

TIP PROJECT: B-3656

CONTRACT: C202566

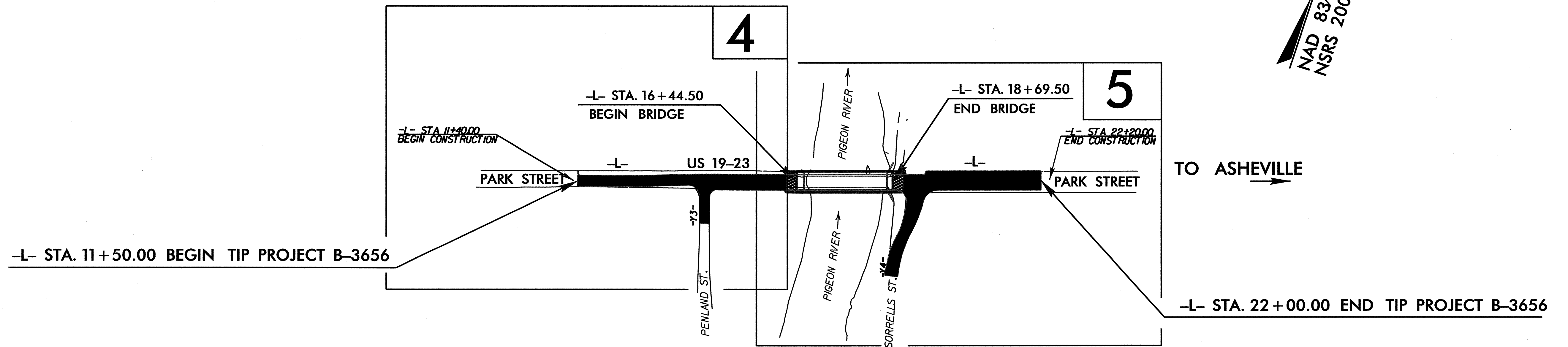
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**HAYWOOD COUNTY**


LOCATION: BRIDGE 419 ON US 19-23 OVER PIGEON RIVER  
IN CANTON

TYPE OF WORK: UTILITY CONSTRUCTION

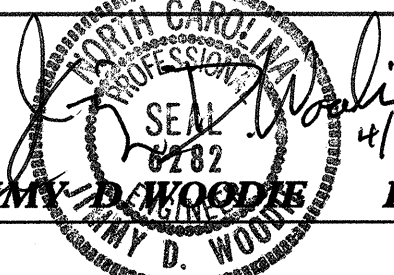
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.
N.C.	B-3656	UC-1
DESCRIPTION		



PREPARED BY

**Municipal Services**  **Engineering Company, P.A.**

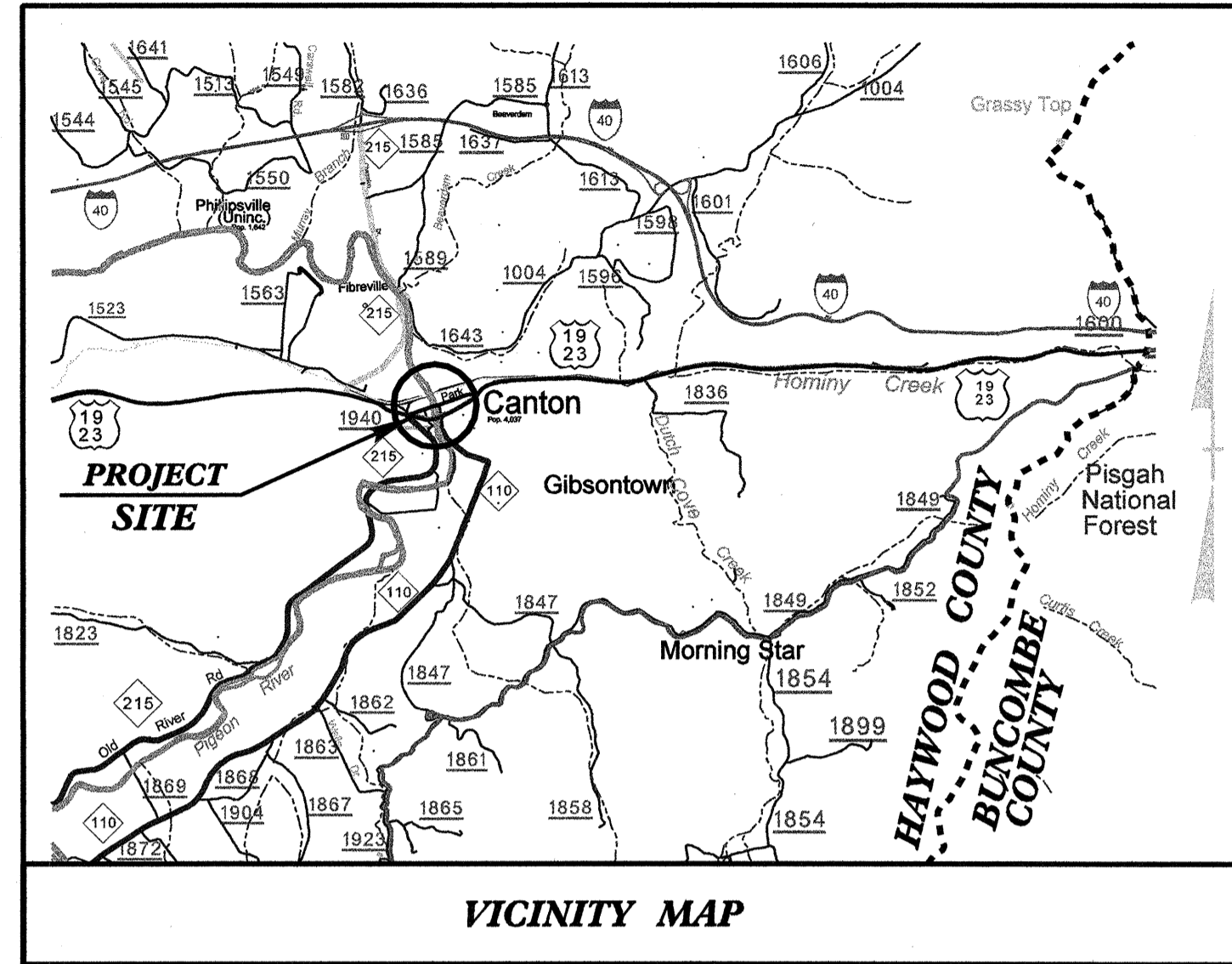
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393  
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767  
P.O. BOX 276 MOREHEAD CITY, N.C. 28557 (252) 726-9481

UTILITY DESIGN ENGINEER  **JIMMY D. WOOD** P.E. 4/12/2011

TIP PROJECT: B-3656

CONTRACT:

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.
N.C.	B-3656	UC-2
DESCRIPTION		
5/19/2011 REV.1 REMOVED ALL REFERENCES TO PLANTING AND SEEDING		



THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF CANTON

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**HAYWOOD COUNTY**

LOCATION: BRIDGE 419 ON US 19-23 OVER PIGEON RIVER  
IN CANTON

TYPE OF WORK: UTILITY CONSTRUCTION

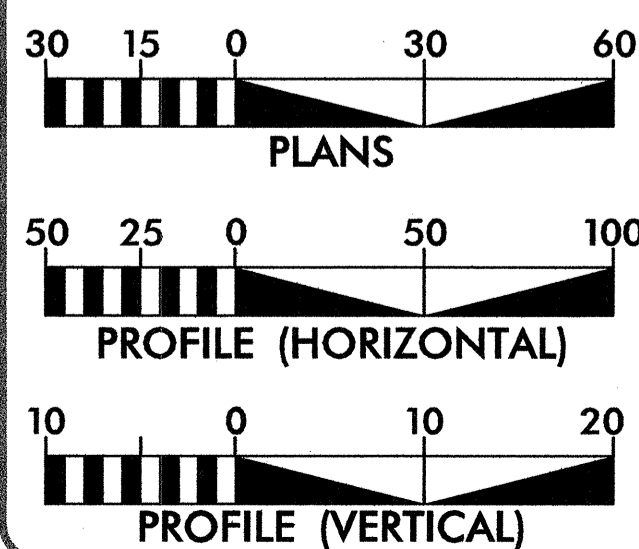
**GENERAL NOTES**

1. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY SHOULD ANY FIELD CONDITIONS BE ENCOUNTERED THAT VARY FROM THE INFORMATION PROVIDED IN THE CONTRACT DOCUMENTS.
2. LOCATIONS OF SHOWN UTILITIES ARE APPROXIMATE. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING EXACT LOCATION AND ELEVATION OF UTILITIES PRIOR TO EXCAVATION FOR THE PIPELINE.
3. BURIED TELEPHONE CABLES (FIBER OPTICS AND CONVENTIONAL) ARE KNOWN TO VARY DUE TO INSTALLATION TECHNIQUES. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR COORDINATING WITH THE UTILITY COMPANY TO DETERMINE SPECIFIC CABLE LOCATIONS. THE ENGINEER MUST BE NOTIFIED OF THE EXACT LOCATIONS AND ELEVATIONS OF THE CABLES WHEN IT APPEARS THAT MODIFICATIONS TO THE PIPELINE ALIGNMENT MAY BE NECESSARY. NOTIFICATION SHALL BE MADE WELL IN ADVANCE OF THE TRENCH EXCAVATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH LOCATING OR REPAIRING BURIED CABLES ALONG THE PIPELINE ROUTE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE LOCAL POWER COMPANY ANY ADDITIONAL SUPPORT OF EXISTING POWER POLES AS REQUIRED FOR THE PIPELINE TRENCH EXCAVATION. ALL COSTS OF SUCH WORK SHALL BE PAID BY THE CONTRACTOR.
5. MAINTAIN 1'-6" MINIMUM CLEARANCE BETWEEN ALL EXISTING PIPES CROSSED, UNLESS OTHERWISE NOTED.
6. EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE INSTALLED ACCORDING TO THE CONTRACT DOCUMENTS AND AS DIRECTED BY THE ENGINEER. ALL DEVICES SHALL BE MAINTAINED SUCH THAT THEY FUNCTION AS INTENDED.
7. PROVIDE TEMPORARY LINER (STRAW AND NETTING) FOR ALL DISTURBED DITCHLINES GREATER THAN 3% SLOPE OR AS NOTED ON THE PLANS.
8. THE CONTRACTOR SHALL REMOVE AND REINSTALL ALL FENCE, MAILBOXES, ETC. AS REQUIRED FOR PIPE INSTALLATION. ANY ADDITIONAL FENCE MATERIALS REQUIRED SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
9. PLACED RIP-RAP SHALL HAVE A MINIMUM DEPTH OF 18 INCHES AND SHALL HAVE A LAYER OF SYNTHETIC GEOTEXTILE FILTER FABRIC PLACED BETWEEN THE SOIL AND STONE.
10. REFER TO GENERAL SPECIFICATIONS FOR TESTING OF SEWER LINES AND ALL APPLICABLE PROJECT SPECIFICATIONS.
11. ALL WORK TO COMPLY WITH NCDENR, COUNTY OF HAYWOOD, AND TOWN OF CANTON REGULATIONS AND CODES, AND SHALL BE CONSISTANT WITH NCDOT REQUIREMENTS.
12. ALL PAVEMENT REPAIRS SHALL DONE IN ACCORDANCE WITH N.C. STANDARD DRAWING NO. 654.01

**CONSTRUCTION SEQUENCE**

1. CLEAR AREAS NECESSARY TO CONSTRUCT TEMPORARY EROSION DEVICES AROUND THE SITE TO CONTAIN ALL RUNOFF DUE TO CONSTRUCTION.
2. INSTALL ALL EROSION CONTROL DEVICES. ANY DITCHES DISTURBED DURING CONSTRUCTION SHALL BE RETURNED TO EXISTING CONDITION.
3. COMPLETE CONSTRUCTION.
4. MAINTAIN ALL EROSION CONTROL DEVICES UNTIL PERMANENT VEGETATION HAS BEEN ESTABLISHED.
5. APPLY STRAW AND ASPHALT TACK TO ALL SLOPES 3:1 OR GREATER.
6. ANY AND ALL LAND DISTURBED DURING ONE WORK DAY SHALL BE STABILIZED BY THE END OF THAT SAME WORK DAY.

