GREATER THAN 3" LARGER THAN OUTSIDE DIAMETER OF PIPE AND ADDITIONALLY REINFORCED WITH A MINIMUM OF 0.20 SQ. IN. OF STEEL AT 90 DEGREES. (ADDITIONAL REINFORCING NOT REQUIRED FOR CORED OPENINGS)
 - ALL SURFACES SHALL BE SMOOTH EVEN TEXTURED WITH A MINIMUM OF HONEYCOMB, FINS AND OTHER IMPERFECTIONS.
 - PENETRATING LIFTING HOLES SHALL BE PLUGGED WITH EXPANSION GROUT.
 - INVERTS MAY BE 3600 PSI READY MIX CONCRETE IN LIEU OF BRICK. PRECAST INVERTS ARE ACCEPTABLE.
 - STEPS IN 5' DIAMETER MANHOLES TO BE OVER WIDEST SHELF.
 - 4' CONE SECTIONS MAYBE USED WITH 5' MANHOLES WITH A 5'-4" TRANSITION SECTION PLACED DIRECTLY BENEATH THE 4' CONE.
 - ALL MANHOLE SECTIONS SHALL BE DESIGNED FOR H-20 LOADING.
 - MINIMUM HEIGHT FOR CONCENTRIC CONES ON MANHOLES WITH BOLT DOWN F&C IS 32".

**CHARLOTTE-MECKLENBURG
UTILITY DEPARTMENT
ENGINEERING DIVISION
CHARLOTTE, NORTH CAROLINA**

**STANDARD DETAIL
SEWER
PRECAST MANHOLES
4' AND 5' DIAMETER**

Job No.	File No.
PLAN	Scales NTS
PROFILE	Hor. Vert.
As Built	Date
MSW	Project-Eng
Approved By	Date

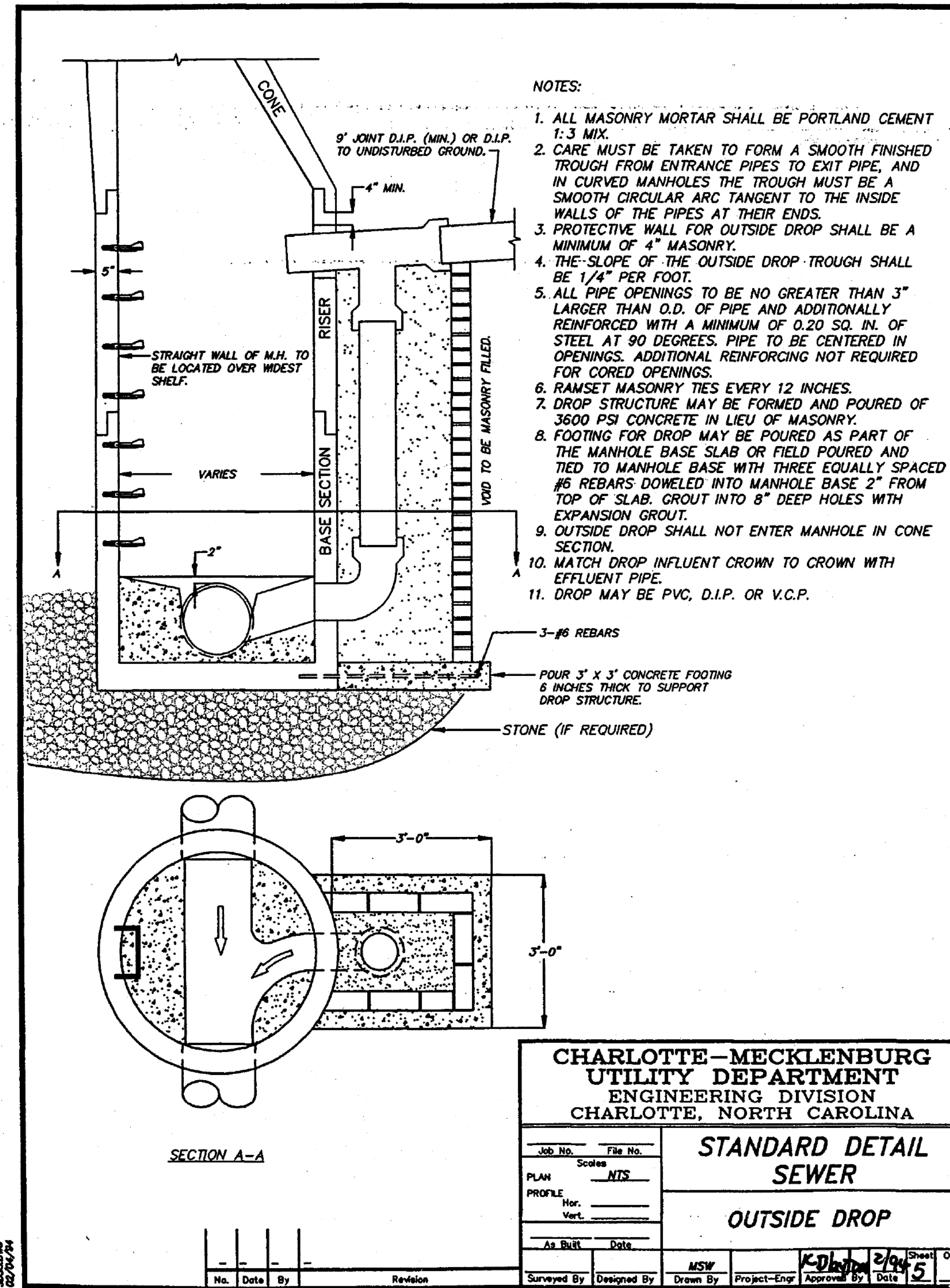
No.	Date	By	Revision

July 27, 1995 XV-60 Sewer Specifications/Details (SD)

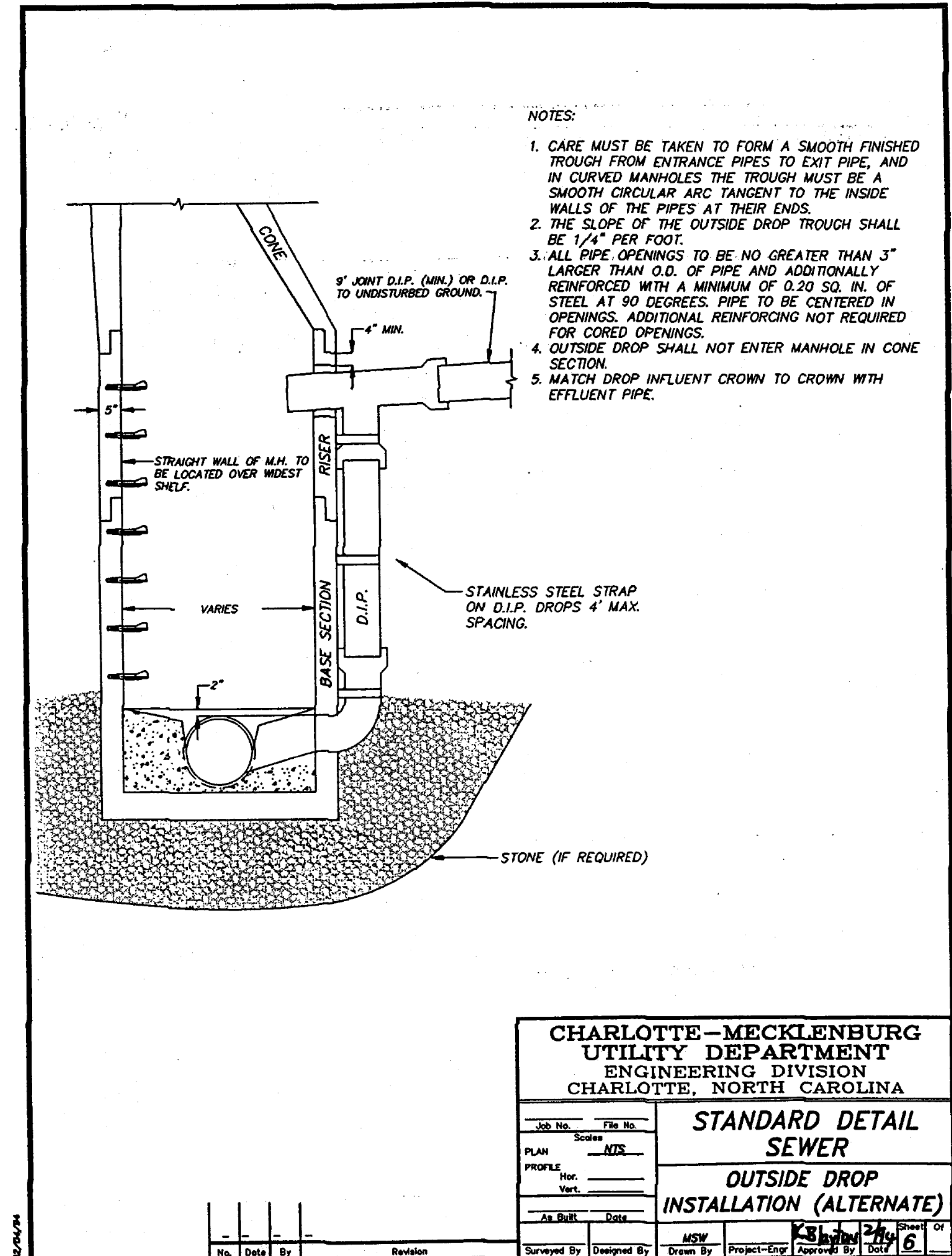
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CLTWater STANDARD DETAILS

