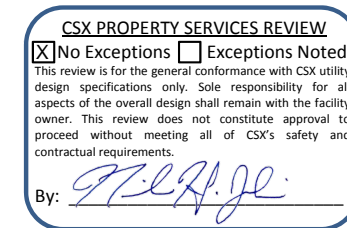


JACK AND BORE

Apex, Wake County, North Carolina | Florence Division, Aberdeen Subdivision
 Mile Post S 172.36 | Latitude Longitude: 35.72127, -78.86446

CSXT GENERAL NOTES:

1. CSXT owns its right-of-way for the primary purpose of operating a railroad, and shall maintain unrestricted use of its property for current and future operations.
2. Agency or its contractor shall arrange and conduct its work so that there will be no interference with CSXT operations, including train, signal, telephone and telegraphic services, or damages to CSXT's property, or to poles, wires, and other facilities of tenants of CSXT's property or right-of-way.
3. Refer to the CSXT's "Design & Construction Standard Specifications Pipeline Occupancies" revised June 5, 2018 (4.1.2).
4. Work schedule is subject to the approval of all required construction submittals by the CSXT Construction Representative, verification that proposed work will not conflict with any CSXT U.G. Facilities, and the availability of CSXT Flagging and Protection Services. Construction submittals will be based upon the proposed scope of work and may include, but are not limited to; proposed work plan, project schedule, means and methods, site access, dewatering, temporary excavation/shoring, soil disposition/management, track monitoring, concrete placement work, structural lifting/rigging plans for hoisting operations, substructure construction plans, steel erection plans, roadwork plans, etc. No work may begin on, over, or adjacent to CSXT property, or that could potentially impact CSXT property, operations or safety without the prior completion and approval of the required aforementioned information and approvals.
5. Prior to construction, all signal facilities and/or warning devices at proposed facility crossing, i.e. cantilevers, flashers, and gates must be located and marked/flagged by CSXT. The traditional "One Call" utility locate services are not responsible for locating any CSX under-grade utilities or facilities Contractor shall be held liable for any damages to CSXT communication & signal facilities.
6. Contractor also has the sole responsibility of ascertaining that all other utilities have been properly located by complying with the local "call before you dig" regulation(s). Contractor shall solely be responsible for notifying owners of adjacent properties and of underground facilities and utility owners when prosecution of the work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property.
7. The use of construction safety fencing is required when a CSXT Flagman is not present. Distance of fencing from nearest rail to be determined by the CSXT Track Supervisor and shall be removed upon completion of the project.
8. Contractor access will be limited to the immediate project area only. The CSXT property outside the project area may not be used for contractor access to the project site and no temporary at-grade crossings will be allowed.
9. All material and equipment will be staged to not block any CSXT access or maintenance roads. No hoisting or auxiliary equipment necessary for the procedure shall be placed on CSXT track structure and / or ballast section. Clear working locations for equipment used will be laid out and approved by CSXT's representative prior to equipment set-up. Agency and contractor shall not store their materials or equipment on CSXT's property or where they may potentially interfere with CSXT's operations.
10. CSXT does not grant or convey an easement for this installation.
11. CSXT requires contractors, subcontractors, and vendors to participate in job safety briefings daily and as necessary with the CSXT flagger. The scope of work may require that various protection against train movements be discussed, understood, and utilized. Work shall only be undertaken with the presence and permission of the CSXT flagger. If at any time the CSXT flagger perceives that the hoisting procedure is causing or has the potential to cause a hazard or delay to CSXT operations through the project site, work will cease until such time as satisfactory modifications have been reviewed and approved.
12. Erosion and Sedimentation Control (E&SC) – Clearing and grubbing operations shall not adversely impact the stability of CSXT property. Temporary (and permanent) erosion and sedimentation (E&S) control devices shall be provided to prevent the flow of sediment onto and adjacent to CSXT property. The addition of permanent E&SC control Best Management Practices (BMP) devices may be required at the project's expense. E&SC devices shall not restrict or prevent access to CSXT operations and shall be maintained by the contractor for the life of the project. No additional drainage (construction or permanent) may be directed onto CSXT property. Upon completion of the project, contractor shall remove all temporary erosion and sedimentation control devices used during construction activities from CSXT's property.
13. The right of way shall be restored to a condition equal to or better than the condition prior to beginning the project before final acceptance will be provided. Punch lists shall be responded to prior to issuance of an acceptance memorandum signed by the CSXT representative.
14. No construction or entry upon the CSXT corridor is permitted until the document transaction is completed, you are in receipt of a fully executed document, and you have obtained authority from CSXT's.
15. CSX does not represent or warrant the right-of-way dimensions depicted on these drawings. A third party survey is recommended for verification and accuracy.
16. Upon completion of project construction, contractor must submit to CSX the as-built plans showing the final alignment on CSXT property, including actual depth of facility and any field change to location on CSXT property, pipe materials, number of innerducts, etc.
17. The front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger from leading the pipe so that no unsupported excavation is ahead of the pipe. The bore head / auger set-up (sketch or photos) shall be submitted by contractor and accepted by assigned CSXT representative prior to start of the jack & bore.
18. The operation shall be progressed on a 24-hour basis without stoppage (except for adding lengths of pipe) until the leading edge of the pipe has reached the receiving pit.
19. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered.
20. Pipeline shall be prominently marked at both sides of the CSXT property lines by durable, weatherproof signs located over the centerline of the pipe in accordance with CSXT specifications.
21. If required, a dewatering plan in accordance with CSXT specifications will be submitted to the CSXT representative for review and approval prior to any dewatering operations. Dewatering drawdown level at tracks shall be field verified that it meets the approved dewatering design prior to commencement of jack and bore operations.
22. Blasting is not permitted under, on, or adjacent to CSXT property.
23. Jacking pit: identify hazards and put controls in place prior to start of excavation. Contractor shall erect a barrier and construction fence along the face of jacking pit construction limits and not encroach past it when preparing the pit. Stake or mark pit as needed for digging. Erosion control devices shall be placed at the jacking and receiving pits protecting CSXT property and ditches to the satisfaction of the CSXT representative.
24. Excavation: If the excavation is 5 feet or greater in depth, the walls may be sloped at 1.5 horizontal to 1 vertical to reduce the risk of cave-ins or slides. A safe manner in which to enter and exit the excavation must be established. The toe of slopes in excavation shall in no case be undercut by power shovels, bulldozers, graders, blasting, or in any manner. Excavation shall not be made in excess of the authorized cross-section.
25. Backfill, cover or fence all excavations when unattended. The CSXT representative will approve the protection method and the type of fencing material. Set fencing back at least 3 feet (91 centimeters) from the edges of the excavation. Set fence posts securely in the ground and insure the fencing is securely tied to posts with zip ties or some other tie wrap product.
26. For any excavations permitted on CSXT property, all backfill in excavations and trenches shall be compacted to 95% maximum dry density as defined in ASTM standard d1557 and installed in six-inch lifts. In-situ soil shall be used for backfill material. Should additional offsite backfill material be needed, offsite material sources are to meet state and residential clean fill requirements and be preapproved by CSXT's representative. CSXT does not require a specific testing requirement or standard for stone.

JACK AND BORE

27. Track monitoring: prior to commencing jack & bore operations, contractor shall be required to conduct and submit a baseline survey along the top of each rail under CSXT flagger protection and in accordance with the preapproved settlement monitoring construction submittal. Additional survey data shall be collected and submitted once each day during casing pipe installation, or as directed by CSXT representative. Contractor shall also take elevation shots at top of tie and top of casing pipe before starting the bore to verify depth of cover proposed for the work has been met.
28. Projects that generate soils from CSXT property must adhere to CSXT's soil management policies. CSXT requires soils generated from its property to either be reused on CSXT property or properly disposed in a CSXT approved disposal facility. CSXT environmental department will handle waste characterization and profiling into an approved disposal facility. CSXT prohibits any environmental sampling on its property unless granted through a written environmental right-of-entry or approved in writing by the CSXT environmental department. The management of soils generated from CSXT property should be planned for and properly permitted (if applicable) prior to initiating any work on CSXT property. A list of CSXT approved laboratories and/or disposal facilities may be obtained from the CSXT manager environmental programs.

