

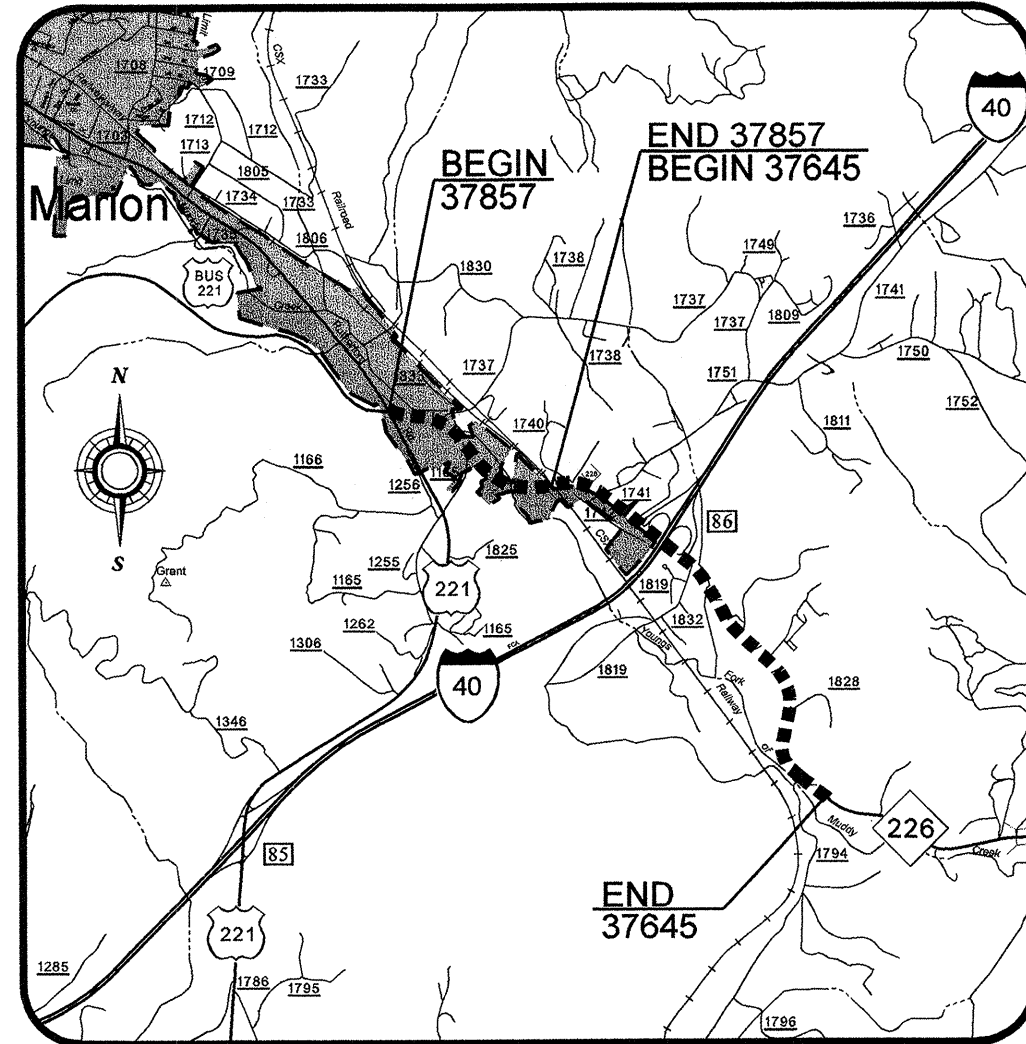
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

STATE PROJECT REFERENCE NO.	SHEET NO.
37645 & 37857	UC-1

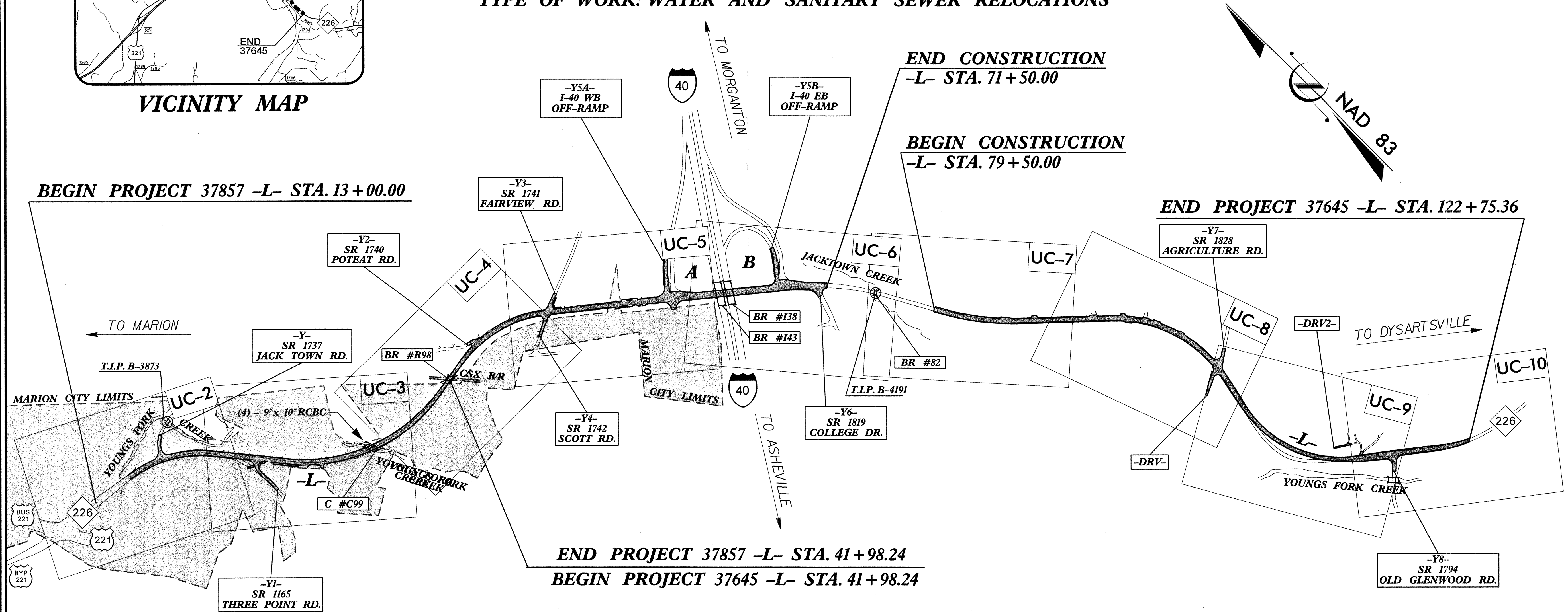
**UTILITY CONSTRUCTION PLANS  
McDOWELL COUNTY**

LOCATION: 37857 - NC 226 FROM SOUTH OF US 221 TO CSX RAILROAD  
37645 - NC 226 FROM CSX RAILROAD TO EAST OF SR 1794

TYPE OF WORK: WATER AND SANITARY SEWER RELOCATIONS



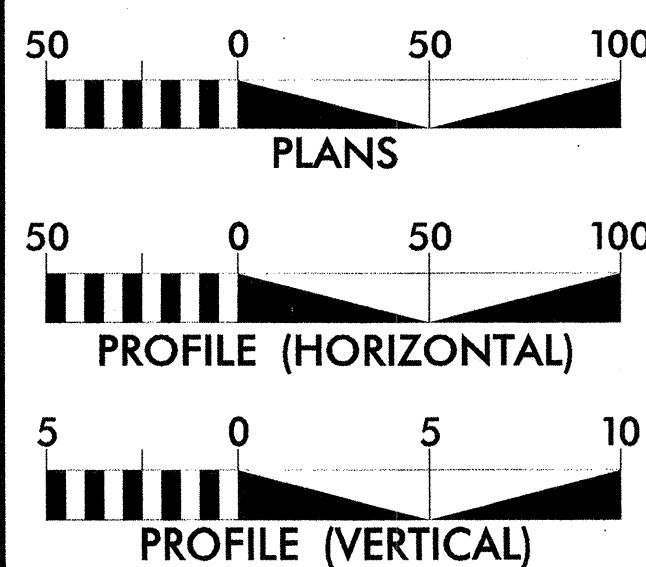
VICINITY MAP



WBS: 37645 & 37857

CONTRACT: C201667

GRAPHIC SCALES



INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UC-1	TITLE SHEET
UC-2 THRU UC-10	UTILITY CONSTRUCTION PLAN SHEETS
UC-11 THRU UC-14	PROFILE SHEETS
UC-15 THRU UC-23	DETAILS SHEET(S)

WATER AND SEWER OWNERS ON PROJECT

- (1) WATER - CITY OF MARION
- (2) SANITARY SEWER - CITY OF MARION

UTILITIES ENGINEER

*Edward T. Woodall, P.E.*  
SEAL 25881  
ENGINEER  
NORTH CAROLINA PROFESSIONAL ENGINEER  
EDWARD T. WOODALL, III



PLANS PREPARED BY :  
RUMEL, KLEPPER & KAHL, LLP  
consulting engineers  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609  
FOR

DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

JULY 25, 2005

LETTING DATE:

B. Keith Skinner, P.E.

PROJECT ENGINEER

Stephen E. Roberts, P.E.

PROJECT DESIGN ENGINEER

NCDOT CONTACT: Division Project Manager - Division 13

-Y-  
 PI Sta 11+59.68    PI Sta 14+47.92  
 $\Delta = 56' 02" 59.4" (RT)$      $\Delta = 4' 48" 26.8" (LT)$   
 $D = 243.54'$      $D = 2' 30" 00.0"$   
 $L = 127.07'$      $L = 192.30'$   
 $T = 238.73'$      $T = 96.21'$   
 $R = 2,291.83'$      $R = 2,291.83'$   
 SE = SEE PLANS

**PROP. 1 - BREAK DOWN & REBUILD EXIST. MH#4**  
 STA. 13+28 -S1-  
 STA. 18+65 (35' LT) -L-

SEE SHEET UC-11 FOR -S1- PROFILE

**PROP. MH#3**  
 STA. 12+60 -S1-  
 STA. 18+57 (32' RT) -L-  
**PROP. 68' - 8" DI SEWER PIPE, PC 350**  
**PROP. 57' - 24" STEEL ENCASEMENT PIPE, 0.25" THICK, BY BORING & JACKING**

**BEGIN PROJECT 37857 -L- STA. 13+00.00**  
 (SEE PAVEMENT MARKING PLANS)

**PROP. MH#2**  
 STA. 11+17 -S1-  
 STA. 17+09 (26' RT) -L-  
**PROP. 143' - 8" PVC SEWER PIPE, SDR 26**

ADJUST EXISTING MANHOLE

-Y- POT Sta. 9+94.76 =  
 -L- POC Sta. 18+78.33

**PLUG & FILL OR REMOVE ABANDONED PIPE**

**PROP. MH#1**  
 STA. 10+00 -S1-  
 STA. 15+90 (48' RT) -L-  
**PROP. 117' - 8" PVC SEWER PIPE, SDR 26**

SAN. SEWER C.O. (TYP.)  
 SEE NOTE 3

REMOVE & RESET METER AS REQUIRED TO CONSTRUCT SANITARY SEWER.

**PROP. 29' - 3/4" PE WATER TUBING, SDR 9, 200 # WP**  
**29' - 1" PVC ENCASEMENT PIPE, SCH 40**  
**RECONNECT EXISTING WATER METER**

SANITARY SEWER EASEMENT TO BE ACQUIRED BY THE CITY OF MARION.

**PROP. 734' - FILL OR REMOVE ABANDONED 10" & 15" PIPES, TC SEWER**  
**PROP. 4 - BREAKDOWN, PLUG & FILL ABANDONED UTILITY MANHOLE**

REMOVE EXIST. FIRE HYDRANT AND VALVE AND CAP EXISTING TEE

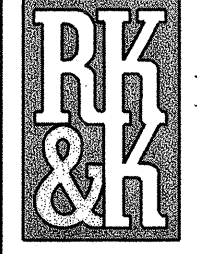
TEMPORARY ROADWAY CONSTRUCTION EASEMENT

**PROP. 1 - FIRE HYDRANT**  
**48' - 6" DI RJ WATER PIPE, PC 350**  
**1 - 12" x 6" RJ DI TEE**  
**1 - 6" GATE VALVE & VALVE BOX, 200#WP**  
 SEE SHEET UC-19 FOR DETAIL

-L-  
 PI Sta 19+41.78  
 $\Delta = 42' 23" 09.0" (RT)$   
 $D = 6' 45" 00.0"$   
 $L = 627.94'$   
 $T = 329.12'$   
 $R = 848.83'$   
 SE = 0.06 ft/ft  
 RO = 180 ft

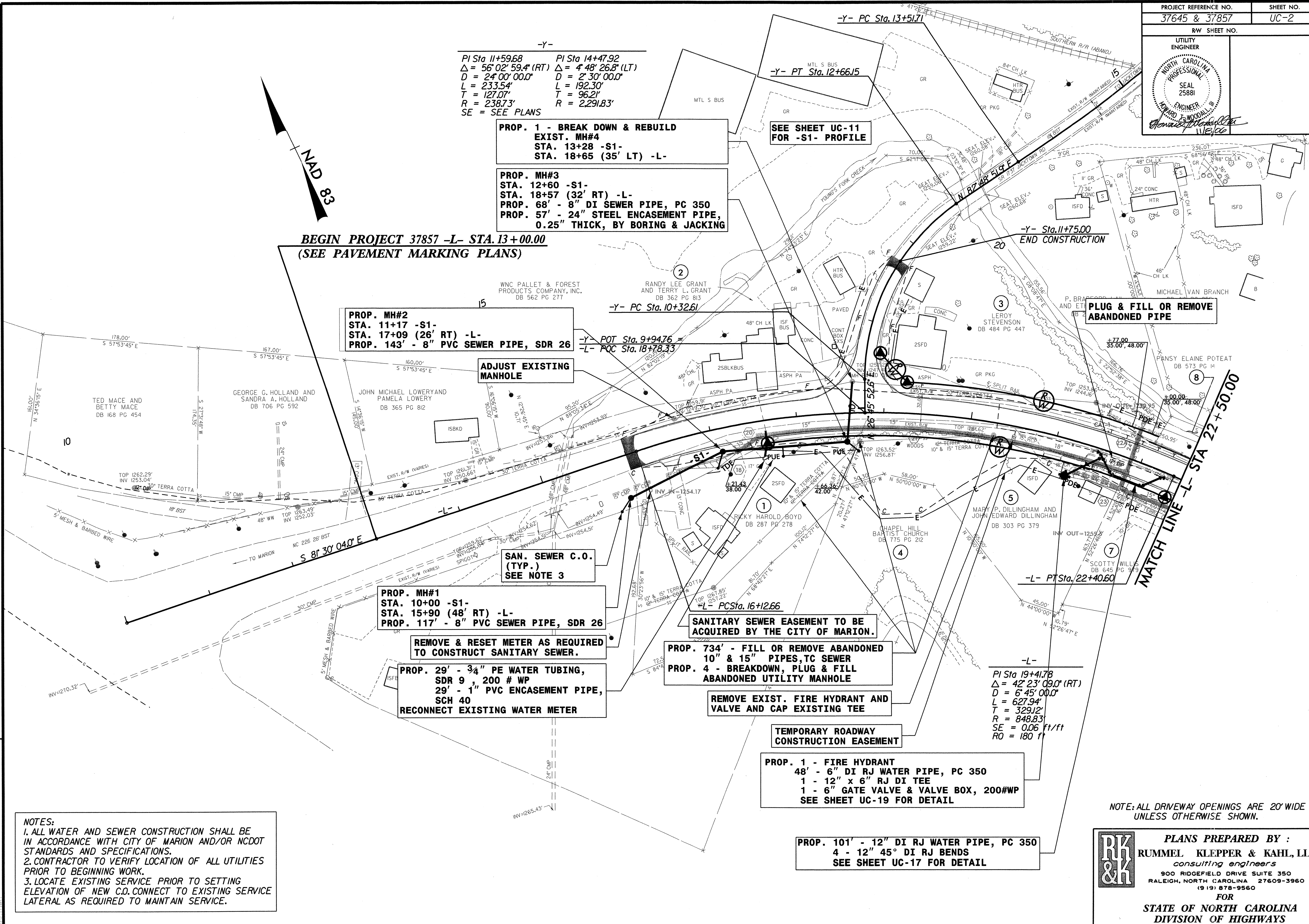
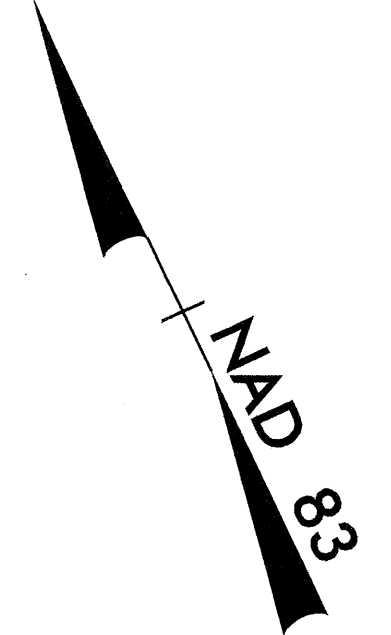
**PROP. 101' - 12" DI RJ WATER PIPE, PC 350**  
**4 - 12" 45° DI RJ BENDS**  
 SEE SHEET UC-17 FOR DETAIL

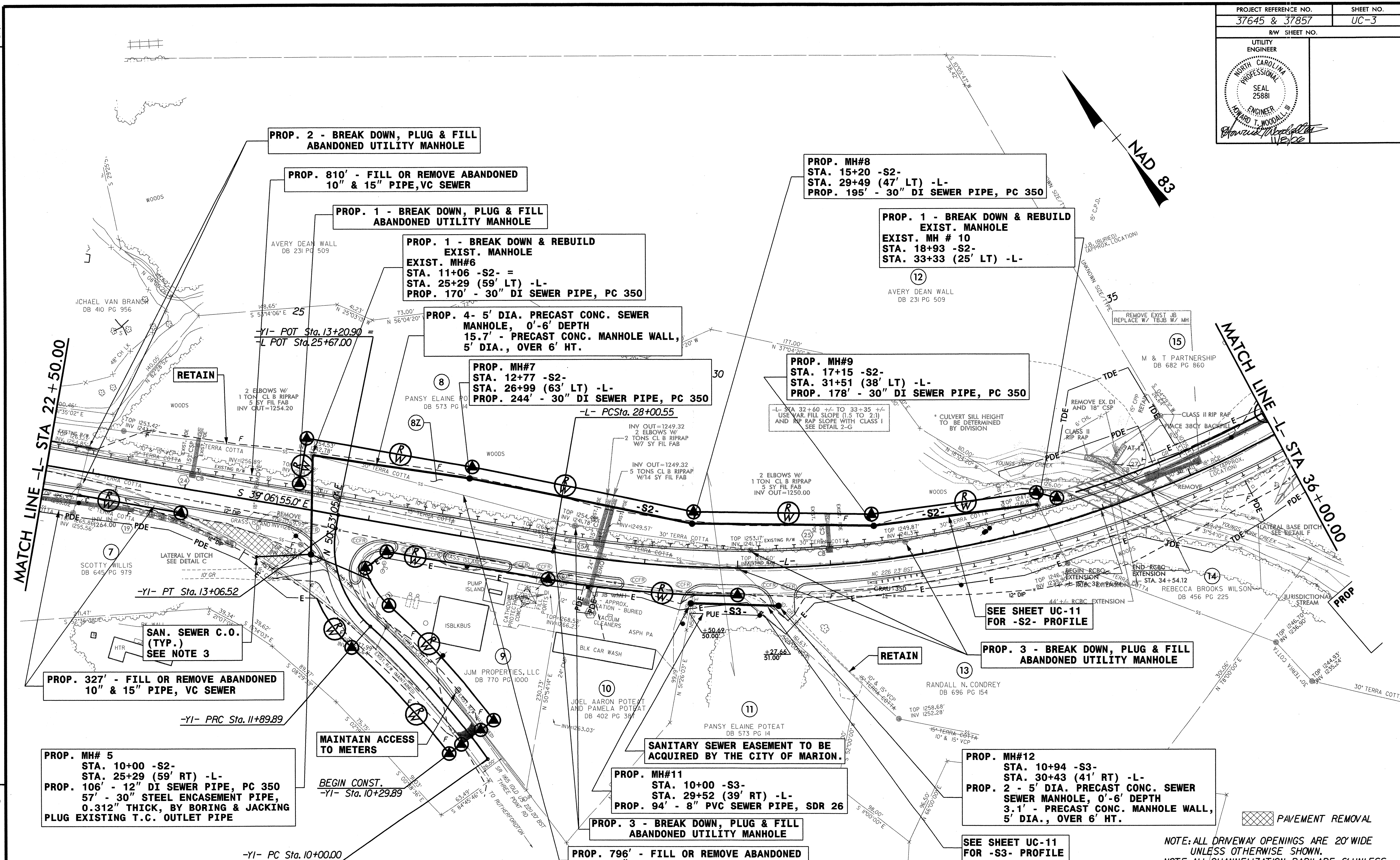
NOTE: ALL DRIVEWAY OPENINGS ARE 20' WIDE UNLESS OTHERWISE SHOWN.

**PLANS PREPARED BY :**  

**RUMMEL KLEPPER & KAHL, LLP**  
*consulting engineers*  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 (919) 878-9560  
 FOR  
**STATE OF NORTH CAROLINA**  
**DIVISION OF HIGHWAYS**

**NOTES:**  
 1. ALL WATER AND SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF MARION AND/OR NCDOT STANDARDS AND SPECIFICATIONS.  
 2. CONTRACTOR TO VERIFY LOCATION OF ALL UTILITIES PRIOR TO BEGINNING WORK.  
 3. LOCATE EXISTING SERVICE PRIOR TO SETTING ELEVATION OF NEW C.O. CONNECT TO EXISTING SERVICE LATERAL AS REQUIRED TO MAINTAIN SERVICE.

