

09/08/2011

TIP PROJECT: B-5770

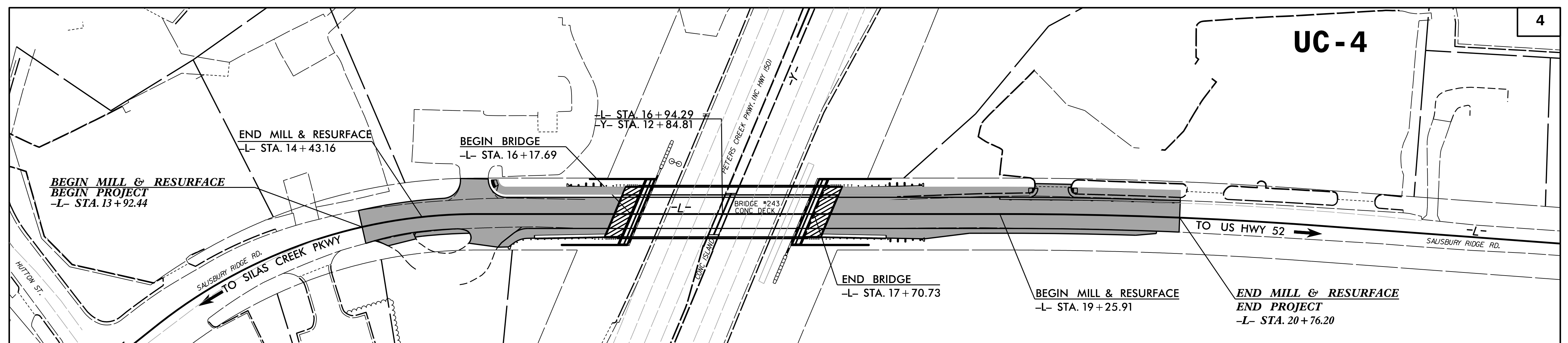
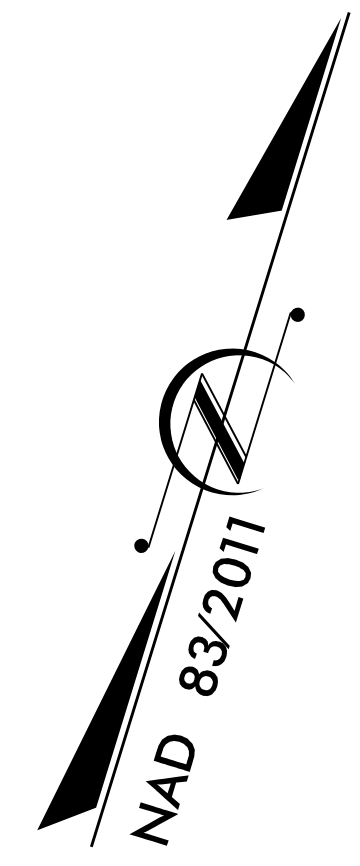
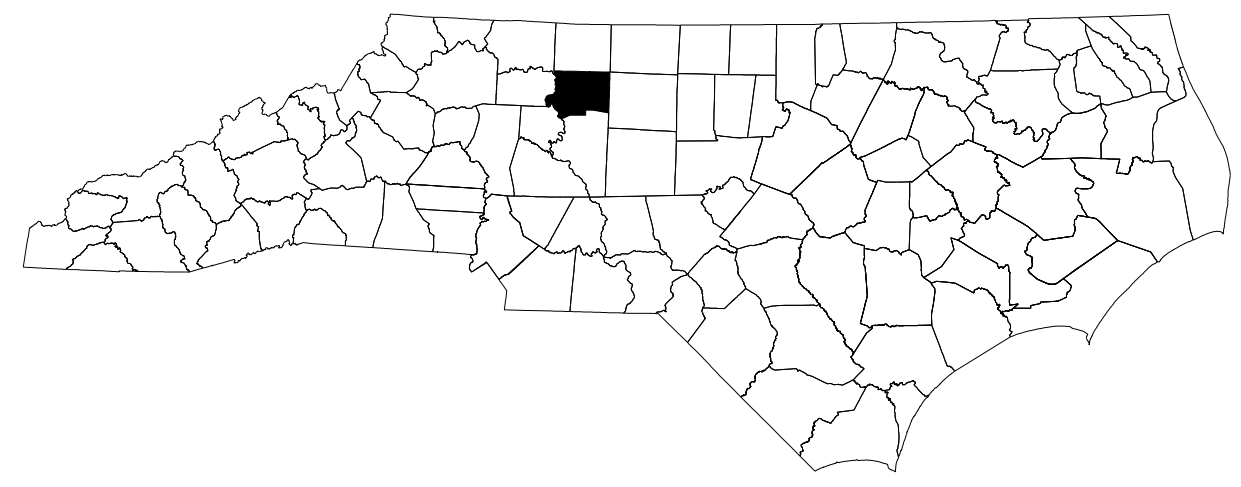
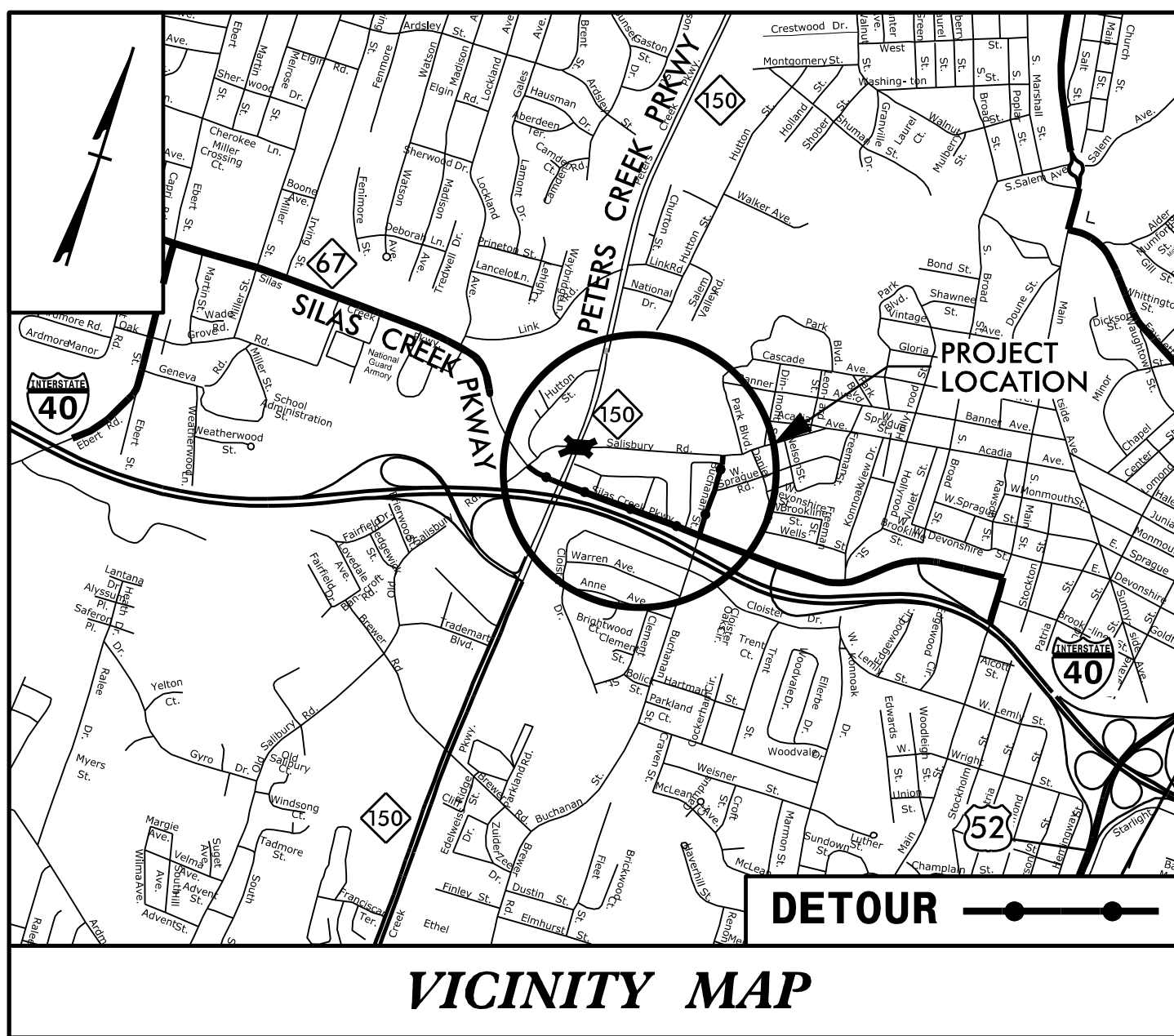
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

T.I.P. NO.	SHEET NO.
B-5770	UC-1

UTILITY CONSTRUCTION PLANS FORSYTH COUNTY

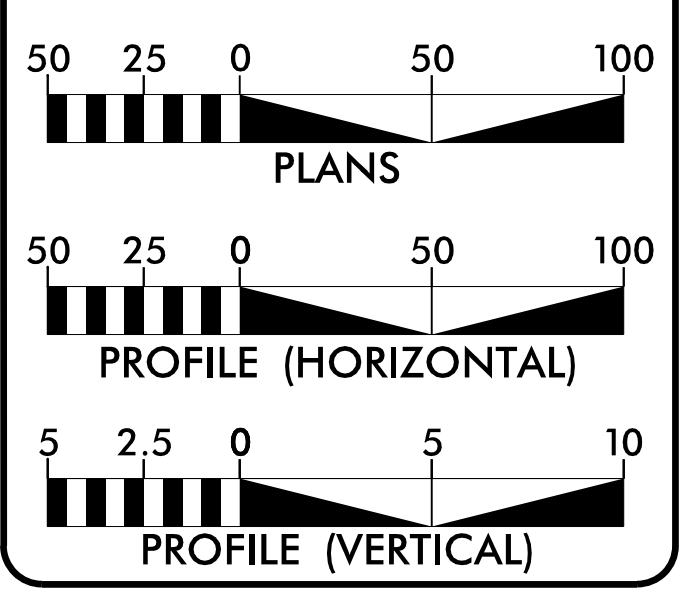
LOCATION: BRIDGE NO. 243 ON SALISBURY RIDGE RD.
OVER NC 150 (PETERS CREEK PARKWAY)

TYPE OF WORK: UTILITY CONSTRUCTION



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



INDEX OF SHEETS

SHEET NO.:	DESCRIPTION:
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY
UC-3	NOTES
UC-3A	DETAILS
UC-4	UTILITY CONSTRUCTION SHEET
UC-5	PROFILE SHEET

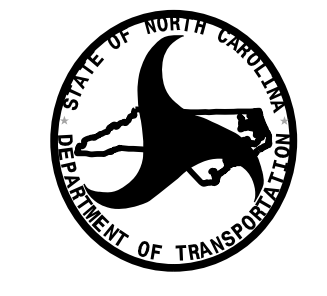
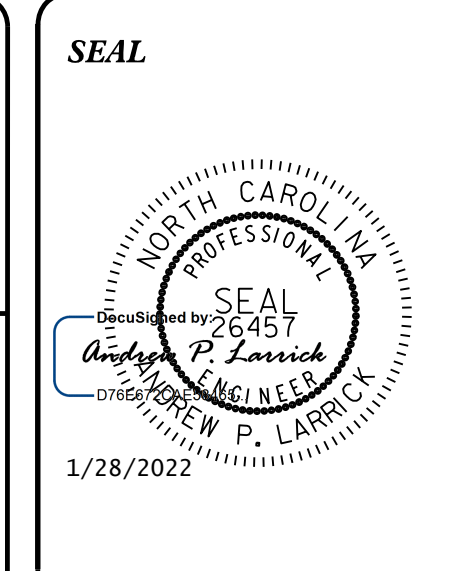
WATER AND SEWER OWNERS ON PROJECT

- A) WATER:
WINSTON-SALEM / FORSYTH COUNTY UTILITIES
- B) SEWER:
WINSTON-SALEM / FORSYTH COUNTY UTILITIES

PREPARED IN THE OFFICE OF:
DAVIS • MARTIN • POWELL
ENGINEERS & SURVEYORS **dmp**

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DIVISION OF HIGHWAYS
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1555 MAIL SERVICE CENTER
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PHONE (919) 707-6690
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- Amy York CENTRAL UTILITIES MANAGER
Ali Kouchehi, P.E. REGIONAL UTILITIES ENGINEER
Jon Loughry SENIOR UTILITIES ENGINEER
Dayton Martin REGIONAL UTILITY COORDINATOR
Jon Gaillard SENIOR UTILITY COORDINATOR

\$\$\$\$\$ SYSTEM \$\$\$\$\$\$
\$\$\$\$\$ USER \$\$\$\$\$\$

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	
11 1/4 Degree Bend	
22 1/2 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	
Telephone Pole	
Joint Use Pole	
Utility Pole	
Utility Pole with Base	
H-Frame Pole	
Power Transmission Line Tower	
Water Manhole	
Power Manhole	
Telephone Manhole	
Sanitary Sewer Manhole	
Hand Hole for Cable	
Power Transformer	
Telephone Pedestal	
CATV Pedestal	
Gas Valve	
Gas Meter	
Located Miscellaneous Utility Object	
Abandoned According to Utility Records	
End of Information	

*Underground Power Line	
*Underground Telephone Cable	
*Underground Telephone Conduit	
*Underground Fiber Optics Telephone Cable	
*Underground TV Cable	
*Underground Fiber Optics TV Cable	
*Underground Gas Pipeline	
Aboveground Gas Pipeline	
*Underground Water Line	
Aboveground Water Line	
*Underground Gravity Sanitary Sewer Line	
Aboveground Gravity Sanitary Sewer Line	
*Underground SS Forced Main Line	
Underground Unknown Utility Line	
SUE Test Hole	
Water Meter	
Water Valve	
Fire Hydrant	
Sanitary Sewer Cleanout	

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

5/14/99
REV: 2/1/2012

5/14/99

REVISIONS

UTILITY CONSTRUCTION

GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2018.
2. THE EXISTING UTILITIES BELONG TO WINSTON-SALEM / FORSYTH COUNTY UTILITIES.
3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, PUBLIC WATER SUPPLY SECTION. ALL SEWER LINES AND SEWER PUMP STATIONS TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, WATER QUALITY SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.
4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.
5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNER'S REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPORTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.

