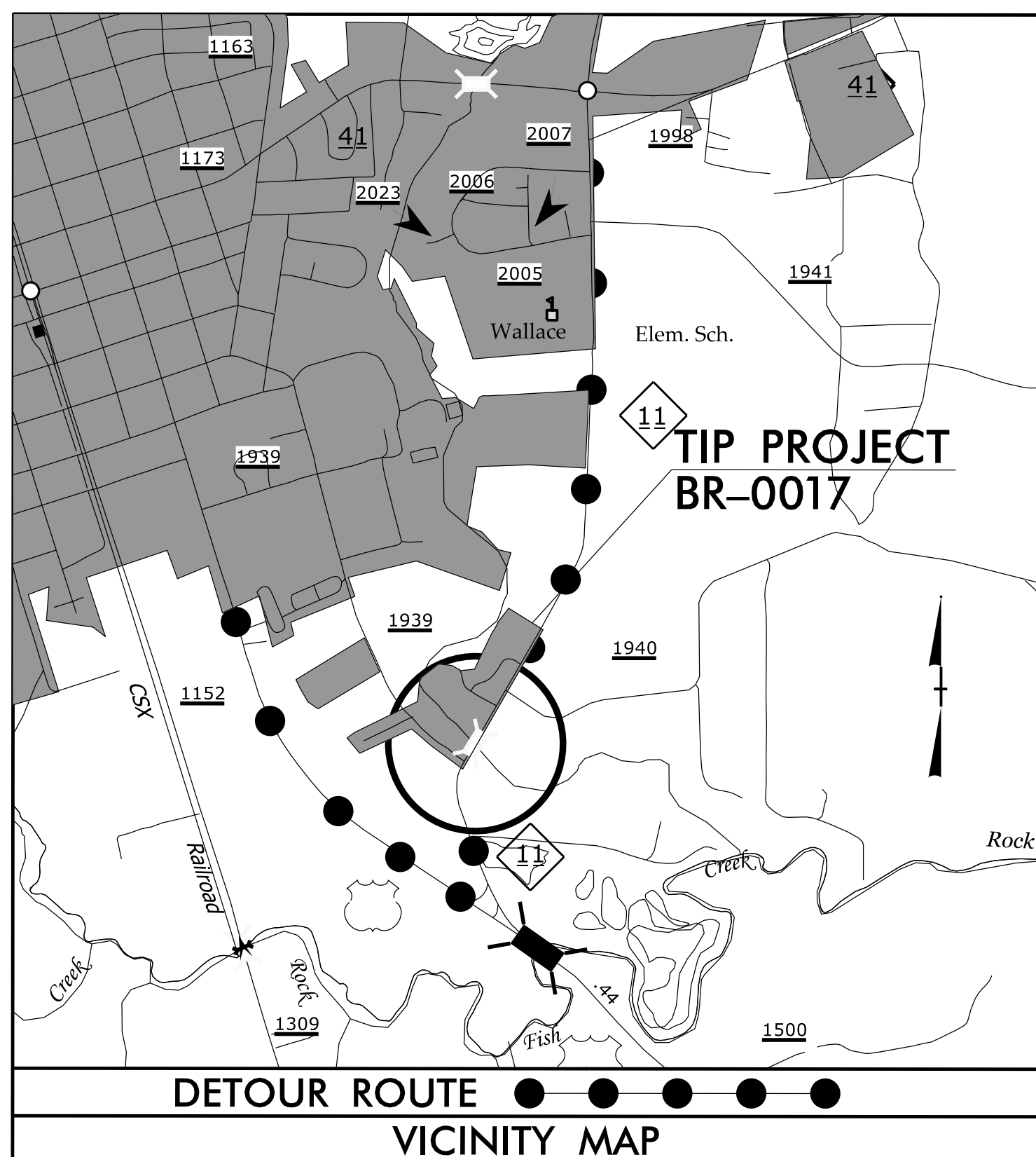


TIP PROJECT: BR-0017



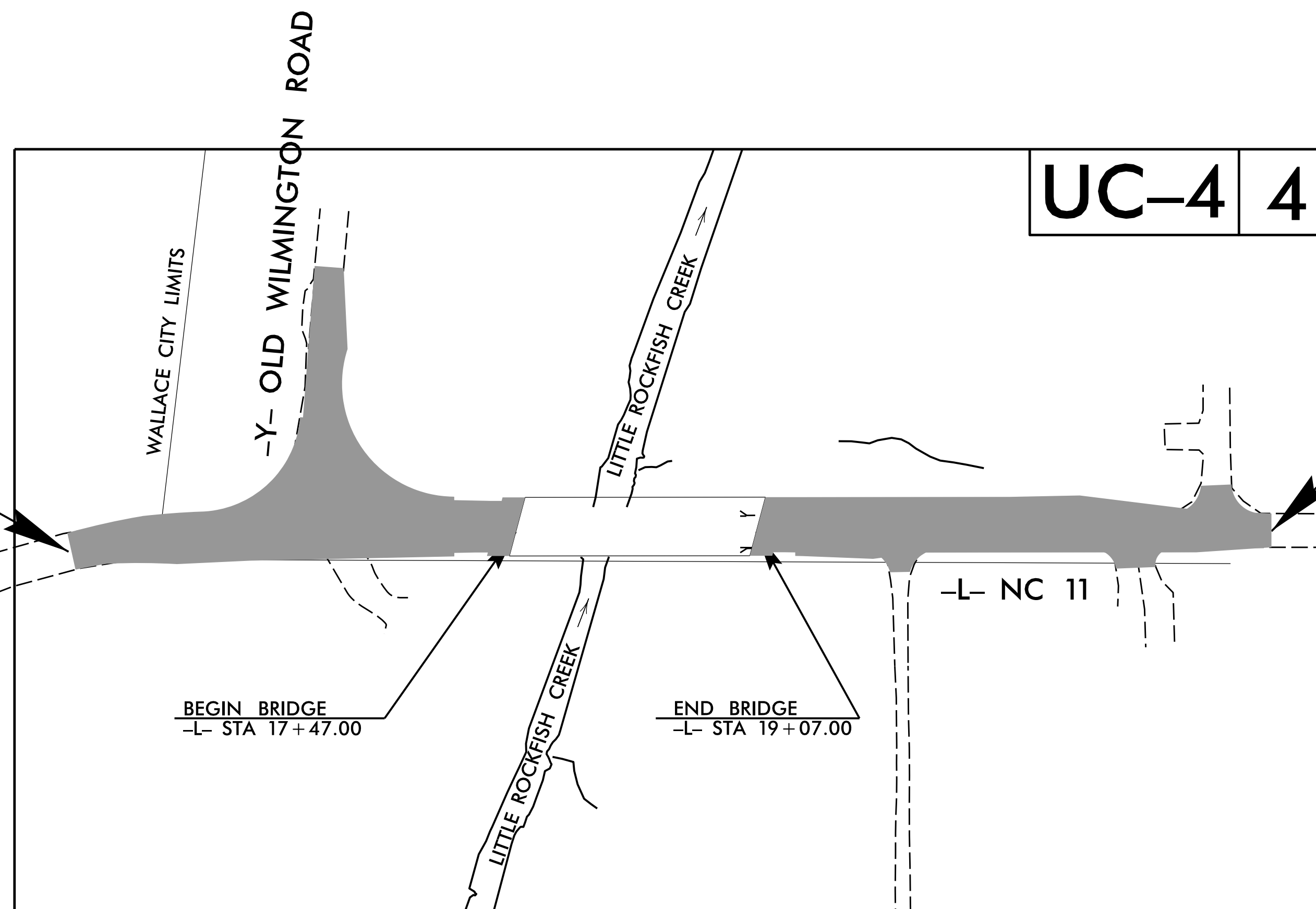
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