REVISIONS





REVISIONS

**PROP. 327' - FILL OR REMOVE ABANDONED 10" & 15" PIPE, VC SEWER**

**PROP. MH# 5**  
STA. 10+00 -S2-  
STA. 25+29 (59' RT) -L-  
**PROP. 106' - 12" DI SEWER PIPE, PC 350**  
57' - 30" STEEL ENCASUREMENT PIPE,  
0.312" THICK, BY BORING & JACKING  
PLUG EXISTING T.C. OUTLET PIPE

**MAINTAIN ACCESS TO METERS**

**BEGIN CONST.**  
-YI- Sta. 10+29.89

-YI- PC Sta. 10+00.00

-YI-  
PI Sta 12+53.78      PI Sta 10+95.37  
Δ = 58°06' 38.8" (RT)      Δ = 13°17' 31.6" (LT)  
D = 49°49' 20.7"      D = 7°00' 00.0"  
L = 116.64'      L = 189.89'  
T = 63.89'      T = 95.37'  
R = 115.00'      R = 818.51'  
SE = SEE PLANS      SE = SEE PLANS

-L-  
PI Sta 35+03.06  
Δ = 60°25' 59.0" (LT)  
D = 4°45' 00.0"  
L = 1,272.27'  
T = 702.51'  
R = 1,206.23'  
SE = 0.05 ft/ft  
RO = 170 ft

**PROP. 796' - FILL OR REMOVE ABANDONED 30" PIPE, TC SEWER**

**PROP. MH#11**  
STA. 10+00 -S3-  
STA. 29+52 (39' RT) -L-  
**PROP. 94' - 8" PVC SEWER PIPE, SDR 26**

**SANITARY SEWER EASEMENT TO BE ACQUIRED BY THE CITY OF MARION.**

**PROP. 3 - BREAK DOWN, PLUG & FILL ABANDONED UTILITY MANHOLE**

**PROP. MH#12**  
STA. 10+94 -S3-  
STA. 30+43 (41' RT) -L-  
**PROP. 2 - 5' DIA. PRECAST CONC. SEWER SEWER MANHOLE, 0'-6" DEPTH**  
3.1' - PRECAST CONC. MANHOLE WALL, 5' DIA., OVER 6' HT.

**SEE SHEET UC-11 FOR -S3- PROFILE**

**PROP. 3 - BREAK DOWN, PLUG & FILL ABANDONED UTILITY MANHOLE**

**SEE SHEET UC-11 FOR -S2- PROFILE**

**PROP. MH#9**  
STA. 17+15 -S2-  
STA. 31+51 (38' LT) -L-  
**PROP. 178' - 30" DI SEWER PIPE, PC 350**

**PROP. 1 - BREAK DOWN & REBUILD EXIST. MANHOLE**  
EXIST. MH # 10  
STA. 18+93 -S2-  
STA. 33+33 (25' LT) -L-

**PROP. MH#8**  
STA. 15+20 -S2-  
STA. 29+49 (47' LT) -L-  
**PROP. 195' - 30" DI SEWER PIPE, PC 350**

**PROP. 1 - BREAK DOWN & REBUILD EXIST. MANHOLE**  
EXIST. MH#6  
STA. 11+06 -S2- =  
STA. 25+29 (59' LT) -L-  
**PROP. 170' - 30" DI SEWER PIPE, PC 350**

**PROP. 4- 5' DIA. PRECAST CONC. SEWER MANHOLE, 0'-6" DEPTH**  
15.7' - PRECAST CONC. MANHOLE WALL, 5' DIA., OVER 6' HT.

**PROP. MH#7**  
STA. 12+77 -S2-  
STA. 26+99 (63' LT) -L-  
**PROP. 244' - 30" DI SEWER PIPE, PC 350**

**PROP. 810' - FILL OR REMOVE ABANDONED 10" & 15" PIPE, VC SEWER**

**PROP. 2 - BREAK DOWN, PLUG & FILL ABANDONED UTILITY MANHOLE**

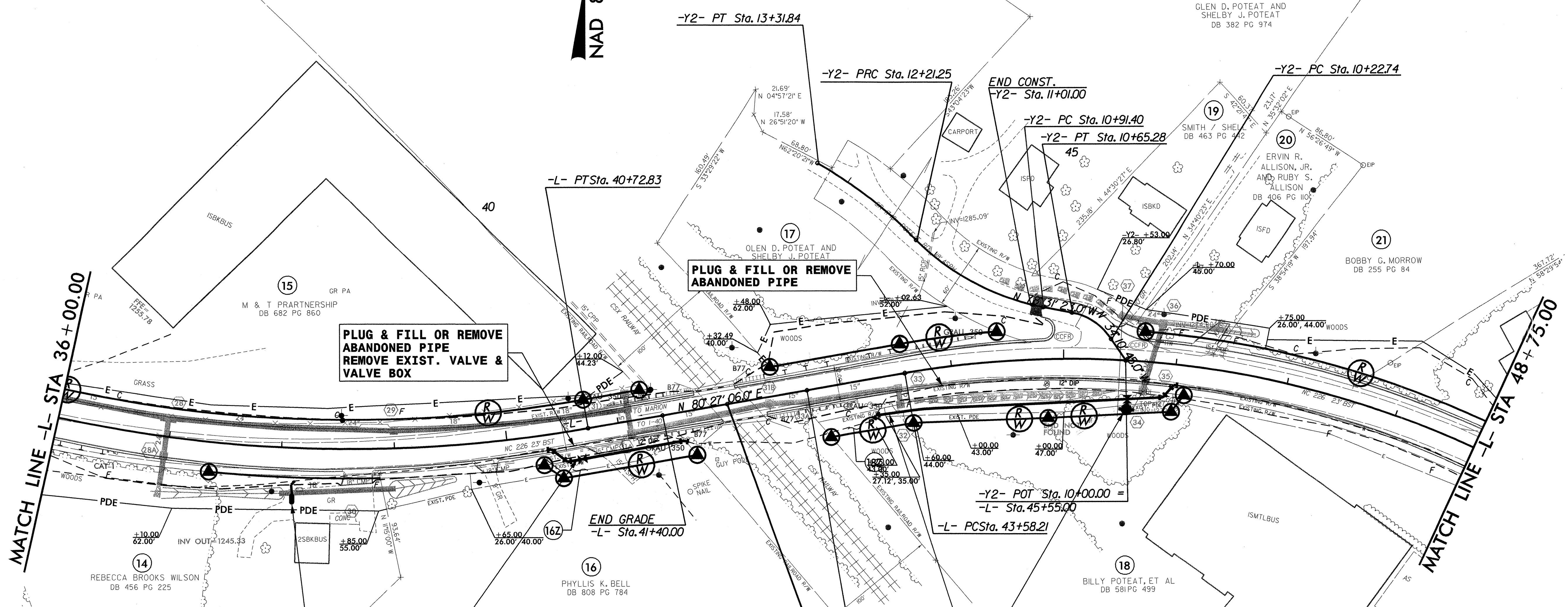
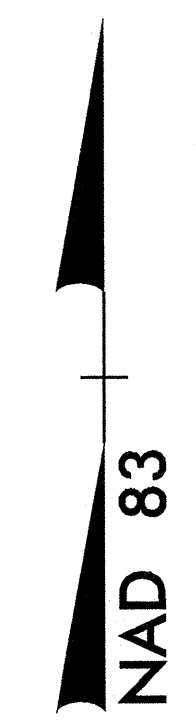
NOTE: ALL DRIVEWAY OPENINGS ARE 20' WIDE UNLESS OTHERWISE SHOWN.  
NOTE: ALL CHANNELIZATION RADII ARE 6' UNLESS OTHERWISE SHOWN.

**PLANS PREPARED BY :**  
 **RUMMEL KLEPPER & KAHL, LLP**  
consulting engineers  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
(919) 878-9560  
FOR  
**STATE OF NORTH CAROLINA**  
DIVISION OF HIGHWAYS

**NOTES:**  
1. ALL WATER AND SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF MARION AND/OR NCDOT STANDARDS AND SPECIFICATIONS.  
2. CONTRACTOR TO VERIFY LOCATION OF ALL UTILITIES PRIOR TO BEGINNING WORK.  
3. LOCATE EXISTING SERVICE PRIOR TO SETTING ELEVATION OF NEW C.O. CONNECT TO EXISTING SERVICE LATERAL AS REQUIRED TO MAINTAIN SERVICE.

PAVEMENT REMOVAL

-Y2-		
PI Sta 10+45.14 Δ = 44° 20' 38.0" (LT) D = 104' 15' 00.0" L = 42.54' T = 22.40' R = 54.96' SE = SEE PLANS	PI Sta 11+58.35 Δ = 34° 24' 32.6" (RT) D = 26' 30' 00.0" L = 129.85' T = 66.95' R = 216.21'	PI Sta 12+76.90 Δ = 15° 45' 34.6" (LT) D = 14' 15' 00.0" L = 110.59' T = 55.65' R = 402.08'



**PROP. 1 - RELOCATE EXIST. WATER METER**  
 10' - 3/4" PE WATER TUBING,  
 SDR 9, 200# WP  
 5' - 1" PVC ENCASEMENT PIPE, SCH 40  
 AT CULVERT  
 CONNECT TO EXISTING SERVICE LINE

**END PROJECT 37857 -L- STA. 41+98.24**  
**BEGIN PROJECT 37645 -L- STA. 41+98.24**

**PROP. 130' 12" DI RJ WATER PIPE, PC 350**  
 2 - 12" 45° DI RJ BENDS  
 1 - 12" 22 1/2° DI RJ BEND  
 1 - 12" GATE VALVE & VALVE BOX,  
 200 PSI WP  
 SEE SHEET UC-17 FOR DETAIL

**PROP. 274' 12" DI RJ WATER PIPE, PC 350**  
 3 - 12" 45° DI RJ BENDS  
 1 - 12" 11 1/4° DI RJ BEND  
 10' - 6" DI RJ WATER PIPE, PC 350  
 1 - 12" x 6" DI RJ TEE  
 1 - 6" GATE VALVE & VALVE BOX,  
 200# WP  
 LOCATE VALVE OUTSIDE RIP RAP AREA  
 RELOCATE FIRE HYDRANT 1' INSIDE  
 PROP. R/W  
 REMOVE EXIST. 6" VALVE, VALVE  
 BOX, & HYDRANT  
 SEE SHEET UC-19 FOR DETAIL

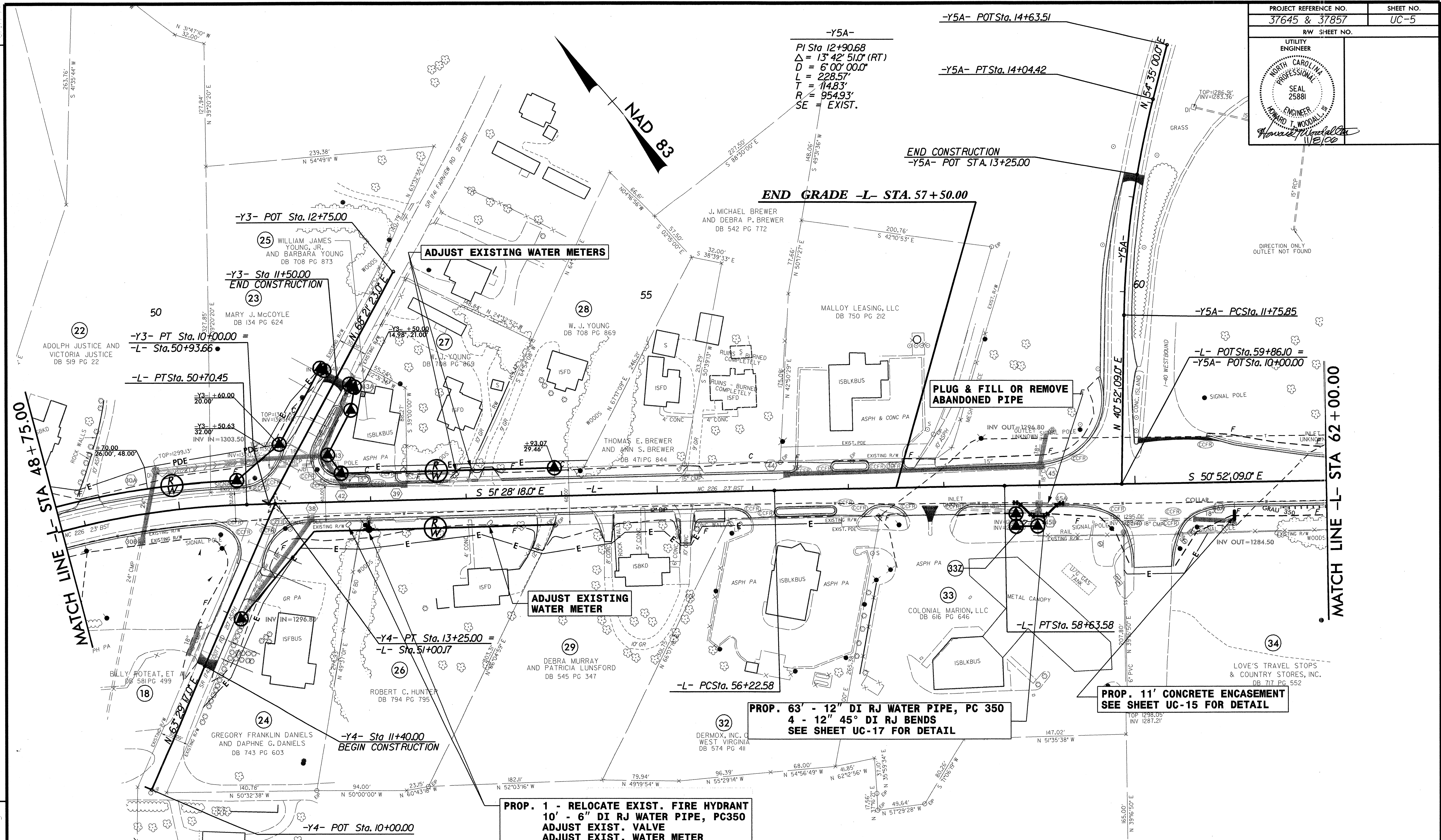
**NOTE: ALL DRIVEWAY OPENINGS ARE 20' WIDE UNLESS OTHERWISE SHOWN.**

**NOTES:**  
 1. ALL WATER AND SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF MARION AND/OR NCDOT STANDARDS AND SPECIFICATIONS.  
 2. CONTRACTOR TO VERIFY LOCATION OF ALL UTILITIES PRIOR TO BEGINNING WORK.

-L-	
PI Sta 35+03.06	Δ = 60° 25' 59.0" (LT)
D = 4' 45' 00.0"	L = 127.227'
T = 702.51'	R = 1206.23'
SE = 0.05 ft/ft	RO = 170 ft

-L-	
PI Sta 47+36.81	Δ = 48° 04' 36.0" (RT)
D = 6' 45' 00.0"	L = 712.25'
T = 378.60'	R = 848.83'
SE = 0.06 ft/ft	RO = 180 ft

**PLANS PREPARED BY :**  
**RUMMEL KLEPPER & KAHL, LLP**  
*consulting engineers*  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 (919) 878-9560  
 FOR  
**STATE OF NORTH CAROLINA**  
**DIVISION OF HIGHWAYS**



REVISIONS

11/7/2016  
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**PROP. 1 - RELOCATE EXIST. FIRE HYDRANT**  
 10' - 6" DI RJ WATER PIPE, PC350  
 ADJUST EXIST. VALVE  
 ADJUST EXIST. WATER METER

**PROP. 63' - 12" DI RJ WATER PIPE, PC 350**  
 4 - 12" 45° DI RJ BENDS  
 SEE SHEET UC-17 FOR DETAIL

**PROP. 11' CONCRETE ENCASEMENT**  
 SEE SHEET UC-15 FOR DETAIL

**PLUG & FILL OR REMOVE**  
**ABANDONED PIPE**

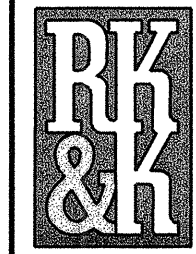
**ADJUST EXISTING WATER METERS**

**ADJUST EXISTING**  
**WATER METER**

**NOTES:**  
 1. ALL WATER AND SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF MARION AND/OR NCDOT STANDARDS AND SPECIFICATIONS.  
 2. CONTRACTOR TO VERIFY LOCATION OF ALL UTILITIES PRIOR TO BEGINNING WORK.

-L-  
 PI Sta 57+43.08  
 $\Delta = 0'36'09.0"$  (RT)  
 $D = 0'15'00.0"$   
 $L = 241.00'$   
 $T = 120.50'$   
 $R = 22,918.31'$   
 SE = NC

NOTE: ALL DRIVEWAY OPENINGS ARE 20' WIDE UNLESS OTHERWISE SHOWN.  
 NOTE: ALL CHANNELIZATION RADII ARE 5' UNLESS OTHERWISE SHOWN.

**PLANS PREPARED BY :**  

**RUMMEL KLEPPER & KAHL, LLP**  
*consulting engineers*  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 (919) 878-9560  
 FOR  
**STATE OF NORTH CAROLINA**  
**DIVISION OF HIGHWAYS**

**-Y5B-**  
 PIs Sta 12+46.01    PI Sta 14+04.65  
 Δs = 21° 37' 15.8"    Δ = 38° 40' 03.3" (LT)  
 Ls = 200.00'    D = 21° 37' 15.8"  
 LT = 134.34'    L = 178.84'  
 ST = 67.58'    T = 92.98'  
                   R = 265.00'  
                   SE = EXIST.

MATCH LINE -L- STA 62+00.00

MATCH LINE -L- STA 76+00.00

**END CONSTRUCTION**  
**-Y5B- POT STA.13+00.00**

**PLUG & FILL OR REMOVE ABANDONED PIPE AND APPURTENANCES**

**ADJUST EXIST. WATER VALVE**

**END CONSTRUCTION -L- STA. 71+50.00**

**-Y6- POT Sta. 13+44.97 = -L- Sta. 70+62.00**

**-Y5B- POT Sta. 10+00.00 = -L- POT Sta. 67+98.00**

**-L- PCS Sta. 68+81.53**

**-L- PT Sta. 75+36.27**

**-Y6- PT Sta. 11+11.70**

**-Y6- PC Sta. 10+00.00**

**SUPPORT FOR EXISTING UTILITIES REQUIRED BY CONTRACTOR**

**PROP. 247' - 12" DI RJ WATER PIPE, PC350**  
**4 - 12" 45° DI RJ BENDS**  
**1 - 12" x 6" DI RJ TEE**

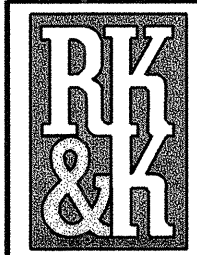
**PROP. 1 - RELOCATE EXIST. FIRE HYDRANT**  
**23' - 6" DI RJ WATER PIPE, PC 350**  
**1 - 6" GATE VALVE & VALVE BOX**

**-L-**  
 PI Sta 72+12.71  
 Δ = 21° 16' 45.0" (RT)  
 D = 3' 15' 00.0"  
 L = 654.74'  
 T = 331.19'  
 R = 1,762.95'  
 SE = 0.05 ft/ft  
 RO = 140 ft

**-Y6-**  
 PI Sta 10+55.88  
 Δ = 4° 59' 59.2" (LT)  
 D = 4' 28' 34.4"  
 L = 111.70'  
 T = 55.88'  
 R = 1,280.00'

**NOTES:**  
 1. ALL WATER AND SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF MARION AND/OR NCDOT STANDARDS AND SPECIFICATIONS.  
 2. CONTRACTOR TO VERIFY LOCATION OF ALL UTILITIES PRIOR TO BEGINNING WORK.

NOTE: ALL DRIVEWAY OPENINGS ARE 20' WIDE UNLESS OTHERWISE SHOWN.

**PLANS PREPARED BY :**  
 **RUMMEL KLEPPER & KAHL, LLP**  
*consulting engineers*  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 (919) 878-9560  
 FOR  
**STATE OF NORTH CAROLINA**  
**DIVISION OF HIGHWAYS**

REVISIONS

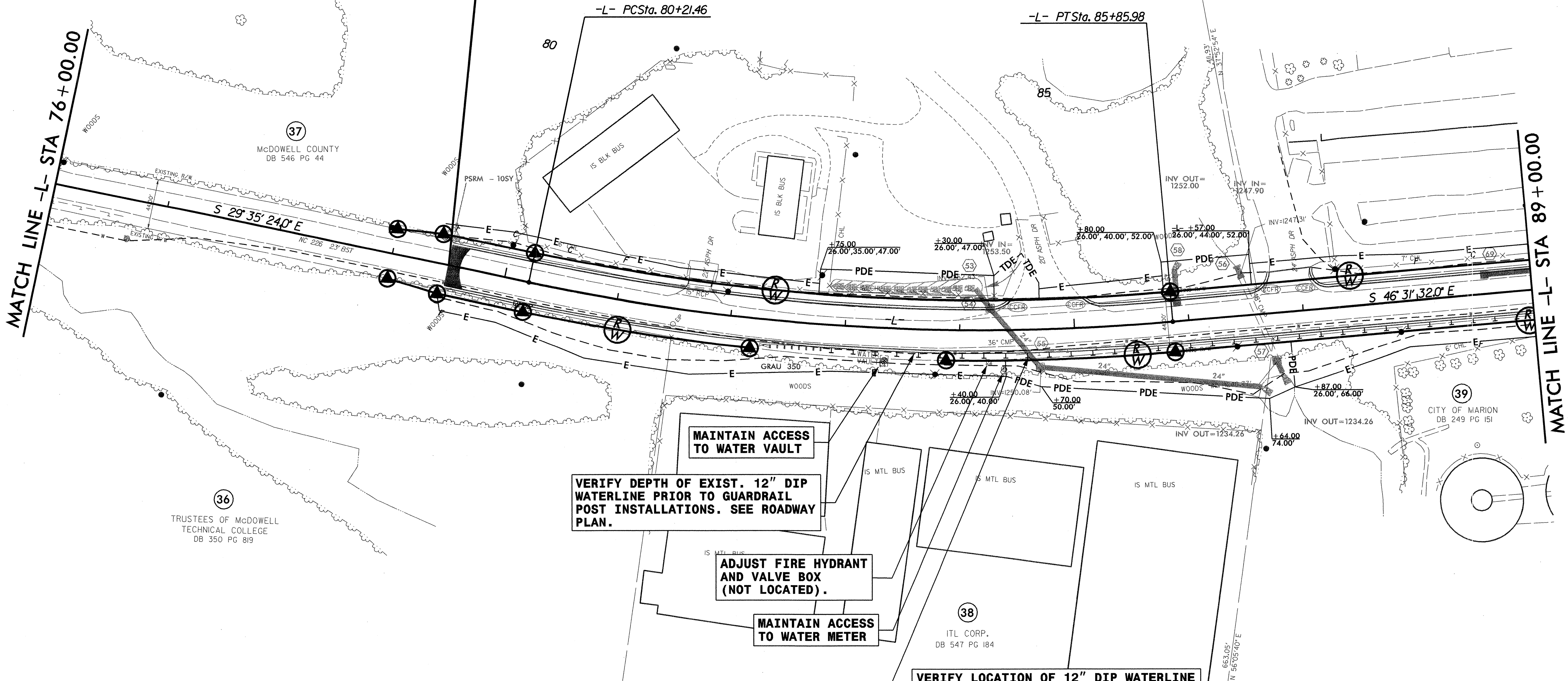
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(40)  
NORTH CAROLINA DEPT. OF  
TRANSPORTATION AND PUBLIC WORKS  
NO DEED

BEGIN CONSTRUCTION -L- STA. 79+50.00

MATCH LINE -L- STA 76+00.00

MATCH LINE -L- STA 89+00.00



VERIFY DEPTH OF EXIST. 12" DIP WATERLINE PRIOR TO GUARDRAIL POST INSTALLATIONS. SEE ROADWAY PLAN.