6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE DEPARTMENT.
7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.
8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY. LINE STOPS AND INSERT VAVLES WILL BE REQUIRED WHERE INDICATED ON THE PLANS, WHERE THE UTILITY OWNER CANNOT ISOLATE THE EXISTING LINES WITHOUT MAJOR DISRUPTION OF SERVICE TO MANY USERS.
9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

PROJECT SPECIFIC NOTES:

1. UNLESS OTHERWISE NOTED, FOR PROPOSED WATER MAINS AND SEWER MAINS 4" THRU 12" DIAMETER, PIPE SHALL BE DUCTILE IRON, PC 350. PROVIDE RESTRAINED-JOINT DIP WHERE INDICATED ON PROFILES.
2. WATER LINE VALVES SHALL BE RESILIENT-SEAT GATE VALVES CONFORMING TO ANSI/AWWA C509, OR ANSI/AWWA C515, AND SHALL BE RATED FOR A MINIMUM WORKING PRESSURE OF 250 PSI.
3. THE INTERIOR OF PROPOSED SANITARY SEWER LINES SHALL BE LINED WITH A MINIMUM OF 40 MILS OF CORROSION- RESISTANT CERAMIC EPOXY COATING AS DESCRIBED IN THE UC PROJECT SPECIAL PROVISIONS. ALL BELLS AND SPIGOTS FOR SANITARY SEWER PIPE MUST BE LINED WITH A MINIMUM OF 8 MILS OF JOINT COMPOUND.
4. CONTRACTOR'S ATTENTION IS DIRECTED TO SECTIONS 102, 107, AND 1550 OF THE STANDARD SPECIFICATIONS CONCERNING TRENCHLESS INSTALLATION.
5. CONTRACTOR SHALL COORDINATE WITH THE UTILITY OWNER CONCERNING THE TIMING AND SCHEDULE OF REQUIRED SHUT-DOWNS OF ANY EXISTING WATER OR SEWER MAINS.

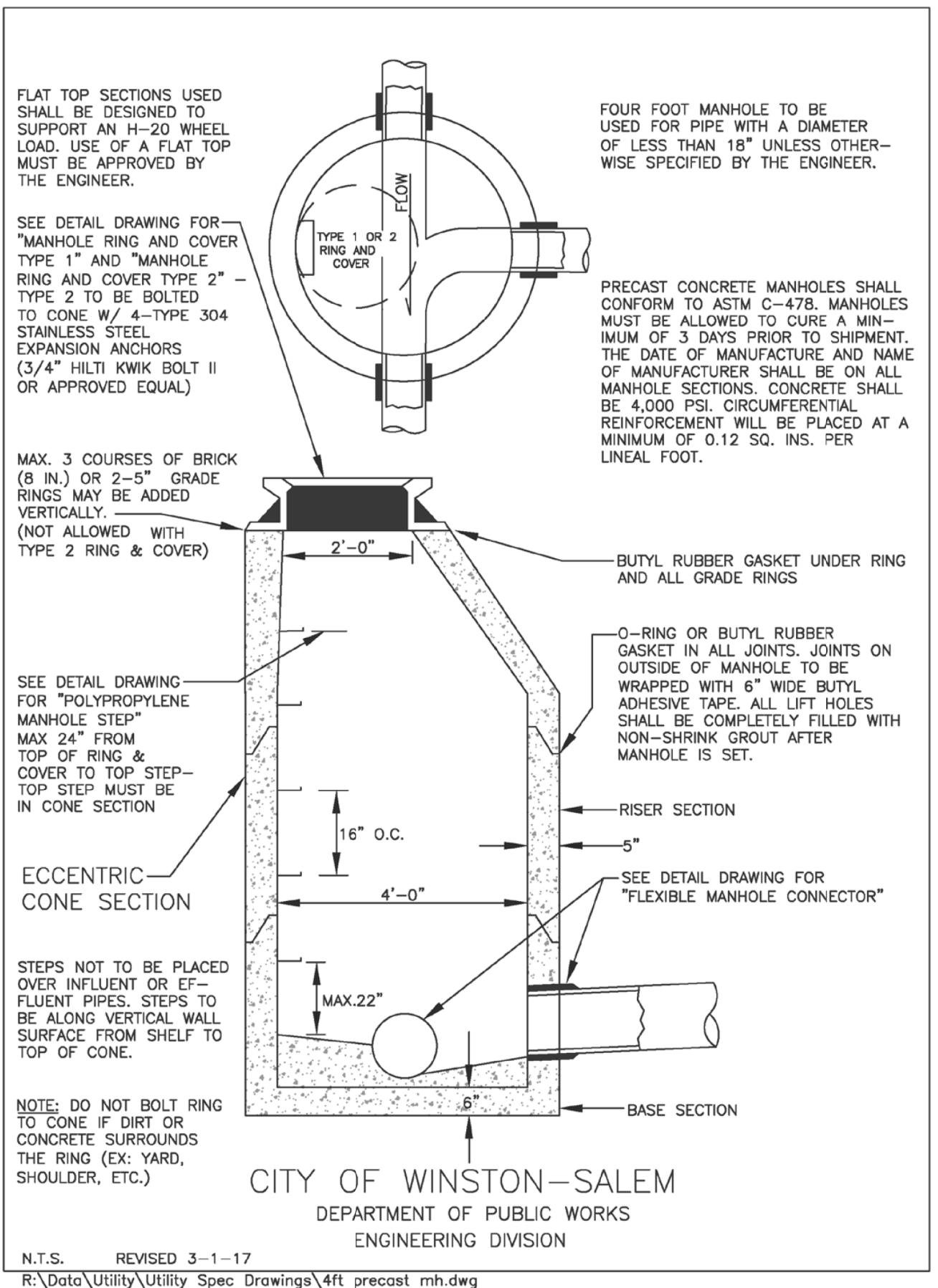
PROJECT REFERENCE NO. B-5770	SHEET NO. UC-3
DESIGNED BY: DMP	
DRAWN BY: DMP	
CHECKED BY: DMP	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	1/28/2022
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

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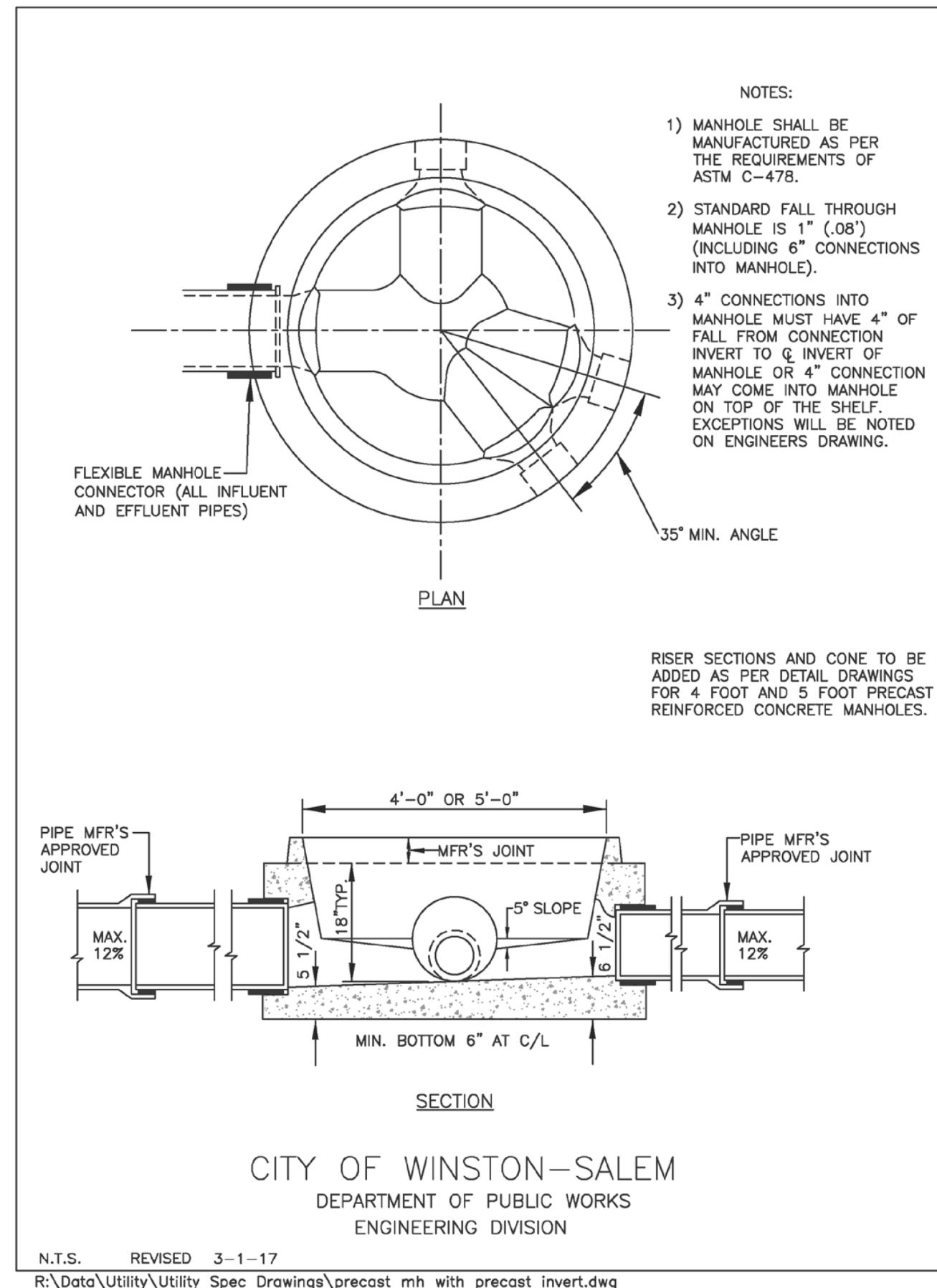
5/14/09