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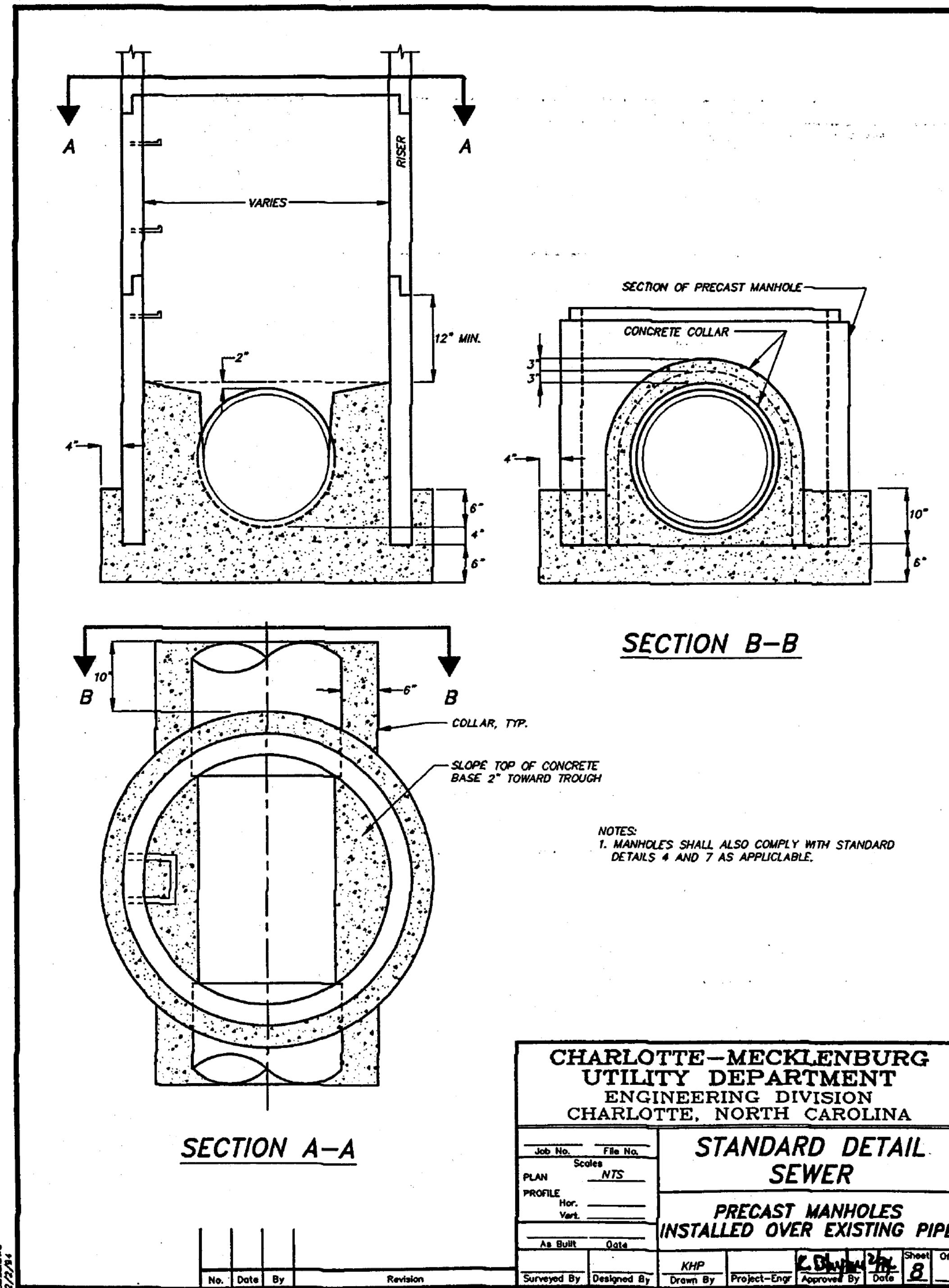
July 27, 1995 XV-61 Sewer Specifications/Details (SD)



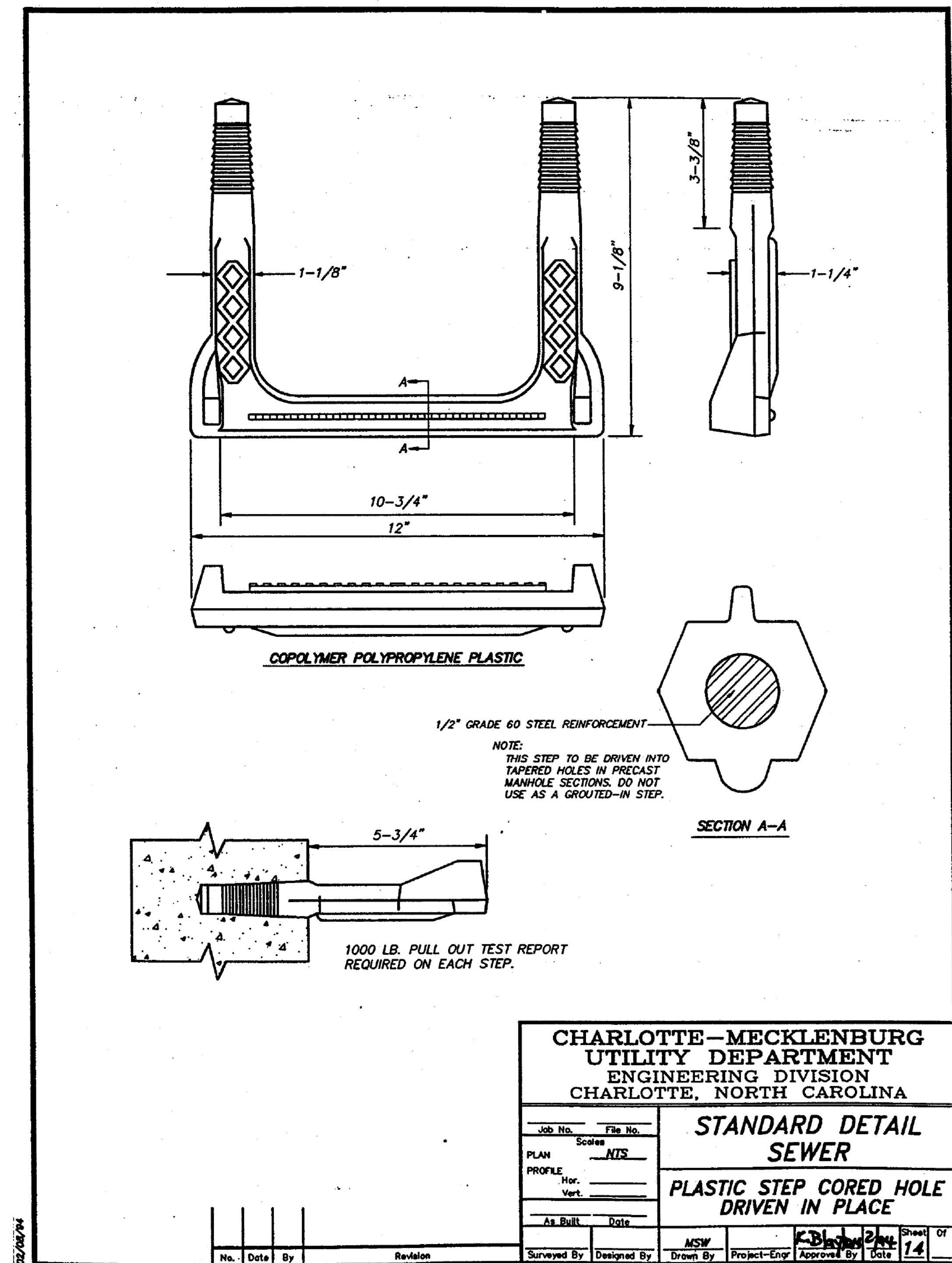
July 27, 1995 XV-62 Sewer Specifications/Details (SD)

CLTWater STANDARD DETAILS

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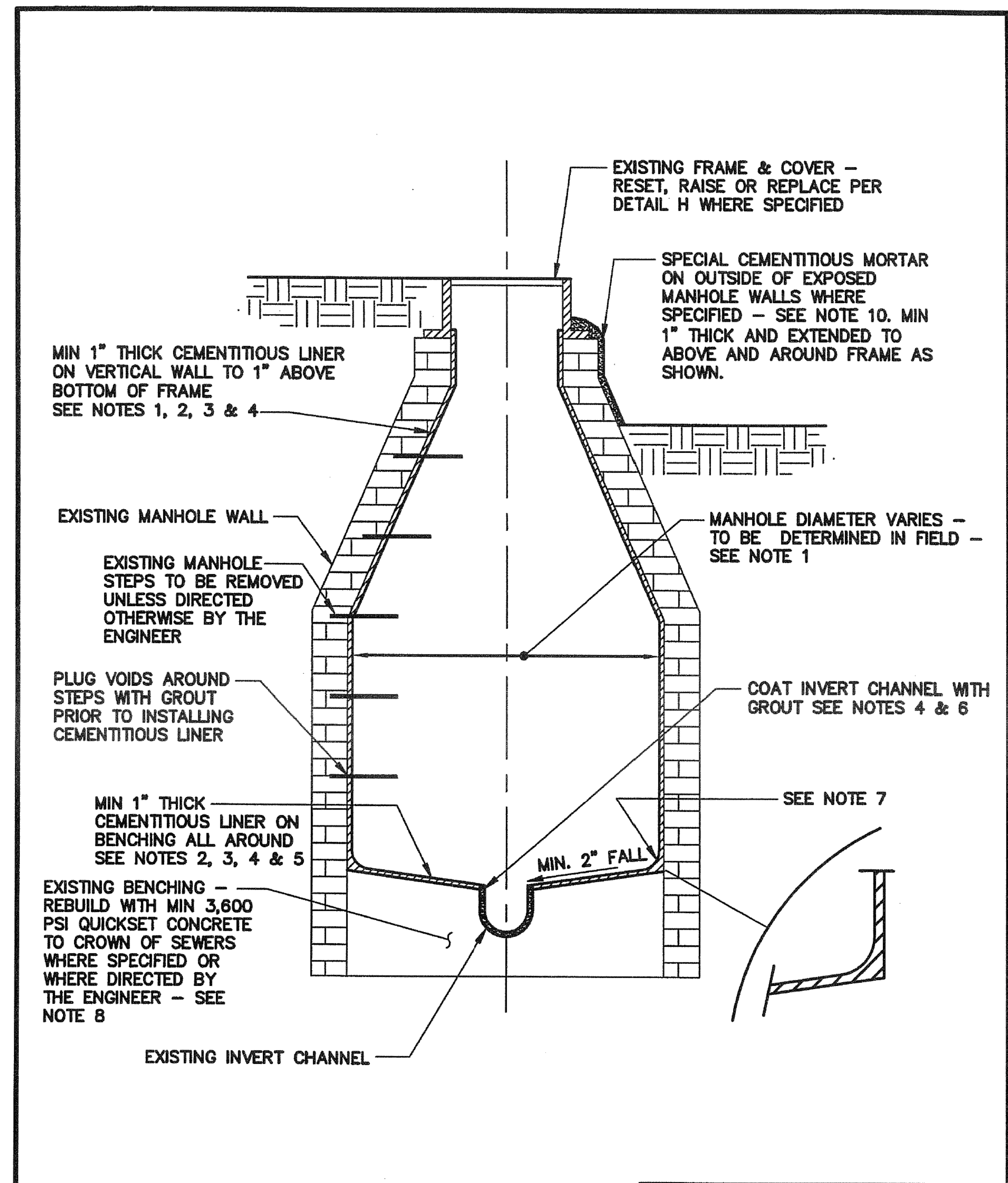
July 27, 1995 XV-64 Sewer Specifications/Details (SD)