ADJUST FIRE HYDRANT AND VALVE BOX (NOT LOCATED).

MAINTAIN ACCESS TO WATER METER

VERIFY LOCATION OF 12" DIP WATERLINE PRIOR TO STORM DRAIN INSTALLATION. WATERLINE ASSUMED TO BE BELOW EXIST. 36" CMP. SEE ROADWAY PLAN.

NOTES:  
1. ALL WATER AND SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF MARION AND/OR NCDOT STANDARDS AND SPECIFICATIONS.  
2. CONTRACTOR TO VERIFY LOCATION OF ALL UTILITIES PRIOR TO BEGINNING WORK.

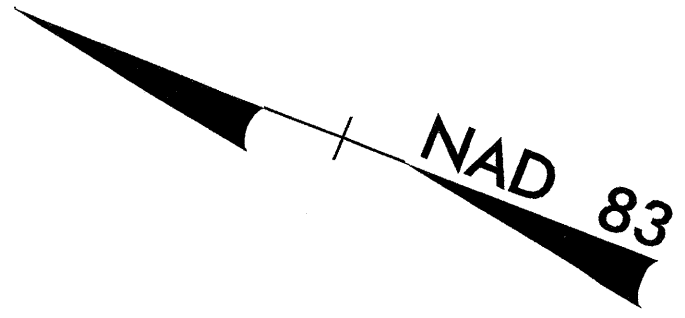
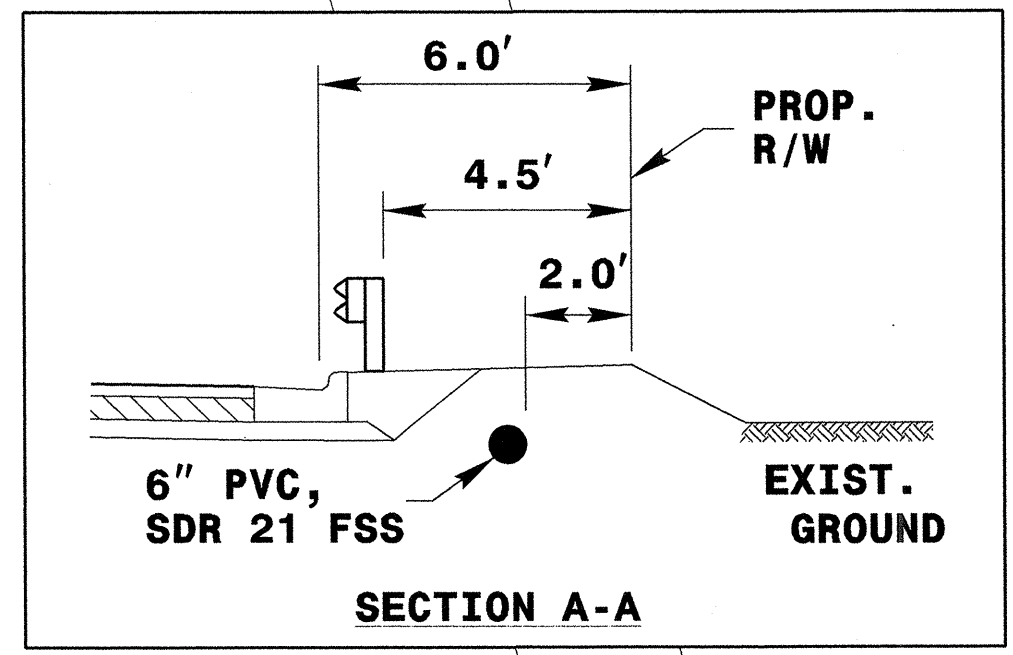
NOTE: ALL DRIVEWAY OPENINGS ARE 20' WIDE UNLESS OTHERWISE SHOWN.

**R&K**  
PLANS PREPARED BY :  
**RUMMEL KLEPPER & KAHL, LLP**  
consulting engineers  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
(919) 878-9560  
FOR  
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

-L-  
PI Sta 83+05.79  
Δ = 16° 56' 08.0" (LT)  
D = 3° 00' 00.0"  
L = 564.52'  
T = 284.33'  
R = 1909.86'  
SE = 0.04 ft/ft  
RO = 130 ft

REVISIONS

11/7/2006  
 H:\projects\37645\37857\112306\37-25\112306-uc-7.dgn  
 8/17/00



40  
NORTH CAROLINA DEPT. OF  
TRANSPORTATION AND PUBLIC WORKS  
NO DEED

41  
THE McDOWELL AGRICULTURAL  
CENTER, INC.  
DB 220 PG 498

**PROP. 161' - 12" DI RJ WATER PIPE, PC350**  
1 - 12" 90° DI RJ BEND  
4 - 12" 45° DI RJ BENDS  
INSTALL VERTICAL BENDS AS  
REQUIRED TO AVOID CONFLICT  
WITH PROPOSED STORM DRAINAGE  
SEE SHEET UC-17 FOR DETAIL

**RESTRAIN 45° BEND  
TO EXIST. VALVE**

**PROP. 694' - 12" DI WATER PIPE, PC350**  
2 - 12" 45° DI RJ BEND

**ADJUST EXISTING  
MANHOLE**

-W1- STA. 10+00 (45° BEND) =  
-L- STA. 96+25 (18' LT)

-Y7- Sta 11+70.00  
END CONSTRUCTION

**PLUG & FILL OR REMOVE  
ABANDONED PIPE**

**PROP. 870' - 6" PVC, SDR 21 FORCE MAIN SEWER**  
1 - 6" 45° DI RJ BEND  
1 - 11 1/2" DI RJ BEND  
SEE SHEET UC-17 FOR DETAIL

**PLUG & FILL OR REMOVE  
ABANDONED PIPE**

**6" PVC, SDR 21 FSS**

-S4- STA. 10+00 (45° BEND) =  
-L- STA. 94+14 (27' RT)

-DRV- POTSta. 10+00.00  
BEGIN CONSTRUCTION

**PLUG & FILL OR REMOVE  
ABANDONED PIPE**

39  
CITY OF MARION  
**PROP. 1 - RELOCATE EXIST. WATER METER**  
11' - 3/4" PE WATER TUBING,  
SDR 9, 200# WP  
11' - 1" PVC ENCASMENT PIPE,  
SCH 40  
1 - 12" x 3/4" TAPPING SADDLE  
1 - 3/4" CORP. STOP

-L-	-DRV-
PI Sta 97+91.57	PI Sta 11+56.43
$\Delta = 58' 48" 08.0" (RT)$	$\Delta = 20' 42" 47.0" (RT)$
D = 6' 05" 00.0"	D = 28' 38" 52.4"
L = 966.61'	L = 72.30'
T = 530.73'	T = 36.55'
R = 941.85'	R = 200.00'
SE = 0.06 ft/ft	SE = NC
RO = 180 ft	

**NOTES:**  
1. ALL WATER AND SEWER CONSTRUCTION SHALL BE  
IN ACCORDANCE WITH CITY OF MARION AND/OR NCDOT  
STANDARDS AND SPECIFICATIONS.  
2. CONTRACTOR TO VERIFY LOCATION OF ALL UTILITIES  
PRIOR TO BEGINNING WORK.

NOTE: ALL DRIVEWAY OPENINGS ARE 20' WIDE  
UNLESS OTHERWISE SHOWN.

**PLANS PREPARED BY :**  
**RUMMEL KLEPPER & KAHL, LLP**  
consulting engineers  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
(919) 878-9560  
FOR  
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

REVISIONS

MATCH LINE -L- STA 89+00.00

MATCH LINE -L- STA 103+00.00

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**PROP. 1 - RELOCATE EXIST. FIRE HYDRANT**  
 1' INSIDE PROP. R/W  
 14' - 6" DI RJ WATER PIPE, PC 350  
 1 - 6" GATE VALVE & VALVE BOX, 200# WP  
 1 - RELOCATE EXIST. WATER METER  
 10' - 3/4" PE TUBING, SDR 9  
 200 PSI WP  
 10' - 1" PVC ENCASEMENT PIPE, SCH 40  
 1 - 3/4" CORP. STOP  
 1 - 12" x 3/4" TAPPING SADDLE

-L-  
 PI Sta 110+11.63  
 $\Delta = 64' 15" 52.0" (LT)$   
 $D = 6' 50" 00.0"$   
 $L = 940.46'$   
 $T = 526.63'$   
 $R = 838.47'$   
 $SE = 0.06 \text{ ft/ft}$   
 $RO = 180 \text{ ft}$

-DRV2-  
 PI Sta 11+12.21  
 $\Delta = 100' 34" 26.3" (LT)$   
 $D = 260' 26" 07.3"$   
 $L = 38.62'$   
 $T = 26.49'$   
 $R = 22.00'$   
 $SE = RC$

**PROP. 1180' - 12" DI RJ WATER PIPE, PC 350**  
 1 - 12" GATE VALVE & VALVE BOX,  
 200 PSI WP  
 1 - RELOCATE EXIST. WATER METER  
 10' - 3/4" PE TUBING, SDR 9,  
 200 PSI WP  
 10' - 1" PVC ENCASEMENT PIPE, SCH 40  
 1 - 3/4" CORP. STOP  
 1 - 12" x 3/4" TAPPING SADDLE  
 SEE SHEET UC-17 FOR DETAIL

-DRV2- PCSta. 10+85.1  
 -DRV2- POTSta. 10+00.00 =  
 -L- POTSta. 114+75.94  
 -DRV2- PTSta. 11+24.34

-DRV2- POTSta. 11+70.00  
 BEGIN CONSTRUCTION

-DRV2- POTSta. 13+00.00  
 END CONSTRUCTION

MATCH LINE -L- STA 103+00.00

MATCH LINE -L- STA 115+00.00

PLUG & FILL OR REMOVE  
 ABANDONED PIPE

PLUG & FILL OR REMOVE  
 ABANDONED PIPE

PROP. 1220' - 6" PVC, SDR 21  
 FORCE MAIN SEWER

PLUG & FILL OR REMOVE  
 ABANDONED PIPE  
 REMOVE EXIST. VALVE

REVISIONS

11/8/2006  
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838.12'

LARRY GILLIAND AND  
 PATRICIA DIANE GILLIAND  
 DB 413 PG 198

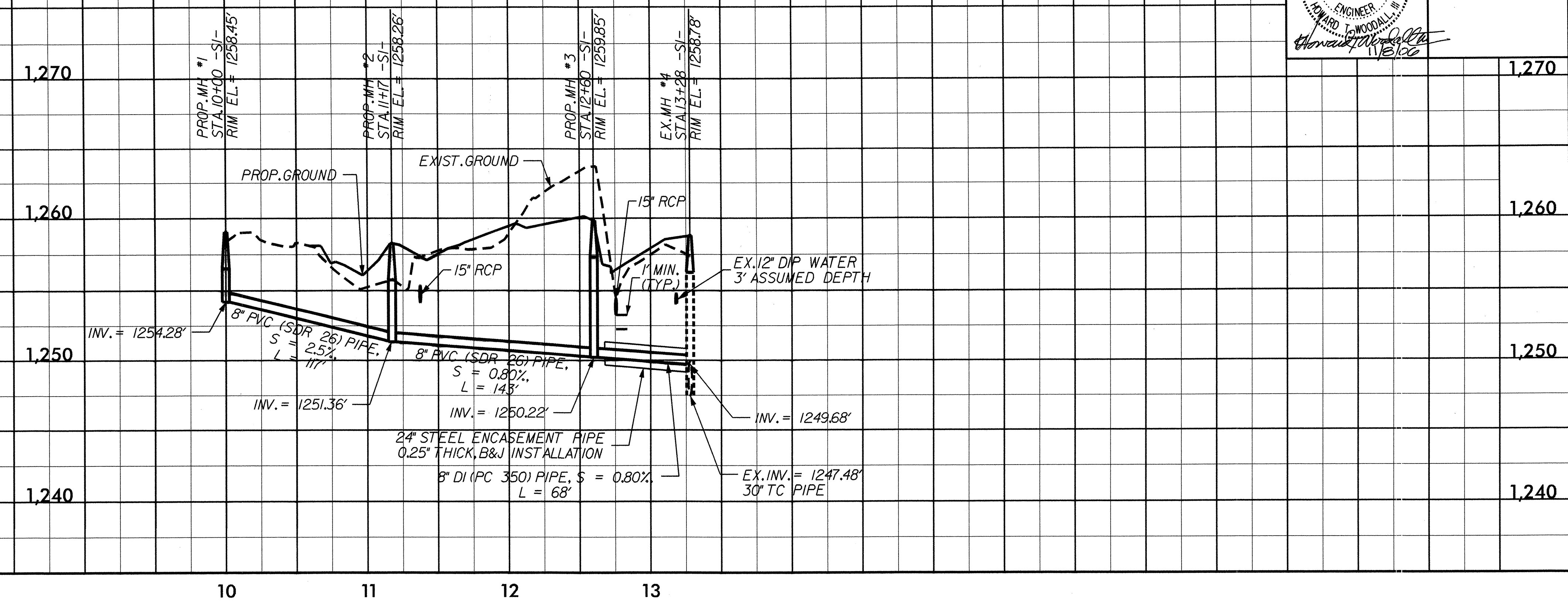
NOTE: ALL DRIVEWAY OPENINGS ARE 20' WIDE  
 UNLESS OTHERWISE SHOWN.

NOTES:  
 1. ALL WATER AND SEWER CONSTRUCTION SHALL BE  
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 RALEIGH, NORTH CAROLINA 27609-3960  
 (919) 878-9560  
 FOR  
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**DIVISION OF HIGHWAYS**

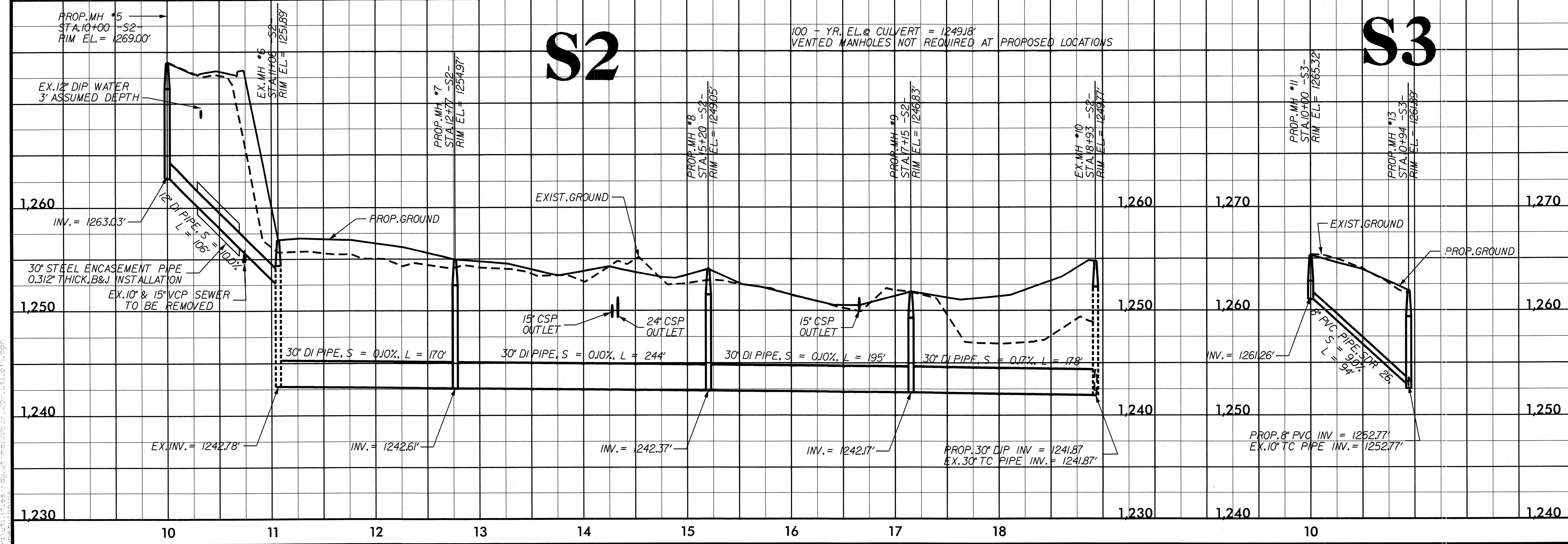


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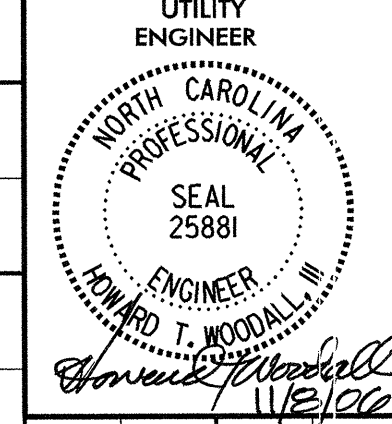
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100 - YR. EL. @ CULVERT = 1249.18'  
 VENTED MANHOLES NOT REQUIRED AT PROPOSED LOCATIONS