**UTILITY CONSTRUCTION PLANS
DUPLIN COUNTY**

LOCATION: BRIDGE NO. 12 ON NC 11 OVER LITTLE ROCKFISH CREEK

TYPE OF WORK: WATER & SEWER RELOCATION

T.I.P. NO.	SHEET NO.
BR-0017	UC-1



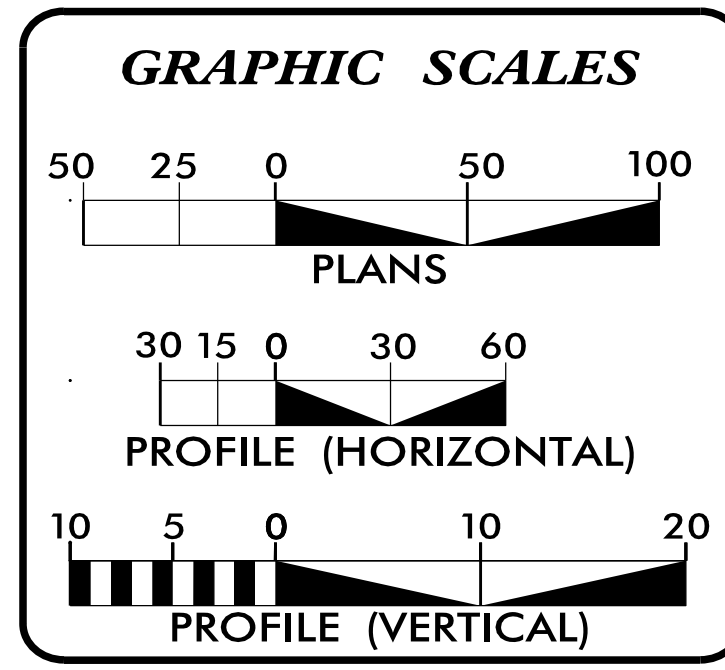
BEGIN TIP PROJECT BR-0017
-L- POC STA. 14+50.00

END TIP PROJECT BR-0017
-L- POT STA. 22+50.00

TO US 117

TO I-40

DOCUMENT NOT CONSIDERED FINAL
UNTIL ALL SIGNATURES ARE COMPLETED



INDEX OF SHEETS	
SHEET NO.:	DESCRIPTION:
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY SHEET
UC-3	NOTES SHEET
UC-3a	UTILITY DETAIL SHEET
UC-4	UTILITY CONSTRUCTION PLAN SHEET
UC-5	UTILITY PROFILE SHEET

WATER AND SEWER OWNERS ON PROJECT

(1) TOWN OF WALLACE

PREPARED IN THE OFFICE OF
STROUD ENGINEERING, P.A.

107-B COMMERCE STREET
GREENVILLE, NORTH CAROLINA 27858
(252) 756-9352
LICENSE NO. C-0647

DAVID E. TUTEN, P.E. CONSULTANT CONTACT #1
LINWOOD E. STROUD, P.E. CONSULTANT CONTACT #2
CONSULTANT CONTACT #3

SEAL

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

NABIL HAMDAN UTILITIES REGIONAL ENGINEER
KELVIN MARTIN UTILITIES ENGINEER
VACANT UTILITIES AREA COORDINATOR
LARRY JAMES JR. UTILITIES COORDINATOR

8/17/99

PROJECT REFERENCE NO. <i>BR-0017</i>	SHEET NO. <i>UC-2</i>
DESIGNED BY: L.E.S.	
DRAWN BY: L.H.J.	
CHECKED BY: D.E.T.	
APPROVED BY: D.E.T.	
REVISIONS:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
UTILITY CONSTRUCTION PLANS ONLY	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

UTILITY CONSTRUCTION

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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

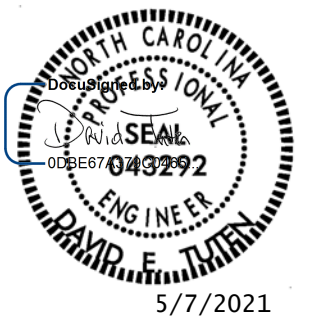
EXISTING UTILITIES SYMBOLS

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	AATUR
End of Information	E.O.I.

*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)

UTILITY CONSTRUCTION

PROJECT REFERENCE NO. <i>BR-0017</i>	SHEET NO. <i>UC-3</i>
DESIGNED BY: LES	
DRAWN BY: LHJ	
CHECKED BY: DET	
APPROVED BY: DET	
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

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 THE TOWN OF WALLACE.

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 TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT 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 OWNERS' 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.