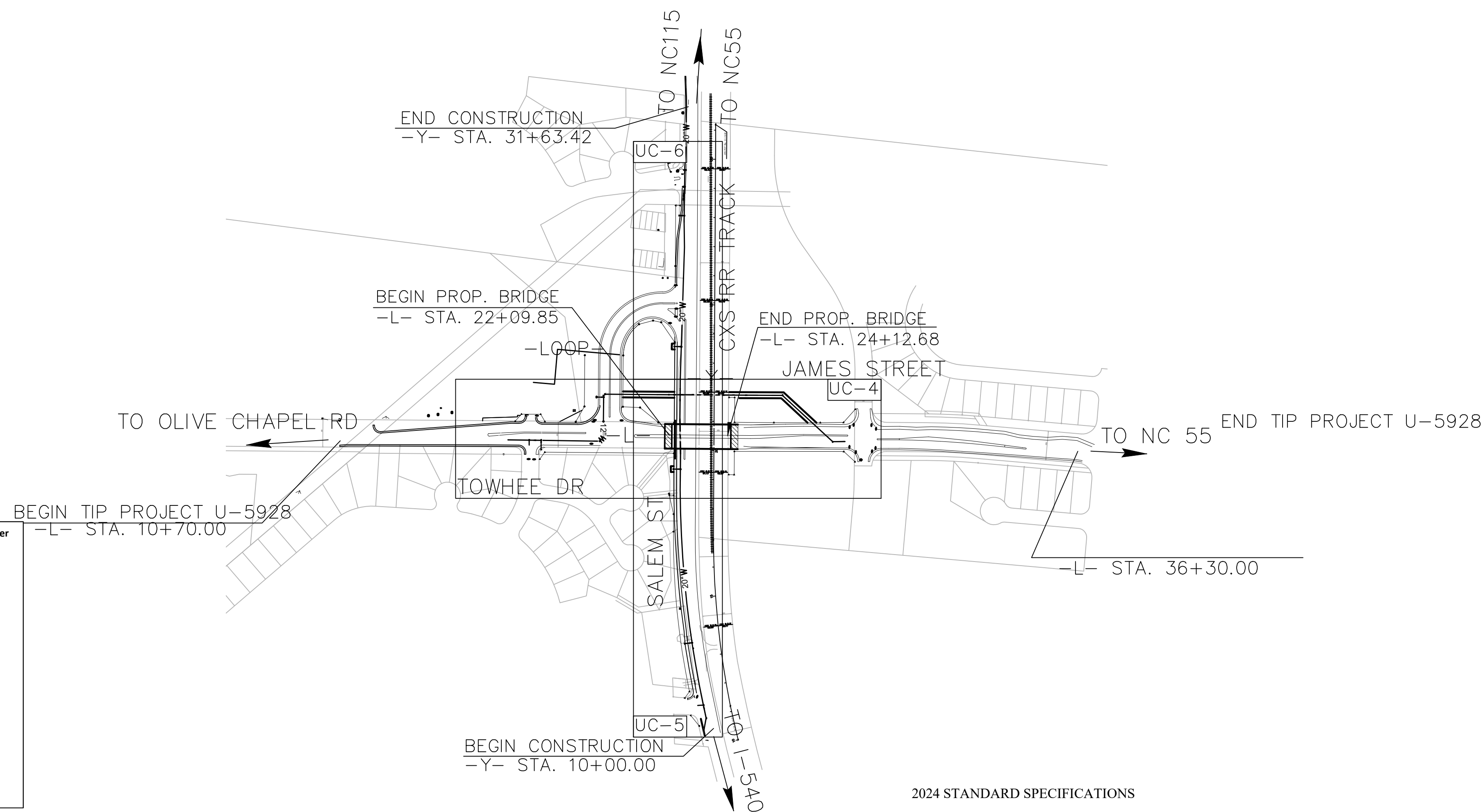
TIP PROJECT: U-5928

T.I.P. NO.	SHEET NO.
U-5928	UC-1

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

UTILITY CONSTRUCTION PLANS WAKE COUNTY

LOCATION: JAMES STREET TO TOWHEE DRIVE
CONSTRUCT GRADE SEPARATED INTERCHANGE FOR APEX
PEAKWAY AT SOUTH SALEM STREET AND CSX RAILROAD
TYPE OF WORK: WATER LINE RELOCATION



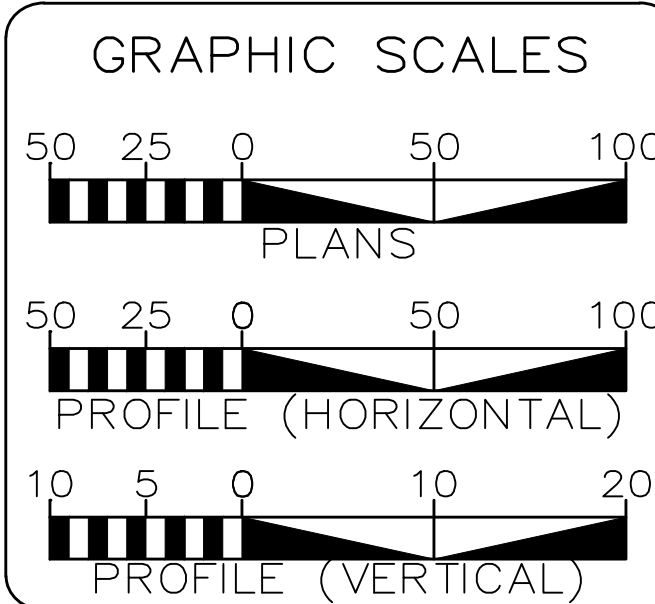
The signatures affixed below certify that this sheet has been reviewed and approved solely per the certifications signed on the cover sheet of these construction plans.

Public Works - Transportation	Water Resources - Stormwater
Building Inspections	Planning
Water Resources - Utility Engineering	Planning - Transportation
Electric	Fire
Water Resources - Soil & Erosion Control	Parks, Recreation & Cultural Resources

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL
UNTIL ALL SIGNATURES ARE COMPLETED

2024 STANDARD SPECIFICATIONS



INDEX OF SHEETS


SHEET NO.:	DESCRIPTION:
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY
UC-3 & UC-3A	NOTES
UC-3C & UC-3D	DETAILS
UC-4 THRU UC-6	PLAN & PROFILE SHEETS

WATER AND SEWER OWNERS ON PROJECT

(A) WATER TOWN OF APEX
(B) SANITARY SEWER TOWN OF APEX

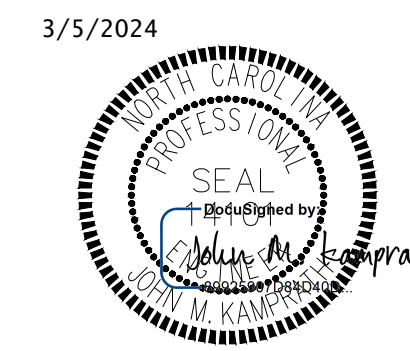
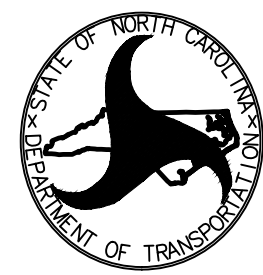
LETTING DATE: ?? 2024

PREPARED IN THE OFFICE OF



VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

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BRANDON T. BARHAM, PE	CONSULTANT CONTACT #2
TIM GOINS, PE	CONSULTANT CONTACT #3

**DIVISION OF HIGHWAYS
UTILITIES UNIT**
1555 MAIL SERVICES CENTER
RALEIGH, NC 27699-1555
PHONE (919) 707-6690
FAX (919) 250-4151

DONALD PROPER	UTILITIES REGIONAL ENGINEER
JAMES SWINSON	UTILITIES ENGINEER
XXXX	UTILITIES AREA COORDINATOR
MONROE BROWN	UTILITIES COORDINATOR

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS



UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	----- 12" WL -----
11¼ Degree Bend	----- †† -----
22½ Degree Bend	----- †X -----
45 Degree Bend	----- †X -----
90 Degree Bend	----- † -----
Plug	----- † -----
Tee	----- † -----
Cross	----- † -----
Reducer	----- ▶ -----
Gate Valve	----- GV -----
Butterfly Valve	----- BV -----
Tapping Valve	----- TGV -----
Line Stop	----- LS -----
Line Stop with Bypass	----- LS/BP -----
Blow Off	----- BO -----
Fire Hydrant	----- PFH -----
Relocate Fire Hydrant	----- RFH -----
Remove Fire Hydrant	----- REM FH -----
Water Meter	----- PWM -----
Relocate Water Meter	----- RWM -----
Remove Water Meter	----- REM WM -----
Water Pump Station	----- PST(W) -----
RPZ Backflow Preventer	----- PRPZ -----
DCV Backflow Preventer	----- PBEP -----
Relocate RPZ Backflow Preventer	----- RRPZ -----
Relocate DCV Backflow Preventer	----- RBEP -----

PROPOSED SEWER SYMBOLS

Gravity Sewer Line (Sized as Shown)	----- 12" SS -----
Force Main Sewer Line (Sized as Shown)	----- 12" FSS -----
Manhole (Sized per Note)	----- • -----
Sewer Pump Station	----- PST(SS) -----

PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

Power Pole	----- 6 -----
Telephone Pole	----- 6 -----
Joint Use Pole	----- 6 -----
Telephone Pedestal	----- TP PED -----
Utility Line by Others (Type as Shown)	----- PROP O/H POW LINES -----
Trenchless Installation	----- 12" TL INSTALL -----
Encasement by Open Cut	----- 24" ENCAS BY OC -----
Encasement	----- 24" ENCASMENT -----

Thrust Block	----- I -----
Air Release Valve	----- AR -----
Utility Vault	----- UV -----
Concrete Pier	----- CP -----
Steel Pier	----- SP -----
Plan Note	----- NOTE -----
Pay Item 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	----- A/G Gas -----
Power Manhole	----- ⊙ -----	*Underground Water Line	----- -----
Telephone Manhole	----- ⊙ -----	Aboveground Water Line	----- A/G Water -----
Sanitary Sewer Manhole	----- ⊙ -----	*Underground Gravity Sanitary Sewer Line	----- SS -----
Hand Hole for Cable	----- ☒ -----	Aboveground Gravity Sanitary Sewer Line	----- A/G Sanitary Sewer -----
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	----- AATUR -----	Sanitary Sewer Cleanout	----- ⊙ -----
End of Information	----- E.O.I. -----		

