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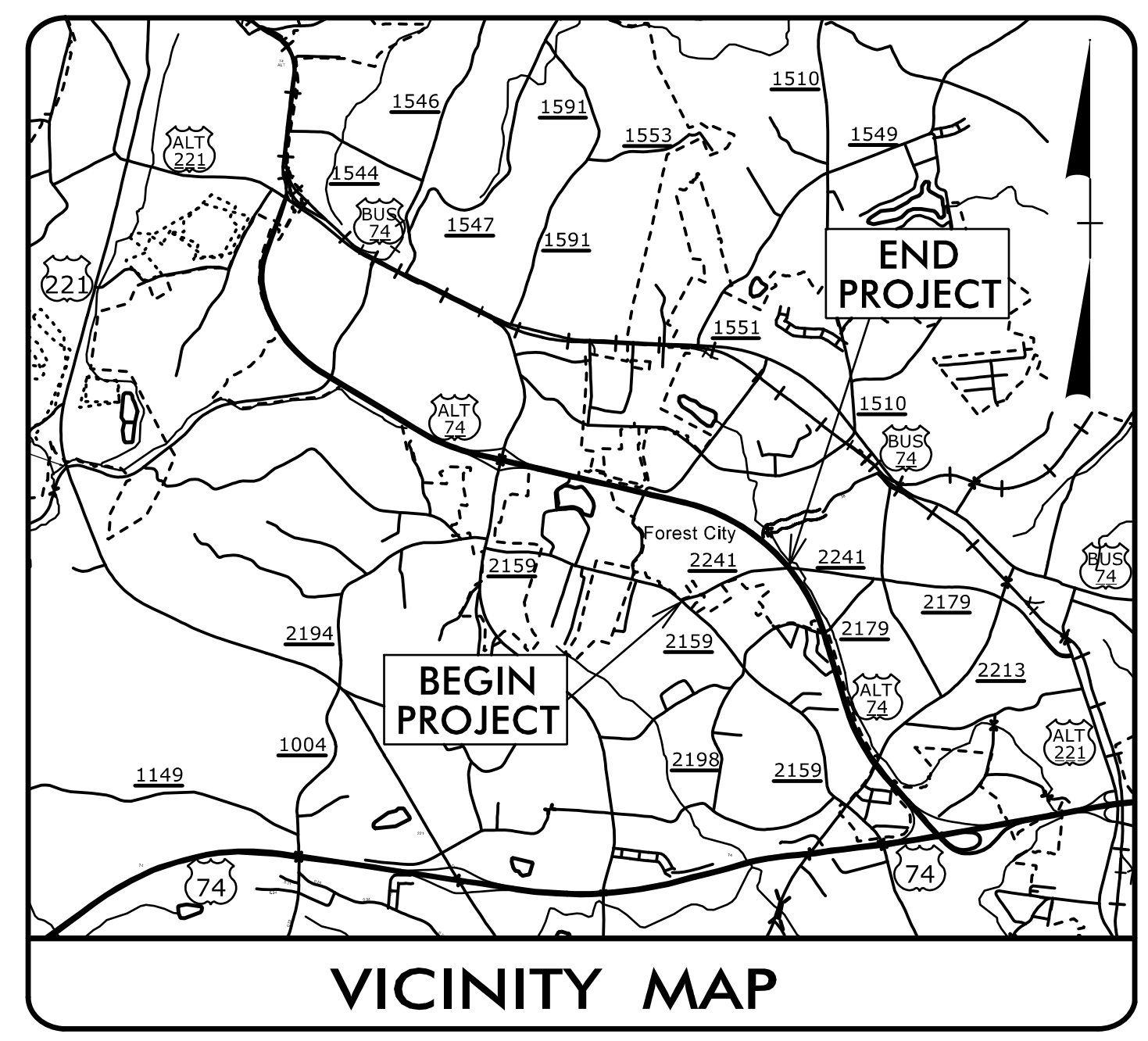
09\_08/99

TIP PROJECT: U-5833

T.I.P. NO.	SHEET NO.
U-5833	UC-1

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

UTILITY CONSTRUCTION PLANS  
RUTHERFORD COUNTY

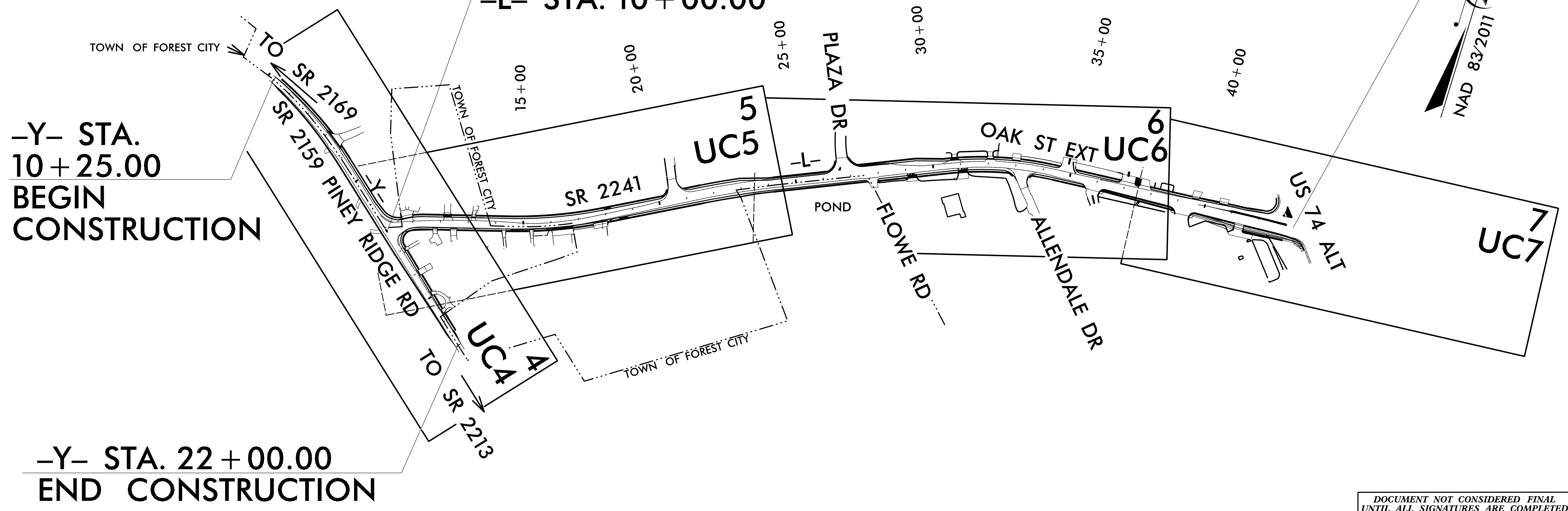


LOCATION: SR 2241 (OAK STREET EXT.) FROM  
SR 2159 (PINEY RIDGE RD) TO US 74 ALT.

TYPE OF WORK: WATER AND SEWER RELOCATION

BEGIN PROJECT U-5833  
-L- STA. 10 + 00.00

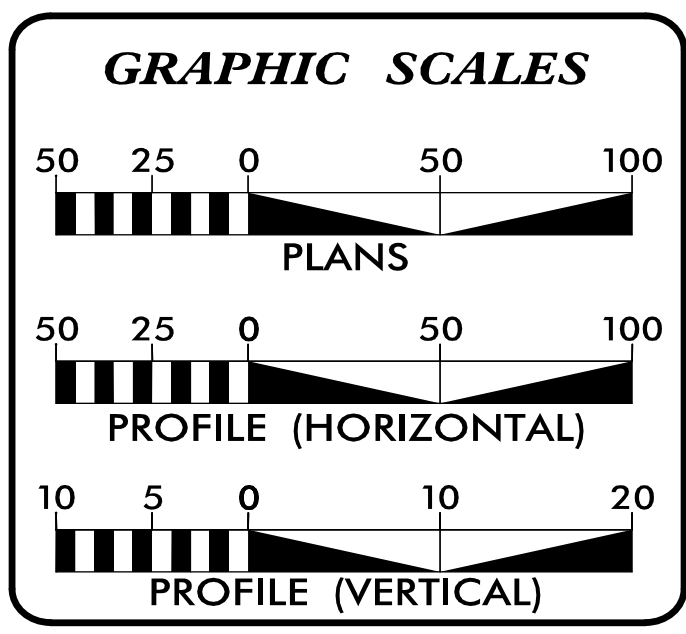
END PROJECT U-5833  
-L- STA. 43 + 29.67



-Y- STA.  
10 + 25.00  
BEGIN  
CONSTRUCTION

-Y- STA. 22 + 00.00  
END CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL  
UNTIL ALL SIGNATURES ARE COMPLETED



INDEX OF SHEETS

SHEET NO.:	DESCRIPTION:
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY
UC-3	NOTES
UC-3A	DETAILS
UC-4 THRU UC-7	UTILITY CONSTRUCTION SHEETS
UC-8 THRU UC-10	PROFILE SHEETS