**GRAPHIC SCALES**



**INDEX OF SHEETS**

SHEET No.	DESCRIPTION
UC-1	TITLE SHEET
UC-2	GENERAL NOTES
UC-3	UC PLAN SHEET
UC-4	UC PROFILE SHEET
UC-5, UC-6	UC DETAILS


**UTILITY OWNERS ON PROJECT**

- (1.) TOWN OF CANTON (WATER)
- (2.) TOWN OF CANTON (SEWER)

PREPARED BY

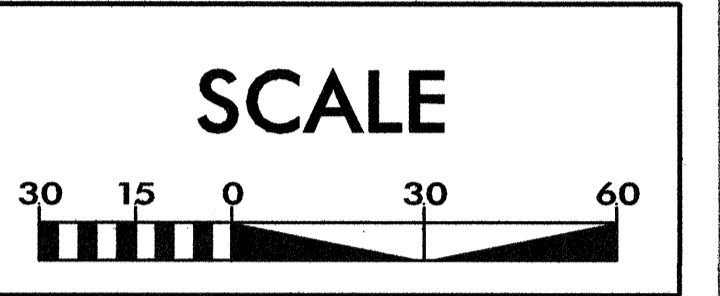
Municipal Services  Engineering Company, P.A.

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P.O. BOX 276 MOREHEAD CITY, N.C. 28557 (252) 726-9481

UTILITY DESIGN ENGINEER  JIMMY D. WOODIE P.E.



UTILITY CONSTRUCTION



SEE SHEET UC-4 FOR PROFILE OF SEWER LINE  
SEE SHEET UC-4 FOR PROFILE OF WATER LINE

PROP. 8" VALVE

PROP. 17.6' OF 8" D.I. R.J. SEWER LINE

PROP. WATER TIGHT MANHOLE 'A' STA 0+00.0 PROFILE I

PROP. 90° BEND

PROP. 12" X 10" REDUCER

PROP. 90° BEND

PROP. 10" VALVE

PROP. 33.2' OF 10" D.I. R.J. WATERLINE

SEE INSET A

PROPOSED 10" X 10" TEE

PROP. 10" X 8" REDUCER

PROP. 45° VERTICAL BEND

PROP. 90° VERTICAL BEND SEE PROFILE I ON SHEET UC-4

PROP. 10" X 8" REDUCER

6' X 4' VALVE VAULT SEE PROFILE AND DETAIL ON UC-4

PROP. 90° BEND

SEE INSET B FOR ADDITIONAL NOTES

DIRECTIONAL BORE FOR SEWER LINE BEGINS HERE STA 3+72.32

PROP. 156.49' OF 8" D.I. R.J. SEWER LINE

ABANDON EXIST 8" FORCE MAIN SEWER

5' MIN. BETWEEN WATER AND SEWER

PROP. 18.9' OF 10" D.I. R.J. WATERLINE

-L- STA 22+00.00 END TIP PROJECT B

PROP. 347.4' OF 12" SDR II HDPE WATER LINE

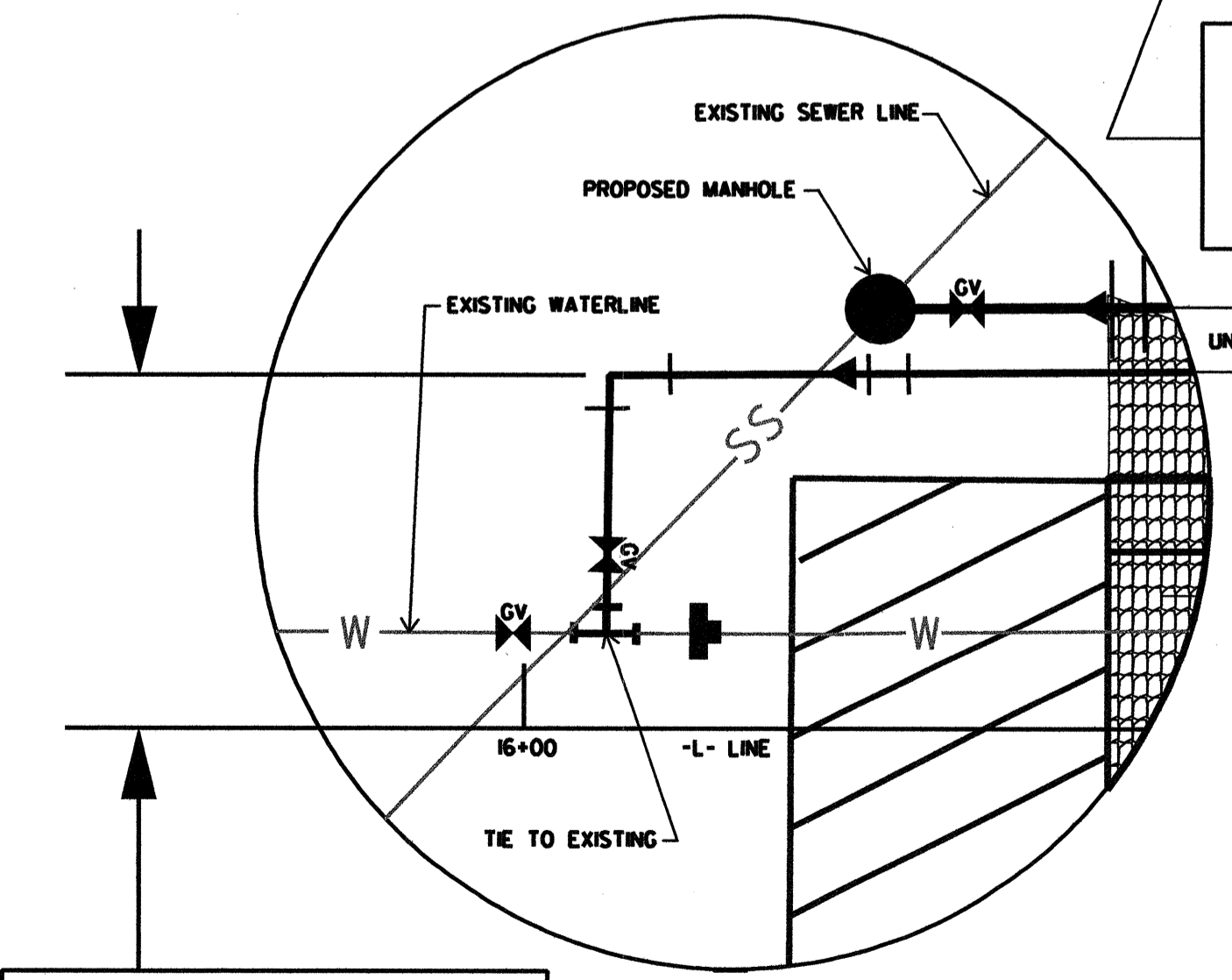
PROP. 351.4' OF 10" SDR II HDPE SEWER LINE