July 27, 1995 XV-70 Sewer Specifications/Details (SD)

CLTWater STANDARD DETAILS

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- NOTES:**
- MANHOLE SHOWN IS A TYPICAL SHAPE. HOWEVER, MANHOLE SHAPES WILL VARY. CONTRACTOR SHALL DETERMINE ACTUAL SHAPE. UNIT PRICES BID SHALL COVER ANY SHAPE.
 - BID ITEMS ARE INCLUDED FOR COATING EXISTING 4-FOOT, 5-FOOT, AND 6-FOOT DIAMETER MANHOLES WITH ANY SPECIFIED MATERIAL AND WITH HYDROGEN-SULFIDE RESISTANT MATERIAL. THE ENGINEER WILL SPECIFY THE REQUIRED MATERIAL FOR EACH MANHOLE.
 - CEMENTITIOUS LINER SHALL NOT BE INSTALLED UNTIL ALL MAIN SEWER, SERVICE LATERAL WORK WITHIN THE MANHOLE, AND OTHER MANHOLE REHABILITATION WORK IS COMPLETED.
 - CONTRACTOR SHALL PROPERLY PREPARE SURFACE PRIOR TO LINING IN STRICT ACCORDANCE WITH THE LINING MANUFACTURER'S RECOMMENDATIONS AND THE SPECIFICATIONS. ALL MATERIAL REMOVED DURING THE PREPARATORY WORK INCLUDING PRESSURE CLEANING SHALL BE REMOVED FROM THE MANHOLE AND DISPOSED OF OFFSITE - NO MATERIAL SHALL BE ALLOWED TO ENTER THE SEWERS. IN ADDITION, NO CHEMICALS USED FOR CLEANING OR OTHER OPERATIONS SHALL BE ALLOWED TO ENTER THE SEWER. CEMENTITIOUS LINING SHALL BE MONOLITHICALLY SPRAY APPLIED IN ONE PASS AND TROWELED SMOOTH AFTER APPLICATION.
CONTRACTOR SHALL PROVIDE BYPASS PUMPING AS REQUIRED WHILE REHABILITATING MANHOLES. BYPASS PUMPING MUST BE PERFORMED WHEN COATING THE INVERT CHANNELS WITH GROUT. NO MATERIAL SHALL BE ALLOWED TO ENTER THE SEWERS.
 - PROVIDE ADDITIONAL CEMENTITIOUS MATERIAL AS NECESSARY TO PROVIDE A MINIMUM 2" FALL FROM THE MANHOLE WALL TO THE INVERT CHANNEL. ANY AND ALL ADDITIONAL CEMENTITIOUS MATERIAL REQUIRED TO PROVIDE THE 2" FALL SHALL BE INCIDENTAL TO THE WORK AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE CEMENTITIOUS COATING. THE CONTRACTOR IS ADVISED THAT MOST OF THE EXISTING BENCHES ARE FLAT. PROVIDE CHANNEL IN BENCHING FOR SEWERS ENTERING MANHOLES ABOVE BENCHING. CHANNEL TO PROVIDE SMOOTH TRANSITION TO MAIN INVERT CHANNEL.
 - COAT INVERT CHANNELS WITH A QUICKSET NON-SHRINK GROUT TO PROVIDE A CONSTANT SLOPE BETWEEN INLET AND OUTLET SEWERS WHEN SPECIFIED/REQUIRED BY THE ENGINEER. PROVIDE ADDITIONAL MATERIAL AS NECESSARY TO PROVIDE A UNIFORM INVERT CHANNEL THROUGH THE MANHOLE. THE WIDTH OF THE UNIFORM CHANNEL SHALL BE EQUAL TO THE INCOMING AND OUTGOING PIPE DIAMETERS. THE FINISHED CHANNEL SHALL BE SMOOTH AND FREE OF BURRS THAT WILL CATCH TOILET PAPER, DEBRIS, RAGS, ETC. SEE NOTE 8.
 - AT WALL/BENCH INTERFACE, INSTALL ADDITIONAL CEMENTITIOUS MATERIAL TO PROVIDE A SMOOTH TRANSITION FROM THE WALL TO THE BENCH AS SHOWN. MATERIAL SHALL BE MONOLITHICALLY APPLIED WITH THE WALL AND BENCH MATERIAL.
 - THE ENGINEER WILL SPECIFY MANHOLE BENCHES AND INVERT CHANNELS THAT ARE REQUIRED TO BE RE-BUILT. THE ENGINEER WILL DETERMINE SUCH WORK BASED ON MANHOLE INSPECTIONS. RE-BUILDING MAY BE REQUIRED IF THERE IS NO BENCHING, AND NO DEFINED INVERT CHANNEL OR IF THE EXISTING INVERT CHANNEL IS MORE THAN 6 INCHES WIDER THAN THE INCOMING AND OUTGOING PIPE DIAMETERS. EXISTING INVERT CHANNELS THAT ARE LESS THAN 6 INCHES WIDER THAN THE INCOMING/OUTGOING PIPE DIAMETERS SHALL BE NARROWED TO PROVIDE A UNIFORM CHANNEL PER NOTE 6 AS PART OF THE MANHOLE REHABILITATION WORK AND AT NO ADDITIONAL COST. BENCHES AND INVERTS SHALL BE IN ACCORDANCE WITH CMUD STANDARD SPECIFICATIONS AND DETAILS. SEE NOTE 6.
 - ALL REHABILITATED MANHOLES SHALL BE VACUUM TESTED IN ACCORDANCE WITH ASTM C-1244 EXCEPT THAT THE MINIMUM TEST TIME SHALL BE 1 MINUTE. VACUUM TESTING SHALL BE PERFORMED AFTER ALL MANHOLE REHABILITATION WORK IS COMPLETE. TESTING SHALL INCLUDE VACUUM TESTING THE FRAME-CHIMNEY INTERFACE. CONTRACTOR TO PERFORM ALL MANHOLE REHABILITATION WORK NECESSARY IN ORDER TO PASS THE VACUUM TEST. THE CONTRACTOR SHALL REPAIR ALL LEAKS AND SHALL RE-TEST MANHOLES THAT FAIL THE VACUUM TEST REGARDLESS OF THE REASON FOR THE FAILURE (INCLUDING LEAKS AT THE FRAME-CHIMNEY SEAL) AT NO ADDITIONAL COST TO THE OWNER.
 - THE ENGINEER WILL SPECIFY MANHOLES TO RECEIVE AN EXTERIOR COATING OF MORTAR. THE MORTAR SHALL BE SPECIALLY DESIGNED FOR INSTALLATION ON VERTICAL, EXPOSED SURFACES AS RECOMMENDED BY THE MORTAR MANUFACTURER. THE MORTAR SHALL BE USED TO REPAIR BROKEN OR CRACKED MORTAR AND TO PATCH HOLES IN EXPOSED WALLS. ALL OLD, CRACKED MORTAR SHALL BE COMPLETELY REMOVED AND THE SUBSTRATE SURFACE SHALL BE CLEAN AND DRY PRIOR TO INSTALLING NEW, 1-INCH THICK MORTAR. MORTAR TO BE HB2 REPAIR MORTAR BY THOROC, SIKATOP 123 BY SIKA CORPORATION OR APPROVED EQUAL.

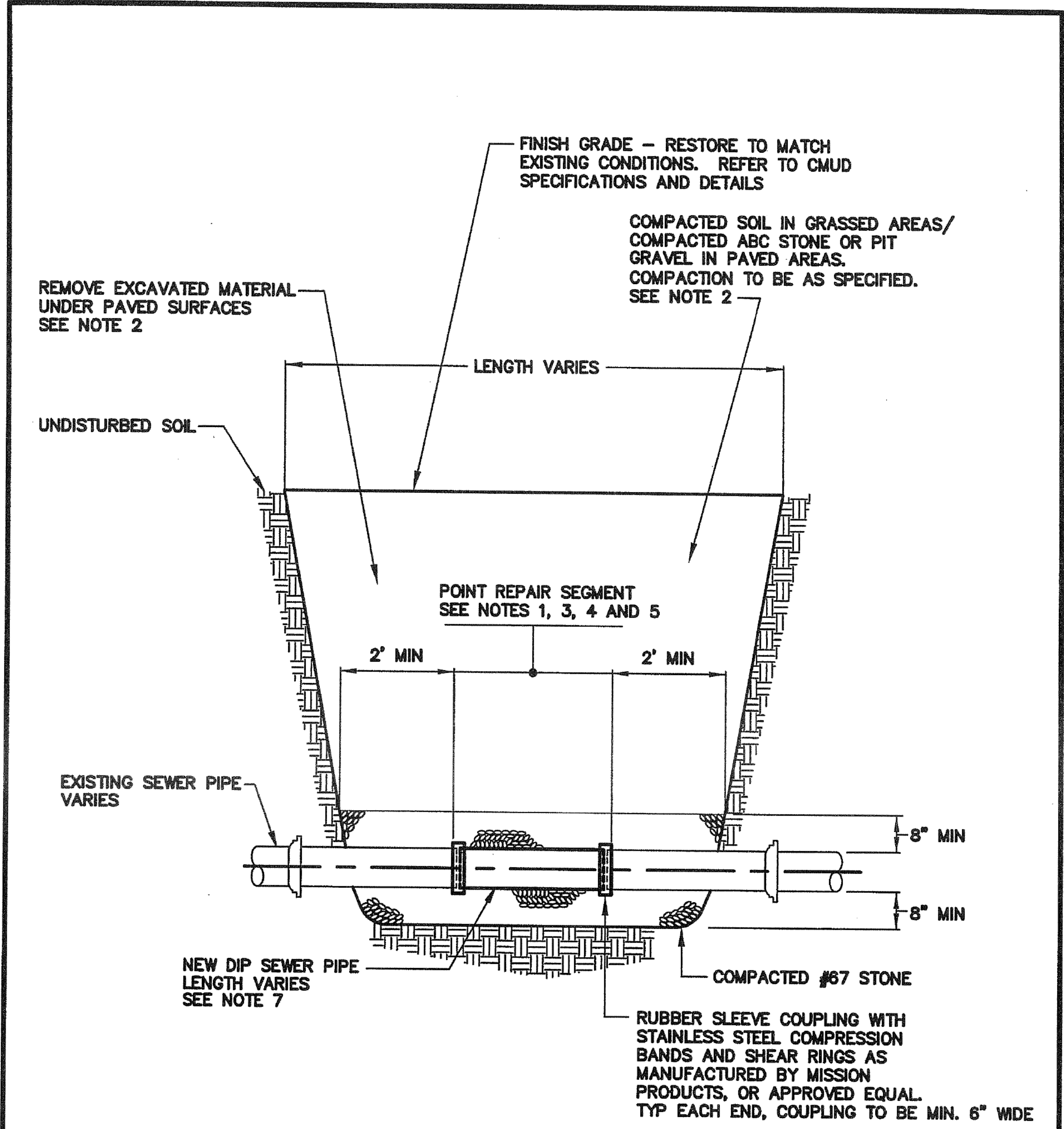
CHARLOTTE-MECKLENBURG UTILITIES CHARLOTTE, NORTH CAROLINA			
REHABILITATION OF EXISTING MANHOLES (PAGE 1 OF 2)			
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CHARLOTTE-MECKLENBURG UTILITIES CHARLOTTE, NORTH CAROLINA			
REHABILITATION OF EXISTING MANHOLES (PAGE 2 OF 2)			
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CLTWater STANDARD DETAILS