4' Precast Reinforced Concrete Manhole



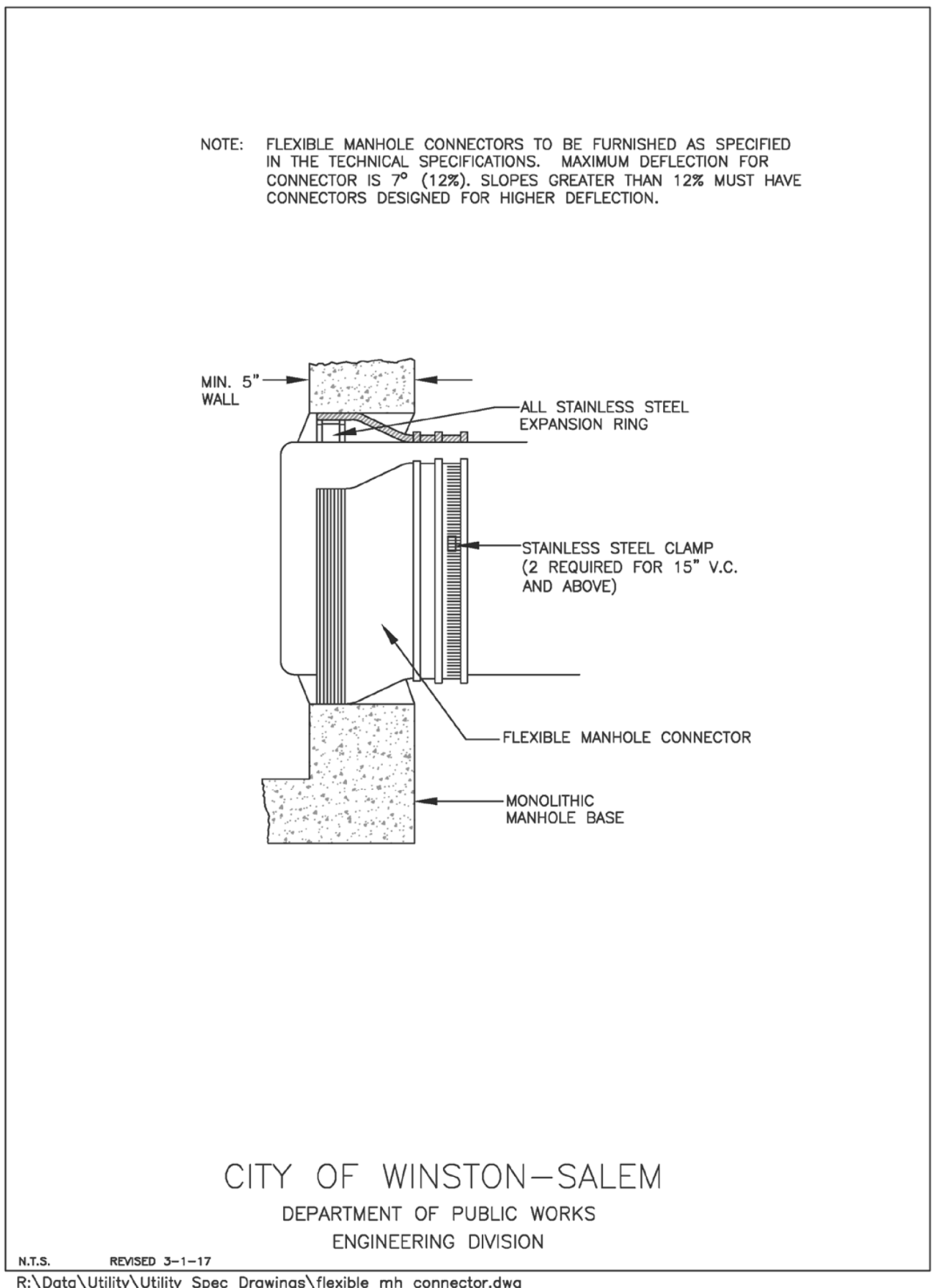
C-10

Precast Reinforced Concrete Manhole with Precast Invert



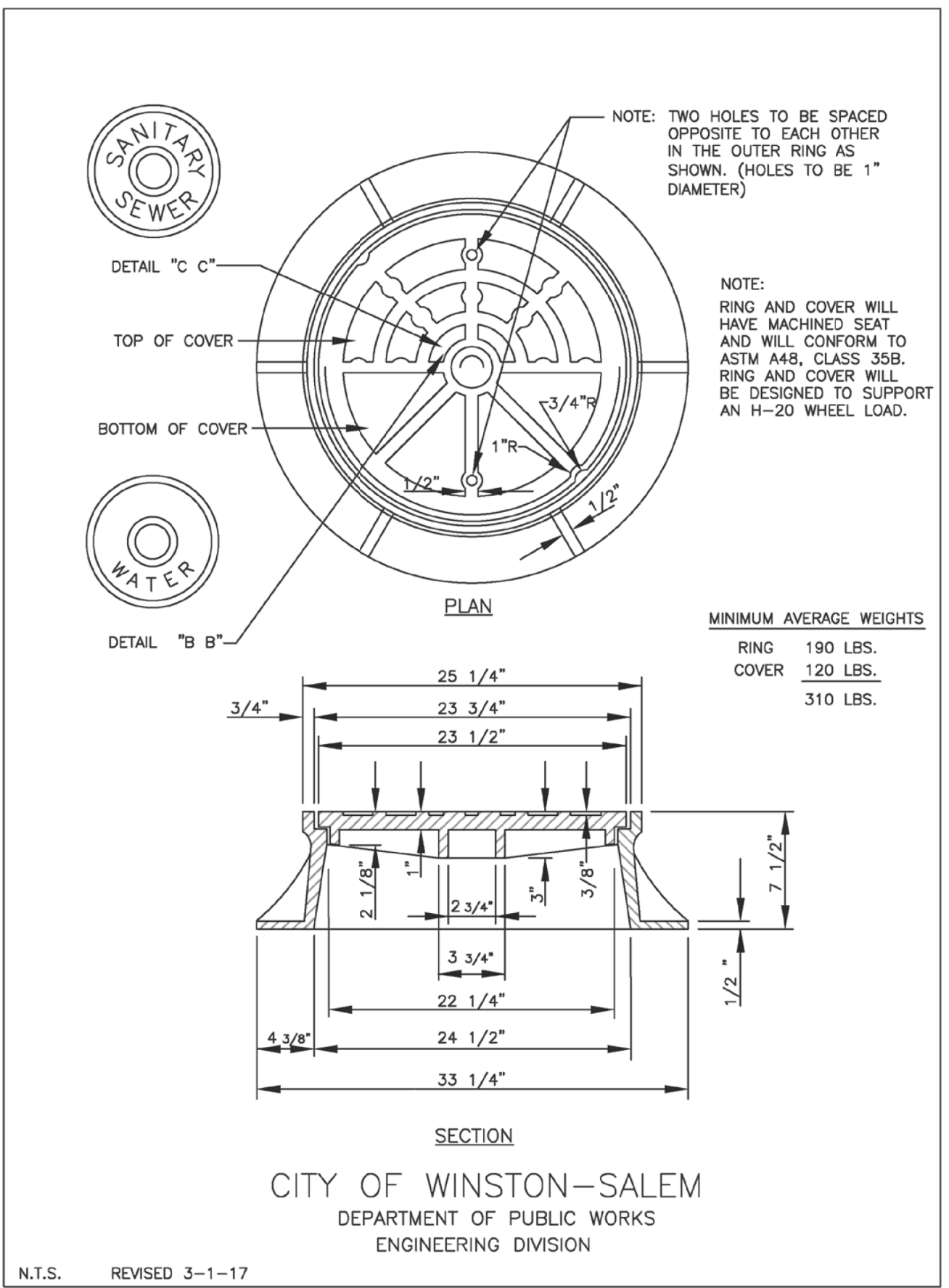
C-16

Flexible Manhole Connector



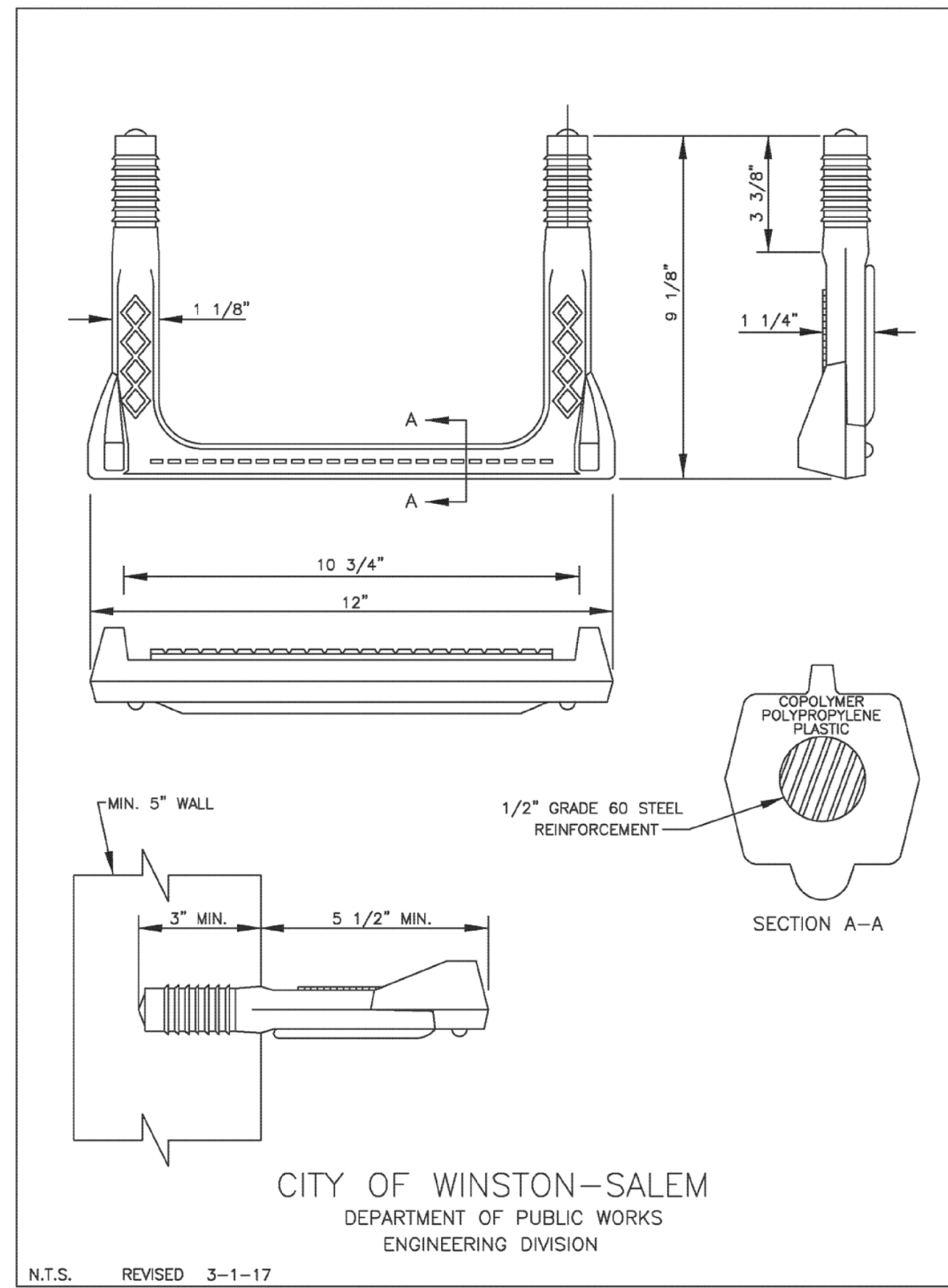
C-17

Manhole Ring and Cover (Type 1)



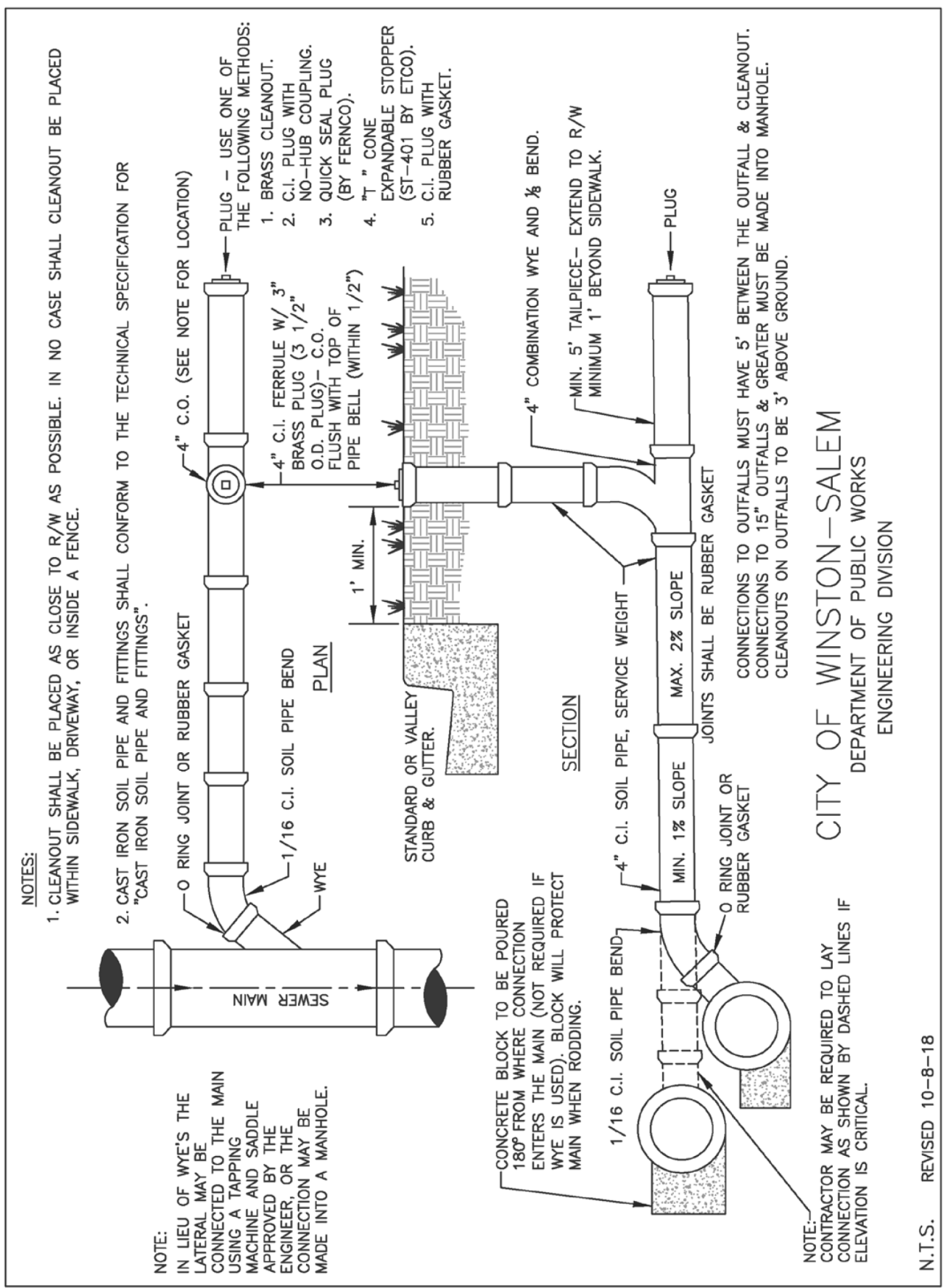
C-18

Polypropylene Manhole Step



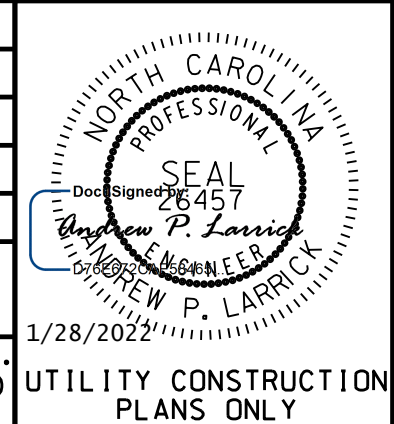
C-21

4" Sewer Connection



C-22

PROJECT REFERENCE NO.	SHEET NO.
B-5770	UC-3A
DESIGNED BY: APL	
DRAWN BY: RDL	
CHECKED BY: APL	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	1/28/2022
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY



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FROM CITY OF WINSTON-SALEM, NC
TECHNICAL SPECIFICATIONS AND
DETAIL DRAWINGS FOR WATER LINE AND
SANITARY SEWER LINE CONSTRUCTION,
INDEX OF DETAIL DRAWINGS:

SECTION C - Water and Sanitary Sewer Detail Drawings

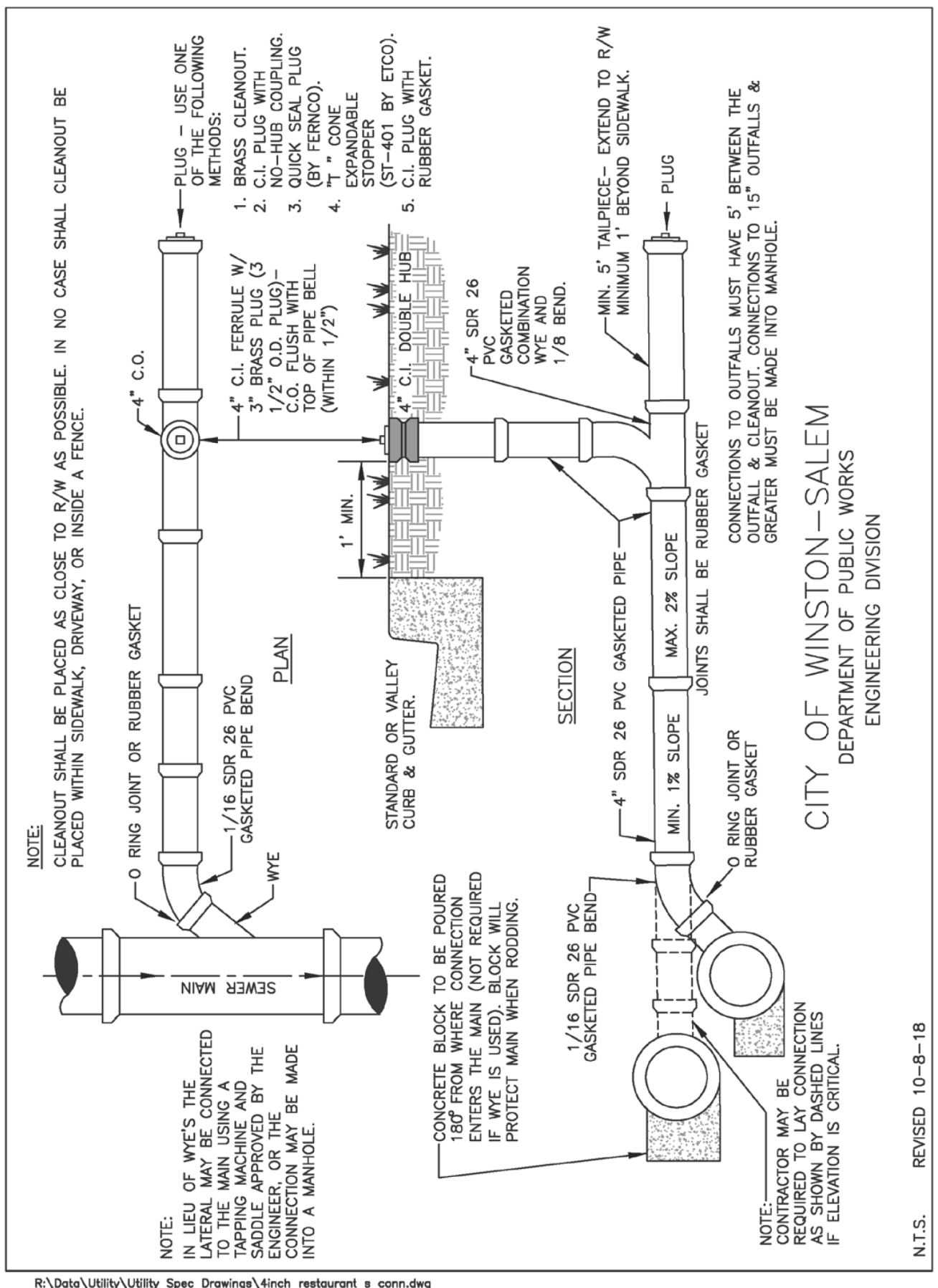
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UTILITY CONSTRUCTION PLANS PREPARED BY:
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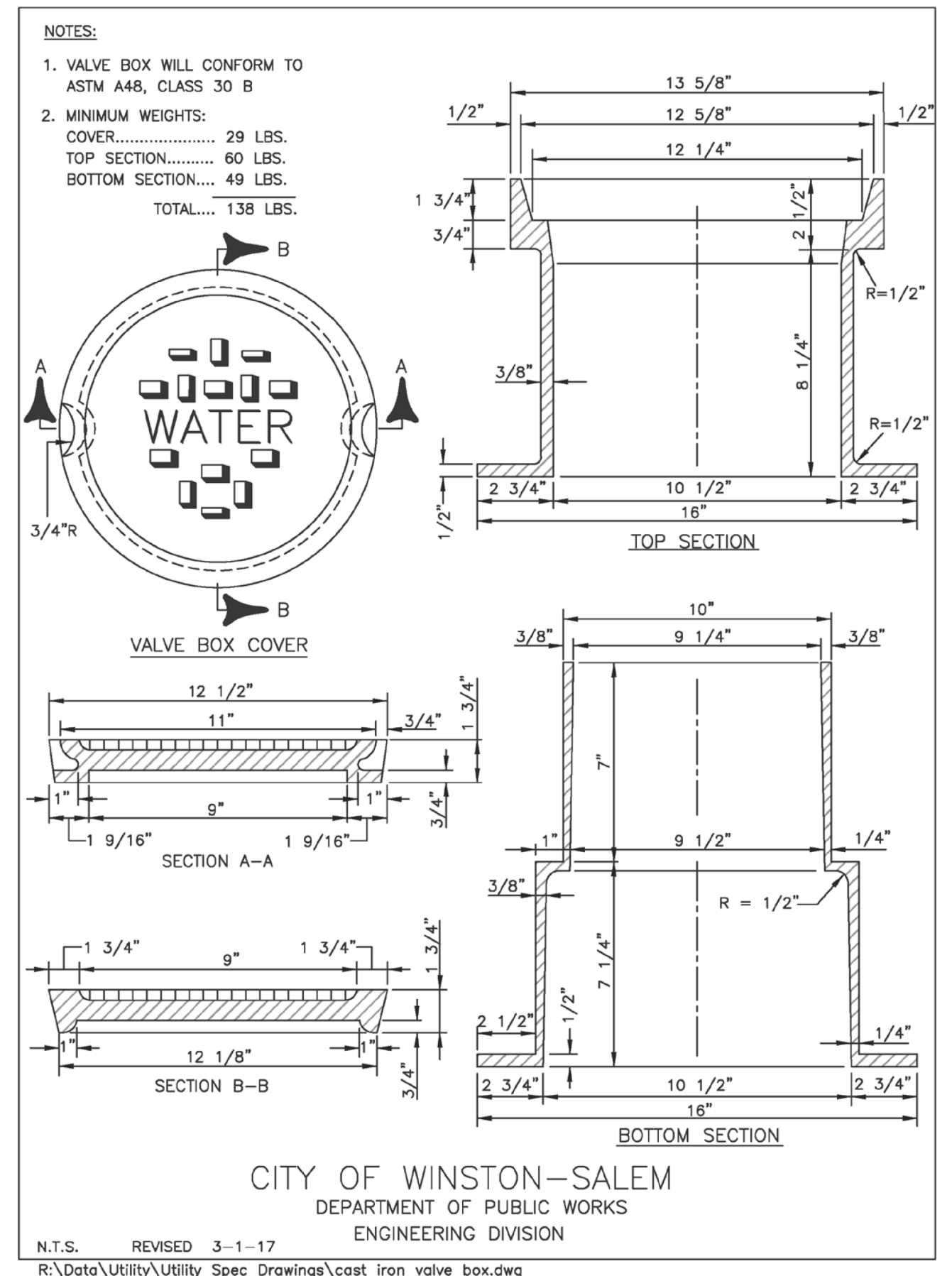
5/14/99