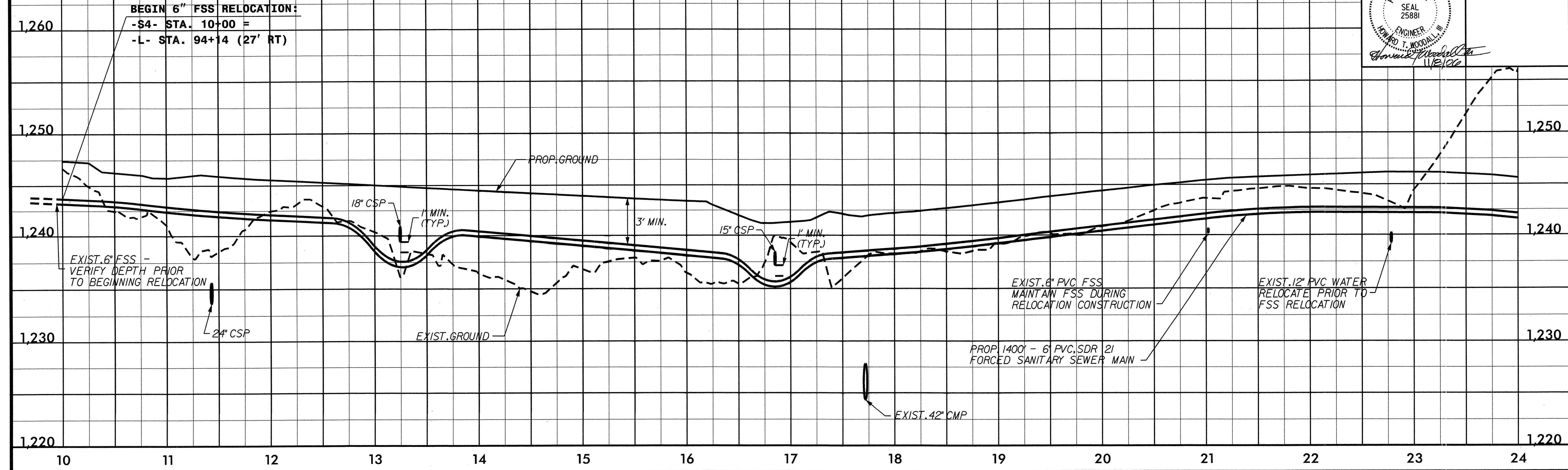


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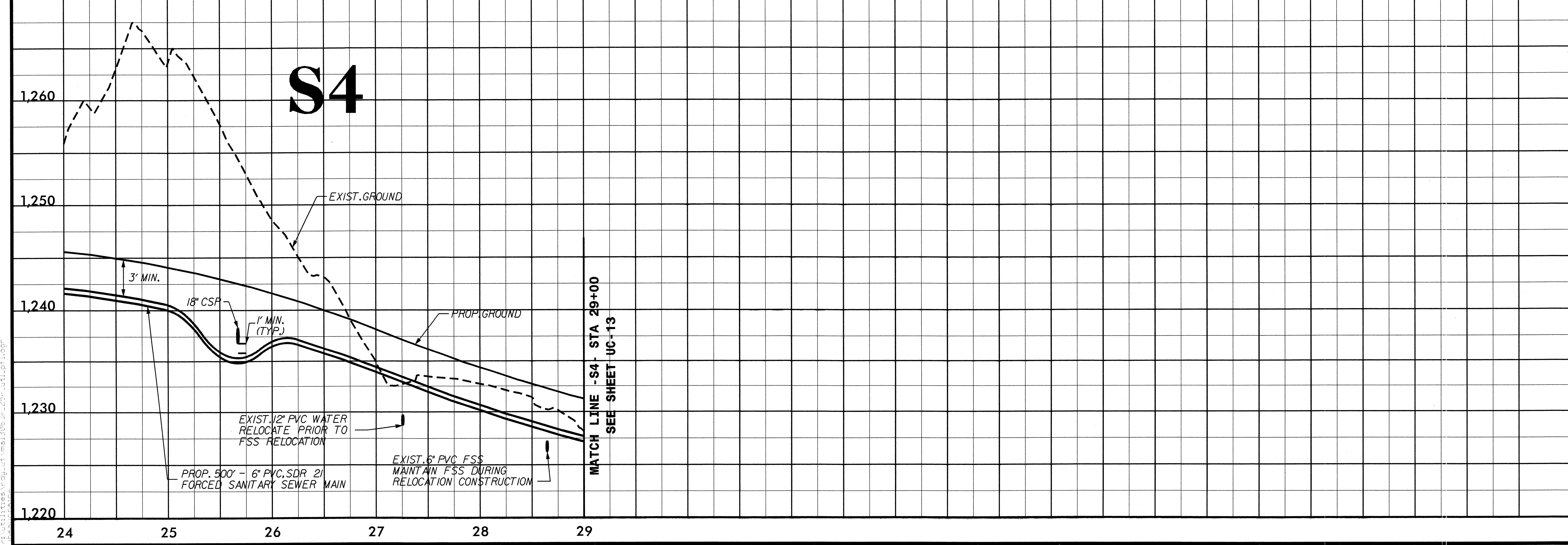
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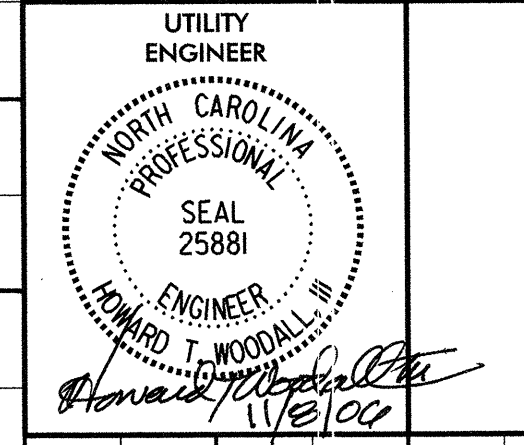
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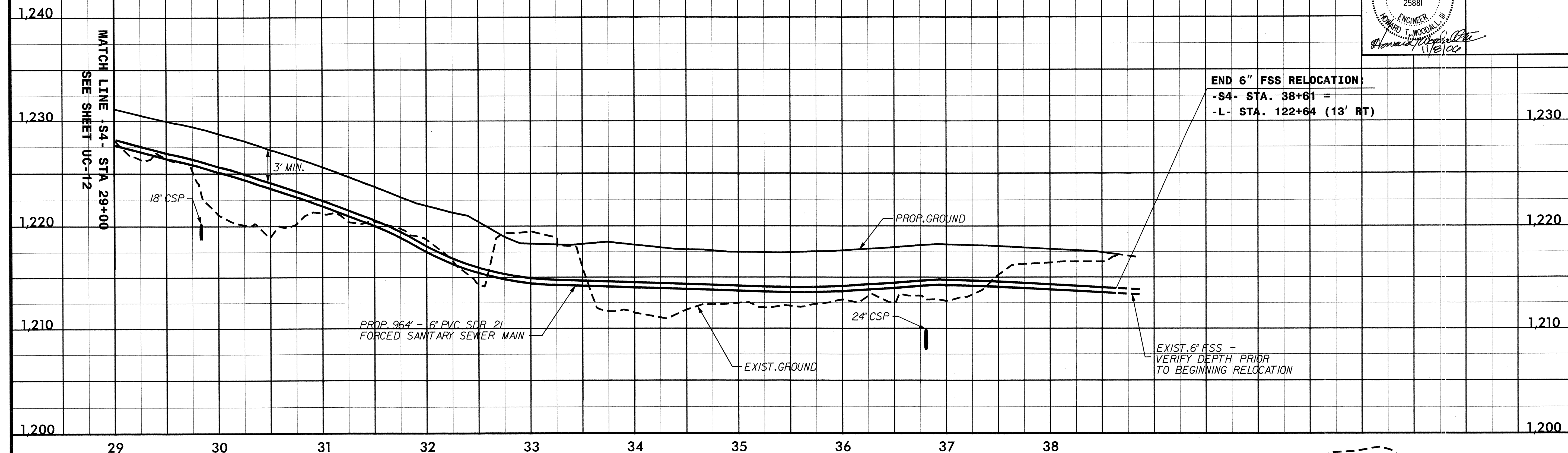
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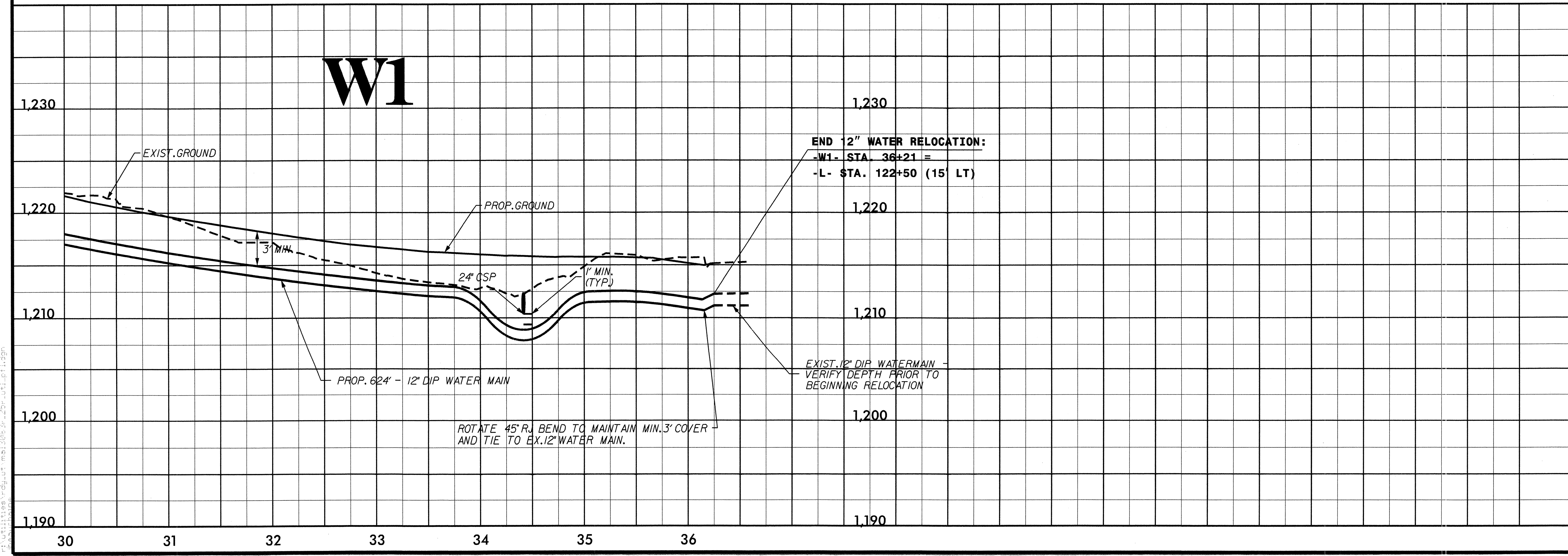
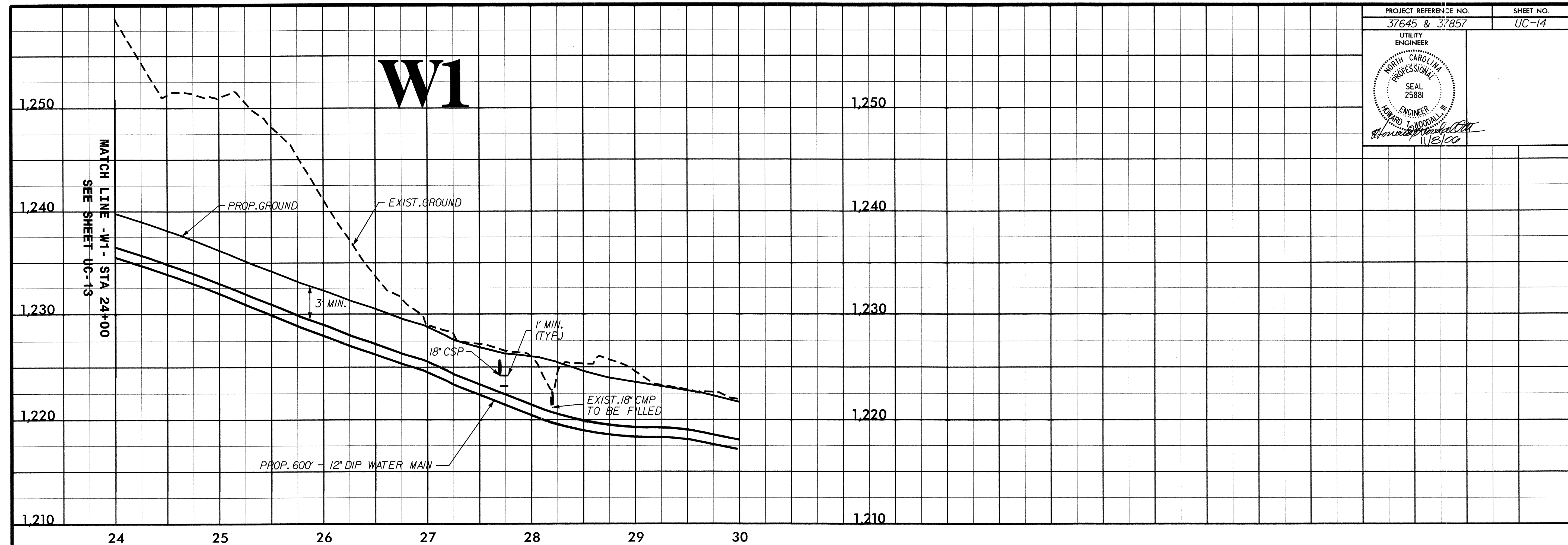
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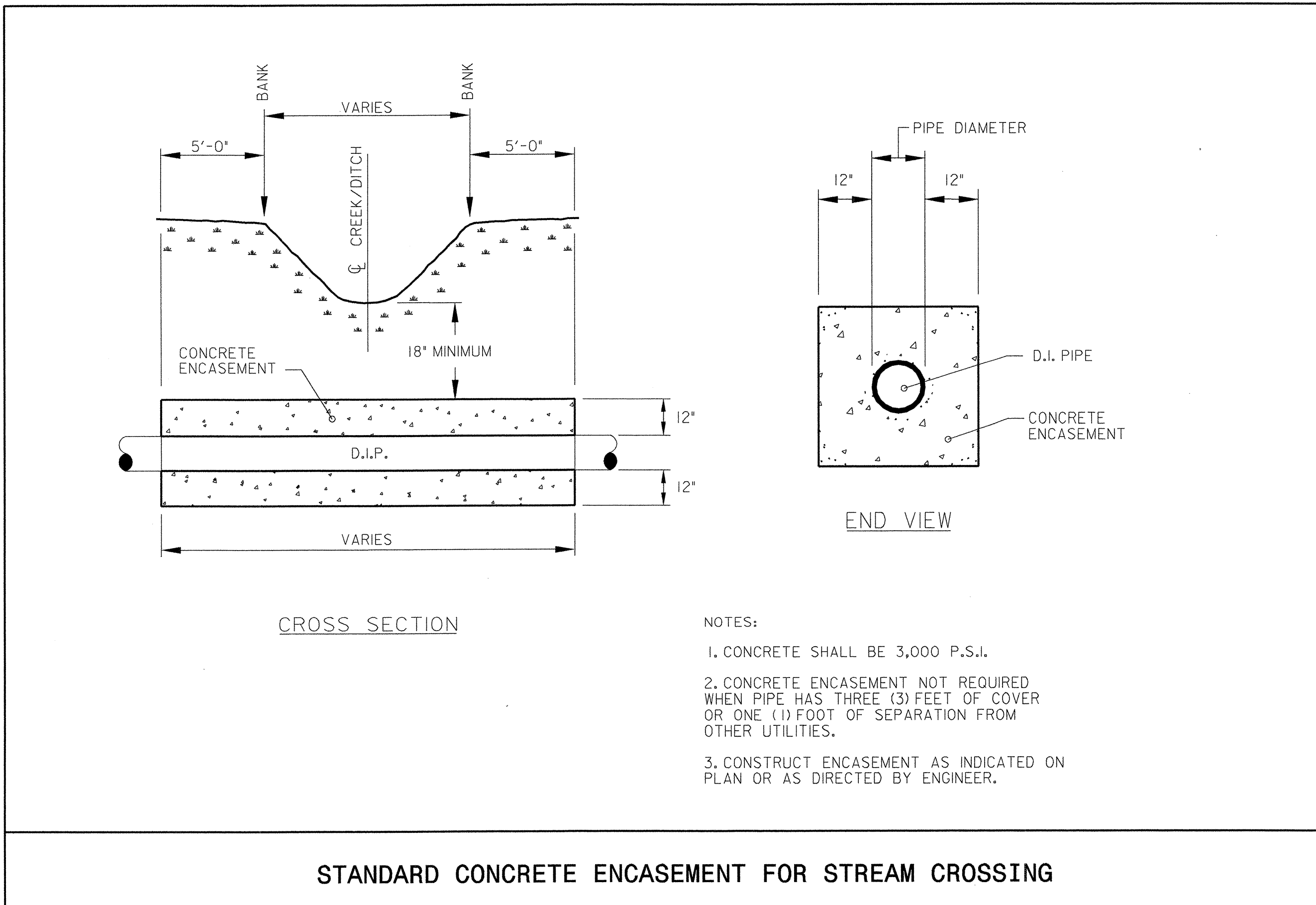
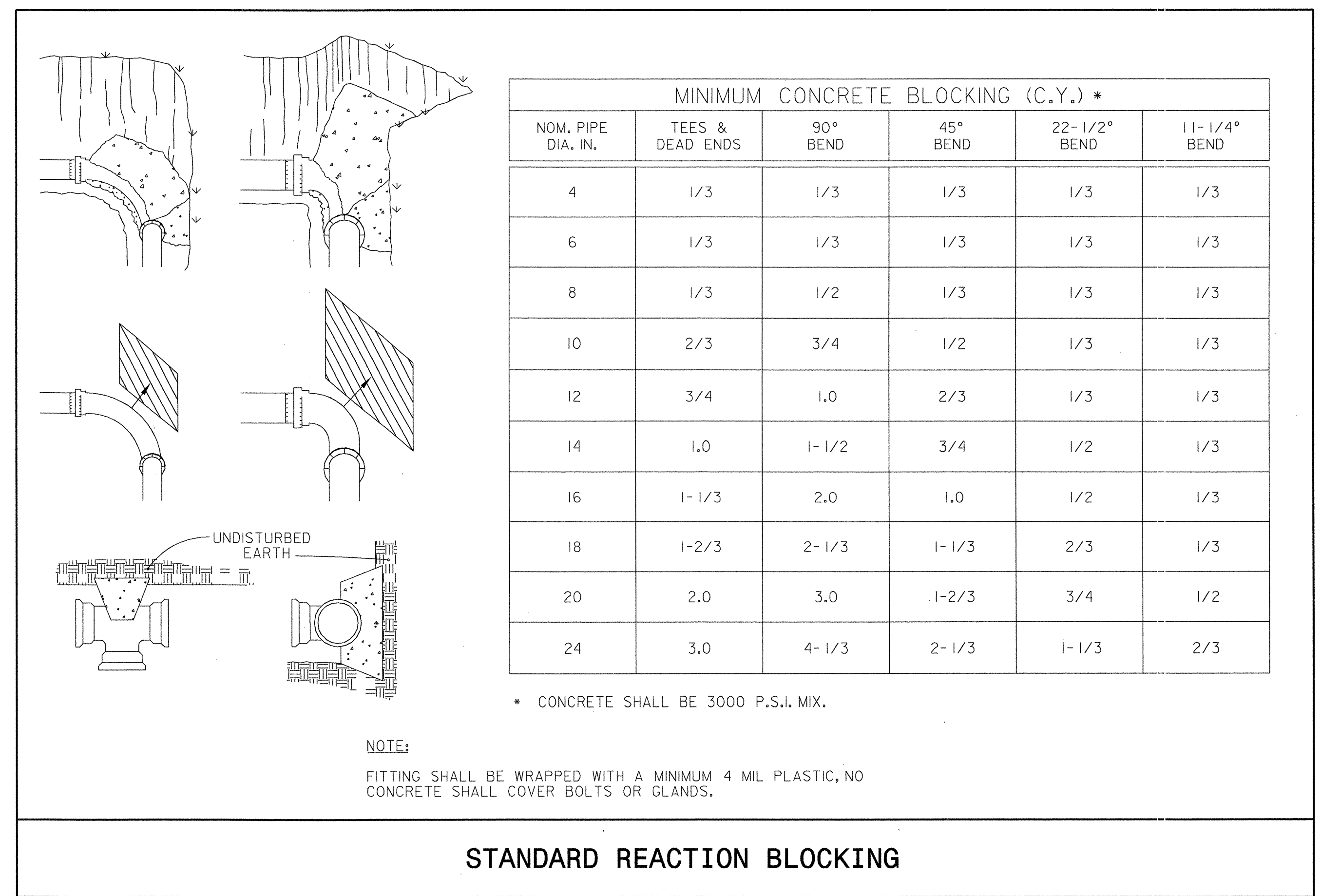
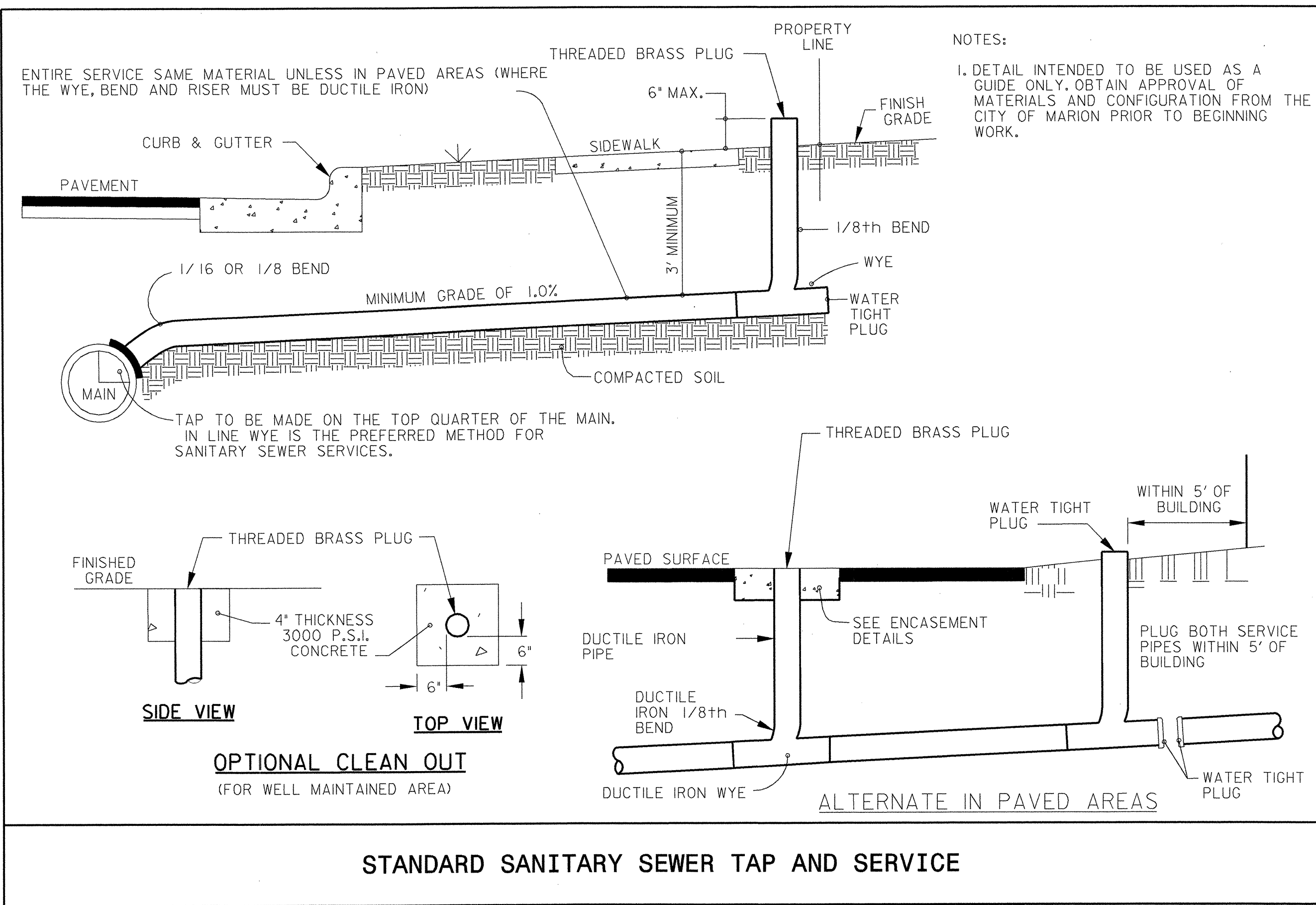
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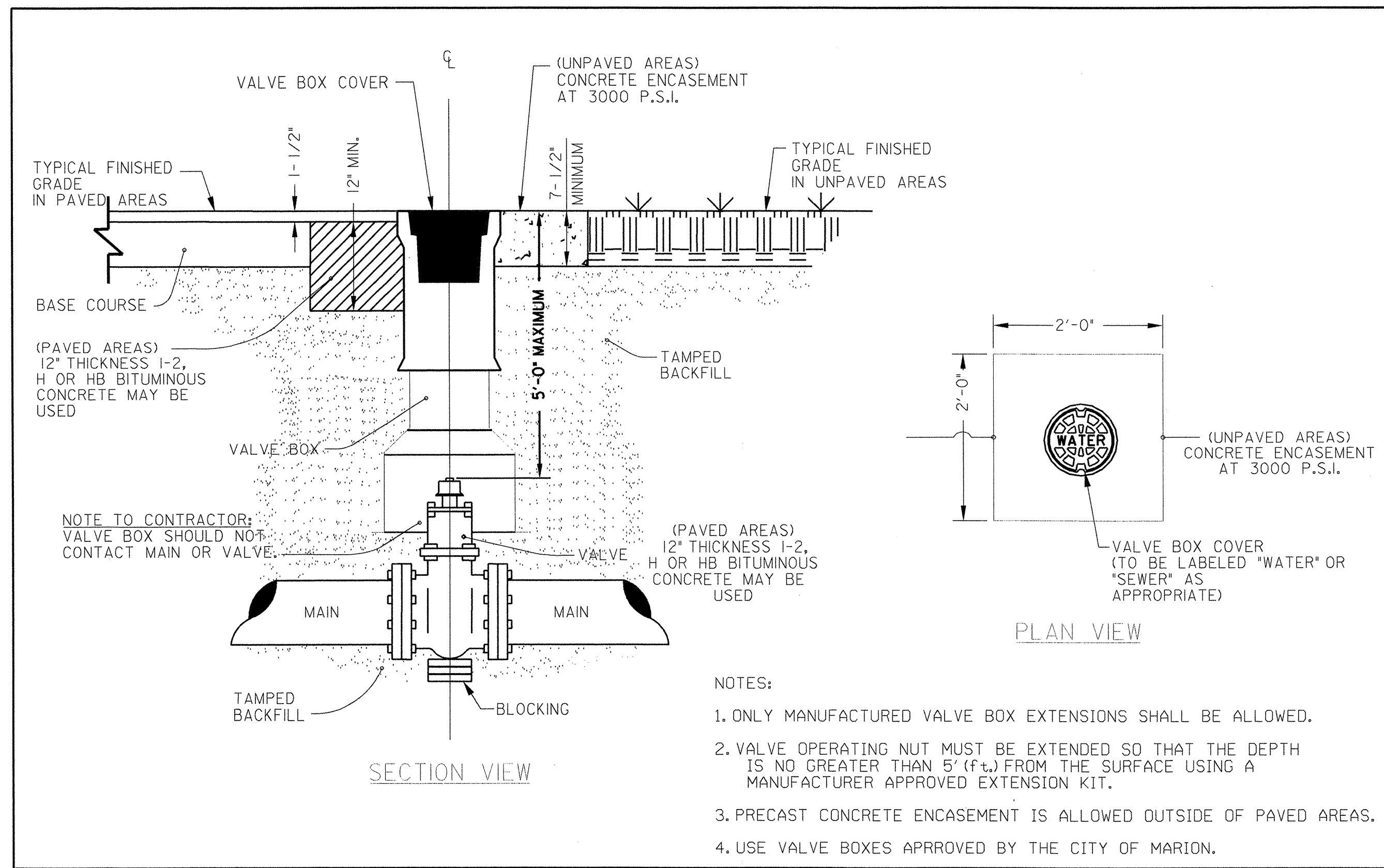