WATER AND SEWER OWNERS ON PROJECT

(A) WATER - TOWN OF FOREST CITY  
(B) SANITARY SEWER - TOWN OF FOREST CITY

PREPARED IN THE OFFICE OF

**TGS ENGINEERS**  
804-C N. LAFAYETTE ST  
SHELBY, NC 28150  
PH (704) 476-0003  
CORP. LICENSE NO.: C-0275

B. CHAD HOUSER, PE PLS CONSULTANT CONTACT #1  
JIMMY TERRY, PE CONSULTANT CONTACT #2

SEAL

4/10/2018

**DIVISION OF HIGHWAYS**  
DIVISION 13  
55 Orange Street  
Asheville, NC 28801  
(828) 251-6171

LONNIE WATKINS, PE DIVISION CONTACT #1  
KEITH RADCLIFF DIVISION CONTACT #2

4/9/2018  
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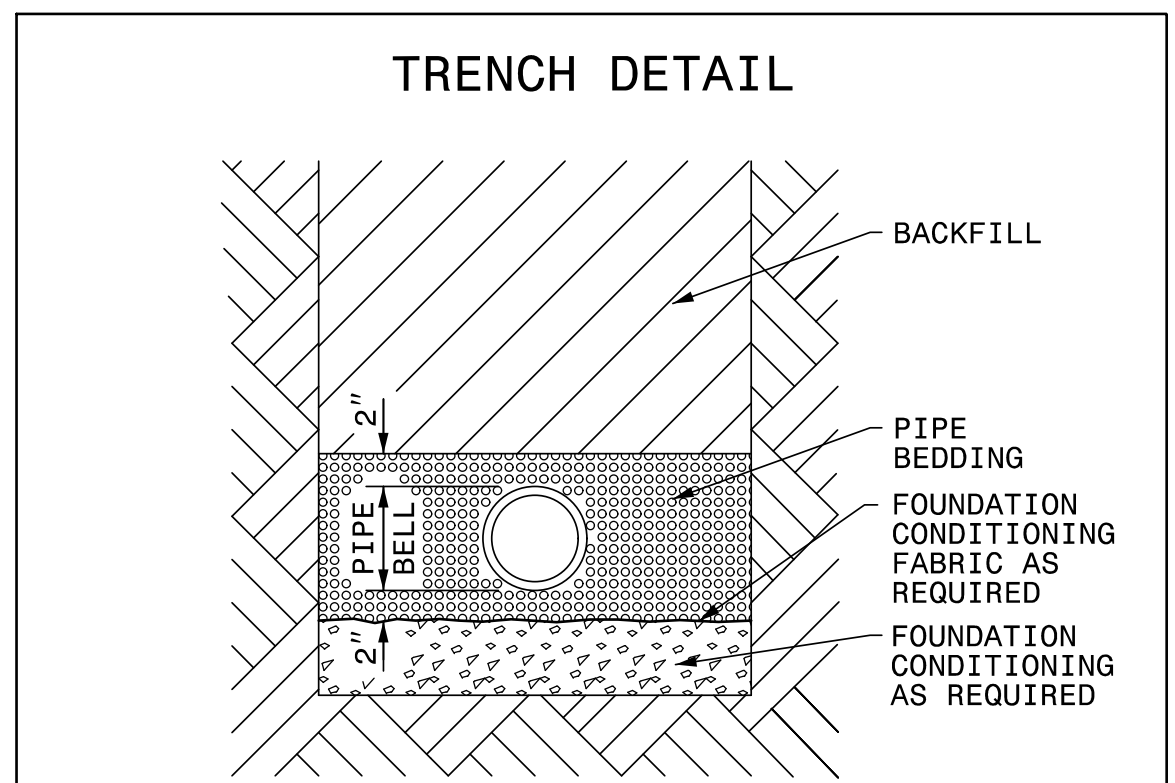




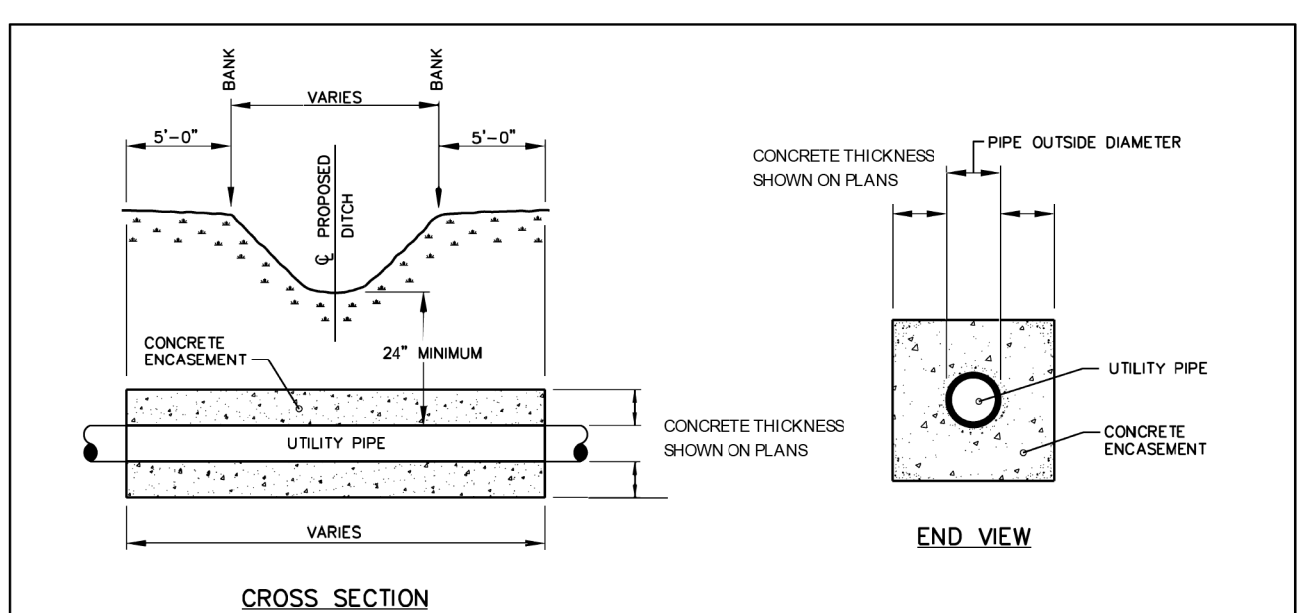
# UTILITY CONSTRUCTION PROJECT TYPICAL DETAILS

## LIST OF STANDARD DRAWINGS

- 1515.01 WATER METER
- 1515.02 FIRE HYDRANT
- 1520.01 SEWER CLEAN OUT
- 1525.06 PRECAST CONCRETE SANITARY SEWER MANHOLE WITH CAST-IN-PLACE BOTTOM

