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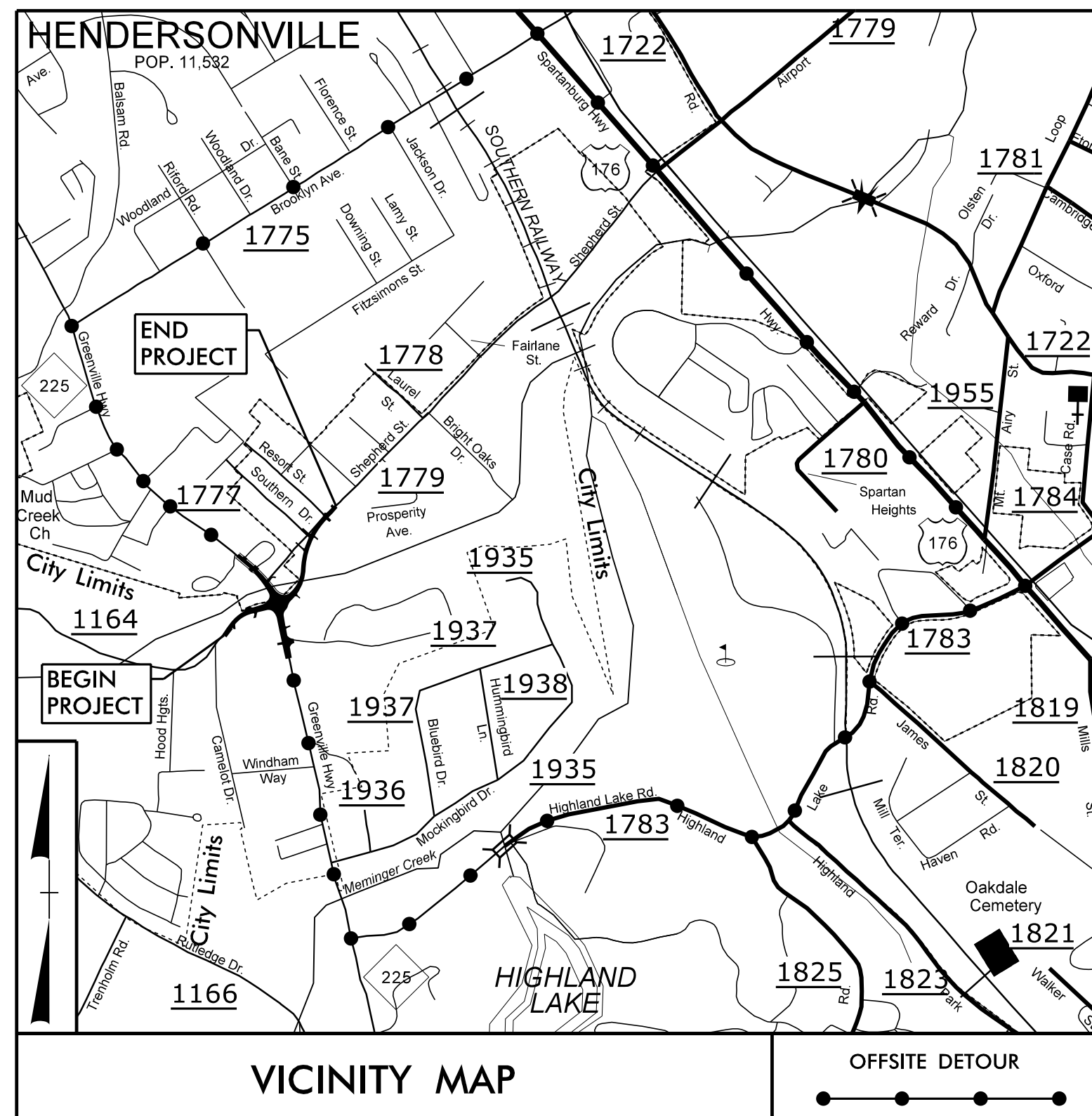
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09_028/299

TIP PROJECT: U-5105

CONTRACT: DN00565

See Sheet 1-A For Index of Sheets



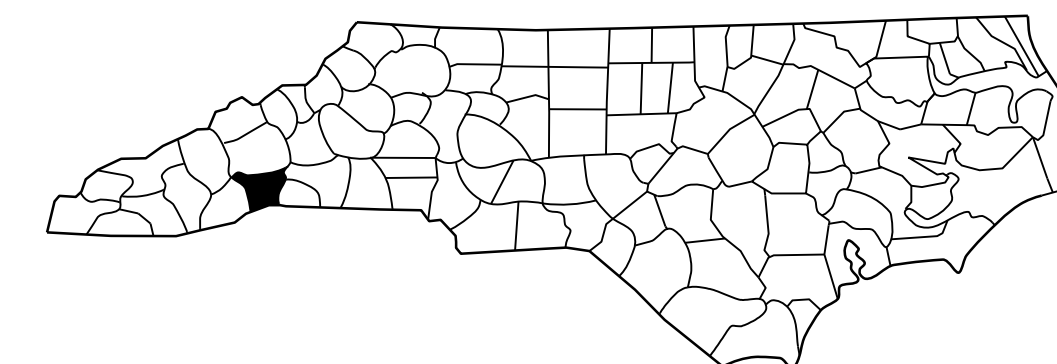
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HENDERSON COUNTY

LOCATION: HENDERSONVILLE - NC 225/SR 1164 (ERKWOOD DRIVE) /SR 1779 (SHEPHERD STREET) - INTERSECTION IMPROVEMENTS
TYPE OF WORK: GRADING, PAVING, DRAINAGE, CULVERT, & LIGHTING

THIS PROJECT CONTAINS
EROSION CONTROL PLANS
FOR CLEARING AND
GRUBBING PHASE OF
CONSTRUCTION.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5105	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
41903.1.1		P.E.	
41903.2.2		RW, UTL.	
41903.3.3		CONST	

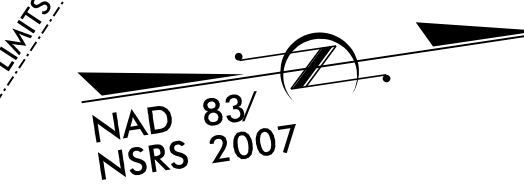


EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	---X---X---X
1622.01	Temporary Berms and Slope Drains	—T—
1630.02	Silt Basin Type B	▨
1630.03	Temporary Silt Ditch	—T—
1630.05	Temporary Diversion	—T—
1630.06	Special Stilling Basin	—T—
1632.03	Rock Inlet Sediment Trap Type C	□
1633.01	Temporary Rock Silt Check Type-A	▨
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	▨
1633.02	Temporary Rock Silt Check Type-B	▨
	Wattle	—) —
	Wattle with Polyacrylamide (PAM)	—) —
1634.01	Temporary Rock Sediment Dam Type-A	▨
1634.02	Temporary Rock Sediment Dam Type-B	▨
1635.01	Rock Pipe Inlet Sediment Trap Type-A	—C—
1635.02	Rock Pipe Inlet Sediment Trap Type-B	—C—
1630.04	Stilling Basin	▨
1630.06	Special Stilling Basin	▨
	Rock Inlet Sediment Trap:	
1632.01	Type A	A □
1632.02	Type B	B □
1632.03	Type C	C □
	Skimmer Basin	▨
	Tiered Skimmer Basin	▨
	Infiltration Basin	▨

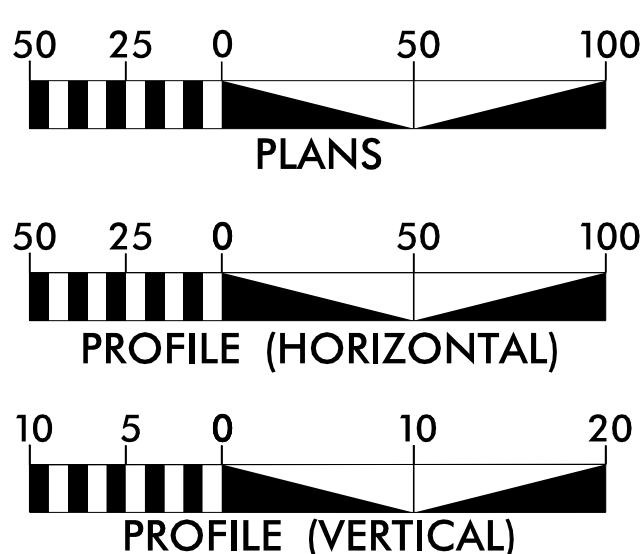
BEGIN TIP PROJECT U-5105
-L- POT STA. 16+90.00

END TIP PROJECT U-5105
-L- POC STA. 25+55.00



THERE IS NO CONTROL OF ACCESS ON THIS PROJECT.

GRAPHIC SCALES



ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER QUALITY.

CALYX
ENGINEERS + CONSULTANTS
Formerly Mulkey Engineers & Consultants

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CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com

NC License # F-1333

Prepared In the Office of:
ROADSIDE ENVIRONMENTAL UNIT
1 South Wilmington St.
Raleigh, NC 27611
2018 STANDARD SPECIFICATIONS

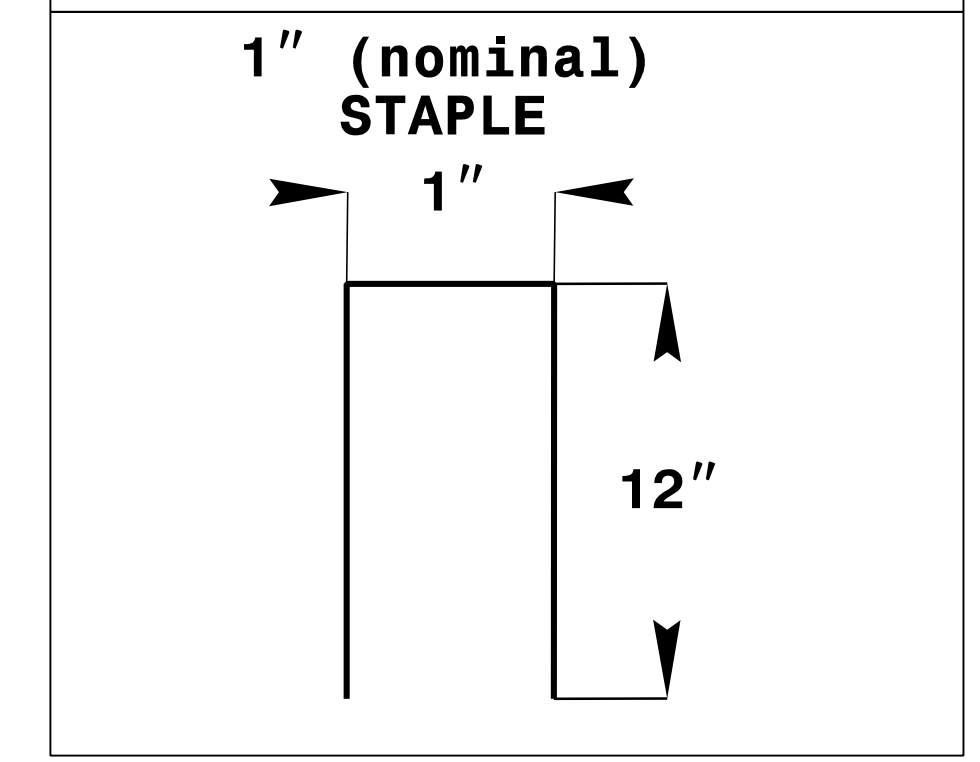
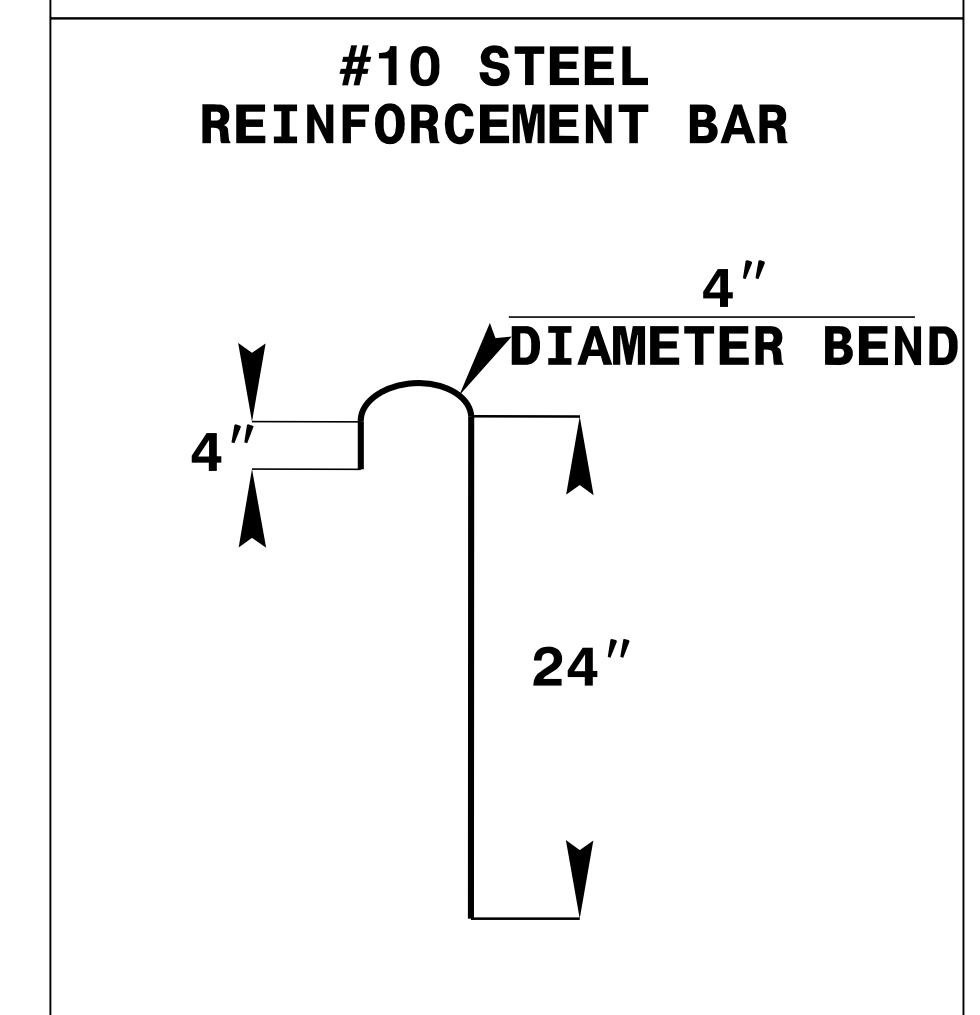
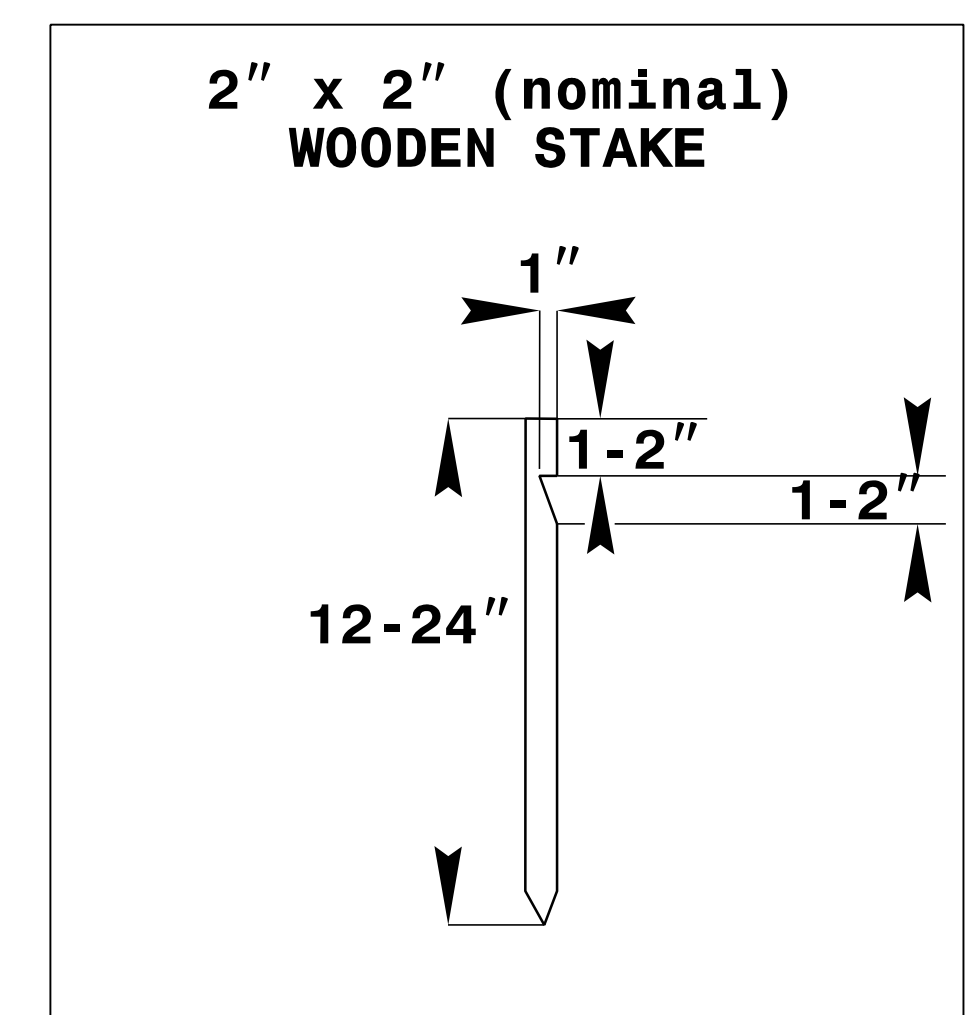
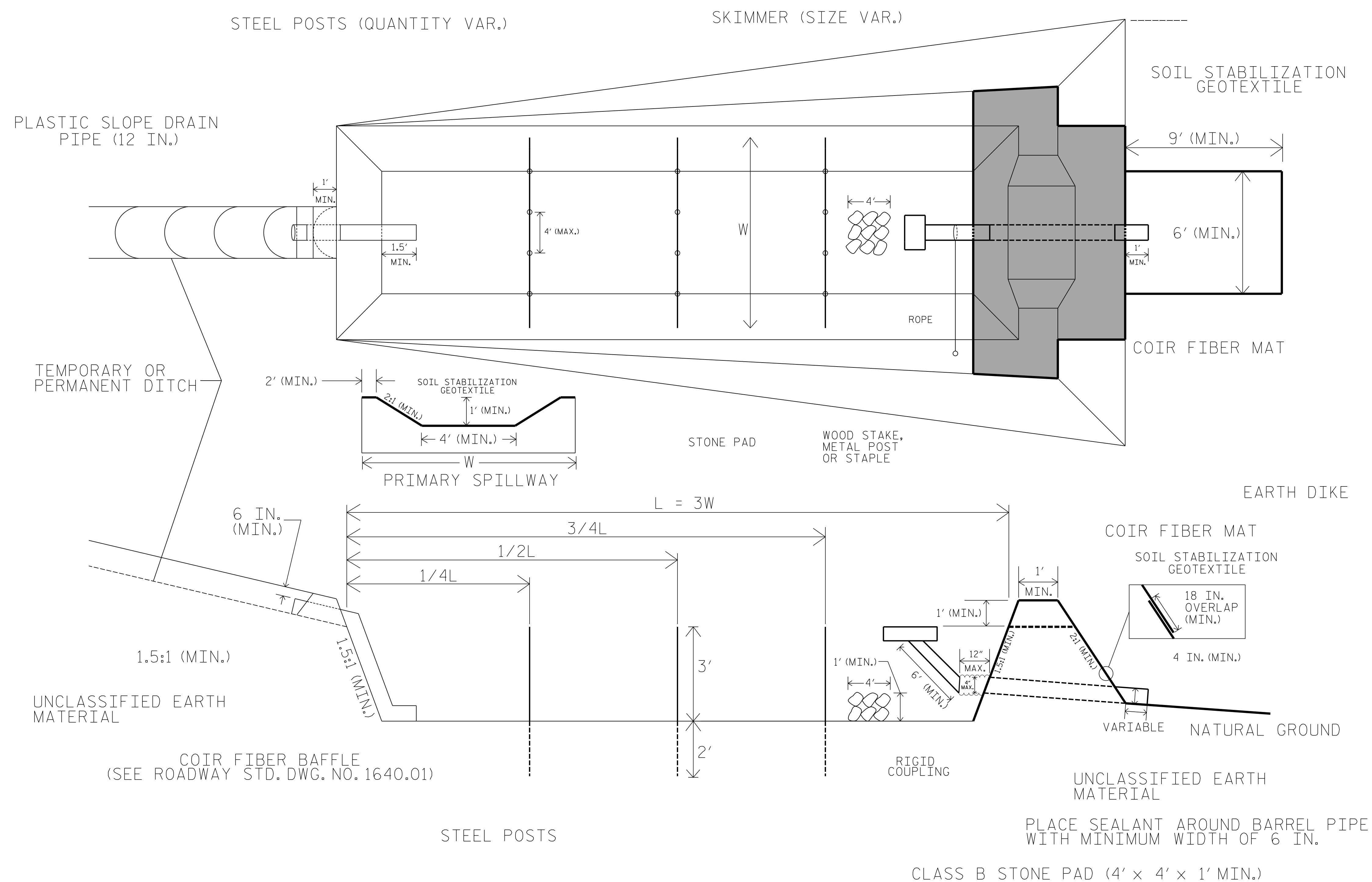
Designed by:
JAMES R. HOPSON JR. 3736
NAME LEVEL III CERTIFICATION NO.

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2012 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01 Railroad Erosion Control Detail	1632.01 Rock Inlet Sediment Trap Type A
1605.01 Temporary Silt Fence	1632.02 Rock Inlet Sediment Trap Type B
1606.01 Special Sediment Control Fence	1632.03 Rock Inlet Sediment Trap Type C
1607.01 Gravel Construction Entrance	1633.01 Temporary Rock Silt Check Type A
1622.01 Temporary Berms and Slope Drains	1633.02 Temporary Rock Silt Check Type B
1630.01 Riser Basin	1634.01 Temporary Rock Sediment Dam Type A
1630.02 Silt Basin Type B	1634.02 Temporary Rock Sediment Dam Type B
1630.03 Temporary Silt Ditch	1635.01 Rock Pipe Inlet Sediment Trap Type A
1630.04 Stilling Basin	1635.02 Rock Pipe Inlet Sediment Trap Type B
1630.05 Temporary Diversion	1640.01 Coir Fiber Baffle
1630.06 Special Stilling Basin	1645.01 Temporary Stream Crossing
1631.01 Matting Installation	

SKIMMER BASIN WITH BAFFLES DETAIL



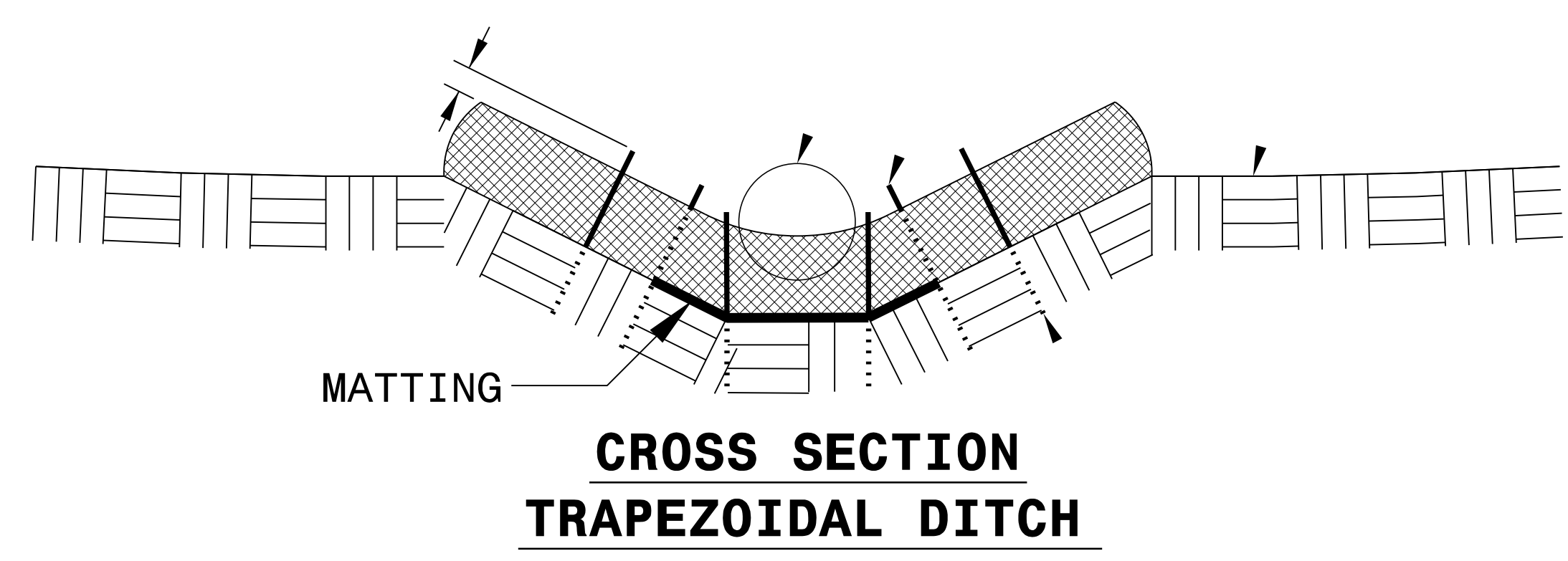
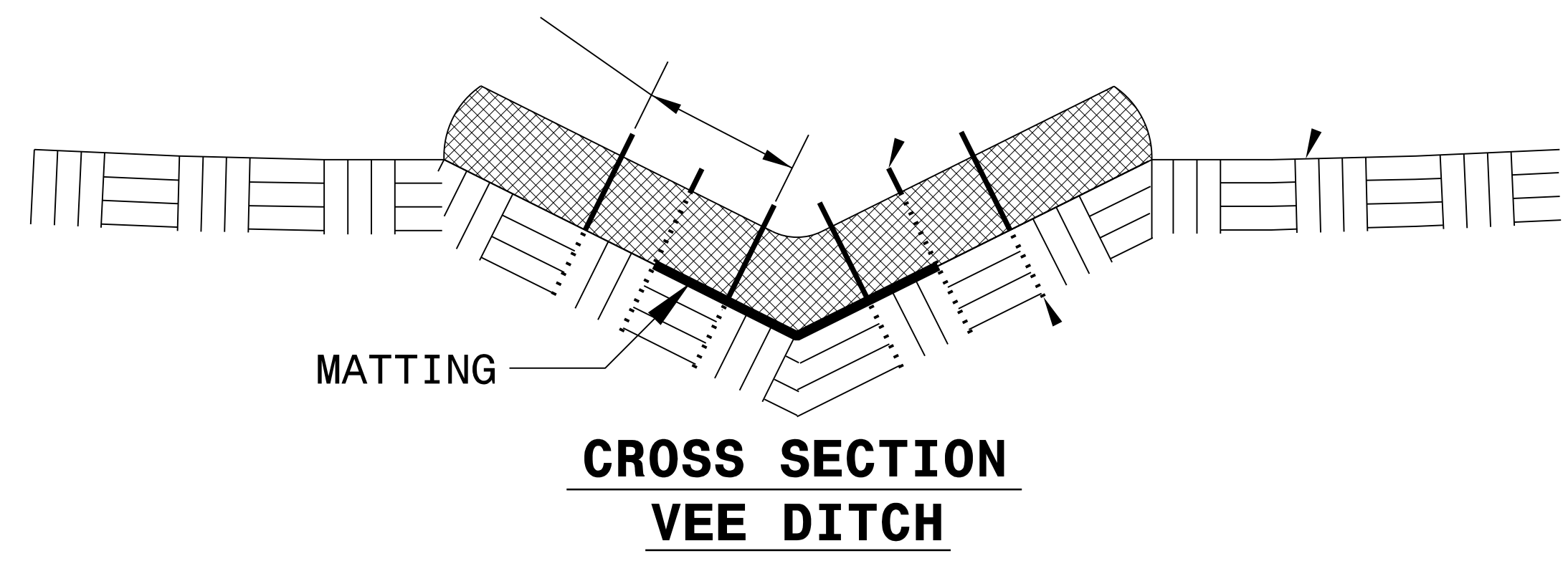
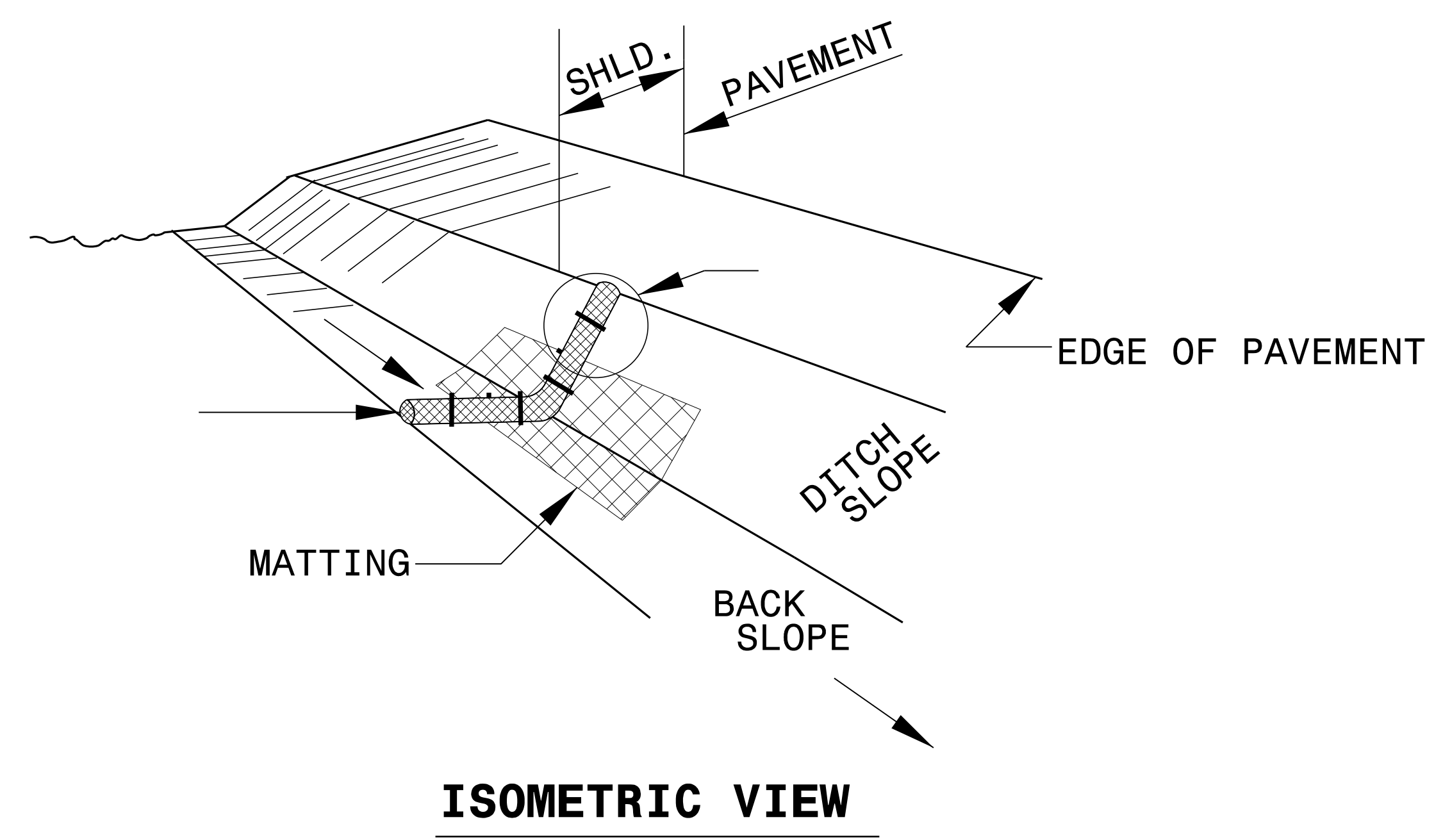
COIR FIBER MAT ANCHOR OPTIONS