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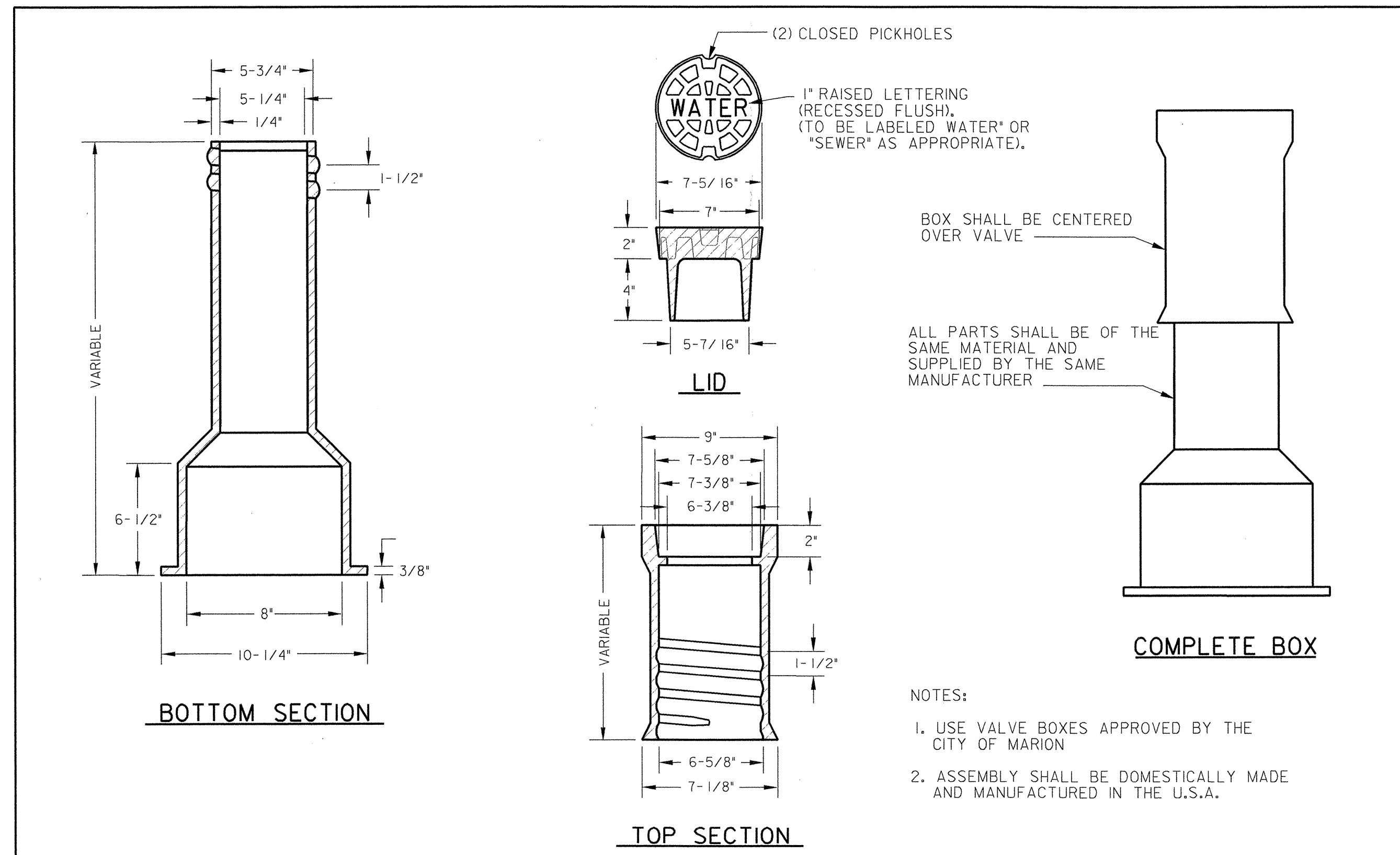


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STANDARD VALVE BOX INSTALLATION (DETAIL 1 of 2)

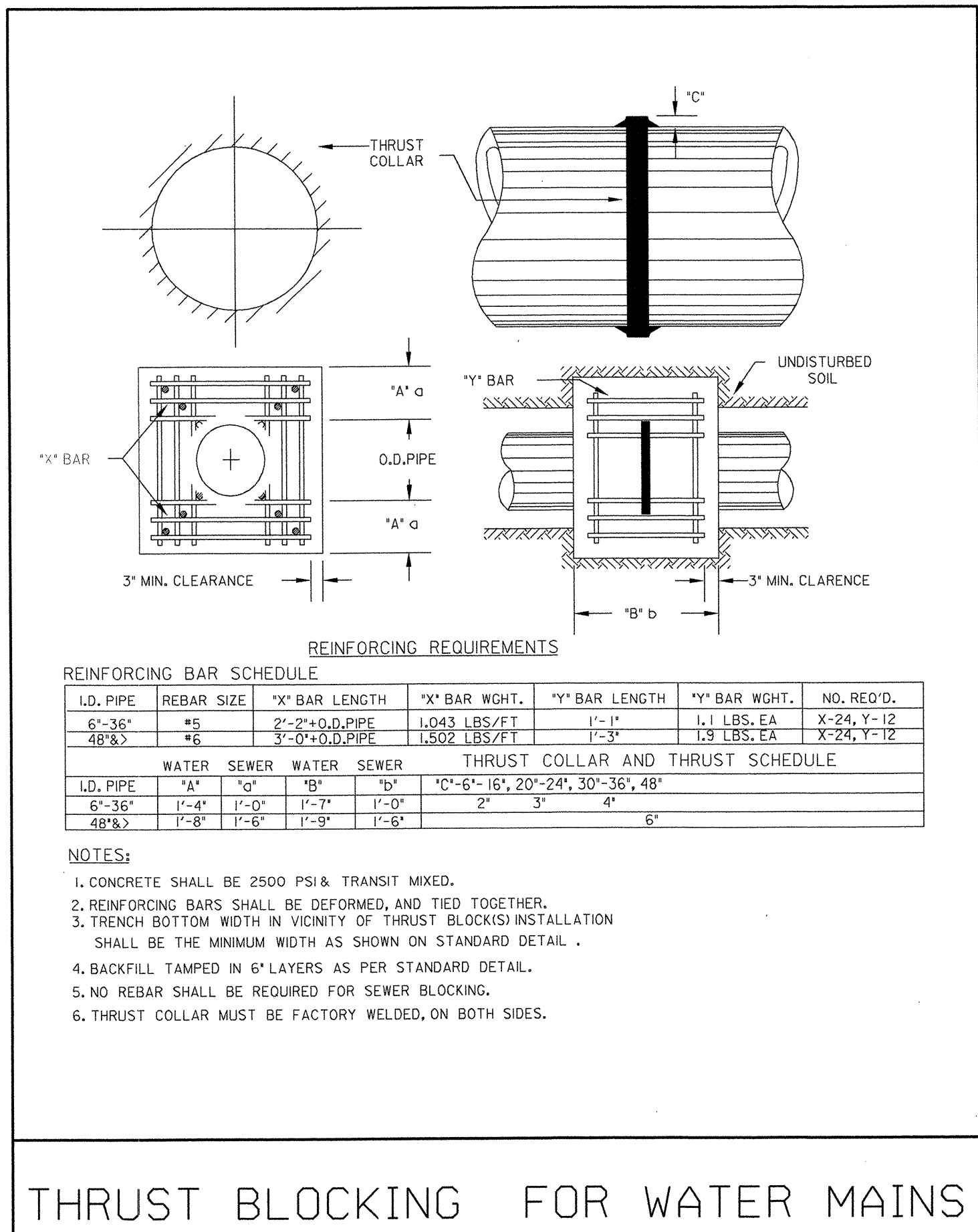


STANDARD VALVE BOX INSTALLATION (DETAIL 2 of 2)

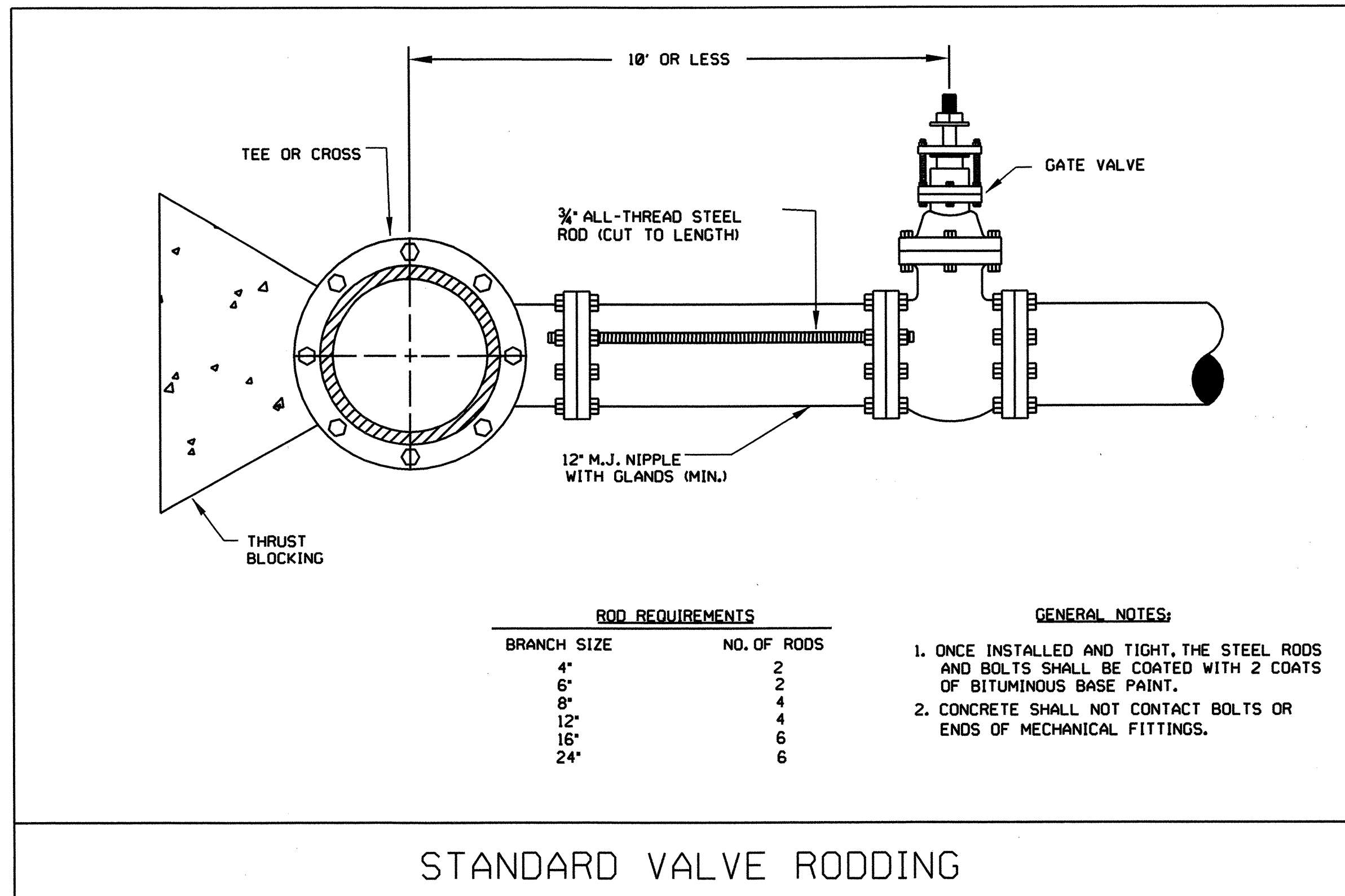
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 H.T.K.