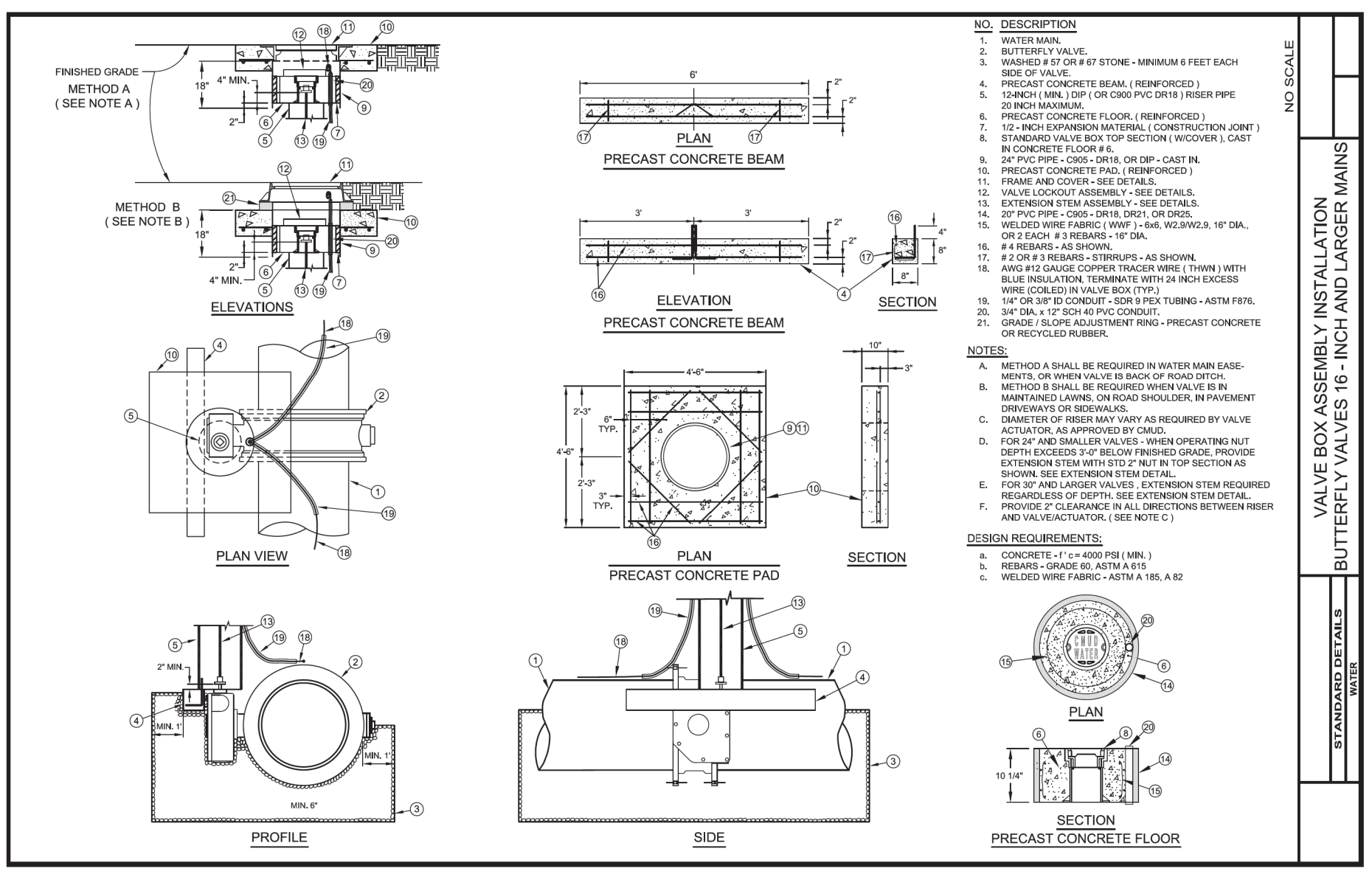


PLACE FOUNDATION CONDITIONING MATERIAL BELOW BEDDING IF REQUIRED, AS DIRECTED BY ENGINEER. PIPE BEDDED IN SELECT MATERIAL, CLASS II (TYPE 1) OR CLASS III. TRENCH BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL IF APPROVED BY THE ENGINEER, OR SELECT MATERIAL. ALL 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.



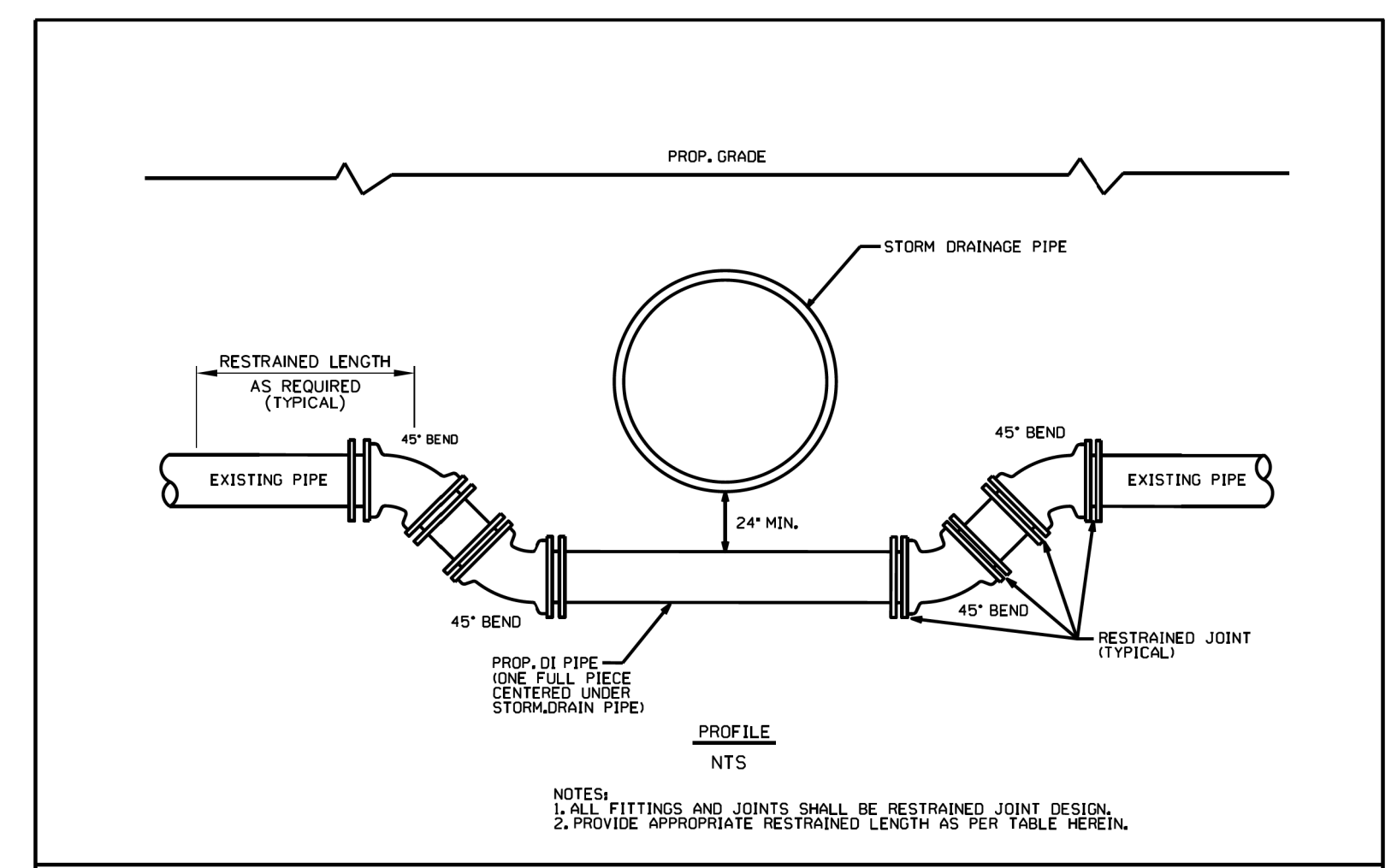
### UTILITY PIPE CONCRETE ENCASUREMENT FOR DITCH/CREEK/STORMWATER CROSSINGS

- NOTES:  
 1. CONCRETE SHALL BE CLASS B - 2500 P.S.I. MIN. COMPRESSIVE STRENGTH.  
 2. CONCRETE ENCASEMENT IS NOT REQUIRED WHEN PIPE IS AT LEAST THREE (3) FEET UNDER CENTERLINE OF CREEK BOTTOM.



