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NOTES:

FOR SOIL NAIL RETAINING WALLS BUILD-OUT, SEE SOIL NAIL RETAINING WALLS PROVISION.

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS

FOR MICROPILES AND MICROPILE FOOTING, SEE MICROPILE SLOPE STABILIZATION PROVISION.

AVOID SOIL NAILS WITH INSTALLING GUARDRAIL POSTS.

DESIGN SOIL NAIL RETAINING WALLS AND MICROPILE SLOPE STABILIZATION FOR INTERNAL, EXTERNAL, AND GLOBAL STABILITY.

PER THE TYPICAL SECTION, THE EXISTING GROUND IS LOCATED BEHIND THE FUTURE SOIL NAIL WALL FACE. AT THE CONTRACTOR'S OPTION, CONSTRUCT NEW GROUND PRIOR TO BEGINNING SOIL NAIL WALL CONSTRUCTION OR INSTALL SOIL NAILS INTO THE EXISTING GROUND AND EXTEND THE NAILS TO FACING FALSEWORK. BACKFILL BEHIND THE FALSEWORK AFTER CONSTRUCTING THE WALL FINAL FACING.

BEFORE BEGINNING SOIL NAIL WALL DESIGN FOR SOIL NAIL RETAINING WALL AT SITE 6, SURVEY WALL LOCATION AND SUBMIT A WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE WALL ENVELOPE IS ACCEPTED.

DESIGN SOIL NAIL RETAINING WALL AT SITE 6 FOR THE FOLLOWING:

- 1) H= DESIGN HEIGHT
- 2) DESIGN LIFE = 75 YEARS
- 3) IN-SITU ASSUMED MATERIAL PARAMETERS (RESIDUAL SOILS):
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
- 4) IN-SITU ASSUMED MATERIAL PARAMETERS (WEATHERED ROCK):
UNIT WEIGHT, $\gamma = 130$ PCF
FRICTION ANGLE, $\phi = 41$ DEGREES
COHESION, $c = 0$ PSF
- 5) DESIGN FAILURE PLANE AT WALL AND FOOTING EQUAL TO AN INFERRED ROCK LINE AT A DEPTH OF 5 FT BELOW PROPOSED BOTTOM OF FOOTING.

DESIGN SOIL NAIL RETAINING WALL FOR A LIVE LOAD (TRAFFIC) SURCHARGE.


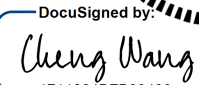
DESIGN SOIL NAIL RETAINING WALL FOR A 300 LB/FT HORIZONTAL TRAFFIC IMPACT LOAD.

EXISTING AND FUTURE OBSTRUCTIONS SUCH AS GUARDRAIL, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH SOIL NAILS FOR RETAINING WALL.

REMOVE THE LOOSE DEBRIS ON THE SURFACE OF THE SLOPE TO THE SATISFACTION OF THE ENGINEER BEFORE INSTALLING SOIL NAILS.

DO NOT DISTURB EXISTING VEGETATION BEYOND THE LIMITS OF THE SOIL NAILS INSTALLATION AREA.

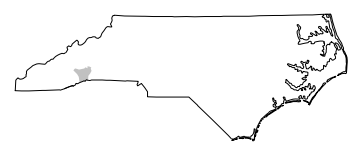
LIMITED SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF SITE 6. THE INFORMATION PROVIDED FOR DESIGN WAS SUPPLEMENTED BASED ON VISUAL OBSERVATIONS AND APPROXIMATIONS AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

GEOTECHNICAL ENGINEER  DocuSigned by:  171122258204135	ENGINEER DATE: 8/8/2025 SIGNATURE: _____ DATE: _____
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DF18314.
2045064

FINAL 2G-6B


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY



HIGHWAY DIVISION 14


PREPARED BY: C. WANG, P.E.	DATE: 08/2025
REVIEWED BY: P. ALTON, P.E.	DATE: 08/2025

SINCE



1881

Prepared in the Office of:
FROEHLING & ROBERTSON, INC.
Engineering Stability Since 1881
310 Hubert Street
Raleigh, North Carolina 27603-2302
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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

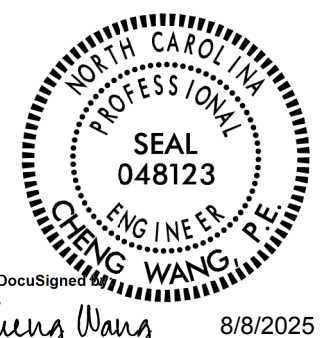
PROJECT NO.: DF18314.2045064
COUNTY: HENDERSON

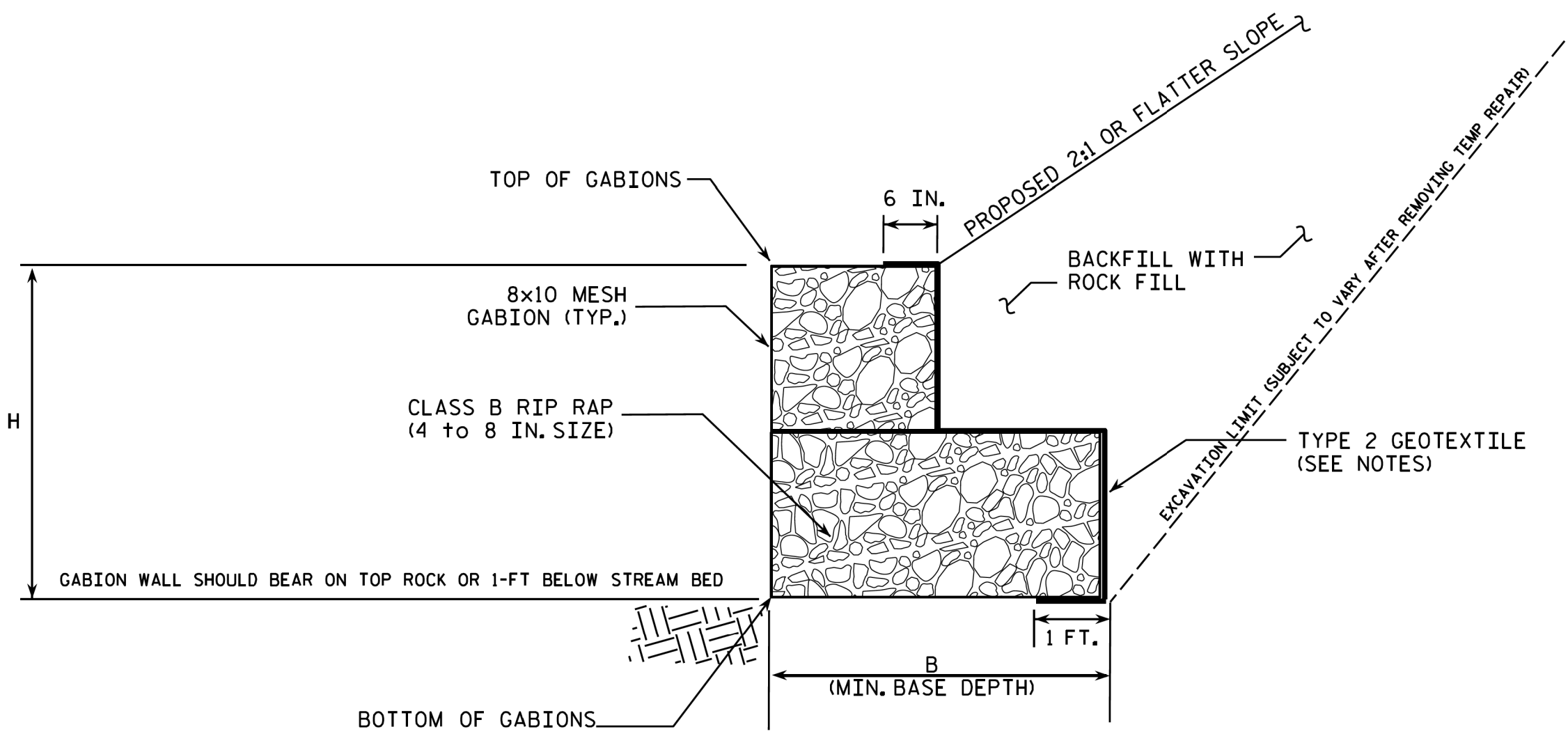
**HURRICANE HELENE EMERGENCY REPAIRS
SOIL NAIL SHOULDER BUILD OUT
SITE 6- BALD ROCK RD.**

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
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2			4		

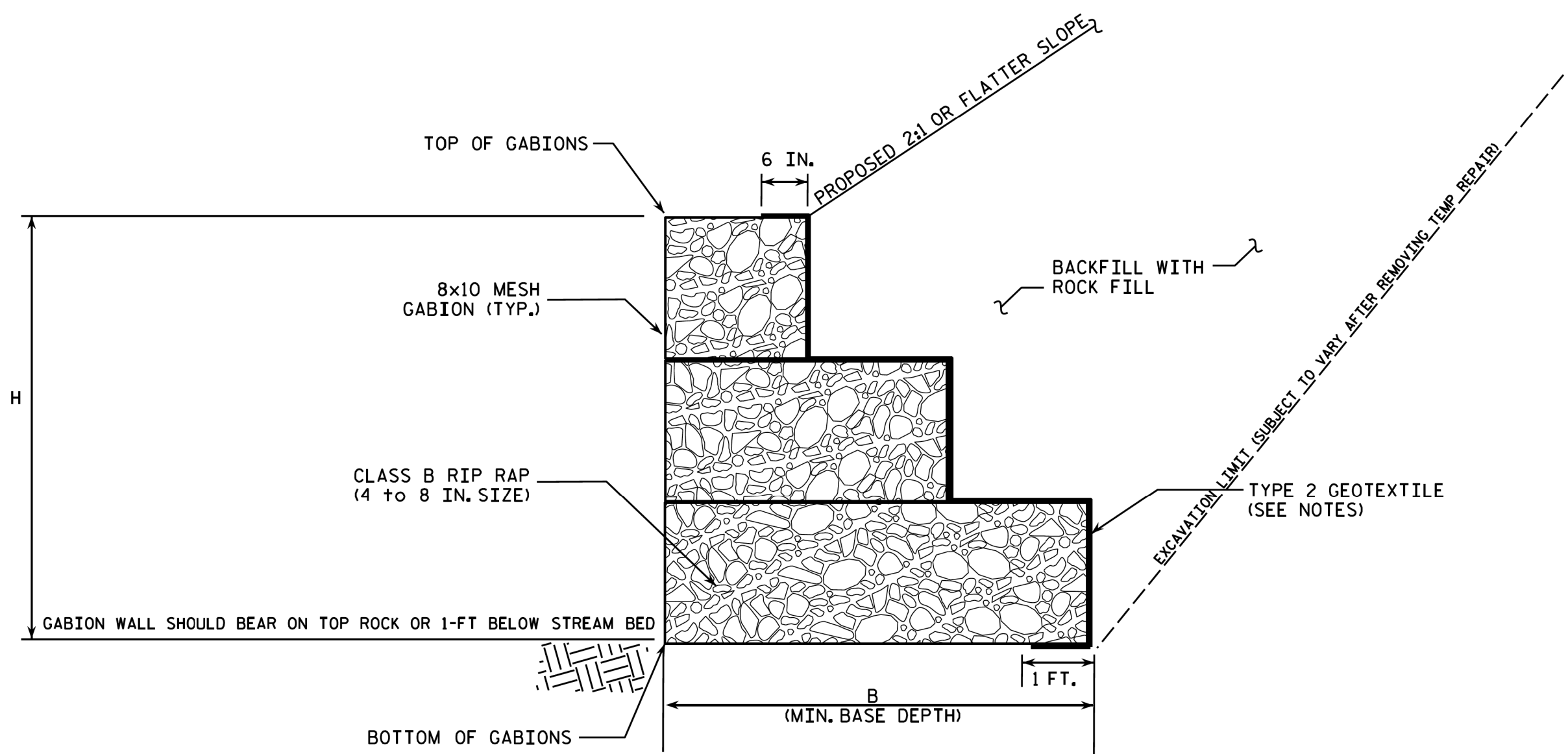
SHEET NO. 2G-6b

REVISIONS

GEOTECHNICAL ENGINEER  SEAL 048123 CHENG WANG, P.E. 8/8/2025 DATE	ENGINEER _____ SIGNATURE _____ DATE
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TYPICAL SECTION - B/H = 1.0 (MIN.)
N.T.S.