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

Salem Waterline Line and Curve Data

No.	Delta	Radius	Length	Bearing	Ch. Dist.	Start Northing	Start Easting	End Northing	End Easting
L1		19.91'		N73°13'38"E		717393.44	2039060.45	717399.19	2039079.51
L2		43.07'		S84°27'13"E		717399.19	2039079.51	717395.03	2039122.38
C1	012°25'45"	3638.12'	789.21'	N78°30'22"E	787.66'	717395.03	2039122.38	717551.98	2039894.24
L3		124.47'		N85°27'19"E		717551.98	2039894.24	717561.84	2040018.32
L4		121.11'		N84°05'07"E		717561.84	2040018.32	717574.32	2040138.79
L5		139.14'		N85°24'41"E		717574.32	2040138.79	717585.46	2040277.48
L6		449.28'		N86°52'10"E		717585.46	2040277.48	717609.99	2040726.09
L7		93.98'		N84°09'35"E		717609.99	2040726.09	717619.55	2040819.58
L8		184.63'		N85°55'47"E		717619.55	2040819.58	717632.66	2041003.74
L9		62.66'		N87°33'53"E		717632.66	2041003.74	717635.32	2041066.34
C2	003°18'24"	1800.00'	103.88'	N85°54'41"E	103.86'	717635.32	2041066.34	717642.73	2041169.94
L10		76.66'		N84°15'29"E		717642.73	2041169.94	717650.40	2041246.22
C3	003°28'10"	1854.99'	112.32'	N83°05'44"E	112.30'	717650.40	2041246.22	717663.90	2041357.71

-W- Line and Curve Data

No.	Delta	Radius	Length	Bearing	Ch. Dist.	Start Northing	Start Easting	End Northing	End Easting
L11		42.18'		N05°45'31"W		717002.84	2040109.84	717044.81	2040105.60
L12		234.70'		N37°36'41"E		717044.81	2040105.60	717230.73	2040248.84
L13		608.71'		N04°37'50"W		717230.73	2040248.84	717837.46	2040199.70
L14		608.71'		N04°37'50"W		717230.73	2040248.84	717837.46	2040199.70
L15		7.08'		N49°35'05"W		717837.46	2040199.70	717842.05	2040194.31
L16		143.37'		S85°26'57"W		717842.05	2040194.31	717830.67	2040051.40
L17		18.00'		N49°37'50"W		717830.67	2040051.40	717842.33	2040037.68
L18		241.80'		N04°13'13"W		717842.33	2040037.68	718083.48	2040019.89
L19		73.16'		N04°12'38"W		718083.48	2040019.89	718156.44	2040014.52

NOTES KEYED TO PLAN

- 1 CONNECT TO EX. WATERLINE WITH THRUST COLLAR
- 2 ~180 LF 16" DIP WATERLINE JACK AND BORE INSTALLATION WITH 36" DIA (0.532" THICK) UNCOATED SPIRAL WELDED STEEL MEETING ASTM A-139, GRADE B WITH A YIELD STRENGTH OF 35,000 PSI. JOINTS TO BE BUTT WELDED. SEE DETAIL, SHEET UC-3D. CARRIER PIPE THICKNESS DUE TO CSX CROSSING REQUIREMENTS. ALL CSX REQUIREMENTS ARE TO BE MET WITH THIS INSTALLATION. WATERLINE TO BE WRAPPED IN TWO LAYERS OF 6 MIL POLYETHYLENE FILM WRAP FOR THE LENGTH OF THE CASING.
- 3 ~120 LF 20" DIP WATER LINE CARRIER PIPE INSIDE 42" DIA (0.312" THICK) UNCOATED SPIRAL WELDED STEEL PIPE MEETING ASTM A-139, GRADE B WITH A YIELD STRENGTH OF 35,000 PSI (42" ENCASMENT PIPE). 42" WELDED STEEL PIPE SHALL BE INSTALLED BY JACK AND BORE OPERATION. JOINTS TO BE BUTT WELDED. SEE DETAIL, SHEET UC-3D. WATER LINE TO BE WRAPPED IN TWO LAYERS OF 8 MIL POLYETHYLENE FILM WRAP FOR THE LENGTH OF THE CASING.
- 4 ~60 LF 20" RIDIP WATER LINE OPEN CUT INSTALLATION. WATERLINE TO BE WRAPPED IN TWO LAYERS OF 8 MIL POLYETHYLENE FILM WRAP FOR 60 LF LEADING TO THE EASEMENT (~180 LF WRAPPED). MAINTAIN MINIMUM 18" VERTICAL SEPARATION FROM COLONIAL PIPELINE CASING MATERIALS. NO WORK TO OCCUR WITHIN COLONIAL PIPELINE EASEMENT UNTIL EXISTING CASING HAS BEEN EXTENDED PAST PROPOSED RIGHT-OF-WAY. ALL COLONIAL PIPELINE REQUIREMENTS ARE TO BE MET WITH THIS INSTALLATION.
- 5 REMOVE EXISTING MANHOLE AND APPROXIMATELY 15 LF OF 8" SEWER. SET NEW MANHOLE. RIM: 457.10' INVERT OUT: 449.90'. SEE DETAILS, SHEET UC-3D.
- 6 45° BEND C/W FACTORY RESTRAINED JOINTS AND CONCRETE REACTION BLOCKING. SEE DETAIL 600.13 ON SHEET UC-3C.
- 7 INSTALL FIRE HYDRANT ASSEMBLY. SEE DETAIL SHEET UC-3C.
- 8 INSTALL 20" BLOW-OFF ASSEMBLY. SEE DETAIL SHEET UC-3C.

Notes

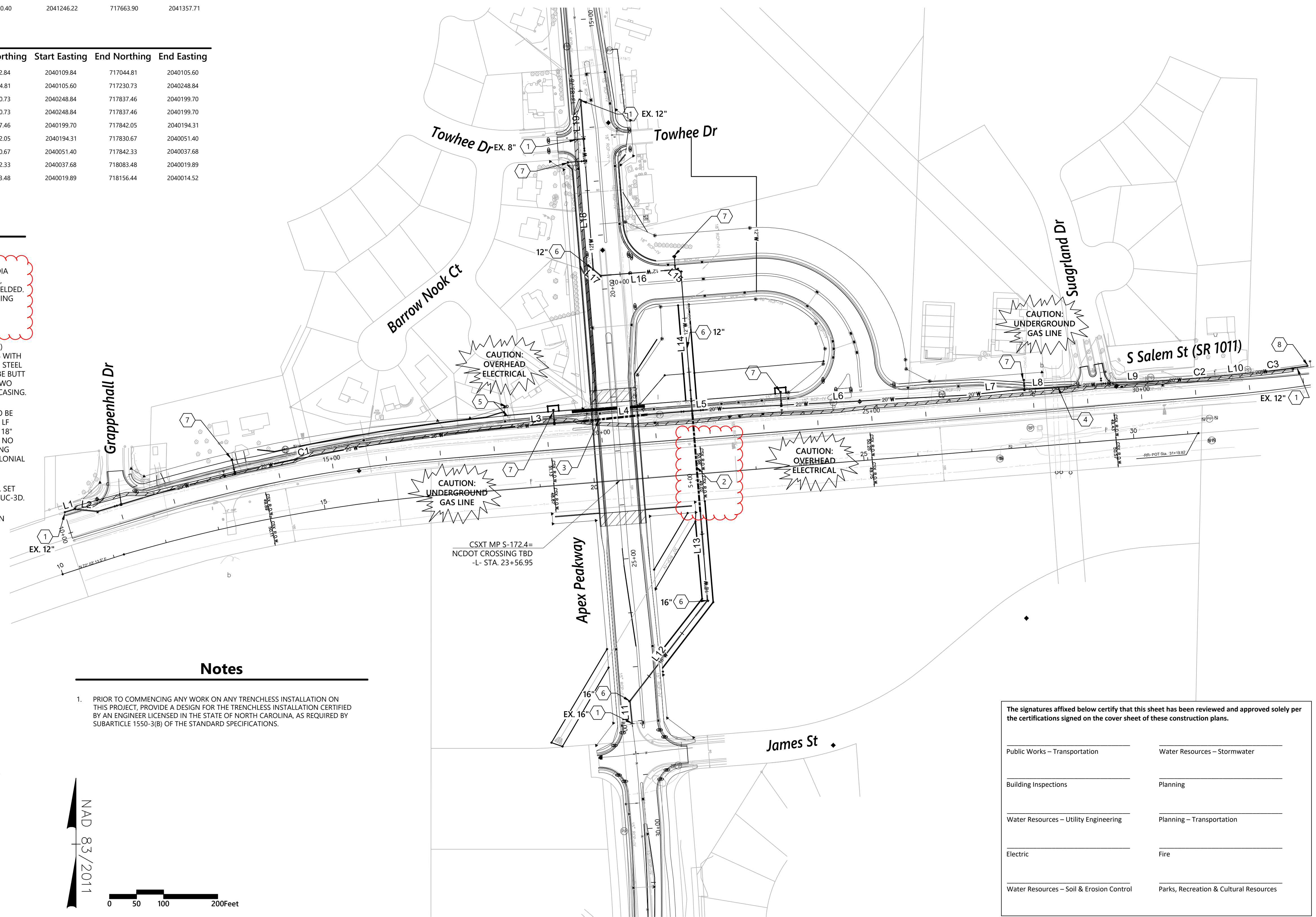
- Town of Apex Notes:**
- ALL WATER LINES SHALL BE INSTALLED WITH A MINIMUM OF 3 FEET OF COVER.
 - MAINTAIN 18" MINIMUM VERTICAL SEPARATION BETWEEN UTILITIES.
 - VERIFY ALL ILLUSTRATED UTILITY CROSSINGS PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER IF CONFLICTS ARE ENCOUNTERED.
 - CONTRACTOR SHALL COORDINATE UTILITY RELOCATION OR ABANDONMENT WITH LOCAL UTILITY COMPANIES AS REQUIRED.
 - WATER SHALL BE AT LEAST 10 FEET LATERALLY FROM EXISTING OR PROPOSED SEWERS. WHERE LOCAL CONDITIONS PREVENT A SEPARATION OF 10 FEET, THE WATER MAIN MAY BE LAID CLOSER, PROVIDED THAT THE ELEVATION OF THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER WITH A HORIZONTAL SEPARATION OF AT LEAST 3 FEET.
 - ALL GATE VALVES SHALL BE APPROVED BY THE TOWN OF APEX. BUTTERFLY VALVES ARE NOT APPROVED FOR USE.