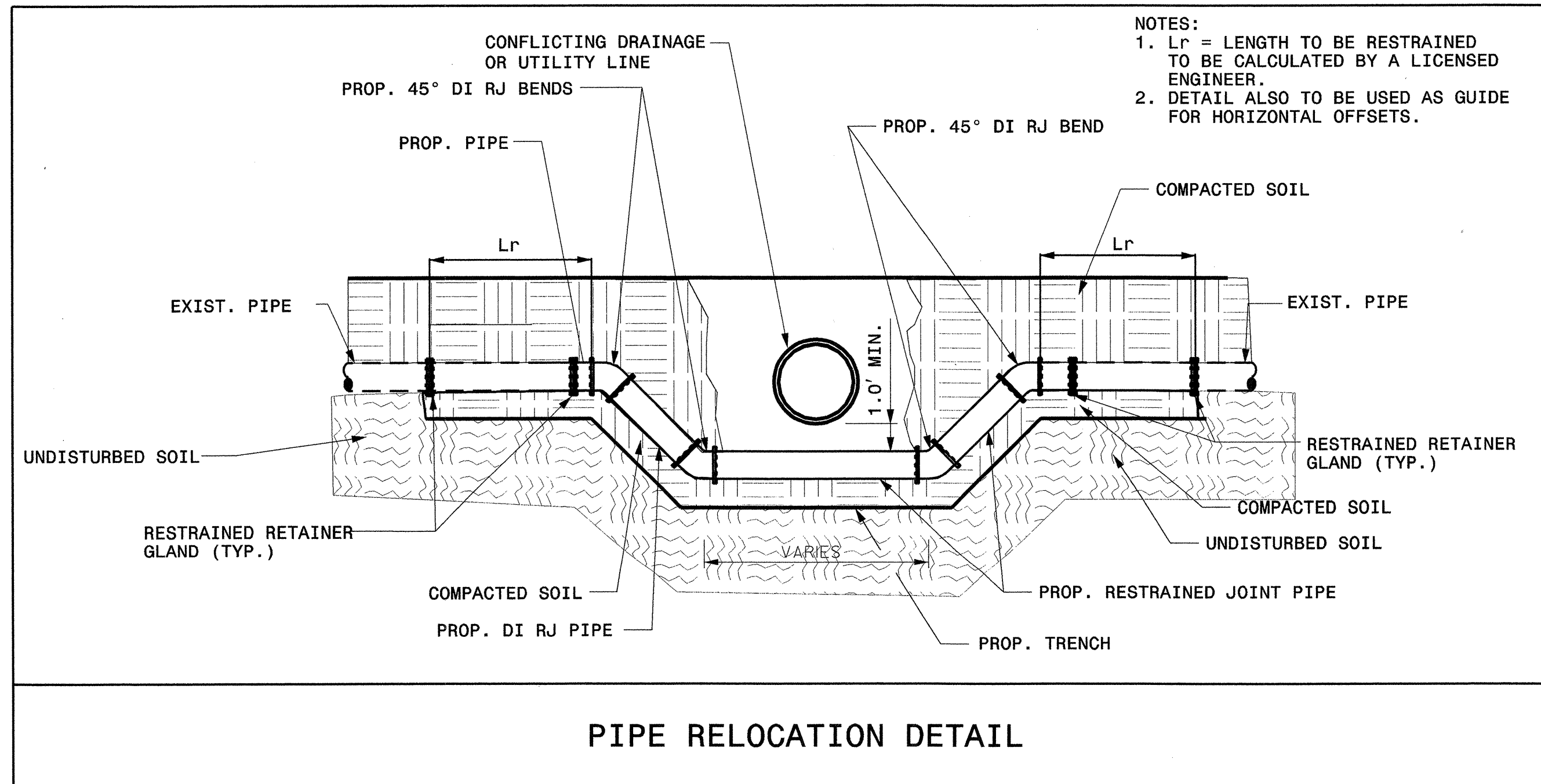




THRUST BLOCKING FOR WATER MAINS



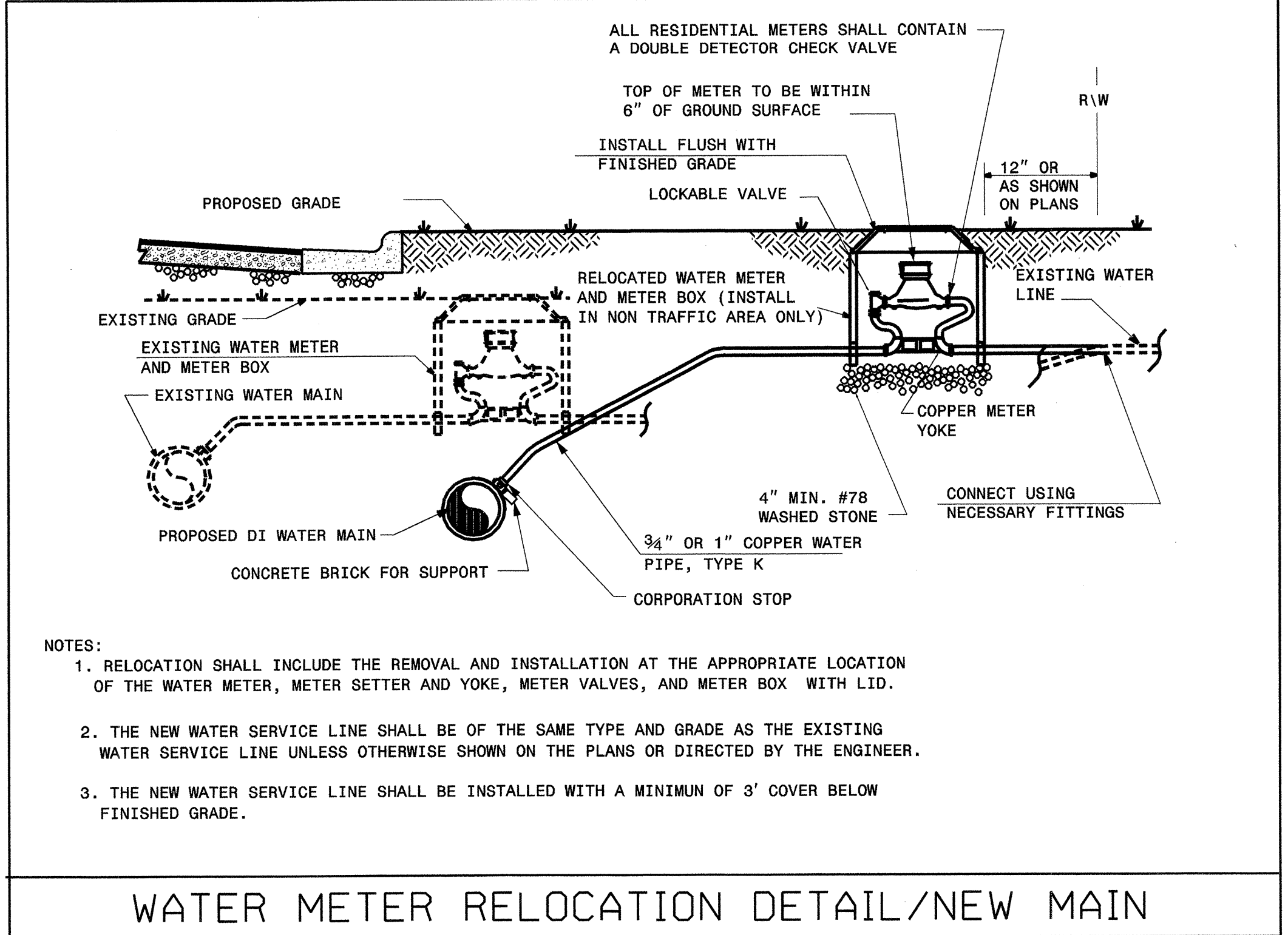
STANDARD VALVE RODDING



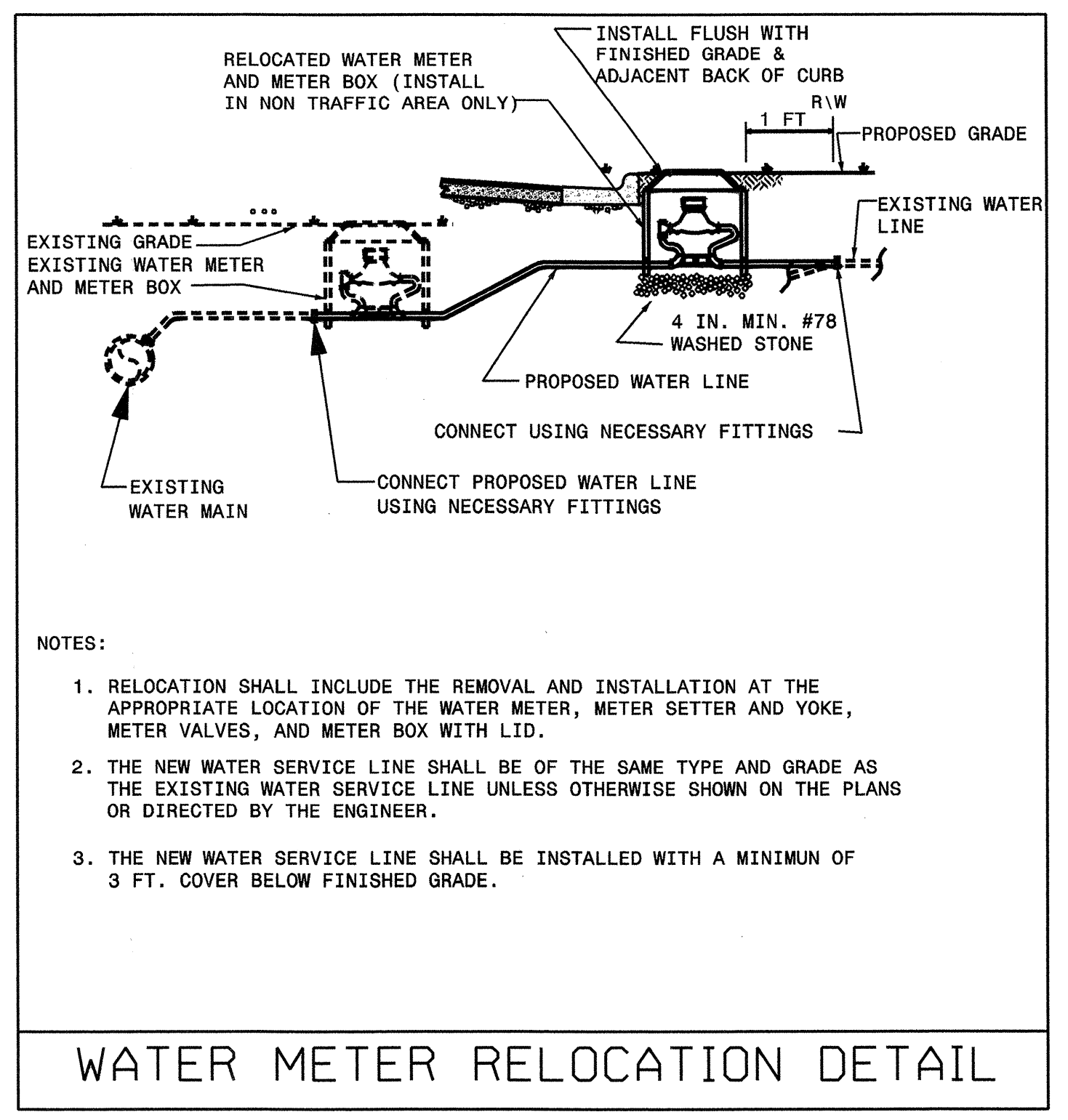
PIPE RELOCATION DETAIL

REVISIONS

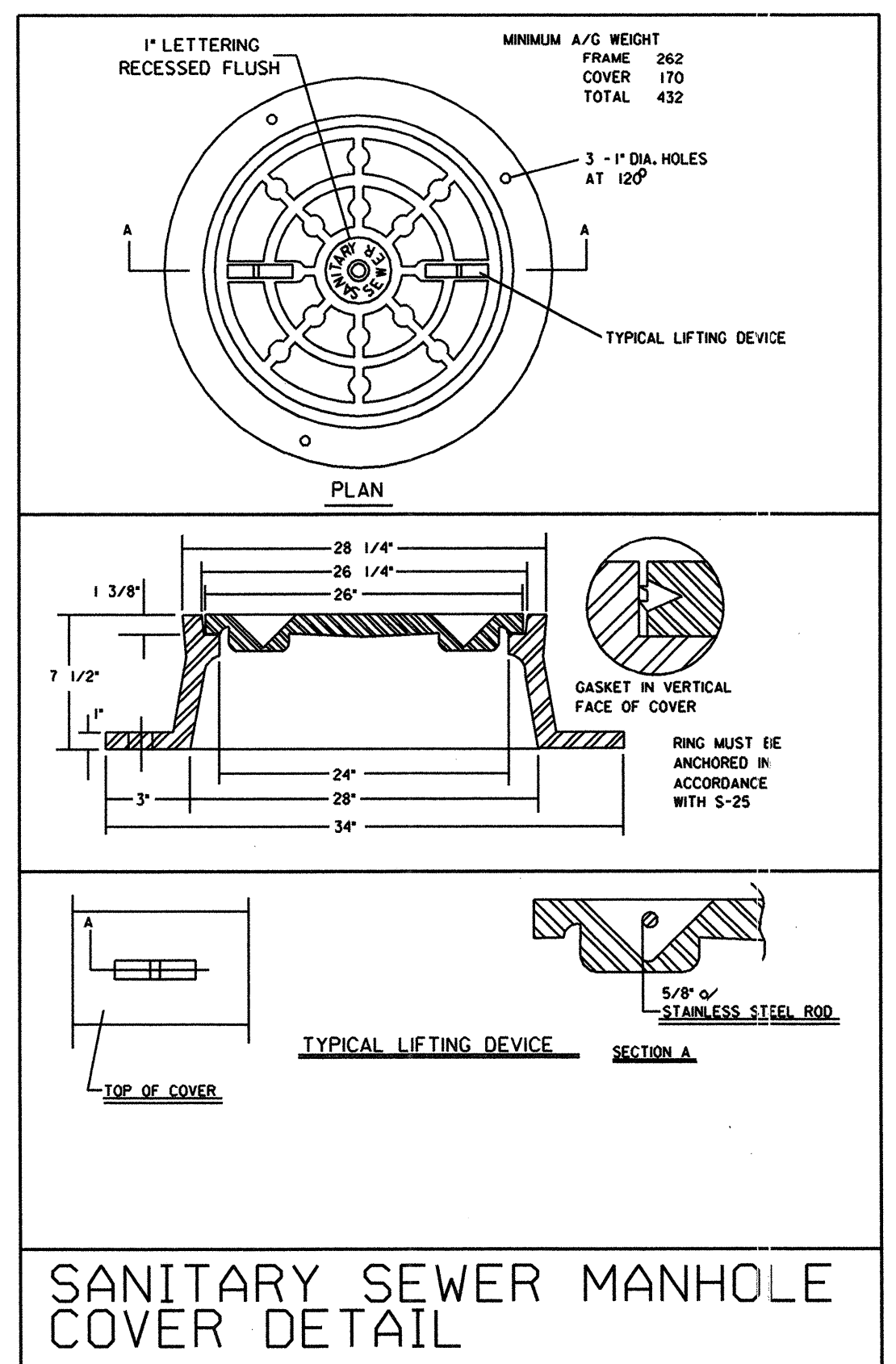
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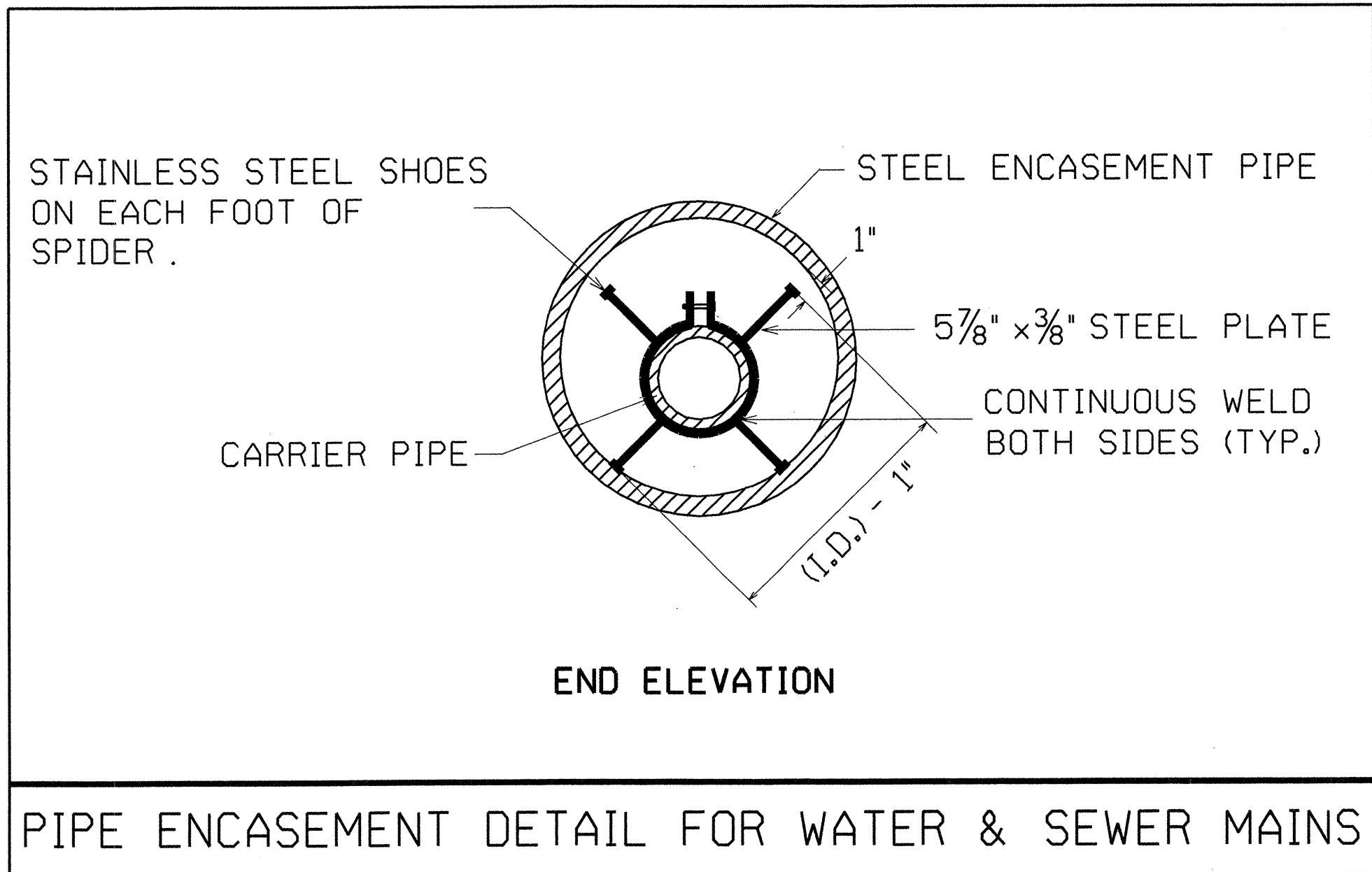
WATER METER RELOCATION DETAIL/NEW MAIN



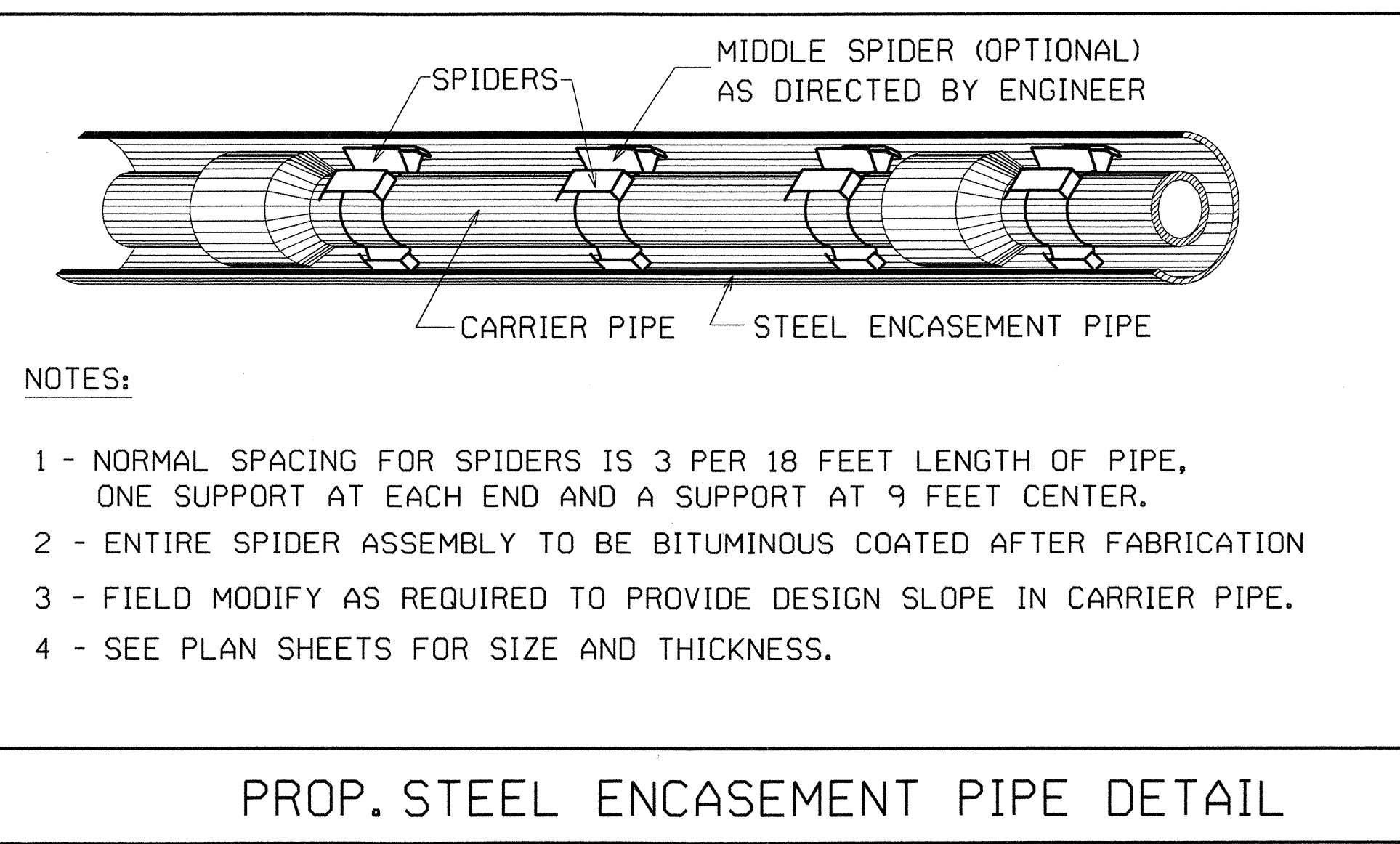
WATER METER RELOCATION DETAIL



SANITARY SEWER MANHOLE COVER DETAIL



PIPE ENCASEMENT DETAIL FOR WATER & SEWER MAINS



PROP. STEEL ENCASEMENT PIPE DETAIL

NOTE:

1. OBTAIN APPROVAL OF ALL MATERIALS AND LAYOUTS FROM THE CITY OF MARION BEFORE PROCEEDING WITH CONSTRUCTION.
2. DETAILS SHOWN HEREON ARE TO BE USED AS A GUIDE ONLY.

**RK & K**

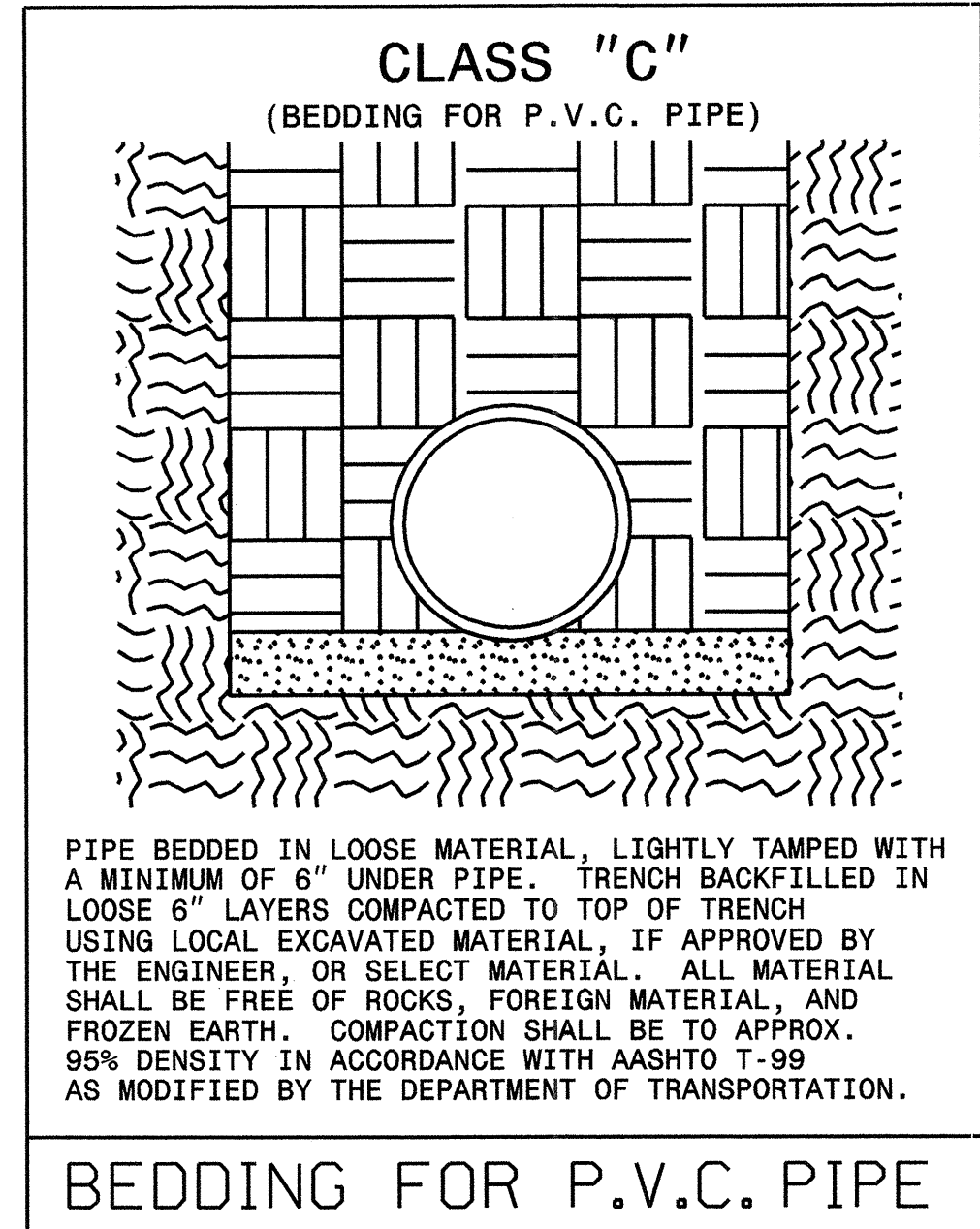
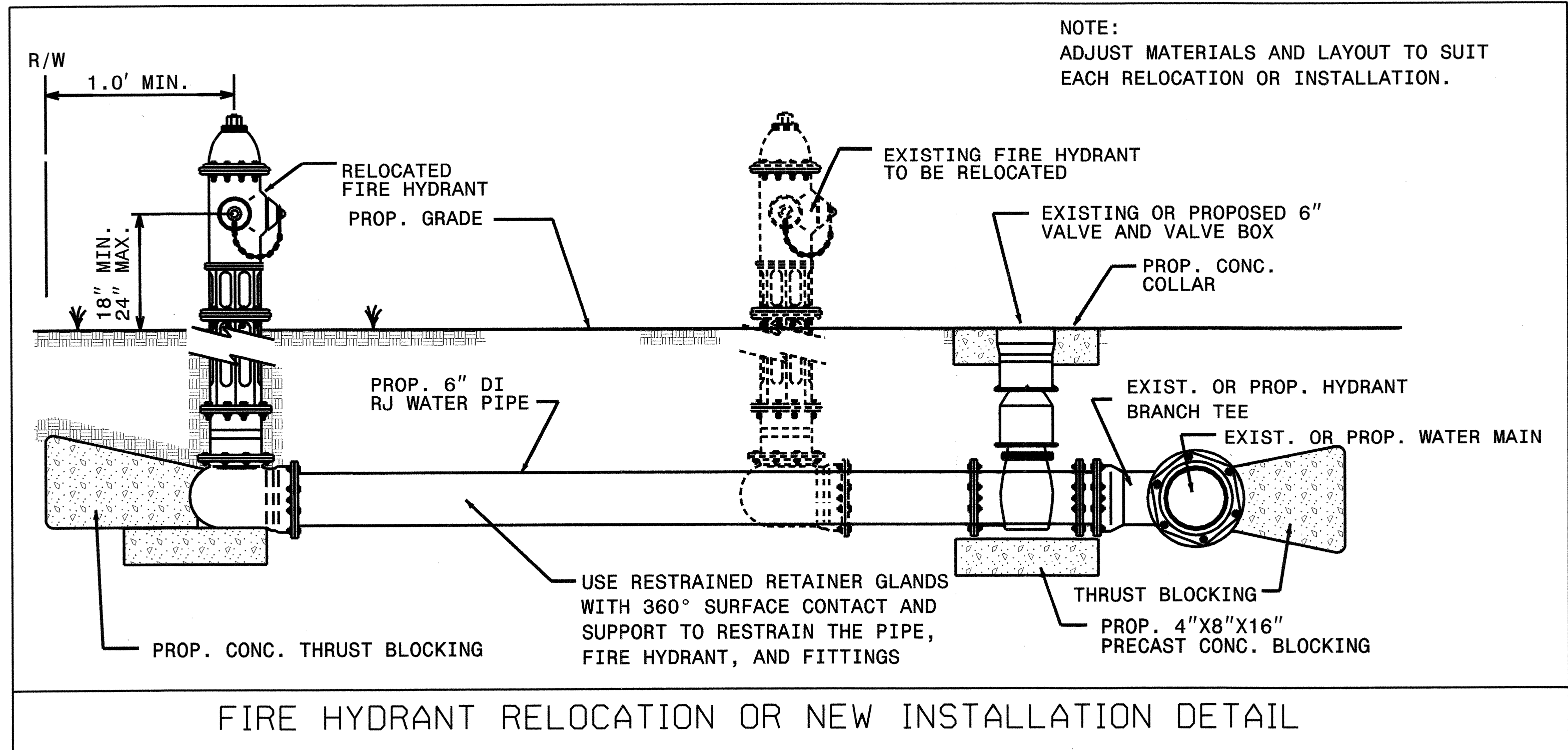
PLANS PREPARED BY :

**RUMMEL KLEPPER & KAHL, LLP**  
consulting engineers  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
(919) 878-9560

FOR  
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

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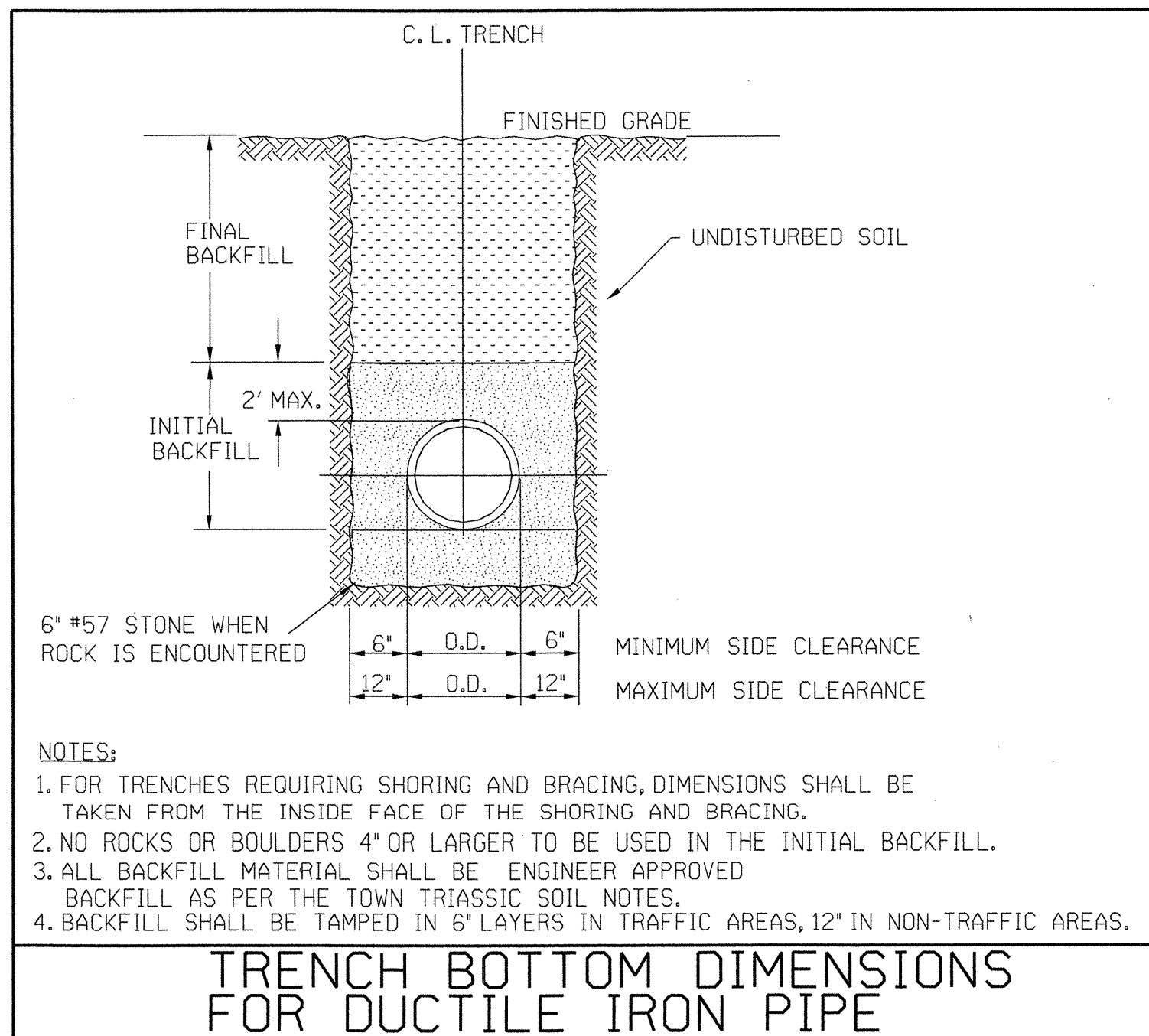


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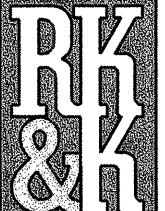
TABLE FOR PRESSURE CLASS 350 DUCTILE IRON PIPE

DEPTH OF COVER	PIPE SIZE							
	8"	10"	12"	14"	16"	18"	20"	24"
3'	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH
5'	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH	TYPE 1 TRENCH
10'	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH
15'	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH	TYPE 2 TRENCH
20'	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH
25'	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH	TYPE 3 TRENCH
30'	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH
35'	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH
40'	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH	TYPE 4 TRENCH

NOTES:  
SEE DETAIL FOR TRENCH BOTTOM DIMENSIONS.  
OTHER PRESSURE CLASS PIPES AND BEDDING MUST BE APPROVED BY THE TOWN ENGINEER.