TEMP. CONSTRUCTION ENTRANCE

PROP. 12" X 10" REDUCER

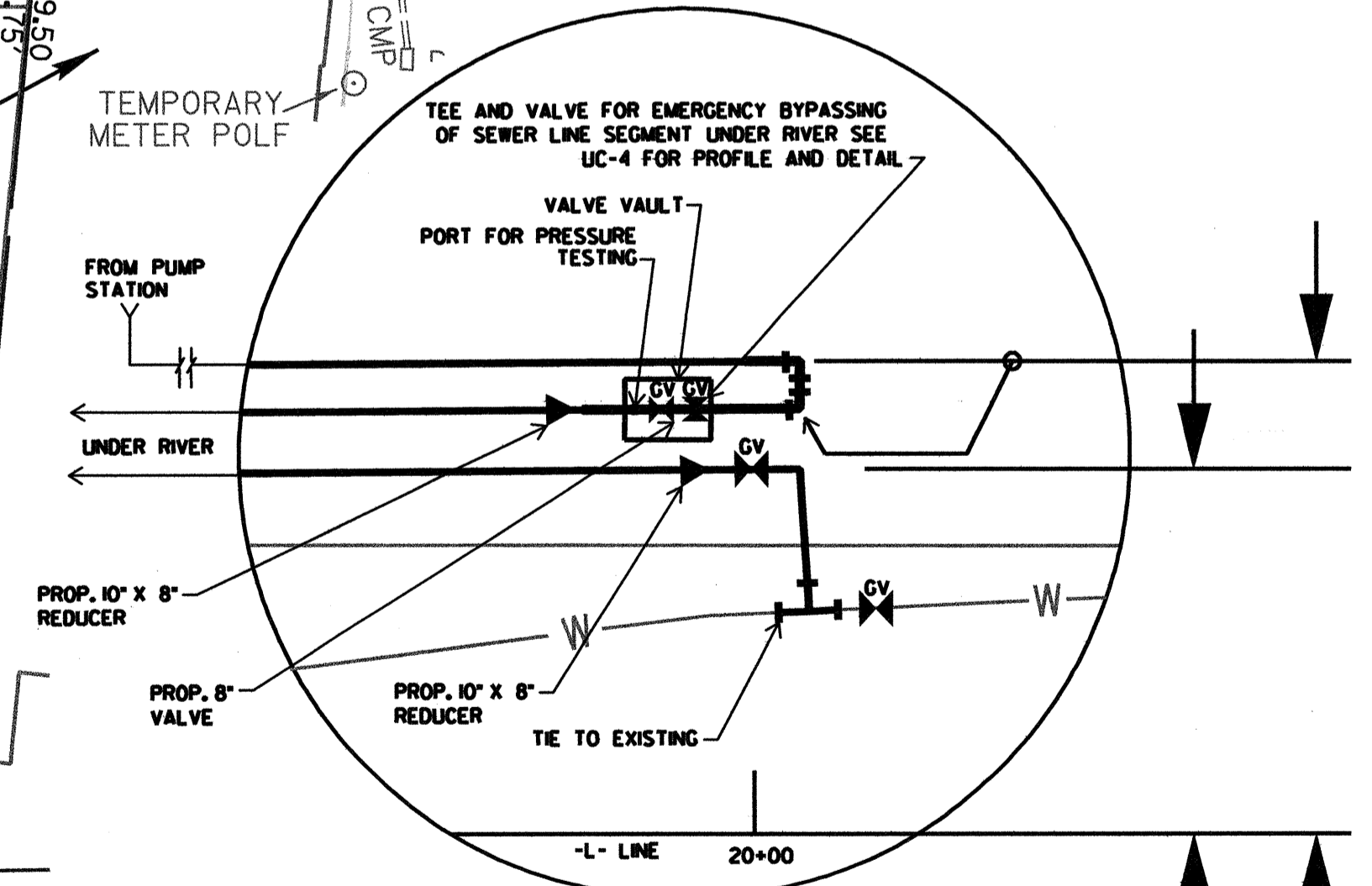
PROPOSED 10" X 10" TEE

PROP. 10" VALVE



90° BEND @ 27.17' PERPENDICULAR TO -L- LINE STATION 16+06.52

INSET A

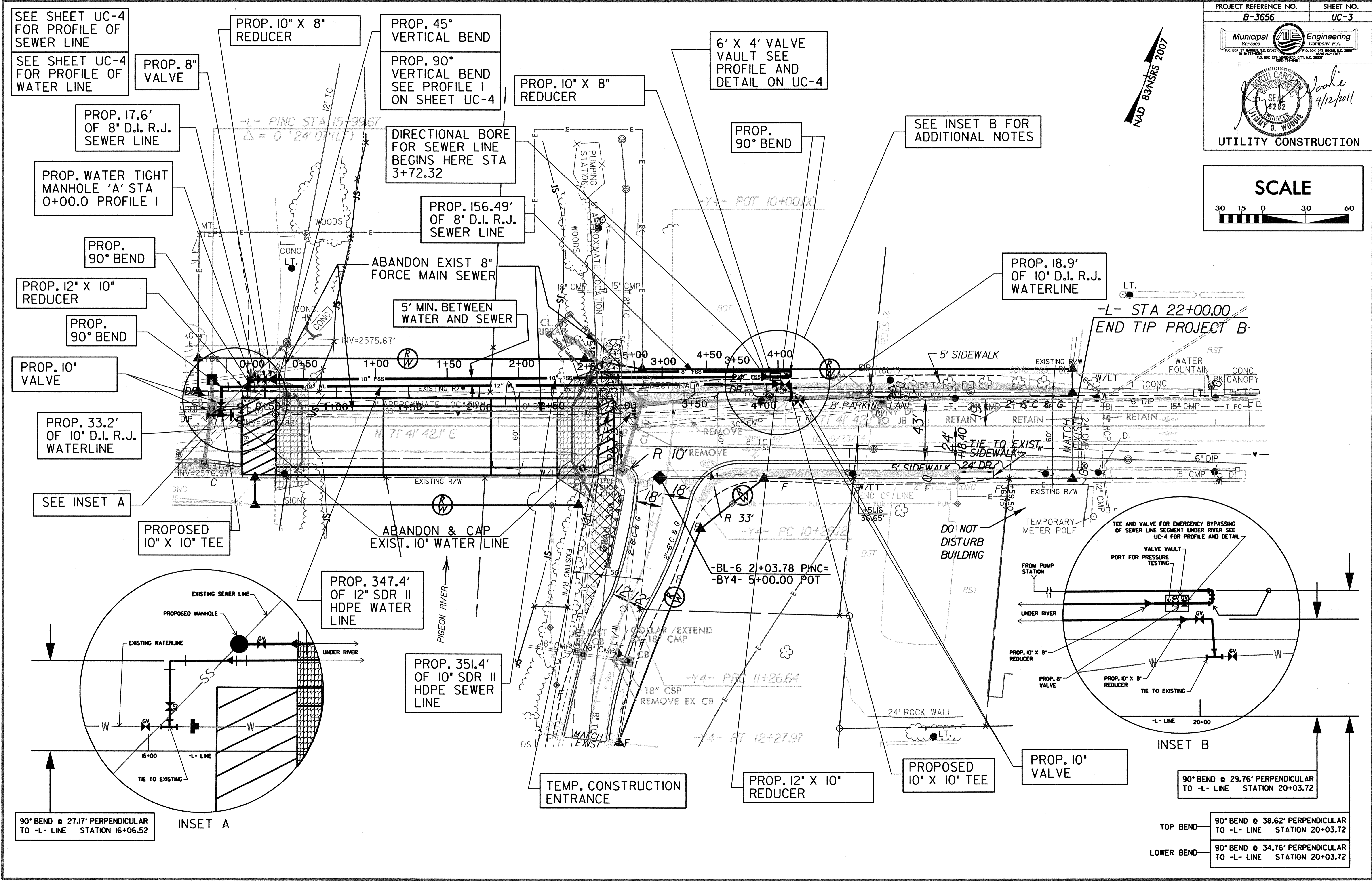


INSET B

90° BEND @ 29.76' PERPENDICULAR TO -L- LINE STATION 20+03.72

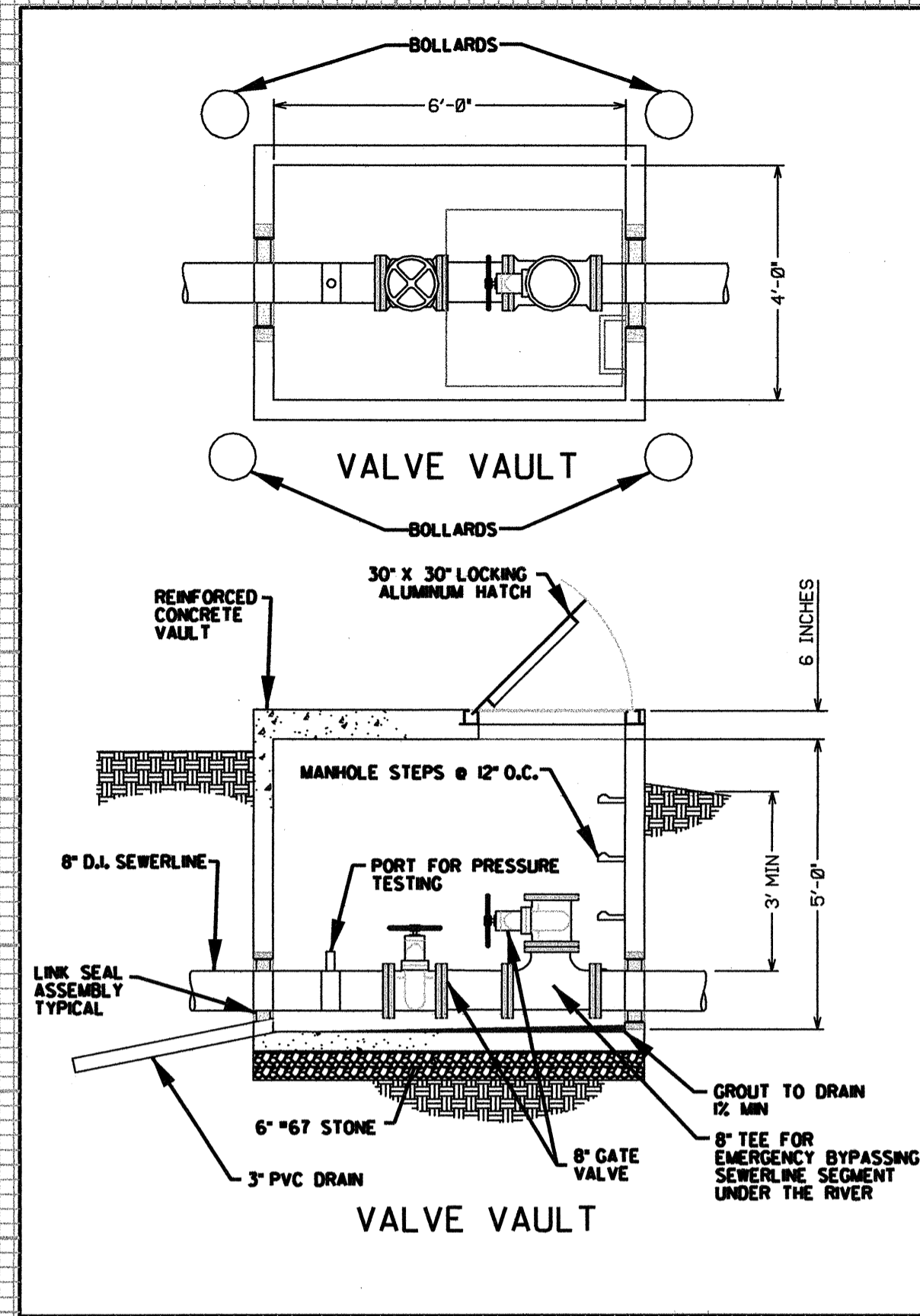
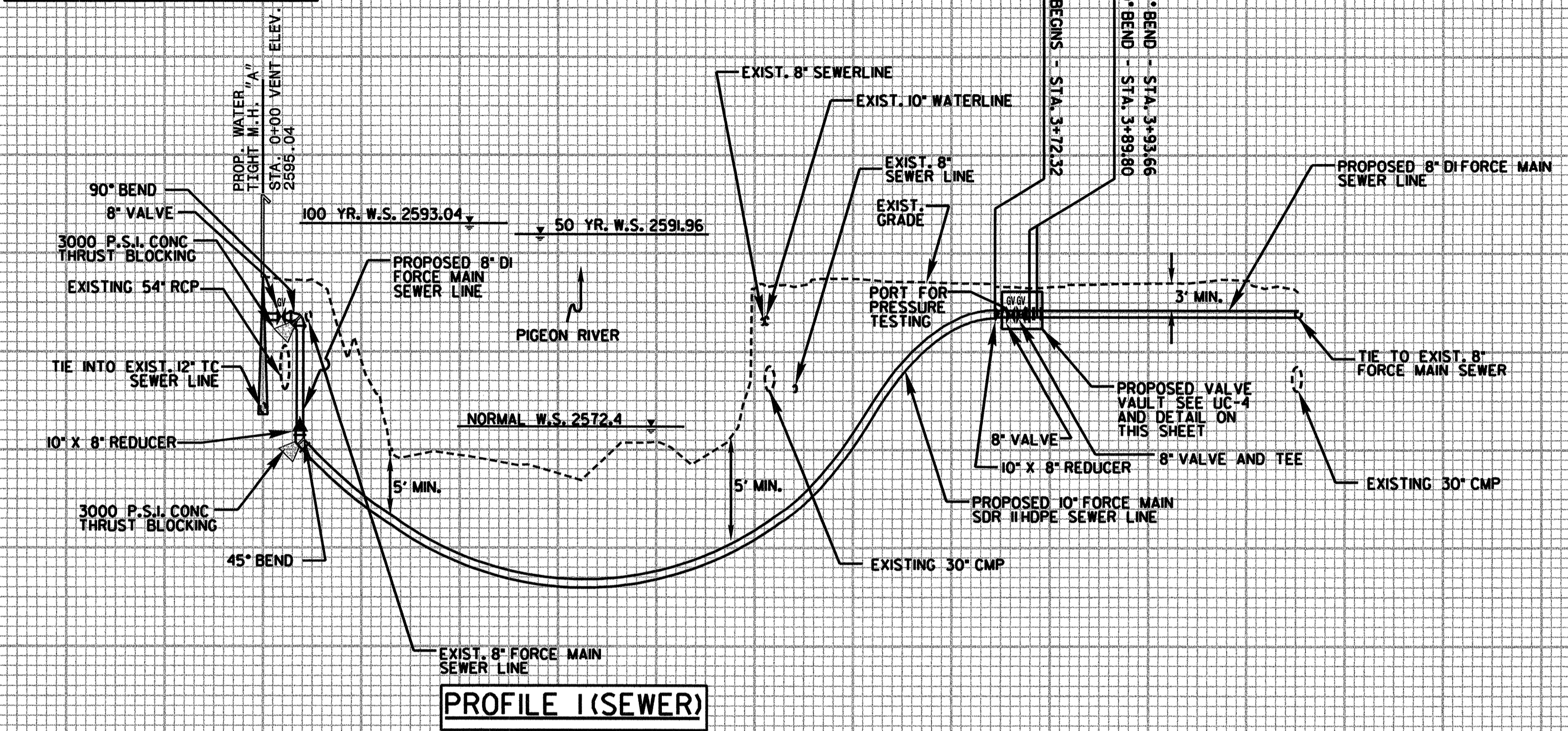
TOP BEND 90° BEND @ 38.62' PERPENDICULAR TO -L- LINE STATION 20+03.72