TYPICAL SECTION - B/H = 1.0 (MIN.)
N.T.S.

FOR GABION RETAINING WALL, SEE PROVISION.
ALL WORKMANSHIP TO BE IN ACCORDANCE WITH NCDOT AND GABION MANUFACTURER'S SPECIFICATIONS.

REMOVE THE TEMPORARY REPAIRS (RIP RAP AND BOULDERS) AND ANY LOOSE DEBRIS ON THE SURFACES OF THE SLOPES TO UNDISTURBED IN-SITU MATERIALS TO THE SATISFACTION OF THE ENGINEER BEFORE CONSTRUCTING GABION WALLS.

IF LOOSE MATERIALS EXIST AT THE BOTTOMS OF THE PROPOSED GABION WALLS, UNDERCUT THE MATERIALS TO THE SATISFACTION OF THE ENGINEER BEFORE CONSTRUCTING GABION WALLS.

USE GALVANIZED & PVC COATED GABIONS WITH 8x10 MESH.

PLACE TYPE 2 GEOTEXTILE ON FOUNDATION SOILS AND ARRANGE EMPTY GABIONS AS SHOWN. FASTEN ADJACENT UNITS AND HAND PLACE CLASS B RIP RAP (4 TO 8 IN. NOMINAL SIZE) IN GABIONS. PROVIDE GABION STIFFENERS WHERE REQUIRED. CLOSE LID AND FASTEN.

BACKFILL BEHIND GABIONS WITH ROCK FILL. PRIOR TO BACKFILLING, COVER BACK OF GABION WITH TYPE 2 GEOTEXTILE AND SLIGHTLY OVERLAP FABRIC ON GABION TOP. FABRIC SHALL COVER GABION SIDES AT ENDS OF EACH COURSE.

PLACE NEXT COURSE OF EMPTY GABIONS, FASTEN ADJACENT UNITS TOGETHER, HAND PLACE RIP RAP IN GABIONS, PROVIDE GABION STIFFENERS WHERE REQUIRED, CLOSE AND FASTEN LID, INSTALL FABRIC ON GABION BACK, AND BACKFILL BEHIND GABIONS. GABIONS SHOULD BE BENCHED INTO EXISTING GROUND BEYOND FAILED AREA AT EACH END. REPEAT UNTIL TOP COURSE OF GABIONS IS INSTALLED.

EXTEND FABRIC OVER TOP COURSE OF GABIONS BEYOND THE SLOPE TIE POINT AT THE TOP OF WALL.

GRADE ABOVE AND BEHIND GABIONS AT A SLOPE INCLINATION OF 2(H):1(V) OR FLATTER.

NO SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF SITE 7. THE INFORMATION PROVIDED FOR DESIGN WAS BASED ON VISUAL OBSERVATIONS AND APPROXIMATIONS AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

BEFORE BEGINNING GABION RETAINING WALL DESIGN AT SITE 7, SURVEY WALL LOCATION AND SUBMIT A WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE WALL ENVELOPE IS ACCEPTED.

DESIGN GABION RETAINING WALL FOR EXTERNAL AND GLOBAL STABILITY.
DESIGN GABION RETAINING WALL FOR A LIVE LOAD (TRAFFIC) SURCHARGE.


- DESIGN GABION RETAINING WALL AT SITE 7 FOR THE FOLLOWING:
- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
 - 2) DESIGN LIFE = 75 YEARS
 - 3) IN-SITU ASSUMED MATERIAL PARAMETERS (RESIDUAL SOILS):
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
 - 4) IN-SITU ASSUMED MATERIAL PARAMETERS (WEATHERED ROCK)
UNIT WEIGHT, $\gamma = 130$ PCF
FRICTION ANGLE, $\phi = 41$ DEGREES
COHESION, $c = 0$ PSF

WALL 1 =	1,876	SO. FT.
WALL 2 =	240	SO. FT.
WALL 3 =	417	SO. FT.
TOTAL STRUCTURE QUANTITY = 2,533 SO. FT.		

TOTAL STRUCTURE QUANTITY INCLUDES EMBEDMENT BELOW GRADE

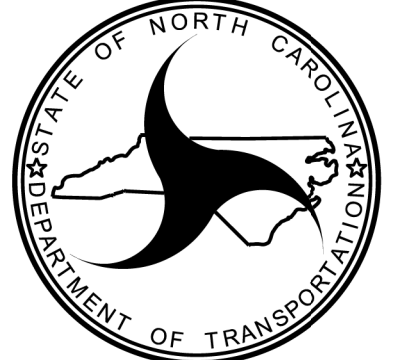
PROJECT NO.: DF18314.2045066
COUNTY: HENDERSON

PREPARED BY: C. WANG, P.E.	DATE: 08/2025
REVIEWED BY: P. ALTON, P.E.	DATE: 08/2025

SINCE

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NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS

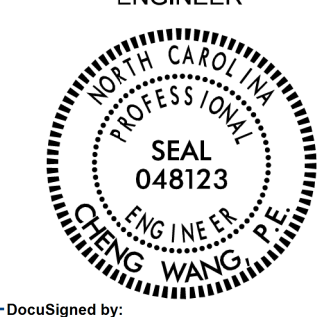
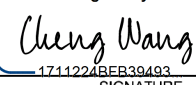


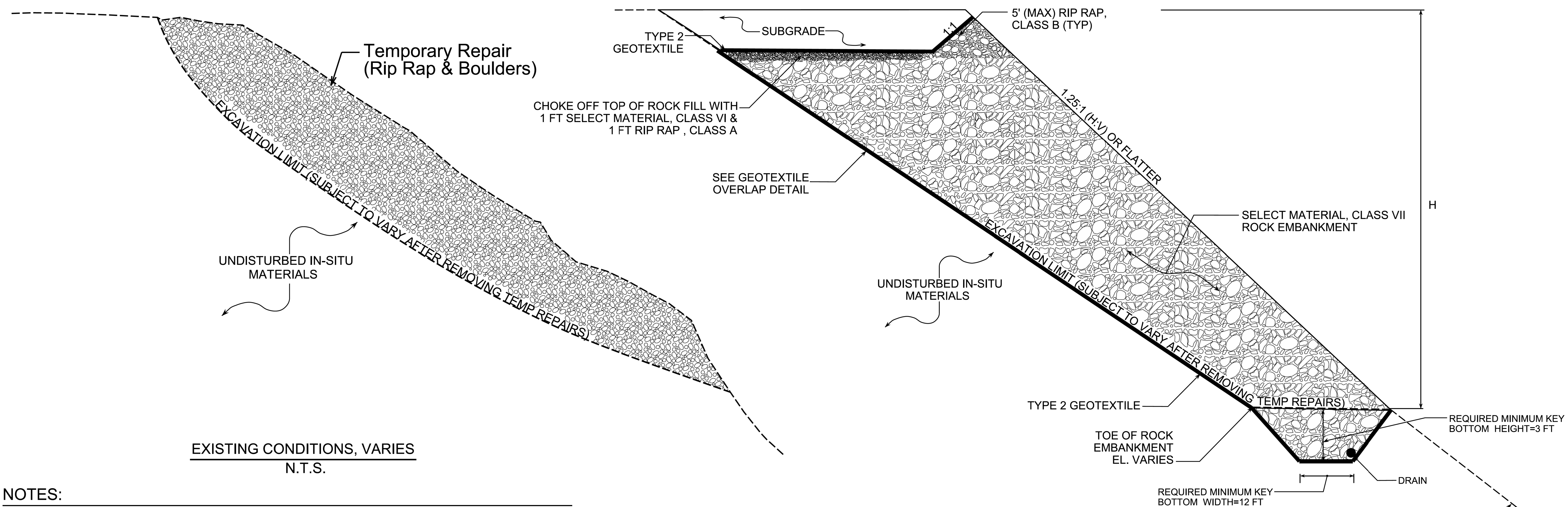
GEOTECHNICAL
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GABION RETAINING WALL
 SITE 7- BALD ROCK RD.

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			2G-7
2			4			

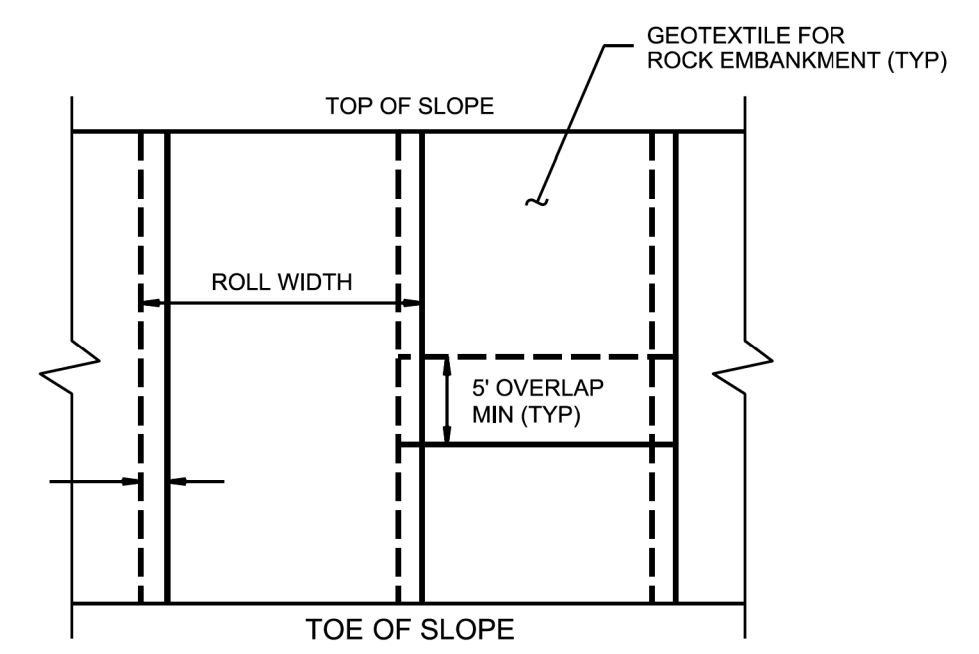
REVISIONS

GEOTECHNICAL ENGINEER  SEAL 048123 CHENG WANG, P.E. DocuSigned by:  SIGNATURE 8/8/2025 DATE	ENGINEER SIGNATURE DATE
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NOTES:

1. FOR ROCK EMBANKMENT, SEE ROCK EMBANKMENT PROVISION.
2. THE MAXIMUM ALLOWABLE HEIGHT FOR THE ROCK EMBANKMENT DETAIL IS 40'.
3. FOR ROCK EMBANKMENT, BENCH EXISTING SLOPE IN ACCORDANCE WITH SECTION 235 OF THE STANDARD SPECIFICATIONS, WHERE POSSIBLE.
4. REMOVE THE TEMPORARY REPAIR (RIP RAP AND BOULDERS) TO UNDISTURBED IN-SITU MATERIALS TO THE SATISFACTION OF THE ENGINEER BEFORE CONSTRUCTING ROCK EMBANKMENT.
5. IF SOFT/LOOSE MATERIALS EXIST AT THE TOE OF SLOPE, UNDERCUT THE MATERIALS TO THE SATISFACTION OF THE ENGINEER AND BACKFILL WITH SELECT MATERIAL APPROVED BY THE ENGINEER.
6. CONSTRUCTION OF THE TOE KEY MAY REQUIRE ADDITIONAL EXCAVATION BEYOND THE LIMITS OF THE TEMPORARY REPAIR



GEOTEXTILE OVERLAP DETAIL
(PLAN VIEW) N.T.S.