4" Restaurant Sewer Connection



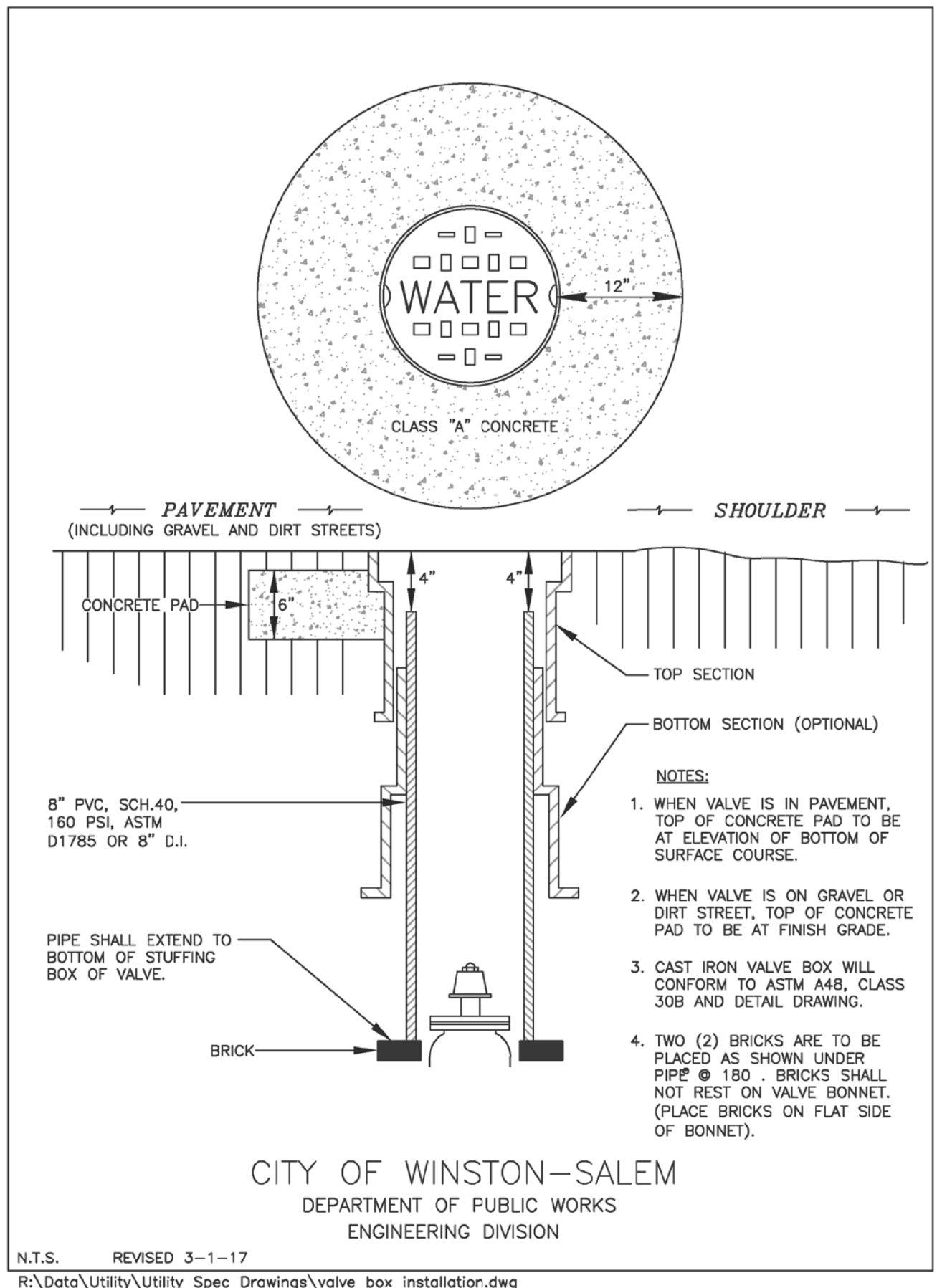
C-25

Cast Iron Valve Box



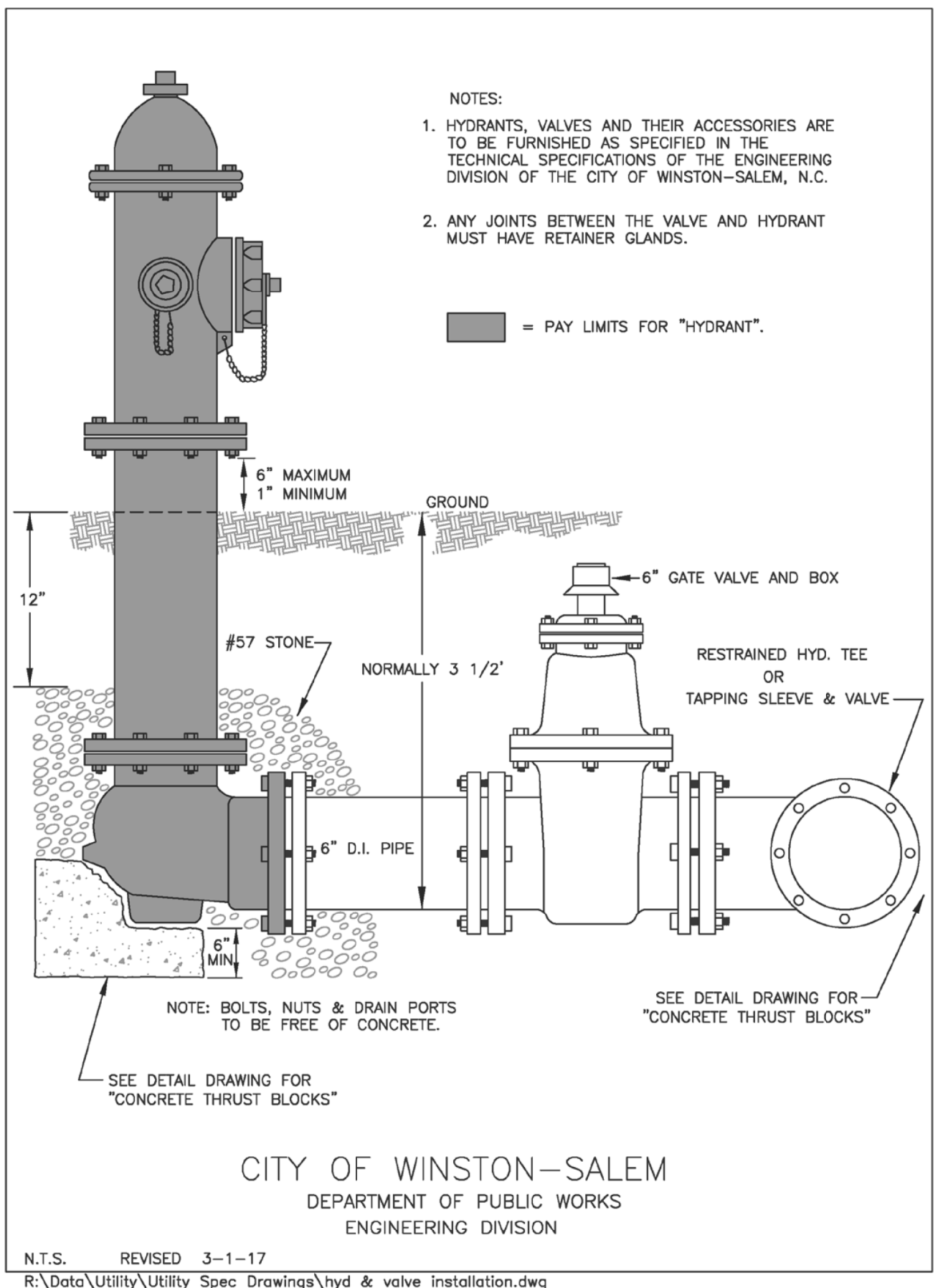
C-39

Valve Box Installation



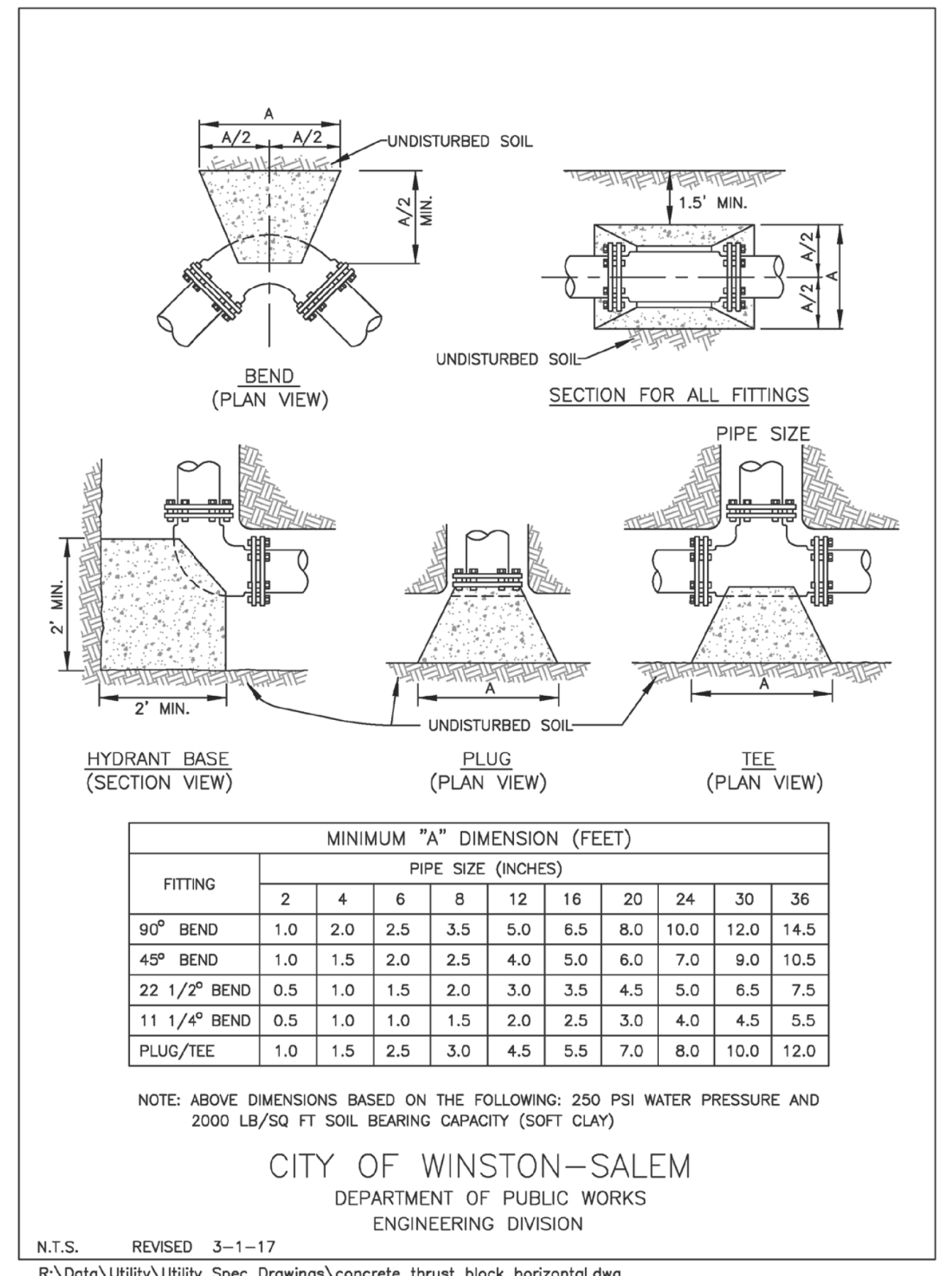
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Hydrant and Valve Installation



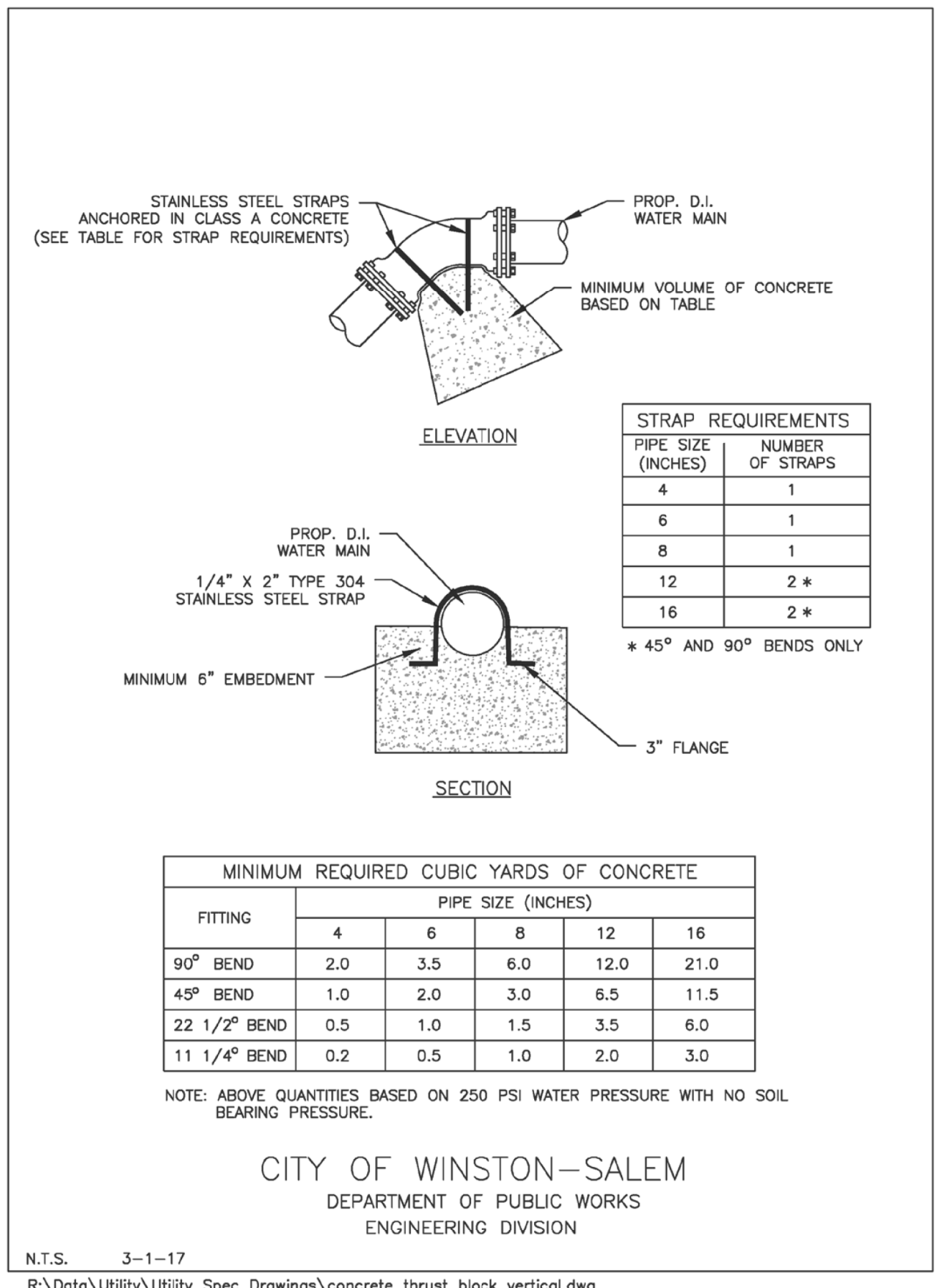
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Concrete Thrust Blocks for Horizontal Bends



C-43

Concrete Thrust Blocks w/ Anchors for Top Vertical Bends



C-44

PROJECT REFERENCE NO. B-5770 SHEET NO. UC-3B

DESIGNED BY: APL
 DRAWN BY: RDL
 CHECKED BY: APL
 APPROVED BY:
 REVISED:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 1/28/2022
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 UTILITY CONSTRUCTION PLANS ONLY

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 Andrew P. Larrick
 License No. 45457
 Matthew P. Larrick

UTILITY CONSTRUCTION

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REVISIONS

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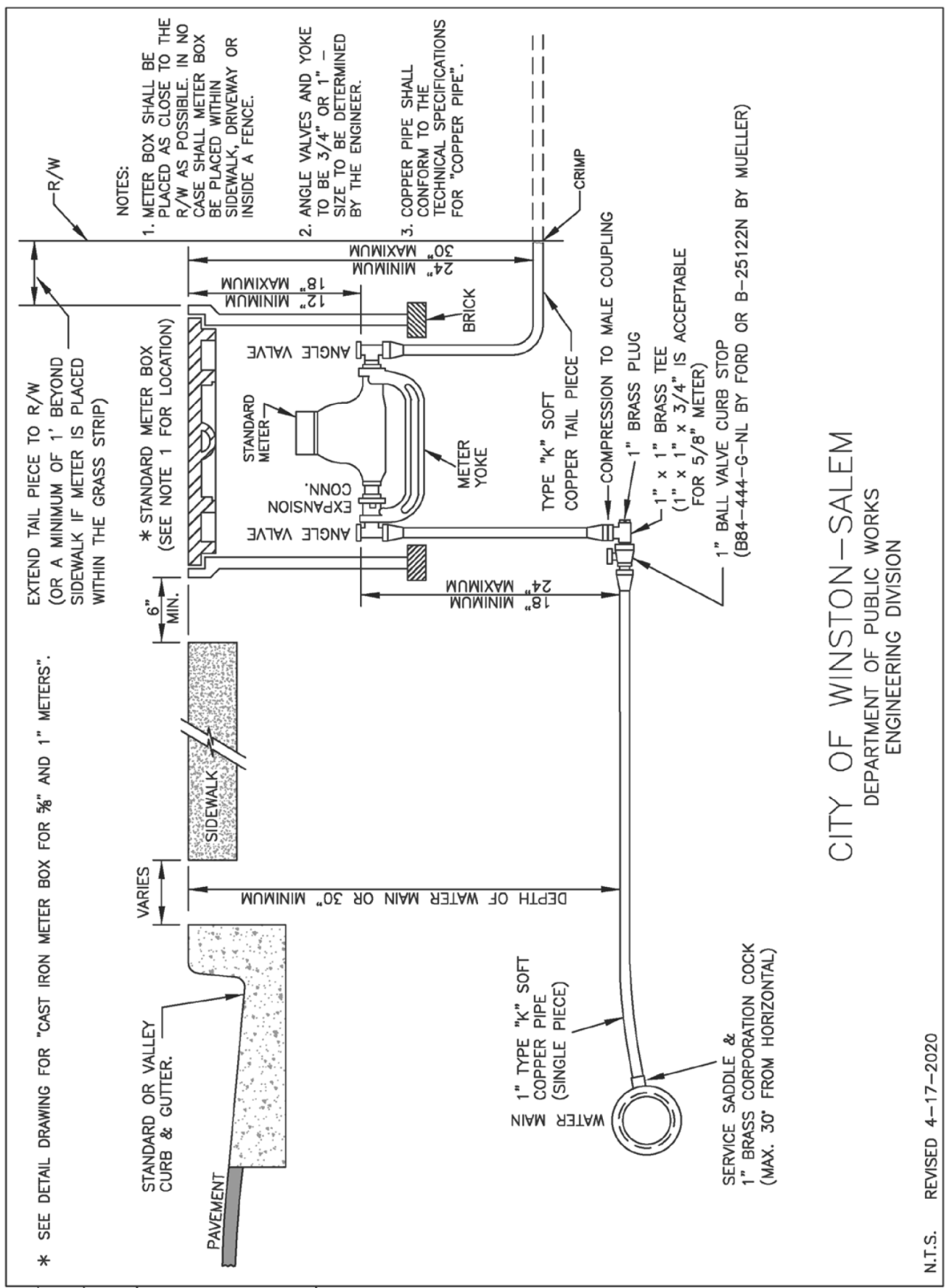
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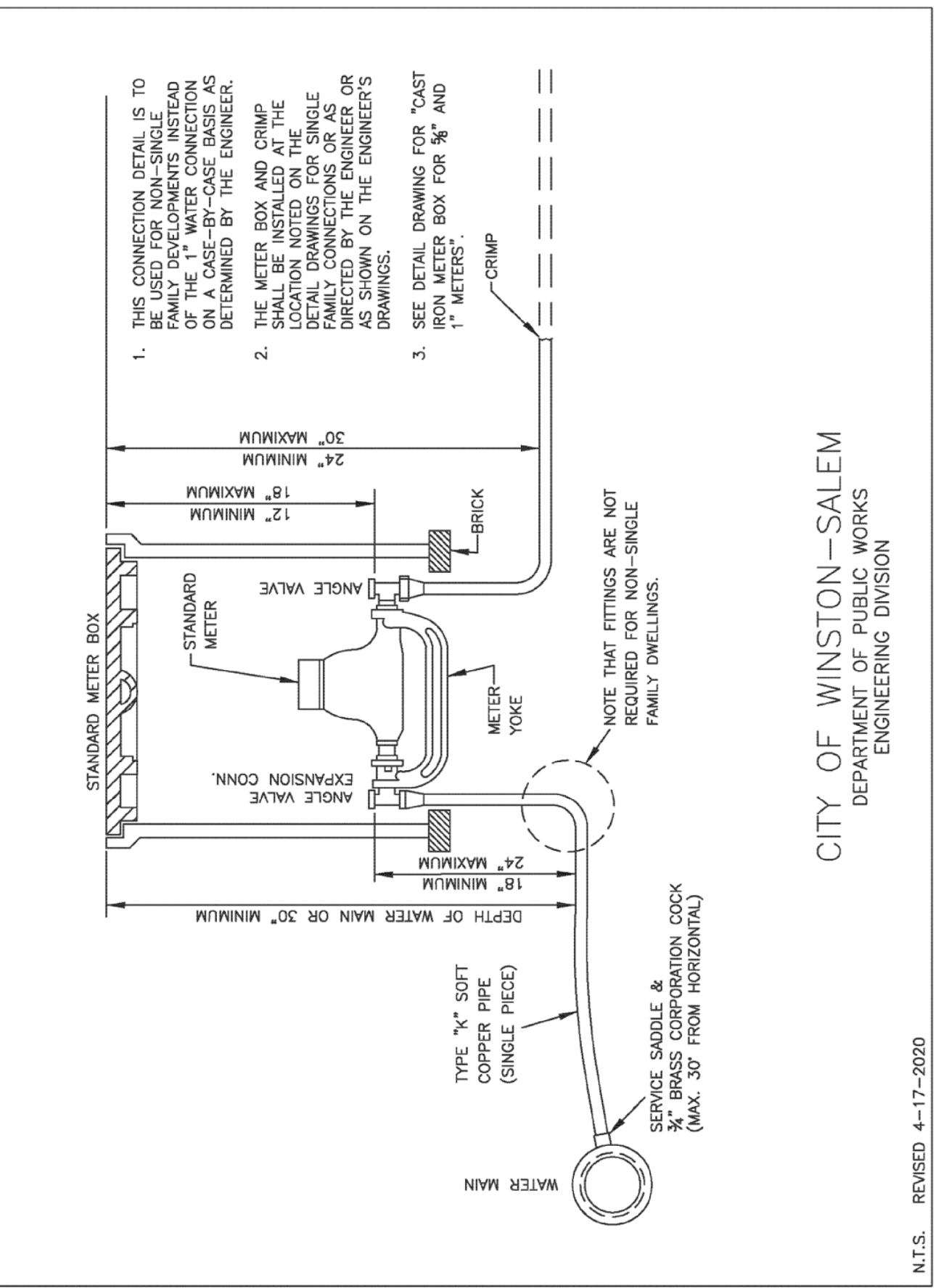
REVISIONS