NOTES

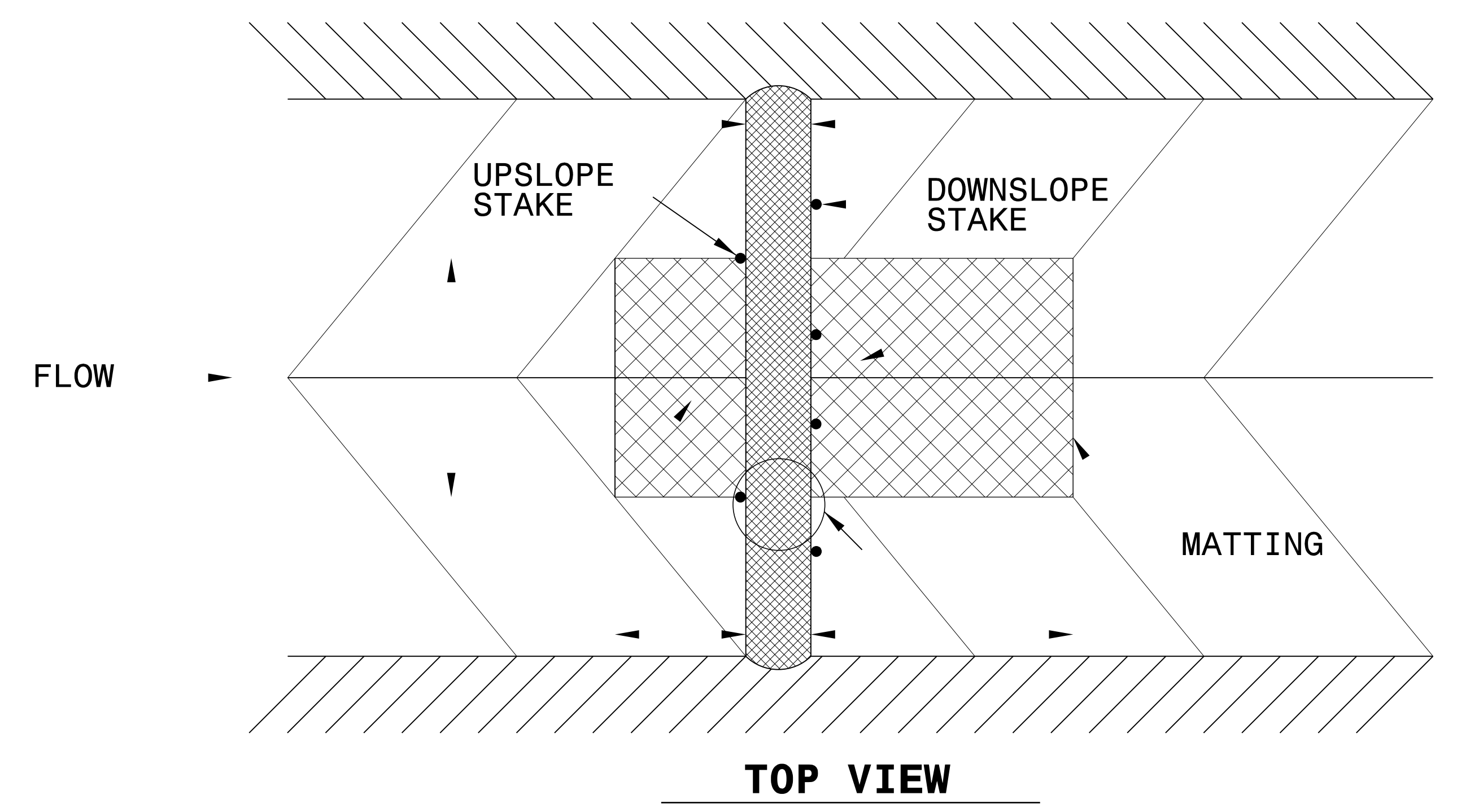
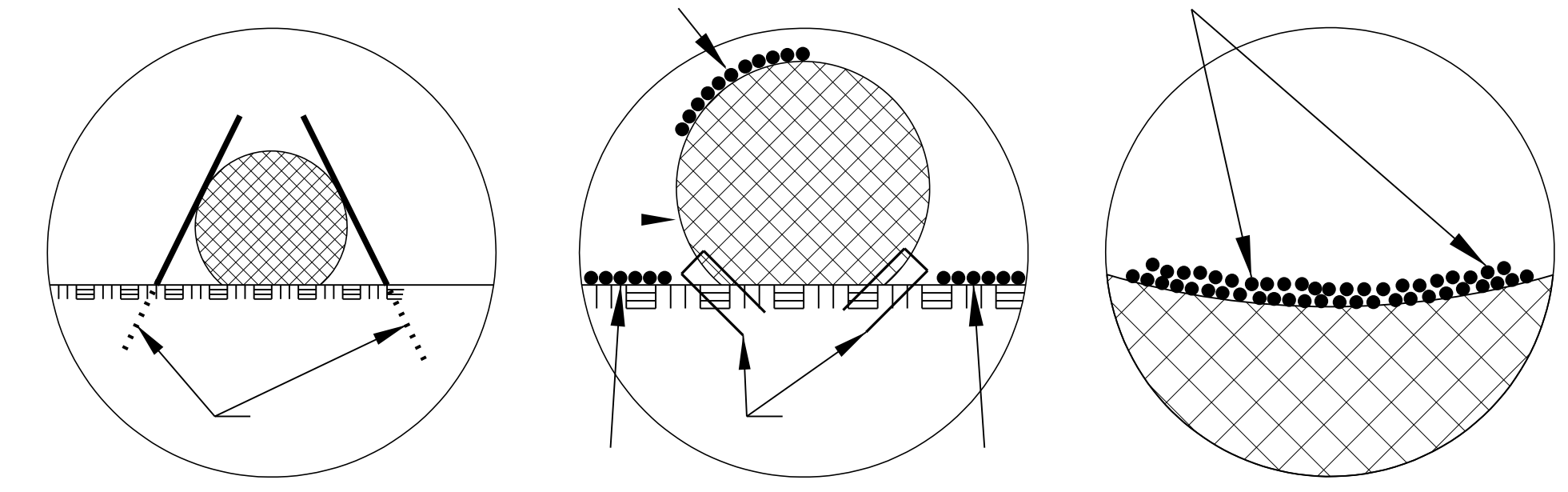
1. SEED AND PLACE MATTING FOR EROSION CONTROL ON INTERIOR AND EXTERIOR SIDESLOPES.
2. LIMIT EARTH DIKE HEIGHT TO 5 FT.
3. FOR BASIN DEPTH OF 3 FT., THE MINIMUM BASIN WIDTH SHALL BE 9 FT.
4. DETERMINE PRIMARY SPILLWAY WEIR LENGTH (FT.) USING $Q/0.8$, WHERE Q IS FLOW RATE (CFS) INTO BASIN.
5. PLASTIC SLOPE DRAIN PIPE AT INLET OF BASIN MAY BE REPLACED BY FILTRATION GEOTEXTILE OR TARP AS DIRECTED.
6. SOIL STABILIZATION GEOTEXTILE FOR PRIMARY SPILLWAY SHALL BE ONE CONTINUOUS PIECE OF MATERIAL OR OVERLAPPED 18 IN. (MIN.).

NOT TO SCALE

COIR FIBER WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



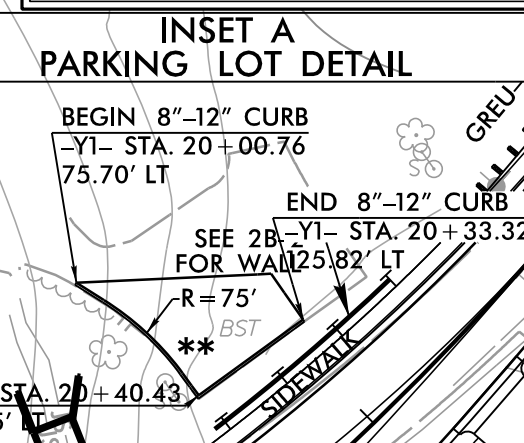
- NOTES:**
- USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE.
 - USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.
 - ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.
 - INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.
 - PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.
 - INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.
 - INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.
 - PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.
 - INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.



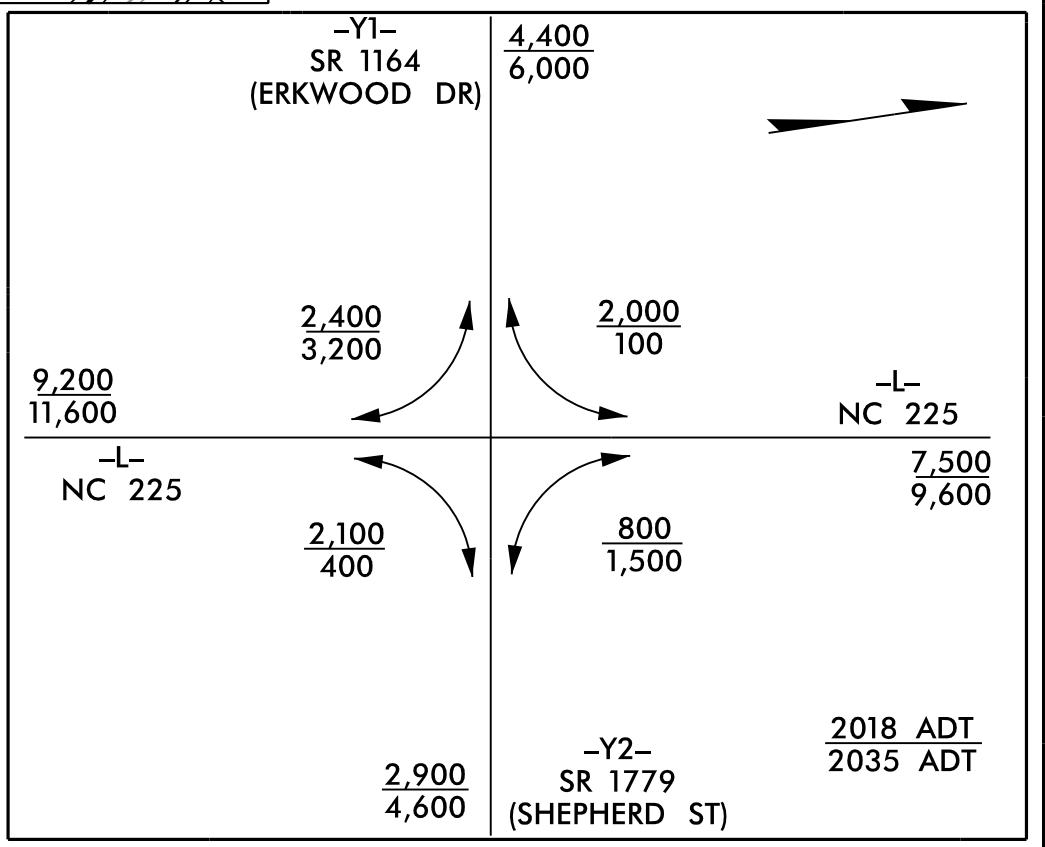
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

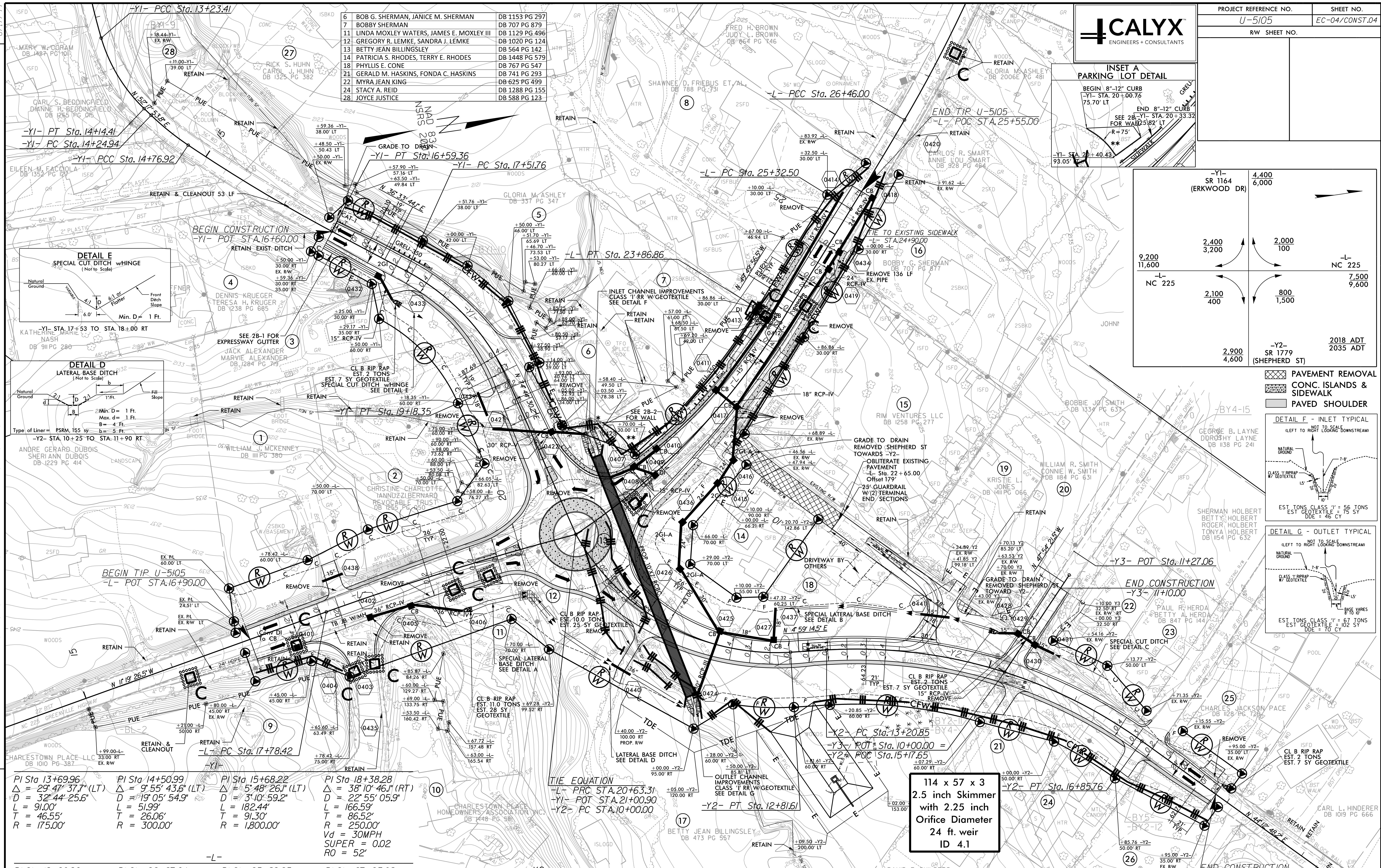
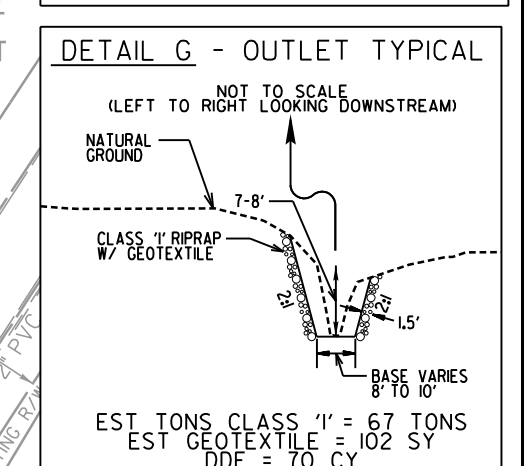
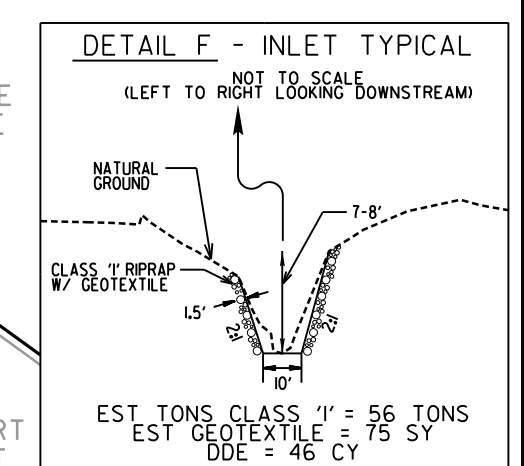
<i>SITE DESCRIPTION</i>	<i>STABILIZATION TIME</i>	<i>TIMEFRAME EXCEPTIONS</i>
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.



6	BOB G. SHERMAN, JANICE M. SHERMAN	DB 1153 PG 297
7	BOBBY SHERMAN	DB 707 PG 879
11	LINDA MOXLEY WATERS, JAMES E. MOXLEY III	DB 1129 PG 496
12	GREGORY R. LEMKE, SANDRA J. LEMKE	DB 1020 PG 124
13	BETTY JEAN BILLINGSLEY	DB 564 PG 142
14	PATRICIA S. RHODES, TERRY E. RHODES	DB 1448 PG 579
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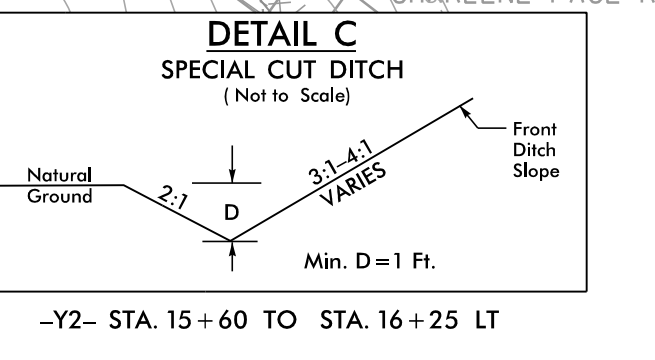
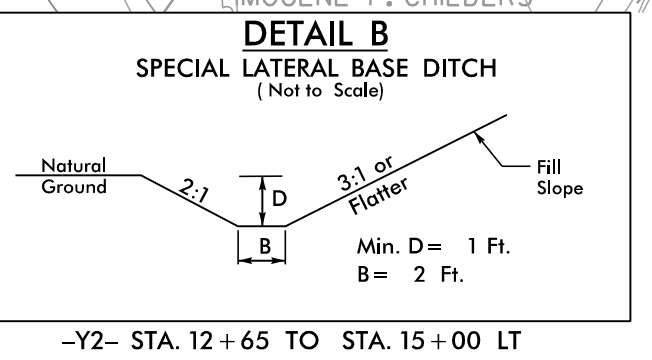
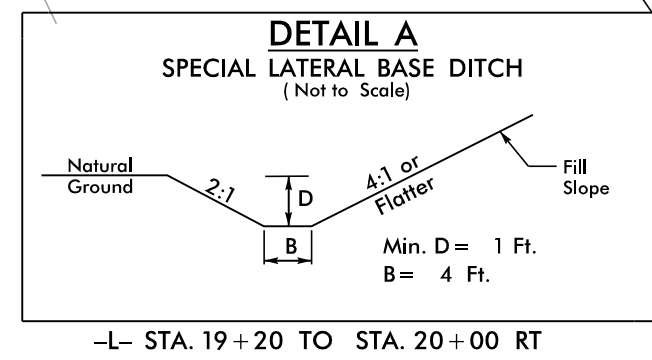
PAVEMENT REMOVAL
CONC. ISLANDS & SIDEWALK
PAVED SHOULDER



PI Sta 13+69.96 Δ = 29° 47' 37.7" (LT) D = 32' 44" 25.6" L = 91.00' T = 46.55' R = 175.00'	PI Sta 14+50.99 Δ = 9° 55' 43.6" (LT) D = 19' 05" 54.9" L = 51.99' T = 26.06' R = 300.00'	PI Sta 15+68.22 Δ = 5° 48' 26.1" (LT) D = 3' 10" 59.2" L = 182.44' T = 91.30' R = 1,800.00'	PI Sta 18+38.28 Δ = 38° 10' 46.1" (RT) D = 22' 55" 05.9" L = 166.59' T = 86.52' R = 250.00' Vd = 30MPH SUPER = 0.02 RO = 52'
PI Sta 19+20.96 Δ = 5° 04' 09.5" (RT) D = 1' 46" 45.7" L = 284.89' T = 142.54' R = 3,220.00' Vd = 40MPH SUPER = 0.04 RO = 84' AHEAD BEARING = N65°15'02.9"W	PI Sta 22+27.64 Δ = 24° 43' 02.0" (LT) D = 7' 38" 22.0" L = 323.55' T = 164.33' R = 750.00' Vd = 40MPH SUPER = 0.04 RO = 84' BACK BEARING = N25°06'54.47"W	PI Sta 25+89.25 Δ = 1° 18' 02.0" (LT) D = 1' 08' 45.3" L = 113.49' T = 56.75' R = 5,000.00'	PI Sta 27+23.08 Δ = 5° 53' 02.0" (LT) D = 3' 49" 11.0" L = 154.04' T = 77.09' R = 1,500.00'
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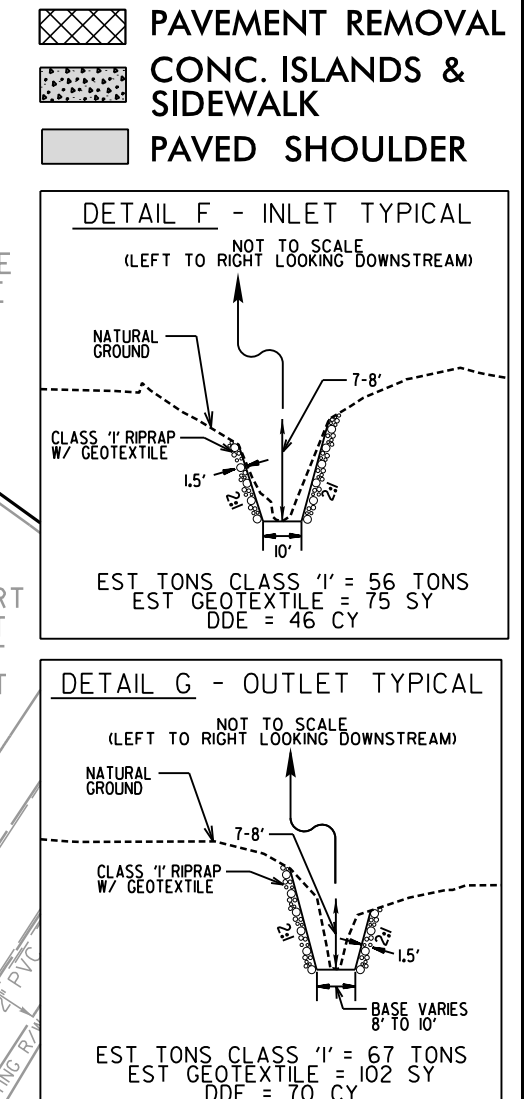
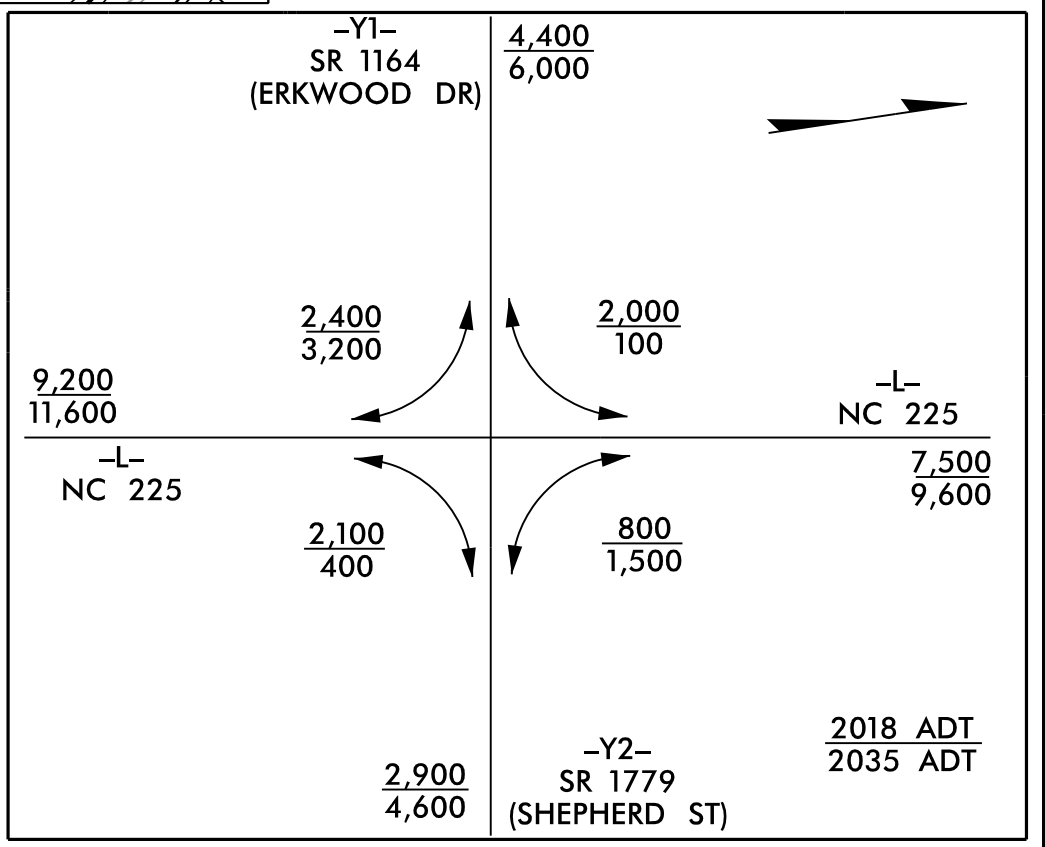
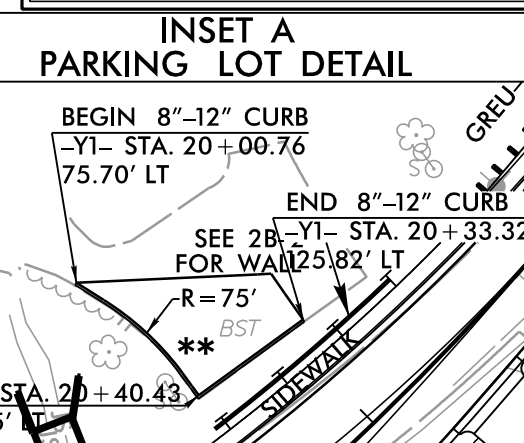
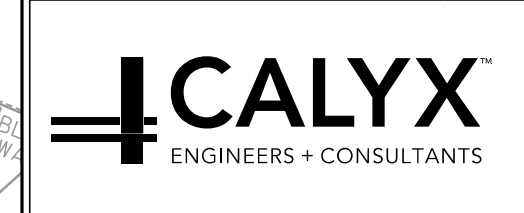
TIE EQUATION
-L- PRC STA. 20+63.31
-Y1- POT STA. 21+00.90
-Y2- PC STA. 10+00.00