ROCK EMBANKMENT DETAIL
N.T.S.

PROJECT NO.: DF18314.2045455
COUNTY: HENDERSON

PREPARED BY: C. WANG, P.E.	DATE: 08/25
REVIEWED BY: P. ALTON, P.E.	DATE: 08/25

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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

HURRICANE HELENE EMERGENCY REPAIRS
ROCK EMBANKMENT
SITE 8-BALD ROCK RD.

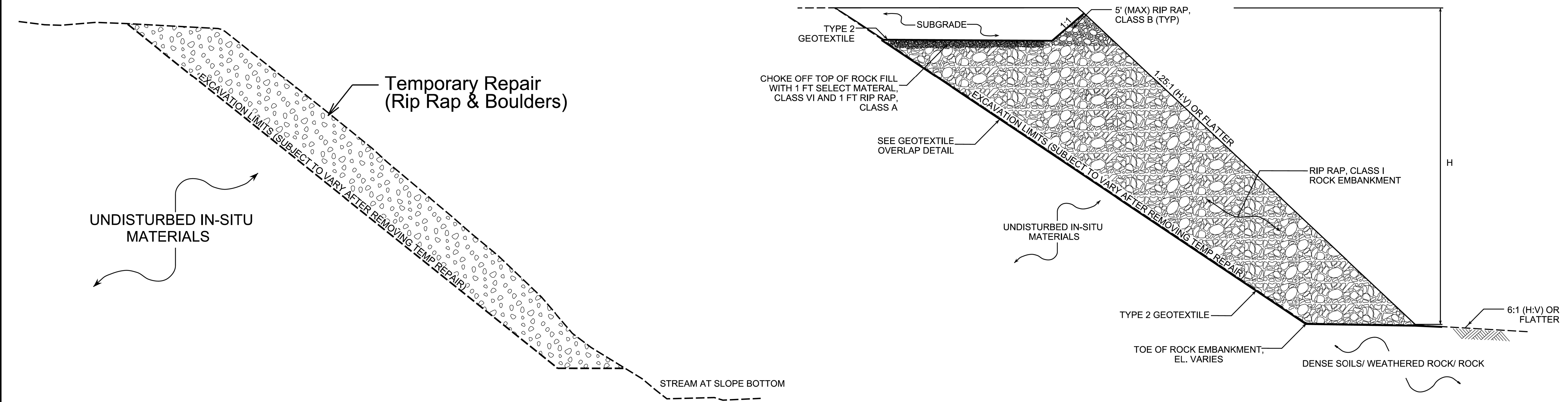
REVISIONS					
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SHEET NO. 2G-8

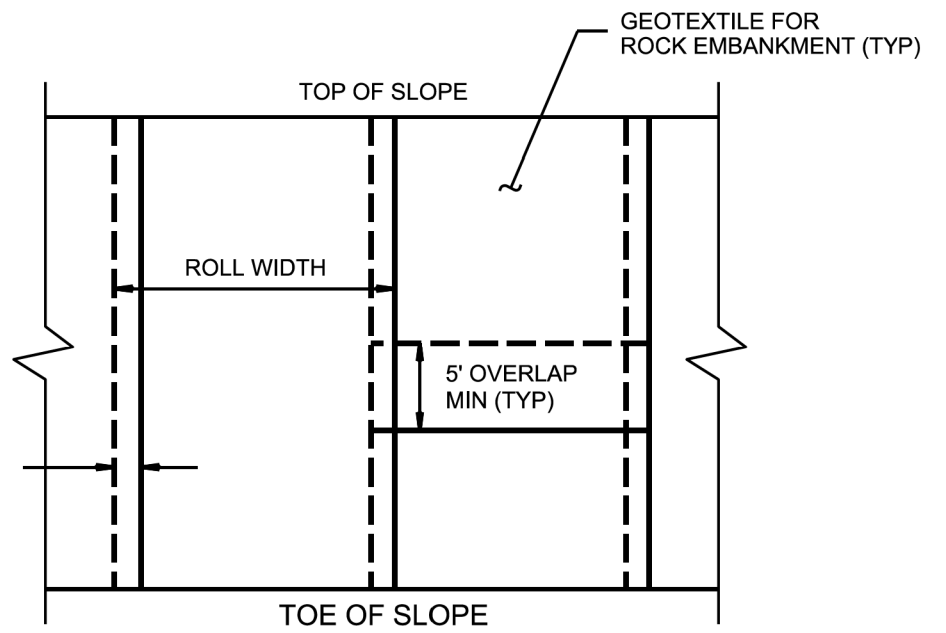
REVISIONS



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ROCK EMBANKMENT DETAIL
N.T.S.



GEOTEXTILE OVERLAP DETAIL
(PLAN VIEW) N.T.S.

NOTES:

1. FOR ROCK EMBANKMENT, SEE ROCK EMBANKMENT PROVISION.
2. THE MAXIMUM ALLOWABLE HEIGHT FOR THE ROCK EMBANKMENT DETAIL IS 80'.
3. FOR ROCK EMBANKMENT, BENCH EXISTING SLOPE IN ACCORDANCE WITH SECTION 235 OF THE STANDARD SPECIFICATIONS, WHERE POSSIBLE.
4. REMOVE THE TEMPORARY REPAIR (RIP RAP AND BOULDERS) TO UNDISTURBED IN-SITU MATERIALS TO THE SATISFACTION OF THE ENGINEER BEFORE CONSTRUCTING ROCK EMBANKMENT.
5. IF SOFT/LOOSE MATERIALS EXIST AT THE TOE OF SLOPE, UNDERCUT THE MATERIALS TO THE SATISFACTION OF THE ENGINEER AND BACK FILL WITH SELECT MATERIAL APPROVED BY THE ENGINEER.
6. NO SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF SITE 9. THE INFORMATION PROVIDED FOR DESIGN WAS BASED ON VISUAL OBSERVATIONS AND APPROXIMATIONS AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

PROJECT NO.: DF18314.2045079

COUNTY: HENDERSON

PREPARED BY: C. WANG, P.E.	DATE: 08/25
REVIEWED BY: P. ALTON, P.E.	DATE: 08/25

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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

**HURRICANE HELENE EMERGENCY REPAIRS
ROCK EMBANKMENT
SITE 9-BALD ROCK RD.**

REVISIONS					
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SHEET NO.
2G-9

REVISIONS



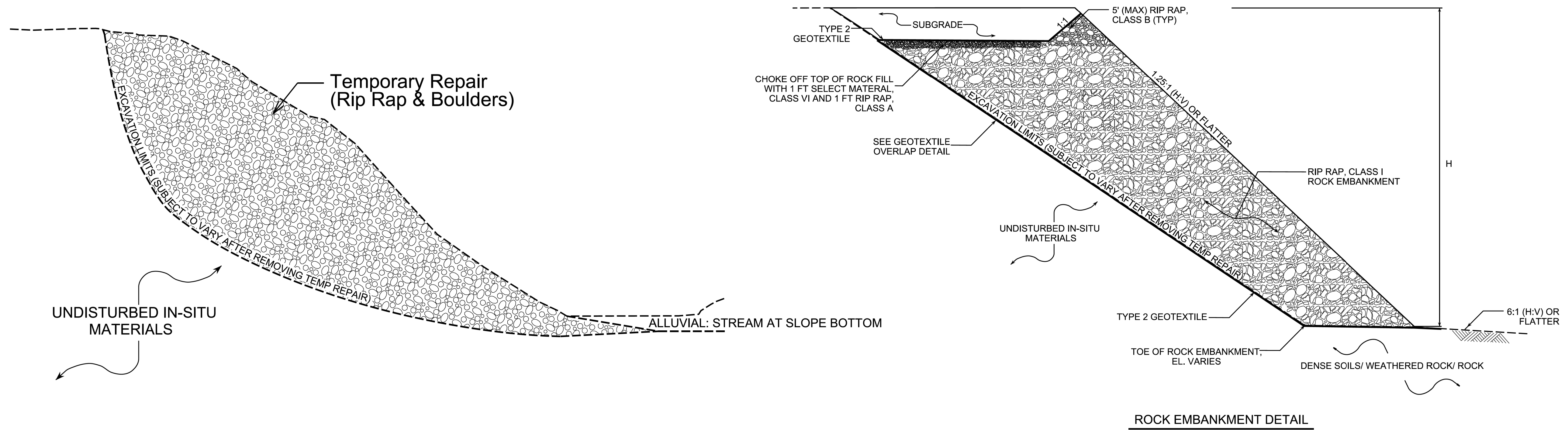
GEOTECHNICAL ENGINEER

ENGINEER

DocuSigned by:
Cheng Wang
8/8/2025

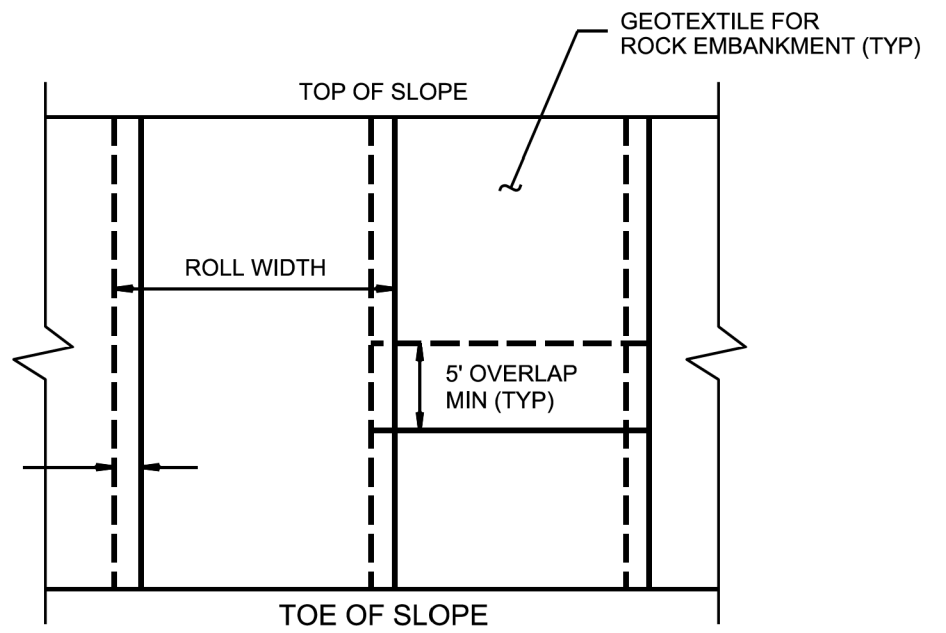
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EXISTING CONDITIONS VARIES
N.T.S.

ROCK EMBANKMENT DETAIL
N.T.S.



GEOTEXTILE OVERLAP DETAIL
(PLAN VIEW) N.T.S.