1" Water Connection (With Curb & Gutter)



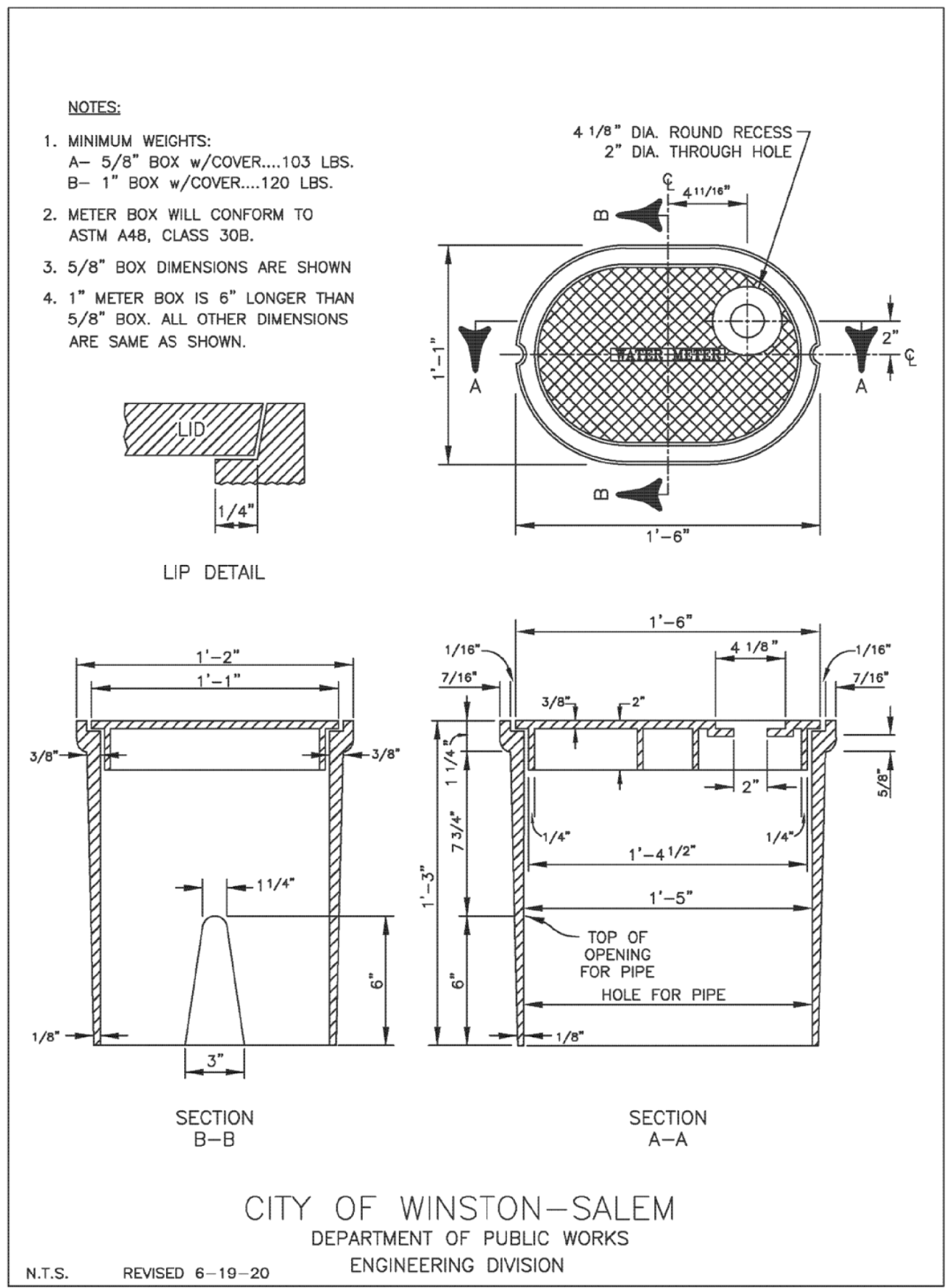
C-46

3/4" Water Connection (Non-Single Family)