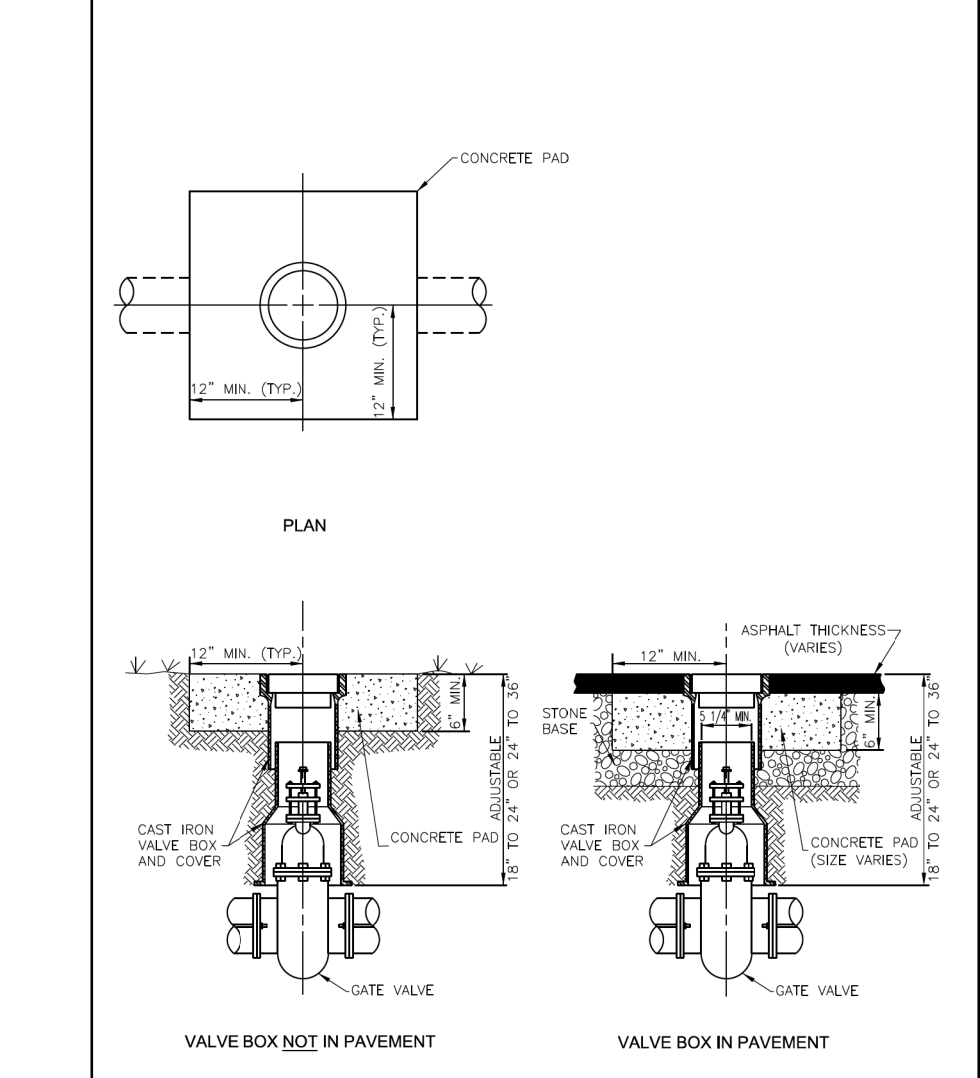
- NO. DESCRIPTION  
 1. WATER MAIN  
 2. BUTTERFLY VALVE  
 3. WAREDED 4" OR 4" X 4" STONE - MINIMUM 6 FEET EACH SIDE OF VALVE  
 4. PRECAST CONCRETE BEAM (REINFORCED)  
 5. 10" MIN. LAMP (OR CRCP PVC DRP) RISER PIPE  
 6. BRICK MANHOLE  
/>
 7. 1/2" HIGH EXPANSION MATERIAL (CONSTRUCTION JOINT)  
 8. STANDARD VALVE BOX TOP SECTION (WOODS) 1. CAST IN CONCRETE FLOOR A.  
 9. PRECAST CONCRETE PAD (REINFORCED)  
 10. FRAME AND COVER (SEE DETAIL)  
 11. VALVE CONTROL ASSEMBLY - SEE DETAIL  
 12. EXTENSION STEM ASSEMBLY - SEE DETAIL  
 13. WELDED WIRE FABRIC (W.W.F.) 6x6, W.O. #2, 18" DIA. OF EACH #3 REBAR - 18" DIA.  
 14. #4 REBAR AS SHOWN  
 15. #2 X 8" REBAR - STRIPS - AS SHOWN  
 16. AWG #12 GAUGE COPPER TRACER WIRE (TWIN) WITH BLUE INSULATION (FOR USE WITH 1/2" DIA. SECTION OF EXTENSION STEM) MIN. 12" L.  
 17. 1/4" OR 3/8" ID CONDUIT - 3/8" OR 1/2" TUBING - ASTM F876, 3/4" DIA. x 1/2" OR 3/8" ID CONDUIT  
 18. GRADE ADJUSTMENT RING - PRECAST CONCRETE OR RECYCLED RUBBER  
 19. CONCRETE 1" MIN. THICK (MIN.)  
 20. REBAR - GRADE 60, ASTM A 618 #11  
 21. WELDED WIRE FABRIC - ASTM A 185, #12

- NOTES:  
 A. METHOD A SHALL BE REQUIRED IN WATER MAIN BASEMENTS, OR WHEN VALVE IS BACK OF ROAD OR OFF-ROAD.  
 B. METHOD B SHALL BE REQUIRED WHEN VALVE IS IN MANHOLE OR UNDER PAVEMENT OR IN SHOULDER IN PAVEMENT OR SIDEWALK.  
 C. DIAMETER OF RISER MAY VARY AS REQUIRED BY VALVE ACTUATOR OR SIDEWALK.  
 D. FOR 24" AND SMALLER VALVES - WHEN OPERATING NUT DEPTH EXCEEDS 18" FROM TOP OF GRADE, PROVIDE EXTENSION STEM (SEE DETAIL).  
 E. SHOWING FOR EXTENSION STEM DETAIL - EXTENSION STEM REQUIRED REGARDLESS OF DEPTH - SEE EXTENSION STEM DETAIL.  
 F. PROVIDE CLEARANCE BETWEEN VALVE AND VALVE ACTUATOR (SEE NOTE C).  
 DESIGN REQUIREMENTS:  
 1. CONCRETE 1" MIN. THICK (MIN.)  
 2. REBAR - GRADE 60, ASTM A 618 #11  
 3. WELDED WIRE FABRIC - ASTM A 185, #12



### FORCE MAIN / WATER MAIN CROSSING UNDER STORM DRAINAGE PIPE

- NOTES:  
 1. ALL FITTINGS AND JOINTS SHALL BE RESTRAINED JOINT DESIGN.  
 2. PROVIDE APPROPRIATE RESTRAINED LENGTH AS PER TABLE HEREIN.



### WATER VALVE BOX INSTALLATION FOR 4", 6", 8", AND 12" GATE VALVES

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

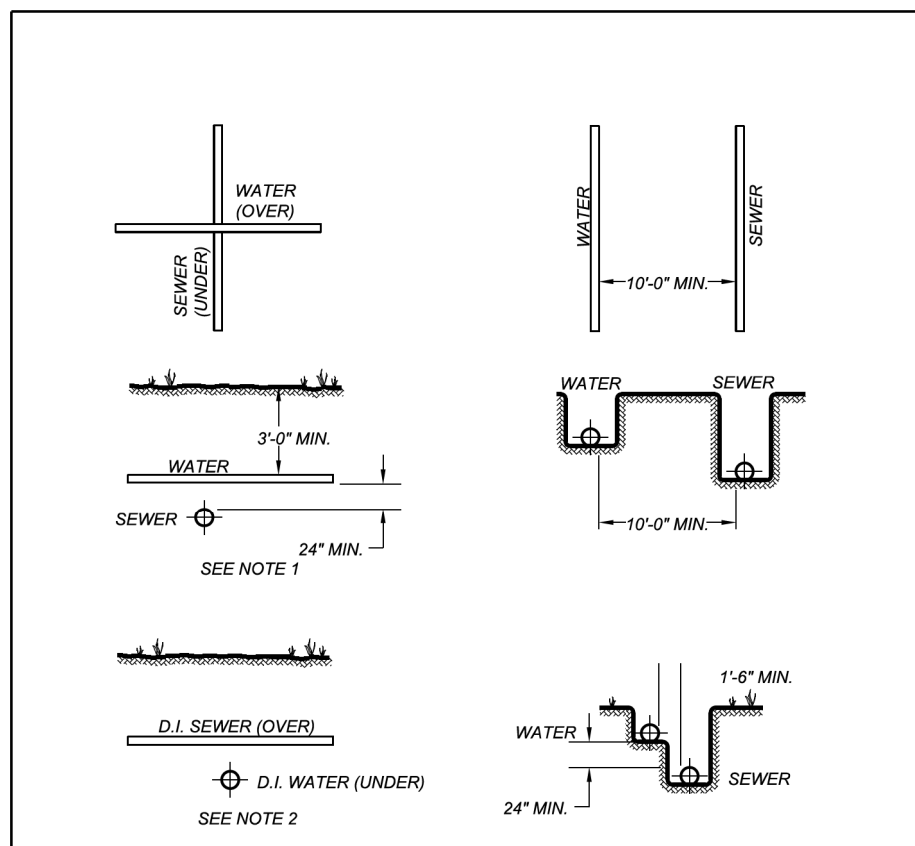
		HORIZONTAL RESTRAINT (ALL AREAS GIVEN ARE IN SQUARE FEET)								VERTICAL RESTRAINT (ALL VOLUMES GIVEN ARE IN CUBIC YARDS)**						
PIPE SIZE	DEGREE OF BEND	LBS. STATIC THRUST *	ALLOWABLE SOIL BEARING (PSF)								PIPE SIZE	RESTRAINING RODS NO. REO'D	DIA.	DEGREE OF BEND		
			1000	2000	3000	4000	5000	6000	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	2	2	2	2	2	2	2	2	6"	2	1/2"	0.50	1.0	1.75
	45"	2,405	4	4	4	4	4	4	4	4	8"	2	5/8"	0.75	1.50	3.0
	90"	4,444	8	8	8	8	8	8	8	8	10"	2	3/4"	1.25	2.25	4.50
6"	11/4"	3,143	3	3	3	3	3	3	3	3	12"	2	7/8"	1.75	3.25	6.50
	22 1/2"	6,286	6	6	6	6	6	6	6	6	14"	4	5/8"	2.25	4.50	8.75
	45"	11,635	12	12	12	12	12	12	12	12	16"	4	3/4"	3.0	6.0	11.50
	90"	20,999	24	24	24	24	24	24	24	24	20"	4	7/8"	5.3	10.4	19.2
8"	11/4"	5,024	5	5	5	5	5	5	5	5						
	22 1/2"	10,048	10	10	10	10	10	10	10	10						
	45"	18,173	18	18	18	18	18	18	18	18						
	90"	32,568	36	36	36	36	36	36	36	36						
10"	11/4"	7,536	7	7	7	7	7	7	7	7						
	22 1/2"	15,072	14	14	14	14	14	14	14	14						
	45"	27,168	28	28	28	28	28	28	28	28						
	90"	49,635	49	49	49	49	49	49	49	49						
12"	11/4"	10,032	10	10	10	10	10	10	10	10						
	22 1/2"	20,064	20	20	20	20	20	20	20	20						
	45"	35,987	35	35	35	35	35	35	35	35						
	90"	65,774	65	65	65	65	65	65	65	65						
14"	11/4"	14,016	14	14	14	14	14	14	14	14						
	22 1/2"	28,032	28	28	28	28	28	28	28	28						
	45"	50,426	50	50	50	50	50	50	50	50						
	90"	93,858	93	93	93	93	93	93	93	93						
16"	11/4"	19,854	19	19	19	19	19	19	19	19						
	22 1/2"	39,708	39	39	39	39	39	39	39	39						
	45"	71,085	71	71	71	71	71	71	71	71						
	90"	130,265	130	130	130	130	130	130	130	130						
20"	11/4"	26,445	26	26	26	26	26	26	26	26						
	22 1/2"	52,890	52	52	52	52	52	52	52	52						
	45"	96,012	96	96	96	96	96	96	96	96						
	90"	172,072	172	172	172	172	172	172	172	172						
TEE/PLUG		78,540	79	40	27	20	16	14	12	10						