LOWER BEND 90° BEND @ 34.76' PERPENDICULAR TO -L- LINE STATION 20+03.72



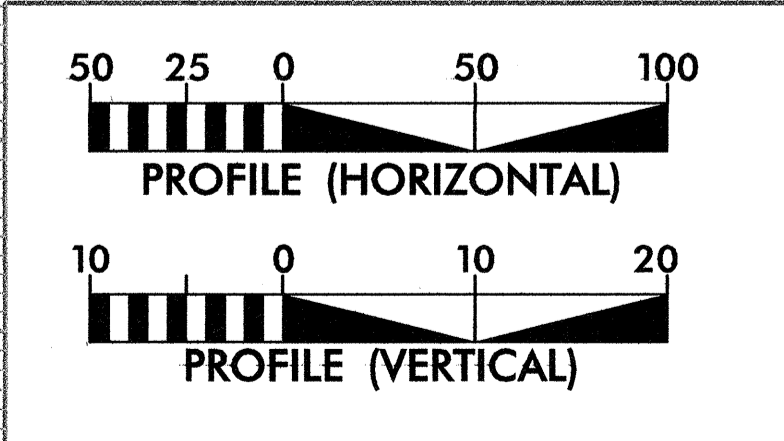
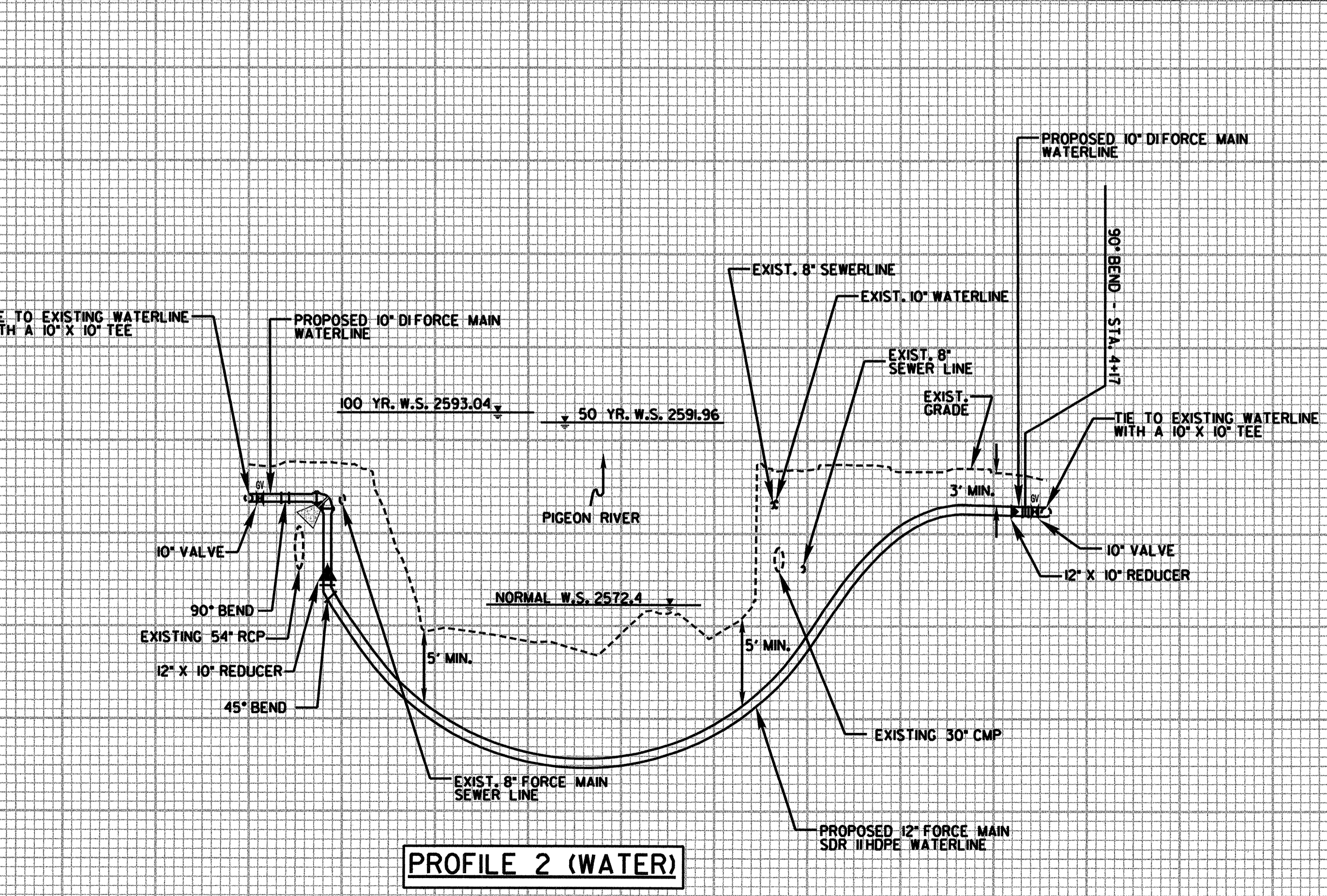
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2,560  
2,550  
2,540

NOTE:  
ONCE BORE IS COMPLETED & FORCE MAIN SEWER IS RECONNECTED IT WILL BE NECESSARY TO CLEAN & WASH THE REMAINDER OF THE ABANDONED FORCE MAIN SEWER OF ANY DEBRIS.



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2,590  
2,580  
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2,550  
2,540

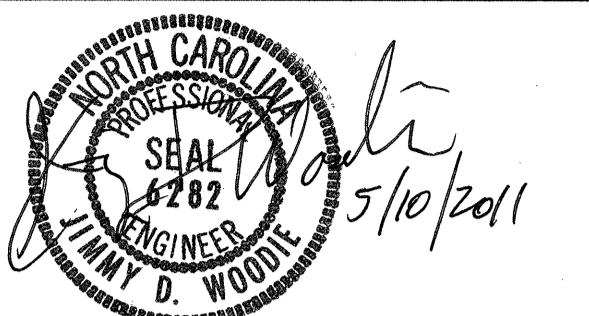
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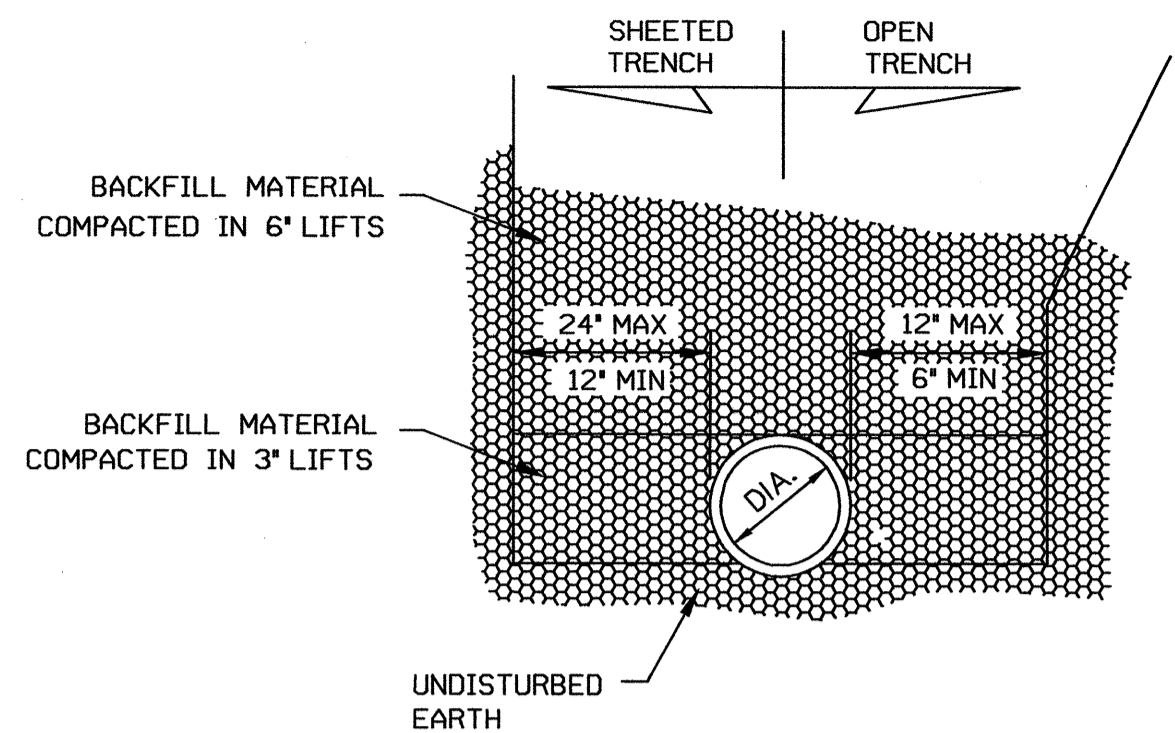
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0 1 2 3 4 5 6 7 8 9 10 11 12