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. CONTRACTOR'S ATTENTION IS DIRECTED TO SECTIONS 102, 107, AND 1550 OF THE STANDARD SPECIFICATIONS CONCERNING TRENCHLESS INSTALLATION.

2. EXISTING CONDITIONS SURVEY AND PROPOSED HIGHWAY PLANS PROVIDED TO STROUD ENGINEERING BY NCDOT.

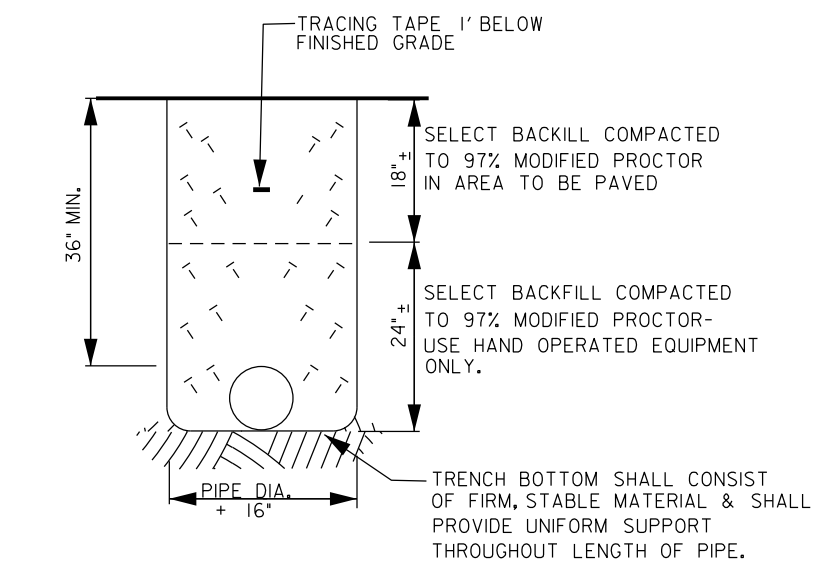
3. THRUST COLLARS ON EXISTING UTILITIES ARE TO BE INSTALLED AND CURED PRIOR TO CONNECTION OF NEW UTILITIES TO EXISTING UTILITIES.

4. CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE SHUTDOWN OF EXISTING WATER AND SANITARY SEWER LINES WITH THE TOWN OF WALLACE AND HAVING ADEQUATE STAFF AND MATERIALS TO COMPLETE CONNECTIONS DURING THE SPECIFIED SHUTDOWN.

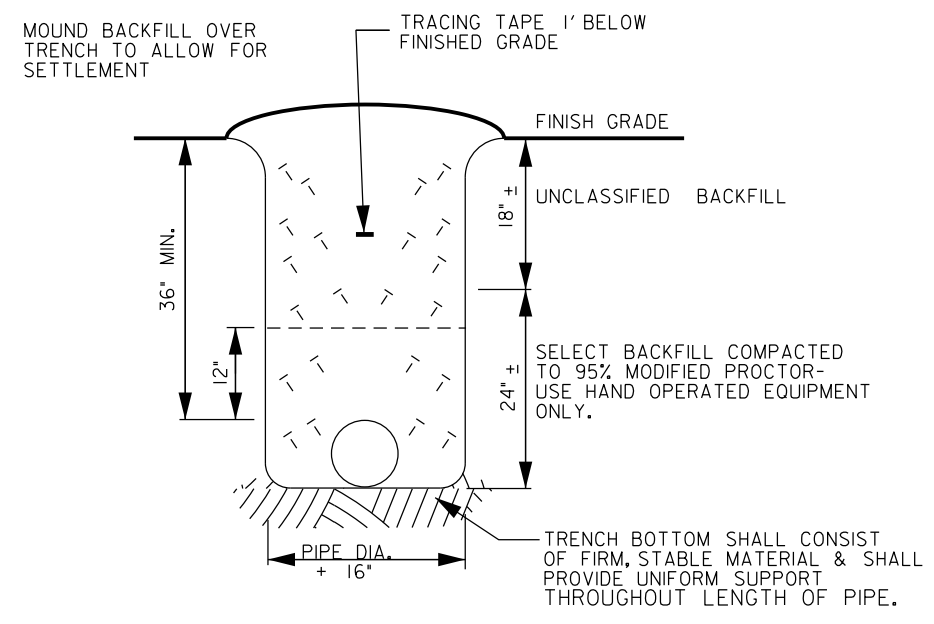


UTILITY CONSTRUCTION

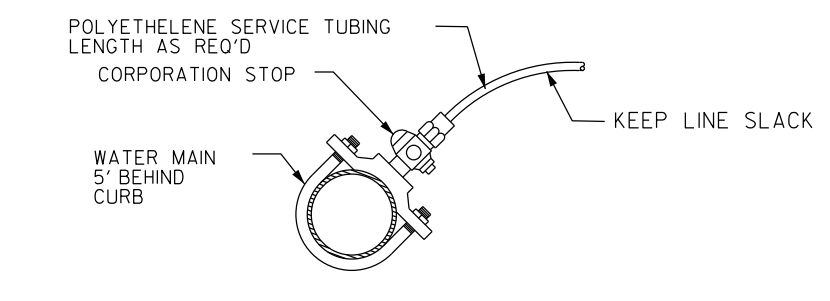
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1 WATER PIPE TRENCH DETAIL (FOR AREA TO BE PAVED)
UC-3a



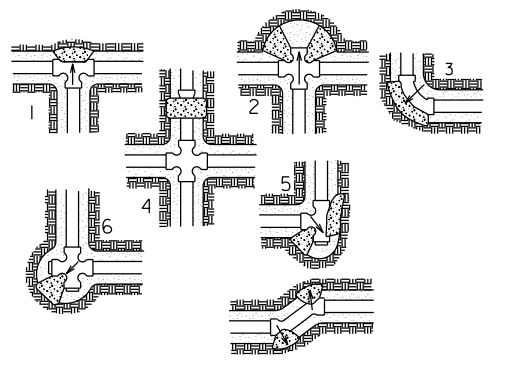
2 WATER PIPE TRENCH DETAIL (OUTSIDE OF PAVED AREAS)
UC-3a