Notes

- PRIOR TO COMMENCING ANY WORK ON ANY TRENCHLESS INSTALLATION ON THIS PROJECT, PROVIDE A DESIGN FOR THE TRENCHLESS INSTALLATION CERTIFIED BY AN ENGINEER LICENSED IN THE STATE OF NORTH CAROLINA, AS REQUIRED BY SUBARTICLE 1550-3(B) OF THE STANDARD SPECIFICATIONS.

LEGEND

- EX. WATERLINE
- 16"W— PROPOSED DIP WATERLINE
- 16"W— PROPOSED RIDIP WATERLINE
- TRENCHLESS INSTALLATION (JACK AND BORE)
- DRY UTILITY DUCT BANK
- PUBLIC UTILITY EASEMENT
- EX. WATERLINE TO BE REMOVED OR ABANDONED

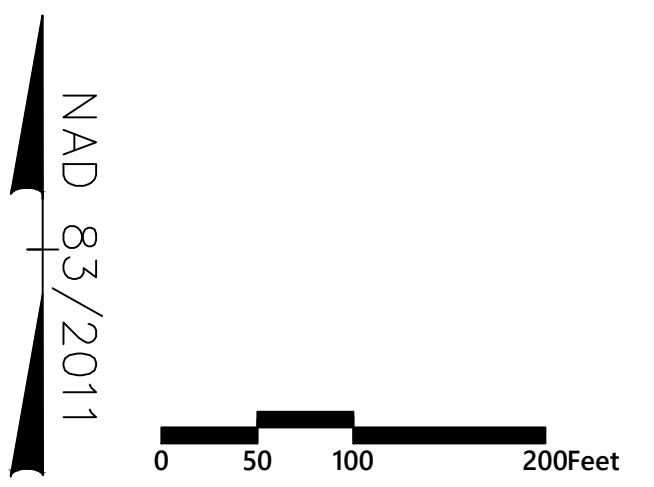


PROJECT REFERENCE NO.	SHEET NO.
U-5928	UC-3B
DESIGNED BY: JK	
DRAWN BY: JT	
CHECKED BY: JK	
APPROVED BY: TG	
REVISED:	6/28/2024
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	UTILITY CONSTRUCTION PLANS ONLY
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

UTILITY CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

The signatures affixed below certify that this sheet has been reviewed and approved solely per the certifications signed on the cover sheet of these construction plans.

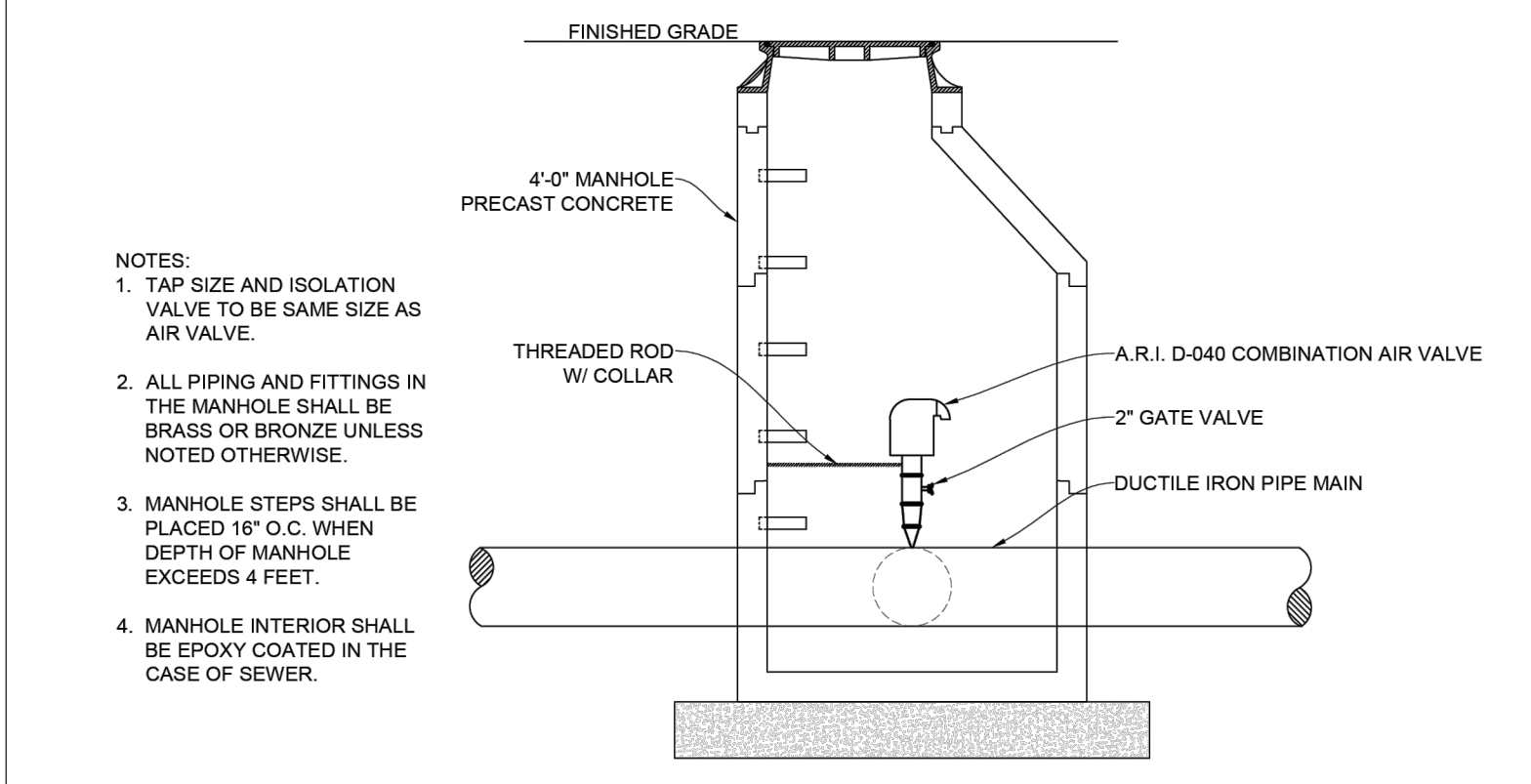
Public Works – Transportation	Water Resources – Stormwater
Building Inspections	Planning
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Electric	Fire
Water Resources – Soil & Erosion Control	Parks, Recreation & Cultural Resources