NOTES:

1. FOR ROCK EMBANKMENT, SEE ROCK EMBANKMENT PROVISION.
2. THE MAXIMUM ALLOWABLE HEIGHT FOR THE ROCK EMBANKMENT DETAIL IS 80'.
3. FOR ROCK EMBANKMENT, BENCH EXISTING SLOPE IN ACCORDANCE WITH SECTION 235 OF THE STANDARD SPECIFICATIONS, WHERE POSSIBLE.
4. REMOVE THE TEMPORARY REPAIR (RIP RAP AND BOULDERS) TO UNDISTURBED IN-SITU MATERIALS TO THE SATISFACTION OF THE ENGINEER BEFORE CONSTRUCTING ROCK EMBANKMENT.
5. IF SOFT/LOOSE MATERIALS EXIST AT THE TOE OF SLOPE, UNDERCUT THE MATERIALS TO THE SATISFACTION OF THE ENGINEER AND BACK FILL WITH SELECT MATERIAL APPROVED BY THE ENGINEER.
6. NO SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF SITE 10. THE INFORMATION PROVIDED FOR DESIGN WAS BASED ON VISUAL OBSERVATIONS AND APPROXIMATIONS AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

PROJECT NO.: DF18314.2045067

COUNTY: HENDERSON

PREPARED BY: C. WANG, P.E.	DATE: 08/25
REVIEWED BY: P. ALTON, P.E.	DATE: 08/25

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

HURRICANE HELENE EMERGENCY REPAIRS
ROCK EMBANKMENT
SITE 10-BALD ROCK RD.

REVISIONS					
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SHEET NO. 2G-10

REVISIONS



GEOTECHNICAL ENGINEER

ENGINEER

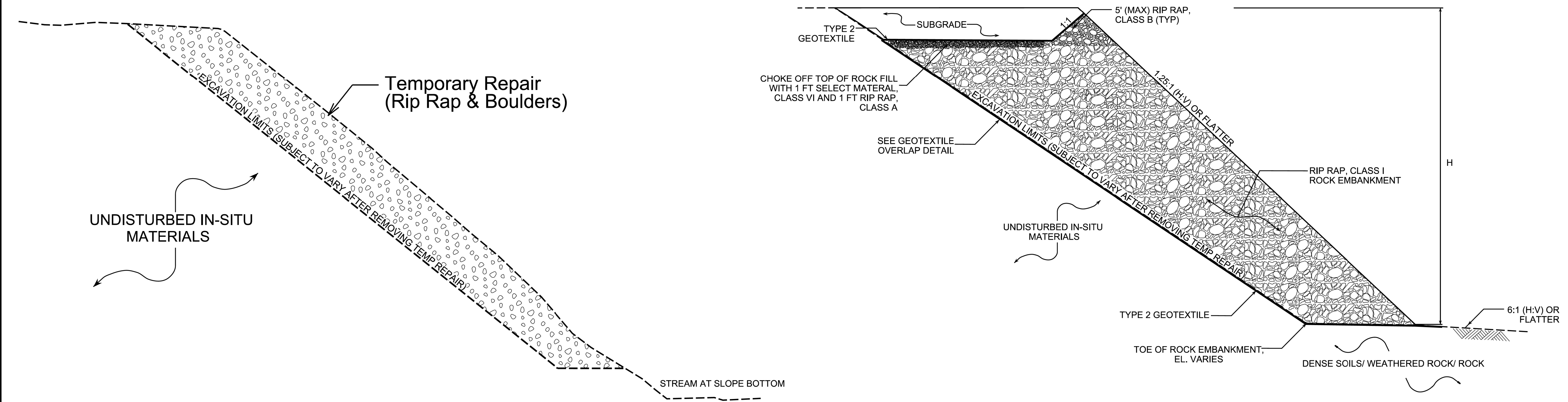
DocuSigned by:
Cheng Wang 8/8/2025

SEAL 048123

CHENG WANG

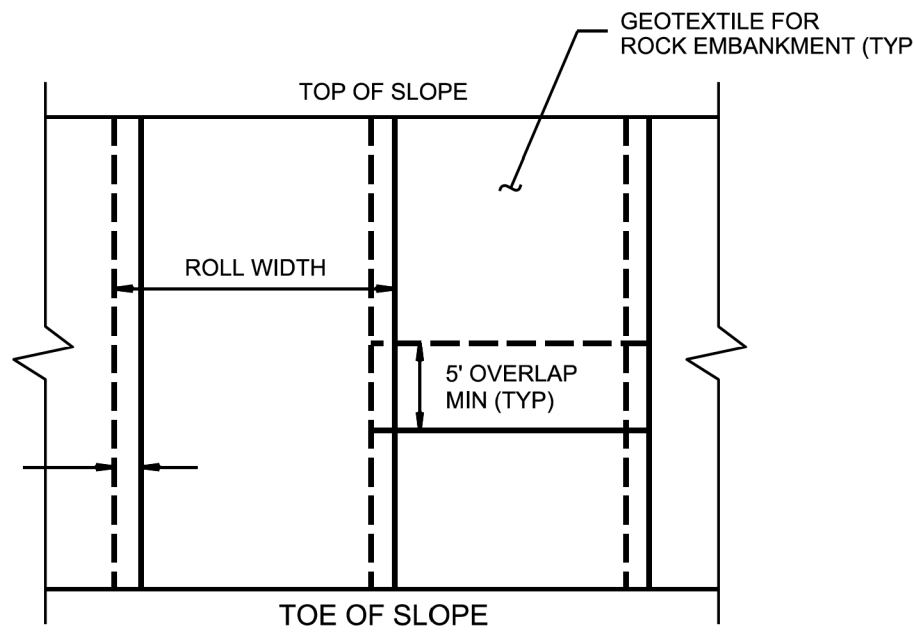
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EXISTING CONDITIONS VARIES
N.T.S.

ROCK EMBANKMENT DETAIL
N.T.S.



GEOTEXTILE OVERLAP DETAIL
(PLAN VIEW) N.T.S.

NOTES:

1. FOR ROCK EMBANKMENT, SEE ROCK EMBANKMENT PROVISION.
2. THE MAXIMUM ALLOWABLE HEIGHT FOR THE ROCK EMBANKMENT DETAIL IS 80'.
3. FOR ROCK EMBANKMENT, BENCH EXISTING SLOPE IN ACCORDANCE WITH SECTION 235 OF THE STANDARD SPECIFICATIONS, WHERE POSSIBLE.
4. REMOVE THE TEMPORARY REPAIR (RIP RAP AND BOULDERS) TO UNDISTURBED IN-SITU MATERIALS TO THE SATISFACTION OF THE ENGINEER BEFORE CONSTRUCTING ROCK EMBANKMENT.
5. IF SOFT/LOOSE MATERIALS EXIST AT THE TOE OF SLOPE, UNDERCUT THE MATERIALS TO THE SATISFACTION OF THE ENGINEER AND BACK FILL WITH SELECT MATERIAL APPROVED BY THE ENGINEER.
6. NO SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF SITE 11. THE INFORMATION PROVIDED FOR DESIGN WAS BASED ON VISUAL OBSERVATIONS AND APPROXIMATIONS AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

PROJECT NO.: DF18314.2045478

COUNTY: HENDERSON

PREPARED BY: C. WANG, P.E.	DATE: 08/25
REVIEWED BY: P. ALTON, P.E.	DATE: 08/25

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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

HURRICANE HELENE EMERGENCY REPAIRS
ROCK EMBANKMENT
SITE 11-BALD ROCK RD.

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. 2G-11

REVISIONS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-L1- STA. 10+50.00	-L1- STA. 12+15.00	230	6	6	230
PROJECT TOTALS:		230	6	6	230
Waste in Lieu of Borrow					
Replace Topsoil on Borrow Pit (5%)					
GRAND TOTALS:		230	6	6	230
SAY:		230		10	

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L1-	10+50.00	12+15.00	CL	370			
			TOTAL:	370			
			SAY:	370			

NOTES:

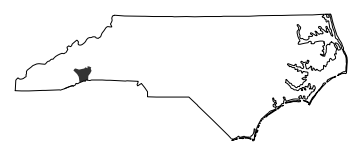
APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR BY THE CONTRACT LUMP SUM PRICE FOR "GRADING".

ALL EARTHWORK QUANTITIES WERE DERIVED FROM ORD QUANTITIES BY NAMED BOUNDARY REPORT(S) AS DESCRIBED IN THE ORD QUICKSTART TRAINING.

DF18314.
2045060

FINAL 3B-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY



HIGHWAY DIVISION 14

PREPARED BY



NC FIRM LICENSE No: C-1506
301 Fayetteville St.,
Suite 1500
Raleigh, NC 27601
(919)882-7839

REVISIONS

SUMMARY OF EARTHWORK (IN CUBIC YARDS)

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-L2- STA. 11+90.00	-L2- STA. 19+60.00	238	77	77	238
PROJECT TOTALS:					
PROJECT TOTALS:					
Waste in Lieu of Borrow		238	77	77	238
Replace Topsoil on Borrow Pit (5%)					
GRAND TOTALS:		238	77	77	238
SAY:		240		80	

PAVEMENT REMOVAL SUMMARY IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L2-	11+90.00	18+65.00	CL	1500			
TOTAL:				1500			
SAY:				1500			

NOTES:

APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR BY THE CONTRACT LUMP SUM PRICE FOR "GRADING".

ALL EARTHWORK QUANTITIES WERE DERIVED FROM ORD QUANTITIES BY NAMED BOUNDARY REPORT(S) AS DESCRIBED IN THE ORD QUICKSTART TRAINING.

DF18314.
2045061

FINAL 3B-2

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY



HIGHWAY DIVISION 14

PREPARED BY

KCA
KISINGER CAMPO
& ASSOCIATES

NC FIRM LICENSE No: C-1506
301 Fayetteville St.,
Suite 1500
Raleigh, NC 27601
(919)882-7839

REVISIONS

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2045465

FINAL 3B-5

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY



HIGHWAY DIVISION 14

PREPARED BY

KCA
KISINGER CAMPO
& ASSOCIATES

NC FIRM LICENSE No: C-1506
301 Fayetteville St.,
Suite 1500
Raleigh, NC 27601
(919)882-7839

REVISIONS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-Y1- STA. 10+20.00	-Y1- STA. 11+15.00	1342	38	38	1342
PROJECT TOTALS:		1342	38	38	1342
PROJECT TOTALS:		1342	38	38	1342
Waste in Lieu of Borrow					
Replace Topsoil on Borrow Pit (5%)					
GRAND TOTALS:		1342	38	38	1342
SAY:		1350		40	

NOTES:

APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR BY THE CONTRACT LUMP SUM PRICE FOR "GRADING".

ALL EARTHWORK QUANTITIES WERE DERIVED FROM ORD QUANTITIES BY NAMED BOUNDARY REPORT(S) AS DESCRIBED IN THE ORD QUICKSTART TRAINING.

PAVEMENT REMOVAL SUMMARY

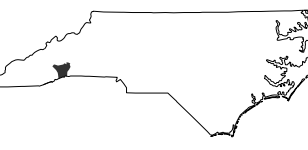
IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-Y1-	10+20.00	11+15.00	CL	240			
TOTAL:				240			
SAY:				240			

DF18314.
2045455

FINAL 3B-8

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY



HIGHWAY DIVISION 14

PREPARED BY

KCA
KISINGER CAMPO
& ASSOCIATES

NC FIRM LICENSE No: C-1506
301 Fayetteville St.,
Suite 1500
Raleigh, NC 27601
(919)882-7839

REVISIONS

SUMMARY OF EARTHWORK IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-L9- STA. 11+35.00	-L9- STA. 14+00.00	1174	4	4	1174
PROJECT TOTALS:		1174	4	4	1174
PROJECT TOTALS:		1174	4	4	1174
Waste in Lieu of Borrow					
Replace Topsoil on Borrow Pit (5%)					
GRAND TOTALS:		1174	0	4	1174
SAY:		1175		5	

NOTES:
 APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR BY THE CONTRACT LUMP SUM PRICE FOR "GRADING".
 ALL EARTHWORK QUANTITIES WERE DERIVED FROM ORD QUANTITIES BY NAMED BOUNDARY REPORT(S) AS DESCRIBED IN THE ORD QUICKSTART TRAINING.