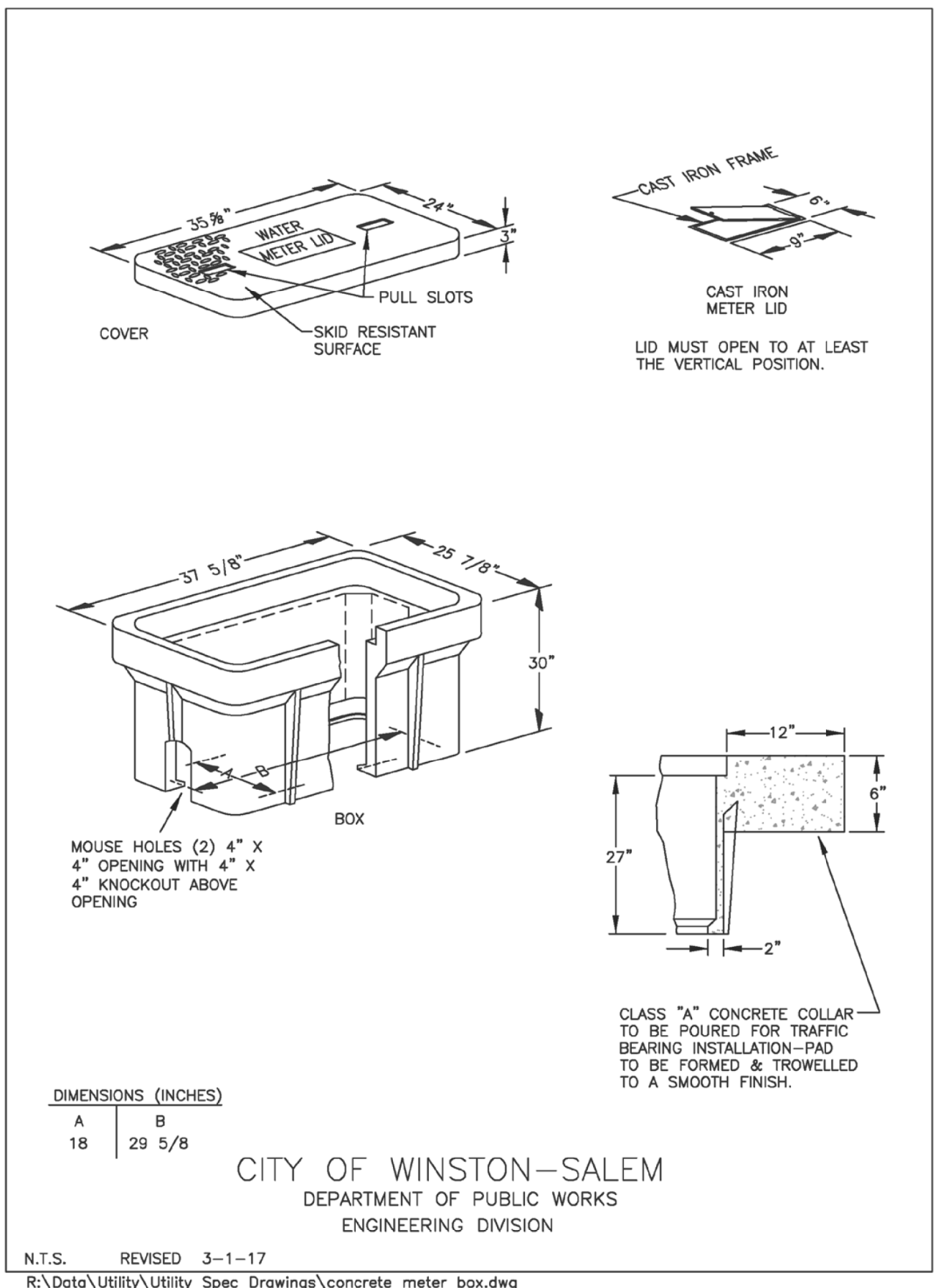
C-48

Cast Iron Meter Box for 5/8" and 1" Meters



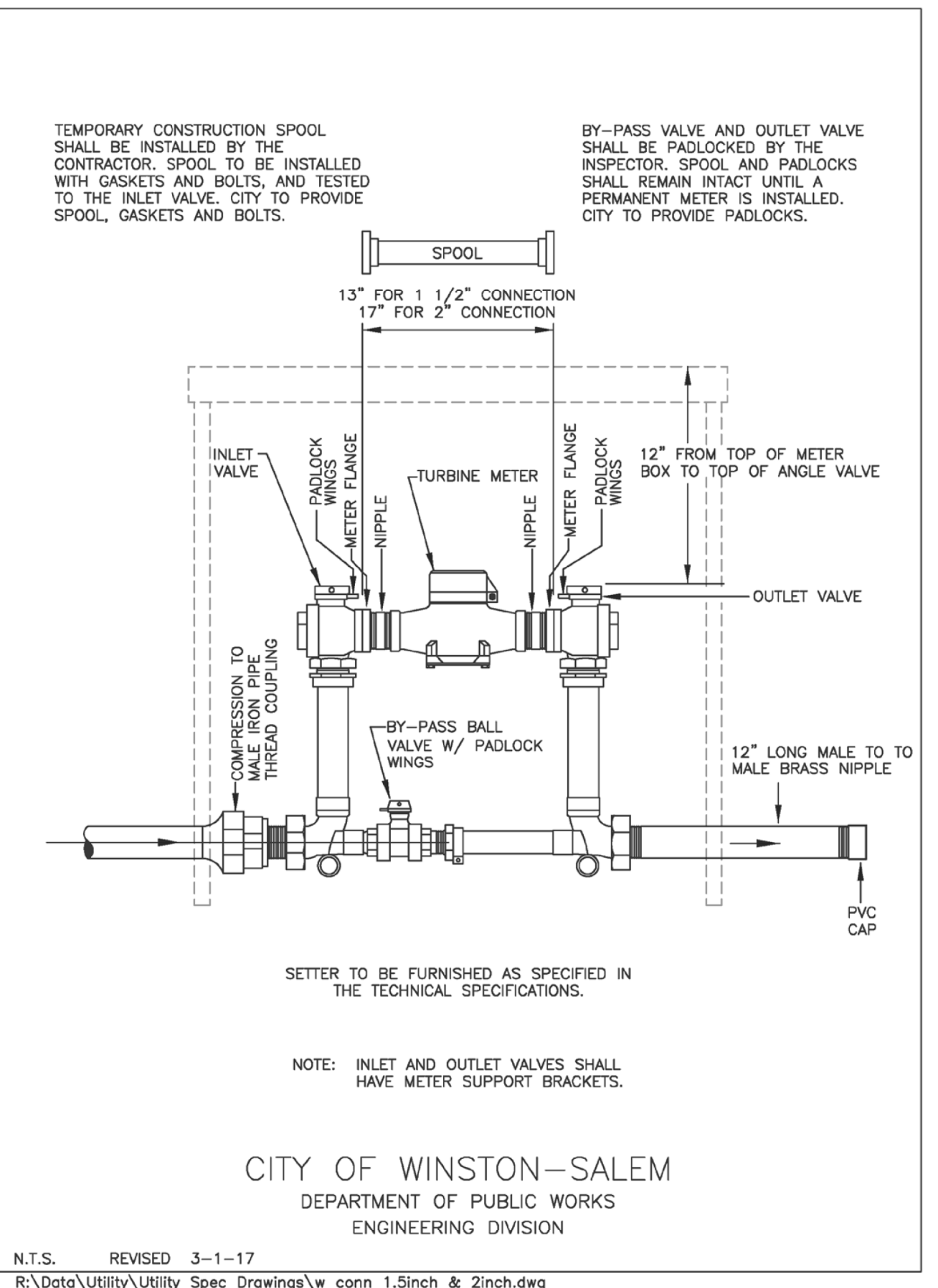
C-49

Polymer Concrete Meter Box for 1 1/2" and 2" Meters



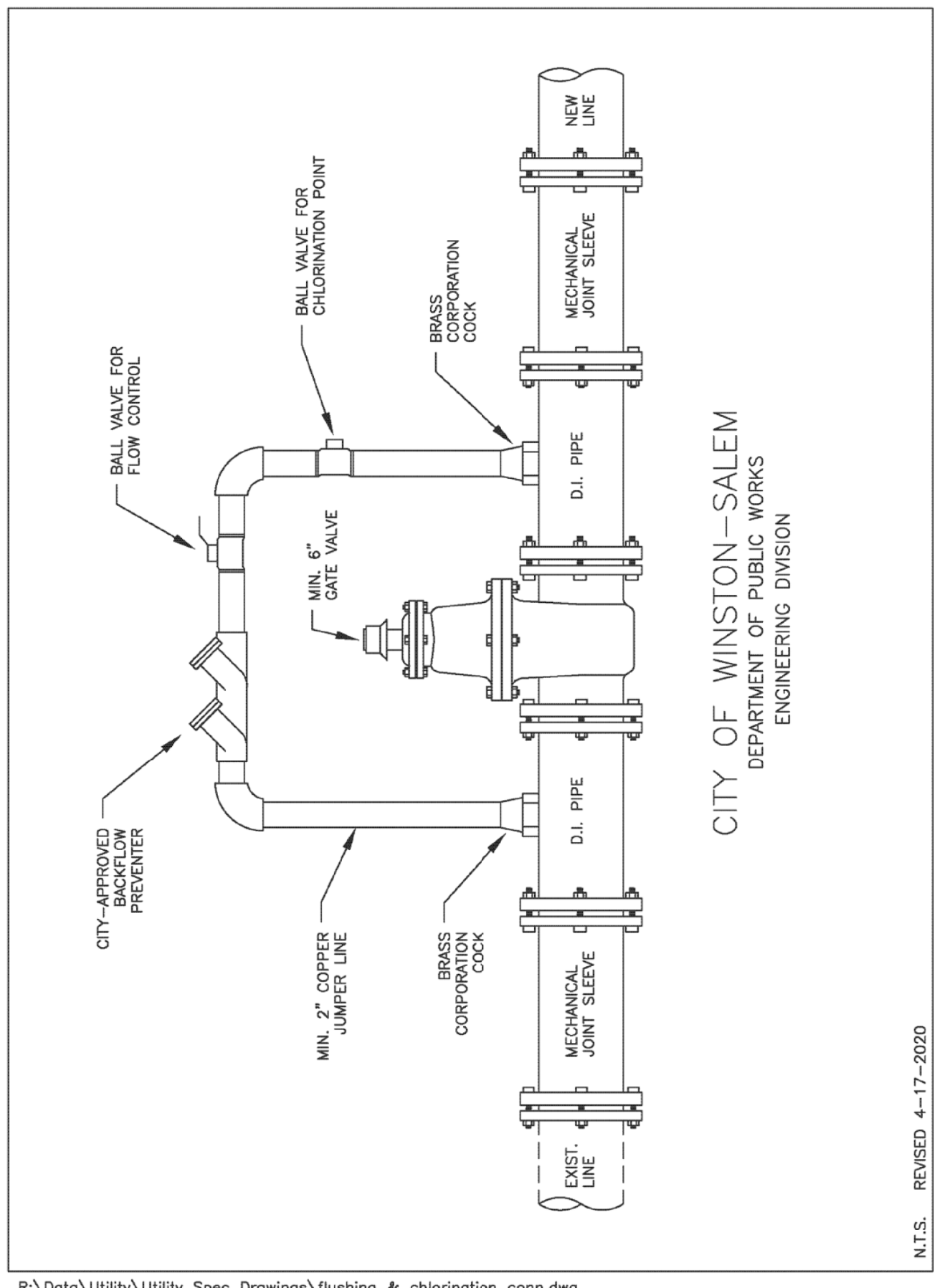
C-50

1 1/2" and 2" Water Connection



C-51

Flushing and Chlorination Connection for Water Main Extensions



C-55

PROJECT REFERENCE NO.	SHEET NO.
B-5770	UC-3C
DESIGNED BY: APL	
DRAWN BY: RDL	
CHECKED BY: APL	
APPROVED BY:	
REVISED:	1/28/2022
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

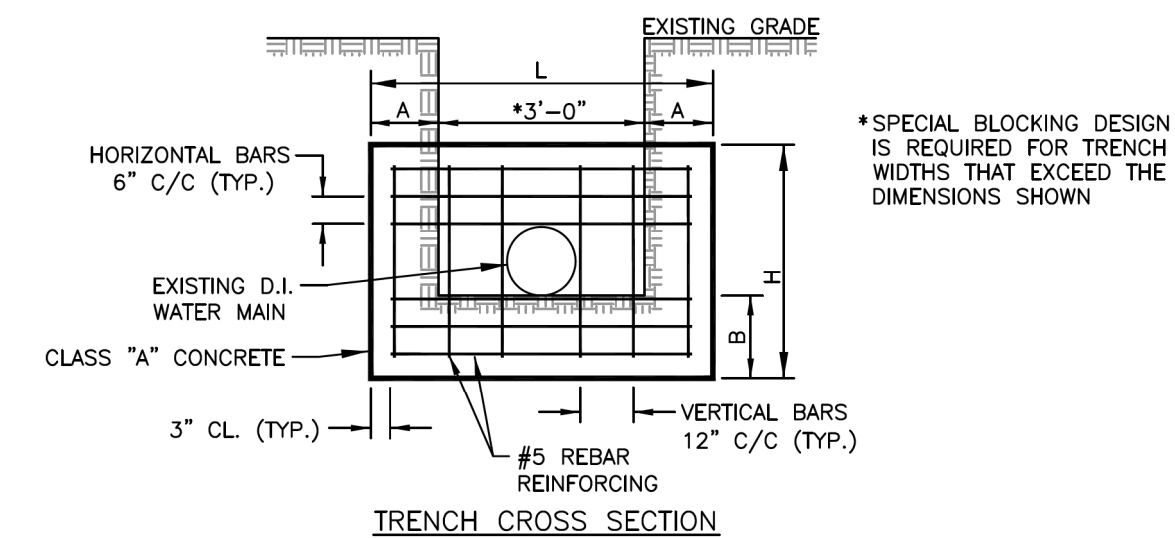
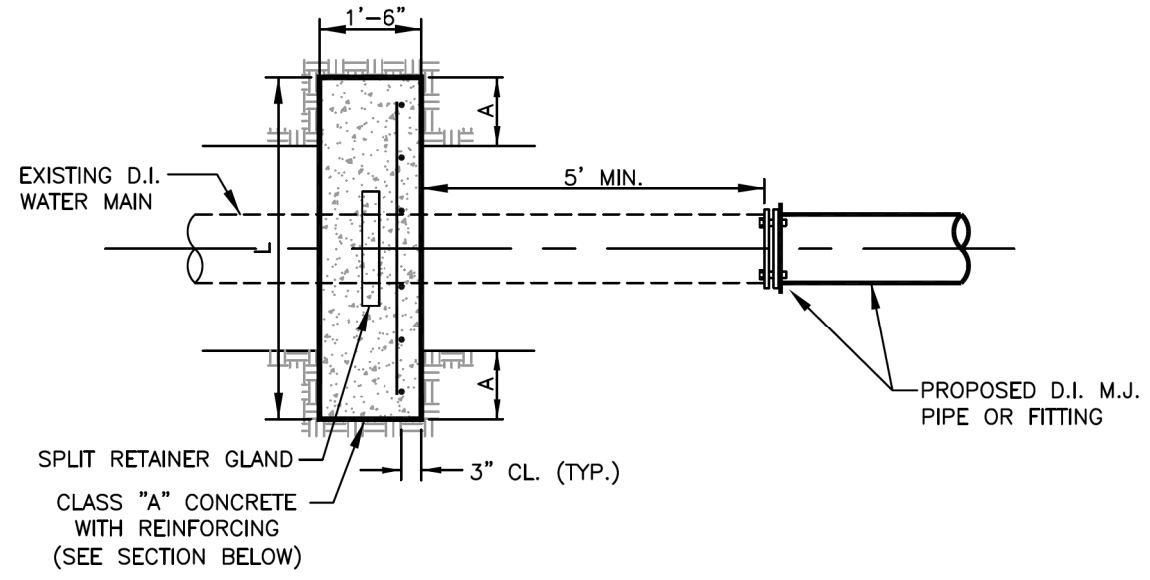
UTILITY CONSTRUCTION

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5/14/18

REVISIONS

THRUST COLLAR FOR EXISTING PIPE



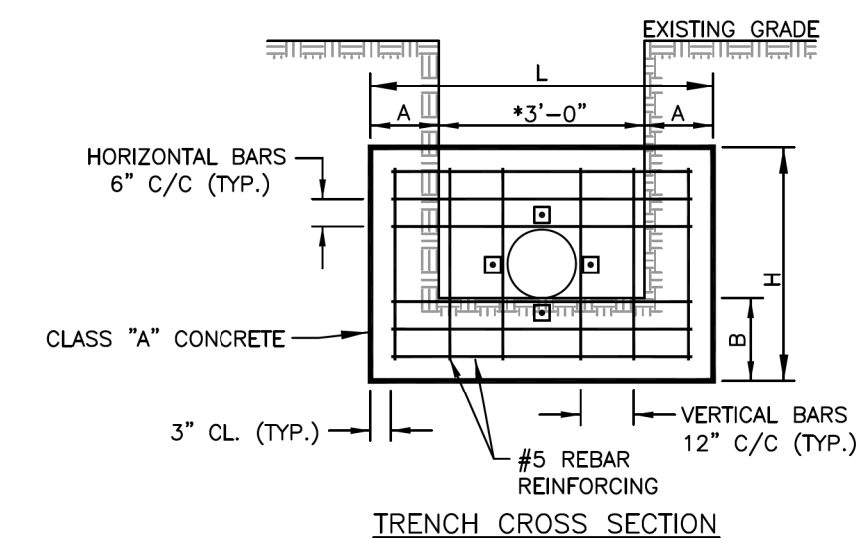
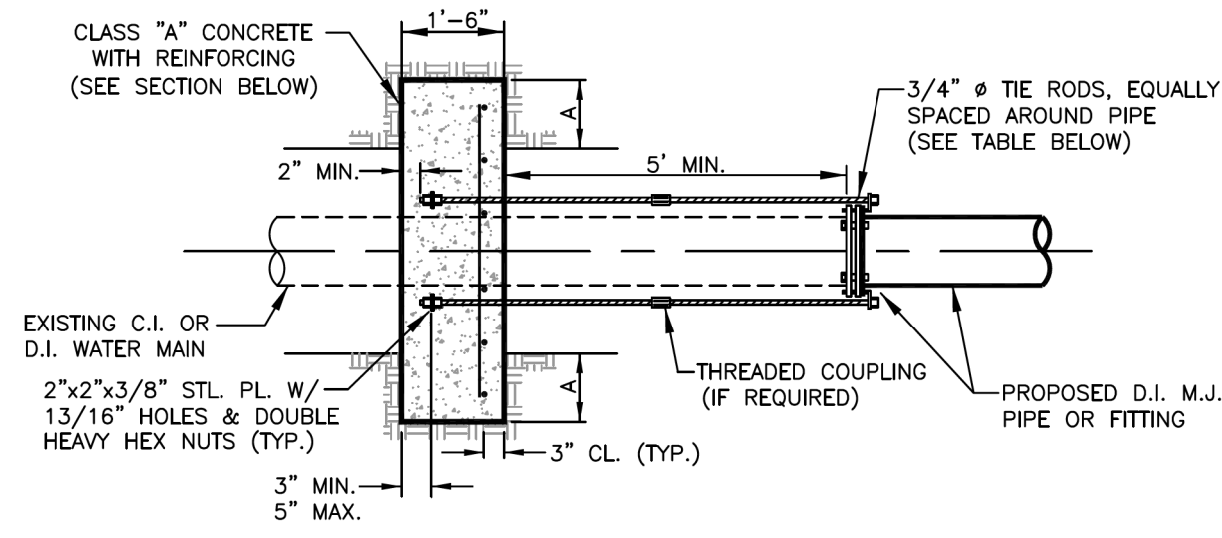
- NOTES:
1. CONCRETE SHALL BE PLACED AND CURED THREE DAYS PRIOR TO REMOVING EXISTING PIPE OR FITTINGS.
 2. INSTALL POLYETHYLENE WRAP AROUND EXISTING PIPE PRIOR TO POURING CONCRETE.
 3. MAINTAIN 2" CLEAR BETWEEN ALL REBARS AND PIPE.
 4. CONCRETE TO BE KEED IN TO UNDISTURBED SOIL ADJACENT TO TRENCH WALL AND BOTTOM.
 5. DESIGN BASED ON MIN. SOIL BEARING OF 2000 PSF. SOFT SOIL CONDITIONS MAY REQUIRE SPECIAL DESIGN.

PIPE SIZE (INCHES)	CONCRETE DIMENSIONS (FT)			
	H	L	A	B
6	2.5	5	1	1
8	2.5	5	1	1
12	4	6	1.5	1
16	4	9	3	1
20	5	10	3.5	1
24	5.5	12	4.5	1

CITY OF WINSTON-SALEM
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

N.T.S. R:\Data\Utility\Utility Spec Drawings\thrust_restraint.dwg 5-21-18

THRUST HARNESS FOR EXISTING PIPE



- NOTES:
1. CONCRETE SHALL BE PLACED AND CURED THREE DAYS PRIOR TO REMOVING EXISTING PIPE OR FITTINGS.
 2. INSTALL POLYETHYLENE WRAP AROUND EXISTING PIPE PRIOR TO POURING CONCRETE.
 3. MAINTAIN 2" CLEAR BETWEEN ALL REBARS AND PIPE.
 4. CONCRETE TO BE KEED IN TO UNDISTURBED SOIL ADJACENT TO TRENCH WALL AND BOTTOM.
 5. DESIGN BASED ON MIN. SOIL BEARING OF 2000 PSF. SOFT SOIL CONDITIONS MAY REQUIRE SPECIAL DESIGN.