114 x 57 x 3
2.5 inch Skimmer
with 2.25 inch
Orifice Diameter
24 ft. weir
ID 4.1



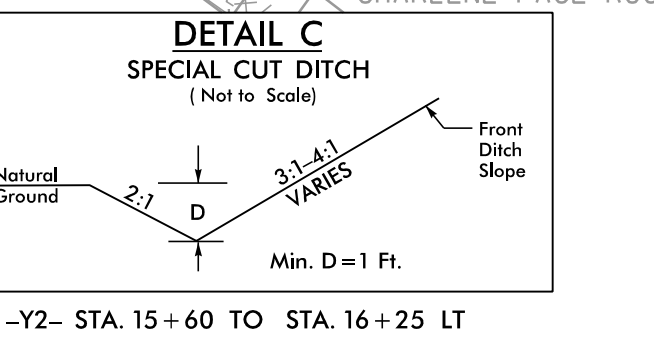
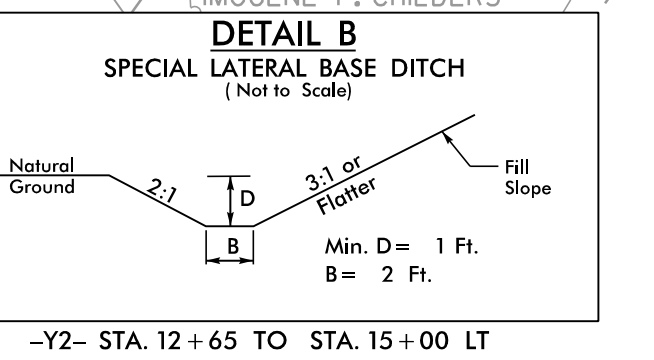
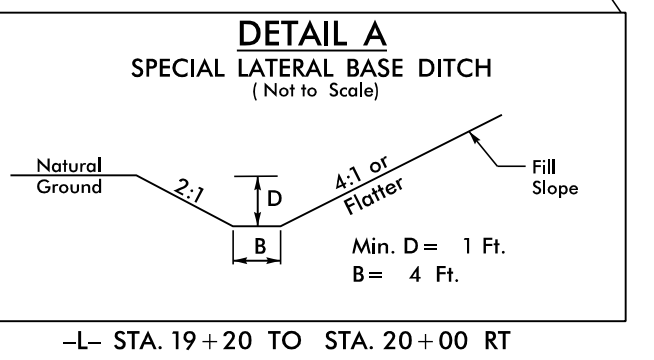
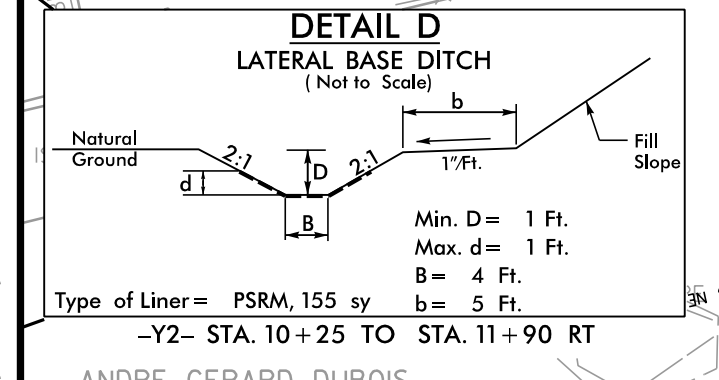
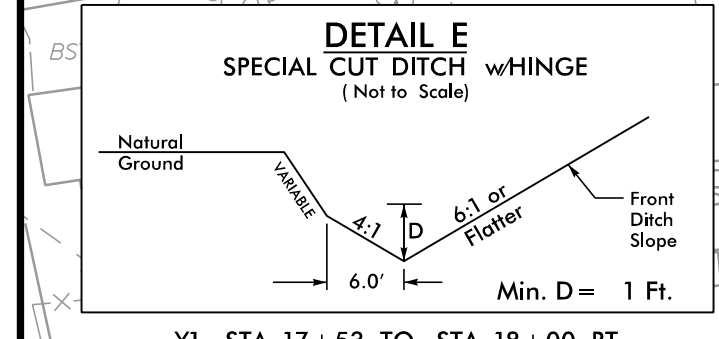
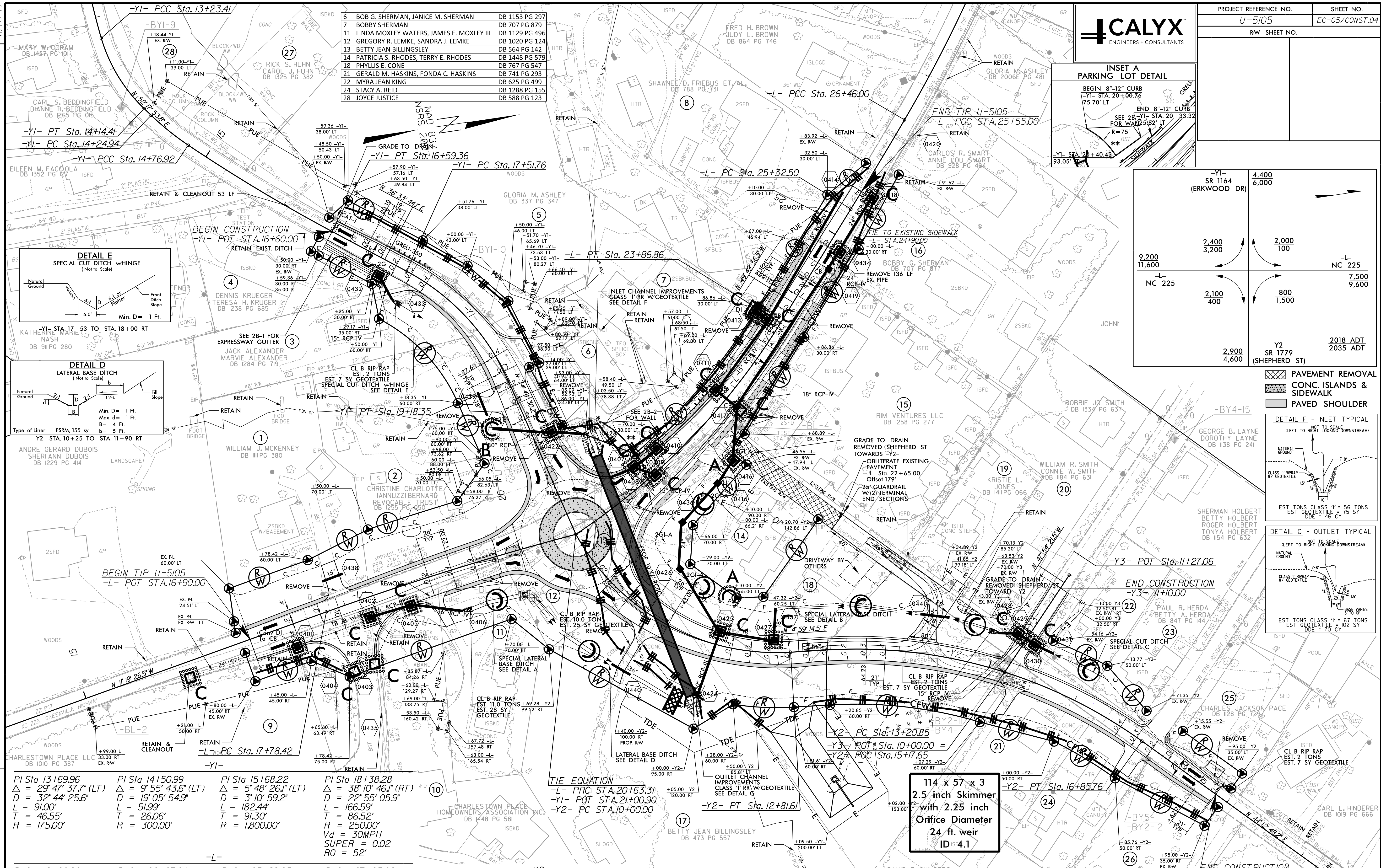
NOTES:
SEE SHEET 5 FOR -L-, -Y1- AND -Y2- PROFILE
SEE SHEET 6 FOR -Y3- PROFILE
SEE SHEET 2B-1 FOR INTERSECTION DETAIL
SEE SHEET 2B-2 FOR WALL DETAIL
SEE SHEET C-1 THRU C-7 FOR CULVERT PLANS
* DO NOT DISTURB CURB
** REPLACE CURB AND EXISTING ASPHALT AS NEEDED. SEE INSET A: PARKING LOT DETAIL.

REVISIONS
7-05-17 - (1) Parcel 15 and Parcel 16; revised existing right of way (2) Parcel 16; revised proposed Right of Way
8-18-17 - Parcel 14; revised proposed drainage, right of way, and easement.
9-6-17 - Parcel 22; Name Change only; Myra Jean King; Parcel 24; Name Change only; Stacy A. Reid



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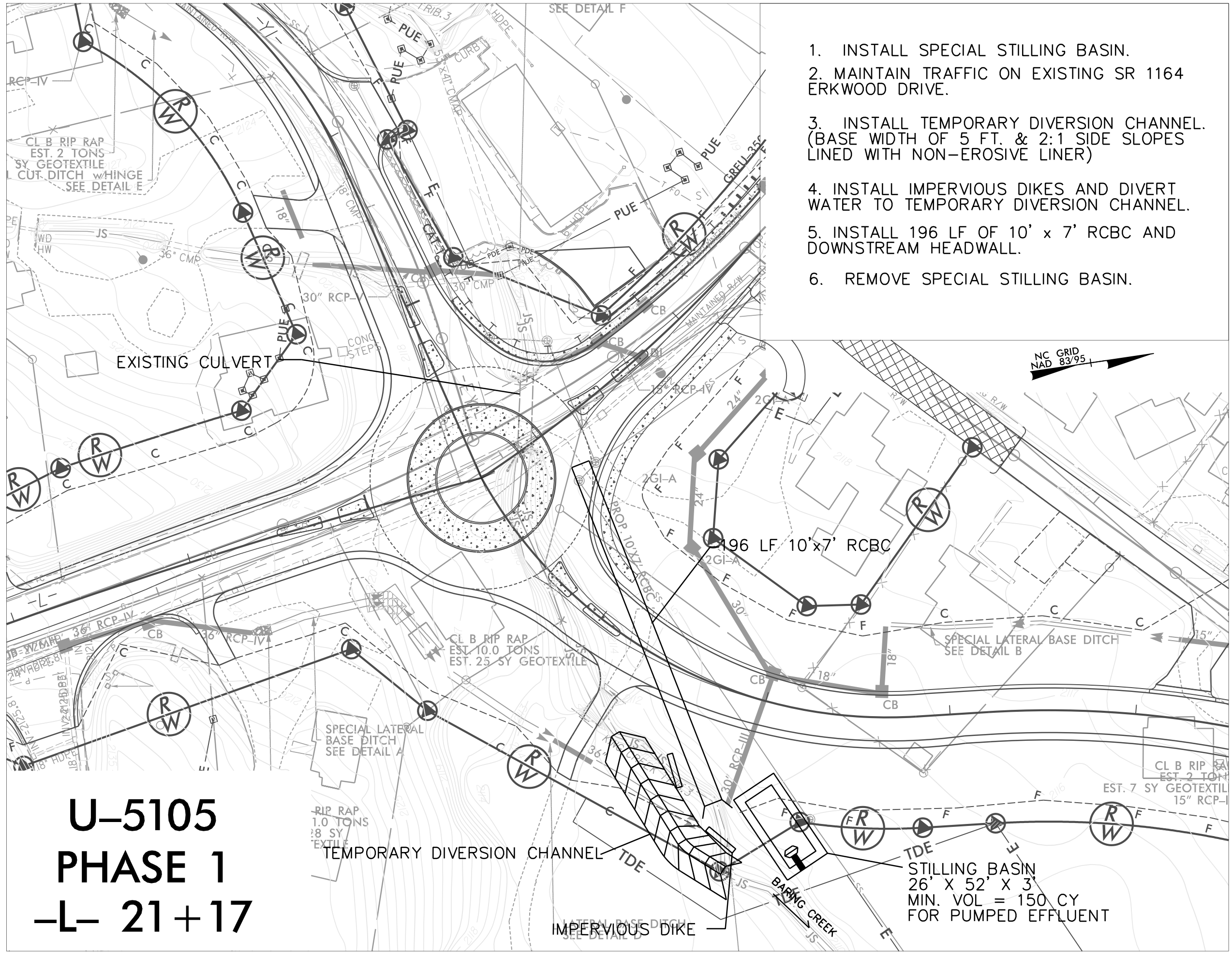
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<p>PI Sta 19+20.96 Δ = 5° 04' 09.5" (RT) D = 1' 46" 45.7" L = 284.89' T = 142.54' R = 3,220.00' Vd = 40MPH SUPER = 0.04 RO = 84' AHEAD BEARING = N65°15'02.9"W</p>	<p>PI Sta 22+27.64 Δ = 24° 43' 02.0" (LT) D = 7' 38" 22.0" L = 323.55' T = 164.33' R = 750.00' Vd = 40MPH SUPER = 0.04 RO = 84'</p>	<p>PI Sta 25+89.25 Δ = 1° 18' 02.0" (LT) D = 1' 08' 45.3" L = 113.49' T = 56.75' R = 5,000.00'</p>	<p>PI Sta 27+23.08 Δ = 5° 53' 02.0" (LT) D = 3' 49" 11.0" L = 154.04' T = 77.09' R = 1,500.00'</p>
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114 x 57 x 3
2.5 inch Skimmer
with 2.25 inch
Orifice Diameter
24 ft. weir
ID = 4.1

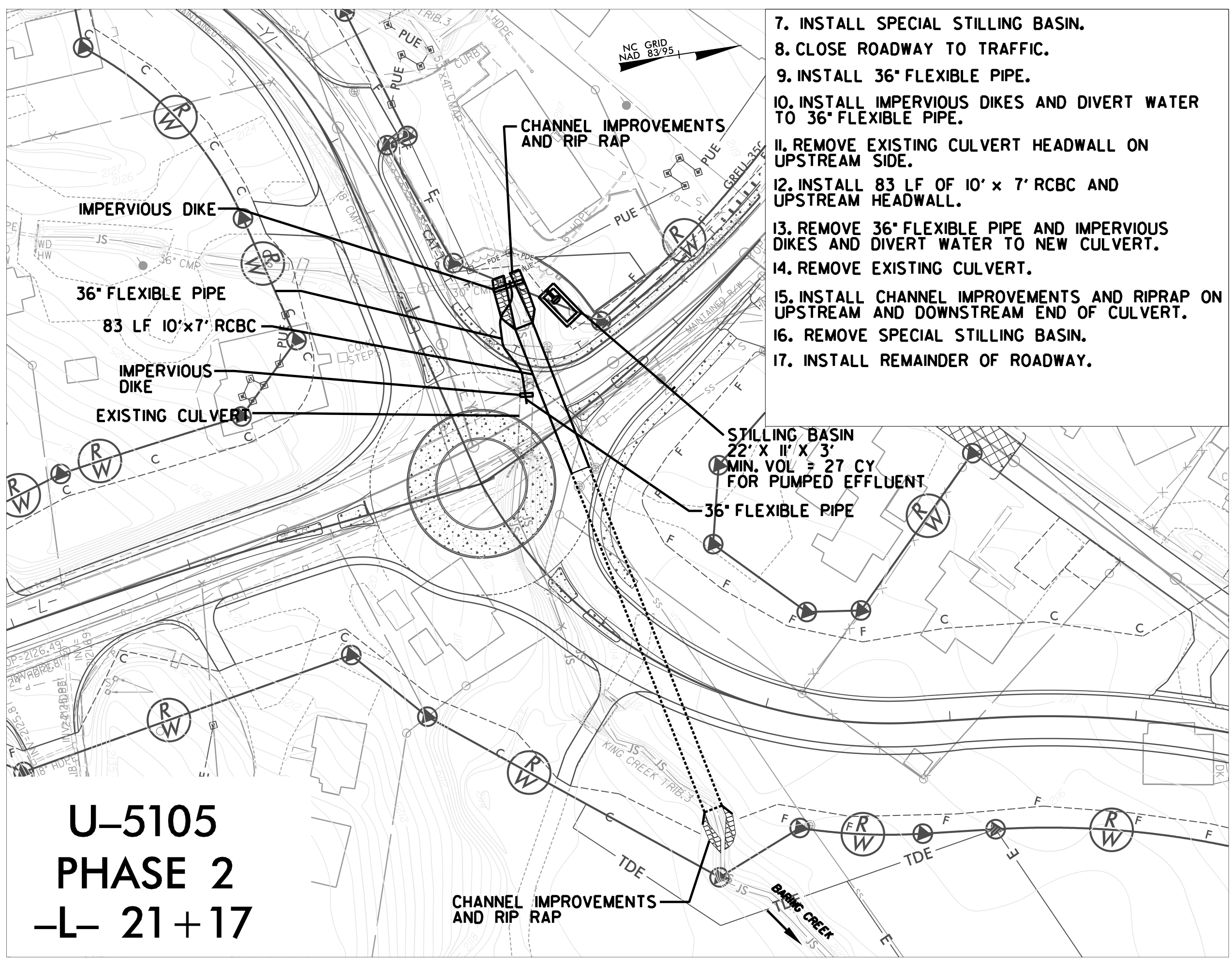
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8-18-17 - Parcel 14: revised proposed drainage, right of way, and easement.
9-6-17 - Parcel 22: Name Change only: Myra Jean King; Parcel 24: Name Change only: Stacy A. Reid



1. INSTALL SPECIAL STILLING BASIN.
2. MAINTAIN TRAFFIC ON EXISTING SR 1164 ERKWOOD DRIVE.
3. INSTALL TEMPORARY DIVERSION CHANNEL. (BASE WIDTH OF 5 FT. & 2:1 SIDE SLOPES LINED WITH NON-EROSIVE LINER)
4. INSTALL IMPERVIOUS DIKES AND DIVERT WATER TO TEMPORARY DIVERSION CHANNEL.
5. INSTALL 196 LF OF 10' X 7' RCBC AND DOWNSTREAM HEADWALL.
6. REMOVE SPECIAL STILLING BASIN.

U-5105
PHASE 1
-L- 21+17

TEMPORARY DIVERSION CHANNEL TDE
 IMPERVIOUS DIKE
 STILLING BASIN
 26' X 52' X 3'
 MIN. VOL = 150 CY
 FOR PUMPED EFFLUENT



7. INSTALL SPECIAL STILLING BASIN.
8. CLOSE ROADWAY TO TRAFFIC.
9. INSTALL 36" FLEXIBLE PIPE.
10. INSTALL IMPERVIOUS DIKES AND DIVERT WATER TO 36" FLEXIBLE PIPE.
11. REMOVE EXISTING CULVERT HEADWALL ON UPSTREAM SIDE.
12. INSTALL 83 LF OF 10' x 7' RCBC AND UPSTREAM HEADWALL.
13. REMOVE 36" FLEXIBLE PIPE AND IMPERVIOUS DIKES AND DIVERT WATER TO NEW CULVERT.
14. REMOVE EXISTING CULVERT.
15. INSTALL CHANNEL IMPROVEMENTS AND RIPRAP ON UPSTREAM AND DOWNSTREAM END OF CULVERT.
16. REMOVE SPECIAL STILLING BASIN.
17. INSTALL REMAINDER OF ROADWAY.

**U-5105
PHASE 2
-L- 21+17**

CHANNEL IMPROVEMENTS AND RIP RAP

STILLING BASIN
22' x 11' x 3'
MIN. VOL = 27 CY
FOR PUMPED EFFLUENT

36" FLEXIBLE PIPE

36" FLEXIBLE PIPE

83 LF 10' x 7' RCBC

IMPERVIOUS DIKE

EXISTING CULVERT

CHANNEL IMPROVEMENTS AND RIP RAP

NC GRID NAD 83/95

BRIDGE CREEK

TDE

TDE

TDE

TDE

TDE

TDE

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TIP NO.	SHEET NO.
U-5105	SIGN-1
APPROVED: <i>Brendan Lehan</i> 8817082FF7854CD	
DATE: 2/26/2018	
SEAL	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

**STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

**SIGNING PLAN
HENDERSON COUNTY**

LOCATION: NC 225 (GREENVILLE HIGHWAY) AT SR 1164 (ERKWOOD DR.) AND SR 1779 (SHEPHERD ST)

U-5105

SUMMARY OF QUANTITIES

ITEM NO.	DESC. NO.	SECT. NO.	ITEM DESCRIPTION	QUANTITY	UNIT
4072000000		903	SUPPORTS, 3LB STEEL U-CHANNEL	400	L.F.
4102000000		904	SIGN ERECTION, TYPE E	22	EA.
4129000000		906	RELOCATE SIGN, TYPE E	4	EA.
4155000000		907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	5	EA.
4192000000		907	DISPOSAL OF SUPPORT, U-CHANNEL	4	EA.

GENERAL NOTES

- WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' AND 'F' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER
- ALL EXISTING SIGNS ON "U" CHANNEL POST WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON PLANS.
- ALL TYPE 'D' SIGNS SHALL BE MOUNTED ON TWO U-CHANNEL POSTS UNLESS OTHERWISE INDICATED ON THE PLANS.
- WHEN EXISTING SIGNS ARE REMOVED AND INSTALLED ON NEW SUPPORTS, THE RE-ERECTION SHALL IMMEDIATELY FOLLOW THE REMOVAL
- IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.
- THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.50	MOUNTING OF TYPE 'D', 'E', AND 'F' SIGNS ON 'U' CHANNEL POSTS
910.40	SINGLE LANE ROUNDABOUT SIGNING, WITH PEDESTRIANS

PAY ITEM NOTES

- DISPOSAL OF SIGN SYSTEM, U-CHANNEL
- RELOCATE SIGN, TYPE E
- DISPOSAL OF SUPPORT, U-CHANNEL
- CONTACT NCDOT TRAFFIC SERVICES FOR REMOVAL AND REPLACEMENT

INDEX

SHEET NO.	DESCRIPTION
SIGN-1	TITLE SHEET
SIGN-2	SIGN QUANTITIES
SIGN-3	SIGN (EXISTING) DETAIL
SIGN-4	SIGN (PROPOSED) DETAIL

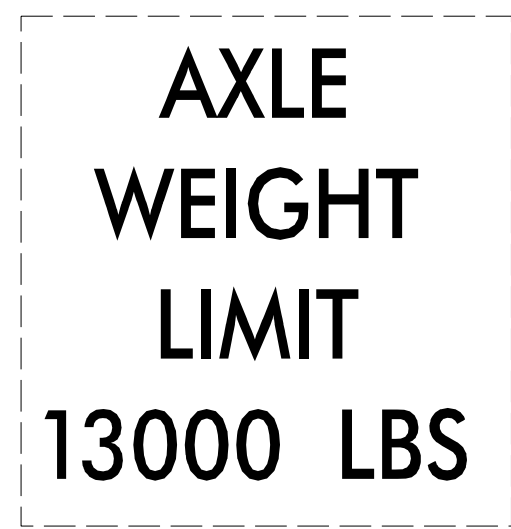
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5/14/19

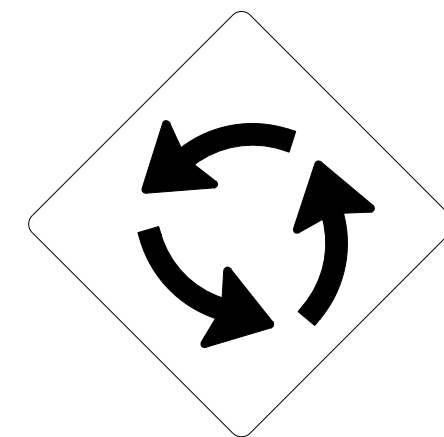
401

QUANTITY REQ'D N/A(Existing)



ONE 'U' POST PER SIGN

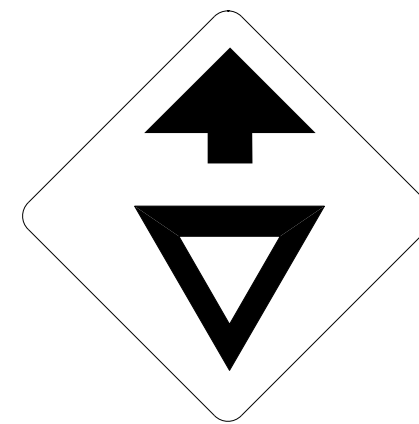
402 QUANTITY REQ'D 4



W2-6
30" X 30"

ONE 'U' POST PER SIGN

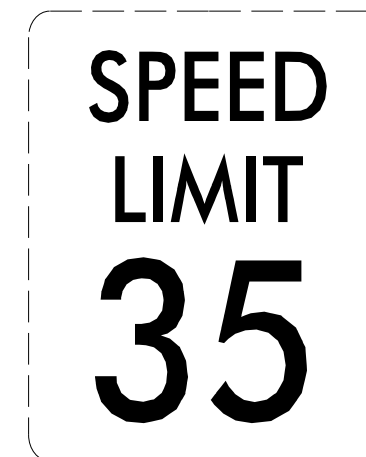
403 QUANTITY REQ'D 4



W3-2
30" X 30"

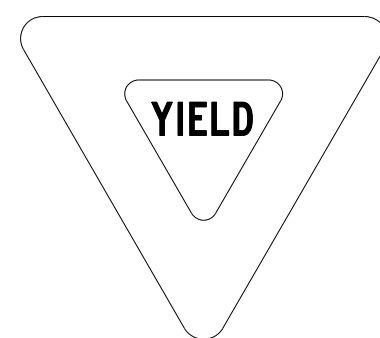
ONE 'U' POST PER SIGN

404
QUANTITY REQ'D N/A (Existing)



ONE 'U' POST PER SIGN

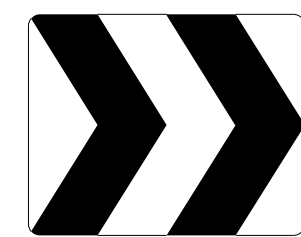
405 QUANTITY REQ'D 8



R1-2
36" X 36"
X 36"

ONE 'U' POST PER SIGN

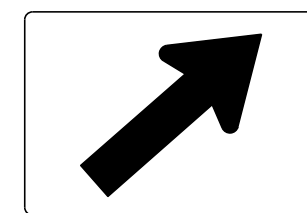
406 QUANTITY REQ'D 4



R6-4
30" X 24"

ONE 'U' POST PER SIGN

408 QUANTITY REQ'D 2



M6-2
21" X 15"

ONE 'U' POST PER SIGN

409 QUANTITY REQ'D 2



M1-5
24" X 24"

ONE 'U' POST PER SIGN

410 QUANTITY REQ'D 1



M3-1
24" X 12"

ONE 'U' POST PER SIGN

411 QUANTITY REQ'D 1



M3-3
24" X 12"

ONE 'U' POST PER SIGN

PROJECT REFERENCE NO.	SHEET NO.
U-5105	SIGN-2
RW SHEET NO.	