- \* 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

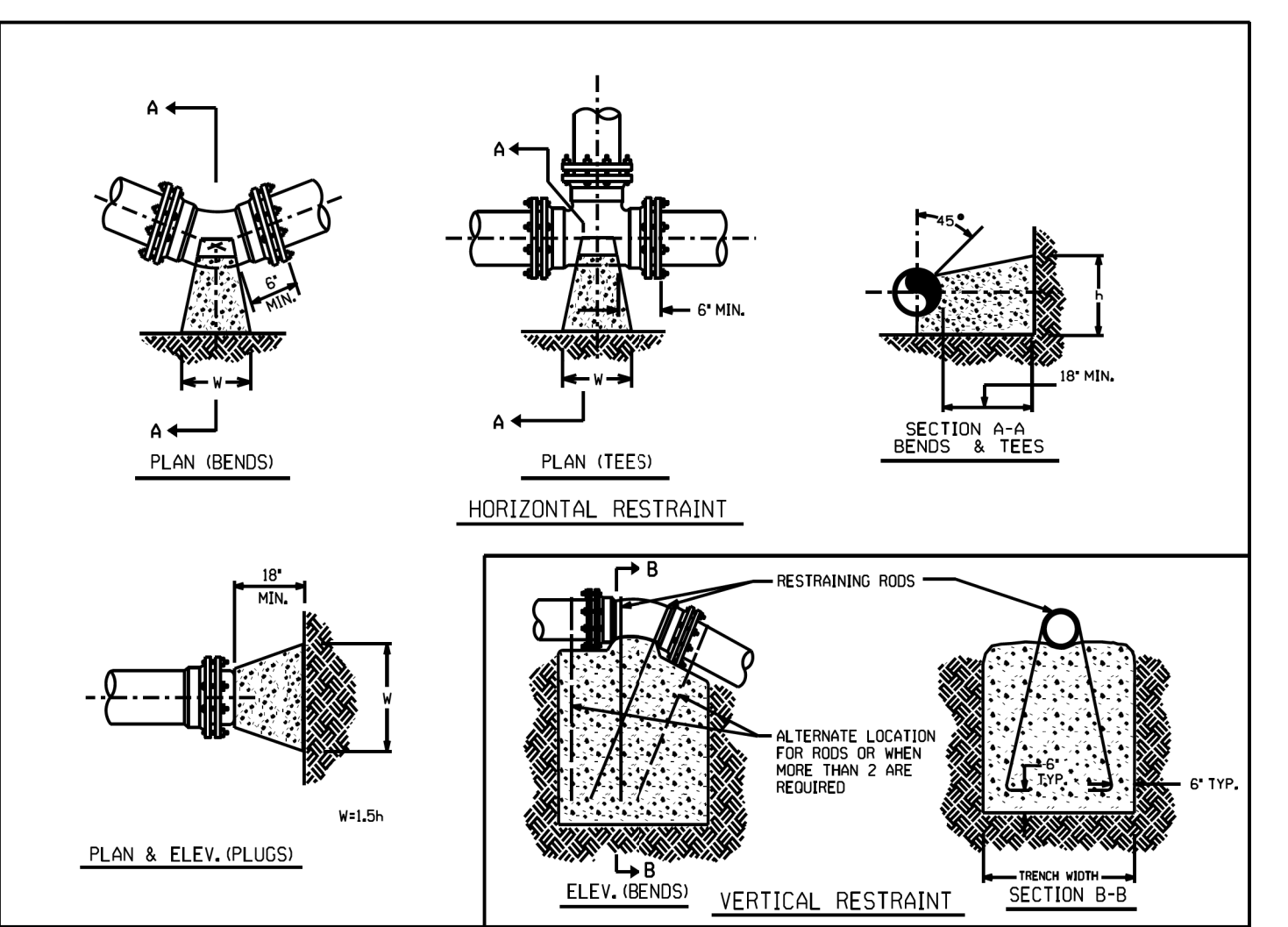
## THRUST RESTRAINT FOR WATER MAINS

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



### TYPICAL PIPE CROSSING AND PARALLELS NTS

- NOTES:  
 1. WHERE THE WATER MAIN IS INSTALLED ABOVE THE SEWER, BUT LESS THAN 24" CLEAR, BOTH THE WATER AND THE SEWER MAINS SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE WITH WATER MAIN STANDARD JOINTS FOR A LATERAL DISTANCE OF AT LEAST 10 FEET ON EACH SIDE OF THE POINT OF CROSSING.  
 2. WHERE THE WATER PIPE IS LAID UNDER SEWER, BOTH THE WATER AND THE SEWER MAINS SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE WITH WATER MAIN STANDARD JOINTS FOR A LATERAL DISTANCE OF AT LEAST 10 FEET ON EACH SIDE OF THE POINT OF CROSSING.  
 3. "SEWER" SHALL BE CONSIDERED TO MEAN EITHER SANITARY SEWER OR STORM SEWER.



### THRUST RESTRAINT FOR PIPE LINES

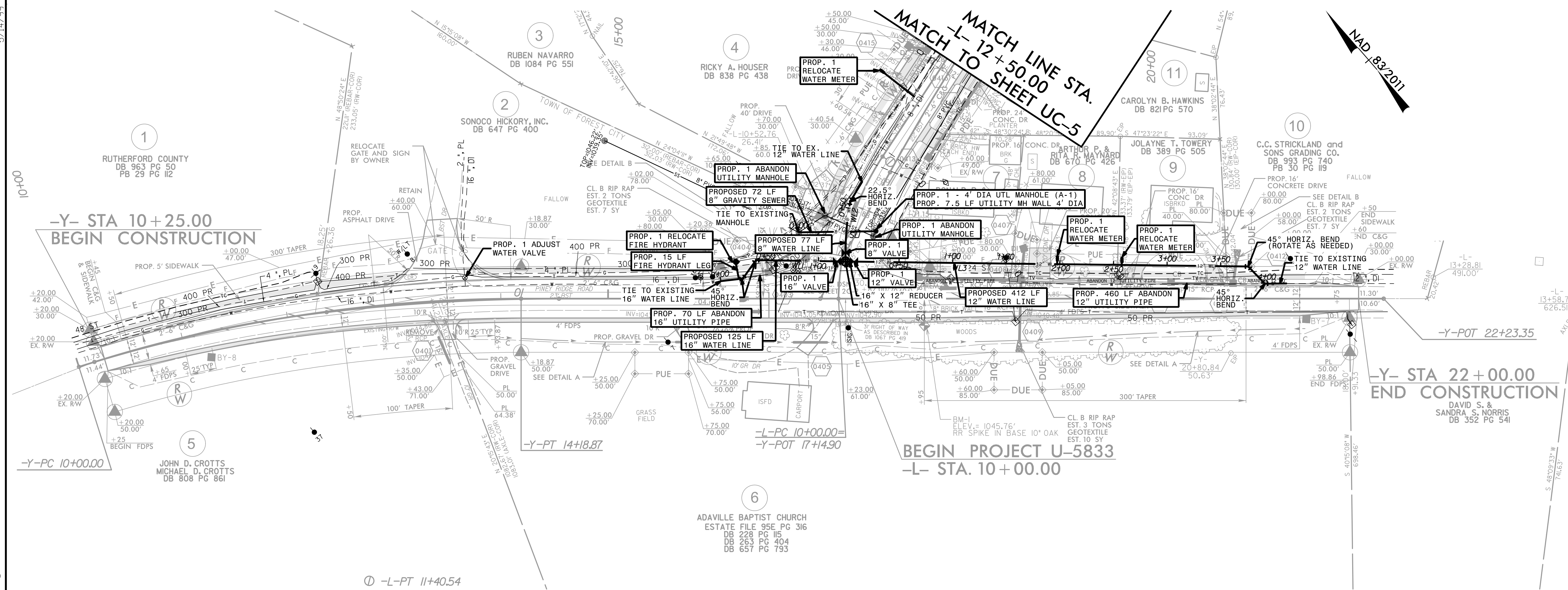
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PROJECT REFERENCE NO.	SHEET NO.
U-5833	UC-4
DESIGNED BY: BCH	
DRAWN BY: BCH	
CHECKED BY: JLT	
APPROVED BY: CDH	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	UTILITY CONSTRUCTION PLANS ONLY
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

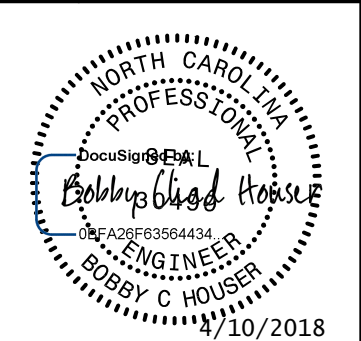
The estimated quantity of Ductile Iron Water Pipe Fitting on this plan sheet is 3,500 pounds. The actual quantity and type of fittings will vary based on field conditions.