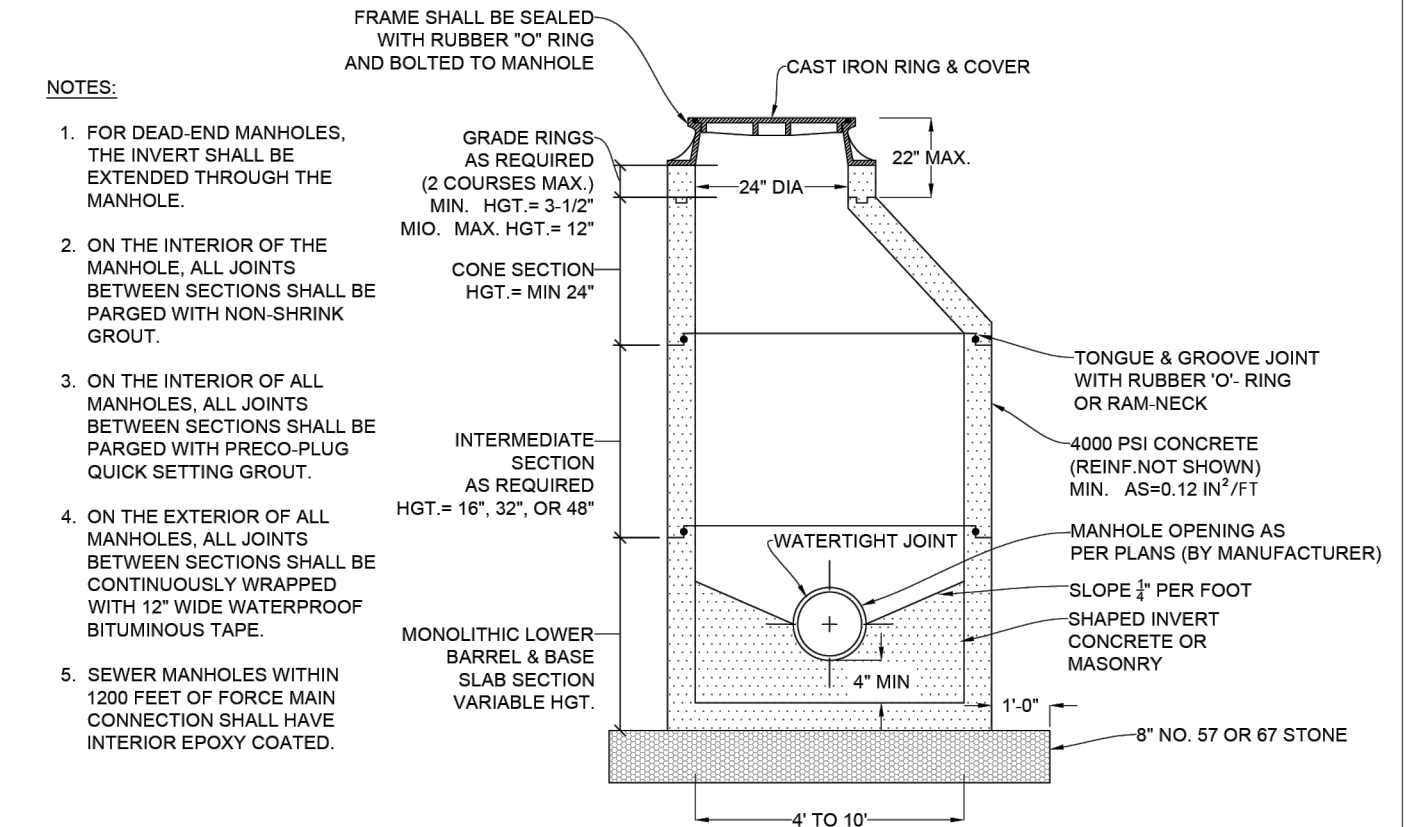
PROJECT REFERENCE NO.	SHEET NO.
U-5928	UC-3D
DESIGNED BY: JK	3/5/2024 NORTH CAROLINA PROFESSIONAL SEAL 14101 VHB ENGINEERING NC, P.C.
DRAWN BY: JT	
CHECKED BY: JK	
APPROVED BY: TG	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
UTILITY CONSTRUCTION PLANS ONLY	

UTILITY CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



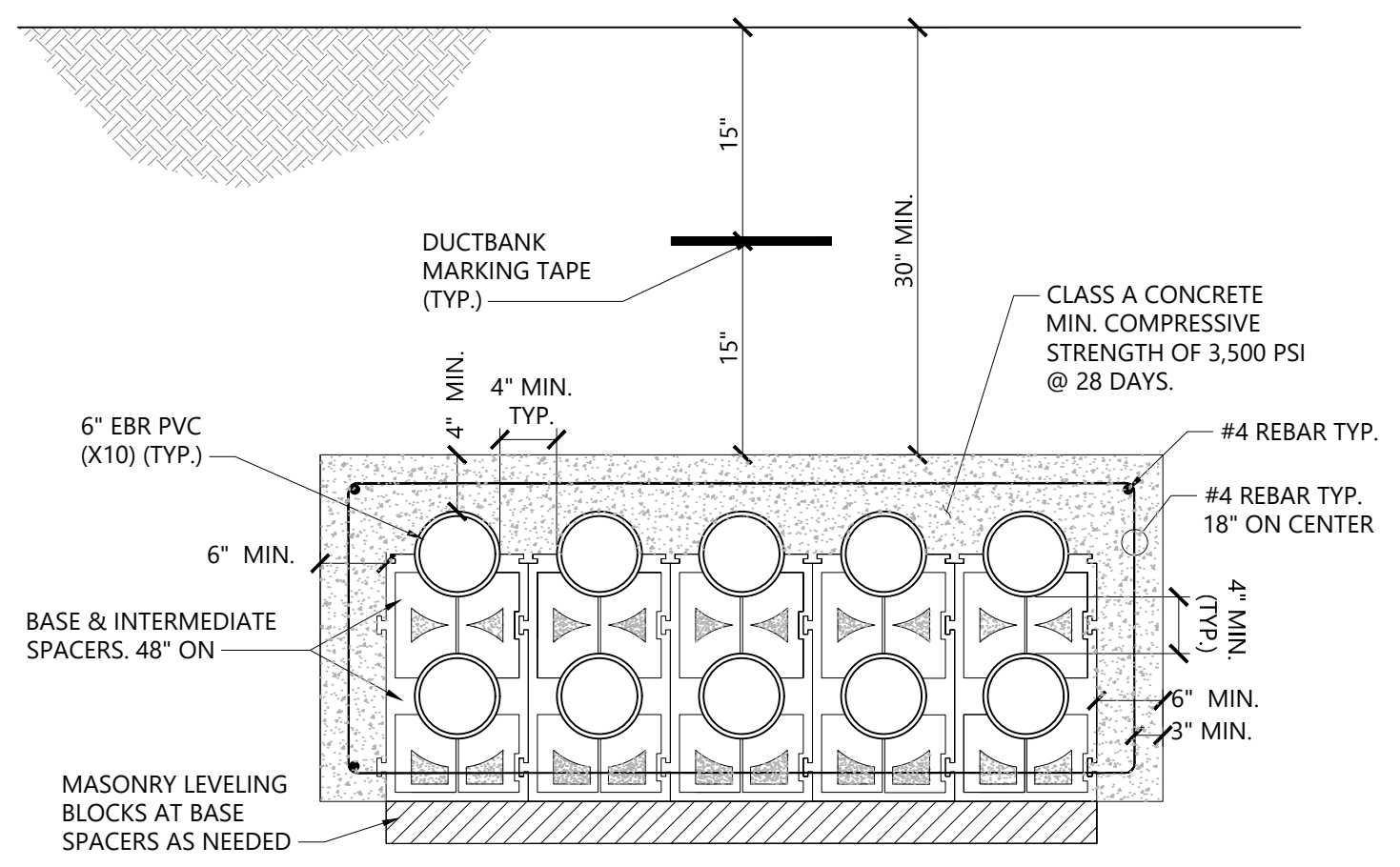
- NOTES:**
1. TAP SIZE AND ISOLATION VALVE TO BE SAME SIZE AS AIR VALVE.
 2. ALL PIPING AND FITTINGS IN THE MANHOLE SHALL BE BRASS OR BRONZE UNLESS NOTED OTHERWISE.
 3. MANHOLE STEPS SHALL BE PLACED 16" O.C. WHEN DEPTH OF MANHOLE EXCEEDS 4 FEET.
 4. MANHOLE INTERIOR SHALL BE EPOXY COATED IN THE CASE OF SEWER.