Prepared In the Offices of:

M M

MOTT MACDONALD

PO Box 100
Fayetteville, NC 27526
www.mottmac.com
License No. F-3669

SIGNING DESIGN ENGINEER

DocuSigned by:
Brendan Lehan

SEAL
045256

2/26/2018

BRENDAN A. LEHAN

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PROJECT REFERENCE NO.	SHEET NO.
U-5105	SIGN-3
RW SHEET NO.	

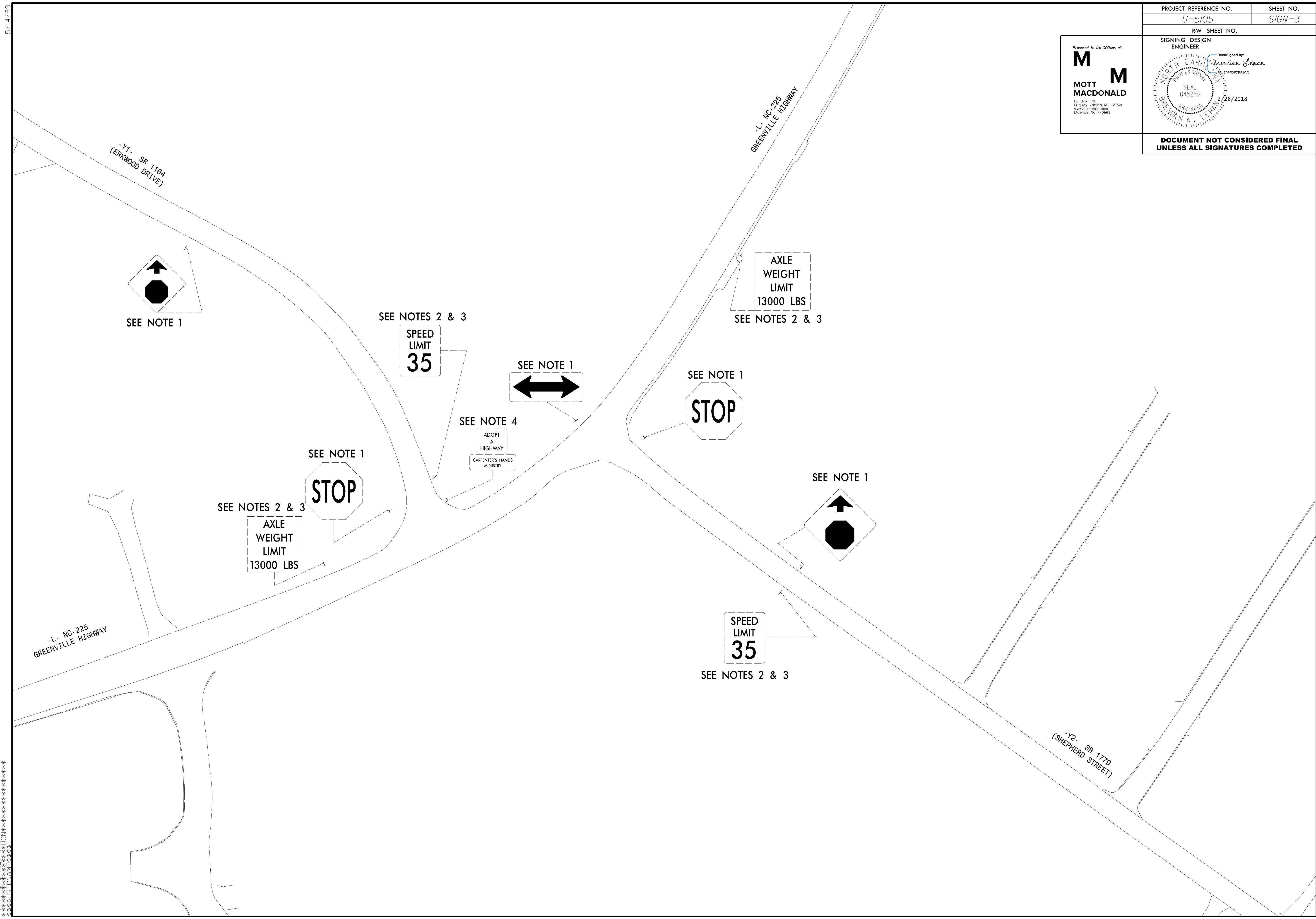
Prepared in the Offices of:
M M
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 PO Box 700
 Fuquay-Varina, NC 27526
 www.mmt11mop.com
 License No. F-0669

SIGNING DESIGN ENGINEER

DocuSigned by:
Brendan Lehan
 9517082F7854CD...

SEAL
 045256
 2/26/2018
 BRENDAN A. LEHAN
 PROFESSIONAL ENGINEER

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-5105	SIGN-4
RW SHEET NO.	

Prepared in the Office of:

M M

MOTT MACDONALD

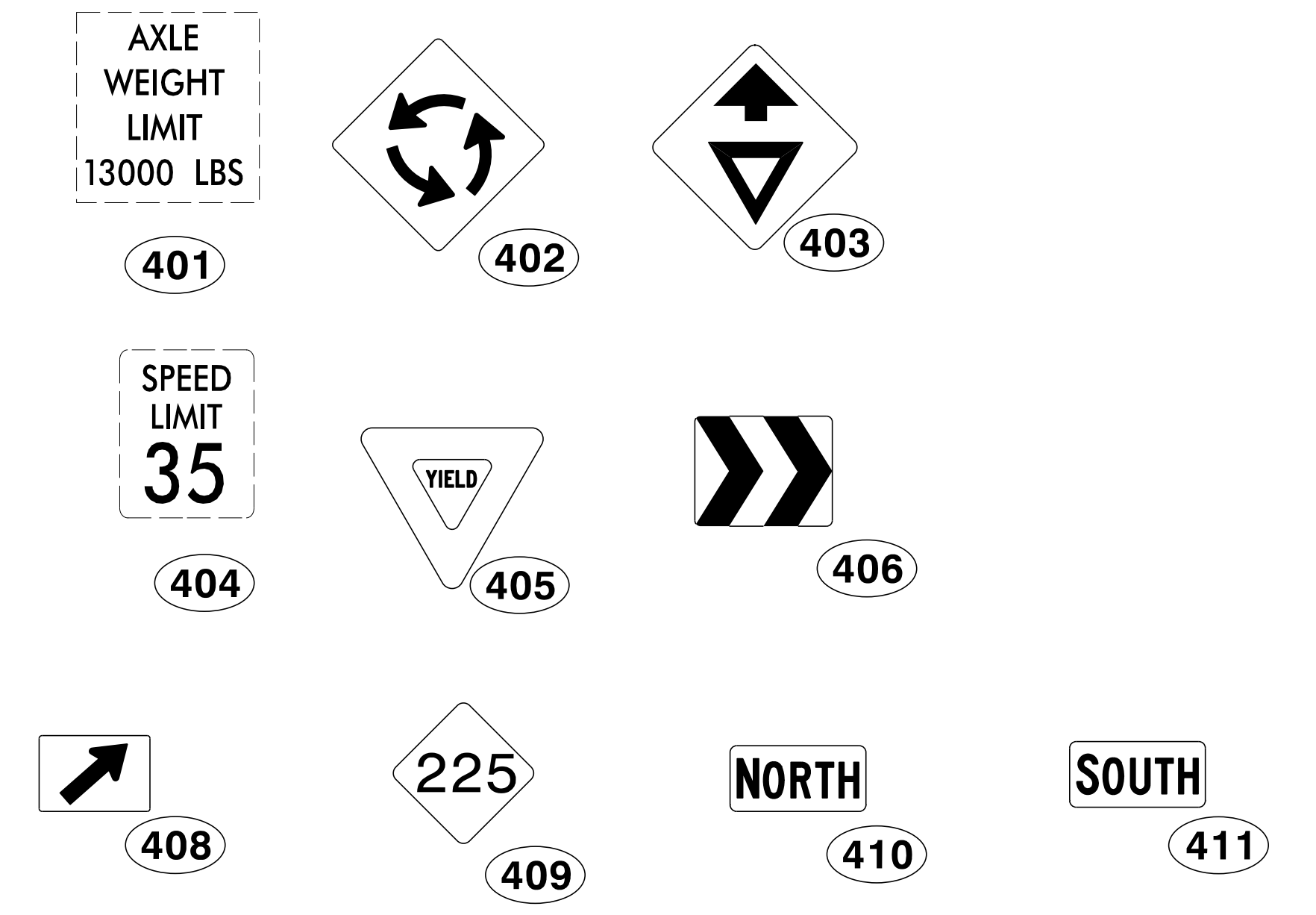
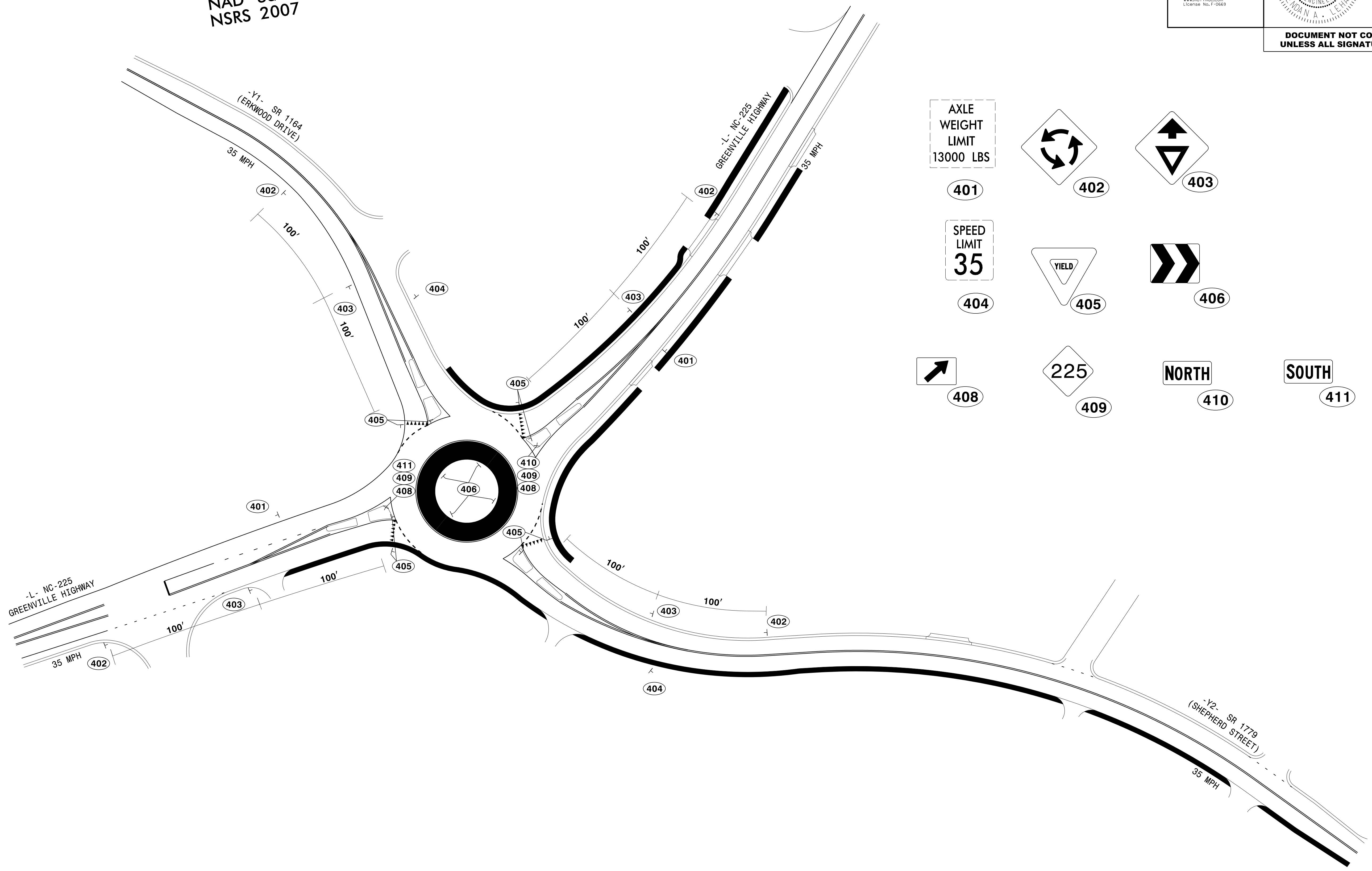
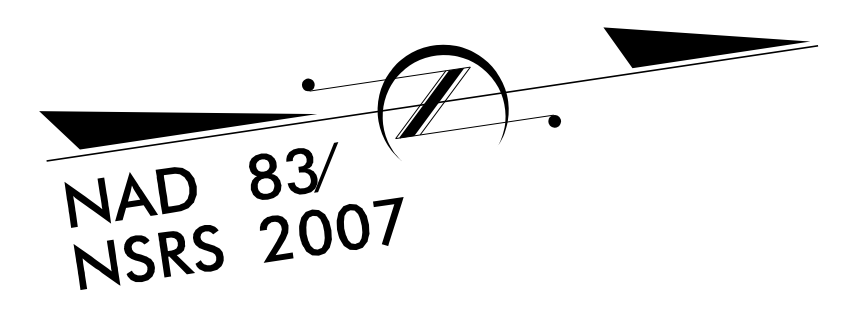
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Furquay-Vorhies, NC 27526
www.mtmac.com
License No. F-0669

SIGNING DESIGN ENGINEER

DocuSigned by:
Brendan Lehan
#17082F7B54CD

SEAL
045256
2/26/2018
ENGINEER
BRYAN A. LEHAN

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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

T.I.P. NO.	SHEET NO.
U-5105	UC-1

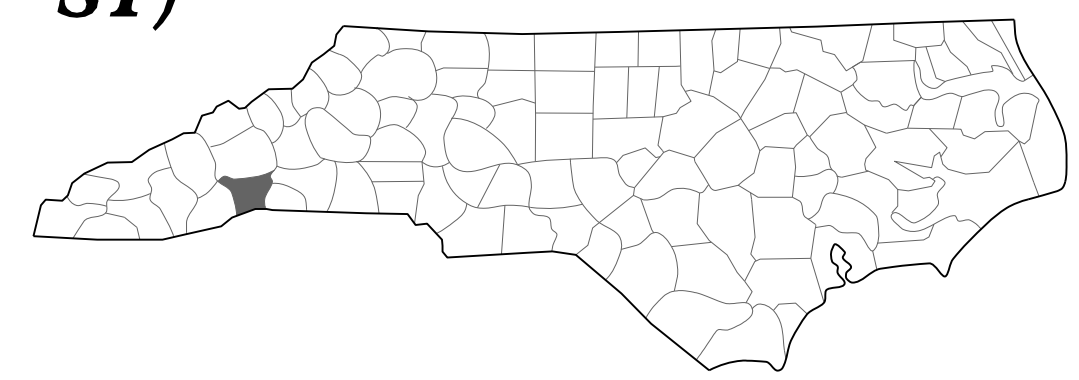
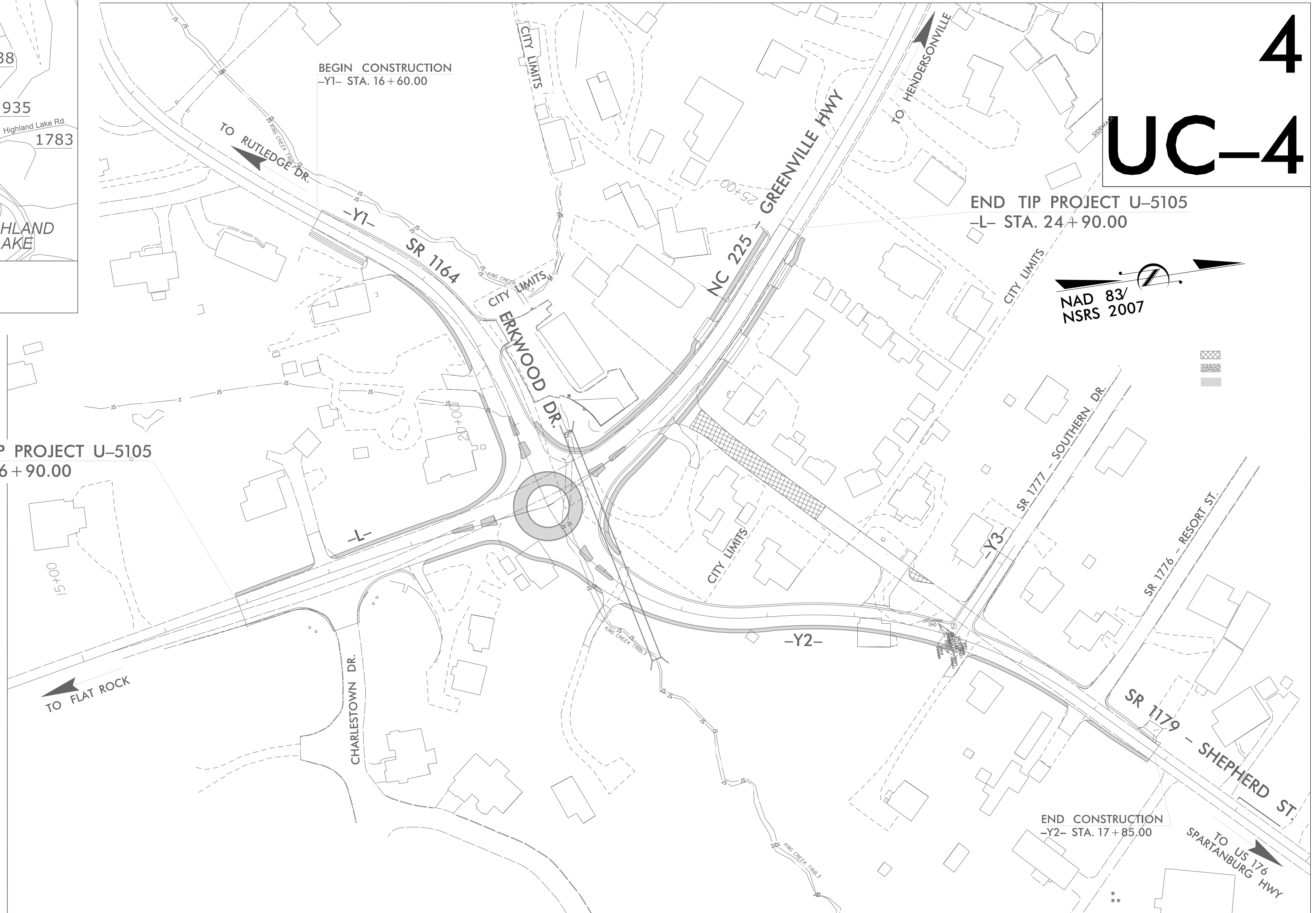
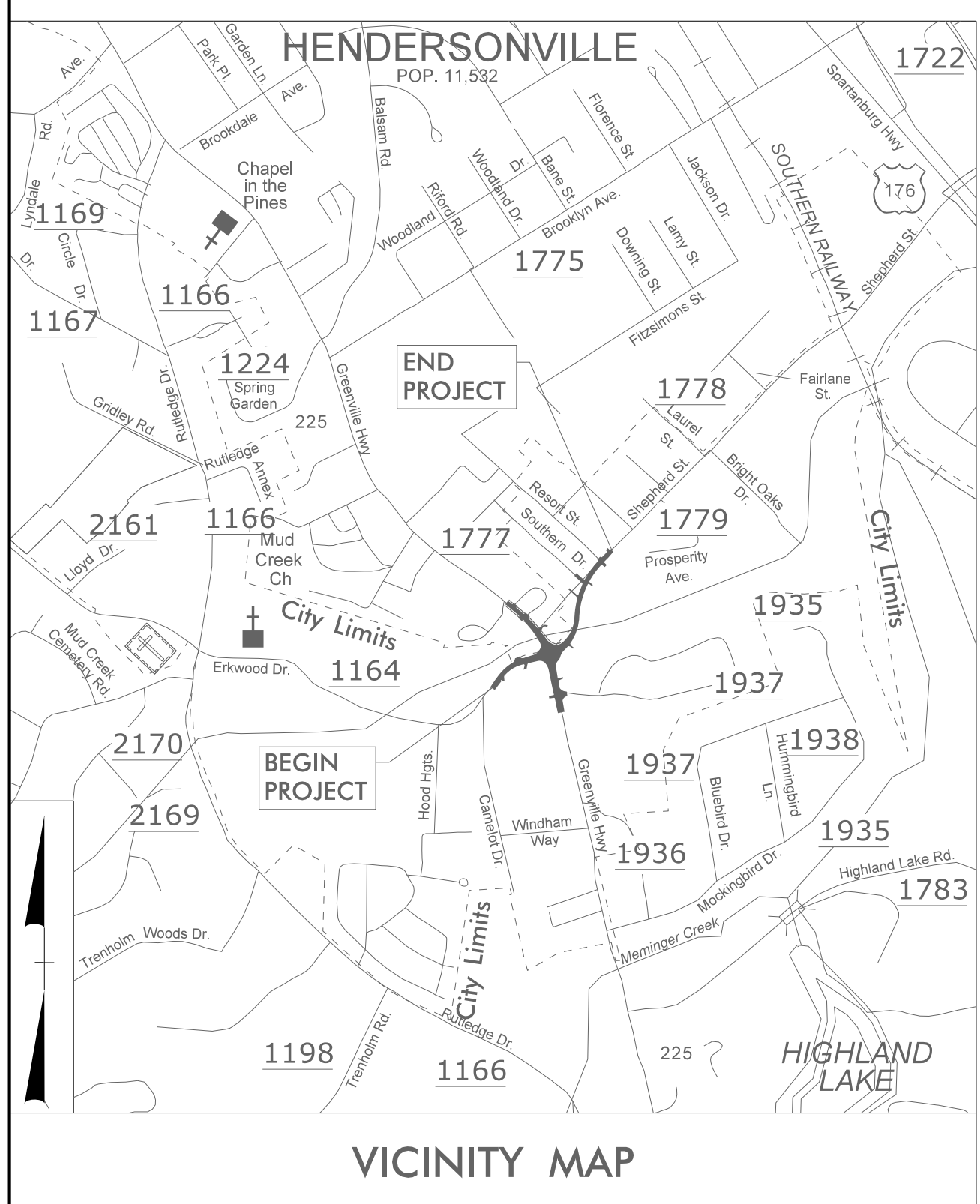
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UNLESS ALL SIGNATURES COMPLETED

UTILITY CONSTRUCTION PLANS HENDERSON COUNTY

LOCATION: NC 225 (GREENVILLE HWY) INTERSECTION IMPROVEMENTS
FROM SR 1164 (ERKWOOD DR) TO SR 1779 (SHEPHERD ST)

TYPE OF WORK: UTILITIES

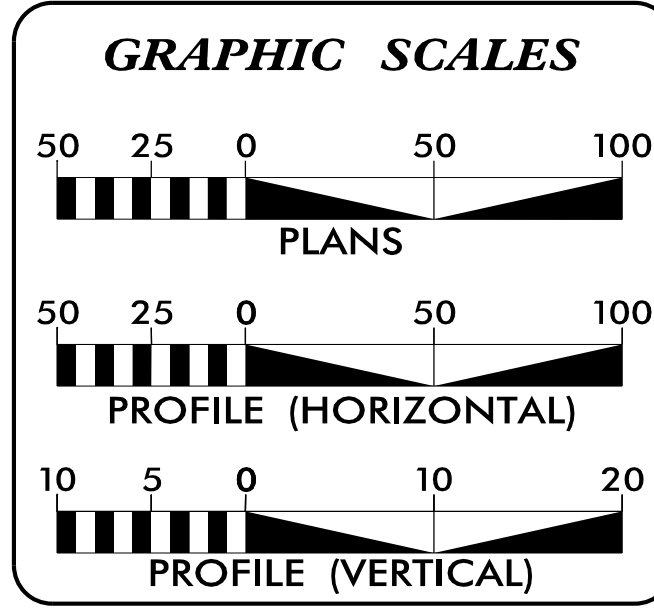
TIP PROJECT: U-5105



4
UC-4

A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF HENDERSONVILLE.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.



SHEET NO.	DESCRIPTION
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY
UC-3	NOTES
UC-3A THRU UC-3D	DETAILS
UC-4	UTILITY CONSTRUCTION SHEET
UC-5 THRU UC-7	PROFILE SHEETS

WATER AND SEWER OWNERS ON PROJECT

TOWN OF HENDERSONVILLE - WATER AND SEWER

PREPARED IN THE OFFICE OF:

HINDE ENGINEERING

License No. C-2639
7520 E. Independence Blvd., Suite 230 Charlotte, NC 28227
Ph. (704) 814-4407

Ronald B. Wilkins, P.E. UTILITIES PROJECT MANAGER
Clint L. Stevens, P.E. UTILITIES PROJECT ENGINEER
Ronald B. Wilkins, P.E. UTILITIES PROJECT DESIGNER

SEAL

5/21/2018 7:13:09 AM EDT

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

Ted Adams DIVISION CONTACT #1
Mitchell Bishop DIVISION CONTACT #2
Bob Golding DIVISION CONTACT #3
Steve Cannon, PE DIVISION CONTACT #4

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UTILITIES PLAN SHEET SYMBOLS

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	REM FH
Water Meter	
Relocate Water Meter	
Remove Water Meter	REM WM
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	

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)

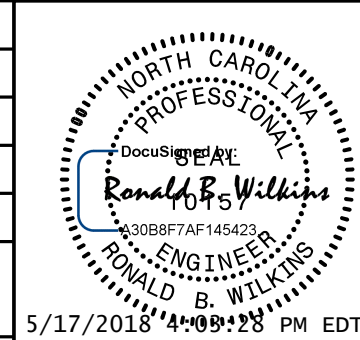
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UTILITY CONSTRUCTION



HINDE ENGINEERING
 License No. C-2639
 7520 E. Independence Blvd., Suite 230 Charlotte, NC 28227

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 UNLESS ALL SIGNATURES COMPLETED**

PROJECT REFERENCE NO. U-5105	SHEET NO. UC-3
DESIGNED BY: RBW	
DRAWN BY: RBW	
CHECKED BY: CLS	
APPROVED BY: RBW	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	5/17/2018 4:09:28 PM EDT
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

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 2012.
2. THE EXISTING UTILITIES BELONG TO THE CITY OF HENDERSONVILLE, N.C. THE CONTACT PERSON FOR THE CITY IS MR. BRENT DETWILER, PE AND HE CAN BE REACHED AT (828) 697-3060
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. WATER LINE AND SEWER LINE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF HENDERSONVILLE STANDARD DETAILS AND THE PROJECT SPECIAL PROVISIONS.
2. PRIOR TO FINAL ACCEPTANCE OF THE WATER AND SEWER LINE WORK THE CONTRACTOR SHALL PROVIDE SURVEYED AS-BUILT RECORD DRAWINGS.
3. ANY PROPOSED CHANGES TO WATER OR SEWER LINE WORK SHALL BE APPROVED IN ADVANCE IN WRITING BY THE ENGINEER.
4. FLUSHING, DISINFECTING AND TESTING OF WATER LINES SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIAL PROVISIONS.
5. TESTING OF SANITARY SEWER PIPING AND MANHOLES SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIAL PROVISIONS.
6. ALL MANHOLES SHALL BE PRECAST WITH PRECAST BASES. NO DOGHOUSE MANHOLES WILL BE ALLOWED ON THIS PROJECT.