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NOTES:

1. THE SEQUENCE OF WORK FOR PERFORMING POINT REPAIRS SHALL BE AS FOLLOWS:
 - A. BYPASS PUMP FLOWS AROUND POINT REPAIR SEGMENT.
 - B. EXCAVATE TO 8" BELOW EXISTING SEWER.
 - C. NEATLY CUT EXISTING SEWER AT EACH END OF POINT REPAIR AND REMOVE EXISTING SEWER COMPLETELY.
 - D. INSTALL #67 STONE TO SEWER INVERT ELEVATION AND COMPACT.
 - E. INSTALL NEW DIP SEWER AT A CONSTANT SLOPE BETWEEN THE TWO EXISTING PIPE ENDS. CONNECT THE NEW SEWER TO THE EXISTING WITH RUBBER SLEEVE COUPLINGS. REMOVE STONE BEDDING AS REQUIRED TO INSTALL PIPE AND COUPLINGS AND FILL VOIDS UNDER PIPE WITH STONE.
 - F. RETURN FLOW THROUGH PIPE.
 - G. BACKFILL AND COMPACT AS SHOWN.
2. UNDER PAVED SURFACES ONLY, CONTRACTOR SHALL REMOVE EXCAVATED SOIL AND DISPOSE OF IT OFFSITE. CONTRACTOR SHALL IMPORT ABC STONE OR PIT GRAVEL FOR BACKFILLING FROM TOP OF #67 STONE TO PAVEMENT SUBGRADE. PAYMENT FOR ABC STONE OR PIT GRAVEL SHALL BE BASED ON THE LENGTH OF POINT REPAIR. ALL COSTS OF THIS WORK SHALL BE INCLUDED IN THE UNIT PRICES BID.
3. SERVICE LATERALS LOCATED WITHIN POINT REPAIR SEGMENTS SHALL BE CONNECTED TO NEW SEWER WITH A DIP TEE. REFER TO DETAIL F.
4. LENGTH OF POINT REPAIR WILL BE DETERMINED BY THE CONTRACTOR AND/OR THE ENGINEER AFTER REVIEWING THE TELEVISION INSPECTION TAPES AND LOGS. THE CONTRACTOR SHALL EXTEND POINT REPAIRS IN THE FIELD AS NECESSARY AND APPROVED BY THE ENGINEER TO CONNECT TO SOLID PIPE.
5. THE CONTRACTOR SHALL USE A TRENCH BOX OR SHEETING AND SHORING IN ACCORDANCE WITH OSHA REGULATIONS TO SUPPORT THE TRENCH WALLS DURING THIS WORK. THE CONTRACTOR WILL NOT BE ALLOWED TO SLOPE TRENCH WALLS.
6. REFER TO DETAIL E FOR CONNECTING TO MANHOLES.
7. ALL PIPE USED FOR POINT REPAIRS SHALL BE DUCTILE IRON PIPE (DIP).

CHARLOTTE-MECKLENBURG UTILITIES
CHARLOTTE, NORTH CAROLINA

TYPICAL POINT REPAIR
(PAGE 2 OF 2)

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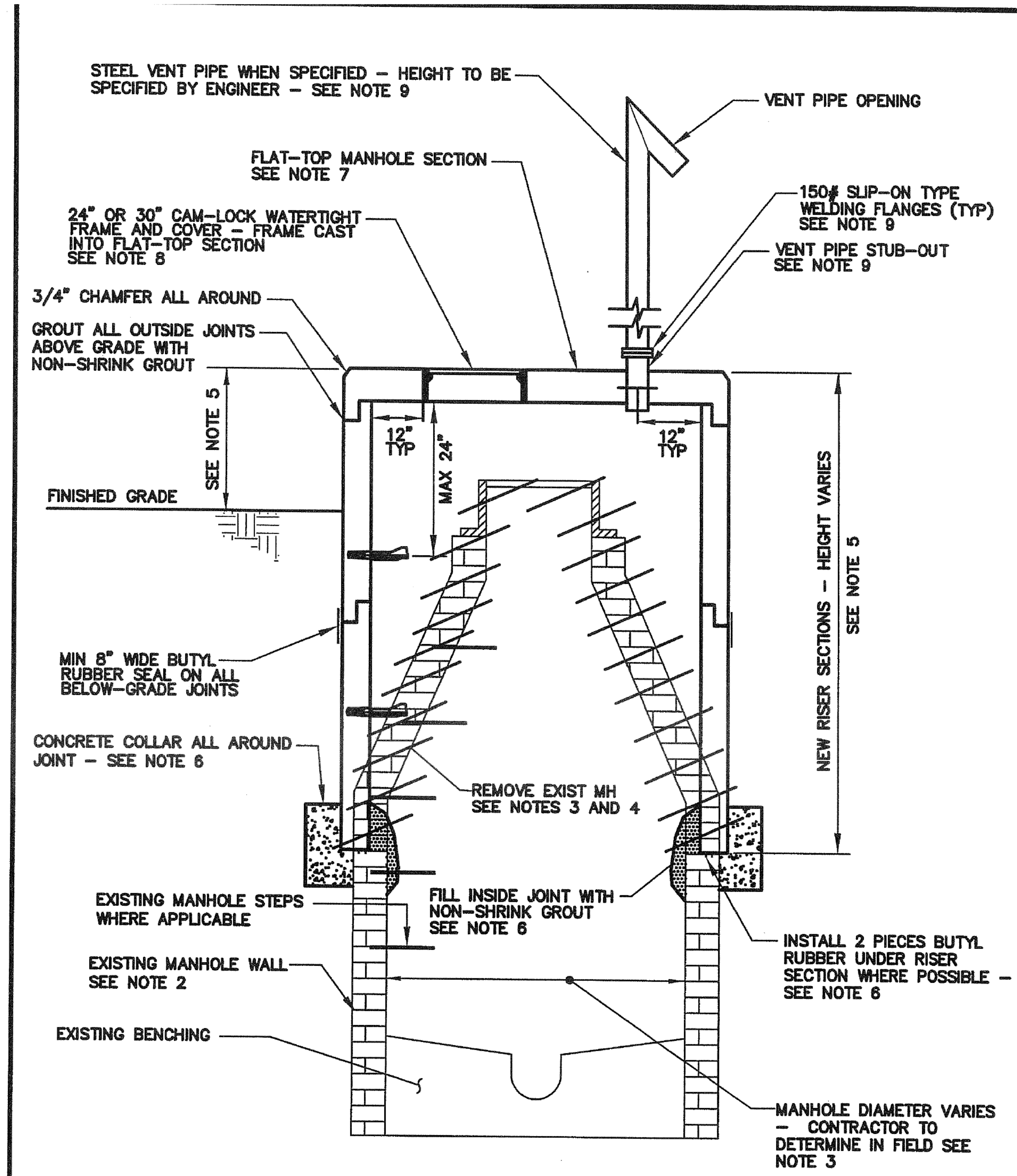
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CLTWater STANDARD DETAILS

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- NOTES:**
1. WORK SPECIFIED IN THIS DETAIL SHALL BE PAID UNDER BID ITEM 6. ALL WORK AND MATERIALS TO BE IN ACCORDANCE WITH CMUD'S STANDARD SPECIFICATIONS AND DETAILS.
 2. THIS DETAIL DEPICTS AN EXISTING BRICK MANHOLE WITH A TYPICAL CHIMNEY SECTION. SOME MANHOLES MAY BE PRECAST CONCRETE WITH CONE SECTIONS.
 3. CONTRACTOR TO MEASURE THE INSIDE DIAMETER OF EXISTING MANHOLE TO SELECT APPROPRIATE DIAMETER OF NEW RISERS.
 4. CONTRACTOR TO REMOVE EXISTING WALLS TO SOLID STRUCTURE (TO AT LEAST BELOW THE CONE OR CHIMNEY SECTION) OR TO THE SPECIFIED LOCATION. THE LIMITS OF REMOVAL SHALL BE APPROVED BY THE ENGINEER IN THE FIELD. CONTRACTOR TO ALSO REMOVE EXISTING FRAMES AND COVERS, VENT PIPES AND ALL APPURTENANCES, STEPS, ETC. CONTRACTOR TO DISPOSE OF ALL MATERIALS OFF-SITE.

NO DEBRIS SHALL BE DROPPED INTO THE SEWER. IF DEBRIS ENTERS THE SEWER, THE CONTRACTOR WILL BE REQUIRED TO CLEAN THE SEWER AT NO ADDITIONAL COST TO THE OWNER.
 5. CONTRACTOR TO INSTALL NEW RISER SECTIONS AS NECESSARY TO EXTEND THE MANHOLE TO THE SPECIFIED/APPROVED ELEVATION. ENGINEER SHALL APPROVE FINAL ELEVATIONS IN THE FIELD. BOTTOM RISER TO BE PROVIDED WITH A FLAT JOINT UNLESS OTHERWISE APPROVED.
 6. CONTRACTOR TO SEAL NEW RISER SECTION/EXISTING WALL JOINT TO PROVIDE A LEAK-TIGHT JOINT. THE CONTRACTOR SHALL PERFORM ALL WORK NECESSARY TO PROVIDE A LEAK-TIGHT SEAL. WHERE POSSIBLE, BUTYL RUBBER SEALANT SHALL BE PROVIDED UNDER THE NEW RISER SECTION. IN ALL CASES, A CONCRETE COLLAR SHALL BE POURED AROUND THE JOINT. COLLAR TO BE MINIMUM 6 INCHES WIDE AND 12 INCHES HIGH CENTERED ON JOINT ALL AROUND.