TOWN OF APEX STANDARDS
EFFECTIVE: NOVEMBER 20, 2007
AIR RELEASE MANHOLE FOR WATER MAINS
STD. NO. 600.12
SHEET 1 OF 1



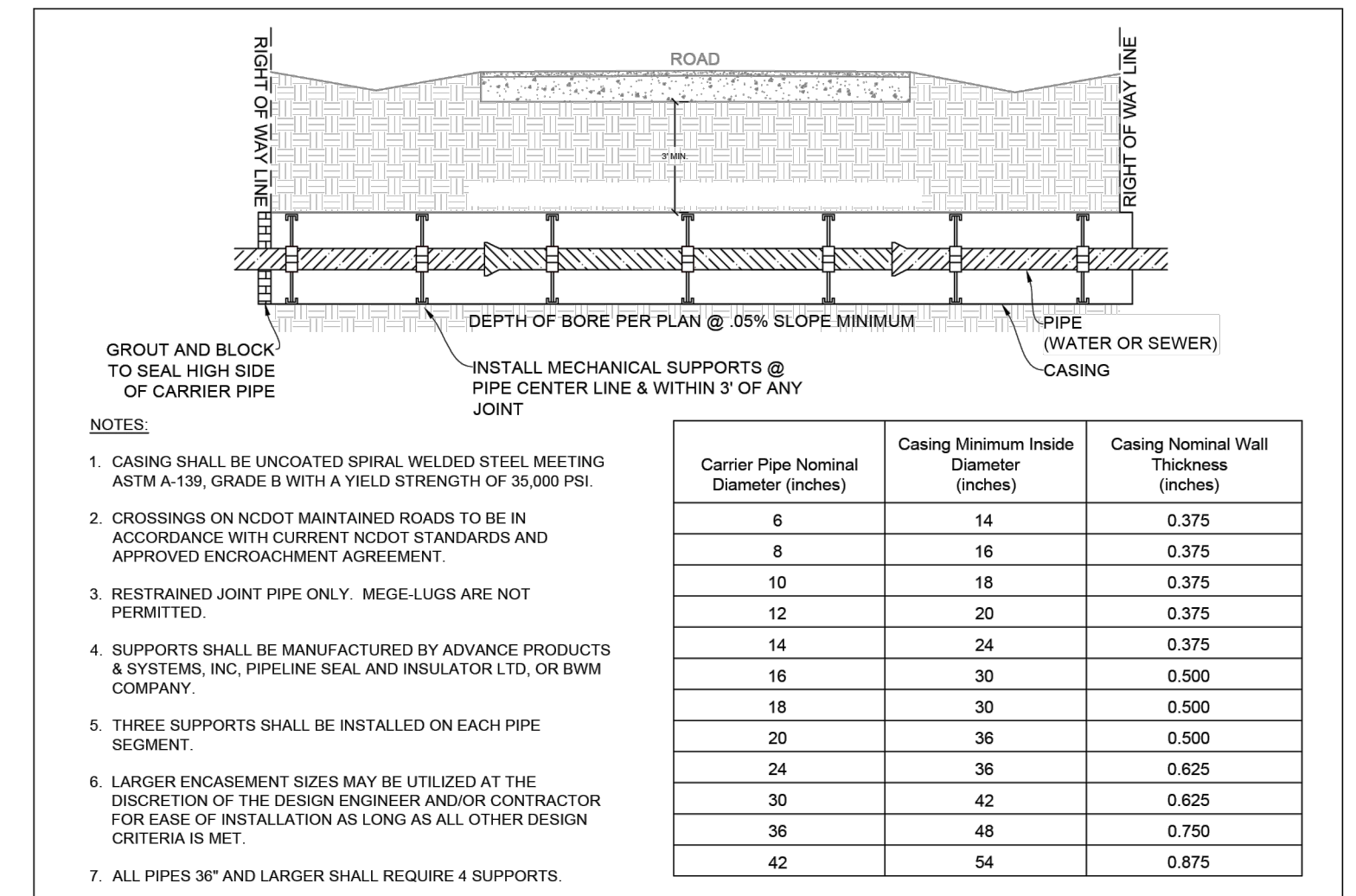
- NOTES:**
1. FOR DEAD END MANHOLES, THE INVERT SHALL BE EXTENDED THROUGH THE MANHOLE.
 2. ON THE INTERIOR OF THE MANHOLE ALL JOINTS BETWEEN SECTIONS SHALL BE PARGED WITH NON-SHRINK GROUT.
 3. ON THE INTERIOR OF ALL MANHOLES, ALL JOINTS BETWEEN SECTIONS SHALL BE PARGED WITH PRECO-PLUG QUICK SETTING GROUT.
 4. ON THE EXTERIOR OF ALL MANHOLES, ALL JOINTS BETWEEN SECTIONS SHALL BE CONTINUOUSLY WRAPPED WITH 12" WIDE WATERPROOF BITUMINOUS TAPE.
 5. SEWER MANHOLES WITHIN 1200 FEET OF FORCE MAIN CONNECTION SHALL HAVE INTERIOR EPOXY COATED.

TOWN OF APEX STANDARDS
EFFECTIVE: APRIL 12, 2022
PRECAST MANHOLE TRAFFIC RATED
STD. NO. 700.04
SHEET 1 OF 3



- NOTES:**
1. GEOTECH TEST, IN ACCORD WITH ASTM D698, THE BOTTOM OF EXCAVATION TO ACHIEVE 98% OF MAXIMUM DRY DENSITY, PRIOR TO CONCRETE PLACEMENT.

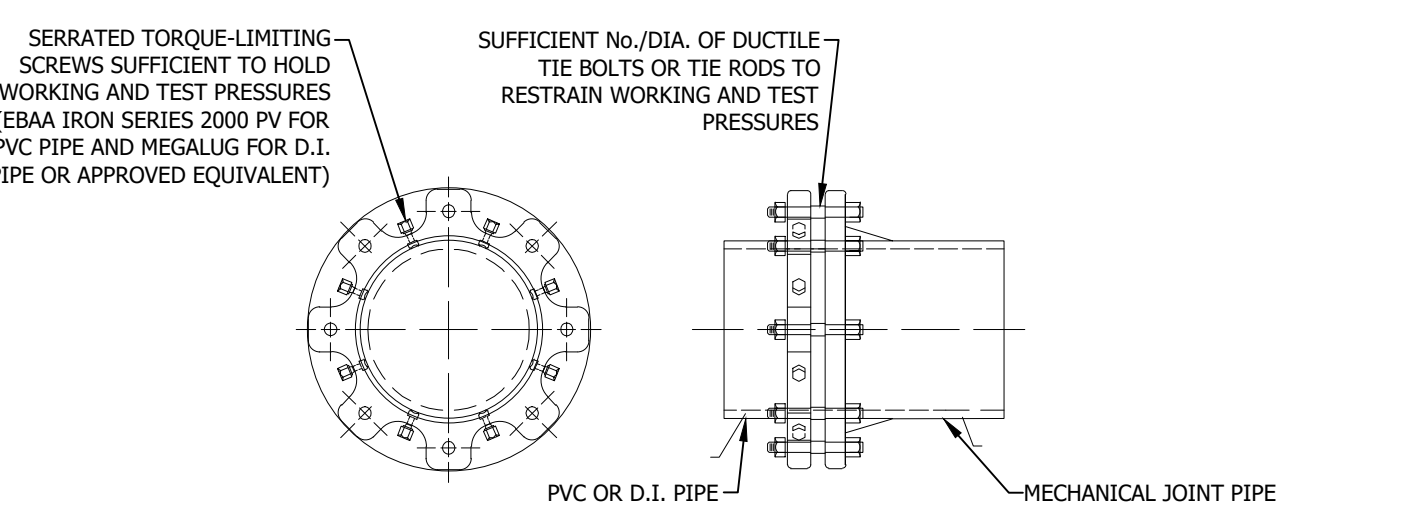
DRY UTILITY DUCT BANK DETAIL
N.T.S. Source: VHB 11/12/18 0



- NOTES:**
1. CASING SHALL BE UNCOATED SPIRAL WELDED STEEL MEETING ASTM A-139, GRADE B WITH A YIELD STRENGTH OF 35,000 PSI.
 2. CROSSINGS ON NCDOT MAINTAINED ROADS TO BE IN ACCORDANCE WITH CURRENT NCDOT STANDARDS AND APPROVED ENCROACHMENT AGREEMENT.
 3. RESTRAINED JOINT PIPE ONLY. MEGE-LUGS ARE NOT PERMITTED.
 4. SUPPORTS SHALL BE MANUFACTURED BY ADVANCE PRODUCTS & SYSTEMS, INC., PIPELINE SEAL AND INSULATOR LTD, OR BWM COMPANY.
 5. THREE SUPPORTS SHALL BE INSTALLED ON EACH PIPE SEGMENT.
 6. LARGER ENCASEMENT SIZES MAY BE UTILIZED AT THE DISCRETION OF THE DESIGN ENGINEER AND/OR CONTRACTOR FOR EASE OF INSTALLATION AS LONG AS ALL OTHER DESIGN CRITERIA IS MET.
 7. ALL PIPES 36" AND LARGER SHALL REQUIRE 4 SUPPORTS.

Carrier Pipe Nominal Diameter (inches)	Casing Minimum Inside Diameter (inches)	Casing Nominal Wall Thickness (inches)
6	14	0.375
8	16	0.375
10	18	0.375
12	20	0.375
14	24	0.375
16	30	0.500
18	30	0.500
20	36	0.500
24	36	0.625
30	42	0.625
36	48	0.750
42	54	0.875