PIPE SIZE (INCHES)	CONCRETE DIMENSIONS (FT)			
	H	L	A	B
6	2.5	5	1	1
8	2.5	5	1	1
12	4	6	1.5	1
16	4	9	3	1
20	5	10	3.5	1
24	5.5	12	4.5	1

CITY OF WINSTON-SALEM
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

N.T.S. R:\Data\Utility\Utility Spec Drawings\thrust_restraint.dwg 5-21-18

*SPECIAL BLOCKING DESIGN IS REQUIRED FOR TRENCH WIDTHS THAT EXCEED THE DIMENSIONS SHOWN

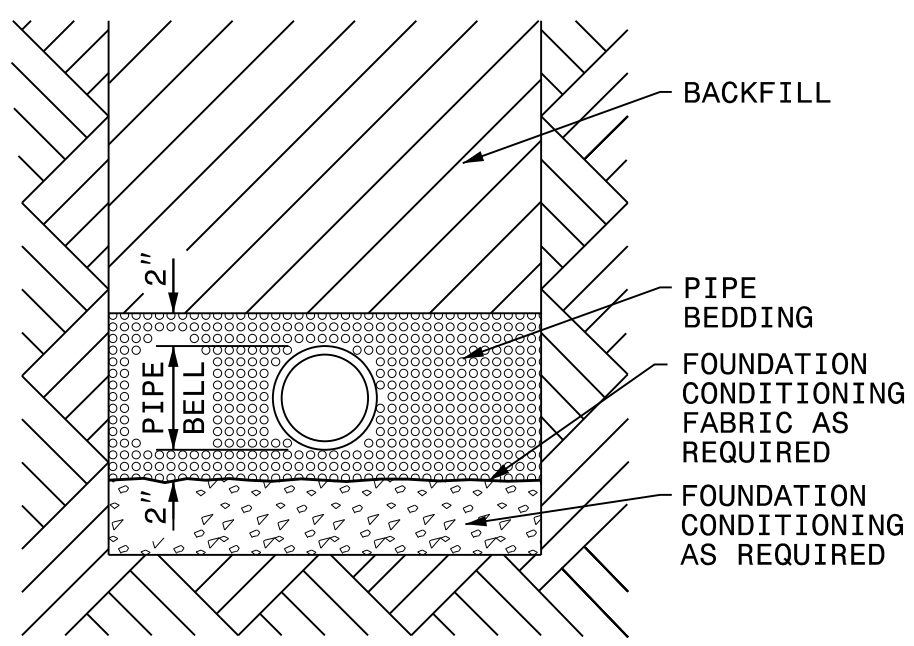
PIPE SIZE (INCHES)	# OF RODS REQUIRED
6	2
8	2
12	4
16	6
20	8
24	12

NOTE: TIE RODS, BOLTS, AND NUTS SHALL MEET ANSI A21.11 (AWWA C111)

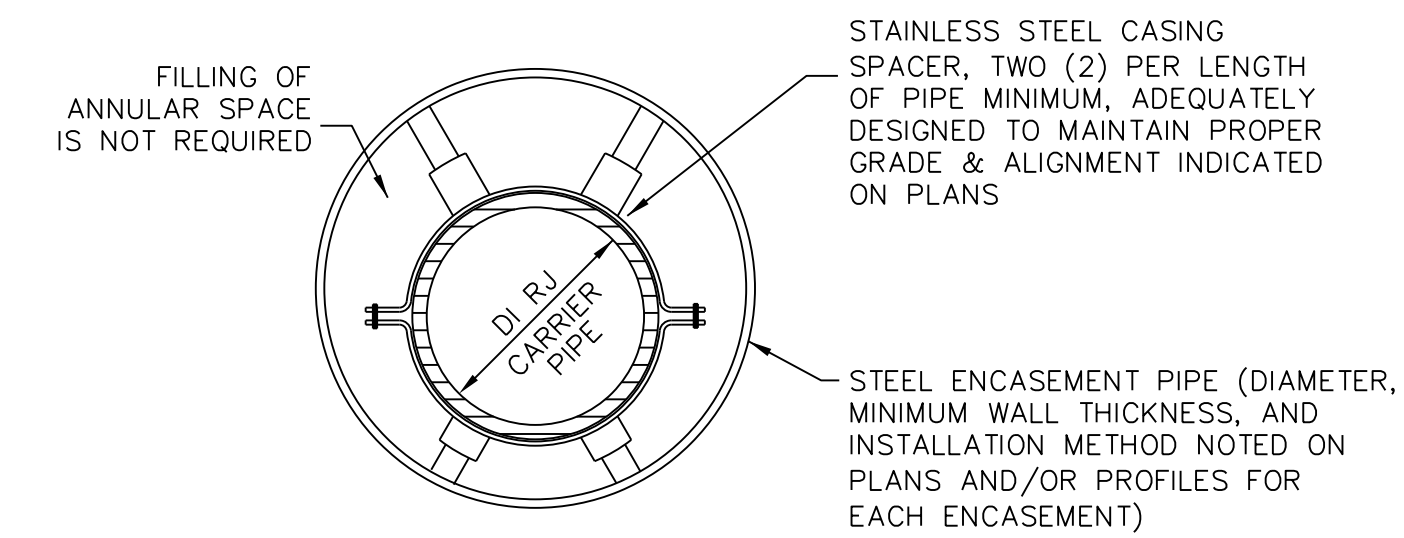
MAXIMUM TRENCH WIDTH AT TOP OF PIPE

NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)	NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		

TRENCH DETAIL



PLACE FOUNDATION CONDITIONING MATERIAL BELOW BEDDING IF REQUIRED AS DIRECTED BY ENGINEER. PIPE BEDDED IN SELECT MATERIAL, CLASS II (TYPE 1) OR CLASS III. TRENCH BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL IF APPROVED BY THE ENGINEER, OR SELECT MATERIAL. ALL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH. COMPACTION SHALL BE TO APPROXIMATELY 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

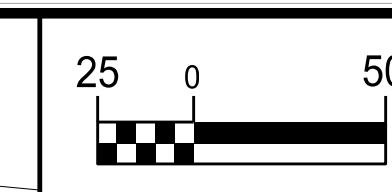


- NOTES:
1. ENCLOSE ENDS WITH BRICK MASONRY.
 2. PROVIDE 1" WEEP HOLE AT LOW END OF ENCASUREMENT.
 3. SEE 2018 NCDOT STANDARD SPECIFICATIONS, DIVISION 15, SECTIONS 1540 AND 1550, FOR OTHER REQUIREMENTS.

TYPICAL ENCASUREMENT PIPE SECTION
N.T.S.

PROJECT REFERENCE NO. B-5770	SHEET NO. UC-3D
DESIGNED BY: APL	
DRAWN BY: RDL	
CHECKED BY: APL	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
1/28/2022 ANDREW P. LARRICK UTILITY CONSTRUCTION PLANS ONLY	

UTILITY CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



PROJECT REFERENCE NO.	SHEET NO.
B-5770	UC-4
DESIGNED BY: DMP	
DRAWN BY: DMP	
CHECKED BY: DMP	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151 UTILITY CONSTRUCTION PLANS ONLY	

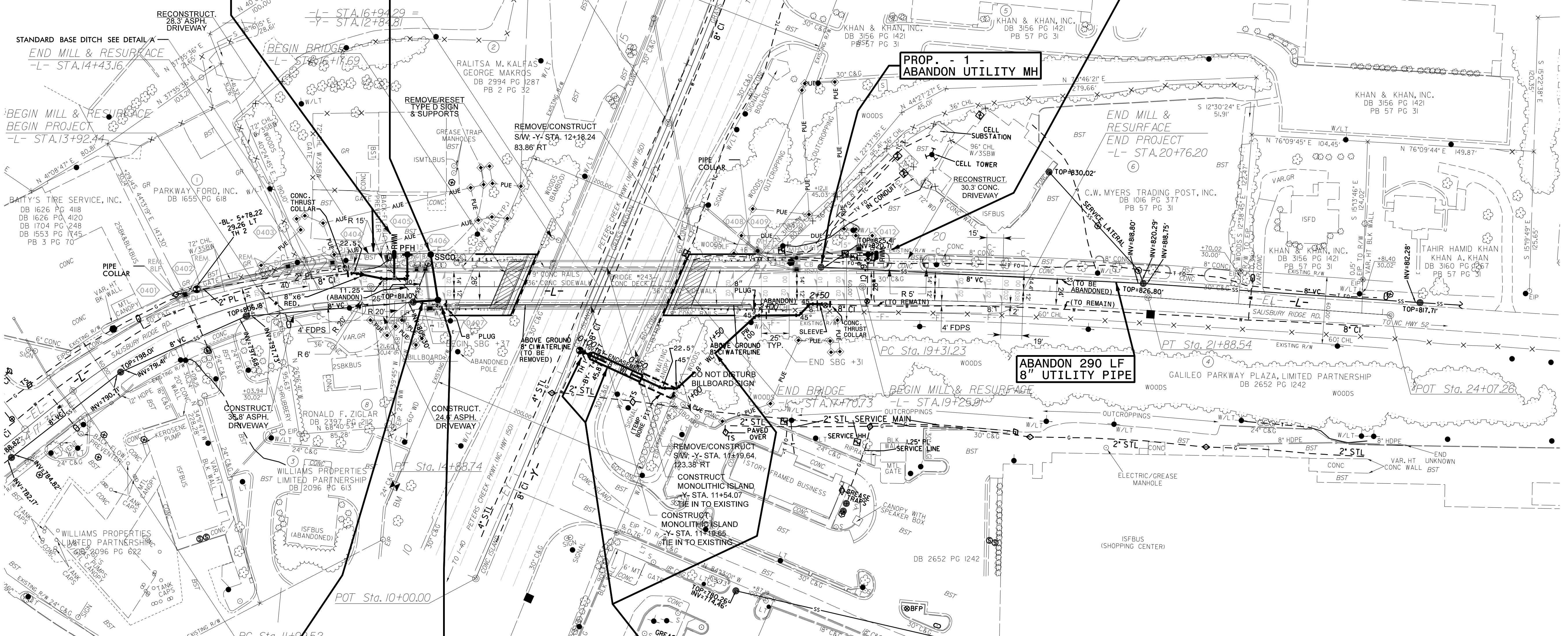
-L-	-Y-	
PI Sta 13+49.84	PI Sta 20+59.95	PI Sta 15+28.63
Δ = 38° 32' 10.6" (RT)	Δ = 4° 12' 44.1" (RT)	Δ = 2° 44' 37.0" (LT)
D = 13' 19" 28.6'	D = 1' 38" 13.3"	D = 1' 38" 13.3"
L = 289.21'	L = 257.31'	L = 167.60'
T = 150.32'	T = 128.71'	T = 83.81'
R = 430.00'	R = 3,500.00'	R = 3,500.00'
SE = MATCH EXISTING	SE = MATCH EXISTING	
LT = 100'	LT = 100'	

PROP. -
 7 L.F. OF 8" WATER LINE,
 46 L.F. OF 6" WATER LINE,
 1 - FIRE HYDRANT, 1 - 6" VALVE,
 17 L.F. OF FIRE HYDRANT LEG,
 1 - RELOCATE WATER METER,
 22 L.F. OF WATER SERVICE LINE

PROP. -
 1 - SAN. SEWER CLEAN-OUT,
 41 LF OF SEWER SERVICE LINE
 (LAY SEWER SERVICE LINE AT
 MIN. 1.0%, MAX. 2.0% GRADE)

PROP. -
 1 - REMOVE FIRE HYDRANT,
 1 - FIRE HYDRANT,
 5 L.F. OF FIRE HYDRANT LEG,
 1 - RELOCATE WATER METER,
 6 L.F. OF WATER SERVICE LINE

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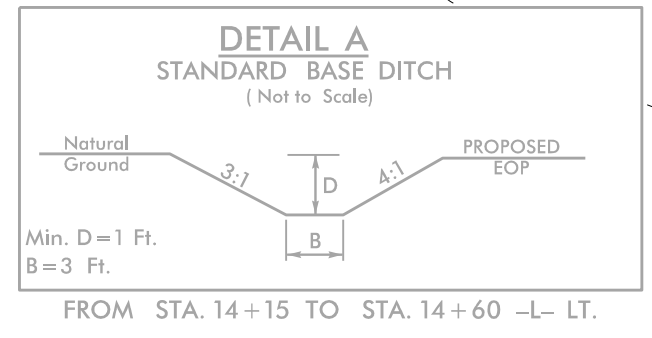


PROP. -
 22 L.F. OF 8" SANITARY GRAVITY SEWER
 CORE EXISTING MH AT INV. 805.50, AND INSTALL 8" D.I. SEWER LINE AT 0.50%

PROP. MH 1 (4' DIA.) STA. 0+22.27, LINE PS100 -L- STA. 15+49.20, 11.9' RT.
 PROP. MH 1 TOP=812.6± (FLUSH W/ FINISHED GRADE) INV=805.61

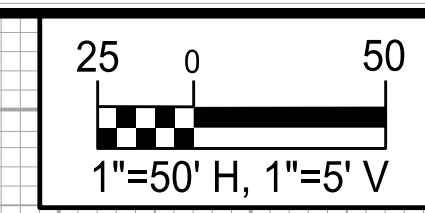
PROP. -
 1 - 8" TAPPING SLEEVE & VALVE
 254 L.F. OF 8" WATER LINE,
 50 L.F. OF 16" ENCASEMENT PIPE,
 50 L.F. OF BORE AND JACK OF 16"
 (SEE UC-5 FOR PROFILE OF PW100)

THE ESTIMATED QUANTITY OF D.I. WATER PIPE FITTINGS ON THIS PLAN SHEET IS 1,460 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.



5/14/99

REVISIONS



PROJECT REFERENCE NO. B-5770	SHEET NO. UC-5
DESIGNED BY: DMP	
DRAWN BY: DMP	
CHECKED BY: DMP	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	1/28/2022
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

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