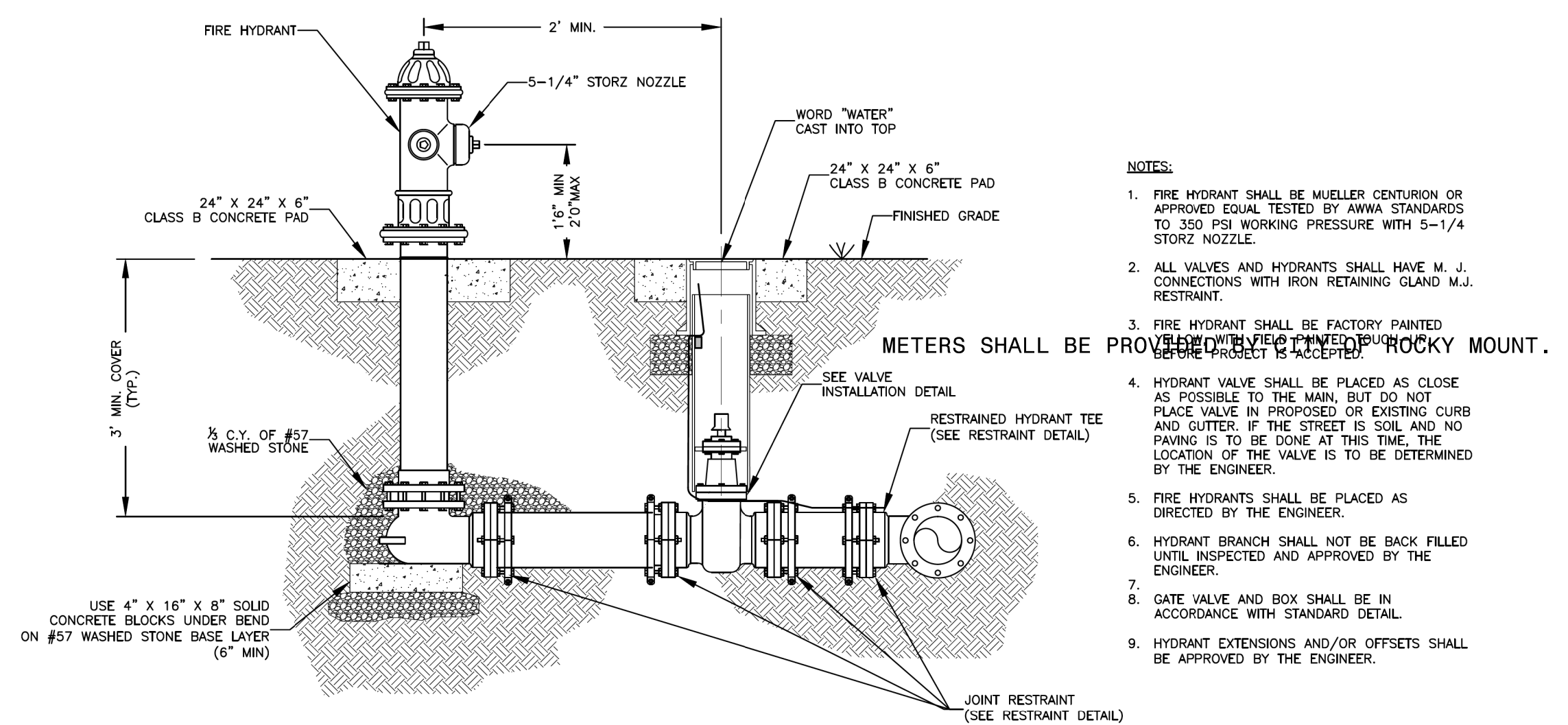
UTILITY CONSTRUCTION

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UTILITY CONSTRUCTION

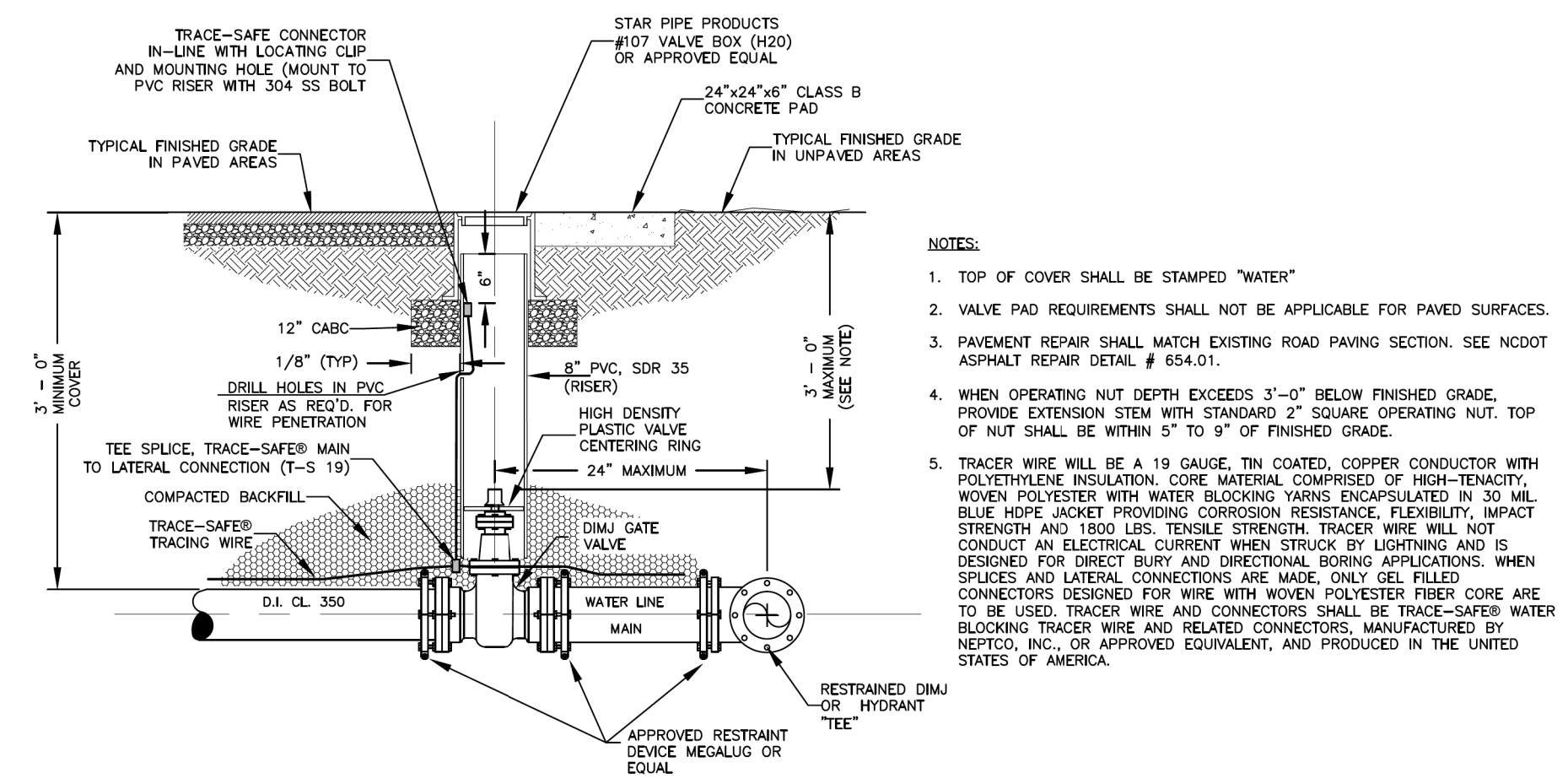


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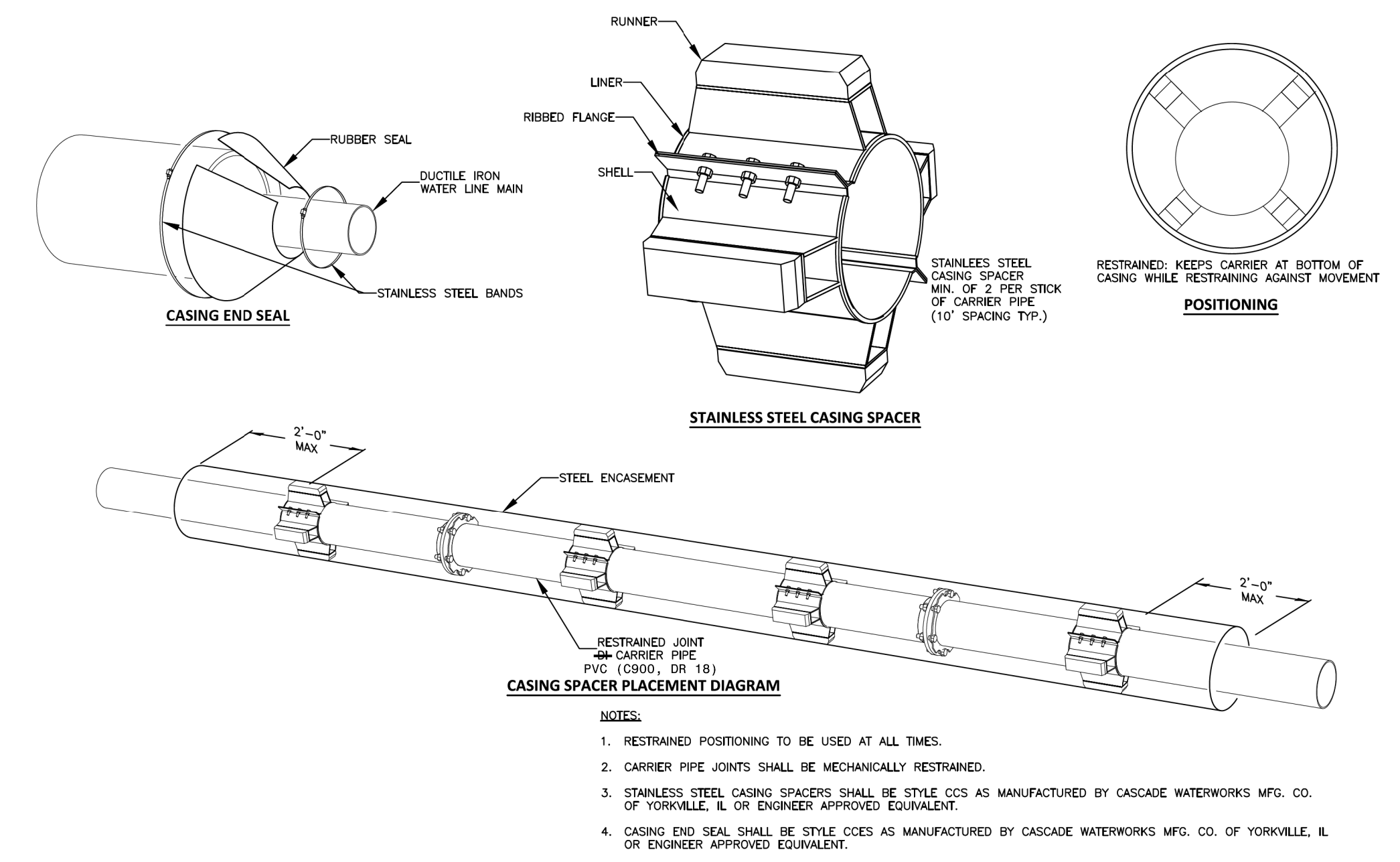
12 FIRE HYDRANT STANDARD INSTALLATION
WD-4 NOT TO SCALE 04/04/18

- NOTES:
- FIRE HYDRANT SHALL BE MUELLER CENTURION OR APPROVED EQUAL TESTED BY ANWA STANDARDS TO 350 PSI WORKING PRESSURE WITH 5-1/4 STORZ NOZZLE.
 - ALL VALVES AND HYDRANTS SHALL HAVE M. J. CONNECTIONS WITH IRON RETAINING GLAND M.J. RESTRAINT.
 - FIRE HYDRANT SHALL BE FACTORY PAINTED WITH PIANO BURNING RESISTANT BLACK ENAMEL. METERS SHALL BE PROVIDED WITH FACTORY PAINTED BLACK ENAMEL. HYDRANT SHALL BE PROVIDED WITH FACTORY PAINTED BLACK ENAMEL. HYDRANT SHALL BE PROVIDED WITH FACTORY PAINTED BLACK ENAMEL. HYDRANT SHALL BE PROVIDED WITH FACTORY PAINTED BLACK ENAMEL.
 - HYDRANT VALVE SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE MAIN, BUT DO NOT PLACE VALVE IN PROPOSED OR EXISTING CURB AND GUTTER. IF THE STREET IS SOIL AND NO PAVING IS TO BE DONE AT THIS TIME, THE LOCATION OF THE VALVE IS TO BE DETERMINED BY THE ENGINEER.
 - FIRE HYDRANTS SHALL BE PLACED AS DIRECTED BY THE ENGINEER.
 - HYDRANT BRANCH SHALL NOT BE BACK FILLED UNTIL INSPECTED AND APPROVED BY THE ENGINEER.
 - GATE VALVE AND BOX SHALL BE IN ACCORDANCE WITH STANDARD DETAIL.
 - HYDRANT EXTENSIONS AND/OR OFFSETS SHALL BE APPROVED BY THE ENGINEER.



5 VALVE INSTALLATION DETAIL
WD-2 NOT TO SCALE 04/04/18

- NOTES:
- TOP OF COVER SHALL BE STAMPED "WATER"
 - VALVE PAD REQUIREMENTS SHALL NOT BE APPLICABLE FOR PAVED SURFACES.
 - PAVEMENT REPAIR SHALL MATCH EXISTING ROAD PAVING SECTION. SEE NCDOT ASPHALT REPAIR DETAIL # 654.01.
 - WHEN OPERATING NUT DEPTH EXCEEDS 3'-0" BELOW FINISHED GRADE, PROVIDE EXTENSION STEM WITH STANDARD 2" SQUARE OPERATING NUT. TOP OF NUT SHALL BE WITHIN 1" TO 1 1/2" OF FINISHED GRADE.
 - TRACER WIRE WILL BE A 19 GAUGE, TIN COATED, COPPER CONDUCTOR WITH POLYETHYLENE INSULATION. CORE MATERIAL COMPRISED OF HIGH-TENACITY, WOVEN POLYESTER WITH WATER BLOCKING YARNS ENCAPSULATED IN 30 MIL BLUE HOPE JACKET PROVIDING CORROSION RESISTANCE, FLEXIBILITY, IMPACT STRENGTH AND 1800 LBS. TENSILE STRENGTH. TRACER WIRE WILL NOT CONDUCT AN ELECTRICAL CURRENT WHEN STRUCK BY LIGHTNING AND IS DESIGNED FOR DIRECT BURY AND DIRECTIONAL BORING APPLICATIONS. WHEN SPLICES AND LATERAL CONNECTIONS ARE MADE, ONLY GEL FILLED CONNECTORS DESIGNED FOR WIRE WITH WOVEN POLYESTER FIBER CORE ARE TO BE USED. TRACER WIRE AND CONNECTORS SHALL BE TRACE-SAFE® WATER BLOCKING TRACER WIRE AND RELATED CONNECTORS, MANUFACTURED BY NEPTCO, INC., OR APPROVED EQUIVALENT, AND PRODUCED IN THE UNITED STATES OF AMERICA.

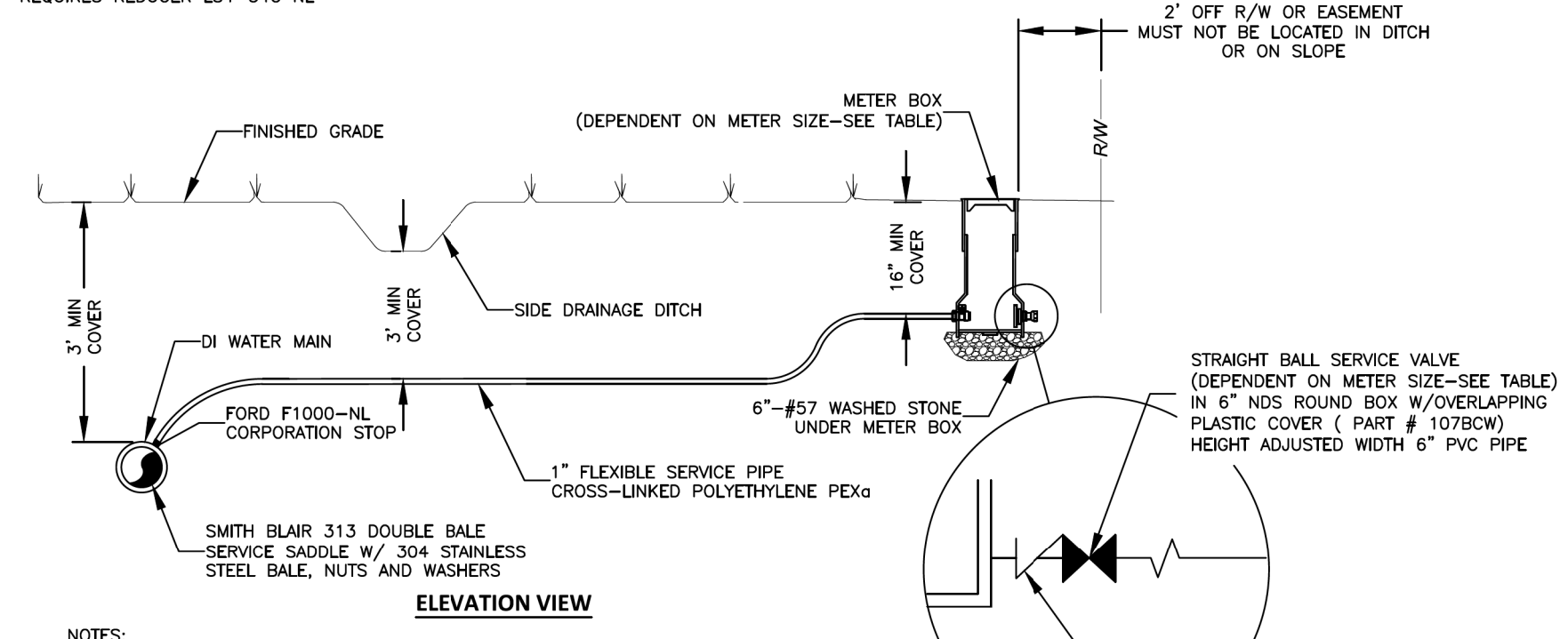


16 CARRIER PIPE IN STEEL ENCASEMENT
WD-5 NOT TO SCALE 04/04/18

- NOTES:
- RESTRAINED POSITIONING TO BE USED AT ALL TIMES.
 - CARRIER PIPE JOINTS SHALL BE MECHANICALLY RESTRAINED.
 - STAINLESS STEEL CASING SPACERS SHALL BE STYLE CCS AS MANUFACTURED BY CASCADE WATERWORKS MFG. CO. OF YORKVILLE, IL OR ENGINEER APPROVED EQUIVALENT.
 - CASING END SEAL SHALL BE STYLE CCEs AS MANUFACTURED BY CASCADE WATERWORKS MFG. CO. OF YORKVILLE, IL OR ENGINEER APPROVED EQUIVALENT.

METER SIZE	METER BOX SIZE	METER BOX	STRAIGHT BALL SERVICE VALVE	STRAIGHT DUAL CARTRIDGE CHECK VALVE
3/4" *	3/4"	FORD CB111-233-NL	FORD B81-233W-NL	HHCB1-333-NL
1"	1"	FORD CB111-444-L-1-NL	FORD B81-344W-NL	HHCB1-444-NL

* REQUIRES REDUCER LB4-346 NL



- NOTES:
- THE CITY OF HENDERSONVILLE SHALL INSTALL WATER METERS.
 - NO METERS WILL BE INSTALLED NOR WATER SERVICE PROVIDED, UNTIL A WRITTEN FINAL ACCEPTANCE OF THE SYSTEM IS ISSUED BY THE CITY.
 - EXTEND TRACER WIRE FROM MAIN TO METER BOX. WIRE NOT SHOWN FOR CLARITY. TRACER WIRE WILL BE A 19 GAUGE, TIN COATED, COPPER CONDUCTOR WITH POLYETHYLENE INSULATION. CORE MATERIAL COMPRISED OF HIGH-TENACITY, WOVEN POLYESTER WITH WATER BLOCKING YARNS ENCAPSULATED IN 30 MIL BLUE HOPE JACKET PROVIDING CORROSION RESISTANCE, FLEXIBILITY, IMPACT STRENGTH AND 1800 LBS. TENSILE STRENGTH. TRACER WIRE WILL NOT CONDUCT AN ELECTRICAL CURRENT WHEN STRUCK BY LIGHTNING AND IS DESIGNED FOR DIRECT BURY AND DIRECTIONAL BORING APPLICATIONS. WHEN SPLICES AND LATERAL CONNECTIONS ARE MADE, ONLY GEL FILLED CONNECTORS DESIGNED FOR WIRE WITH WOVEN POLYESTER FIBER CORE ARE TO BE USED. TRACER WIRE SHALL BE TERMINATED IN METER BOX AT MOUNTED TRACE-SAFE® LOCATING CLIP, MOUNTED A MAXIMUM OF 3" FROM TOP OF BOX WITH 304 SS BOLT. TRACER WIRE AND CONNECTORS SHALL BE TRACE-SAFE® WATER BLOCKING TRACER WIRE AND RELATED CONNECTORS, MANUFACTURED BY NEPTCO, INC., OR EQUIVALENT APPROVED BY ENGINEER, AND PRODUCED IN THE UNITED STATES OF AMERICA.

8 MINIMUM SERVICE LINE: 1" SERVICE LATERAL INSTALLATION
WD-2 NOT TO SCALE 02/16/18

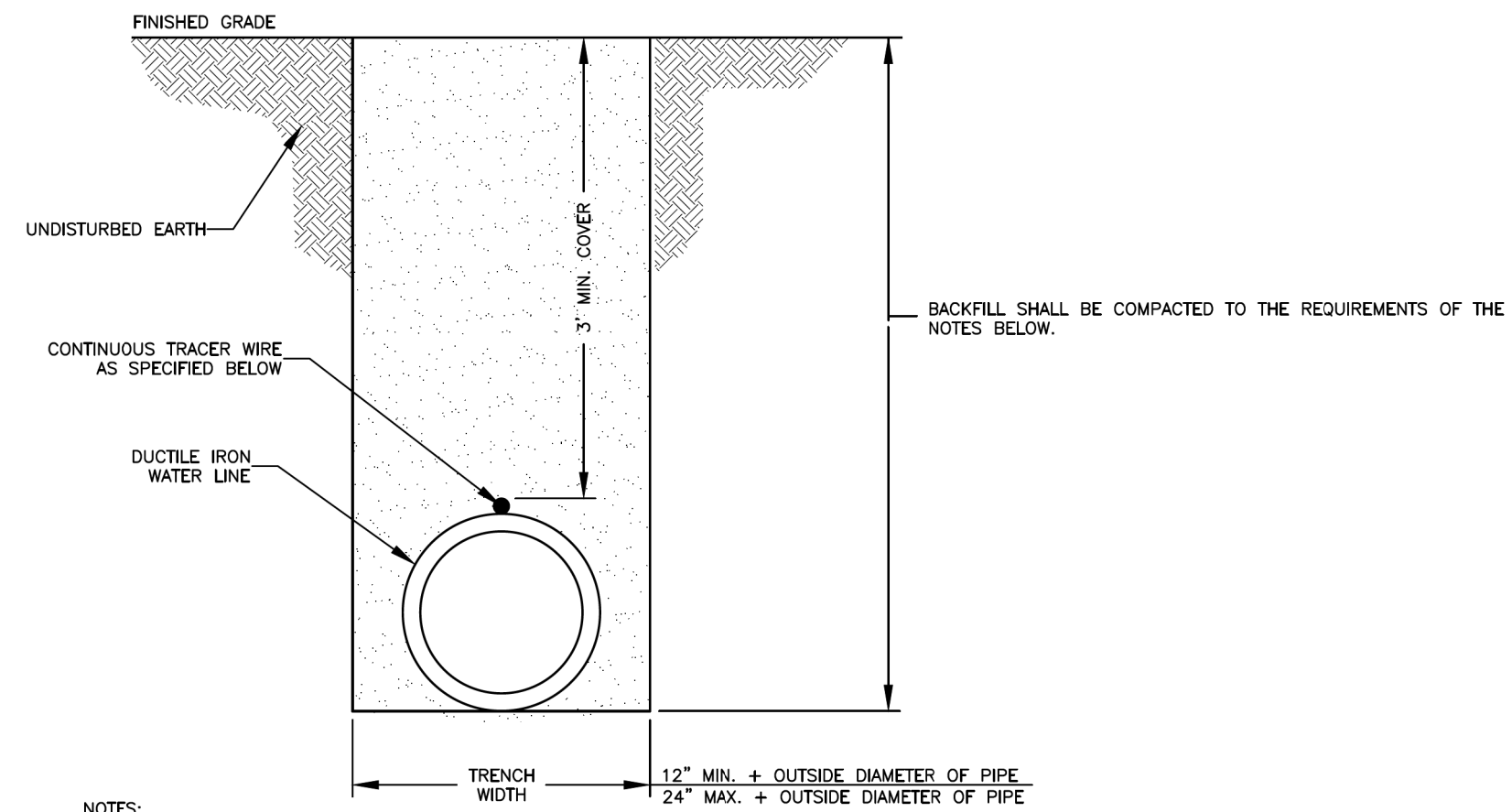
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PROJECT REFERENCE NO.	SHEET NO.
U-5105	UC-3B
DESIGNED BY: RBW	
DRAWN BY: JNA	
CHECKED BY: CLS	
APPROVED BY: RBW	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	5/17/2018 4:03:28 PM EDT UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION



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NOTES:

- TRENCHES EXCAVATED OUTSIDE EXISTING ROAD AND RAILWAY RIGHTS-OF-WAY SHALL BE BACKFILLED WITH COMMON BACKFILL MATERIAL CONSISTING OF EXCAVATED MATERIALS EXCEPT HIGHLY ORGANIC SILTS AND CLAYS AND TAMPED THOROUGHLY. FILL SHALL BE DEPOSITED IN SUCCESSIVE, UNIFORM, APPROXIMATELY HORIZONTAL LAYERS. MATERIAL SHALL BE FREE OF ROOTS, STONES, AND DEBRIS. ALL MATERIAL SHALL HAVE AN IN-PLACE DENSITY OF AT LEAST 85% OF MAXIMUM DRY DENSITY (STANDARD PROCTOR) OR AS APPROVED BY THE ENGINEER. COMMON BACKFILL SHALL NOT CONTAIN STONE BLOCKS, BROKEN CONCRETE, MASONRY RUBBLE, OR OTHER SIMILAR MATERIALS. IT SHALL HAVE PHYSICAL PROPERTIES SUCH THAT IT CAN BE READILY SPREAD AND COMPACTED DURING FILLING. SNOW, ICE, AND FROZEN SOIL WILL NOT BE PERMITTED.

WHERE EXCAVATED MATERIAL, AFTER REMOVAL OF ROCKS, STUMPS, PLANT MATERIAL, AND OTHER EXTRANEOUS MATERIAL AND PROPER DEWATERING, DRYING, PROTECTION, AND STORAGE OF THE EXCAVATION BY THE CONTRACTOR, CANNOT BE PREPARED TO MEET THE REQUIREMENTS FOR COMMON BACKFILL, DUE TO THE NATURE OF THE MATERIAL (E.G., EXCESSIVE ROCK, MUCK, ORGANICS, CLAY, SILT, OR OTHER MATERIAL), AND AS DETERMINED BY THE ENGINEER, THE UNACCEPTABLE EXCAVATION SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR AND REPLACED BY IMPORTED BACKFILL MEETING THE REQUIREMENTS OF STRUCTURAL BACKFILL. IMPORTED STRUCTURAL BACKFILL SHALL BE FREE OF ORGANICS, ROOTS OR OTHER DELETERIOUS MATERIALS AND SHALL NOT CONTAIN MORE THAN FIVE PERCENT (BY WEIGHT) ORGANIC MATERIAL. HAVE A PLASTICITY INDEX (PI) GREATER THAN 25, OR HAVE A MAXIMUM DRY DENSITY LESS THAN 90 POUNDS PER CUBIC FOOT. IMPORTED STRUCTURAL FILL SHOULD CONSIST OF MATERIAL CLASSIFIED AS ML, CL, SC, OR SM, OR BETTER PER ASTM D-2487 AND BE CAPABLE OF BEING COMPACTED TO 85% STANDARD PROCTOR.
- THE WATER LINE SHALL HAVE A MINIMUM OF 3' OF COVER AT FINISHED GRADE.