PAVEMENT REMOVAL SUMMARY IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L9-	11+35.00	14+00.00	CL	590			
TOTAL:				590			
SAY:				590			

DF18314.
2045479

FINAL	3B-9
-------	------

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY



HIGHWAY DIVISION 14

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& ASSOCIATES

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301 Fayetteville St.,
Suite 1500
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(919)882-7839

REVISIONS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-L11- STA. 11+70.00	-L11- STA. 12+35.00	138	2	2	138
PROJECT TOTALS:					
PROJECT TOTALS:		138	2	2	138
Waste in Lieu of Borrow					
Replace Topsoil on Borrow Pit (5%)					
GRAND TOTALS:		138	2	2	138
SAY:		140		5	

NOTES:

APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR BY THE CONTRACT LUMP SUM PRICE FOR "GRADING".

ALL EARTHWORK QUANTITIES WERE DERIVED FROM ORD QUANTITIES BY NAMED BOUNDARY REPORT(S) AS DESCRIBED IN THE ORD QUICKSTART TRAINING.

PAVEMENT REMOVAL SUMMARY

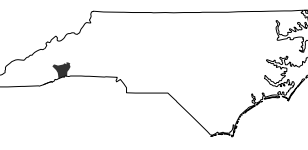
IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L11-	11+70.00	12+35.00	CL	144.44			
TOTAL:				144.44			
SAY:				150			

DF18314.
2045478

FINAL 3B-II

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY



HIGHWAY DIVISION 14

PREPARED BY

KCA
KISINGER CAMPO
& ASSOCIATES

NC FIRM LICENSE No: C-1506
301 Fayetteville St.,
Suite 1500
Raleigh, NC 27601
(919)882-7839

REVISIONS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

Table with columns for Line & Station, Offset, Structure Number, Pipe Size, Invert Elevation, Pipe Material, Endwalls, Quantities, Frame/Grates, and Remarks. Includes data for stations L3 12+90, L3 13+04, L7 11+08, L7 10+98, and L7 13+73.

SHEET TOTALS (48" or Less) and PROJECT TOTALS (48" or Less) summary table.

DF18314. 2045060
FINAL 3D-1
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION HENDERSON COUNTY
HIGHWAY DIVISION 14
PREPARED BY
KCA KISINGER CAMPO & ASSOCIATES
NC FIRM LICENSE No: C-1506
301 Fayetteville St., Suite 1500
Raleigh, NC 27601
(919) 882-7839

REVISIONS

COMPUTED BY: CW DATE: 8/5/25
 CHECKED BY: WPA DATE: 8/5/25

(9-17-24)

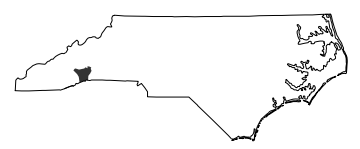
PROJECT NO. DF18314.2045060, etc.	SHEET NO. 3G-1
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**STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS**

DF18314.
2045060

FINAL 3G-1

NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 HENDERSON COUNTY



HIGHWAY DIVISION 14

SUMMARY OF ROCK EMBANKMENTS - SITE 1 (DF18314.2045060)

LINE	Begin Station	End Station	Location LT/RT	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Select Material Class VI/VII	Select Material TON	Select Material Class VI/VII	Select Material TON	Geotextile for Rock Embankments SY	6" Perforated Subdrain Pipe LF	6" Outlet Pipe LF
-L1-	10+60	11+05	RT	A	15	B	15	1	235	VI	15	-	-	235	0	0
-L1-	11+78.42	12+05	LT													

SUMMARY OF ROCK EMBANKMENTS - SITE 4 (DF18314.2045063)

LINE	Begin Station	End Station	Location LT/RT	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Select Material Class VI/VII	Select Material TON	Select Material Class VI/VII	Select Material TON	Geotextile for Rock Embankments SY	6" Perforated Subdrain Pipe LF	6" Outlet Pipe LF
-L4-	11+55	12+15	LT	A	65	B	355	1	795	VI	65	-	-	1075	0	0
-L4-	12+95	15+35	LT													

SUMMARY OF ROCK EMBANKMENTS - SITE 8 (DF18314.2045455)

LINE	Begin Station	End Station	Location LT/RT	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Select Material Class VI/VII	Select Material TON	Select Material Class VI/VII	Select Material TON	Geotextile for Rock Embankments SY	6" Perforated Subdrain Pipe LF	6" Outlet Pipe LF
-Y1-	10+30	11+00	RT	A	30	B	20	-	-	VI	30	VII	1240	510	70	20

SUMMARY OF ROCK EMBANKMENTS - SITE 9 (DF18314.2045479)

LINE	Begin Station	End Station	Location LT/RT	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Select Material Class VI/VII	Select Material TON	Select Material Class VI/VII	Select Material TON	Geotextile for Rock Embankments SY	6" Perforated Subdrain Pipe LF	6" Outlet Pipe LF
-L9-	11+40	12+10	RT	A	25	B	70	1	1385	VI	25	-	-	995	0	0
-L9-	12+65	13+95	RT													

SUMMARY OF ROCK EMBANKMENTS - SITE 10 (DF18314.2045067)

LINE	Begin Station	End Station	Location LT/RT	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Select Material Class VI/VII	Select Material TON	Select Material Class VI/VII	Select Material TON	Geotextile for Rock Embankments SY	6" Perforated Subdrain Pipe LF	6" Outlet Pipe LF
-L10-	11+20	12+10	RT	A	25	B	25	1	560	VI	25	-	-	390	0	0

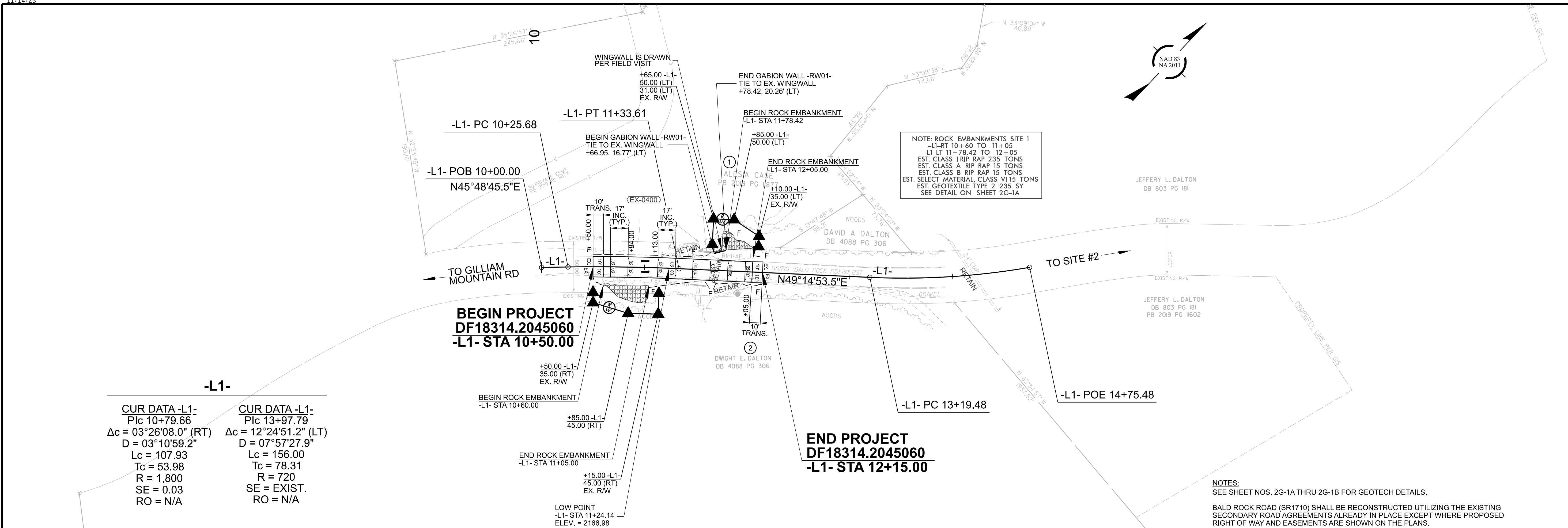
SUMMARY OF ROCK EMBANKMENTS - SITE 11 (DF18314.2045478)

LINE	Begin Station	End Station	Location LT/RT	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Riprap Class 1/2/A/B	Riprap TON	Select Material Class VI/VII	Select Material TON	Select Material Class VI/VII	Select Material TON	Geotextile for Rock Embankments SY	6" Perforated Subdrain Pipe LF	6" Outlet Pipe LF
-L11-	11+85	12+20	RT	A	10	B	10	1	110	VI	10	-	-	100	0	0

SINCE **F&R** Prepared in the Office of:
FROEHLING & ROBERTSON, INC.
 Engineering Stability Since 1881
 310 Hubert Street
 Raleigh, North Carolina 27603-2302
 License No. F-0266
 Bus: 919.828.3441 Fax: 919.828.5751