0 1 2 3 4 5 6 7 8 9 10 11 12



UTILITY CONSTRUCTION



TYPICAL TRENCH DETAIL

MAXIMUM TRENCH WIDTH AT TOP OF PIPE

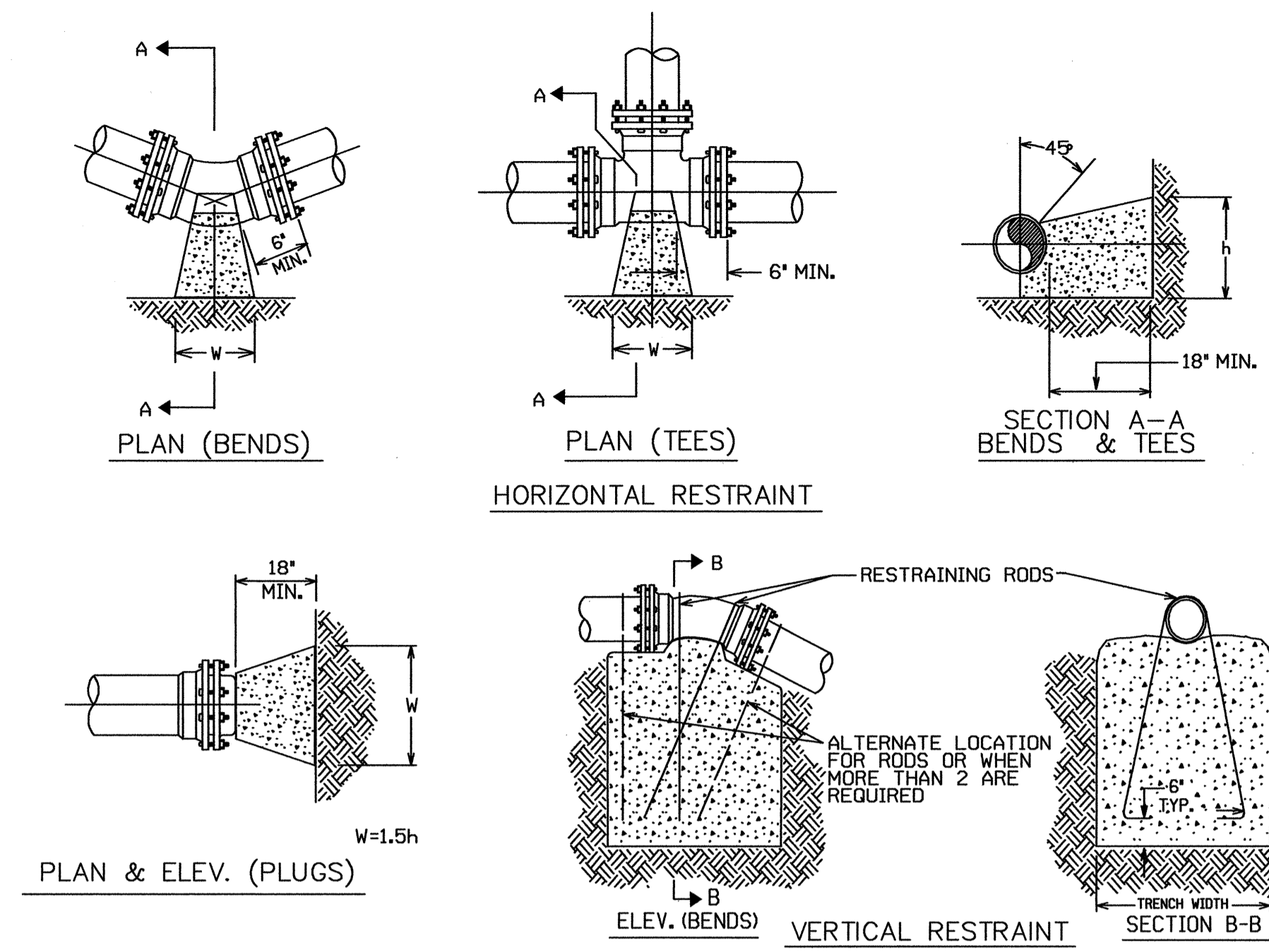
NOTES:

CONSTRUCTION OF TRENCHES SHALL BE IN ACCORDANCE WITH THE LATEST OSHA REGULATIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE REGULATIONS.

NO BOULDERS OR STONES IN EXCESS OF 4" IN SIZE SHALL BE USED AS PART OF THE INITIAL BACKFILL.

PIPE BEDDING MATERIAL SHALL BE # 57 WASHED STONE.

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		



THRUST RESTRAINT FOR PIPE LINES

BASED ON TEST PRESSURE OF 200 P.S.I.

HORIZONTAL RESTRAINT (ALL AREAS GIVEN ARE IN SQUARE FEET)										VERTICAL RESTRAINT (ALL VOLUMES GIVEN ARE IN CUBIC YARDS)**						
PIPE SIZE	DEGREE OF BEND	LBS. STATIC THRUST *	ALLOWABLE SOIL BEARING (PSF)								PIPE SIZE	RESTRAINING RODS NO. REQ'D	DIA.	DEGREE OF BEND		
			1000	2000	3000	4000	5000	6000	7000	8000				11/4°	22 1/2°	45°
4"	11/4°	616	1	1	1	1	1	1	1	1	4"	2	1/2"	0.25	0.50	0.75
	22 1/2°	1,226	1	1	1	1	1	1	1	1	6"	2	1/2"	0.50	1.0	1.75
	45°	2,405	2	2	2	2	2	2	2	2	8"	2	5/8"	0.75	1.50	3.0
	90°	4,444	4	4	4	4	4	4	4	4	12"	2	7/8"	1.75	3.25	6.50
	TEE/PLUG	3,143	3	2	1	1	1	1	1	1	14"	4	5/8"	2.25	4.50	8.75
6"	11/4°	1,385	2	1	1	1	1	1	1	1	4"	2	1/2"	0.25	0.50	0.75
	22 1/2°	2,758	2	2	2	2	2	2	2	2	6"	2	1/2"	0.50	1.0	1.75
	45°	5,409	5	4	2	2	2	2	2	2	8"	2	5/8"	0.75	1.50	3.0
	90°	9,999	10	5	3	3	2	2	2	2	10"	2	3/4"	1.25	2.25	4.50
	TEE/PLUG	7,068	7	4	3	2	2	1	1	1	12"	2	7/8"	1.75	3.25	6.50
8"	11/4°	2,424	3	1	1	1	1	1	1	1	4"	2	1/2"	0.25	0.50	0.75
	22 1/2°	4,904	5	3	2	2	2	2	2	2	6"	2	1/2"	0.50	1.0	1.75
	45°	9,619	10	5	3	3	2	2	2	2	8"	2	5/8"	0.75	1.50	3.0
	90°	17,773	18	9	6	4	4	3	3	3	10"	2	3/4"	1.25	2.25	4.50
	TEE/PLUG	12,568	13	6	4	3	3	2	2	2	12"	2	7/8"	1.75	3.25	6.50
10"	11/4°	3,846	4	2	2	1	1	1	1	1	4"	2	1/2"	0.25	0.50	0.75
	22 1/2°	7,661	8	4	3	2	2	2	2	2	6"	2	1/2"	0.50	1.0	1.75
	45°	15,028	15	8	5	4	3	3	3	3	8"	2	5/8"	0.75	1.50	3.0
	90°	27,768	28	14	9	7	6	5	4	4	10"	2	3/4"	1.25	2.25	4.50
	TEE/PLUG	19,635	20	10	7	5	4	3	3	3	12"	2	7/8"	1.75	3.25	6.50
12"	11/4°	5,543	6	3	2	2	2	1	1	1	4"	2	1/2"	0.25	0.50	0.75
	22 1/2°	11,032	11	6	4	3	2	2	2	2	6"	2	1/2"	0.50	1.0	1.75
	45°	21,641	22	11	7	5	4	4	3	3	8"	2	5/8"	0.75	1.50	3.0
	90°	39,987	40	20	13	10	8	7	6	5	10"	2	3/4"	1.25	2.25	4.50
	TEE/PLUG	28,274	28	14	9	7	6	5	4	4	12"	2	7/8"	1.75	3.25	6.50
14"	11/4°	7,544	8	4	3	2	2	2	1	1	4"	2	1/2"	0.25	0.50	0.75
	22 1/2°	15,016	15	8	5	4	3	3	2	2	6"	2	1/2"	0.50	1.0	1.75
	45°	29,455	29	15	10	7	6	5	4	4	8"	2	5/8"	0.75	1.50	3.0
	90°	54,426	54	27	18	14	11	9	8	7	10"	2	3/4"	1.25	2.25	4.50
	TEE/PLUG	38,495	38	19	13	10	8	6	5	5	12"	2	7/8"	1.75	3.25	6.50
16"	11/4°	9,854	10	5	3	3	2	2	2	2	4"	2	1/2"	0.25	0.50	0.75
	22 1/2°	19,612	20	10	7	5	4	3	3	3	6"	2	1/2"	0.50	1.0	1.75
	45°	38,471	38	17	13	10	8	6	5	5	8"	2	5/8"	0.75	1.50	3.0
	90°	71,085	71	36	24	18	14	12	10	9	10"	2	3/4"	1.25	2.25	4.50
	TEE/PLUG	50,265	50	25	17	13	10	8	7	6	12"	2	7/8"	1.75	3.25	6.50

\* INCLUDES 1.25 SAFETY FACTOR

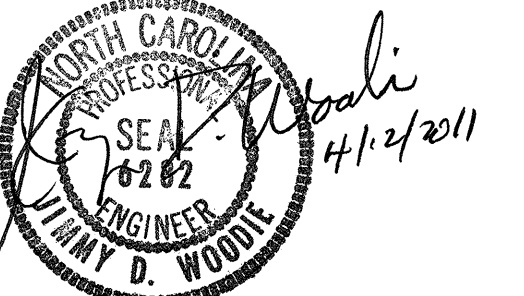
GENERAL NOTES:

1. CONCRETE SHALL BE CLASS "B".
2. CONCRETE SHALL NOT CONTACT BOLTS ENDS OF MECHANICAL JOINT FITTINGS.
3. CONSULT WITH ENGINEER FOR CONCRETE REQUIREMENTS ON MAINS LARGER THAN 16 INCHES. (FOR VERTICAL & HORIZONTAL BENDS)
4. ALLOWABLE SOIL BEARING SHALL BE DETERMINED BY THE ENGINEER.