3 TYPICAL 1" WATER SERVICE
UC-3a

RESULTANT THRUST AT FITTING AT 150 PSI WATER PRESSURE

NOM. PIPE DIA.	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4"	2,700	3,800	2,100	1,100	530
6"	5,600	8,000	4,300	2,200	1,100
8"	9,700	13,600	7,400	3,800	1,900
10"	14,500	20,500	11,100	5,700	2,900
12"	20,500	29,000	15,700	8,000	4,000
14"	27,600	39,000	21,100	11,000	5,400
16"	35,700	50,400	27,300	14,000	7,000
18"	44,800	63,400	34,400	17,500	8,800
20"	55,000	77,600	42,100	21,500	10,800
24"	78,500	111,000	60,200	31,600	15,400
30"	120,600	170,600	92,300	47,100	23,600
36"	172,800	244,400	132,300	67,500	33,900
42"	233,300	330,200	178,600	91,200	46,700
48"	304,000	430,000	232,700	118,600	59,600
54"	384,100	543,200	294,000	149,000	75,300



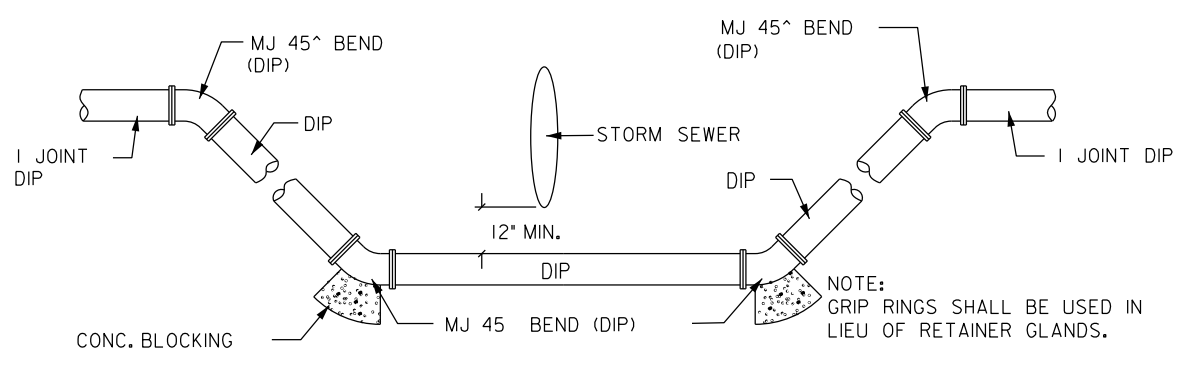
1. THRU LINE CONNECTION, TEE AS TEE.
 2. THRU LINE CONNECTION, CROSS USED AS TEE.
 3. DIRECTION CHANGE, ELBOW AS ELBOW.
 4. CHANGE LINE SIZE, REDUCER AS REDUCER.
 5. DIRECTION CHANGE, TEE USED AS ELBOW AS ELBOW.
 6. DIRECTION CHANGE, CROSS USED AS ELBOW AS ELBOW.
 7. DIRECTION CHANGE AS ELBOW.

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

TO DETERMINE THE SIZE OF A CONCRETE THRUST BLOCK, DIVIDE THE TOTAL FORCE BY THE BEARING VALUES OF THE SOIL. THE QUOTIENT WILL BE THE SIZE OF THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET. APPROXIMATE VALUES FOR VARIOUS TYPES OF SOIL ARE LISTED IN TABLE.

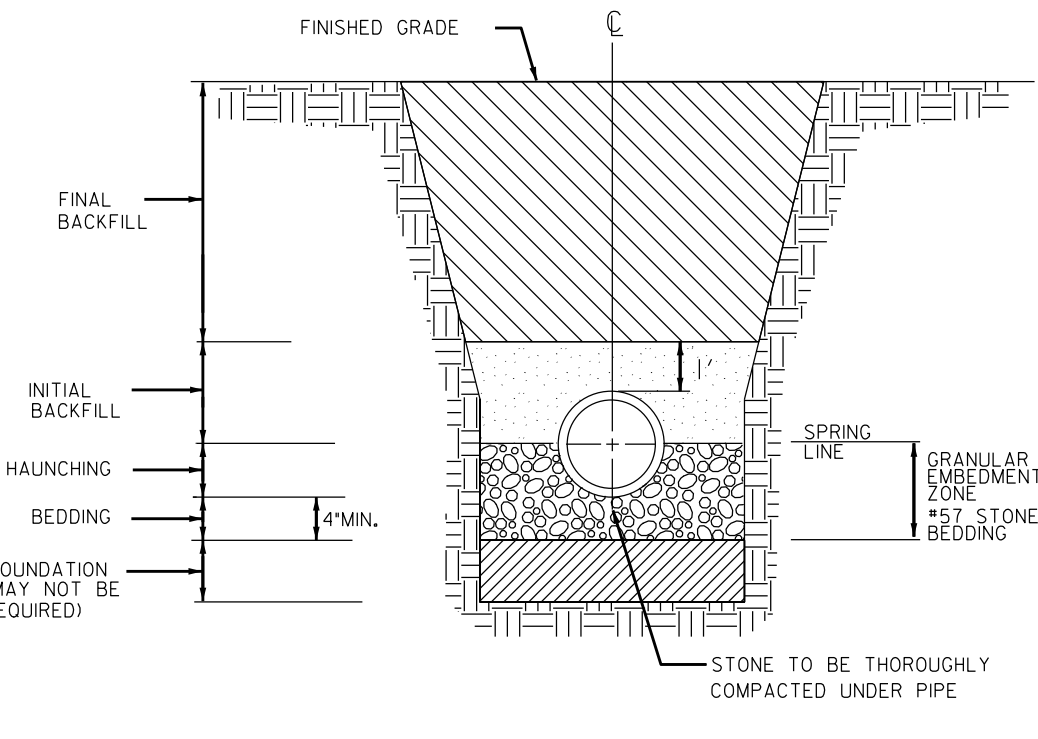
NO RESPONSIBILITY CAN BE ASSUMED FOR THE ACCURACY OF THE DATA IN THIS TABLE DUE TO THE WIDE VARIATION OF BEARING LOAD CAPABILITIES FOR EACH SOIL TYPE.