1881

REVISIONS



DF18314.
2045060

FINAL 4

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY

ROADWAY DESIGN
ENGINEER

7/29/2025

SEAL
039234

JEFFERY L. DALTON
DB 803 PG 181

DAVID A DALTON
DB 4088 PG 306

DAVID A DALTON
DB 803 PG 181
PB 2019 PG 1602

JEFFERY L. DALTON
DB 803 PG 181
PB 2019 PG 1602

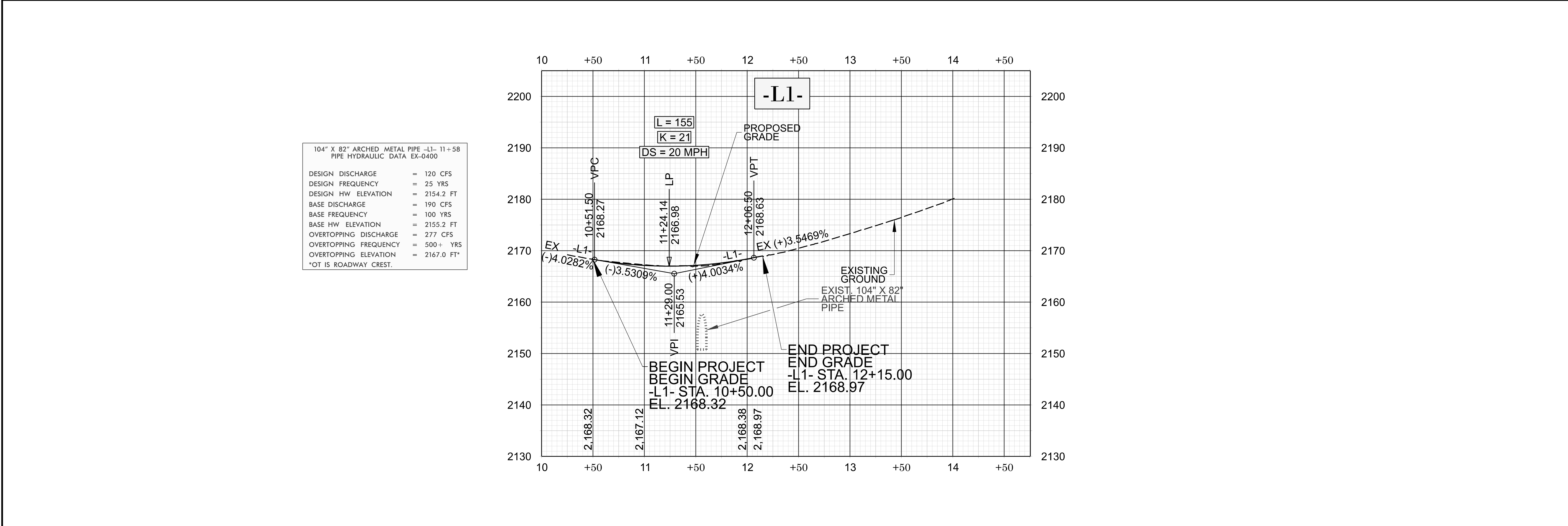
SEAL
049338

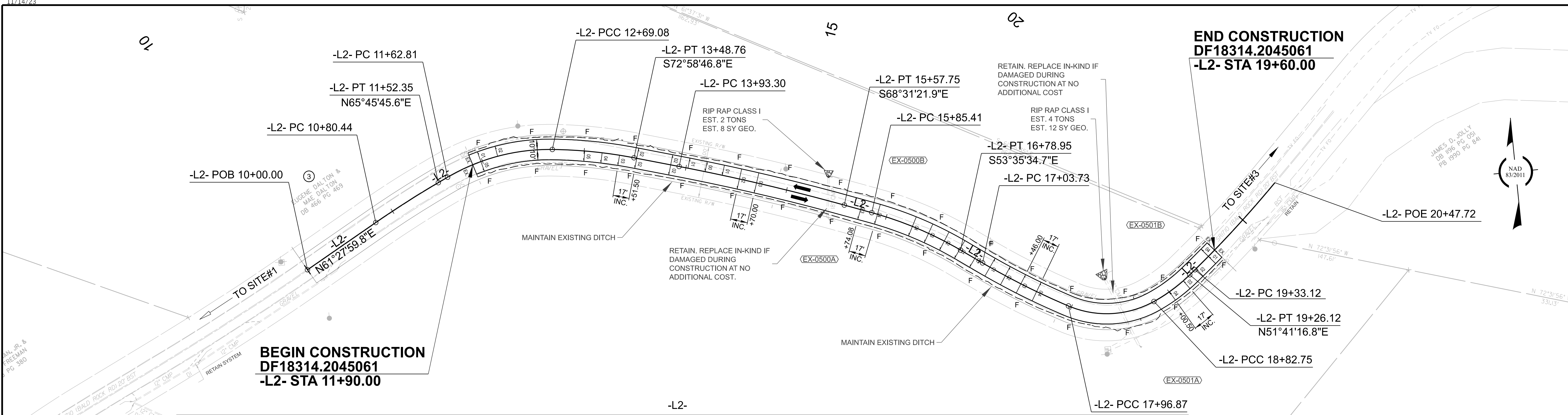
ERIC P. AADLAND

ERIC P. AADLAND

PREPARED BY
KCA
KISINGER CAMPO
& ASSOCIATES

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Suite 1500
Raleigh, NC 27601
(919)882-7839



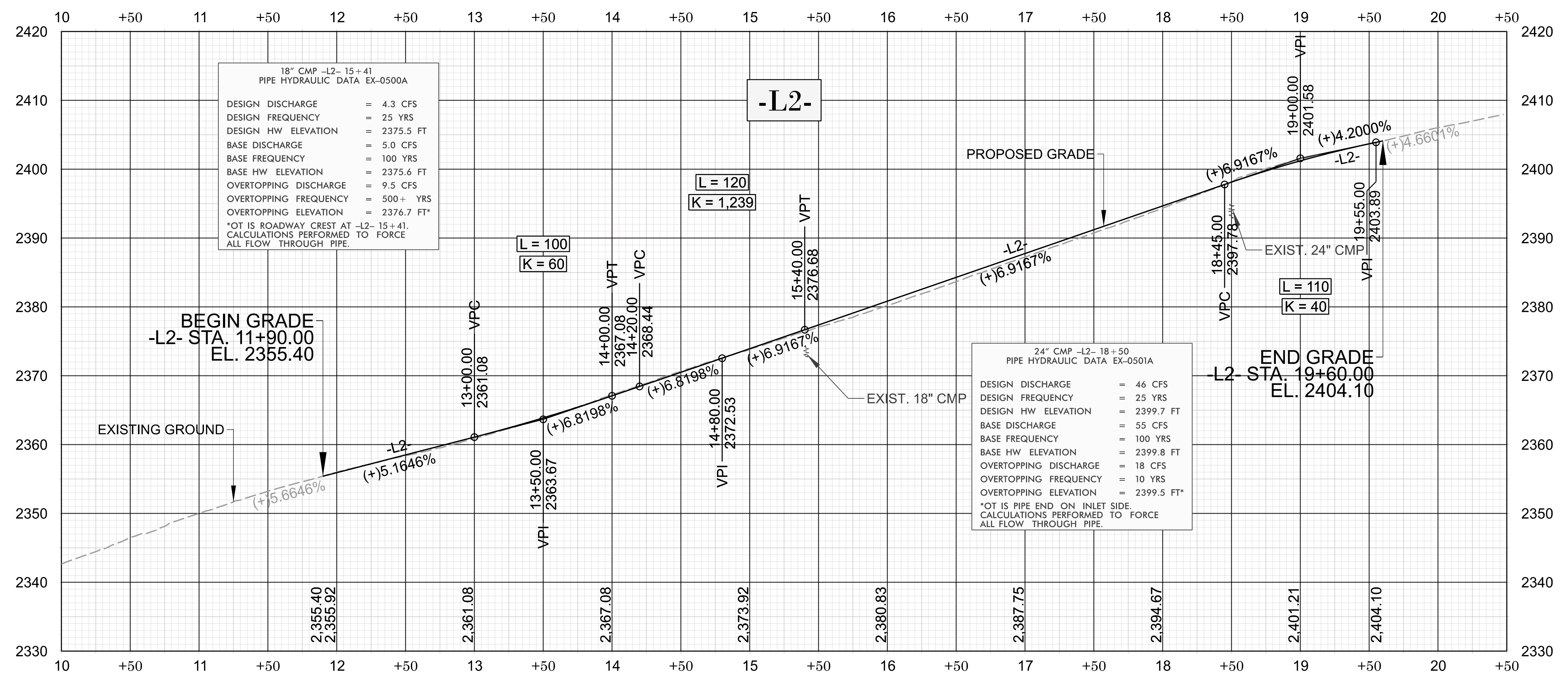


BEGIN CONSTRUCTION
DF18314.2045061
-L2- STA 11+90.00

END CONSTRUCTION
DF18314.2045061
-L2- STA 19+60.00

Station	Plc	Δc	D	Lc	Tc	R	SE	RO
11+16.41	11+16.41	04°17'45.9" (RT)	05°58'28.3"	71.91	35.97	959	EXIST.	N/A
12+17.29	12+17.29	31°04'02.8" (RT)	29°13'57.1"	106.28	54.48	196	EXIST.	N/A
13+09.03	13+09.03	10°11'24.8" (RT)	12°47'21.3"	79.68	39.94	448	0.04	N/A
14+75.57	14+75.57	04°27'24.9" (RT)	02°42'37.1"	164.44	82.26	2,114	0.03	N/A
16+32.45	16+32.45	14°55'47.2" (RT)	15°57'35.4"	93.55	47.04	359	0.04	N/A
17+50.36	17+50.36	07°23'28.4" (RT)	07°56'08.5"	93.14	46.63	722	EXIST.	N/A
18+42.99	18+42.99	51°47'44.3" (LT)	60°18'40.8"	85.88	46.13	95	EXIST.	N/A
19+04.57	19+04.57	15°31'55.2" (LT)	35°48'35.5"	43.37	21.82	160	EXIST.	N/A
19+90.47	19+90.47	05°58'08.8" (LT)	05°12'31.3"	114.60	57.35	1,100	EXIST.	N/A

NOTES:
BALD ROCK ROAD (SR1710) SHALL BE RECONSTRUCTED UTILIZING THE EXISTING SECONDARY ROAD AGREEMENTS ALREADY IN PLACE EXCEPT WHERE PROPOSED RIGHT OF WAY AND EASEMENTS ARE SHOWN ON THE PLANS.



18" CMP -L2- 15+41
PIPE HYDRAULIC DATA EX-0500A

DESIGN DISCHARGE	= 4.3 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 2375.5 FT
BASE DISCHARGE	= 5.0 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 2375.6 FT
OVERTOPPING DISCHARGE	= 9.5 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 2376.7 FT*

*OT IS ROADWAY CREST AT -L2- 15+41. CALCULATIONS PERFORMED TO FORCE ALL FLOW THROUGH PIPE.

24" CMP -L2- 18+50
PIPE HYDRAULIC DATA EX-0501A

DESIGN DISCHARGE	= 46 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 2399.7 FT
BASE DISCHARGE	= 55 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 2399.8 FT
OVERTOPPING DISCHARGE	= 18 CFS
OVERTOPPING FREQUENCY	= 10 YRS
OVERTOPPING ELEVATION	= 2399.5 FT*

*OT IS PIPE END ON INLET SIDE. CALCULATIONS PERFORMED TO FORCE ALL FLOW THROUGH PIPE.

DF18314.2045061
FINAL 5

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION HENDERSON COUNTY

HIGHWAY DIVISION 14
ROADWAY DESIGN ENGINEER

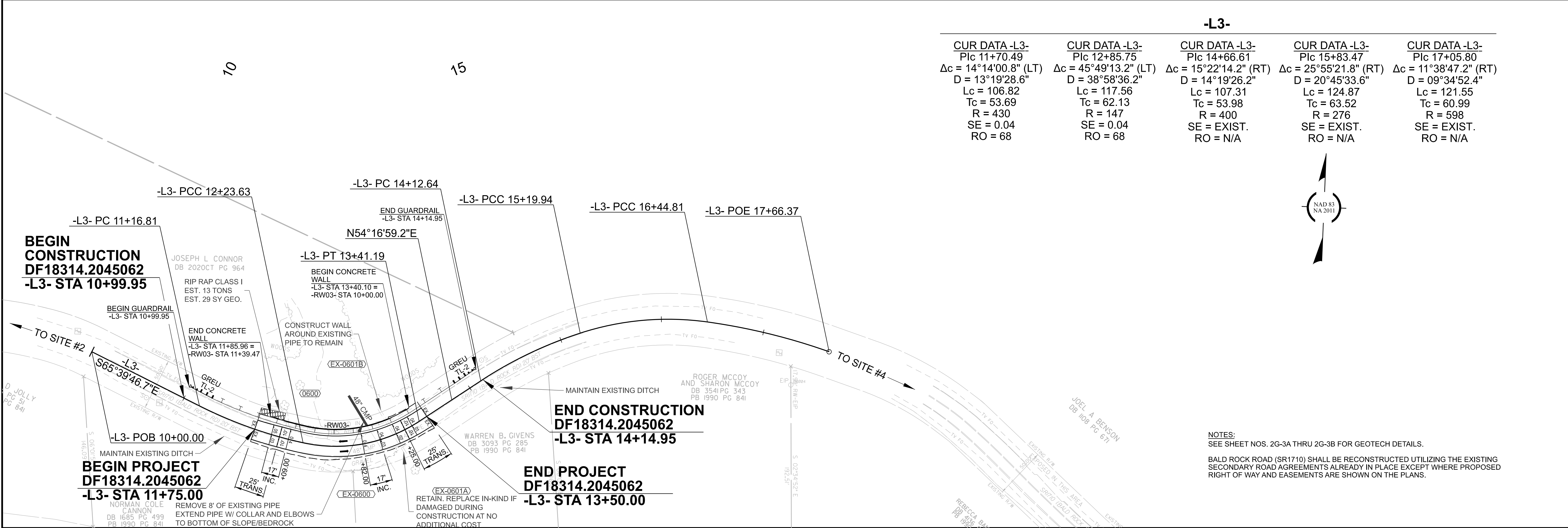
7/29/2025
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 039234
MARK HONEYCUTT