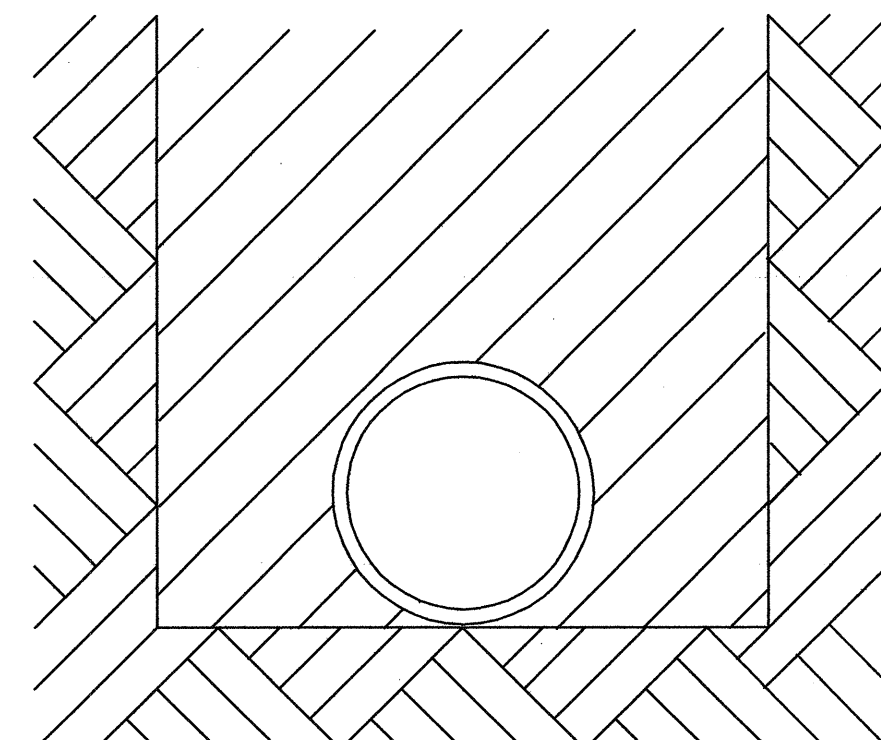
REVISIONS	
NO.	DESCRIPTION

THRUST RESTRAINT FOR WATER MAINS

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



UTILITY CONSTRUCTION



PIPE BEDDED IN FLAT-BOTTOM TRENCH. TRENCH BACKFILLED IN LOOSE 6 INCH 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 APPROX. 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

TYPE "2"  
(BEDDING FOR D.I. PIPE)

T.I.P. NO.	SHEET NO.
B-3656	UO-1

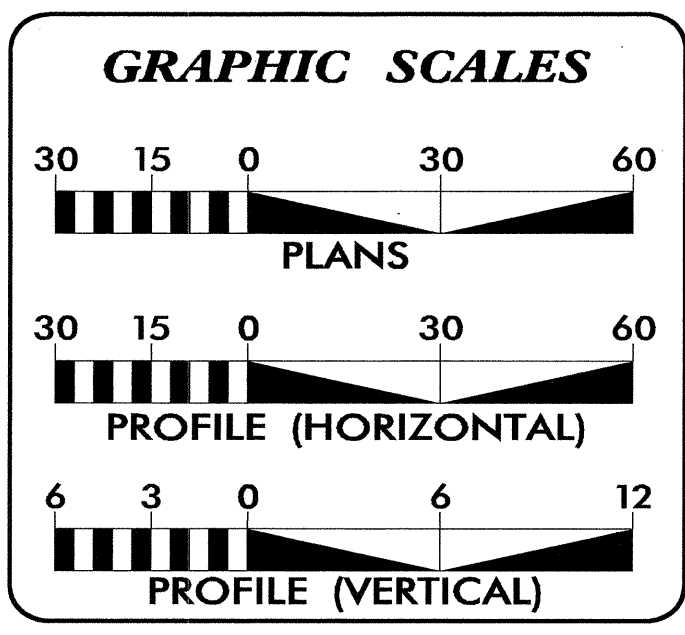
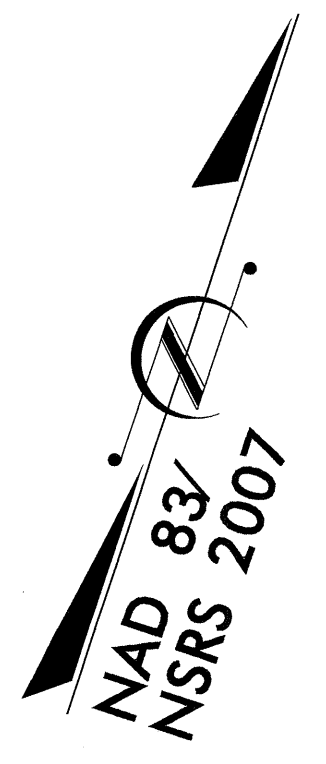
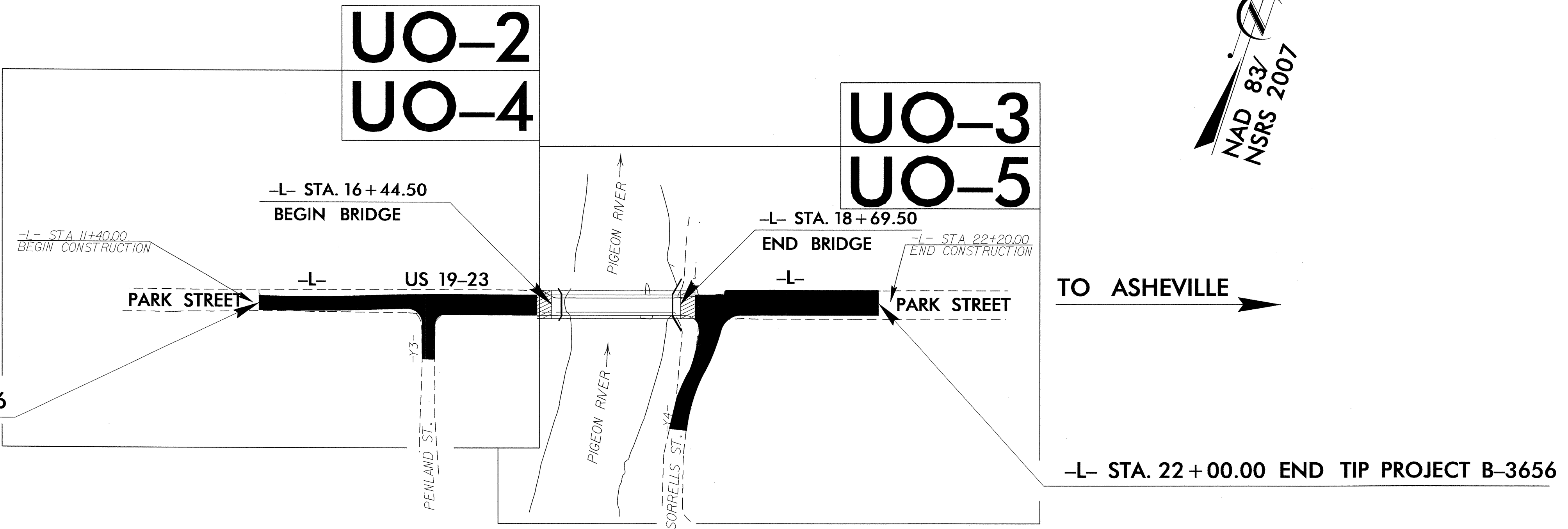
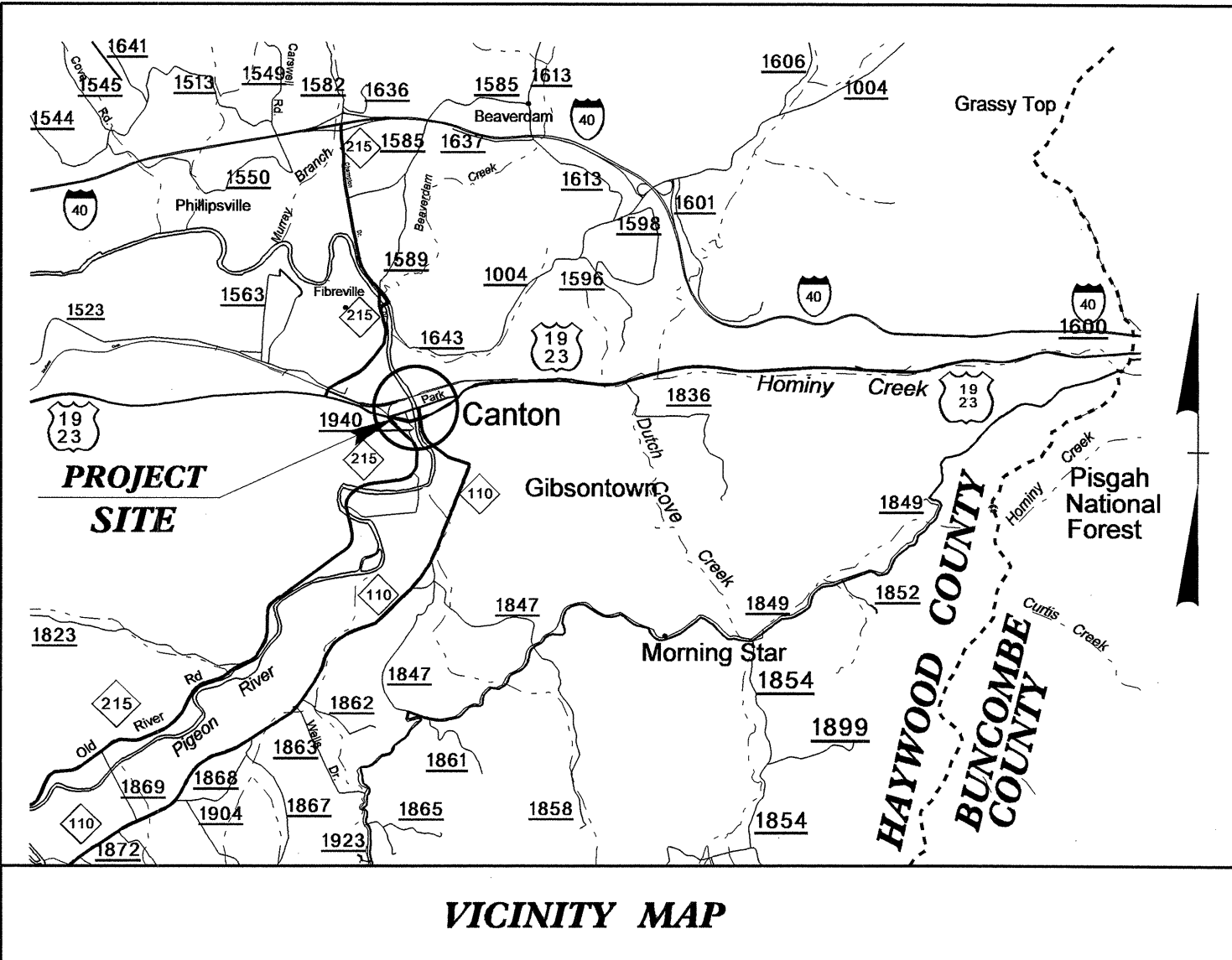
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**UTILITIES BY OTHERS PLANS  
HAYWOOD COUNTY**