NOTE:  
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**PLANS PREPARED BY :**  

**RUMMEL KLEPPER & KAHL, LLP**  
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 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 (919) 878-9560  
**FOR**  
**STATE OF NORTH CAROLINA**  
**DIVISION OF HIGHWAYS**

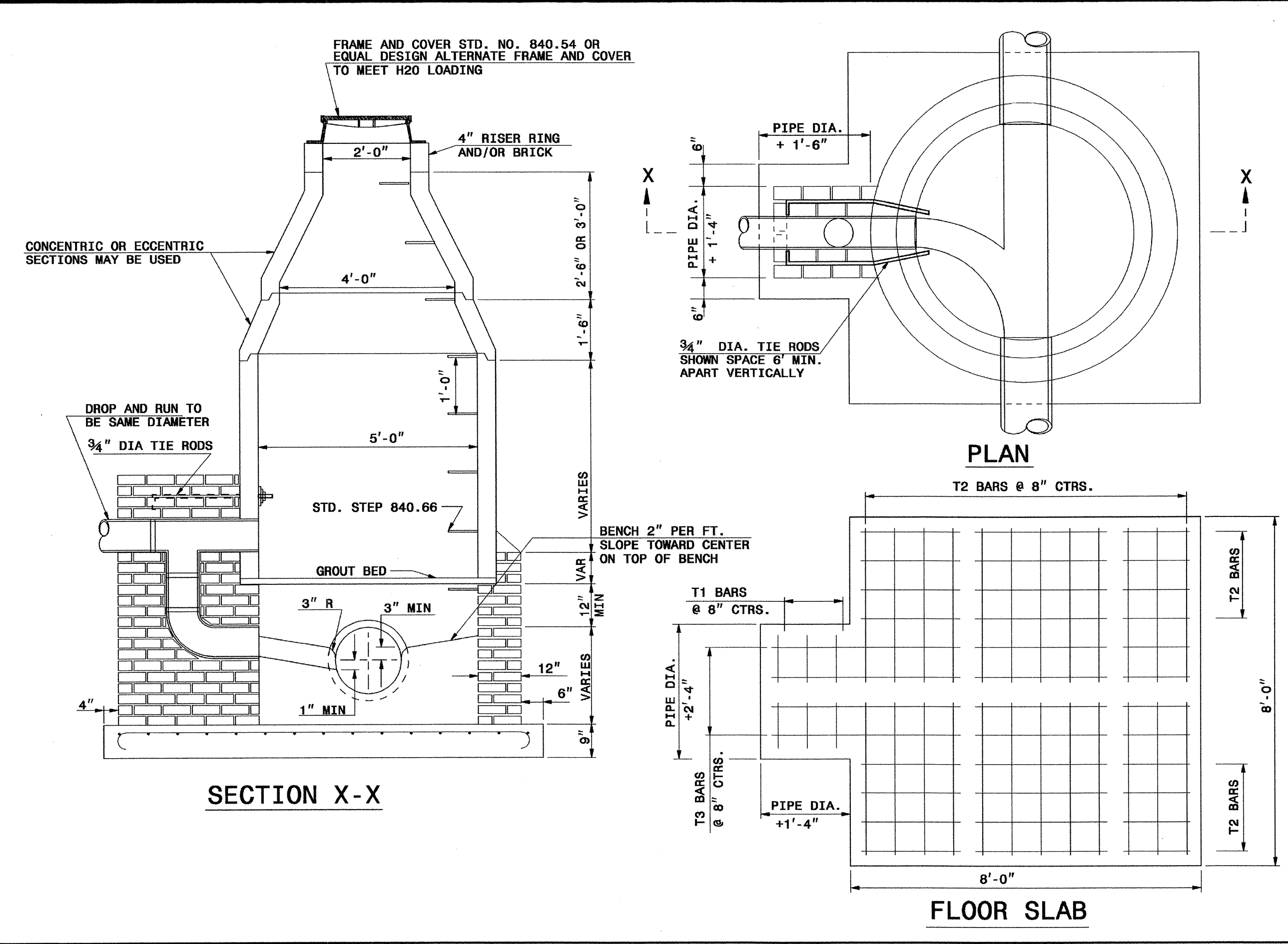
PROJECT REFERENCE NO. 37645 & 37857	SHEET NO. UC-20
RW SHEET NO.	
UTILITY ENGINEER	

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

7-06

ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER DROP MANHOLE**  
5' DIAMETER OUTSIDE DROP

SHEET 1 OF 2  
**1525.03**



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

7-06

ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER DROP MANHOLE**  
5' DIAMETER OUTSIDE DROP

SHEET 1 OF 2  
**1525.03**

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

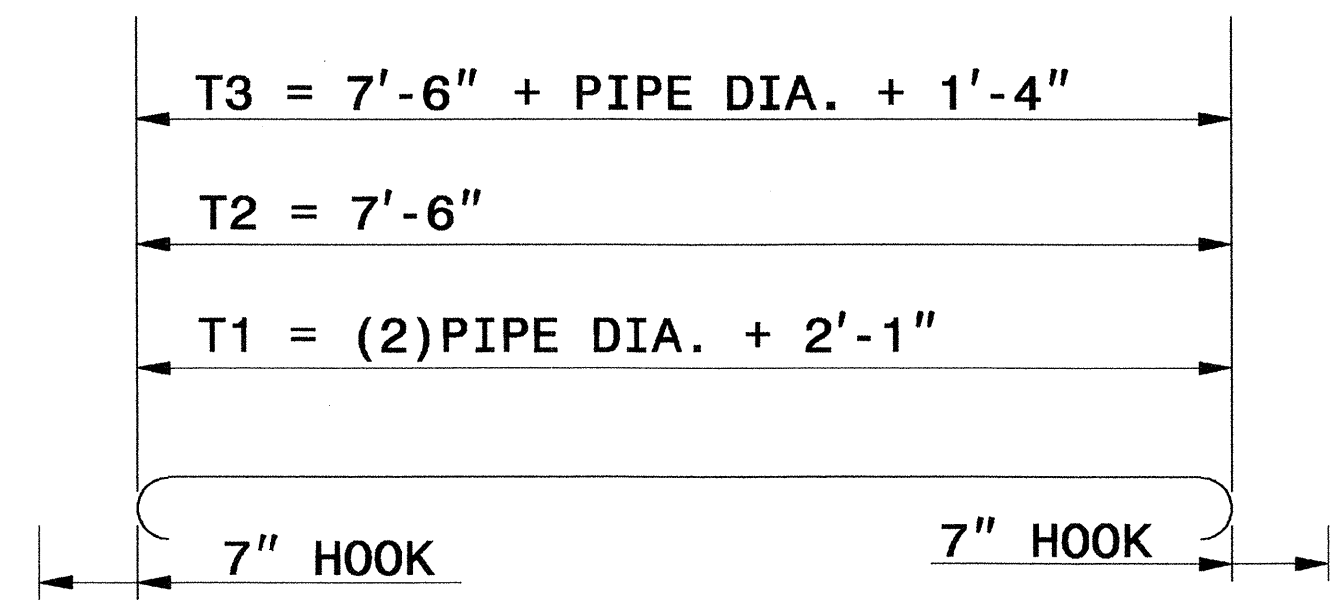
7-06

ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER DROP MANHOLE**  
5' DIAMETER OUTSIDE DROP

SHEET 2 OF 2  
**1525.03**

**GENERAL NOTES:**

- ALL MORTAR JOINTS  $\frac{1}{2}'' \pm \frac{1}{8}''$ .
- USE CLASS "A" CONCRETE FOR BASE.
- USE FORMS TO CONSTRUCT THE BASE.
- CONCRETE BRICK OR JUMBO BRICK WILL BE PERMITTED IN LIEU OF CLAY BRICK.
- PROVIDE PRECAST MANHOLE COMPONENTS WHICH COMPLY WITH AASHTO M199.
- ASSEMBLE RISERS AND GRADE RINGS SO STEPS HAVE A SPACING OF 12" FROM THE TOP TO THE BOTTOM OF THE MANHOLE.
- WHERE THE MANHOLE IS EXPOSED TO ROADWAY TRAFFIC, PLACE THE TOP OF THE MANHOLE FLUSH WITH THE GROUND; AND AT OTHER LOACTIONS PLACE THE TOP A MINIMUM OF 9" ABOVE THE GROUND.



STATE OF NORTH CAROLINA  
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7-06

ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER DROP MANHOLE**  
5' DIAMETER OUTSIDE DROP

SHEET 2 OF 2  
**1525.03**

**PLANS PREPARED BY :**  
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consulting engineers  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
(919) 878-9560

FOR  
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

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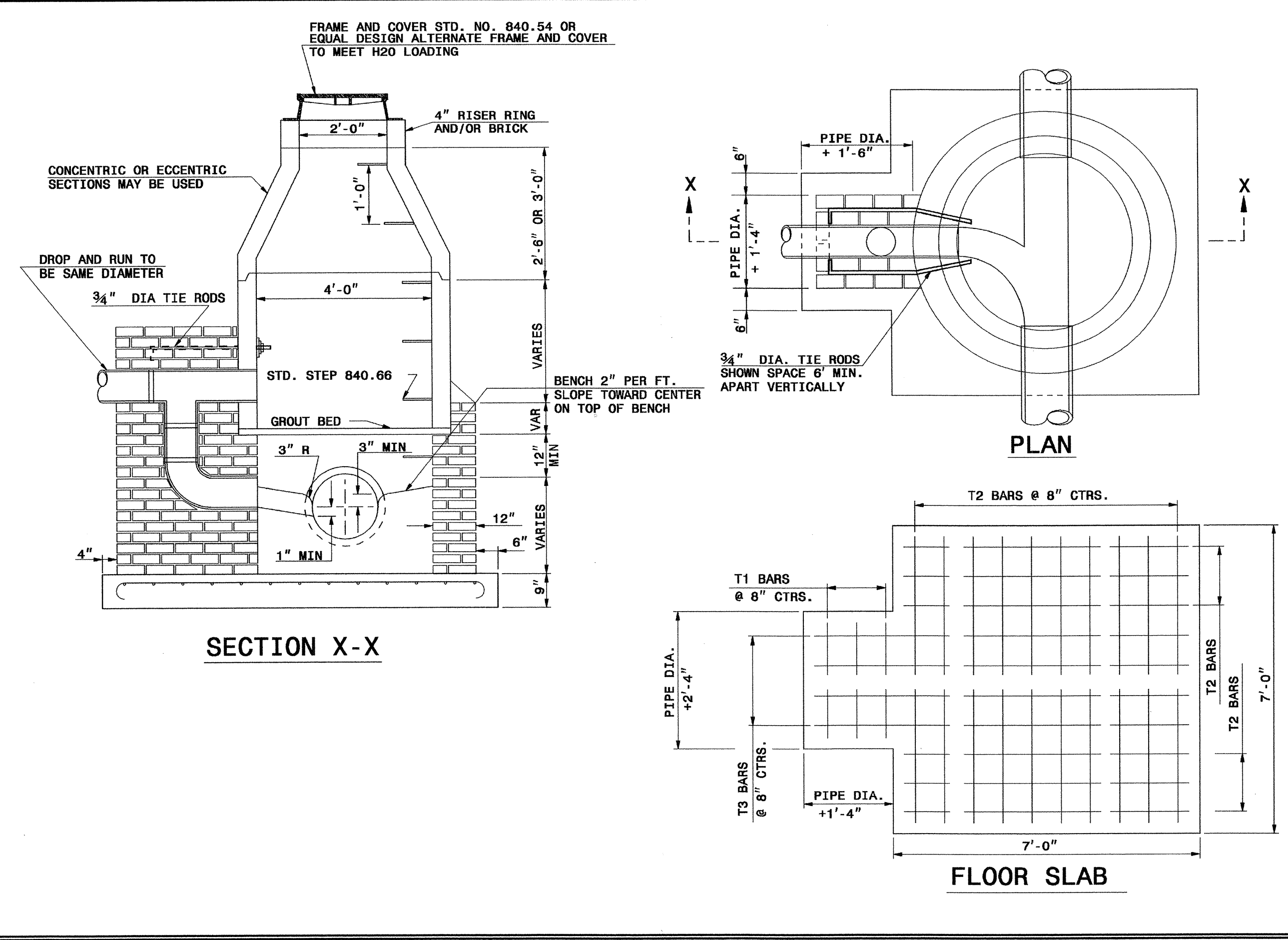
PROJECT REFERENCE NO. 37645 & 37857	SHEET NO. UC-21
RW SHEET NO.	
UTILITY ENGINEER	

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

7-06

ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER DROP MANHOLE**  
4' DIAMETER OUTSIDE DROP

SHEET 1 OF 2  
**1525.02**



STATE OF NORTH CAROLINA  
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7-06

ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER DROP MANHOLE**  
4' DIAMETER OUTSIDE DROP

SHEET 1 OF 2  
**1525.02**

REVISIONS

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

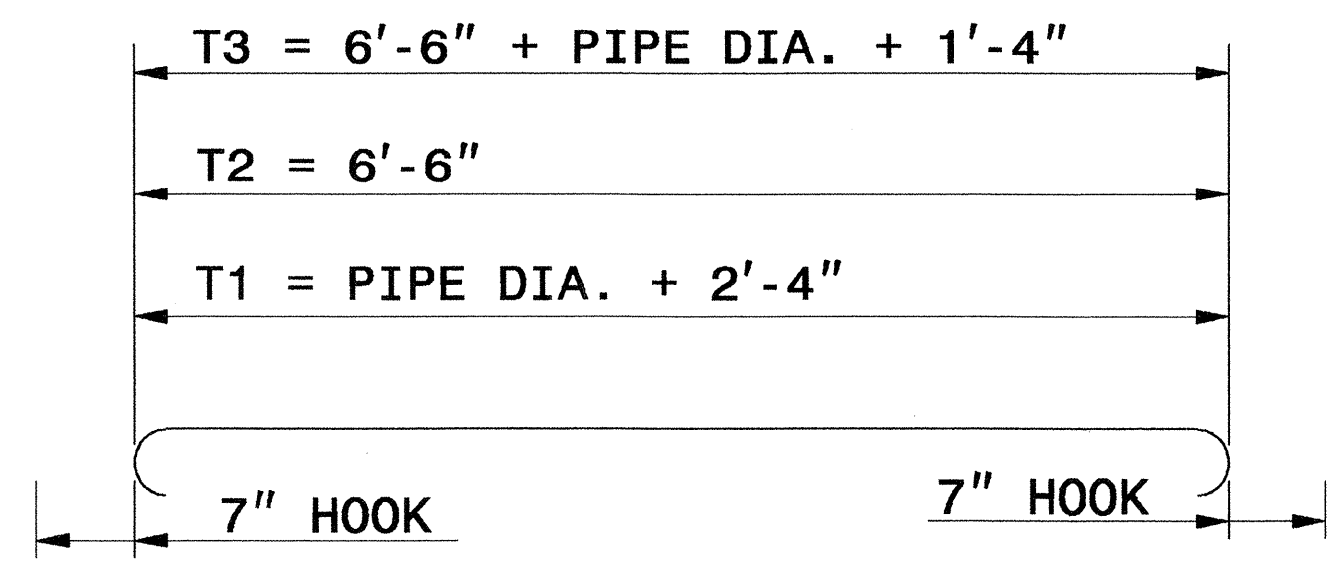
7-06

ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER DROP MANHOLE**  
4' DIAMETER OUTSIDE DROP

SHEET 2 OF 2  
**1525.02**

**GENERAL NOTES:**

- ALL MORTAR JOINTS  $\frac{1}{2}" \pm \frac{1}{8}"$ .
- USE CLASS "A" CONCRETE FOR BASE.
- USE FORMS TO CONSTRUCT THE BASE.
- CONCRETE BRICK OR JUMBO BRICK WILL BE PERMITTED IN LIEU OF CLAY BRICK.
- PROVIDE PRECAST MANHOLE COMPONENTS WHICH COMPLY WITH AASHTO M199.
- ASSEMBLE RISERS AND GRADE RINGS SO STEPS HAVE A SPACING OF 12" FROM THE TOP TO THE BOTTOM OF THE MANHOLE.
- WHERE THE MANHOLE IS EXPOSED TO ROADWAY TRAFFIC, PLACE THE TOP OF THE MANHOLE FLUSH WITH THE GROUND; AND AT OTHER LOACTIONS PLACE THE TOP A MINIMUM OF 9" ABOVE THE GROUND.



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

7-06

ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER DROP MANHOLE**  
4' DIAMETER OUTSIDE DROP

SHEET 2 OF 2  
**1525.02**

**R&K**

**PLANS PREPARED BY :**  
RUMMEL KLEPPER & KAHL, LLP  
consulting engineers  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
(919) 875-9560

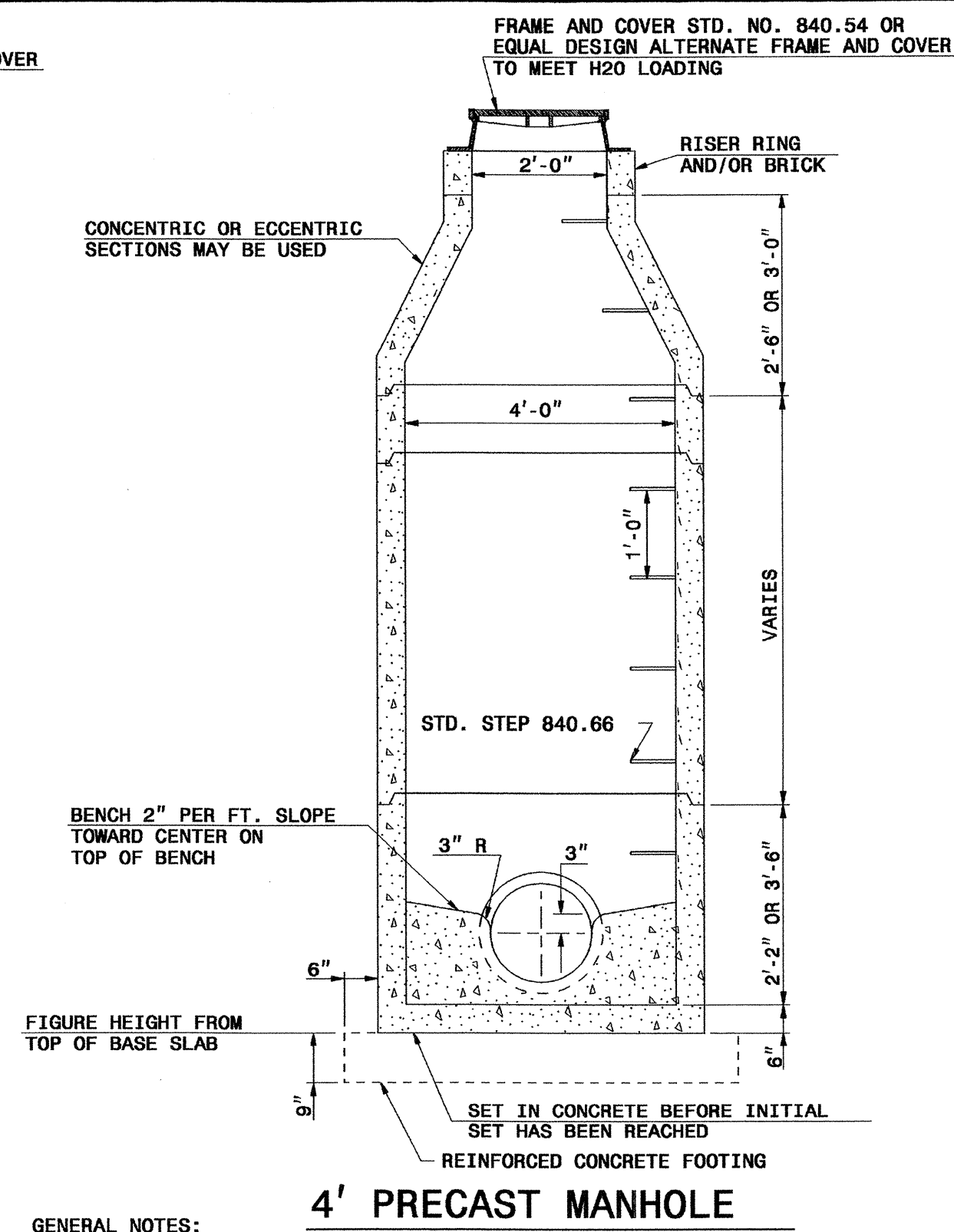
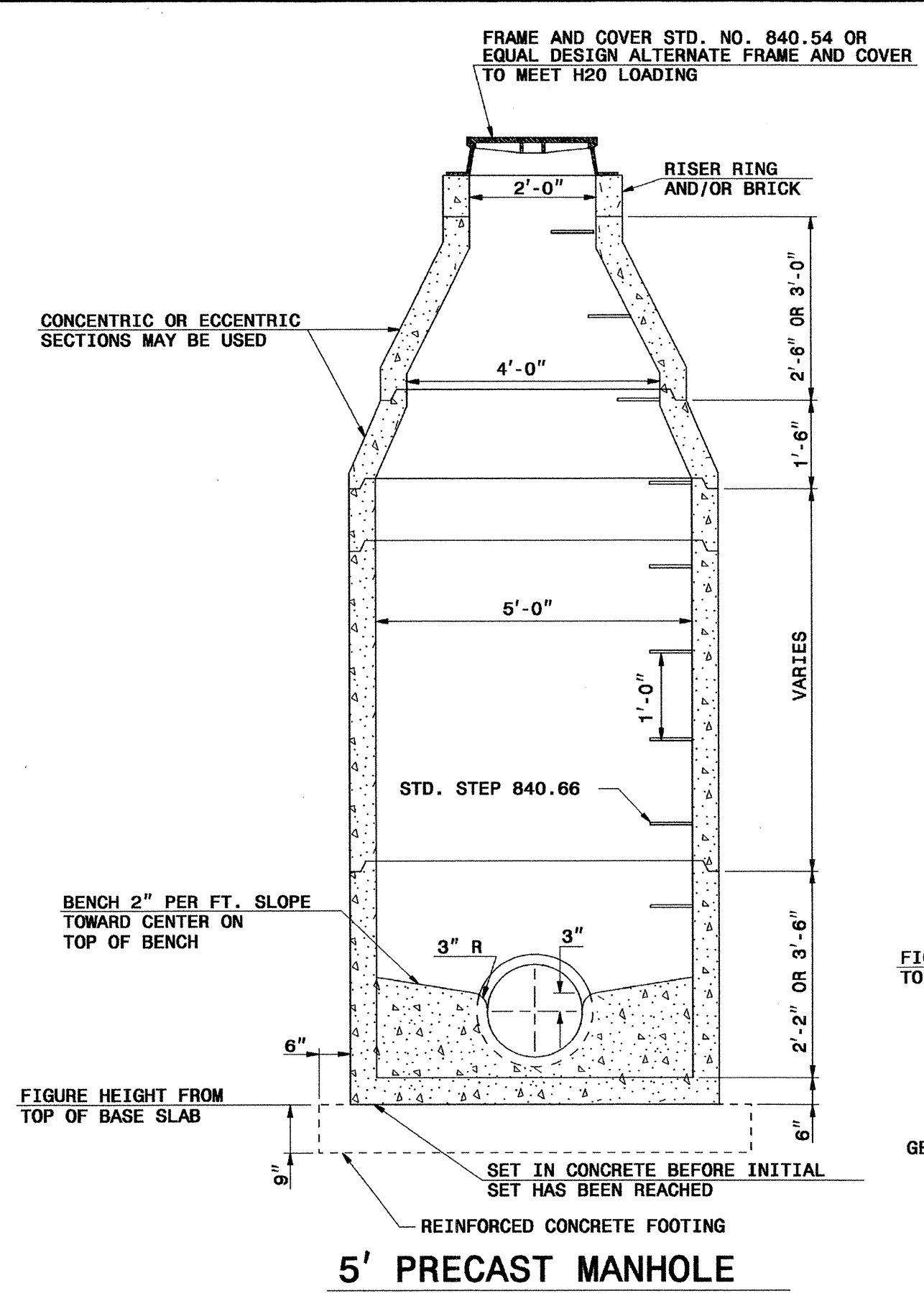
FOR  
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