4 THRUST BLOCKING DETAIL
UC-3a

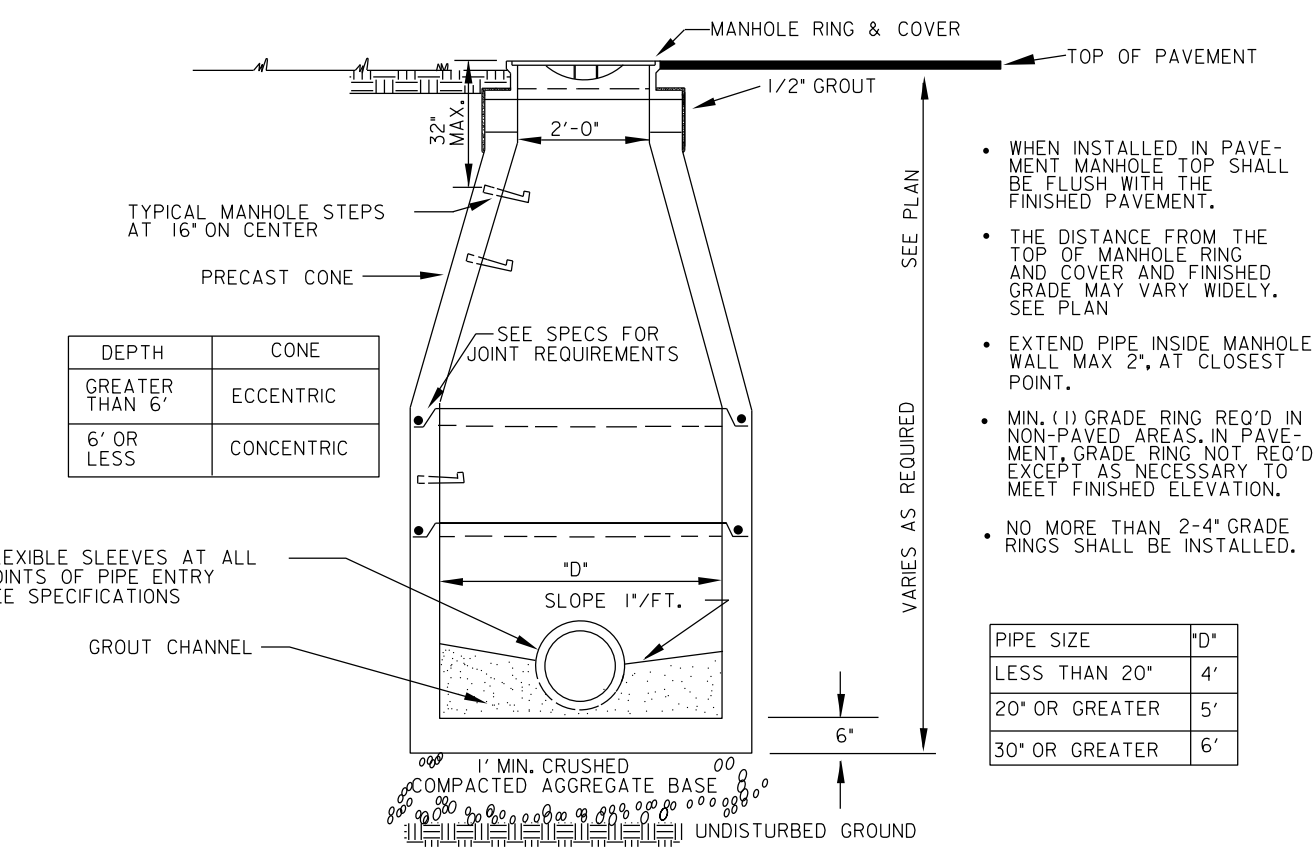


NOTE:
 1. PIPE LENGTHS SHALL BE AS REQUIRED TO CONSTRUCT CROSSING.
 ALL INTERNAL JOINTS TO BE RESTRAINED.

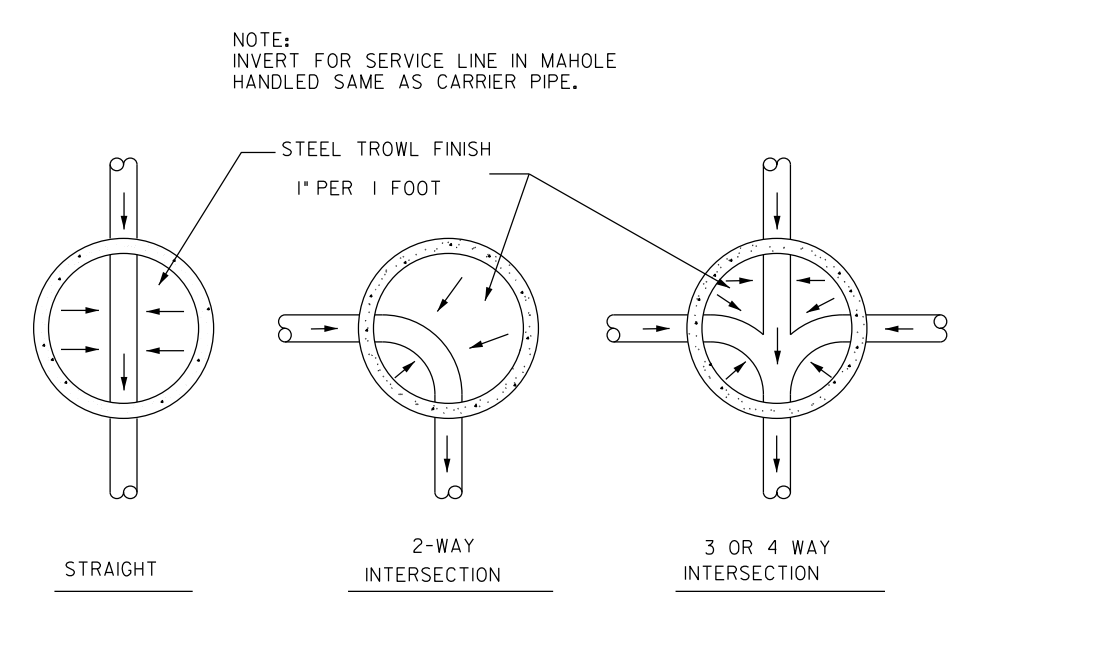
5 WATER MAIN & STORM SEWER CROSSING DETAIL
UC-3a