**LOCATION: BRIDGE 419 ON US 19-23 OVER PIGEON RIVER  
IN CANTON**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE**

**TIP PROJECT: B-3656**



**INDEX OF SHEETS**

SHEET NO.	DESCRIPTION
UO-1	TITLE SHEET
UO-2 THRU UO-3	PRE CONSTRUCTION UBO PLAN SHEETS
UO-4 THRU UO-5	POST CONSTRUCTION UBO PLAN SHEETS

**UTILITY OWNERS ON PROJECT**

- PROGRESS ENERGY
- AT&T
- PSNC ENERGY
- TOWN OF CANTON
- CHARTER COMMUNICATIONS

PREPARED IN THE OFFICE OF:  
**DIVISION OF HIGHWAYS  
UTILITIES ENGINEERING  
SECTION**

1591 MAIL SERVICES CENTER  
RALEIGH, NC 27699-1591  
PHONE (919) 250-4128  
FAX (919) 250-4119

<b>Roger Worthington, P.E.</b>	UTILITIES SECTION ENGINEER
<b>R.B. Wilkins, P.E.</b>	UTILITIES SQUAD LEADER PROJECT ENGINEER
<b>Jong-Tae Yoon</b>	UTILITIES PROJECT DESIGNER

14-APR-2011 09:48  
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\$\$\$\$\$USER\$NAME\$\$\$\$\$

**UTILITIES BY OTHERS**

NOTE:  
 ALL PROPOSED UTILITY WORK  
 SHOWN ON THIS SHEET WILL  
 BE DONE BY OTHERS

NAD 83 NSRS 2007

-L-

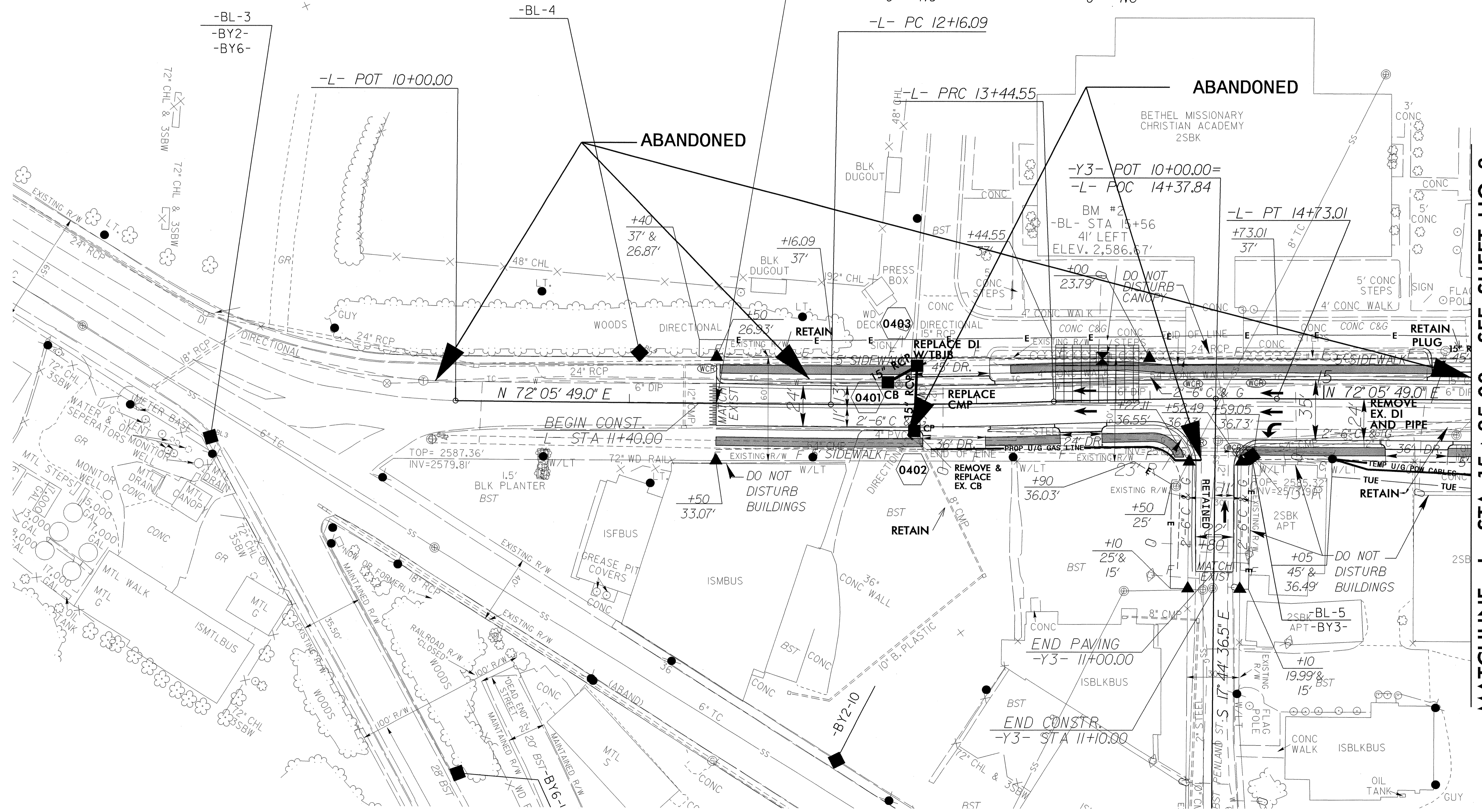
PI Sta 12+80.33 $\Delta = 2^\circ 27' 12.4''$ (LT) D = 1'54' 35.5" L = 128.46' T = 64.24' R = 3,000.00' e = NC	PI Sta 14+08.79 $\Delta = 2^\circ 27' 12.4''$ (RT) D = 1'54' 35.5" L = 128.46' T = 64.24' R = 3,000.00' e = NC
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-L- POT STA 11+50.00  
 BEGIN TIP PROJECT B-3656

-L- PC 12+16.09

**ABANDONED**

**ABANDONED**



**MATCHLINE -L- STA. 15 + 85.00 SEE SHEET UO-3**

5/14/99

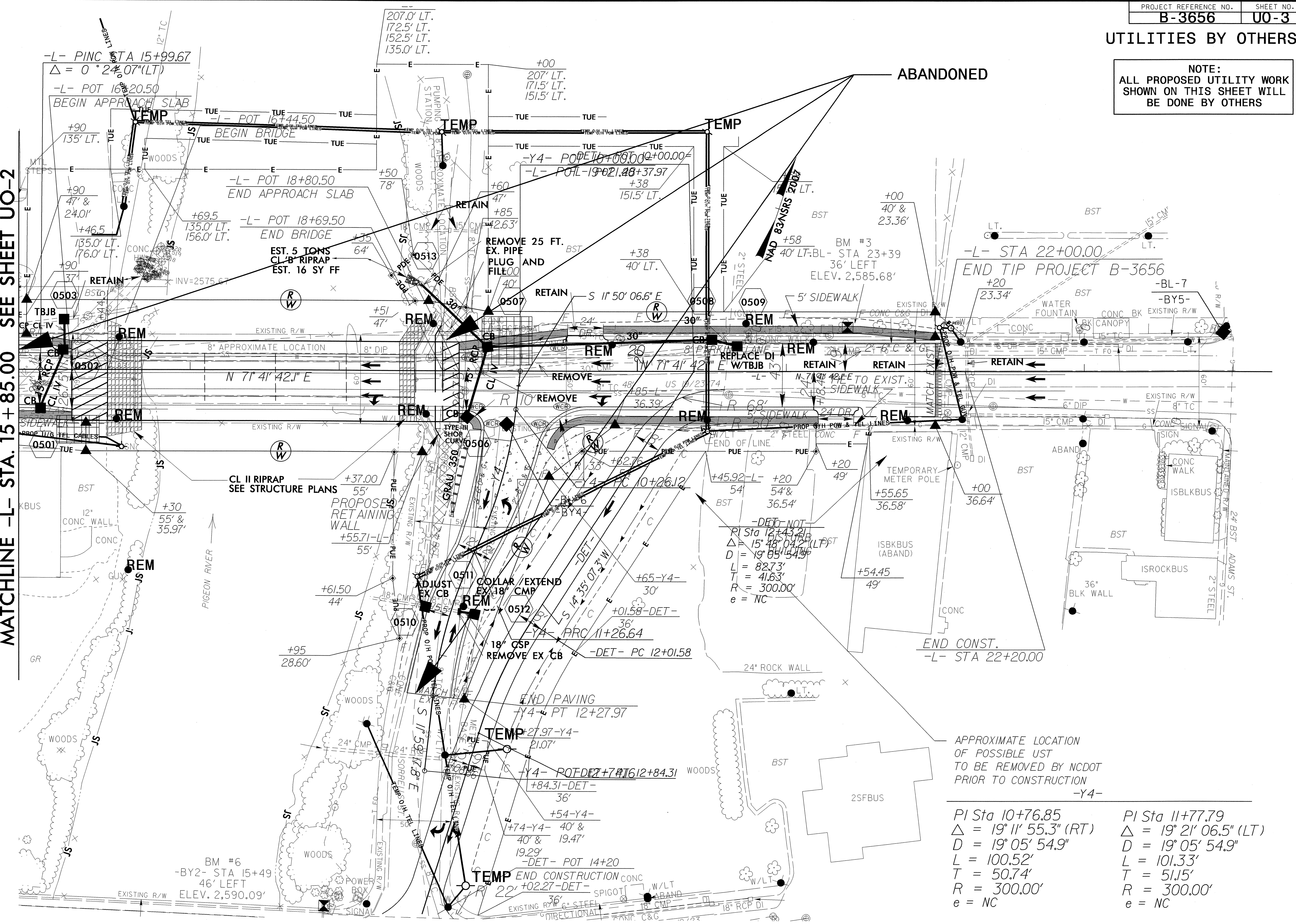
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UTILITIES BY OTHERS