Signed by: *Jake Honeycutt*

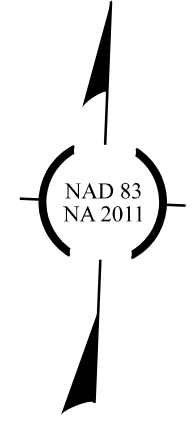
HYDRAULICS ENGINEER
7/29/2025
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 049338
ERIK P. AADLAND

Signed by: *Erik P. Aadland*

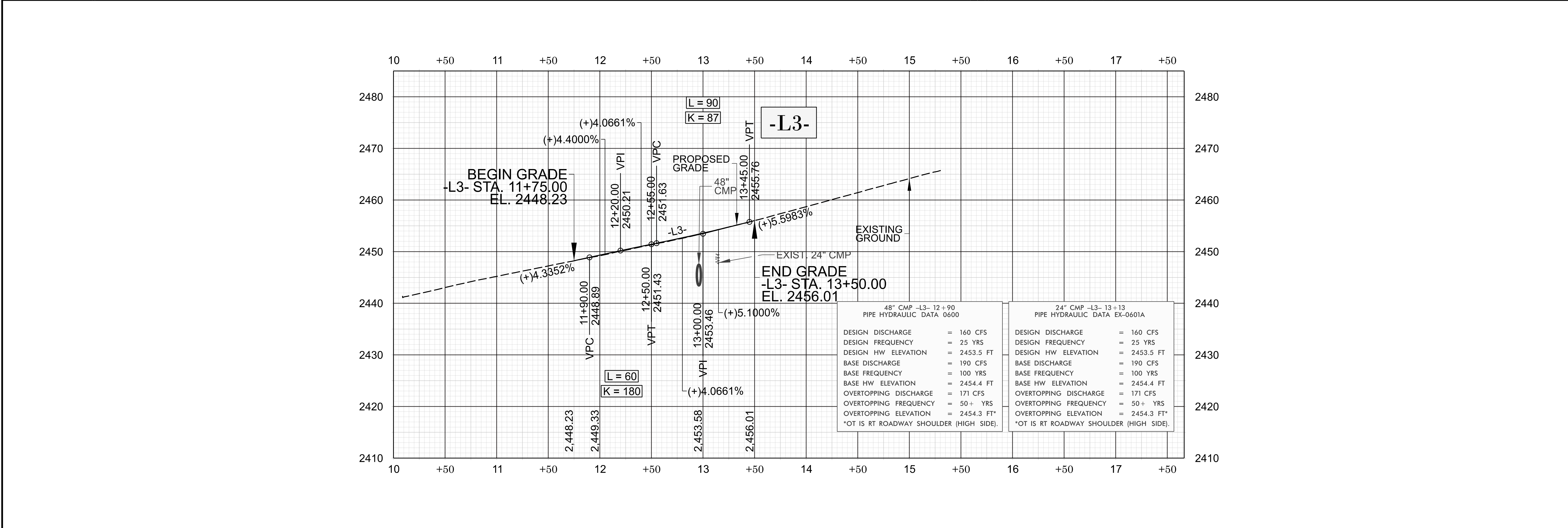
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KISINGER CAMPO & ASSOCIATES
NC FIRM LICENSE No: C-1506
301 Fayetteville St., Suite 1500
Raleigh, NC 27601
(919) 882-7839



-L3-					
CUR DATA -L3- P/c 11+70.49 $\Delta c = 14^\circ 14'00.8''$ (LT) D = 13°19'28.6" Lc = 106.82 Tc = 53.69 R = 430 SE = 0.04 RO = 68	CUR DATA -L3- P/c 12+85.75 $\Delta c = 45^\circ 49'13.2''$ (LT) D = 38°58'36.2" Lc = 117.56 Tc = 62.13 R = 147 SE = 0.04 RO = 68	CUR DATA -L3- P/c 14+66.61 $\Delta c = 15^\circ 22'14.2''$ (RT) D = 14°19'26.2" Lc = 107.31 Tc = 53.98 R = 400 SE = EXIST. RO = N/A	CUR DATA -L3- P/c 15+83.47 $\Delta c = 25^\circ 55'21.8''$ (RT) D = 20°45'33.6" Lc = 124.87 Tc = 63.52 R = 276 SE = EXIST. RO = N/A	CUR DATA -L3- P/c 17+05.80 $\Delta c = 11^\circ 38'47.2''$ (RT) D = 09°34'52.4" Lc = 121.55 Tc = 60.99 R = 598 SE = EXIST. RO = N/A	



NOTES:
SEE SHEET NOS. 2G-3A THRU 2G-3B FOR GEOTECH DETAILS.
BALD ROCK ROAD (SR1710) SHALL BE RECONSTRUCTED UTILIZING THE EXISTING SECONDARY ROAD AGREEMENTS ALREADY IN PLACE EXCEPT WHERE PROPOSED RIGHT OF WAY AND EASEMENTS ARE SHOWN ON THE PLANS.



DF18314.2045062

FINAL 06

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION HENDERSON COUNTY

11/14/23

ROADWAY DESIGN ENGINEER

8/26/2025

Professional Engineer Seal: MIKE T. HONEWELL, SEAL 039234

Professional Engineer Seal: ERIC P. RADLAND, SEAL 049338

HYDRAULICS ENGINEER

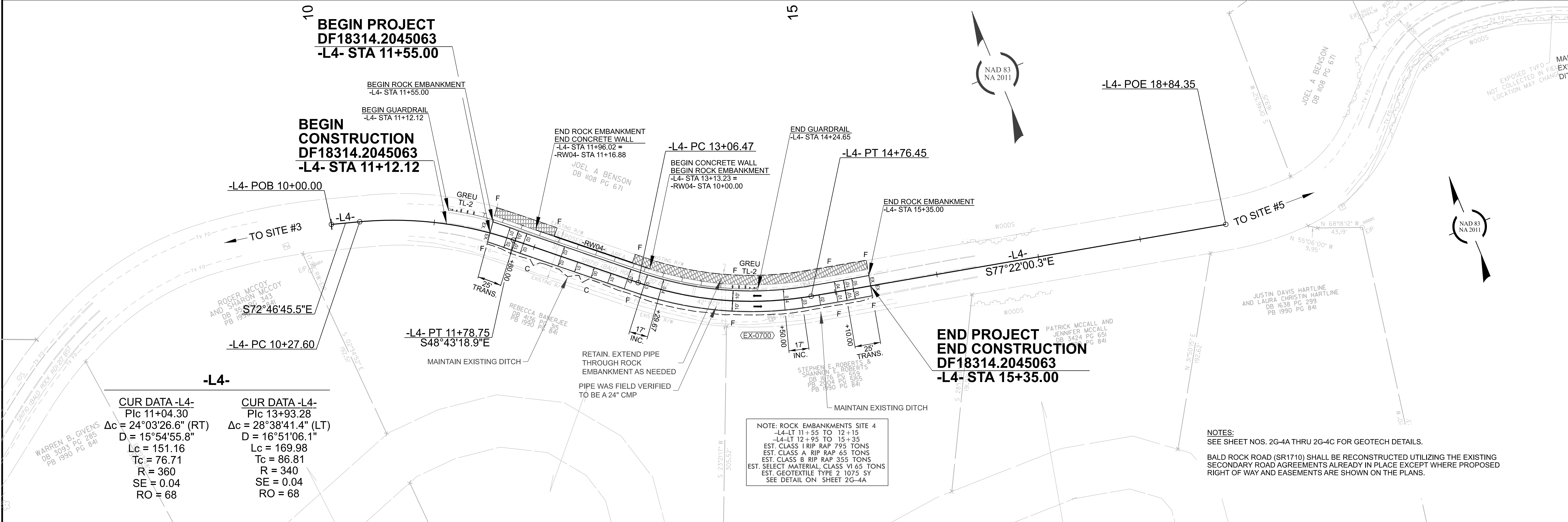
8/26/2025

Professional Engineer Seal: ERIC P. RADLAND, SEAL 049338

Prepared by: Eric P. Radland

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KISINGER CAMPO & ASSOCIATES

NC FIRM LICENSE No: C-1506
301 Fayetteville St., Suite 1500
Raleigh, NC 27601
(919)882-7839

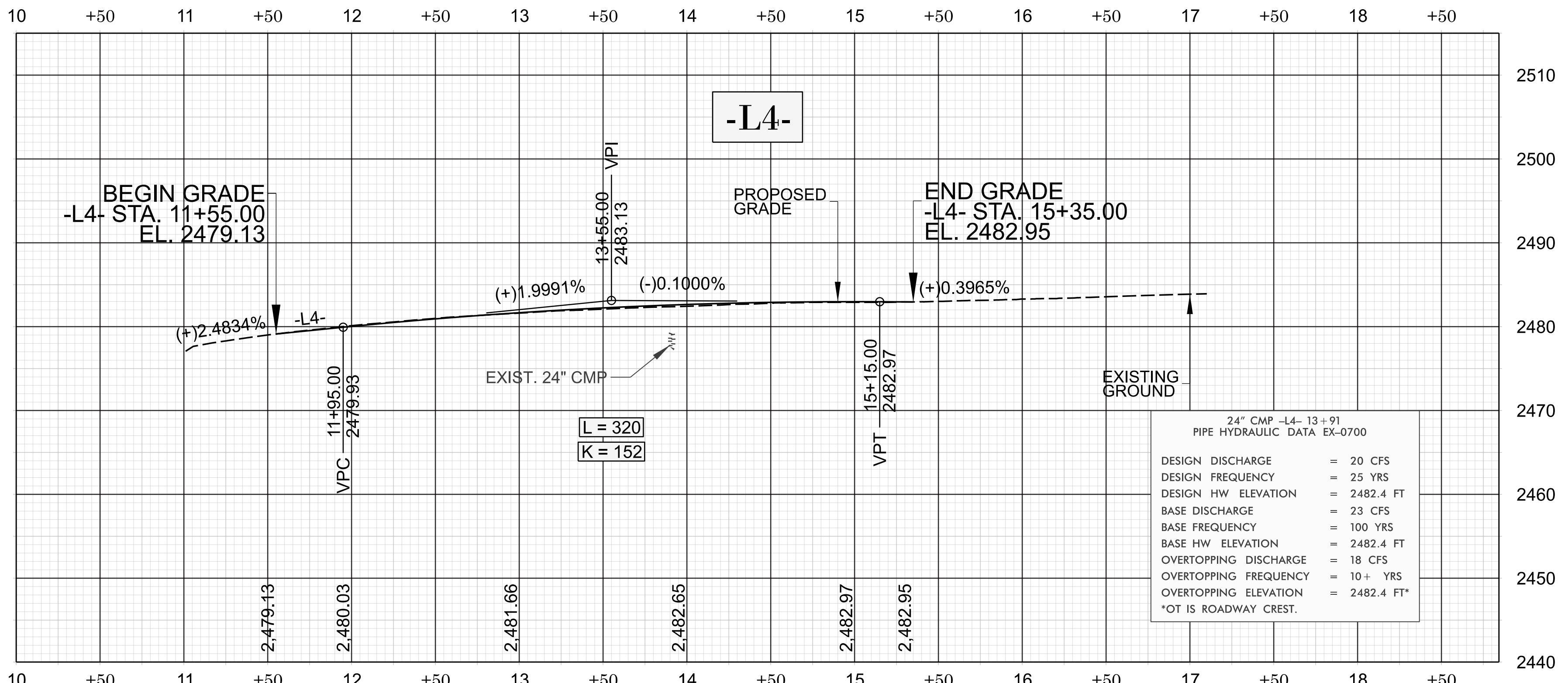


-L4-

CUR DATA -L4-	CUR DATA -L4-
Ptc 11+04.30	Ptc 13+93.28
$\Delta c = 24^{\circ}03'26.6''$ (RT)	$\Delta c = 28^{\circ}38'41.4''$ (LT)
D = 15°54'55.8"	D = 16°51'06.1"
Lc = 151.16	Lc = 169.98
Tc = 76.71	Tc = 86.81
R = 360	R = 340
SE = 0.04	SE = 0.04
RO = 68	RO = 68