6 DIP PIPE
UC-3a

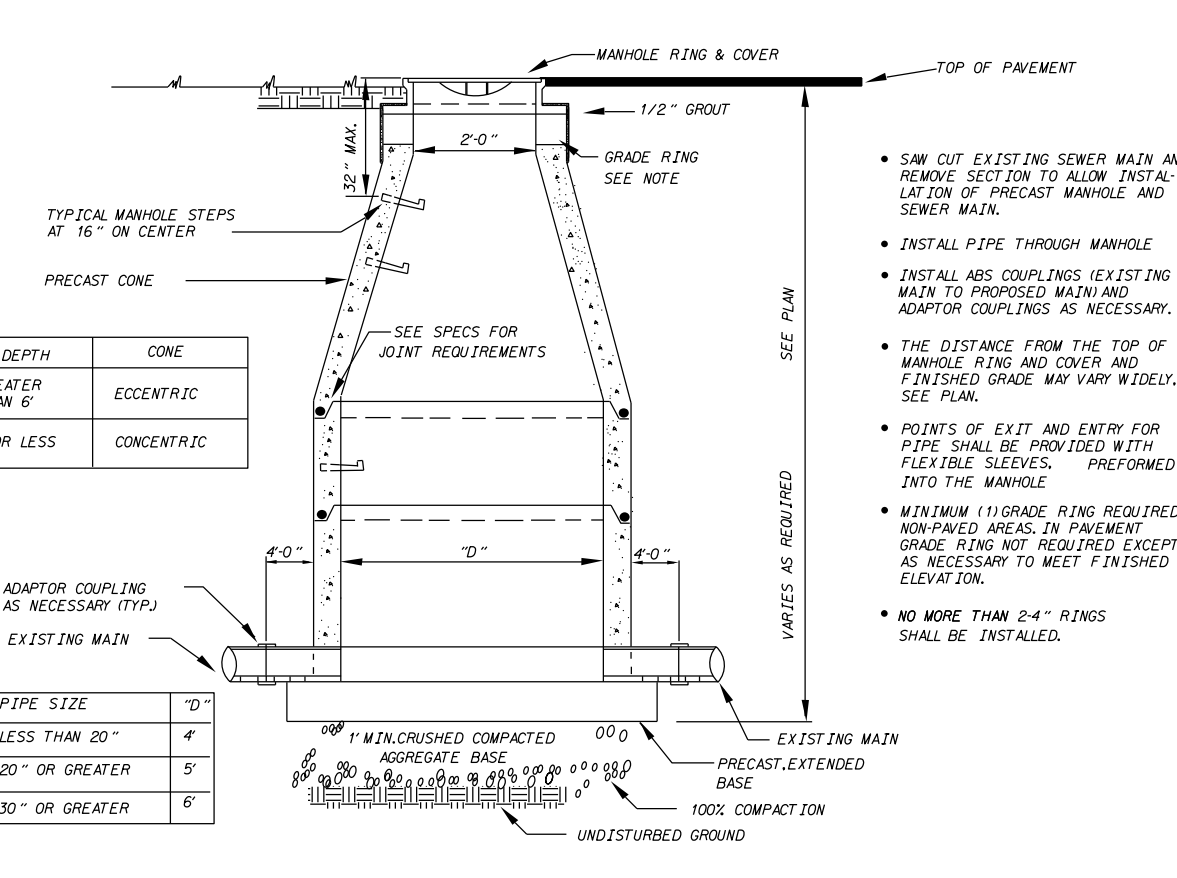


7 TYPICAL MANHOLE DETAIL (MANHOLES LESS THAN 12' IN DEPTH)
UC-3a

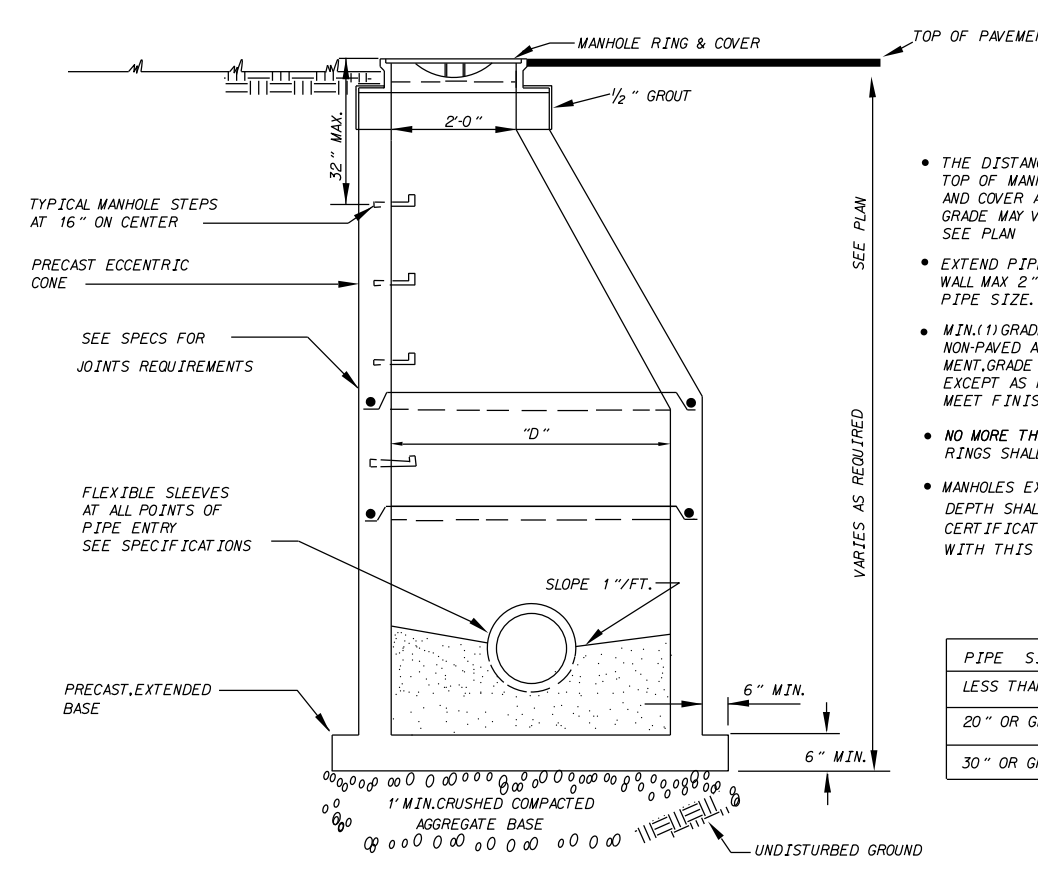


NOTE:
 ACCURATELY SHAPE THE INVERTS TO A SMOOTH SEMI-CIRCLE CONFORMING TO THE INSIDE CONTOUR OF THE ADJACENT SEWER SECTIONS, ALL ENTERING BRANCHES AND CHANGES IN DIRECTIONS SHALL BE FORMED BY A CIRCULAR CURVE IN THE INVERT OF AS LARGE A RADIUS AS THE SIZE OF MANHOLE WILL PERMIT. CHANGES IN SIZE AND GRADE OF THE CHANNELS SHALL BE MADE GRADUALLY AND EVENLY. THE INVERT CHANNELS SHALL BE FORMED DIRECTLY IN THE CONCRETE OF THE MANHOLE BASE, OR SHALL BE BUILT UP WITH BRICKS AND MORTAR. THE FLOOR OF THE MANHOLE OUTSIDE THE CHANNELS SHALL BE SMOOTH AND SHALL SLOPE TOWARD THE CHANNELS NOT LESS THAN ONE INCH PER FOOT NOR MORE THAN TWO INCHES PER FOOT.