TOWN OF APEX STANDARDS
EFFECTIVE: MARCH 23, 2021
BORE & JACK
STD. NO. 450.06
SHEET 1 OF 1

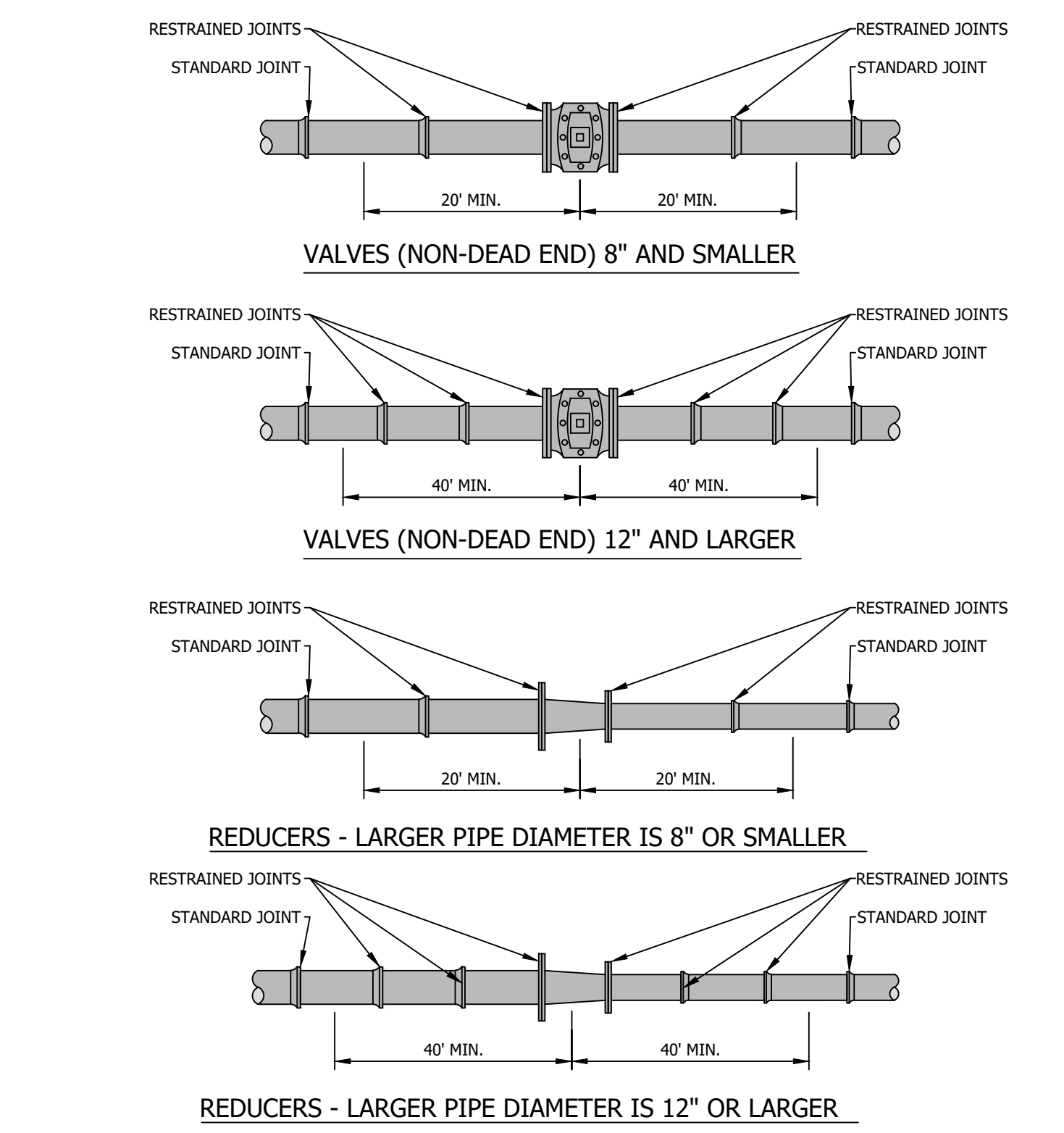


RESTRAINED JOINTS ON MECHANICAL JOINT PIPE & FITTINGS

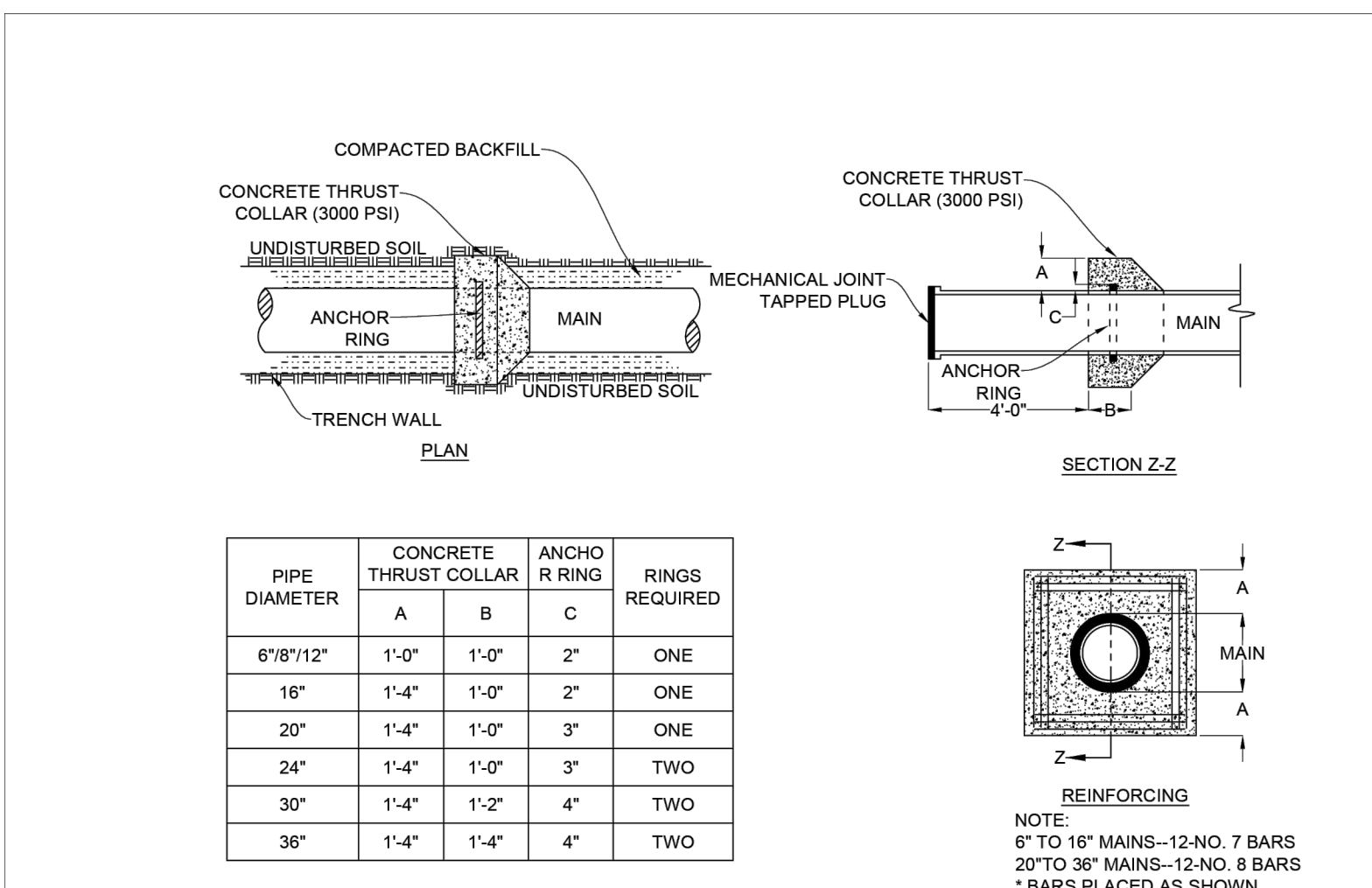
MINIMUM FOOTAGE OF RESTRAINED PIPE FOR VARIOUS DIAMETERS & DEGREES CAST & DUCTILE IRON ELBOWS

COVER DIA. MAIN	DEGREE OF ELBOW						BRANCH OF TEE	REDUCER (LARGE SIDE ONLY)
	11.25°	22.5°	45°	90°	VERTICAL OFFSET 45°			
	3'	3'	3'	3'	UPPER BEND (3')	LOWER BEND (3')		
6"	2'	5'	10'	25'	15'	10'	15'	20'
8"	4'	6'	14'	33'	25'	15'	30'	40'
12"	5'	10'	20'	50'	30'	20'	55'	45'
16"	7'	13'	28'	67'	45'	30'	80'	45'
20"	8'	17'	35'	84'	55'	35'	105'	45'

RESTRAINED JOINT DETAIL
N.T.S. Source: VHB 6/14/19 0



TYP. RESTRAINING FOR VALVES AND REDUCERS
N.T.S. Source: VHB 6/14/19 0



PIPE DIAMETER	CONCRETE THRUST COLLAR			ANCHOR RING	RINGS REQUIRED
	A	B	C		
6"/8"/12"	1'-0"	1'-0"	2"	ONE	
16"	1'-4"	1'-0"	2"	ONE	
20"	1'-4"	1'-0"	3"	ONE	
24"	1'-4"	1'-0"	3"	TWO	
30"	1'-4"	1'-2"	4"	TWO	
36"	1'-4"	1'-4"	4"	TWO	

TOWN OF APEX STANDARDS
EFFECTIVE: DECEMBER 3, 2002
THRUST COLLAR INSTALLATION
STD. NO. 600.11
SHEET 1 OF 1

The signatures affixed below certify that this sheet has been reviewed and approved solely per the certifications signed on the cover sheet of these construction plans.

Public Works - Transportation	Water Resources - Stormwater
Building Inspections	Planning
Water Resources - Utility Engineering	Planning - Transportation
Electric	Fire
Water Resources - Soil & Erosion Control	Parks, Recreation & Cultural Resources

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5/14/2024

The signatures affixed below certify that this sheet has been reviewed and approved solely per the certifications signed on the cover sheet of these construction plans.