ON THE INSIDE OF THE JOINT, CONTRACTOR TO SEAL JOINT WITH NON-SHRINK GROUT. GROUT TO COMPLETELY FILL JOINT AND SHALL EXTEND AT LEAST 6 INCHES EACH SIDE OF JOINT ALL AROUND. GROUT TO BE TAPERED TO THE EXISTING WALL SECTION BELOW THE JOINT. GROUT TO BE RESISTANT TO HYDROGEN-SULFIDE.
 7. NEW FLAT-TOP SECTIONS TO BE INSTALLED ON TOP OF NEW RISER SECTIONS UNLESS SPECIFIED OTHERWISE. FRAMES TO BE CAST INTO FLAT-TOP - SEE NOTE 8. IN SOME INSTANCES, THE ENGINEER MAY SPECIFY THAT A STANDARD CONE SECTION BE INSTALLED INSTEAD OF A FLAT-TOP.
 8. FOR FLAT-TOPS, ALL FRAMES SHALL BE CAST INTO THE FLAT-TOP SECTION UNLESS OTHERWISE SPECIFIED. FOR CONE SECTIONS, FRAMES SHALL BE BOLTED TO THE CONE. ALL COVERS SHALL BE CAM-LOCK WATERTIGHT COVERS UNLESS OTHERWISE SPECIFIED/APPROVED.

24-INCH-DIAMETER FRAMES/COVERS SHALL BE PROVIDED ON MANHOLES FOR SEWERS 24" AND SMALLER. 30-INCH-DIAMETER FRAMES/COVERS SHALL BE PROVIDED ON MANHOLES FOR SEWERS LARGER THAN 24". THE 24" AND 30" CAM-LOCK FRAMES/COVERS SHALL BE AS MANUFACTURED BY EAST JORDAN IRON WORKS, US FOUNDRY, OR APPROVED EQUAL.
 9. WHERE SPECIFIED, FLAT TOP SECTIONS SHALL BE FURNISHED WITH THE VENT PIPE CAST INTO THE TOP SECTION. SEE CMU STANDARD SPECIFICATIONS AND DETAILS.

IF A VENT PIPE IS SPECIFIED, FURNISH VENT PIPE TO THE SPECIFIED HEIGHT (HEIGHT TO VENT OPENING) PER CMU STANDARD SPECIFICATIONS AND DETAILS.

CHARLOTTE-MECKLENBURG UTILITIES CHARLOTTE, NORTH CAROLINA	
REHABILITATION OF MANHOLE WALLS AND TOP SECTION (PAGE 1 OF 2)	
NTS Scale	DETAIL NO. C

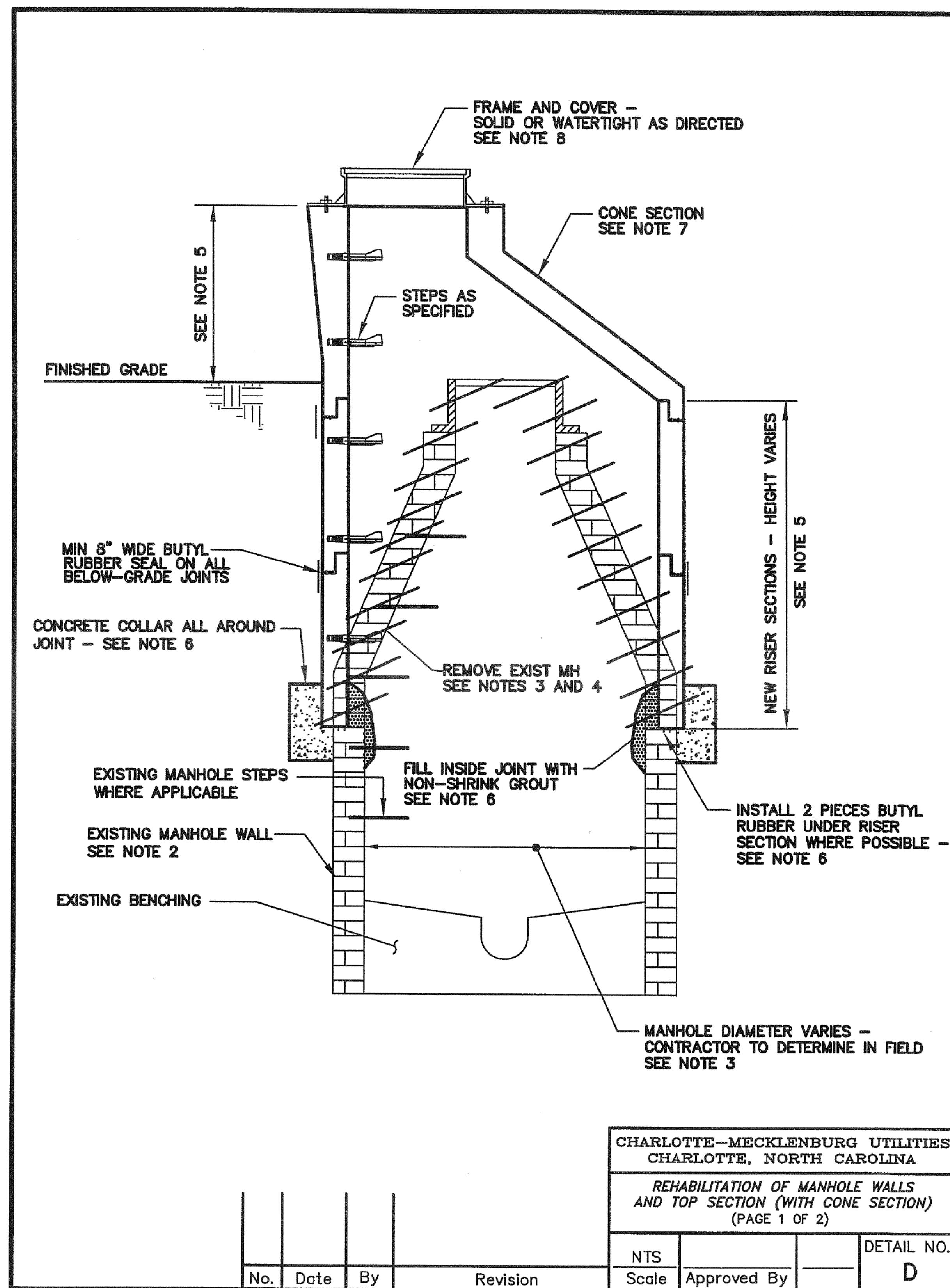
CHARLOTTE-MECKLENBURG UTILITIES CHARLOTTE, NORTH CAROLINA			
REHABILITATION OF MANHOLE WALLS AND TOP SECTION (PAGE 2 OF 2)			
NTS Scale	Approved By	DETAIL NO. C	

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CLTWater STANDARD DETAILS



NOTES:

- ALL WORK AND MATERIALS TO BE IN ACCORDANCE WITH CMU'S STANDARD SPECIFICATIONS AND DETAILS.
- THIS DETAIL DEPICTS AN EXISTING BRICK MANHOLE WITH A TYPICAL CHIMNEY SECTION. SOME MANHOLES MAY BE PRECAST CONCRETE WITH CONE SECTIONS.
- CONTRACTOR TO MEASURE THE INSIDE DIAMETER OF EXISTING MANHOLE TO SELECT APPROPRIATE DIAMETER OF NEW RISERS.
- CONTRACTOR TO REMOVE EXISTING WALLS TO SOLID STRUCTURE (TO AT LEAST BELOW THE CONE OR CHIMNEY SECTION) OR TO THE SPECIFIED LOCATION. THE LIMITS OF REMOVAL SHALL BE APPROVED BY THE ENGINEER IN THE FIELD. CONTRACTOR TO ALSO REMOVE EXISTING FRAMES AND COVERS, VENT PIPES AND ALL APPURTENANCES, STEPS, ETC. CONTRACTOR TO DISPOSE OF ALL MATERIALS OFF-SITE.

NO DEBRIS SHALL BE DROPPED INTO THE SEWER. IF DEBRIS ENTERS THE SEWER, THE CONTRACTOR WILL BE REQUIRED TO CLEAN THE SEWER AT NO ADDITIONAL COST TO THE OWNER.
- CONTRACTOR TO INSTALL NEW RISER AND CONE SECTIONS AS NECESSARY TO EXTEND THE MANHOLE TO THE SPECIFIED/APPROVED ELEVATION. THE FINAL ELEVATION MAY BE HIGHER THAN, LOWER THAN OR EQUAL TO THE EXISTING ELEVATION. THIS DETAIL ILLUSTRATES A HIGHER ELEVATION. THE CONTRACTOR SHALL DETERMINE THE REQUIRED RISER AND CONE HEIGHTS TO MEET THE SPECIFIED ELEVATION. ENGINEER SHALL APPROVE FINAL ELEVATIONS IN THE FIELD. BOTTOM RISER TO BE PROVIDED WITH A FLAT JOINT UNLESS OTHERWISE APPROVED.
- CONTRACTOR TO SEAL NEW RISER SECTION/EXISTING WALL JOINT TO PROVIDE A LEAK-TIGHT JOINT. THE CONTRACTOR SHALL PERFORM ALL WORK NECESSARY TO PROVIDE A LEAK-TIGHT SEAL. WHERE POSSIBLE, BUTYL RUBBER SEALANT SHALL BE PROVIDED UNDER THE NEW RISER SECTION. IN ALL CASES, A CONCRETE COLLAR SHALL BE POURED AROUND THE JOINT. COLLAR TO BE MINIMUM 6 INCHES WIDE AND 12 INCHES HIGH CENTERED ON JOINT ALL AROUND.

ON THE INSIDE OF THE JOINT, CONTRACTOR TO SEAL JOINT WITH NON-SHRINK GROUT. GROUT TO COMPLETELY FILL JOINT AND SHALL EXTEND AT LEAST 6 INCHES EACH SIDE OF JOINT ALL AROUND. GROUT TO BE TAPERED TO THE EXISTING WALL SECTION BELOW THE JOINT. GROUT TO BE RESISTANT TO HYDROGEN-SULFIDE.
- NEW CONE SECTIONS TO BE INSTALLED ON TOP OF NEW RISER SECTIONS UNLESS SPECIFIED OTHERWISE. FRAMES TO BE BOLTED ONTO CONE SECTIONS PER CMU'S STANDARD DETAILS AND DETAIL G. REFER TO DETAIL G FOR ALL WORK IN PAVED AREAS. SEE NOTE 8.
- COVERS SHALL BE CAM-LOCK WATERTIGHT COVERS OR SOLID COVERS AS DIRECTED BY THE ENGINEER. CAM-LOCK WATERTIGHT FRAMES/COVERS SHALL BE AS MANUFACTURED BY EAST JORDAN IRON WORKS, US FOUNDRY, OR APPROVED EQUAL.