NOTE:  
ALL PROPOSED UTILITY WORK  
SHOWN ON THIS SHEET WILL  
BE DONE BY OTHERS

MATCHLINE -L- STA. 15 + 85.00 SEE SHEET UO-2



APPROXIMATE LOCATION  
OF POSSIBLE USE  
TO BE REMOVED BY NCDOT  
PRIOR TO CONSTRUCTION  
-Y4-

PI Sta 10+76.85  
Δ = 19° 11' 55.3" (RT)  
D = 19° 05' 54.9"  
L = 100.52'  
T = 50.74'  
R = 300.00'  
e = NC

PI Sta 11+77.79  
Δ = 19° 21' 06.5" (LT)  
D = 19° 05' 54.9"  
L = 101.33'  
T = 51.15'  
R = 300.00'  
e = NC

5/14/99

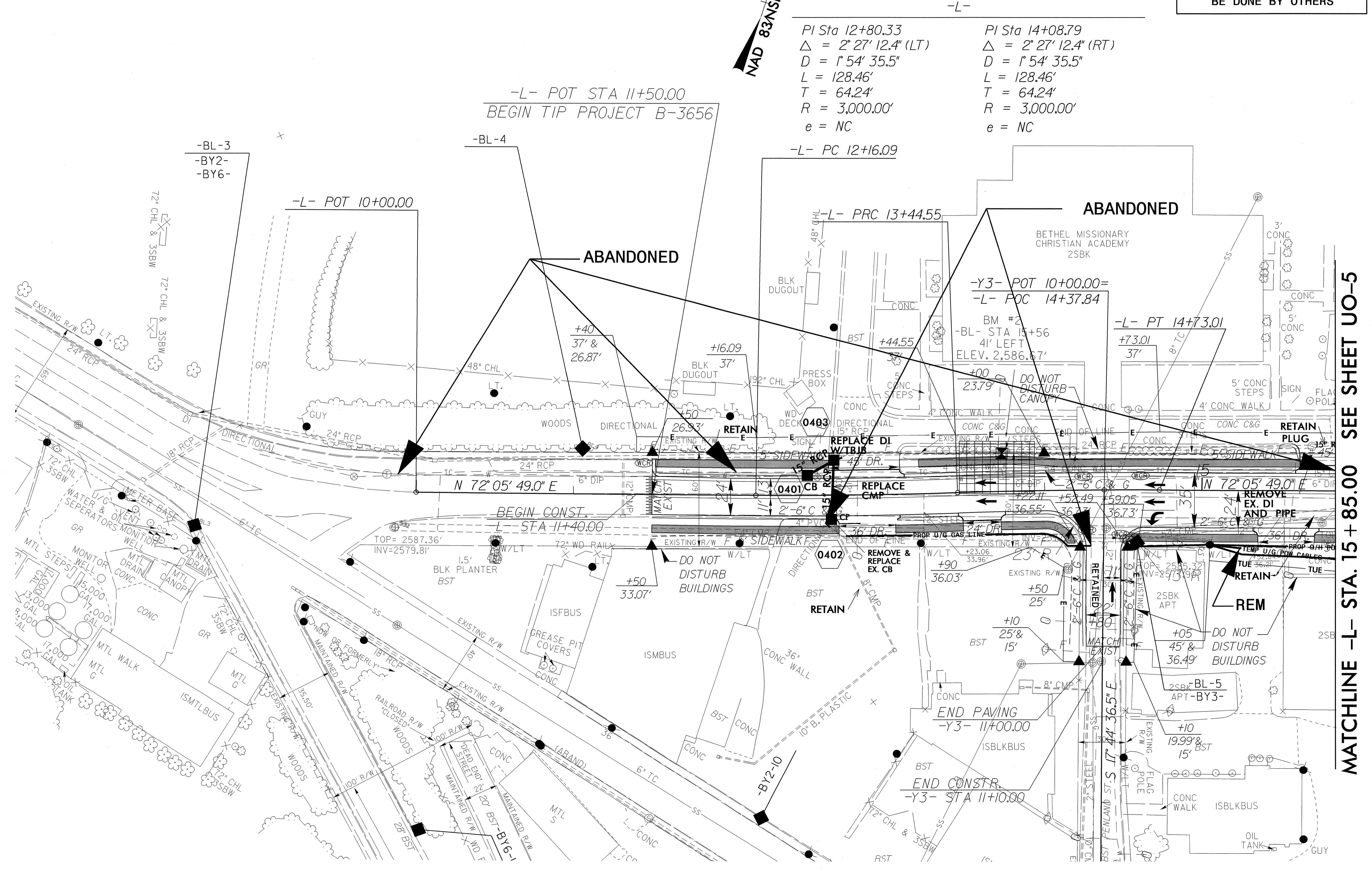
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R:\R:\11111111\B-3656\_Ut\_05\_uo3\_psh.dgn

UTILITIES BY OTHERS

**NOTE:**  
ALL PROPOSED UTILITY WORK  
SHOWN ON THIS SHEET WILL  
BE DONE BY OTHERS

NAD 83 NSRS 2007

<p>PI Sta 12+80.33  <math>\Delta = 2^\circ 27' 12.4" (LT)</math>  <math>D = 1^\circ 54' 35.5"</math>  <math>L = 128.46'</math>  <math>T = 64.24'</math>  <math>R = 3,000.00'</math>  <math>e = NC</math></p>	<p>PI Sta 14+08.79  <math>\Delta = 2^\circ 27' 12.4" (RT)</math>  <math>D = 1^\circ 54' 35.5"</math>  <math>L = 128.46'</math>  <math>T = 64.24'</math>  <math>R = 3,000.00'</math>  <math>e = NC</math></p>
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MATCHLINE -L- STA. 15 + 85.00 SEE SHEET UO-5

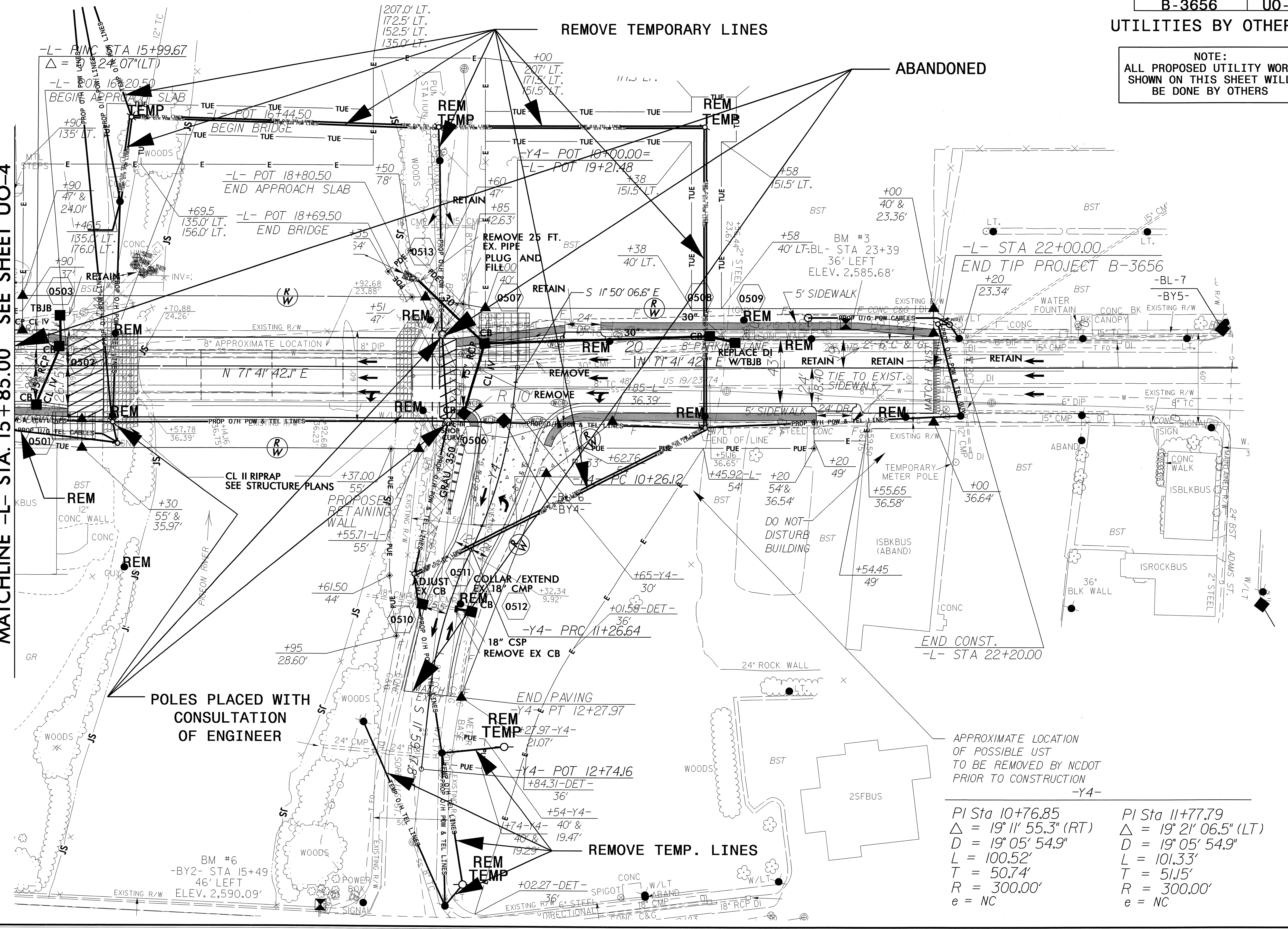
5/14/99

14-APR-2010 09:52 \\B-3656\_U0-4\_UO4-ph.dgn

**UTILITIES BY OTHERS**

**NOTE:**  
ALL PROPOSED UTILITY WORK  
SHOWN ON THIS SHEET WILL  
BE DONE BY OTHERS

**MATCHLINE -L- STA. 15 + 85.00 SEE SHEET UO-4**



APPROXIMATE LOCATION  
OF POSSIBLE UST  
TO BE REMOVED BY NCDOT  
PRIOR TO CONSTRUCTION  
-Y4-

PI Sta 10+76.85 $\Delta = 19^\circ 11' 55.3" (RT)$ $D = 19^\circ 05' 54.9"$ $L = 100.52'$ $T = 50.74'$ $R = 300.00'$ $e = NC$	PI Sta 11+77.79 $\Delta = 19^\circ 21' 06.5" (LT)$ $D = 19^\circ 05' 54.9"$ $L = 101.33'$ $T = 51.15'$ $R = 300.00'$ $e = NC$
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5/14/99  
I:\4\PR\2011\0952\NB-3656\_Ut-05\_UO5\_psh.dgn