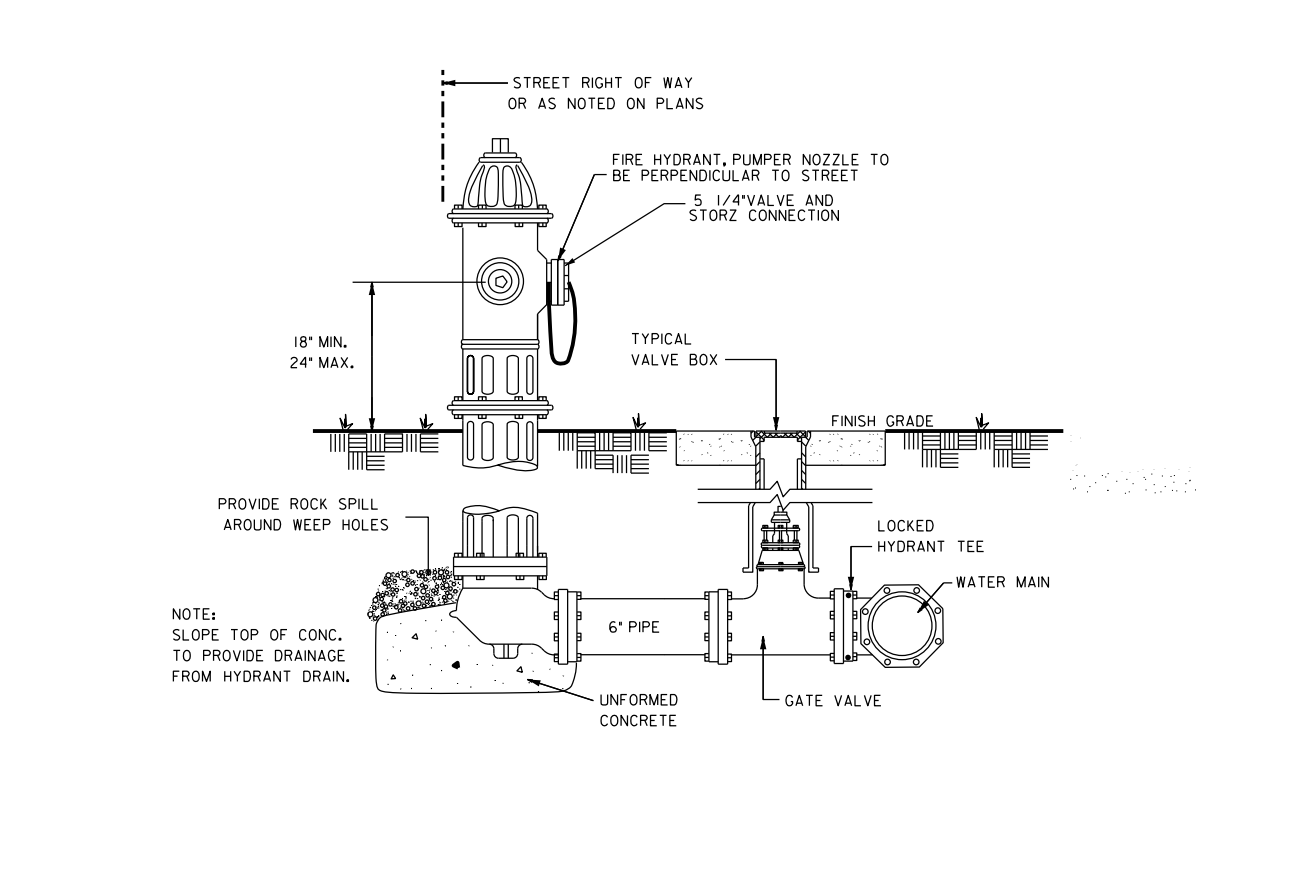
8 MANHOLE INVERT DETAIL
UC-3a



9 PRECAST MANHOLE INSTALLATION OVER EXISTING SEWER MAIN
UC-3a

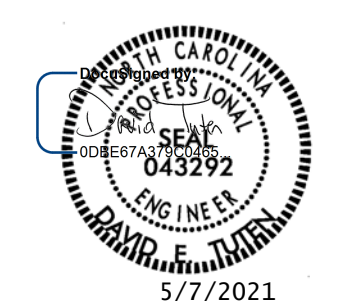


10 TYPICAL MANHOLE DETAIL (MANHOLES OVER 12' IN DEPTH)
UC-3a



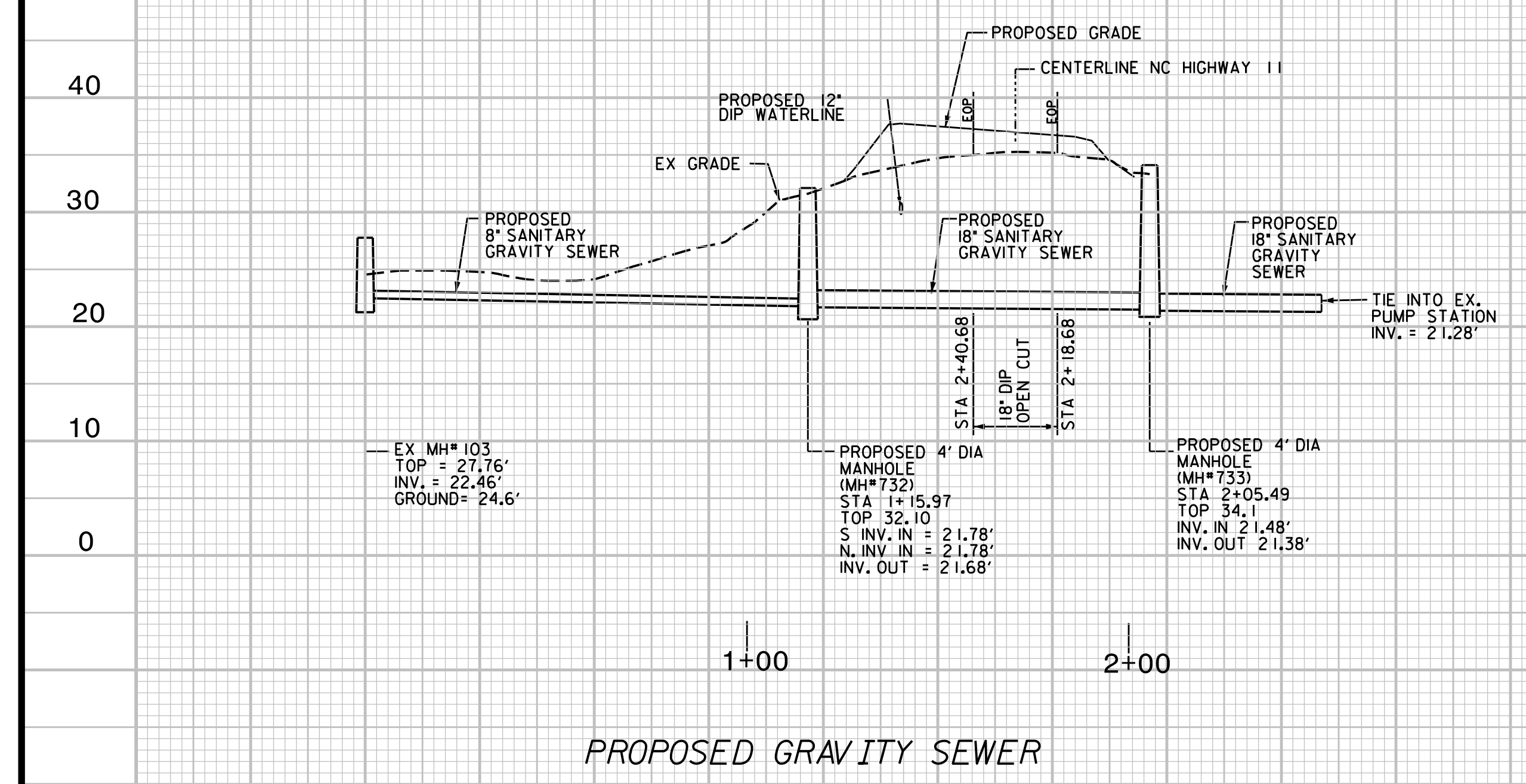
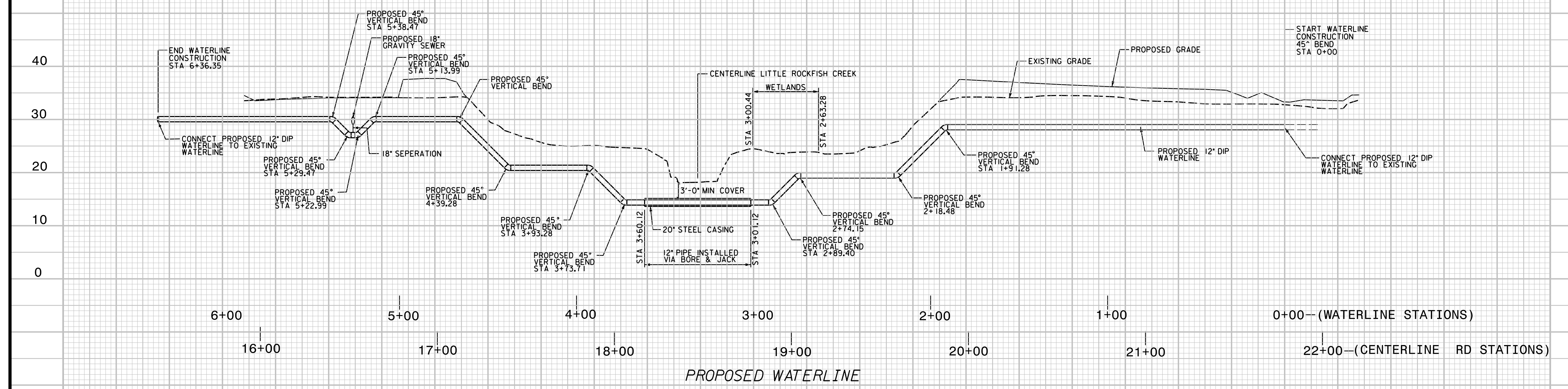
11 FIRE HYDRANT INSTALLATION DETAIL
UC-3a

PROJECT REFERENCE NO.	SHEET NO.
BR-0017	UC-5
DESIGNED BY:	LES
DRAWN BY:	LHJ
CHECKED BY:	DET
APPROVED BY:	DET
REVISED:	
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PHONE: (919) 707-6690	
FAX: (919) 250-4151	



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SCALE
HORIZONTAL: 1"=30'
VERTICAL: 1"=10'