TRACER WIRE WILL BE A 19 GAUGE, TIN COATED, COPPER CONDUCTOR WITH POLYETHYLENE INSULATION. CORE MATERIAL COMPRISED OF HIGH-TENSACITY, WOVEN POLYESTER WITH WATER BLOCKING YARNS ENCAPSULATED IN 30 MIL BLUE HDPE JACKET PROVIDING CORROSION RESISTANCE, FLEXIBILITY, IMPACT STRENGTH AND 1800 LBS. TENSILE STRENGTH. TRACER WIRE WILL NOT CONDUCT AN ELECTRICAL CURRENT WHEN STRUCK BY LIGHTNING AND IS DESIGNED FOR DIRECT BURY AND DIRECTIONAL BORING APPLICATIONS. WHEN SPLICES AND LATERAL CONNECTIONS ARE MADE, ONLY GEL FILLED CONNECTORS DESIGNED FOR WIRE WITH WOVEN POLYESTER FIBER CORE ARE TO BE USED. TRACER WIRE AND CONNECTORS SHALL BE TRACE-SAFE® WATER BLOCKING TRACER WIRE AND RELATED CONNECTORS, MANUFACTURED BY NEPTCO, INC., OR EQUIVALENT APPROVED BY ENGINEER, AND PRODUCED IN THE UNITED STATES OF AMERICA.

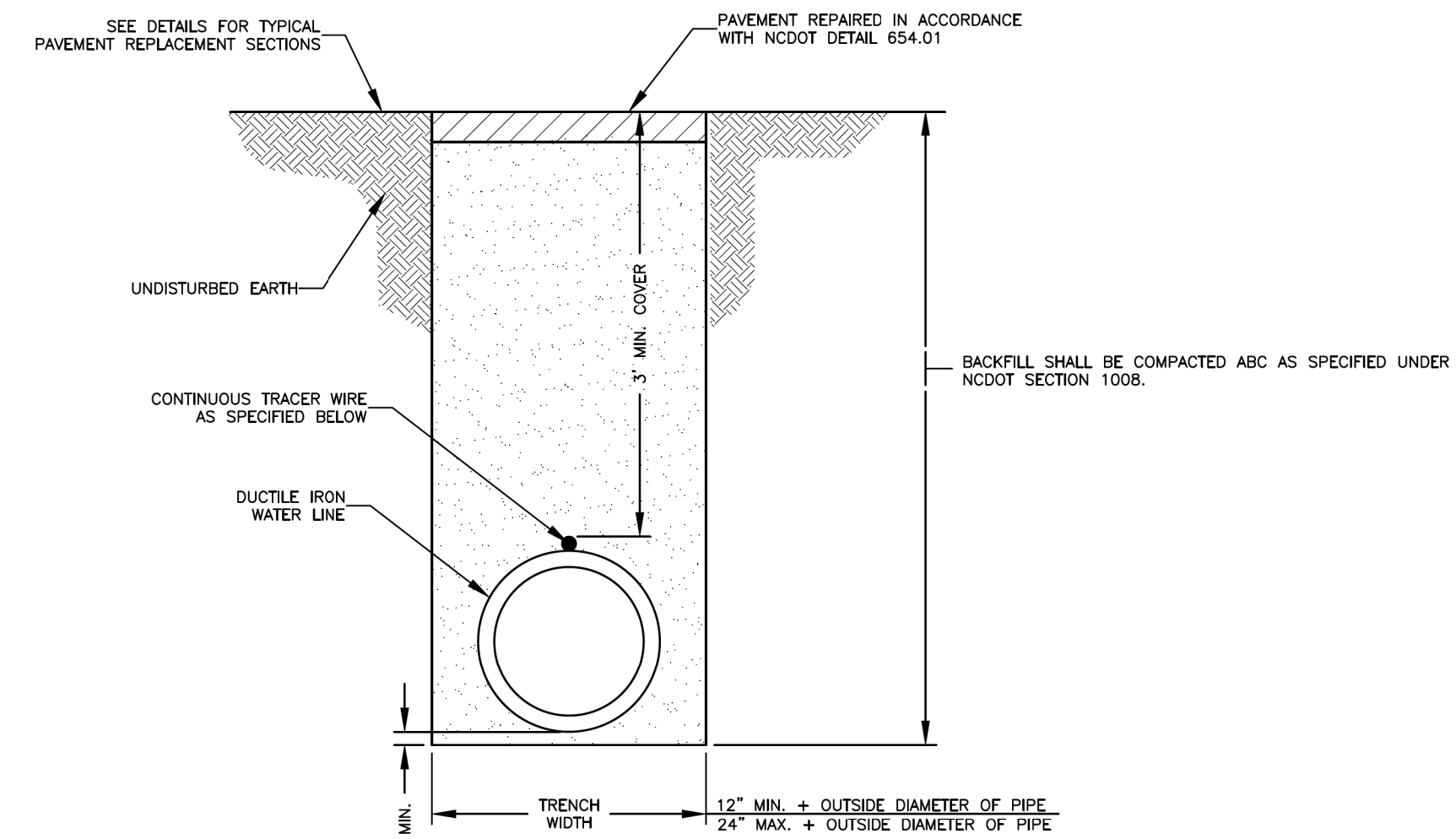
TRACER WIRE SHALL BE EXTENDED ALONG ALL WATER LINES, FITTINGS, VALVES, SERVICES, AND HYDRANTS. LOCATING CLIPS SHALL BE PROVIDED AT ALL VALVES, HYDRANT VALVES AND METER BOXES. THE CONTRACTOR SHALL DUCT TAPE TRACER WIRE ON CROWN OF WATER LINE EVERY FIVE FEET.

1 WATER TRENCH CONSTRUCTION OUTSIDE PAVEMENT

WD-1

NOT TO SCALE

04/04/18



NOTES:

- THIS TRENCH BACKFILL DETAIL APPLIES TO AREAS UNDER PAVEMENT AND AREAS WHERE THE TRENCH IS WITHIN FIVE (5) FEET OF THE EDGE OF PAVEMENT.
- COMPACTION OF THE BACKFILL SHALL BE ACHIEVED THROUGH THE USE OF AN APPROVED VIBRATORY PLATE TAMPER OR ROLLER.
- COMPACTION TESTING OF THE BACKFILL SHALL BE PROVIDED, DIRECTED AND COORDINATED BY THE OWNER. INTERVALS OF TESTING SHALL BE AT THE TOTAL DISCRETION OF THE OWNER AND MAY BE CHANGED AT ANY TIME.

IF A TEST DOES NOT PASS, THE CONTRACTOR SHALL REMOVE THE DEFECTIVE BACKFILL, REDO THE WORK AND THE AREA WILL BE RETESTED. THE CONTRACTOR SHALL BE AWARE OF THE LEVEL OF COMPACTION REQUIRED.

IF THE WORK IS SUSPECT TO BE DEFECTIVE BY THE OWNER, THE WORK SHALL BE RETESTED.

THE WATER CONTENT OF THE BACKFILL MATERIAL SHALL ALSO BE TESTED AND RECORDED FOR EACH TEST COMPLETED. THE CONTRACTOR WILL BE ALLOWED TO ADD WATER TO THE BACKFILL MATERIAL IN ORDER TO OBTAIN THE OPTIMUM WATER CONTENT; HOWEVER, THE CONTRACTOR WILL NOT BE ALLOWED TO UTILIZE THE ADDITION OF WATER AS A MEANS OF COMPACTION. FURTHERMORE, SHOULD THE BACKFILL MATERIAL BE FOUND TO HAVE WATER CONTENT RATIOS WHICH IN THE OPINION OF THE ENGINEER OR THE OWNER PREVENTS THE APPROPRIATE COMPACTION OF THE TRENCH, THE CONTRACTOR SHALL REMOVE ALL DEFECTIVE MATERIAL AND UNDERTAKE THE NECESSARY CORRECTIVE WORK.
- THE WATER LINE SHALL HAVE A MINIMUM OF 3' OF COVER AT FINISHED GRADE.
- TRACER WIRE WILL BE A 19 GAUGE, TIN COATED, COPPER CONDUCTOR WITH POLYETHYLENE INSULATION. CORE MATERIAL COMPRISED OF HIGH-TENSACITY, WOVEN POLYESTER WITH WATER BLOCKING YARNS ENCAPSULATED IN 30 MIL BLUE HDPE JACKET PROVIDING CORROSION RESISTANCE, FLEXIBILITY, IMPACT STRENGTH AND 1800 LBS. TENSILE STRENGTH. TRACER WIRE WILL NOT CONDUCT AN ELECTRICAL CURRENT WHEN STRUCK BY LIGHTNING AND IS DESIGNED FOR DIRECT BURY AND DIRECTIONAL BORING APPLICATIONS. WHEN SPLICES AND LATERAL CONNECTIONS ARE MADE, ONLY GEL FILLED CONNECTORS DESIGNED FOR WIRE WITH WOVEN POLYESTER FIBER CORE ARE TO BE USED. TRACER WIRE AND CONNECTORS SHALL BE TRACE-SAFE® WATER BLOCKING TRACER WIRE AND RELATED CONNECTORS, MANUFACTURED BY NEPTCO, INC., OR EQUIVALENT APPROVED BY ENGINEER, AND PRODUCED IN THE UNITED STATES OF AMERICA.

TRACER WIRE SHALL BE EXTENDED ALONG ALL WATER LINES, FITTINGS, VALVES, SERVICES, AND HYDRANTS. LOCATING CLIPS SHALL BE PROVIDED AT ALL VALVES, HYDRANT VALVES AND METER BOXES. THE CONTRACTOR SHALL DUCT TAPE TRACER WIRE ON CROWN OF WATER LINE EVERY FIVE FEET.

2 WATER TRENCH CONSTRUCTION UNDER PAVEMENT

WD-1

NOT TO SCALE

04/04/18

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UTILITY CONSTRUCTION



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DWG. NO. 14A

MANHOLE COVER

MANHOLE CASTING

NOTE: COVER SHALL BEAR THE WORDS "SANITARY SEWER"

REVISION	DATE	BY

CITY OF HENDERSONVILLE ENGINEERING DEPARTMENT		
DETAIL DWG. NO.	14A	
ITEM NO.	STANDARD MANHOLE CASTING & COVER	

NO SCALE

DWG. NO. 10

SECTION

PLAN

NOTE: IF TOP STEP IS IN 24" DIA. OPENING, IT MAY PROJECT NO MORE THAN 3/16"

SEE DRAWINGS: NO. 13 FOR GRADE ADJUSTMENT, NOS. 14 AND 15 FOR CASTING DETAILS, NOS. 33 AND 34 FOR PAVEMENT DETAIL AROUND CASTING.

MANHOLE CASTING AND COVER NOT SHOWN

CONCRETE WITH STEEL TROWL FINISH OR PRECAST INVERT CHANNELS AND BENCH.

NOTES:
 PRECAST MANHOLE SECTIONS SHALL MEET ASTM C478. MANHOLE JOINTS SHALL UTILIZE BUTYL RUBBER SEALANT, 2 PIECES ALL AROUND OR O-RING GASKETS (ASTM C443). A MINIMUM 6-INCH WIDE BUTYL RUBBER SEAL SHALL BE INSTALLED ON ALL BELOW GRADE EXTERIOR JOINTS. CONCRETE IN MANHOLES SHALL MEET THE SPECIFICATION ITEM NOS. 5 & 14.
 MANHOLE STEPS SHALL BE M.A. IND. PS-1-PF REINFORCED PLASTIC STEPS OR APPROVED EQUAL.
 FOR PIPE CONNECTIONS USE ASTM C-923 FLEXIBLE GASKET SUCH AS A-LOK, DURA SEAL III, KOR-N-SEAL OR APPROVED EQUAL.
 TAR STRIPS SHALL BE USED AT ALL JOINTS. THE CONTRACTOR SHALL APPLY TAR OVER THE CEMENT PARING ON THE OUTSIDE OF THE ADJUSTMENT RINGS AND OVER THE MANHOLE CASTING EXTERIOR.

REVISION	DATE	BY

CITY OF HENDERSONVILLE ENGINEERING DEPARTMENT		
DETAIL DWG. NO.	10	
ITEM NO.	PRECAST MANHOLE SEWERS 8" - 21"	

NO SCALE

DWG. NO. 11

SECTION

PLAN

SEE DRAWINGS: NO. 13 FOR GRADE ADJUSTMENT, NOS. 14 AND 15 FOR CASTING DETAILS, NOS. 33 AND 34 FOR PAVEMENT DETAIL AROUND CASTING.

MANHOLE CASTING AND COVER NOT SHOWN

CONCRETE WITH STEEL TROWL FINISH OR PRECAST INVERT CHANNELS AND BENCH.

NOTES:
 PRECAST MANHOLE SECTIONS SHALL MEET ASTM C478. MANHOLE JOINTS SHALL UTILIZE BUTYL RUBBER SEALANT, 2 PIECES ALL AROUND OR O-RING GASKETS (ASTM C443). A MINIMUM 6-INCH WIDE BUTYL RUBBER SEAL SHALL BE INSTALLED ON ALL BELOW GRADE EXTERIOR JOINTS. CONCRETE IN MANHOLES SHALL MEET THE SPECIFICATION ITEM NOS. 5 & 14.
 MANHOLE STEPS SHALL BE M.A. IND. PS-1-PF REINFORCED PLASTIC STEPS OR APPROVED EQUAL. IF TOP STEP IS IN 24" DIA. OPENING IT MAY PROJECT NO MORE THAN 3/16".
 FOR PIPE CONNECTIONS USE ASTM C-923 FLEXIBLE GASKET SUCH AS A-LOK, DURA SEAL III, KOR-N-SEAL OR APPROVED EQUAL.
 TAR STRIPS SHALL BE USED AT ALL JOINTS. THE CONTRACTOR SHALL APPLY TAR OVER THE CEMENT PARING ON THE OUTSIDE OF THE ADJUSTMENT RINGS AND OVER THE MANHOLE CASTING EXTERIOR.

REVISION	DATE	BY

CITY OF HENDERSONVILLE ENGINEERING DEPARTMENT		
DETAIL DWG. NO.	11	
ITEM NO.	PRECAST MANHOLE SEWERS 24" THRU 48"	

NO SCALE

DWG. NO. 12

PLAN

SECTION

MANHOLE I.D. 48" FOR SEWERS 8" THRU 21", 48" FOR SEWERS 24" THRU 36"

SEE DRAWINGS: NO. 13 FOR GRADE ADJUSTMENT, NOS. 14 AND 15 FOR CASTING DETAILS, NOS. 33 AND 34 FOR PAVEMENT DETAIL AROUND CASTING.

MANHOLE STEPS SHALL BE M.A. IND. PS-1-PF REINFORCED PLASTIC STEPS OR APPROVED EQUAL. IF TOP STEP IS IN 24" DIA. OPENING IT MAY PROJECT NO MORE THAN 3/16".

FOR PIPE CONNECTIONS USE ASTM C-923 FLEXIBLE GASKET SUCH AS A-LOK, DURA SEAL III, KOR-N-SEAL OR APPROVED EQUAL.

TAR STRIPS SHALL BE USED AT ALL JOINTS. THE CONTRACTOR SHALL APPLY TAR OVER THE CEMENT PARING ON THE OUTSIDE OF THE ADJUSTMENT RINGS AND OVER THE MANHOLE CASTING EXTERIOR.

CONCRETE WITH STEEL TROWL FINISH OR PRECAST INVERT CHANNELS & BENCH.

REVISION	DATE	BY

CITY OF HENDERSONVILLE ENGINEERING DEPARTMENT		
DETAIL DWG. NO.	12	
ITEM NO.	SHALLOW PRECAST MANHOLE	

NO SCALE

DWG. NO. 13

SECTION

NOTE: IF TOP STEP IS IN 24" DIA. OPENING, IT MAY PROJECT NO MORE THAN 3/16"

PRECAST MANHOLE SECTIONS SHALL MEET ASTM C478. MANHOLE JOINTS SHALL MEET ASTM C443.

MIN. HEIGHT 6" - ANY COMBINATION OF PRECAST RINGS AND/OR SEWER MANHOLE BRICK.

MAX. HEIGHT 12" - ANY COMBINATION OF PRECAST RINGS AND/OR SEWER MANHOLE BRICK. BRICK COURSES NOT TO EXCEED TWO.

APPLY 3/4" CEMENT MORTAR TO INSIDE OF PRECAST RINGS AND/OR MANHOLE BRICK. APPLY 1/2" BITUMINOUS SEAL TO OUTSIDE OF PRECAST RINGS AND/OR MANHOLE BRICK. CONTRACTOR SHALL APPLY TAR OVER CEMENT PARING ON THE OUTSIDE OF THE ADJUSTMENT RINGS AND OVER THE MANHOLE CASTING EXTERIOR.

NOTE: THIS DETAIL APPLIES FOR ECCENTRIC CONE SECTIONS OR PRECAST FLAT SLAB TOP.

REVISION	DATE	BY

CITY OF HENDERSONVILLE ENGINEERING DEPARTMENT		
DETAIL DWG. NO.	13	
ITEM NO.	MANHOLE GRADE ADJUSTMENT DETAIL	

NO SCALE

END VIEW

TOP VIEW

15" x 18" x 4" CONCRETE PAD POURED AROUND ALL CLEAN OUTS.

#107 VALVE BOX & LID WITH THE WORD "SEWER" CAST IN IT.

4" SCHEDULE 40 PVC SANITARY SEWER SERVICE LATERAL.

4" SDR-35 PVC TO 4" SCHEDULE 40 PVC MALE ADAPTOR.

1/4" MIN. SLOPE.

4" 45° BEND.

12" MIN. SECTION OF SCH 40.

4" PVC COMBINATION & 1/8" BEND.

SANITARY SEWER MAIN 8" MIN. - SDR-35 PVC.

4" PVC CAP.

PROPERTY LINE.

SIDE DRAINAGE DITCH.

NOTE: EXTEND SERVICE LATERAL MINIMUM OF 3 FEET BEYOND EDGE OF PAVEMENT OR EDGE OF DITCH LINE, WHICHEVER CONDITION EXISTS.

4" CLEAN OUT WITH PIPE PLUG.

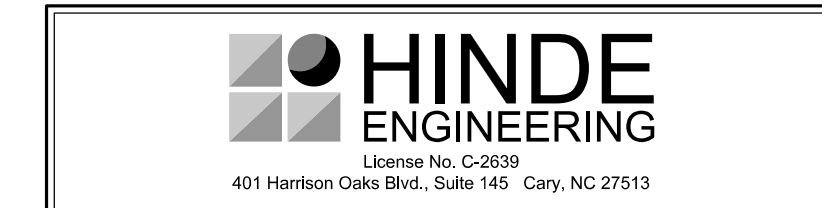
4" CAP.

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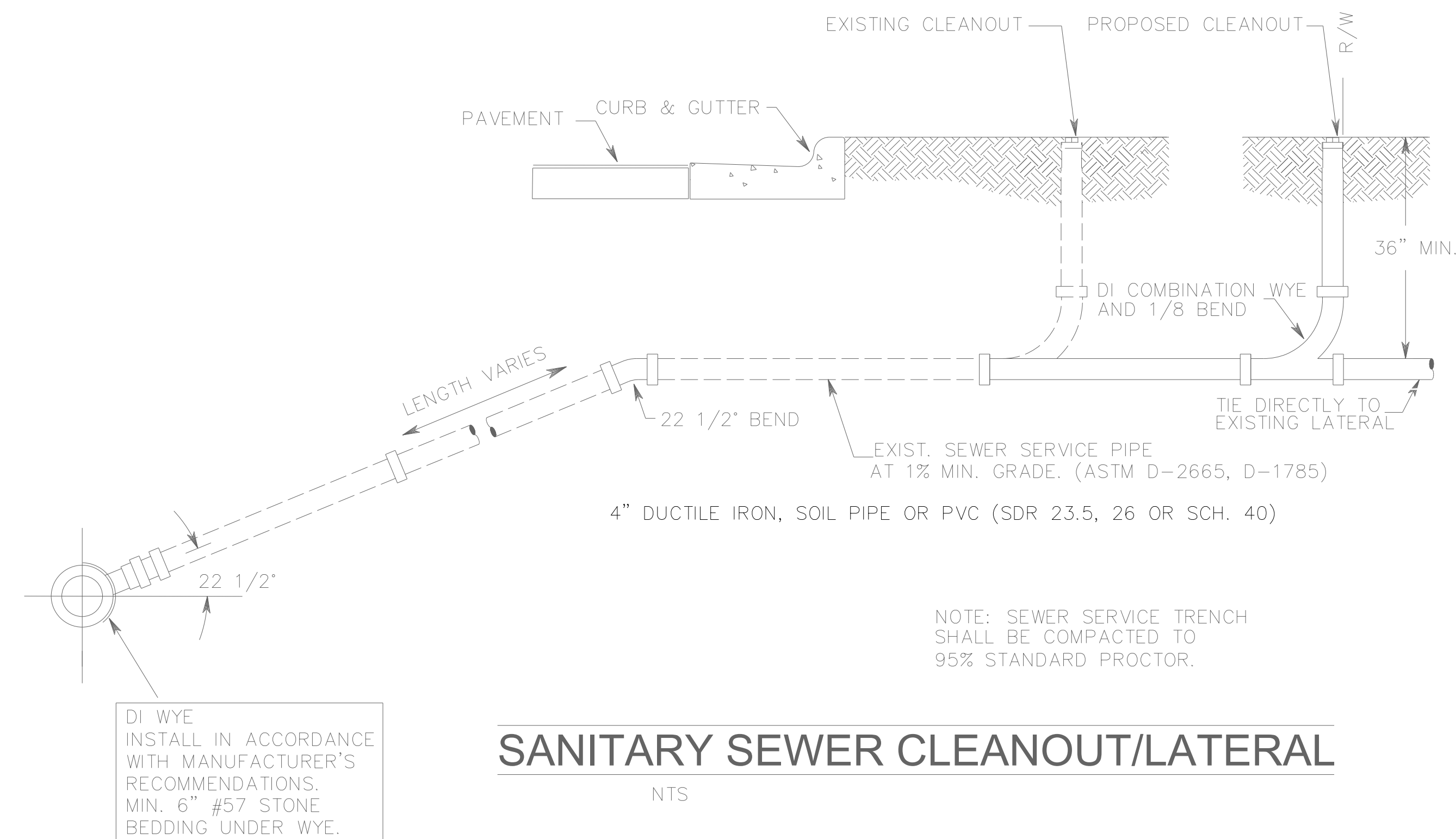
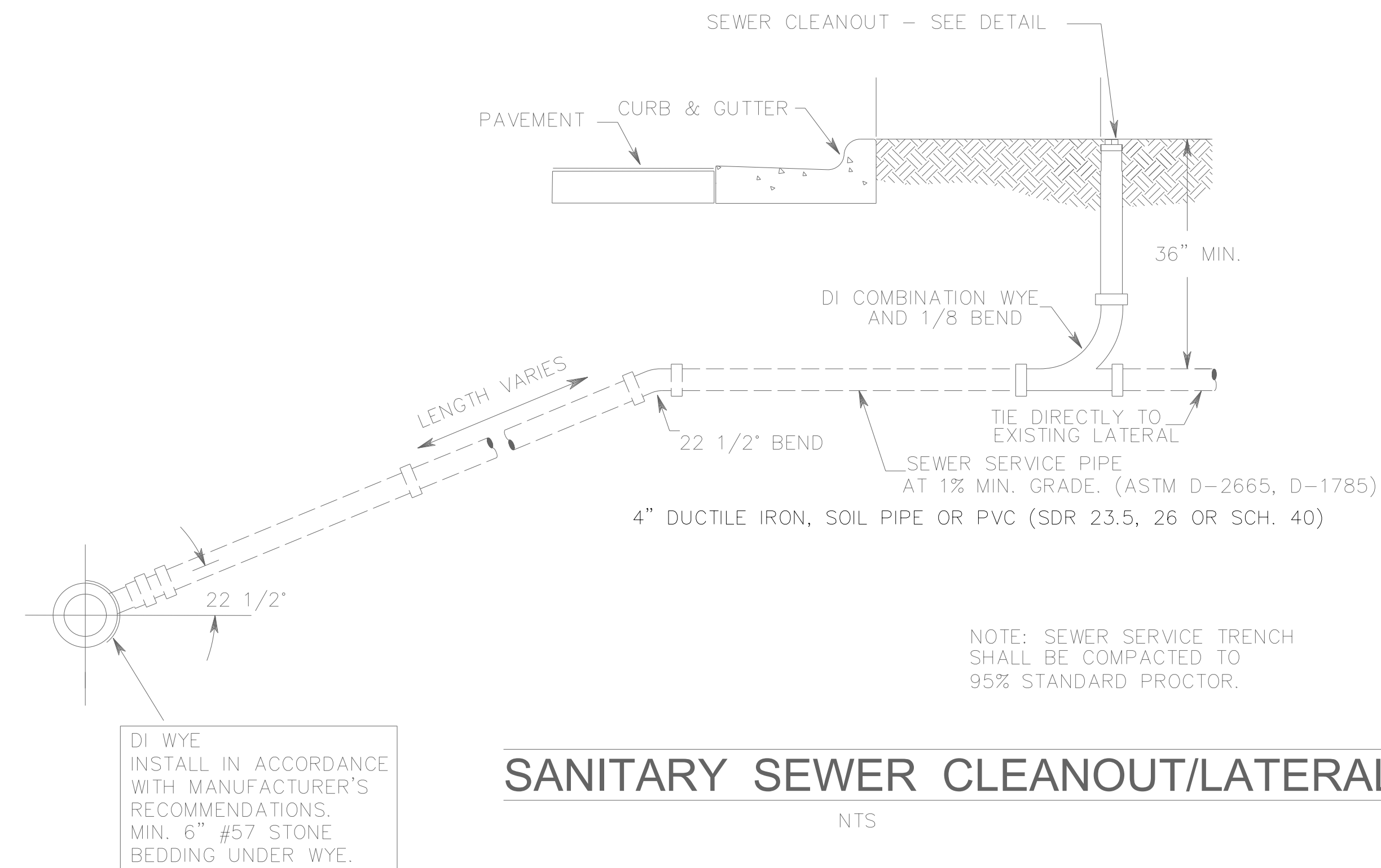
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PROJECT REFERENCE NO.	SHEET NO.
U-5105	UC-3D
DESIGNED BY: RBW	
DRAWN BY: JNA	
CHECKED BY: CLS	
APPROVED BY: RBW	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
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UTILITY CONSTRUCTION



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NOTE:
 THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 4805 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS. (350# MIN WP)