The estimated quantity of "Water Service Line" on this plan sheet is 50 linear feet. The actual quantity will vary based on field conditions and will be determined during construction.

**UTILITY CONSTRUCTION**  
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



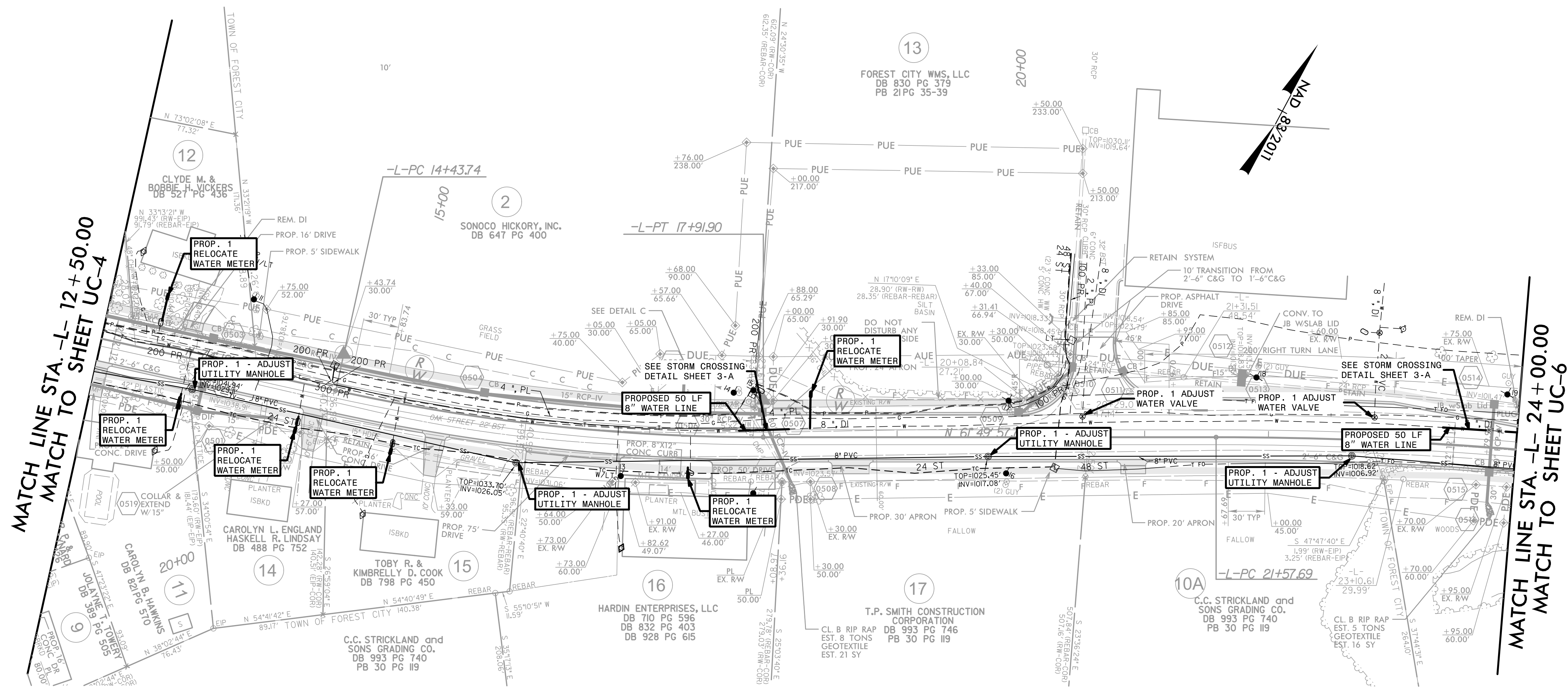
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5/14/99  
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PROJECT REFERENCE NO.	SHEET NO.
U-5833	UC-5
DESIGNED BY: BCH	
DRAWN BY: BCH	
CHECKED BY: JLT	
APPROVED BY: CDH	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
NCDOT HIGHWAY DIVISION 13 PHONE: (828) 251-6171 FAX: (828) 251-6394	
UTILITY CONSTRUCTION PLANS ONLY	

UTILITY CONSTRUCTION

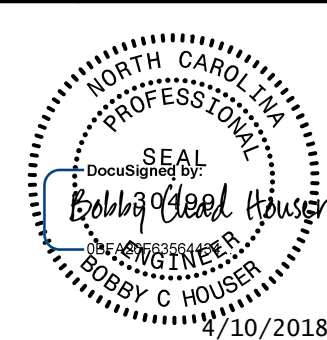
The estimated quantity of Ductile Iron Water Pipe Fitting on this plan sheet is 1500 pounds. The actual quantity and type of fittings will vary based on field conditions.

The estimated quantity of "Water Service Line" on this plan sheet is 250 linear feet. The actual quantity will vary based on field conditions and will be determined during construction.



5/14/99

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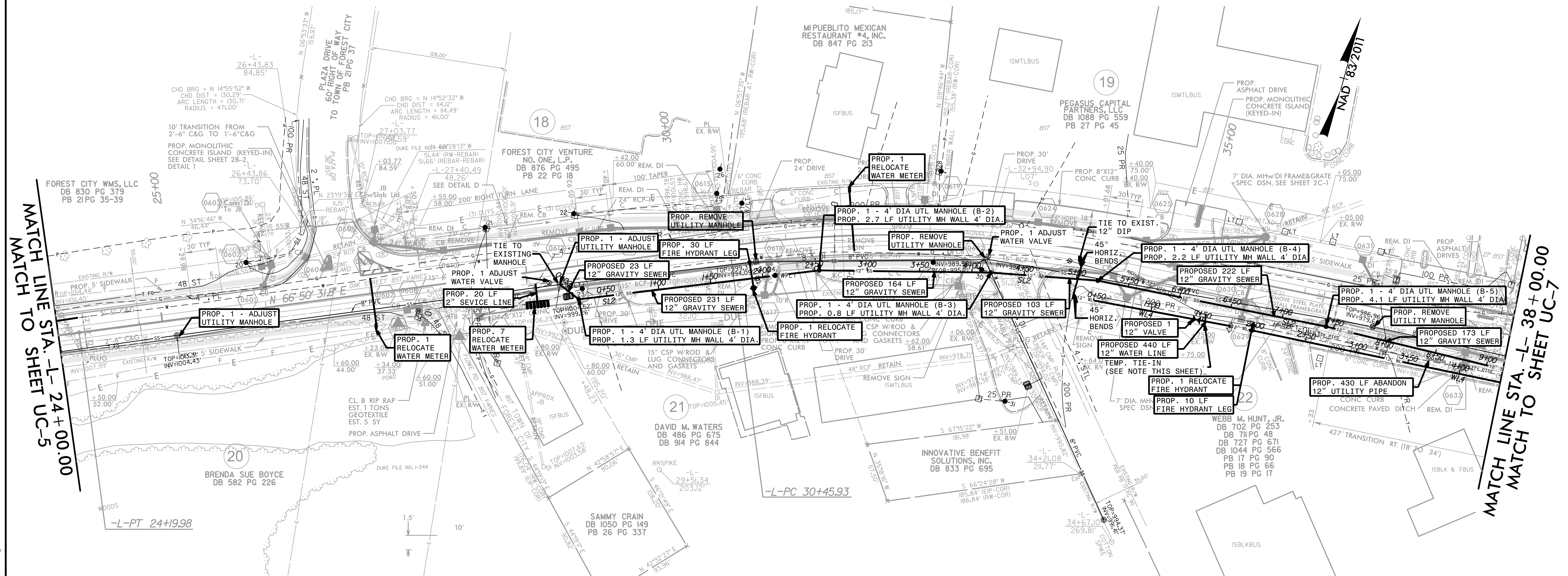
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U-5833	UC-6
DESIGNED BY: BCH	
DRAWN BY: BCH	
CHECKED BY: JLT	
APPROVED BY: CDH	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

**UTILITY CONSTRUCTION**

**NOTE**  
 The contractor shall verify that construction of the proposed 7' Diameter Manhole (0627) will not conflict with the proposed 12" water line at WL-4 Sta. 0+69 +/- . If in conflict, a temporary tie-in shall be placed near WL-4 Sta. 1+50 and the manhole constructed before the water line is placed from WL-4 Sta. 0+00 to 1+50.