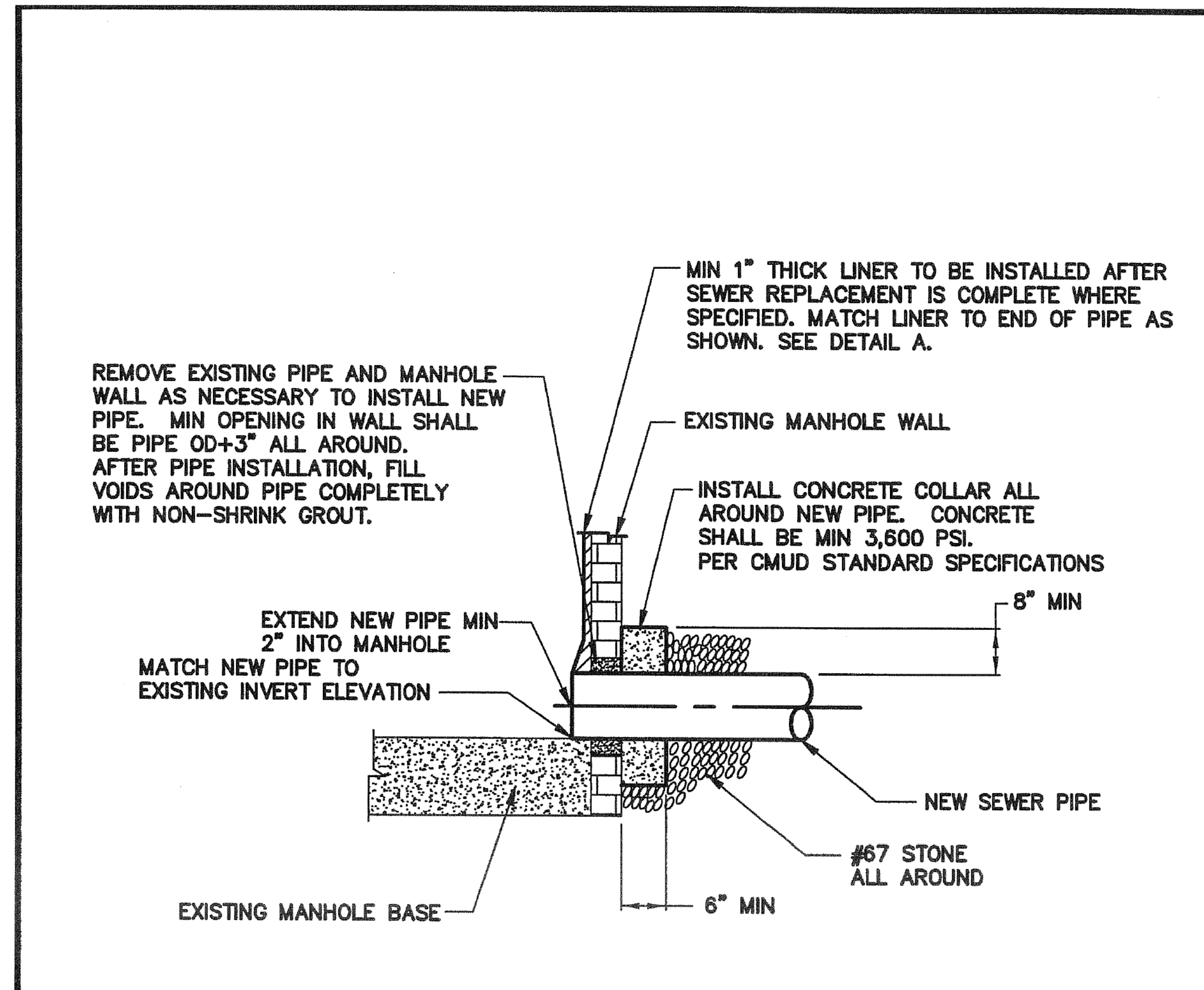
CHARLOTTE-MECKLENBURG UTILITIES
CHARLOTTE, NORTH CAROLINA

REHABILITATION OF MANHOLE WALLS
AND TOP SECTION (WITH CONE SECTION)
(PAGE 2 OF 2)

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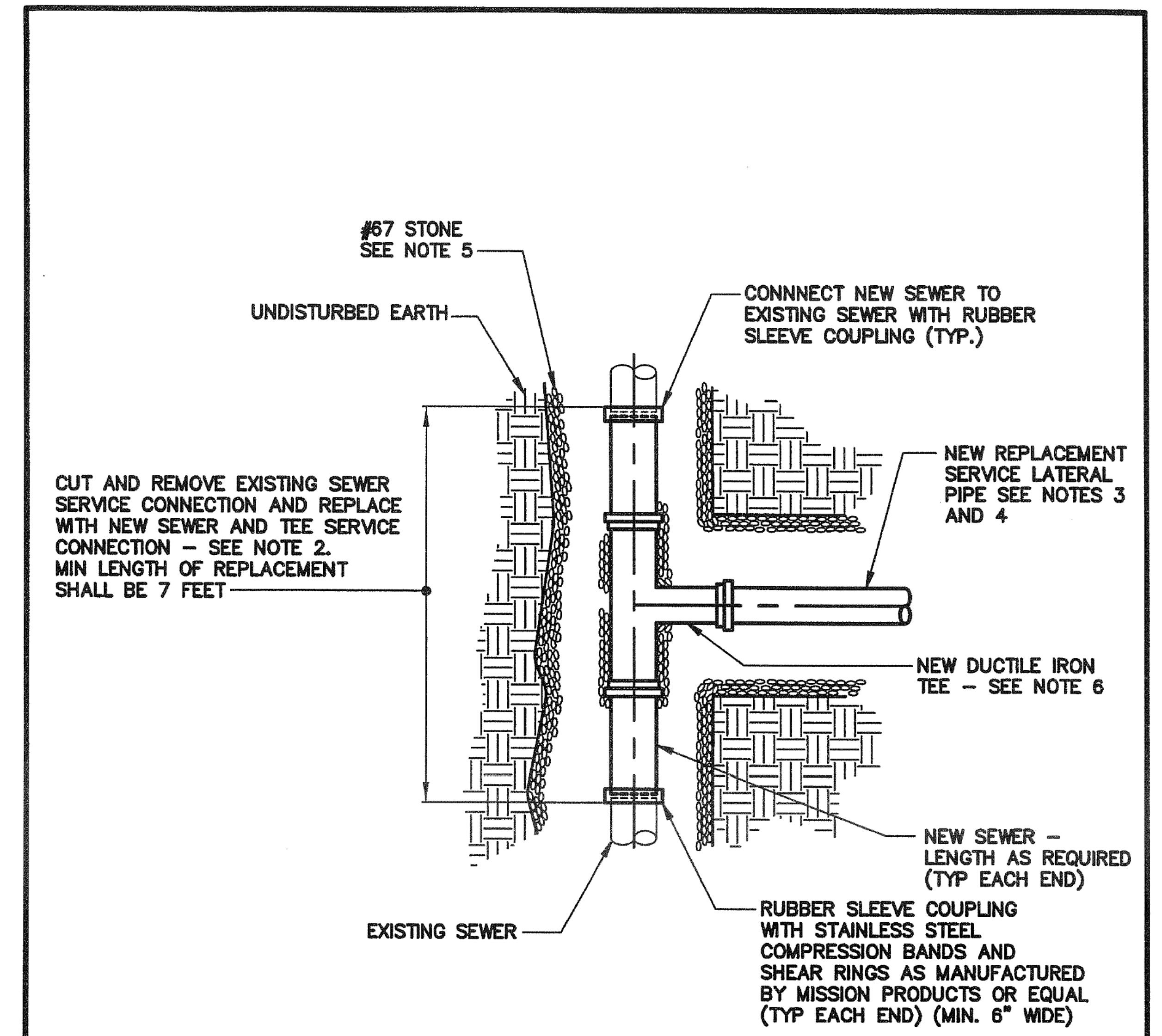


- NOTES:**
1. CONTRACTOR SHALL REFER TO THIS DETAIL WHEN CONNECTING NEW SEWER PIPES TO EXISTING OR NEW MANHOLES. THE NEW PIPES MAY BE INSTALLED FOR A POINT REPAIR, PIPE REPLACEMENT, PIPE BURSTING, OR SERVICE LATERAL REPLACEMENT.

CHARLOTTE-MECKLENBURG UTILITIES
CHARLOTTE, NORTH CAROLINA

NEW PIPE CONNECTION AT MANHOLE

No.	Date	By	Revision	NTS Scale	Approved By	DETAIL NO. E



CHARLOTTE-MECKLENBURG UTILITIES
CHARLOTTE, NORTH CAROLINA

SERVICE LATERAL REPLACEMENT
(PAGE 1 OF 2)