SEE SHEET UC-5 FOR PROFILE -WL1-
 SEE SHEET UC-6 FOR PROFILES -WL2-, -SL1- AND -SL2-
 SEE SHEET UC-7 FOR PROFILE -SL3-

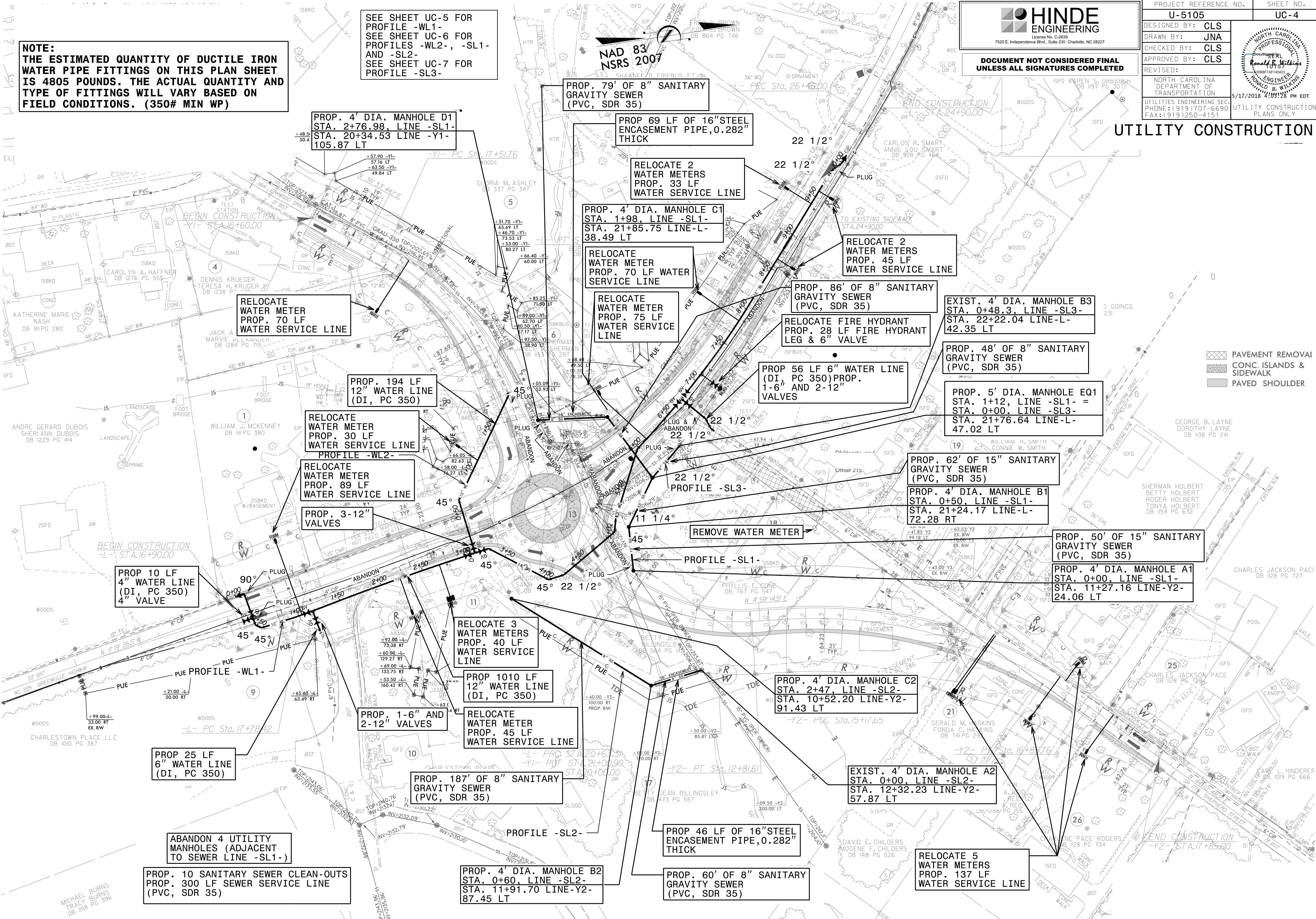


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DESIGNED BY:	CLS		
DRAWN BY:	JNA		
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APPROVED BY:	CLS		
REVISIONS:		NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151 UTILITY CONSTRUCTION PLANS ONLY	

UTILITY CONSTRUCTION

- PAVEMENT REMOVAL
- CONC. ISLANDS & SIDEWALK
- PAVED SHOULDER



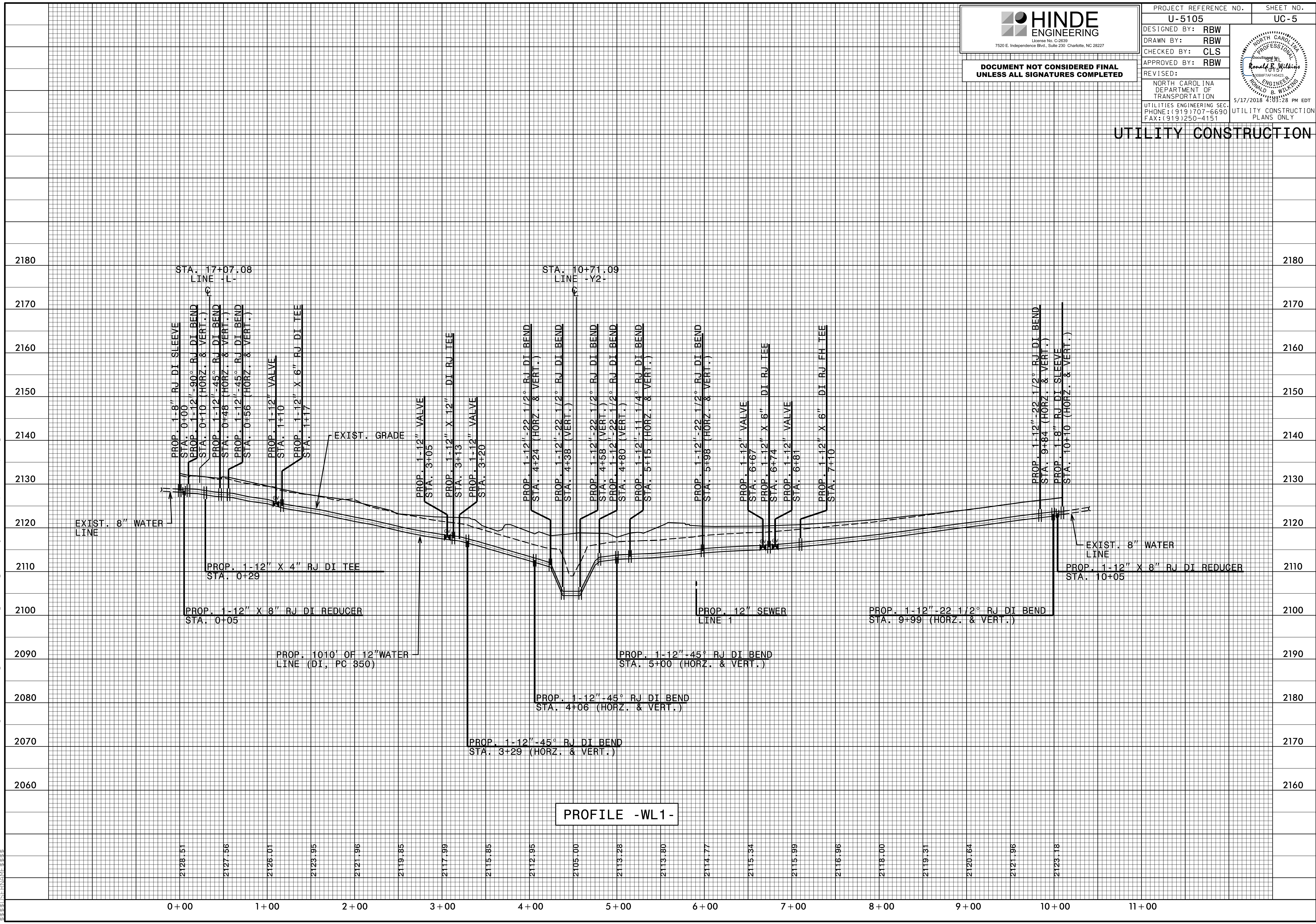
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PROJECT REFERENCE NO. U-5105	SHEET NO. UC-5
DESIGNED BY: RBW	
DRAWN BY: RBW	
CHECKED BY: CLS	
APPROVED BY: RBW	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	5/17/2018 4:03:28 PM EDT UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION



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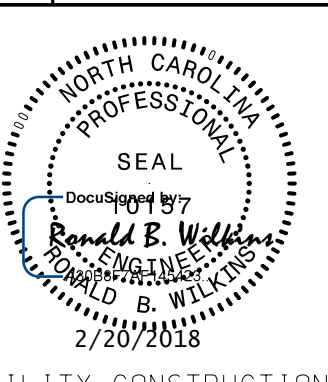
NOTE:
 THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 4805 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS. (350# MIN WP)

SEE SHEET UC-5 FOR PROFILE -WL1-
 SEE SHEET UC-6 FOR PROFILES -WL2-, -SL1- AND -SL2-
 SEE SHEET UC-7 FOR PROFILE -SL3-



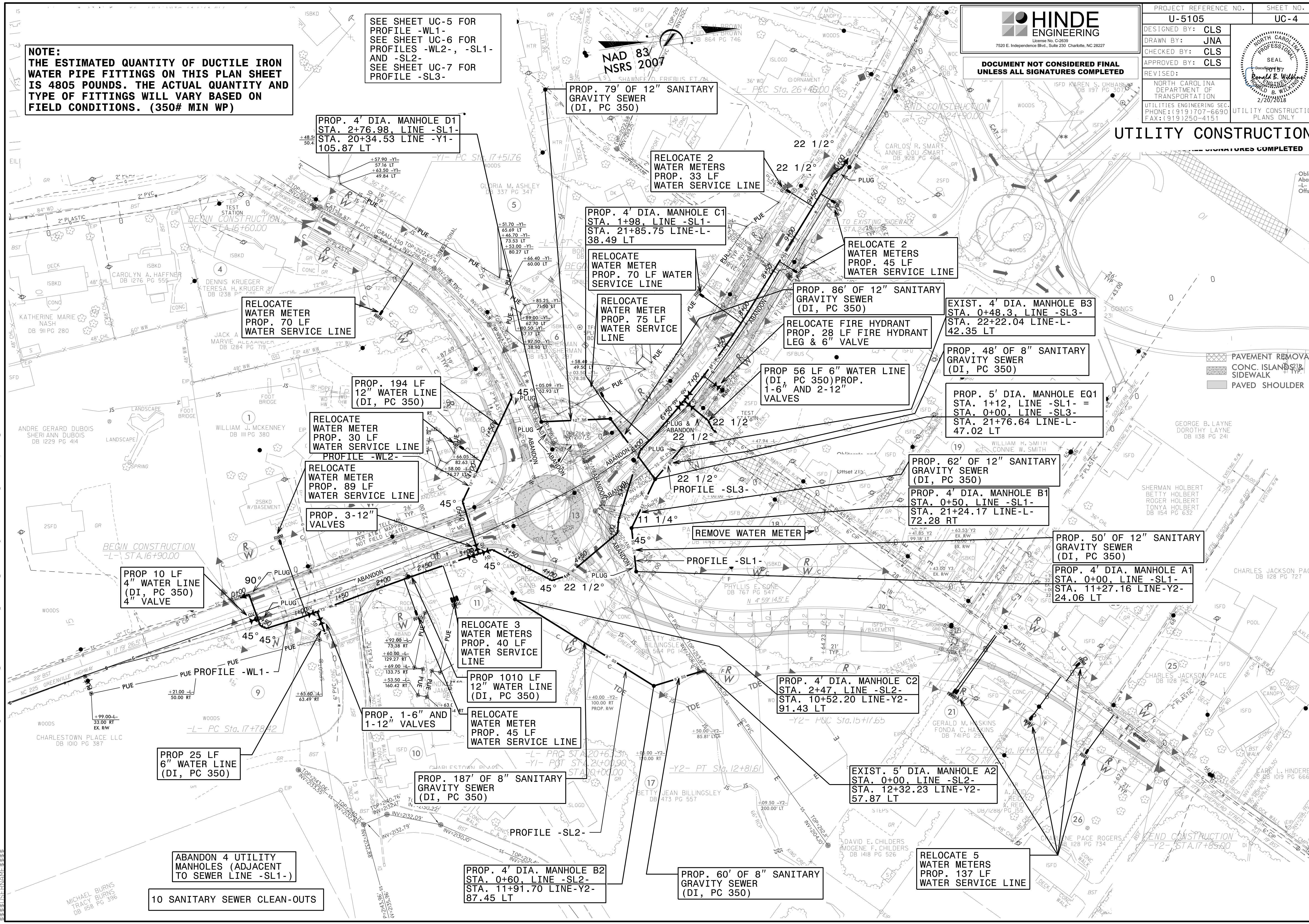
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UTILITY CONSTRUCTION

- PAVEMENT REMOVAL
- CONC. ISLANDS & SIDEWALK
- PAVED SHOULDER



PROP. 79' OF 12" SANITARY GRAVITY SEWER (DI, PC 350)

RELOCATE 2 WATER METERS PROP. 33 LF WATER SERVICE LINE

PROP. 4' DIA. MANHOLE C1 STA. 1+98, LINE -SL1- STA. 21+85.75 LINE-L- 38.49 LT

RELOCATE WATER METER PROP. 70 LF WATER SERVICE LINE

RELOCATE WATER METER PROP. 75 LF WATER SERVICE LINE

PROP. 86' OF 12" SANITARY GRAVITY SEWER (DI, PC 350)

RELOCATE FIRE HYDRANT PROP. 28 LF FIRE HYDRANT LEG & 6" VALVE

EXIST. 4' DIA. MANHOLE B3 STA. 0+48.3, LINE -SL3- STA. 22+22.04 LINE-L- 42.35 LT

PROP. 48' OF 8" SANITARY GRAVITY SEWER (DI, PC 350)

PROP. 5' DIA. MANHOLE EQ1 STA. 1+12, LINE -SL1- STA. 0+00, LINE -SL3- STA. 21+76.64 LINE-L- 47.02 LT

RELOCATE WATER METER PROP. 70 LF WATER SERVICE LINE

PROP. 194 LF 12" WATER LINE (DI, PC 350)

RELOCATE WATER METER PROP. 30 LF WATER SERVICE LINE PROFILE -WL2-

RELOCATE WATER METER PROP. 89 LF WATER SERVICE LINE

PROP. 3-12" VALVES

REMOVE WATER METER

PROP. 62' OF 12" SANITARY GRAVITY SEWER (DI, PC 350)

PROP. 4' DIA. MANHOLE B1 STA. 0+50, LINE -SL1- STA. 21+24.17 LINE-L- 72.28 RT

PROP. 50' OF 12" SANITARY GRAVITY SEWER (DI, PC 350)

PROP. 4' DIA. MANHOLE A1 STA. 0+00, LINE -SL1- STA. 11+27.16 LINE-Y2- 24.06 LT

PROP 10 LF 4" WATER LINE (DI, PC 350) 4" VALVE

RELOCATE 3 WATER METERS PROP. 40 LF WATER SERVICE LINE

PROP 1010 LF 12" WATER LINE (DI, PC 350)

PROP. 1-6" AND 1-12" VALVES

RELOCATE WATER METER PROP. 45 LF WATER SERVICE LINE

PROP. 4' DIA. MANHOLE C2 STA. 2+47, LINE -SL2- STA. 10+52.20 LINE-Y2- 91.43 LT

PROP 25 LF 6" WATER LINE (DI, PC 350)

PROP. 187' OF 8" SANITARY GRAVITY SEWER (DI, PC 350)

EXIST. 5' DIA. MANHOLE A2 STA. 0+00, LINE -SL2- STA. 12+32.23 LINE-Y2- 57.87 LT

ABANDON 4 UTILITY MANHOLES (ADJACENT TO SEWER LINE -SL1-)

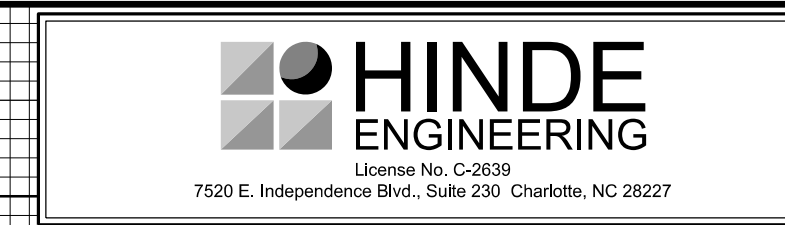
10 SANITARY SEWER CLEAN-OUTS

PROP. 4' DIA. MANHOLE B2 STA. 0+60, LINE -SL2- STA. 11+91.70 LINE-Y2- 87.45 LT

PROP. 60' OF 8" SANITARY GRAVITY SEWER (DI, PC 350)

RELOCATE 5 WATER METERS PROP. 137 LF WATER SERVICE LINE

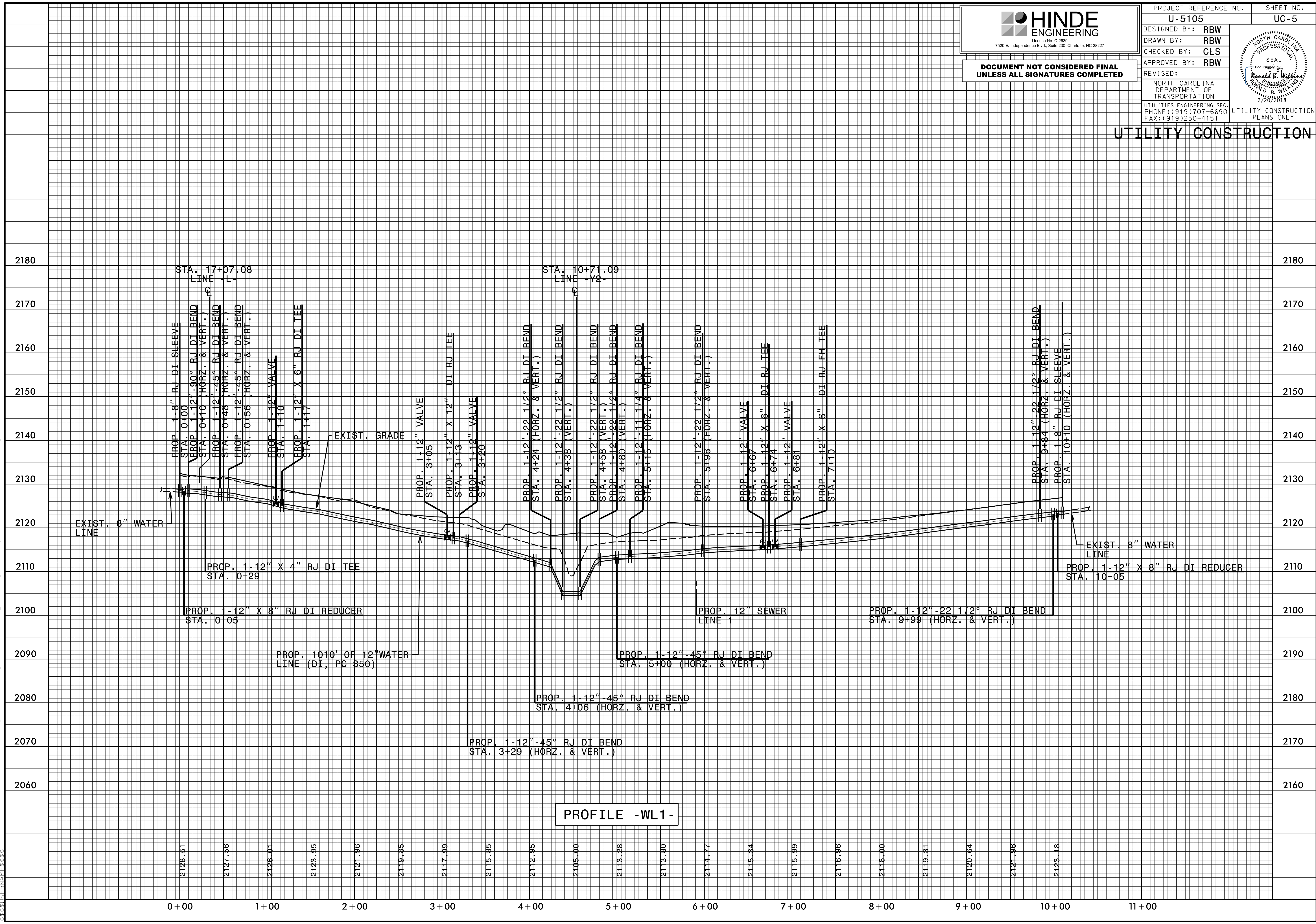
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PROJECT REFERENCE NO. U-5105	SHEET NO. UC-5
DESIGNED BY: RBW	
DRAWN BY: RBW	
CHECKED BY: CLS	
APPROVED BY: RBW	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION



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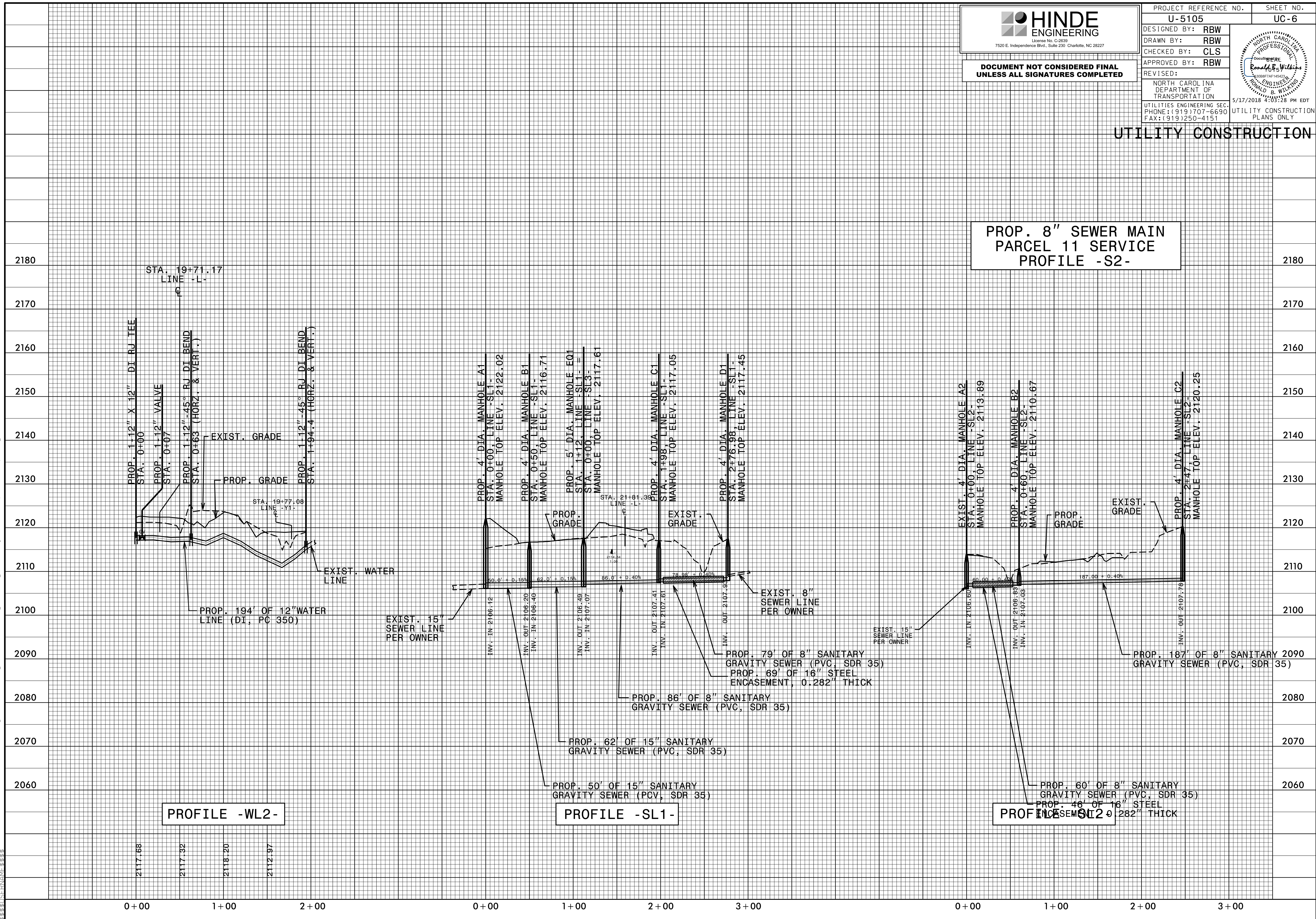


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UNLESS ALL SIGNATURES COMPLETED

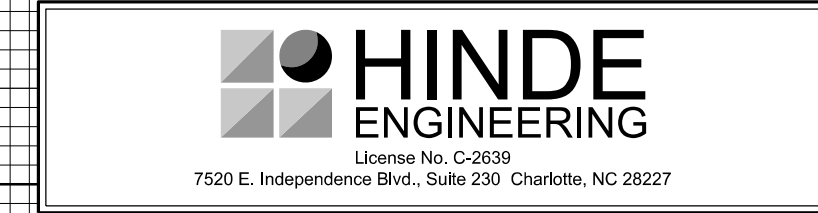
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DRAWN BY: RBW	
CHECKED BY: CLS	
APPROVED BY: RBW	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	5/17/2018 4:05:28 PM EDT
UTILITY CONSTRUCTION PLANS ONLY	

UTILITY CONSTRUCTION

PROP. 8" SEWER MAIN PARCEL 11 SERVICE PROFILE -S2-



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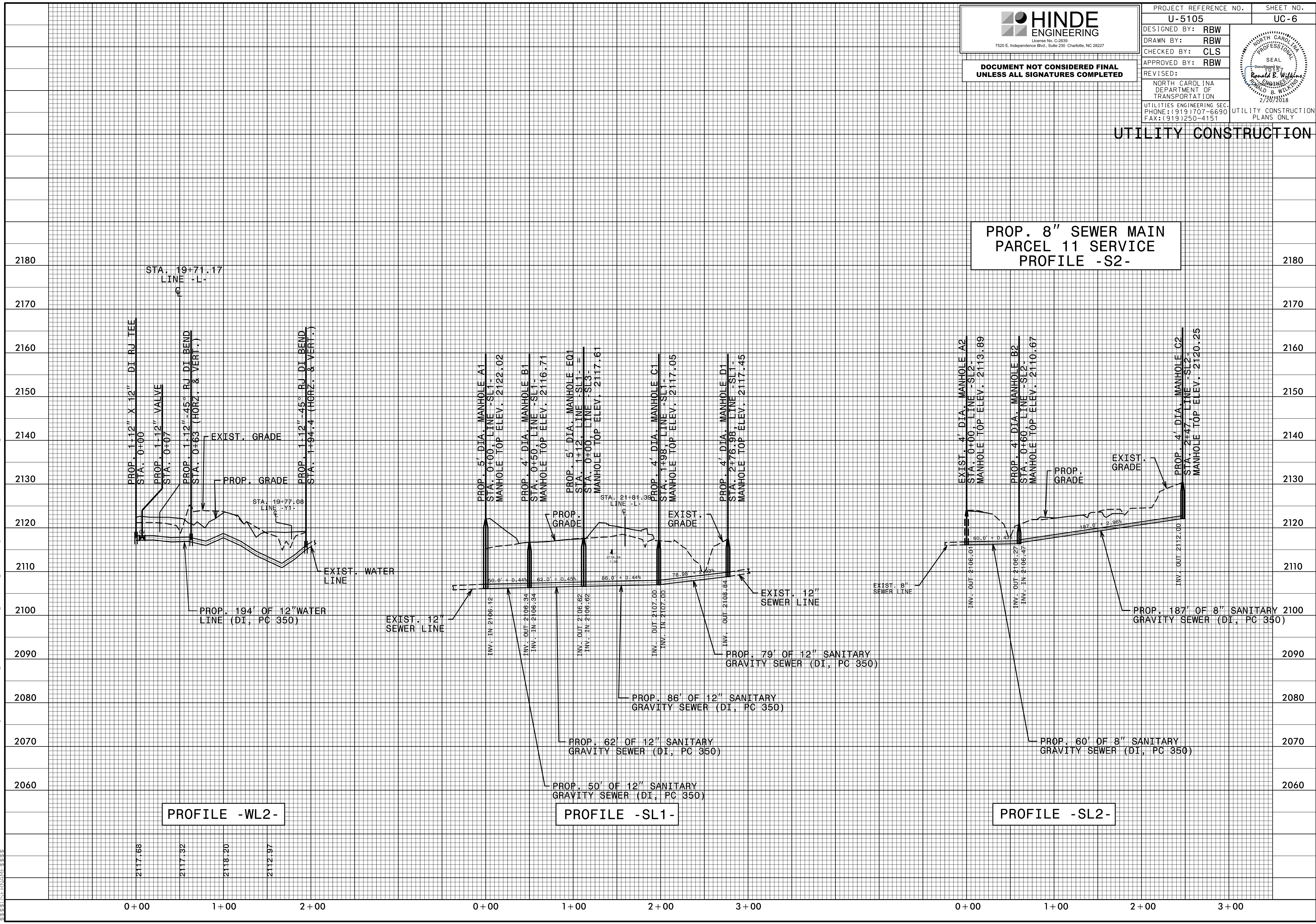
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REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