The estimated quantity of Ductile Iron Water Pipe Fitting on this plan sheet is 1500 pounds. The actual quantity and type of fittings will vary based on field conditions.

The estimated quantity of "Water Service Line" on this plan sheet is 260 linear feet. The actual quantity will vary based on field conditions and will be determined during construction.



5/14/99

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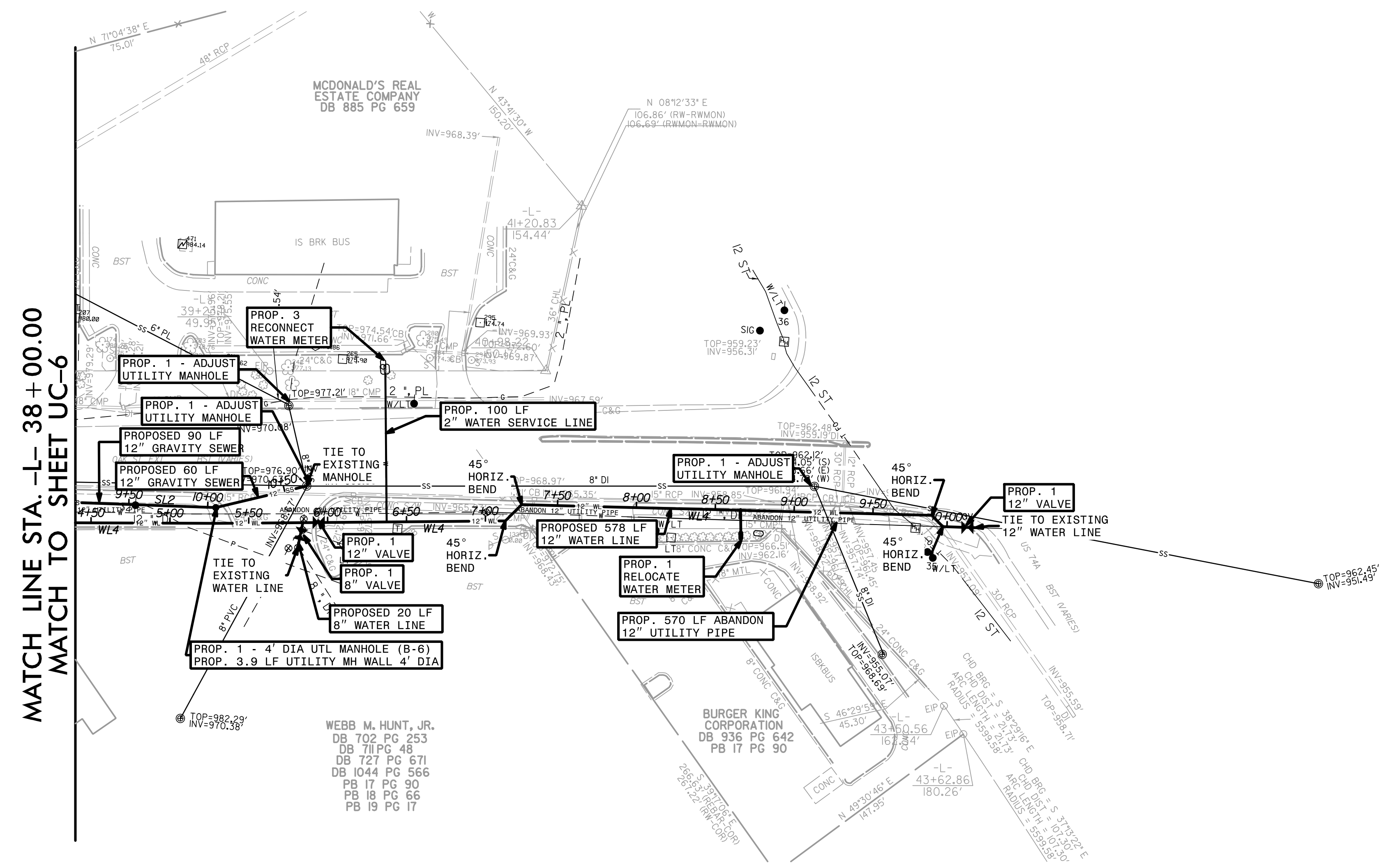
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DESIGNED BY: <b>BCH</b>	
DRAWN BY: <b>BCH</b>	
CHECKED BY: <b>JLT</b>	
APPROVED BY: <b>CDH</b>	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
NCDOT HIGHWAY DIVISION 13 PHONE: (828) 251-6171 FAX: (828) 251-6394	
UTILITY CONSTRUCTION PLANS ONLY	

The estimated quantity of Ductile Iron Water Pipe Fitting on this plan sheet is 500 pounds. The actual quantity and type of fittings will vary based on field conditions.

The estimated quantity of "Water Service Line" on this plan sheet is 200 linear feet. The actual quantity will vary based on field conditions and will be determined during construction.

**UTILITY CONSTRUCTION**



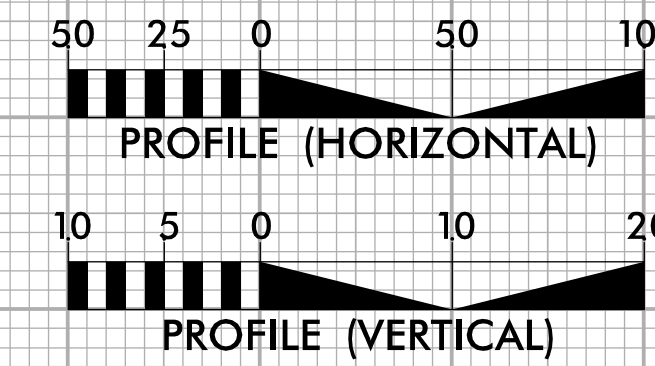
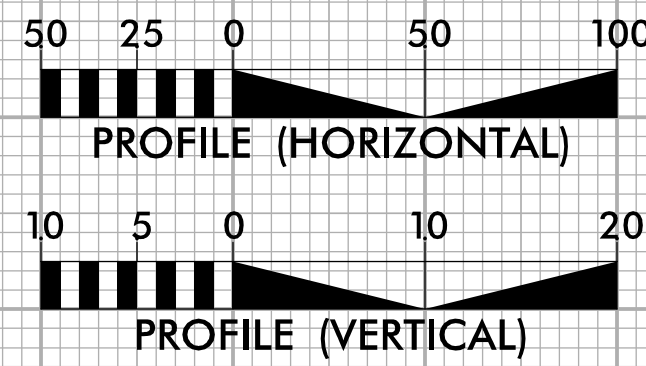
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WEBB M. HUNT, JR.  
 DB 702 PG 253  
 DB 711 PG 48  
 DB 727 PG 671  
 DB 1044 PG 566  
 PB 17 PG 90  
 PB 18 PG 66  
 PB 19 PG 17