Public Works - Transportation	Water Resources - Stormwater
Building Inspections	Planning
Water Resources - Utility Engineering	Planning - Transportation
Electric	Fire
Water Resources - Soil & Erosion Control	Parks, Recreation & Cultural Resources

NOTES KEYED TO PLAN

- CONNECT TO EX. 16" WATERLINE W/ THRUST COLLAR PRIOR TO CONNECTION.
- CONNECT TO EX. 12" WATERLINE W/ THRUST COLLAR PRIOR TO CONNECTION.
- EXTEND EXISTING 8" WATERLINE AND CONNECT WITH 12" X 8" TEE. RESTRAIN VALVE WITH THRUST COLLAR AND RODS PRIOR TO NEW CONNECTION.
- ~180 LF 16" DIP WATERLINE JACK AND BORE INSTALLATION WITH 36" DIA (0.532" THICK) UNCOATED SPIRAL WELDED STEEL MEETING ASTM A-139, GRADE B WITH A YIELD STRENGTH OF 35,000 PSI. JOINTS TO BE BUTT WELDED. SEE DETAIL, SHEET UC-3D. CARRIER PIPE THICKNESS DUE TO CSX CROSSING REQUIREMENTS. ALL CSX REQUIREMENTS ARE TO BE MET WITH THIS INSTALLATION. WATERLINE TO BE WRAPPED IN TWO LAYERS OF 6 MIL POLYETHYLENE FILM WRAP FOR THE LENGTH OF THE CASING.
- AIR RELEASE MANHOLE. SEE DETAIL, SHEET UC-3D.
- 16" DIP 45° BEND C/W FACTORY RESTRAINED JOINTS AND CONCRETE THRUST BLOCK. SEE DETAIL, SHEETS UC-3C AND UC-3D.
- 12" DIP 45° BEND C/W FACTORY RESTRAINED JOINTS AND CONCRETE THRUST BLOCK. SEE DETAIL, SHEETS UC-3C AND UC-3D.
- REMOVE EX. FIRE HYDRANT.
- INSTALL FIRE HYDRANT ASSEMBLY. SEE DETAIL, SHEET UC-3C.
- RETAINING WALL. DESIGN BY OTHERS.
- DRY UTILITY DUCT BANK. SEE DETAIL SHEET UC-3D.

LEGEND

- EX. WATERLINE
- PROPOSED DIP WATERLINE
- PROPOSED RJDIP WATERLINE
- TRENCHLESS INSTALLATION (JACK AND BORE)
- DRY UTILITY DUCT BANK
- PUBLIC UTILITY EASEMENT
- EX. WATERLINE TO BE REMOVED OR ABANDONED

Notes

Town of Apex Notes:

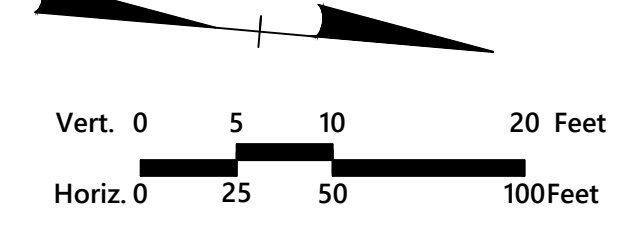
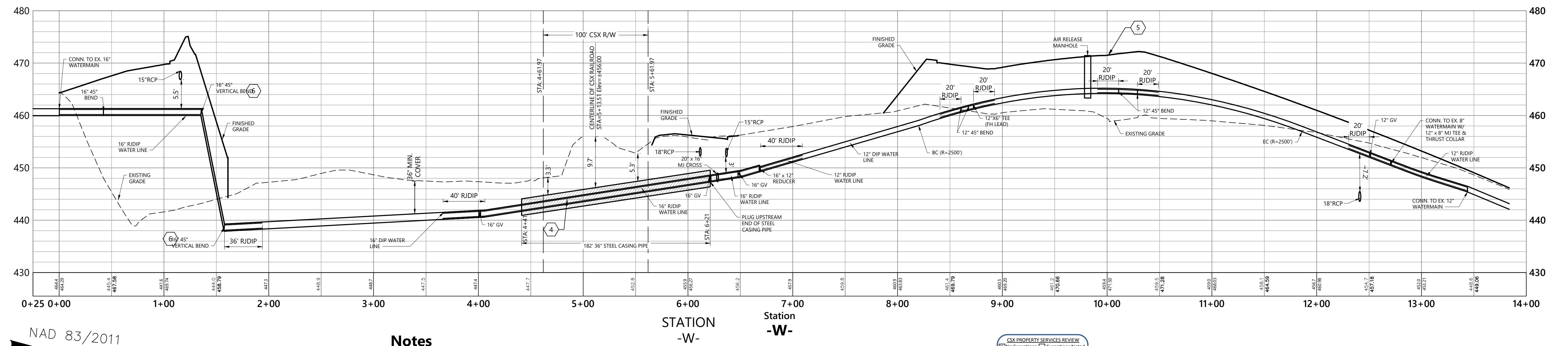
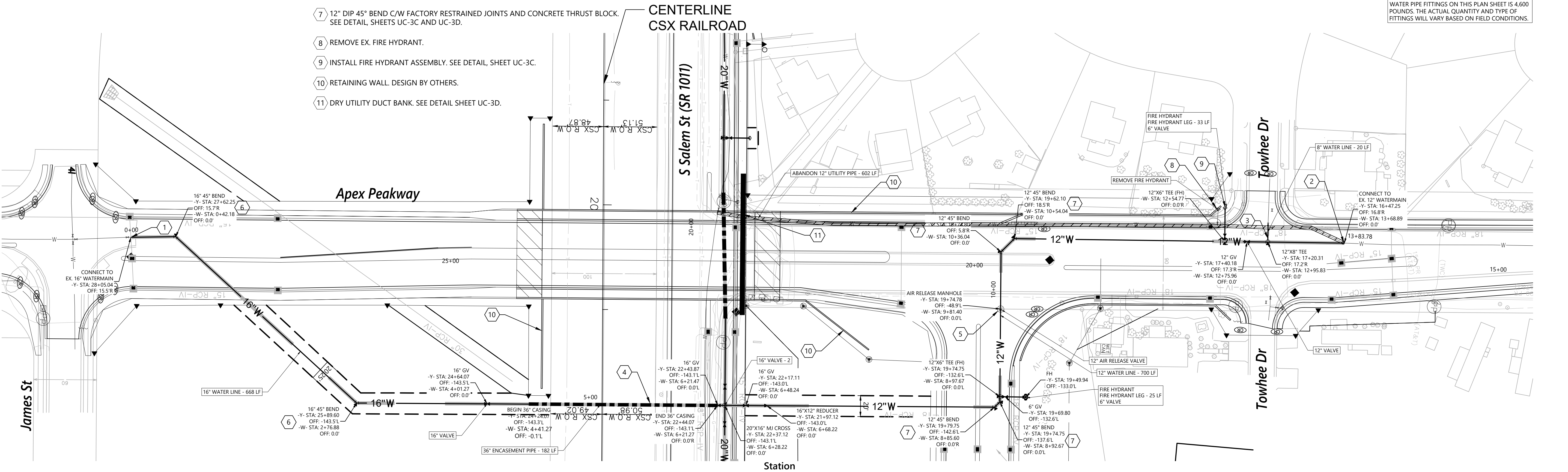
- ALL WATER LINES SHALL BE INSTALLED WITH A MINIMUM OF 3 FEET OF COVER.
- MAINTAIN 18" MINIMUM VERTICAL SEPARATION BETWEEN UTILITIES.
- VERIFY ALL ILLUSTRATED UTILITY CROSSINGS PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER IF CONFLICTS ARE ENCOUNTERED.
- CONTRACTOR SHALL COORDINATE UTILITY RELOCATION OR ABANDONMENT WITH LOCAL UTILITY COMPANIES AS REQUIRED.
- WATER SHALL BE AT LEAST 10 FEET LATERALLY FROM EXISTING OR PROPOSED SEWERS. WHERE LOCAL CONDITIONS PREVENT A SEPARATION OF 10 FEET, THE WATER MAIN MAY BE LAID CLOSER, PROVIDED THAT THE ELEVATION OF THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER WITH A HORIZONTAL SEPARATION OF AT LEAST 3 FEET.
- ALL GATE VALVES SHALL BE APPROVED BY THE TOWN OF APEX. BUTTERFLY VALVES ARE NOT APPROVED FOR USE.



PROJECT REFERENCE NO. U-5928	SHEET NO. UC-4
DESIGNED BY: JK	3/5 NORTH CAROLINA PROFESSIONAL SEAL OF JOHN M. KAMBERG REGISTERED PROFESSIONAL ENGINEER NO. 14404
DRAWN BY: JT	
CHECKED BY: JK	
APPROVED BY: TG	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
UTILITY CONSTRUCTION PLANS ONLY	

UTILITY CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 4,600 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.



- Notes**
- PRIOR TO COMMENCING ANY WORK ON ANY TRENCHLESS INSTALLATION ON THIS PROJECT, PROVIDE A DESIGN FOR THE TRENCHLESS INSTALLATION CERTIFIED BY AN ENGINEER LICENSED IN THE STATE OF NORTH CAROLINA, AS REQUIRED BY SUBARTICLE 1550-3(B) OF THE STANDARD SPECIFICATIONS.

CSX PROPERTY SERVICES REVIEW
No Exceptions
By: [Signature]

3/5/2024 10:53:39 AM \\vhb\gbl\proj\Raleigh\proj\Engineering\UC\Pro\Plan\Sheets\U-5928_UC.dwg Apex Peakway\NGDOT\Utilities\Engineering\UC\Pro\Plan\Sheets\U-5928_UC.dwg