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

7-06

ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER MANHOLE**  
4' AND 5' DIAMETER

SHEET 1 OF 2  
**1525.01**



GENERAL NOTES:  
 PROVIDE PRECAST MANHOLE COMPONENTS WHICH COMPLY WITH AASHTO M199.  
 ASSEMBLE RISERS AND GRADE RINGS SO STEPS HAVE A SPACING OF 12" FROM THE TOP TO THE BOTTOM OF THE MANHOLE.  
 WHERE THE MANHOLE IS EXPOSED TO ROADWAY TRAFFIC, PLACE THE TOP OF THE MANHOLE FLUSH WITH THE GROUND; AND AT OTHER LOCATIONS PLACE THE TOP A MINIMUM OF 9" ABOVE THE GROUND.  
 REINFORCED CONCRETE FOOTING IS REQUIRED WHEN THE MANHOLE IS OVER 12' OR ON A POOR SOIL BASE. THE FOOTING AND BASE SECTION MAY BE PRECAST.

STATE OF NORTH CAROLINA  
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RALEIGH, N.C.

7-06

ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER MANHOLE**  
4' AND 5' DIAMETER

SHEET 1 OF 2  
**1525.01**

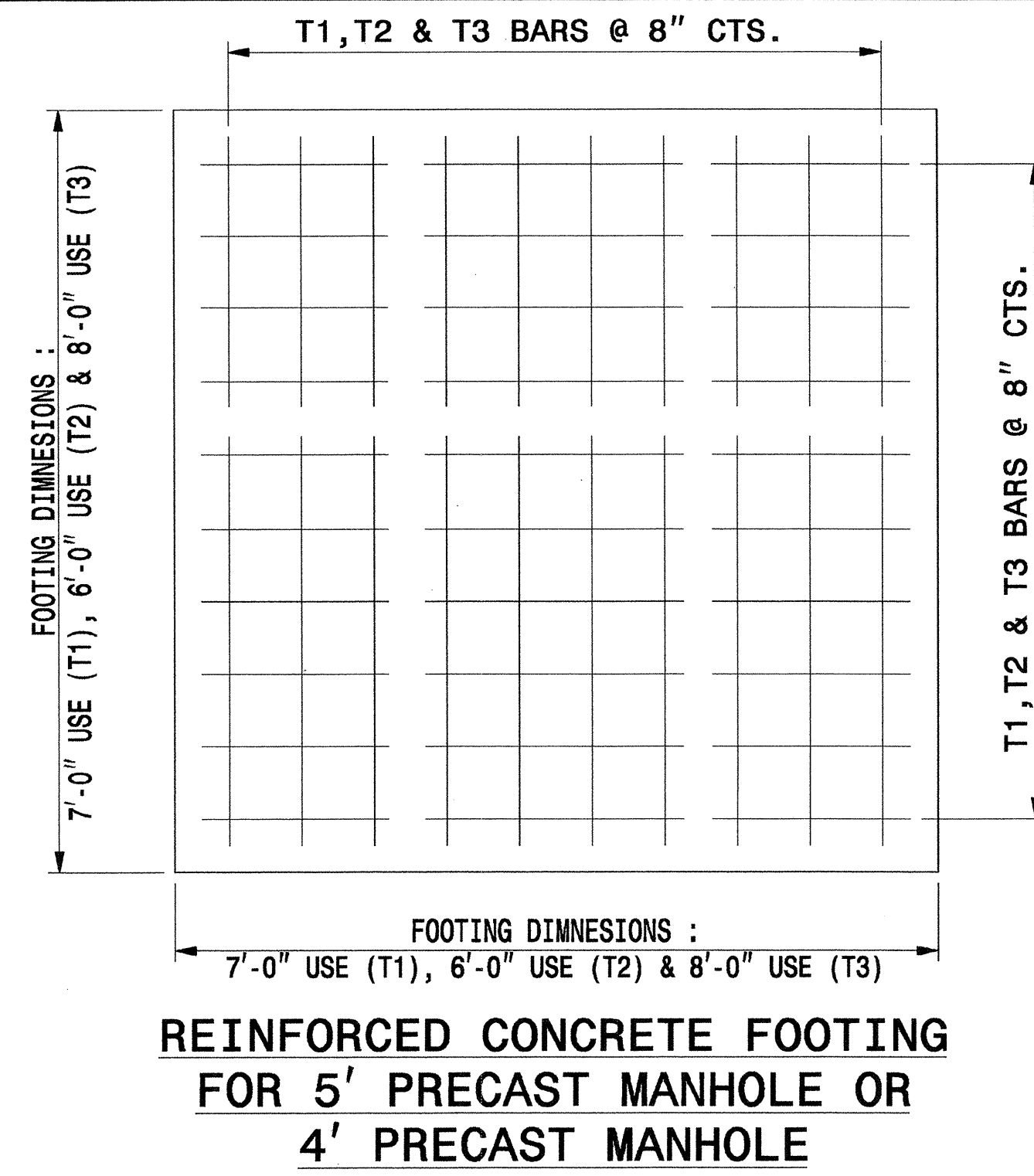
REVISIONS

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
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RALEIGH, N.C.

7-06

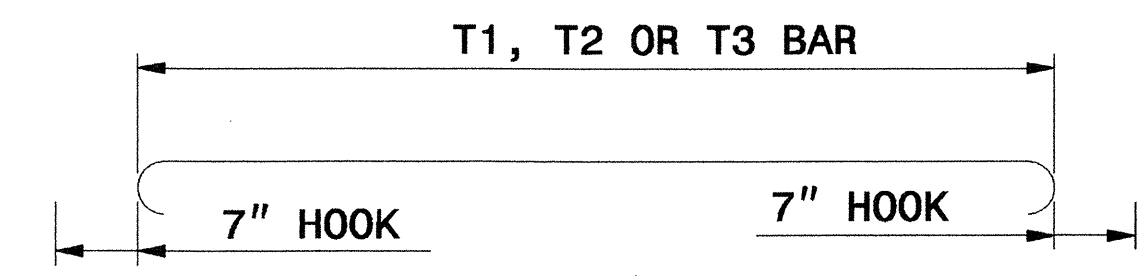
ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER MANHOLE**  
4' AND 5' DIAMETER

SHEET 2 OF 2  
**1525.01**



BILL OF MATERIAL FOR 7'-0" FOOTING				
BAR	SIZE	LENGTH	NO.	WT. lbs.
T1	#5	6'-6"	20	136
CLASS "A" CONC. YD <sup>3</sup> 9" THICK				1.361
CLASS "A" CONC. YD <sup>3</sup> 12" THICK				1.815
BILL OF MATERIAL FOR 6'-0" FOOTING				
BAR	SIZE	LENGTH	NO.	WT. lbs.
T2	#5	5'-6"	18	103
CLASS "A" CONC. YD <sup>3</sup> 9" THICK				1.000
BILL OF MATERIAL FOR 8'-0" FOOTING				
BAR	SIZE	LENGTH	NO.	WT. lbs.
T3	#5	7'-6"	24	188
CLASS "A" CONC. YD <sup>3</sup> 12" THICK				2.370

PLACE REINFORCING STEEL SO THAT STEEL IS PLACED A MIN. OF 2" AND A MAX. OF 4" FROM THE TOP OF THE SLAB.



STATE OF NORTH CAROLINA  
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7-06

ENGLISH STANDARD DRAWING FOR  
**PRECAST SANITARY SEWER MANHOLE**  
4' AND 5' DIAMETER

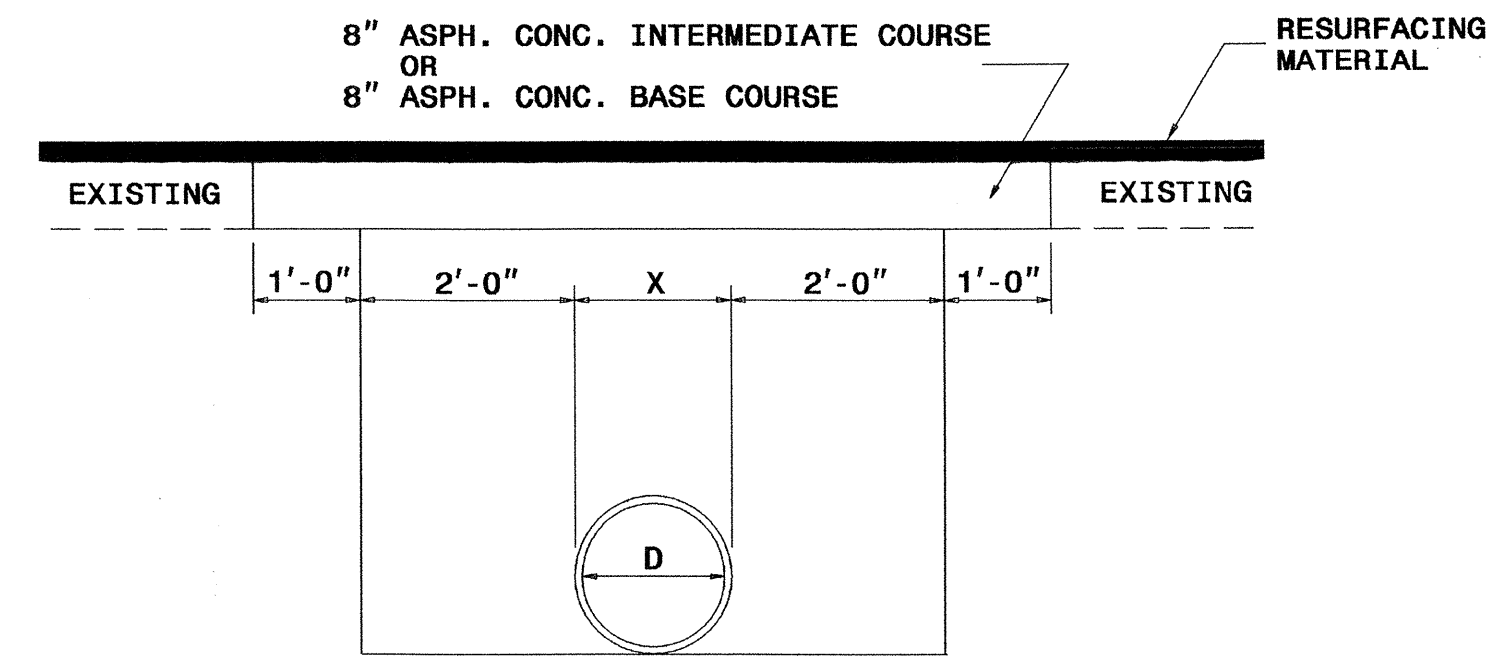
SHEET 2 OF 2  
**1525.01**

**PLANS PREPARED BY :**  
**RUMMEL KLEPPER & KAHL, LLP**  
*consulting engineers*  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 (919) 878-9560  
**FOR**  
**STATE OF NORTH CAROLINA**  
**DIVISION OF HIGHWAYS**

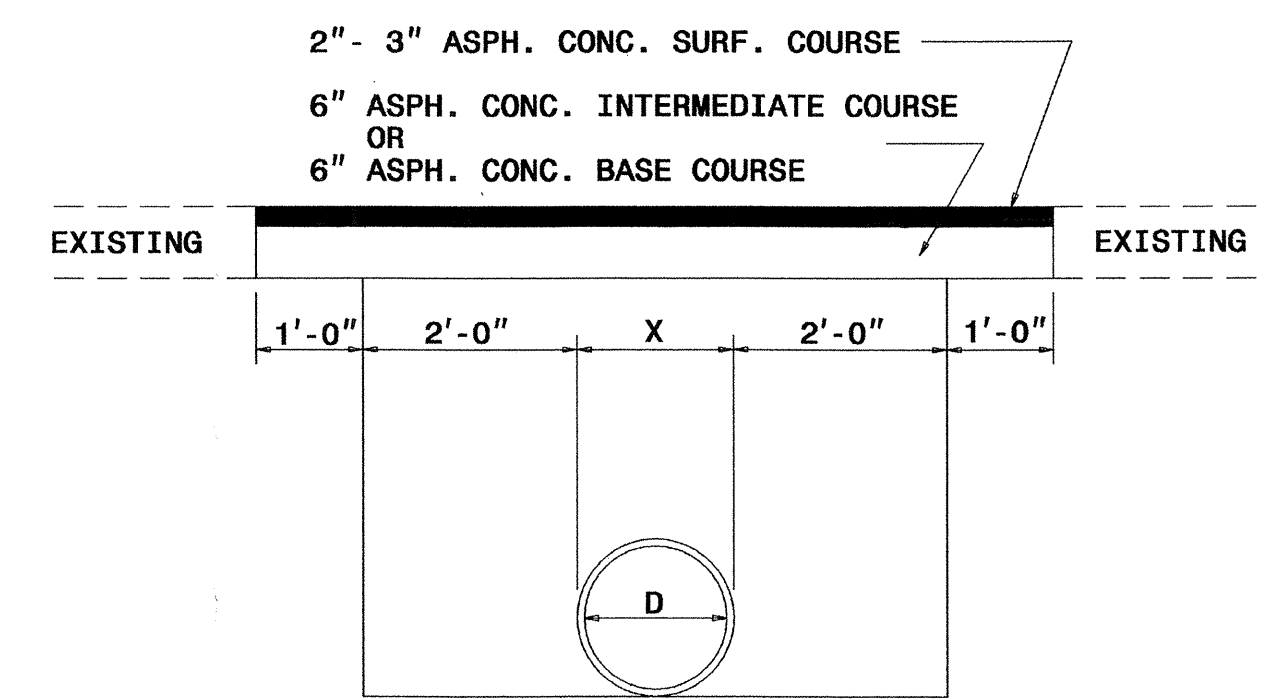
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

7-06 ENGLISH STANDARD DRAWING FOR  
**PAVEMENT REPAIRS**  
FOR SUPERPAVE MIX TYPES  
SHEET 1 OF 1  
**654.01**

D	X	W
12"	1'-4"	7'-4"
15"	1'-7"	7'-7"
18"	1'-10"	7'-10"
24"	2'-6"	8'-6"
30"	3'-1"	9'-1"
36"	3'-8"	9'-8"
42"	4'-5"	10'-5"
48"	5'-0"	11'-0"



**PAVEMENT REPAIRS ON ROADS TO BE RESURFACED  
(PIPE IS PLACED UNDER EXISTING PAVEMENT)**



**PAVEMENT REPAIRS ON ROADS NOT TO BE RESURFACED  
(PIPE IS TO BE PLACED UNDER EXISTING PAVEMENT)**

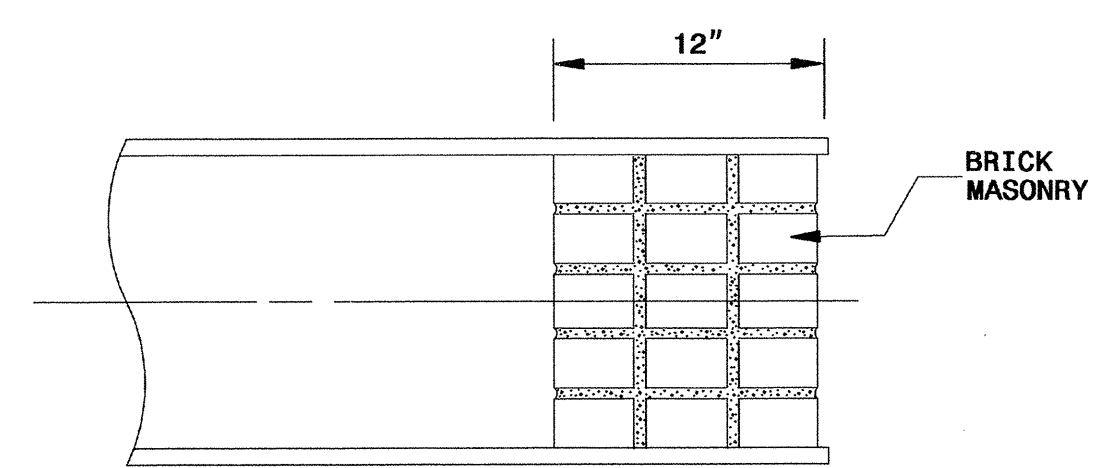
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7-06 ENGLISH STANDARD DRAWING FOR  
**PAVEMENT REPAIRS**  
FOR SUPERPAVE MIX TYPES  
SHEET 1 OF 1  
**654.01**

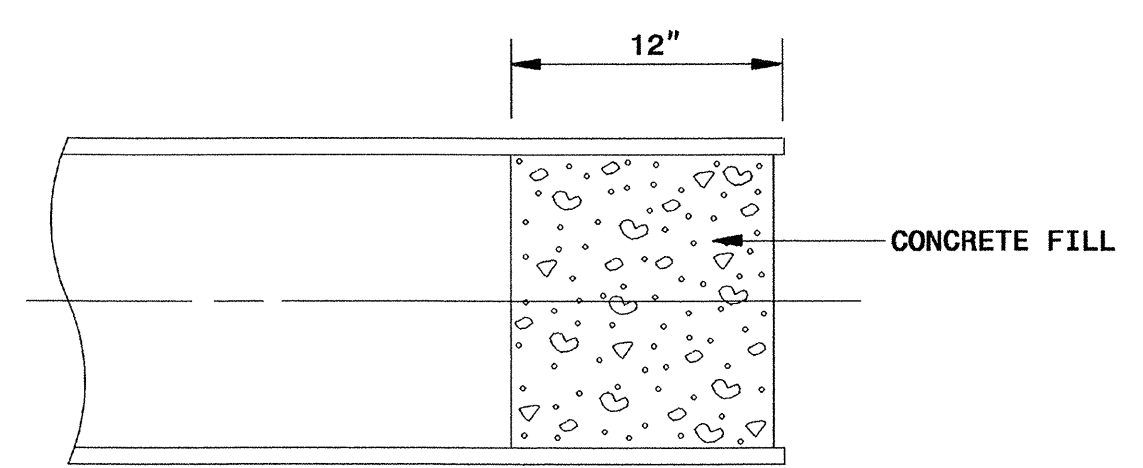
REVISIONS

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

7-06 ENGLISH STANDARD DRAWING FOR  
**CONCRETE AND BRICK PIPE PLUG**  
SHEET 1 OF 1  
**840.71**



**SECTION OF MASONRY  
PIPE PLUG**



**SECTION OF CONCRETE  
PIPE PLUG**

QUANTITIES	
PIPE SIZE	CUBIC YARDS
12"	0.029
15"	0.045
18"	0.065
24"	0.116
30"	0.182
36"	0.262
42"	0.356
48"	0.465
54"	0.589
60"	0.727
66"	0.880

NOTE:  
EITHER BRICK MASONRY OR CONCRETE MAY BE USED.  
CONCRETE BRICK MAY BE USED IN LIEU OF CLAY BRICK. JUMBO BRICK WILL BE PERMITTED.

NOTE:  
USE PAY LIMITS (C.Y.) FOR PIPE PLUGS 12" IN THICKNESS ONLY.

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7-06 ENGLISH STANDARD DRAWING FOR  
**CONCRETE AND BRICK PIPE PLUG**  
SHEET 1 OF 1  
**840.71**

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