BURGER KING  
 CORPORATION  
 DB 936 PG 642  
 PB 17 PG 90

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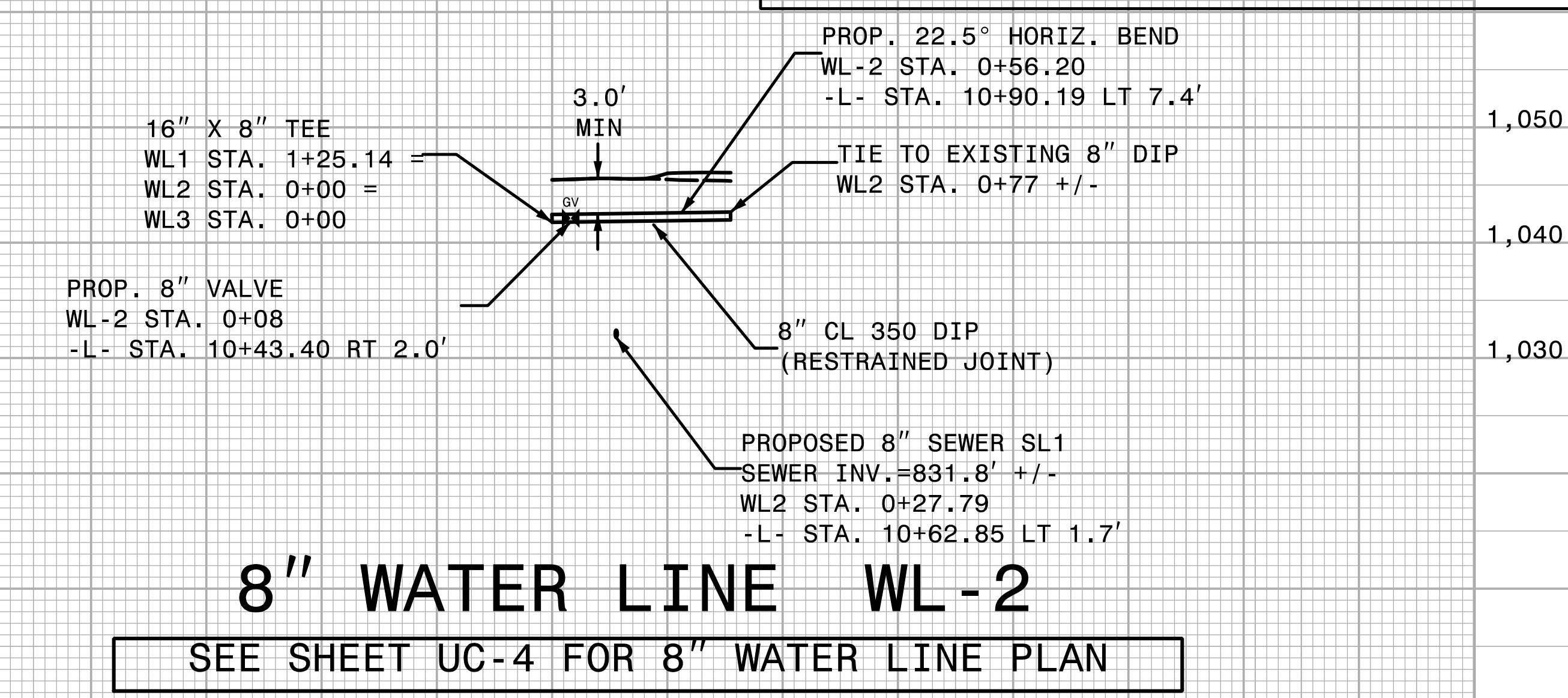
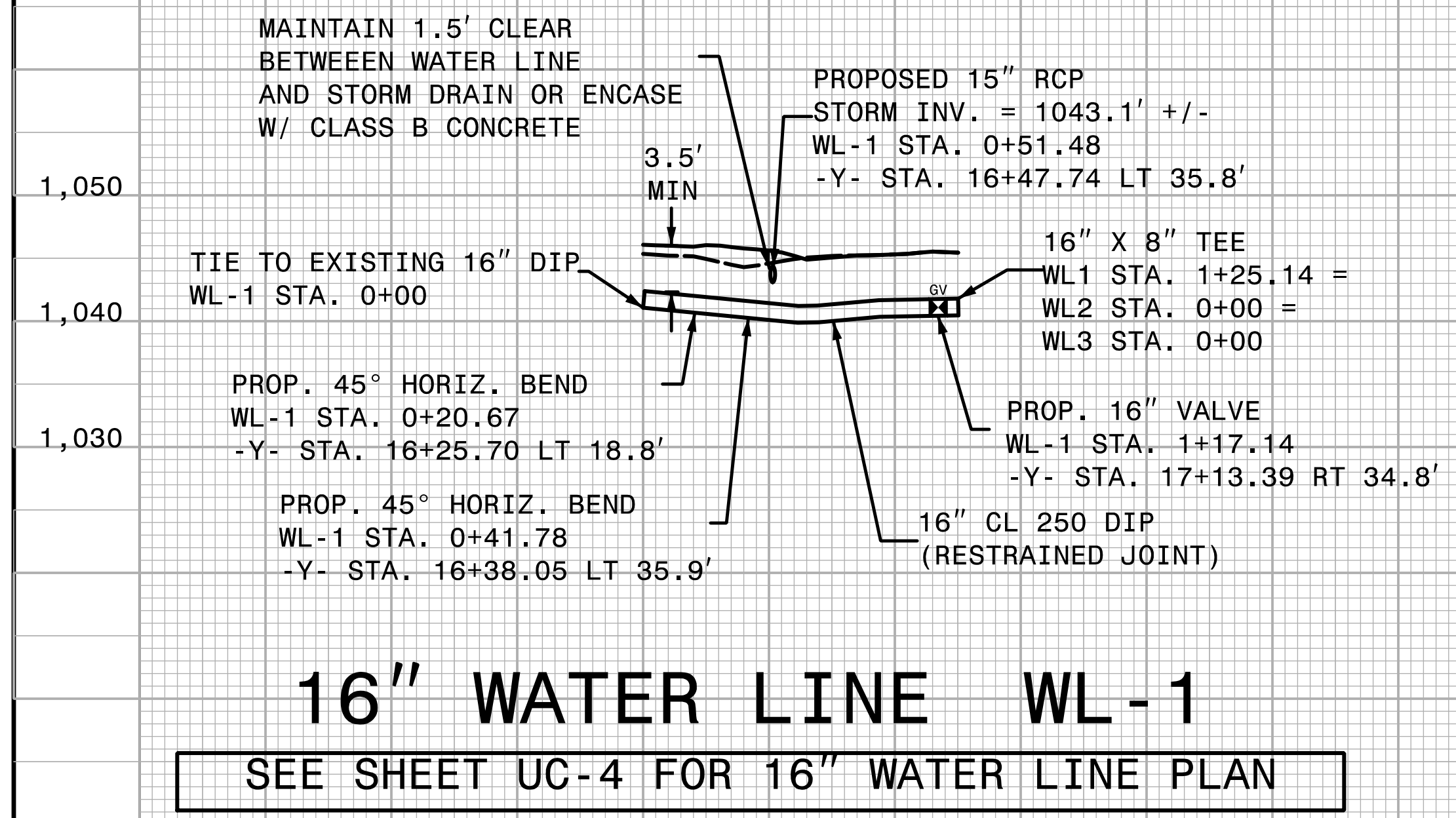
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PROJECT REFERENCE NO. U-5833	SHEET NO. UC-8
DESIGNED BY: BCH	
DRAWN BY: BCH	
CHECKED BY: JLT	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
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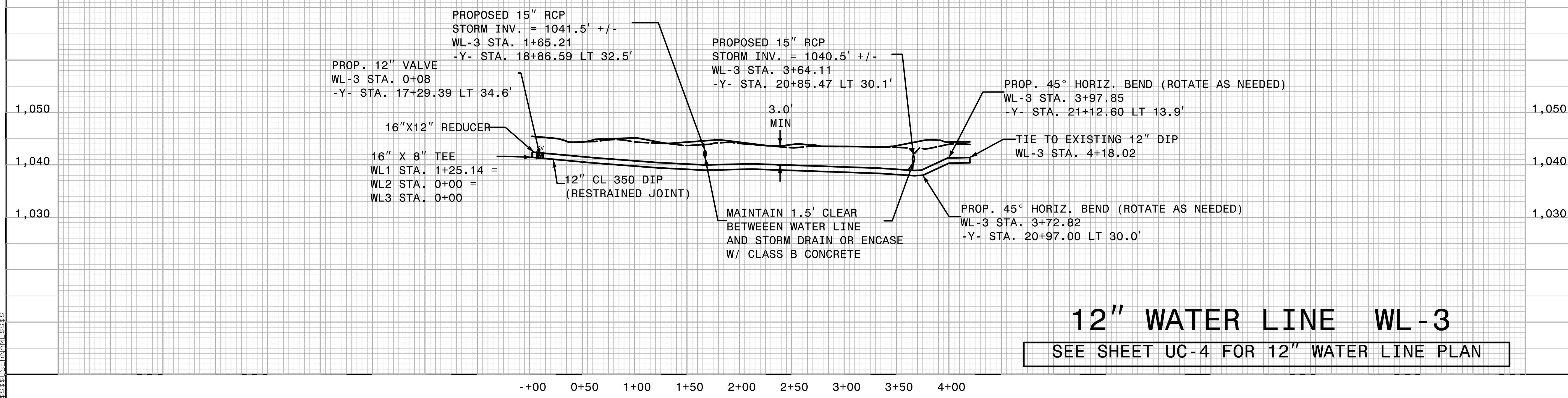
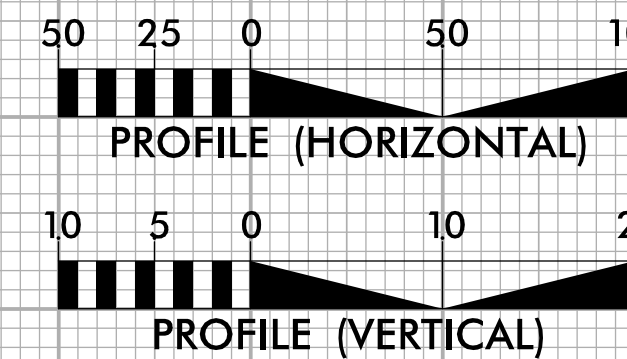
UTILITY CONSTRUCTION

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-+00 0+50 1+00

-+00 0+50



-+00 0+50 1+00 1+50 2+00 2+50 3+00 3+50 4+00

5/28/99