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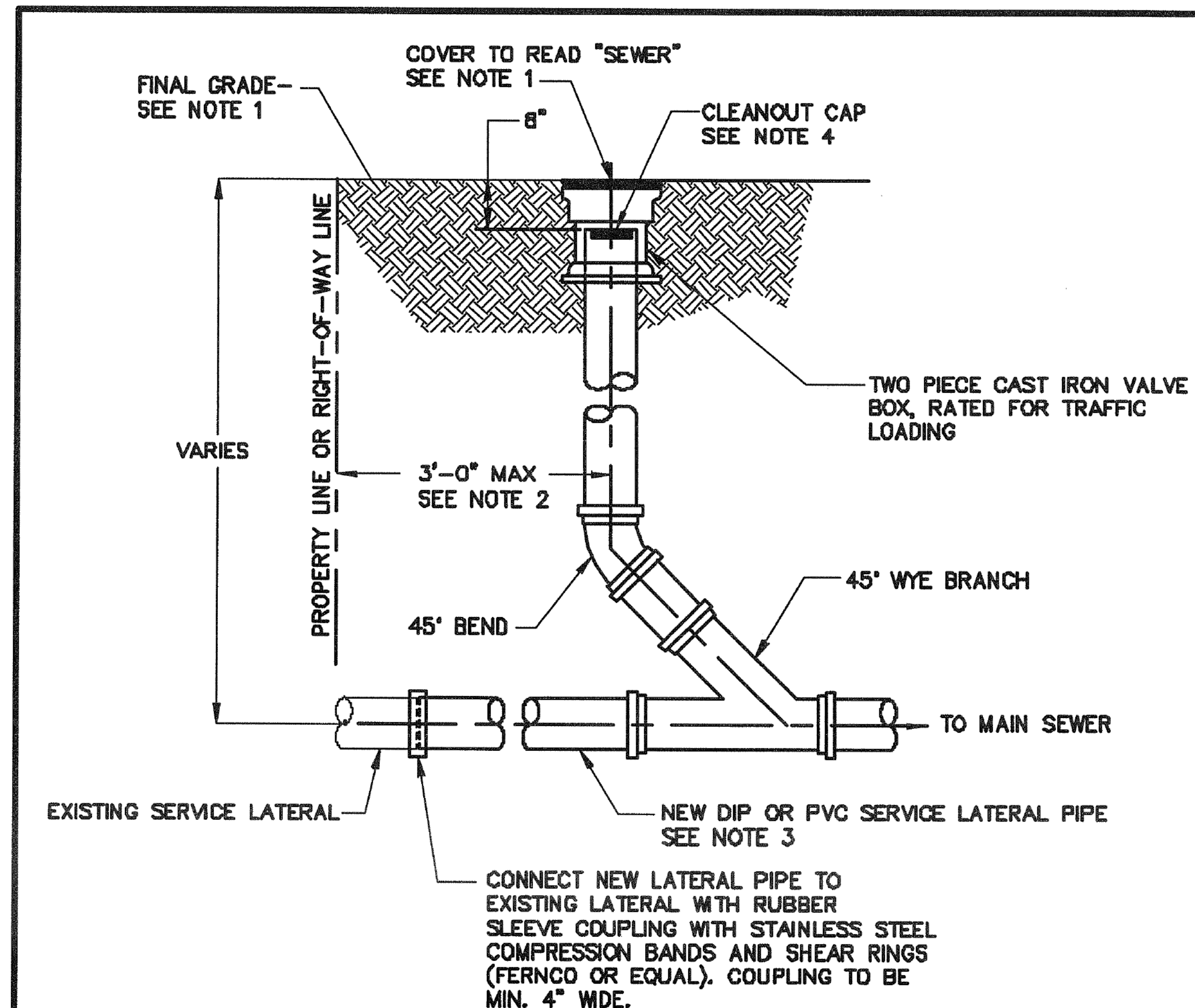
NOTES:

1. REPLACE EXISTING SERVICE LATERALS WHERE SPECIFIED BY THE ENGINEER. REPLACEMENT TO INCLUDE THE TEE AND 6 FEET OF SERVICE LATERAL TO RECONNECT TO THE EXISTING LATERAL OR ADDITIONAL LATERAL TO INSTALL THE NEW LATERAL ALL THE WAY TO THE EDGE OF THE PROPERTY LINE OR ROAD R/W. INSTALL A CLEANOUT AT THE END OF THE NEW LATERAL PER DETAIL F WHEN DIRECTED BY THE ENGINEER. THE ENGINEER WILL DETERMINE WHICH SERVICES TO REPLACE FROM REVIEW OF TELEVISION INSPECTIONS.
2. INSTALL THE NEW SEWER AT A CONSTANT SLOPE BETWEEN THE TWO EXISTING PIPE ENDS.
3. INSTALL FITTINGS, ADAPTERS AND RUBBER SLEEVE COUPLINGS AS NECESSARY TO CONNECT NEW TEE AND SERVICE LATERAL. NEW SERVICE LATERALS SHALL BE DUCTILE IRON PIPE (DIP) OR PVC. NEW LATERALS AND TEE BRANCHES SHALL BE THE SAME SIZE AS THE EXISTING LATERAL.
4. NEW SERVICE LATERAL SHALL BE INSTALLED AT THE EXISTING LATERAL SLOPE AND IN THE EXISTING LATERAL LOCATION. CONNECT NEW LATERAL TO EXISTING LATERAL WITH RUBBER SLEEVE COUPLINGS WITH STAINLESS STEEL COMPRESSION BANDS AND SHEAR RINGS AS MANUFACTURED BY MISSION PRODUCTS OR APPROVED EQUAL. BYPASS FLOWS FROM THE LATERAL DURING CONSTRUCTION TO MAINTAIN SEWER SERVICE. DISPOSE OF EXISTING LATERAL PIPE MATERIAL OFFSITE.
5. INSTALL AND COMPACT #67 CRUSHED STONE TO A MIN OF 1 FOOT ABOVE THE TOP OF THE NEW SEWER PIPE, TEE, FITTINGS AND SERVICE LATERAL PIPES (COMPLETE TO CLEANOUT). IN PAVED AREAS, INSTALL AND COMPACT IMPORTED ABC STONE OR PIT GRAVEL FROM TOP OF STONE TO PAVEMENT SUBGRADE. PAYMENT FOR ABC STONE OR PIT GRAVEL SHALL BE BASED ON THE LENGTH OF POINT REPAIR. IN UNPAVED AREAS, INSTALL AND COMPACT COMMON FILL FROM TOP OF STONE TO FINISHED GRADE. RESTORE SURFACE TO MATCH EXISTING CONDITIONS.
6. TEES SHALL BE ROTATED 22 1/2 DEGREES PER CMUD STANDARDS. INSTALL FITTINGS AS NECESSARY TO RETURN THE NEW LATERAL TO THE EXISTING LATERAL ELEVATION. ALL TEES SHALL BE DUCTILE IRON.

CHARLOTTE-MECKLENBURG UTILITIES
CHARLOTTE, NORTH CAROLINA

SERVICE LATERAL REPLACEMENT
(PAGE 2 OF 2)

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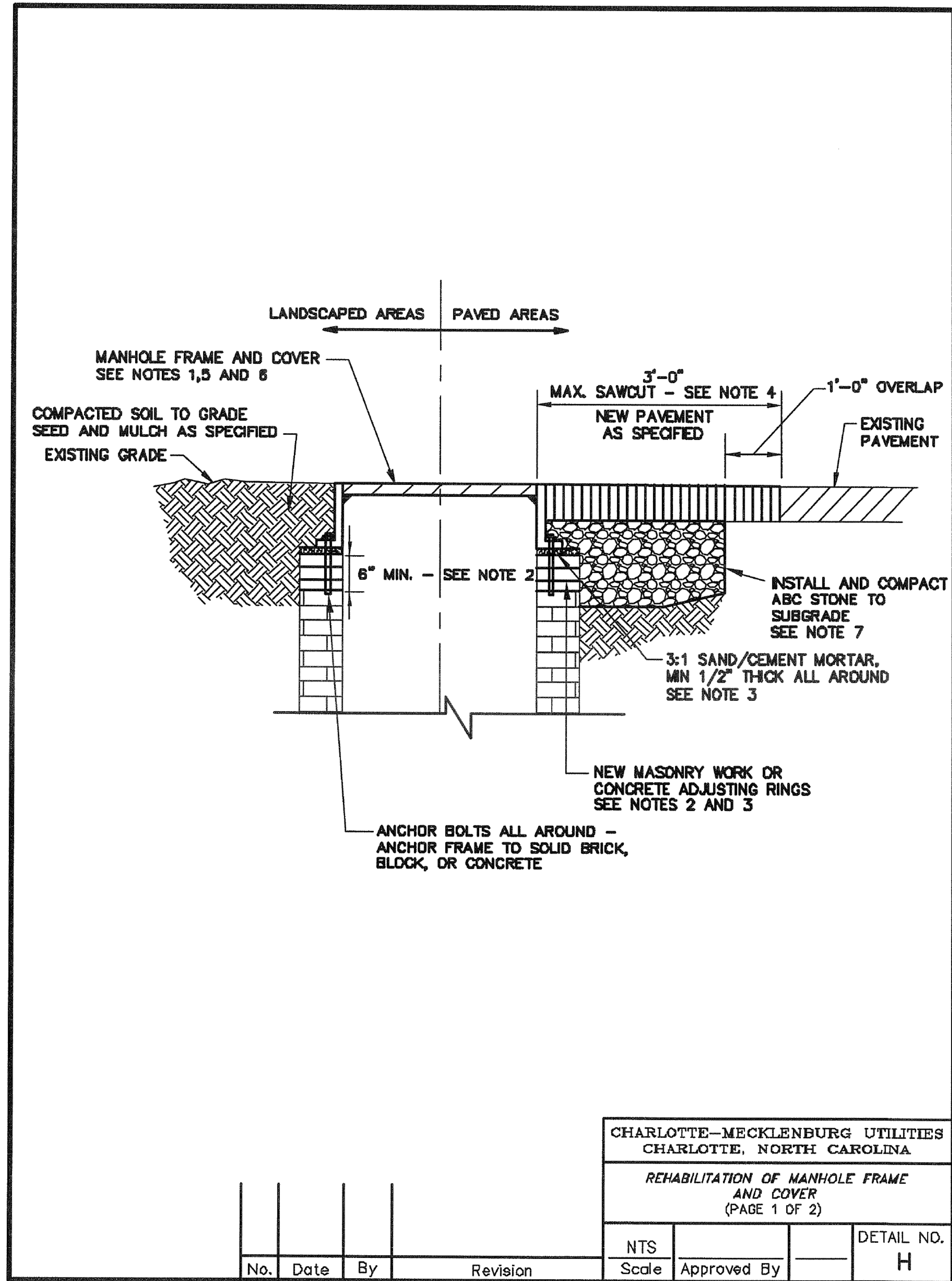
1. CLEANOUT COVER TO BE FLUSH WITH THE FINAL GRADE. RESTORE SURFACE TO MATCH EXISTING CONDITIONS IN ACCORDANCE WITH CMUD STANDARD SPECIFICATIONS AND DETAILS.
2. LOCATION OF CLEANOUT SHALL BE AS DIRECTED BY ENGINEER.
3. NEW SERVICE LATERAL PIPE, CLEANOUT PIPING AND FITTINGS SHALL BE DUCTILE IRON PIPE (DIP) OR PVC. NEW SERVICE LATERALS SHALL BE INSTALLED TO MATCH THE EXISTING SLOPES AND CONFIGURATIONS UNLESS NOTED OTHERWISE. REFER TO DETAIL F.
4. CLEANOUT CAP SHALL BE PLASTIC GRIPPER PLUG, END OF PIPE MODEL, BY CHERNE INDUSTRIES OR APPROVED EQUAL.
5. FOR MEASUREMENT AND PAYMENT, CLEANOUT TO BEGIN AT WYE FITTING.