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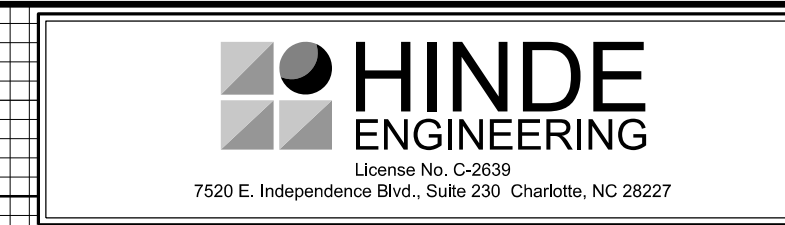
UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

**PROP. 8" SEWER MAIN
PARCEL 11 SERVICE
PROFILE -S2-**



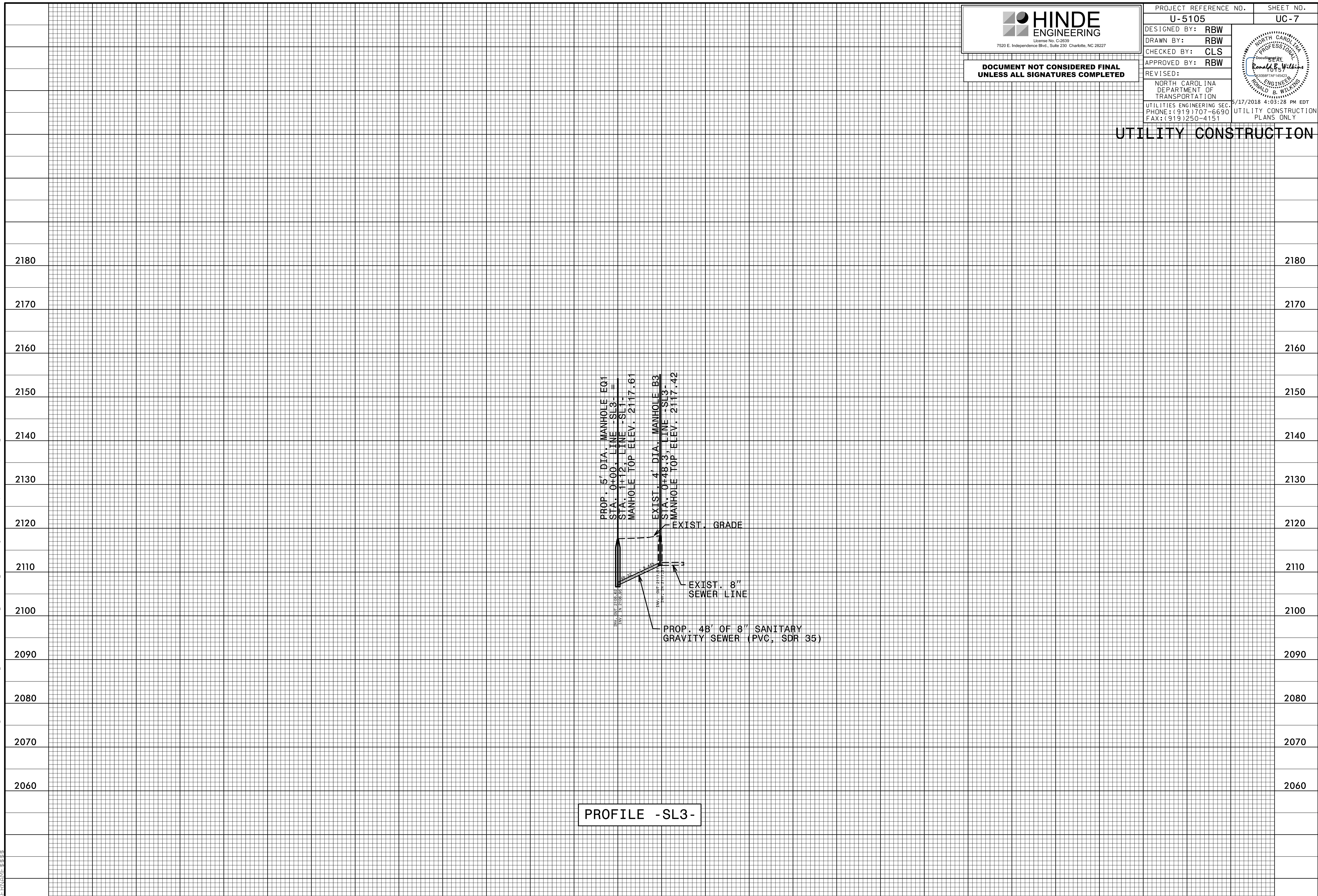
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UNLESS ALL SIGNATURES COMPLETED**

PROJECT REFERENCE NO. U-5105	SHEET NO. UC-7
DESIGNED BY: RBW	
DRAWN BY: RBW	
CHECKED BY: CLS	
APPROVED BY: RBW	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	5/17/2018 4:03:28 PM EDT UTILITY CONSTRUCTION PLANS ONLY

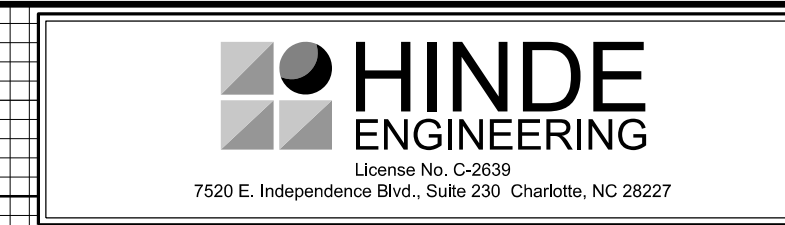
UTILITY CONSTRUCTION



PROFILE -SL3-

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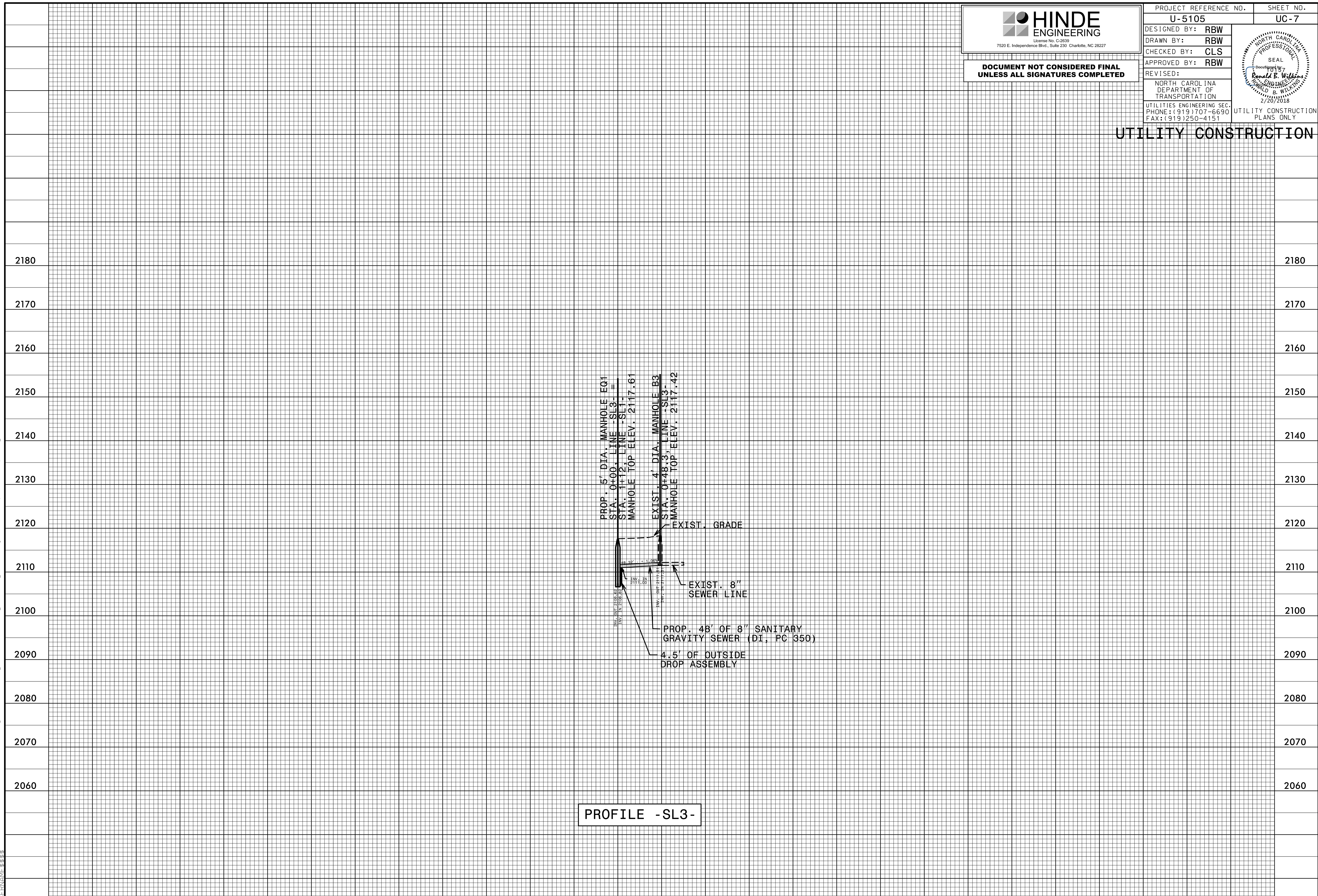
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**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

PROJECT REFERENCE NO. U-5105	SHEET NO. UC-7
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DRAWN BY: RBW	
CHECKED BY: CLS	
APPROVED BY: RBW	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION



PROFILE -SL3-

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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

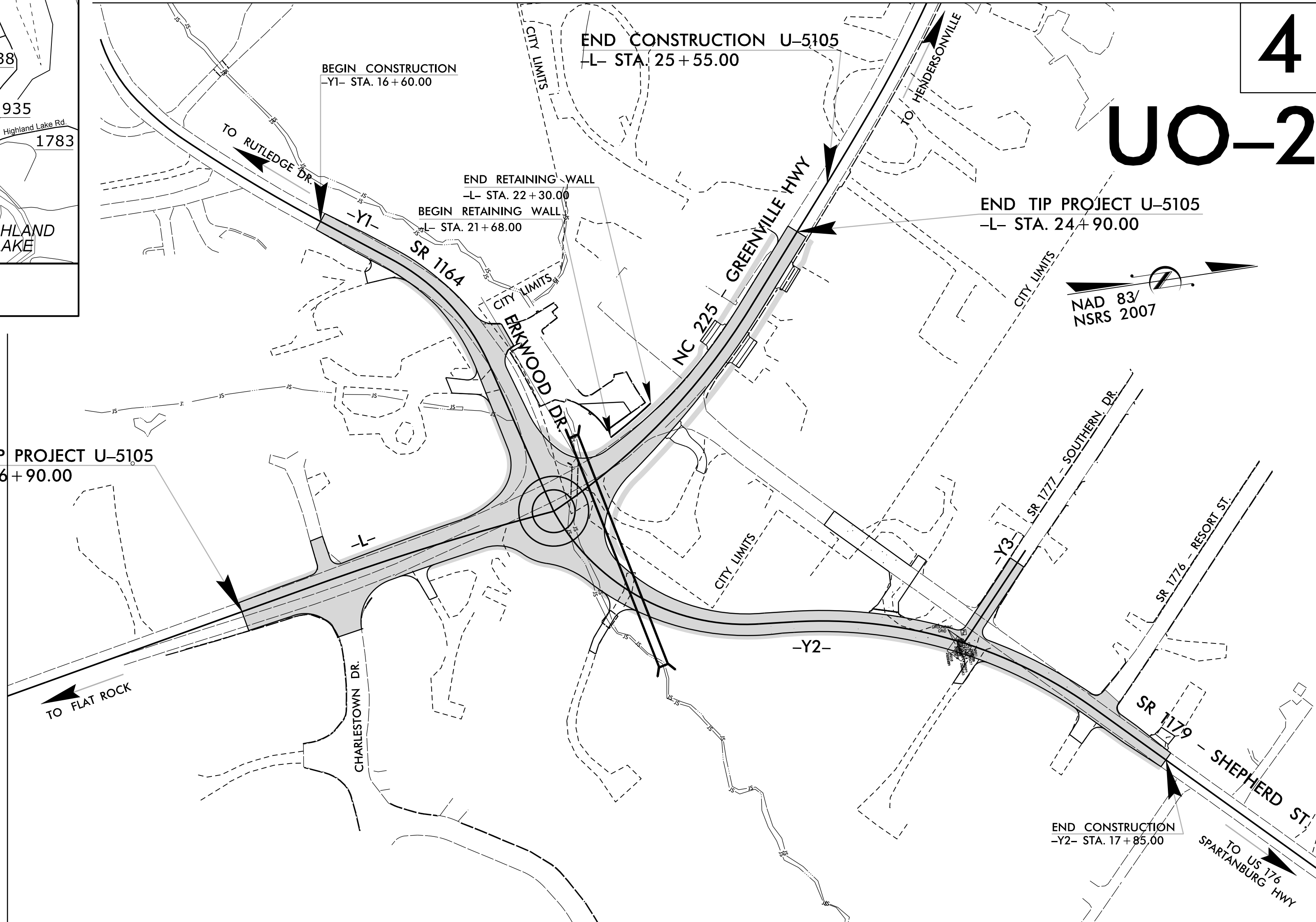
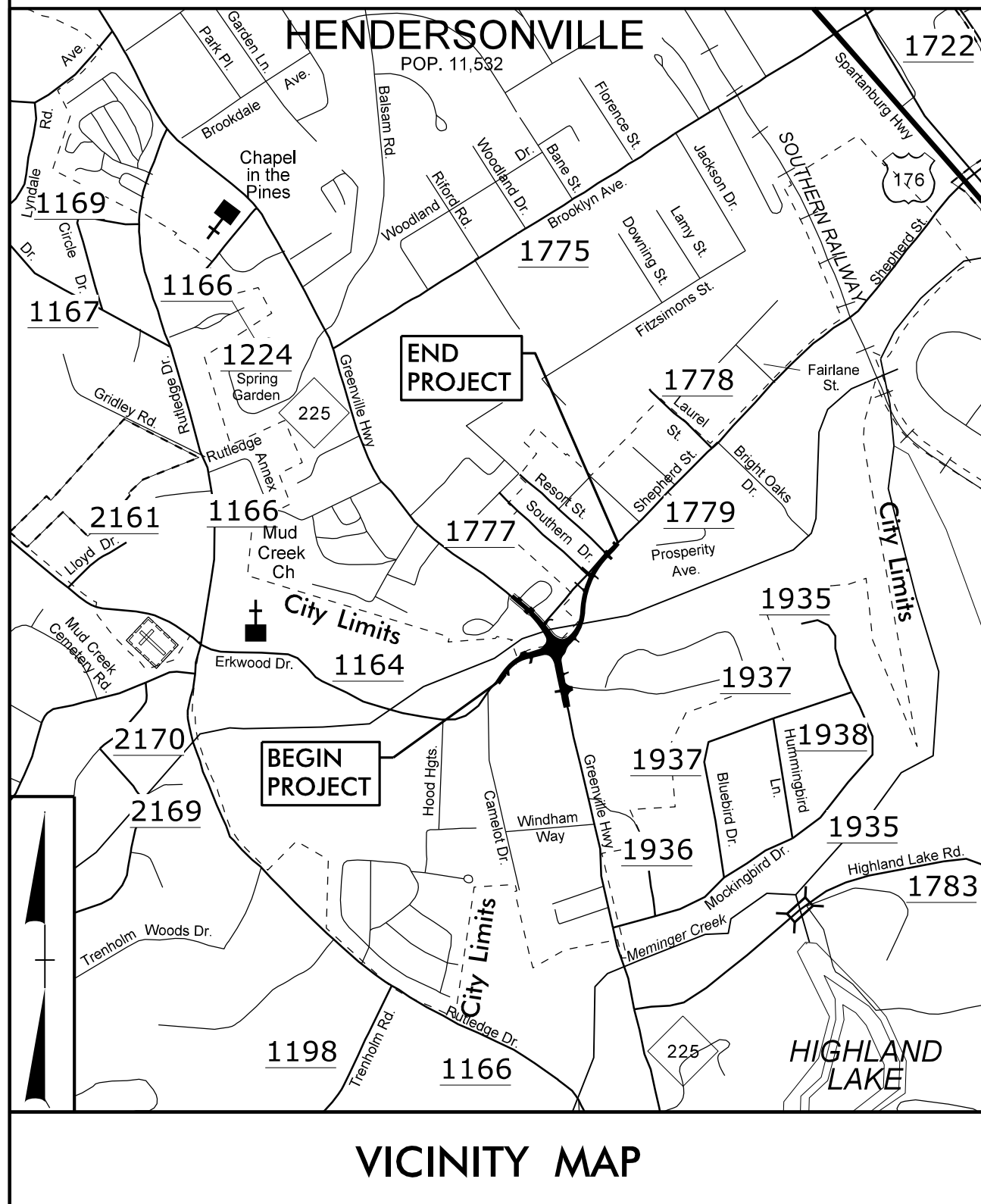
T.I.P. NO.	SHEET NO.
U-5105	UO-1

UTILITIES BY OTHERS PLANS HENDERSON COUNTY

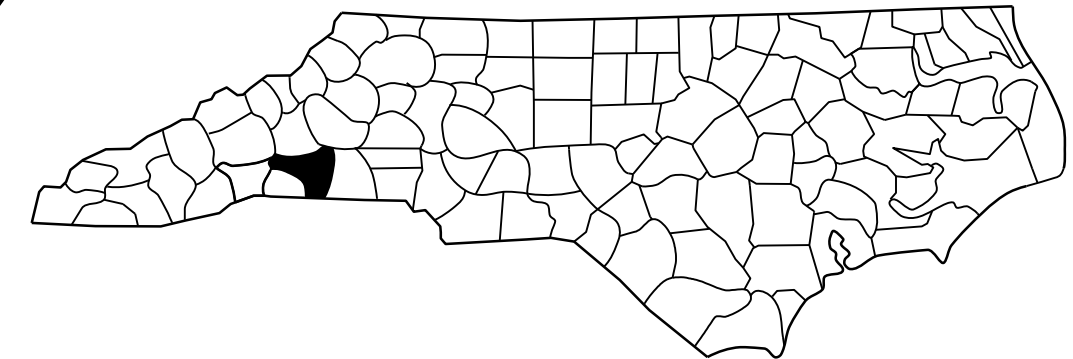
LOCATION: NC 225 (GREENVILLE HWY) INTERSECTION IMPROVEMENTS
FROM SR 1164 (ERKWOOD DR) TO SR 1779 (SHEPHERD ST)
TYPE OF WORK: POWER, TELECOM & GAS RELOCATIONS

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET IS DONE BY OTHERS.
NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

TIP PROJECT: U-5105



4
UO-2

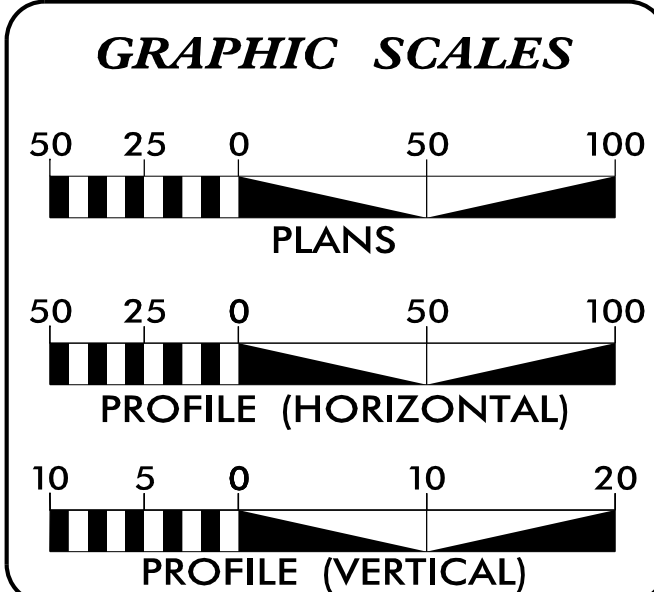


THERE IS NO CONTROL OF ACCESS ON THIS PROJECT.

A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF HENDERSONVILLE.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UO-1	TITLE SHEET
UO-2	UBO PLAN SHEET

UTILITY OWNERS WITH CONFLICTS

- (A) POWER DISTRIBUTION - DUKE ENERGY
- (B) TELECOM - AT&T
- (C) TELECOM - MORRIS BROADBAND
- (D) GAS - PSNC GAS COMPANY

PREPARED IN THE OFFICE OF:

HINDE ENGINEERING
License No. C-2639
7520 E. Independence Blvd., Suite 250 Charlotte, NC 28227
(704) 814-4407

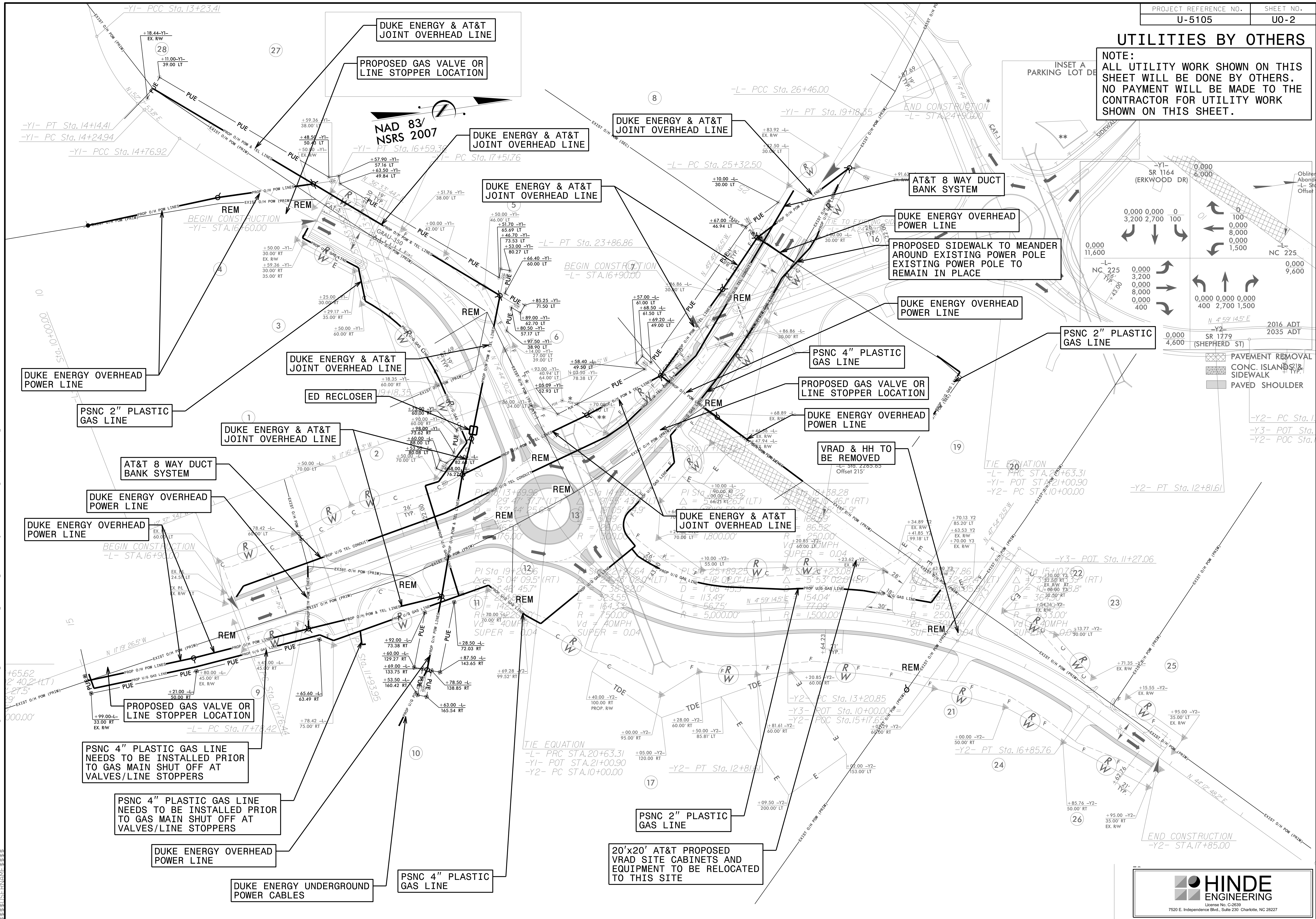
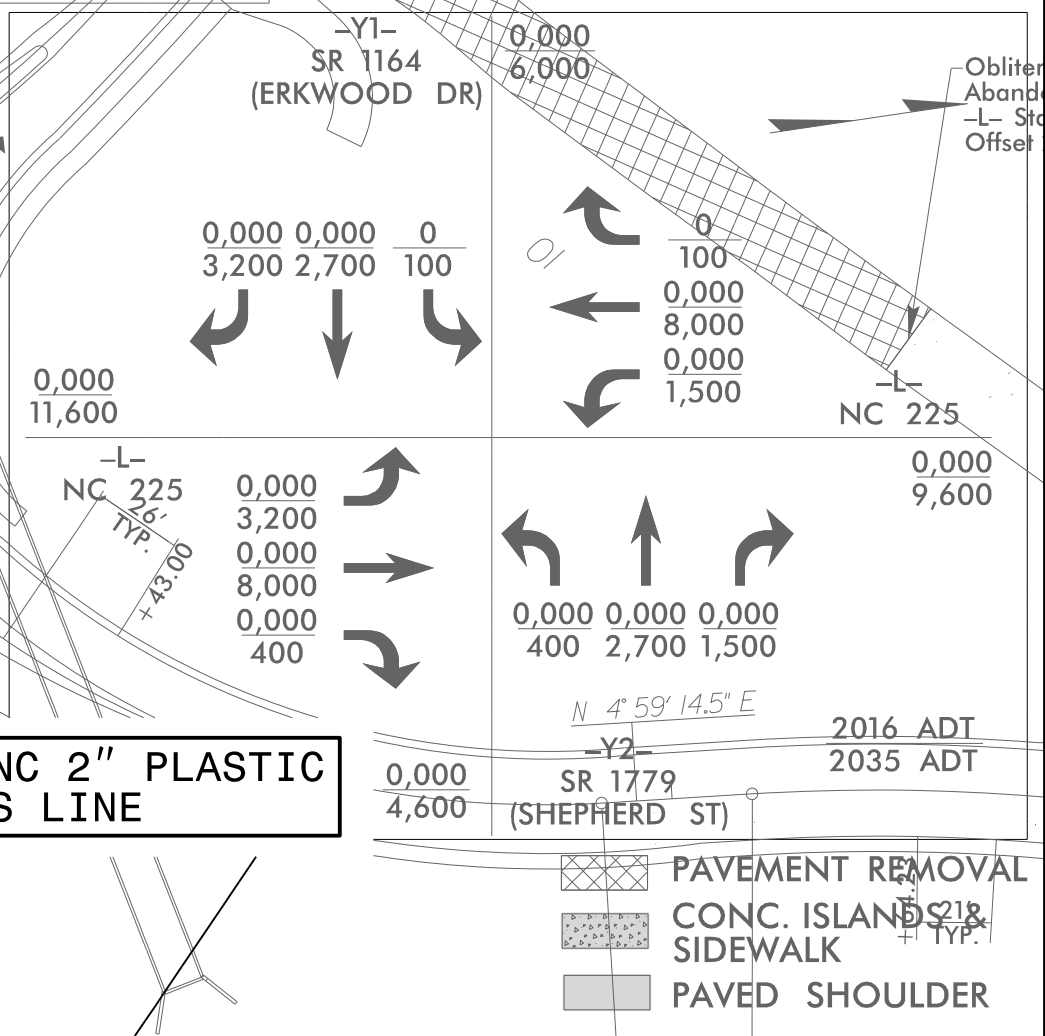
<u>Michael E. Davis</u>	UTILITY COORDINATION PROJECT MANAGER
<u>Todd E. Butner</u>	PROJECT UTILITY COORDINATOR
<u>James N. Arnold</u>	PROJECT UTILITY DESIGNER

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

<u>Ted Adams</u>	DIVISION CONTACT #1
<u>Bob Golding</u>	DIVISION CONTACT #2
<u>Mitchell Bishop</u>	DIVISION CONTACT #3
<u>Steve Cannon, PE</u>	DIVISION CONTACT #4

UTILITIES BY OTHERS

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.



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