CHARLOTTE-MECKLENBURG UTILITIES
CHARLOTTE, NORTH CAROLINA

TYPICAL CLEANOUT

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CLTWater STANDARD DETAILS



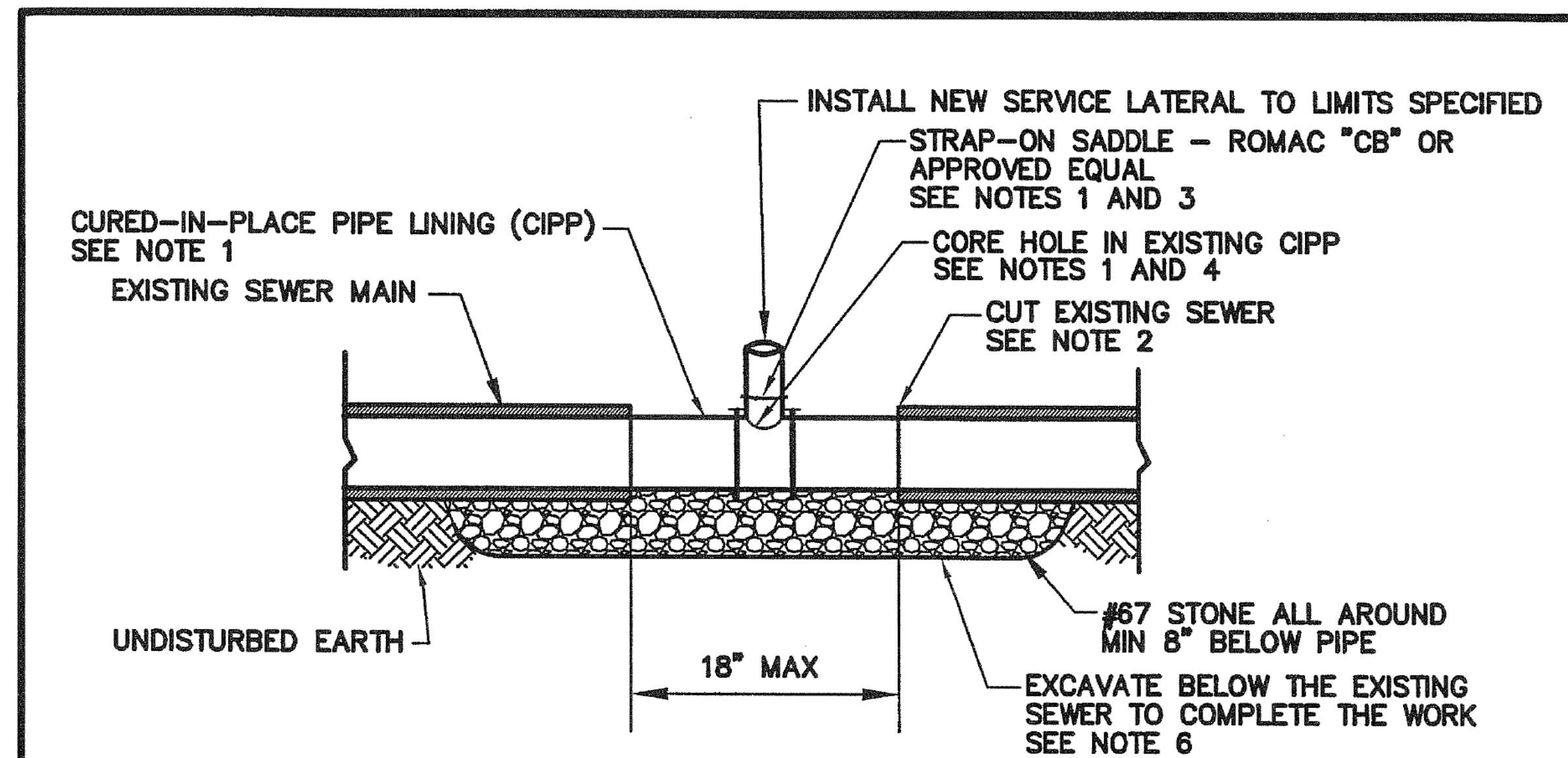
NOTES:

1. CONTRACTOR SHALL REFER TO THIS DETAIL WHEN RAISING MANHOLES AND WHEN RESETTING OR REPLACING EXISTING FRAMES AND COVERS. ALL REHABILITATION OF FRAMES AND COVERS SHALL BE COMPLETED PRIOR TO OTHER MANHOLE REHABILITATION WORK. THIS DETAIL ILLUSTRATES MANHOLES AT GRADE. FOR FRAME AND COVERS ABOVE GRADE, WORK SHALL BE IN ACCORDANCE WITH THIS DETAIL AND ALL OTHER REQUIREMENTS IN CMUD'S STANDARD SPECIFICATIONS AND DETAILS. SEE NOTE 8.
2. CONTRACTOR TO REMOVE AT LEAST 6" OF EXISTING BRICK AND/OR MATERIAL PRIOR TO INSTALLING NEW MASONRY OR CONCRETE ADJUSTING RINGS, TO PROVIDE A NEW SOLID SURFACE FOR SEATING THE FRAME AND TO PROVIDE A LEAK-TIGHT SEAL.
3. REMOVE ALL LOOSE BRICKS AND MORTAR AND PROVIDE A SMOOTH LEVEL SURFACE PRIOR TO INSTALLING MASONRY OR CONCRETE ADJUSTING RINGS. BRUSH SURFACE WITH STIFF WIRE BRUSH PRIOR TO PLACING MORTAR.
4. IN PAVED AREAS, PAVEMENT SHALL BE SAW-CUT NEATLY IN A SQUARE AROUND EXISTING MANHOLES.
5. MANHOLE COVER TO BE FLUSH WITH EXISTING GRADE UNLESS NOTED OTHERWISE.
6. ALL NEW FRAME AND COVERS (WHERE REQUIRED) SHALL BE SOLID OR WATERTIGHT AS SPECIFIED BY THE ENGINEER.
7. FOR COVERS IN PAVED AREAS, FILL AROUND FRAME AND EXPOSED MANHOLE WALL COMPLETELY WITH ABC STONE. ABC STONE TO EXTEND TO EXISTING PAVEMENT - NEW PAVEMENT (MIN 2", MAX 8") TO BE INSTALLED FROM TOP OF ABC STONE TO TOP OF FRAME. THE COST FOR THE ABC STONE, ANCHOR BOLTS, AND PAVEMENT RESTORATION SHALL BE INCLUDED IN THE UNIT PRICES BID.
8. A STREET CUT PERMIT IS REQUIRED TO PERFORM EXCAVATION WORK IN CDOT ROADS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE OWNER WITH THE REQUIRED INFORMATION ASSOCIATED WITH EACH STREET CUT IN ORDER TO PROPERLY OBTAIN A VALID STREET CUT PERMIT FROM CDOT. THE CONTRACTOR'S PROJECT MANAGER, SUPERINTENDENTS AND/OR FOREMEN MUST BE CERTIFIED BY CDOT TO PERFORM ANY EXCAVATION WORK IN CDOT ROADS. CDOT PROVIDES THE CERTIFICATION THROUGH PERIODIC CERTIFICATION COURSES. THE CONTRACTOR AND ALL SUBCONTRACTORS (AS NECESSARY) SHALL OBTAIN THE CERTIFICATION PRIOR TO PERFORMING ANY EXCAVATION IN CDOT ROADS.

CHARLOTTE-MECKLENBURG UTILITIES CHARLOTTE, NORTH CAROLINA			
REHABILITATION OF MANHOLE FRAME AND COVER (PAGE 1 OF 2)			
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CHARLOTTE-MECKLENBURG UTILITIES CHARLOTTE, NORTH CAROLINA			
REHABILITATION OF MANHOLE FRAME AND COVER (PAGE 2 OF 2)			
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Scale	Approved By		H

CLTWater STANDARD DETAILS



NOTES:

1. REFER TO THIS DETAIL TO CONNECT NEW SERVICE LATERALS AFTER THE SEWERS HAVE BEEN LINED WITH CIPP.
THIS DETAIL SHALL ALSO BE USED WHEN RECONNECTING SERVICES FOLLOWING PIPE BURSTING. IN THAT SITUATION, ALL REFERNECS TO CIPP IN THIS DETAIL SHALL BE HDPE.
2. NEATLY CUT THE EXISTING SEWER WITH A CUTTER SPECIFICALLY DESIGNED FOR CUTTING THAT SPECIFIC PIPE MATERIAL TO EXPOSE THE CIPP. FOR VCP AND CONCRETE SEWERS, USE A CHAIN CUTTER TO NEATLY SCORE THE PIPE AND THEN BREAK THE PIPE AWAY. REGARDLESS OF THE CUTTER USED, USE EXTREME CAUTION TO PREVENT DAMAGE TO THE CIPP. REPAIR ANY DAMAGE AS APPROVED BY THE ENGINEER.
3. STRAP-ON SADDLE SHALL BE A ROMAC "CB" SADDLE AS MANUFACTURED BY ROMAC INDUSTRIES, INC. OR APPROVED EQUAL. ANY PROPOSED EQUAL SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL. SADDLE SHALL BE PROVIDED FOR THE SPECIFIC TYPE OF LATERAL PIPE BEING INSTALLED.
4. CAREFULLY REMOVE THE EXISTING LATERAL TO LIMIT DAMAGE TO THE CIPP, INCREASE THE OPENING IN THE CIPP AS NECESSARY AND TO PROVIDE A CIRCULAR OPENING, BRUSH THE CIPP IN THE OPENING SMOOTH TO REMOVE ALL BURRS, INSTALL STRAP-ON SADDLE, AND REPLACE LATERAL TO THE SPECIFIED LIMITS. WHERE POSSIBLE, IMPROVE THE CONFIGURATION OF THE CONNECTION.
5. IF THE CIPP IS DAMAGED FROM OVERCUTTING THE NEW SERVICE CONNECTION, THEN THE NEXT LARGER SIZE HOLE SHALL BE CUT AND A SERVICE SADDLE WITH A BELL REDUCER SHALL BE INSTALLED FOR CONNECTING BACK TO THE NEW SERVICE DIAMETER.
6. SUPPORT THE EXISTING SEWER DURING THIS WORK AS NECESSARY.
7. DEFECTS IDENTIFIED FROM THE POST-CIPP CCTV INSPECTIONS SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER.

CHARLOTTE-MECKLENBURG UTILITIES
CHARLOTTE, NORTH CAROLINA

SERVICE LATERAL CONNECTING TO
CURED-IN-PLACE PIPE LINING (CIPP)

No.	Date	By	Revision	NTS Scale	Approved By	DETAIL NO. 1