NOTE: ROCK EMBANKMENTS SITE 4
 -L4-LT 11+55 TO 12+15
 -L4-LT 12+95 TO 15+35
 EST. CLASS 1 RIP RAP 795 TONS
 EST. CLASS A RIP RAP 65 TONS
 EST. CLASS B RIP RAP 355 TONS
 EST. SELECT MATERIAL, CLASS VI 65 TONS
 EST. GEOTEXTILE TYPE 2 1075 SY
 SEE DETAIL ON SHEET 2G-4A

NOTES:
 SEE SHEET NOS. 2G-4A THRU 2G-4C FOR GEOTECH DETAILS.
 BALD ROCK ROAD (SR1710) SHALL BE RECONSTRUCTED UTILIZING THE EXISTING SECONDARY ROAD AGREEMENTS ALREADY IN PLACE EXCEPT WHERE PROPOSED RIGHT OF WAY AND EASEMENTS ARE SHOWN ON THE PLANS.



DF18314.
2045063

FINAL 7

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDESON COUNTY

HIGHWAY DIVISION 14
ROADWAY DESIGN
ENGINEER

8/26/2025

SEAL
039234
MAKI HONEYCUTT

8/26/2025

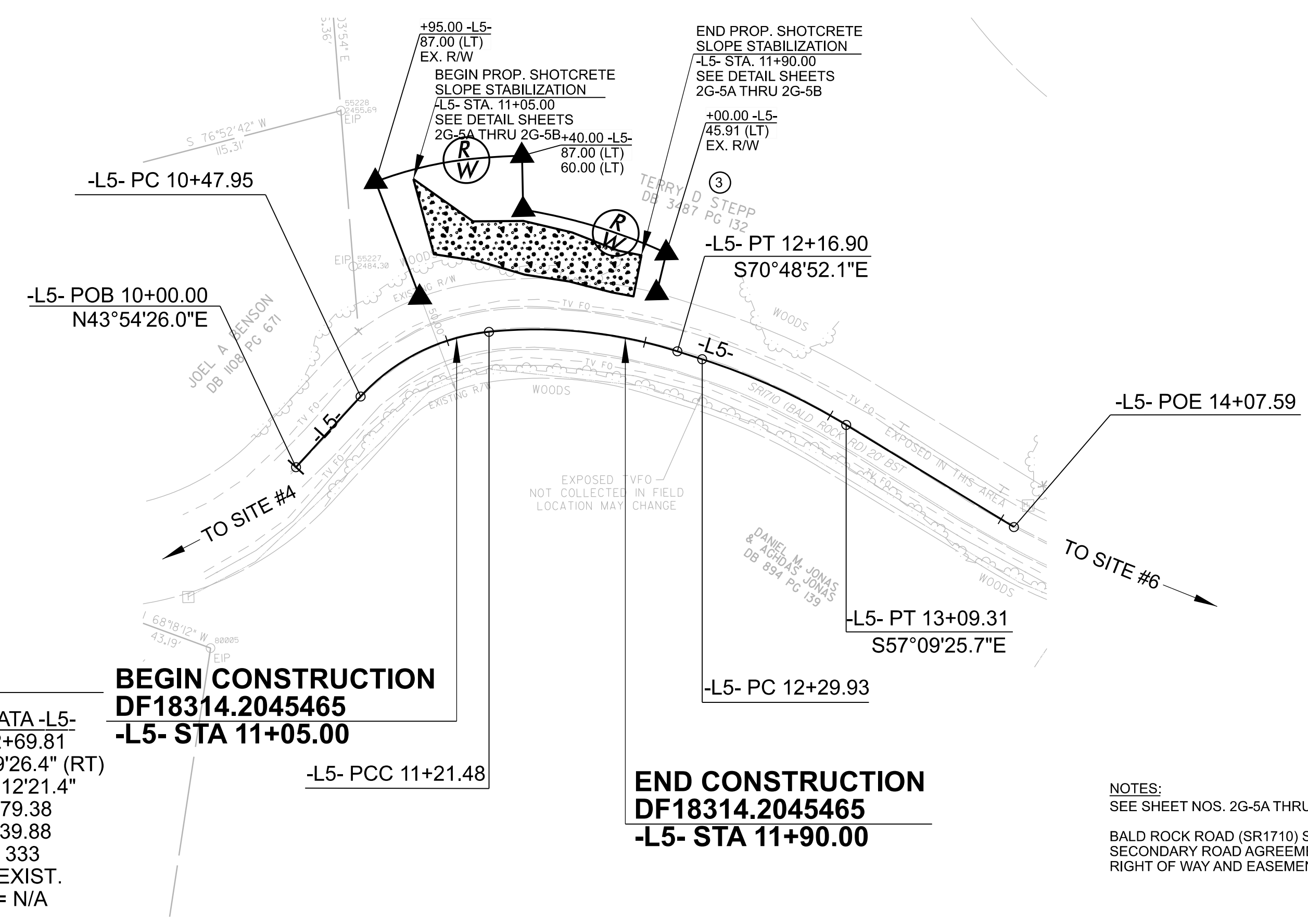
HYDRAULICS
ENGINEER

SEAL
049338
ERIK P. AADLAND

PREPARED BY
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KISINGER CAMPO
& ASSOCIATES

NC FIRM LICENSE No: C-1506
301 Fayetteville St.,
Suite 1500
Raleigh, NC 27601
(919)882-7839

02

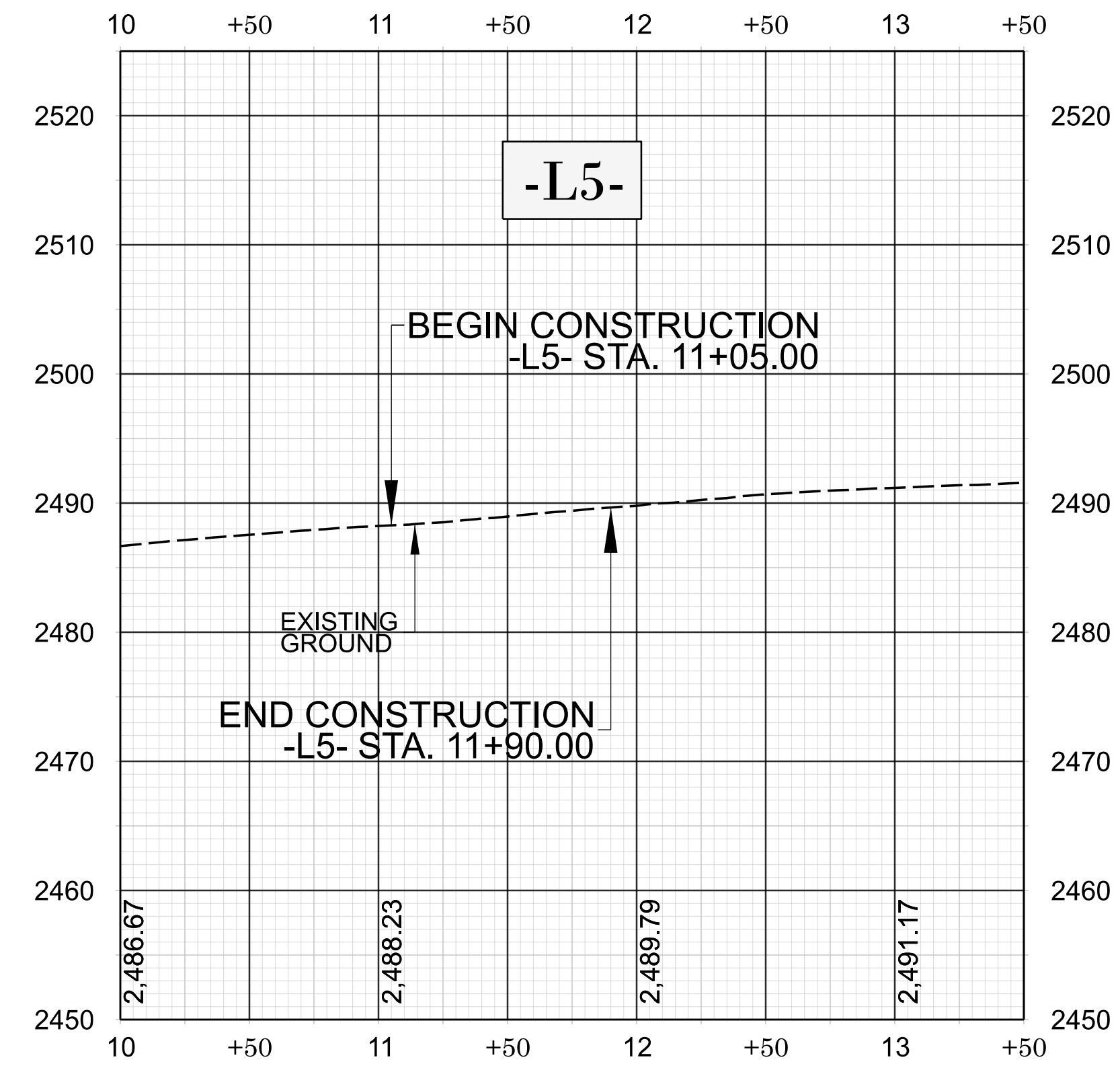


-L5-		
<u>CUR DATA -L5-</u> Plc 10+86.43 $\Delta c = 41^\circ 42' 49.5''$ (RT) D = 56°43'42.6" Lc = 73.53 Tc = 38.48 R = 101 SE = EXIST. RO = N/A	<u>CUR DATA -L5-</u> Plc 11+69.88 $\Delta c = 23^\circ 33' 52.5''$ (RT) D = 24°41'47.2" Lc = 95.42 Tc = 48.39 R = 232 SE = EXIST. RO = N/A	<u>CUR DATA -L5-</u> Plc 12+69.81 $\Delta c = 13^\circ 39' 26.4''$ (RT) D = 17°12'21.4" Lc = 79.38 Tc = 39.88 R = 333 SE = EXIST. RO = N/A

BEGIN CONSTRUCTION
DF18314.2045465
-L5- STA 11+05.00
-L5- PCC 11+21.48

END CONSTRUCTION
DF18314.2045465
-L5- STA 11+90.00

NOTES:
SEE SHEET NOS. 2G-5A THRU 2G-5B FOR GEOTECH DETAILS.
BALD ROCK ROAD (SR1710) SHALL BE RECONSTRUCTED UTILIZING THE EXISTING SECONDARY ROAD AGREEMENTS ALREADY IN PLACE EXCEPT WHERE PROPOSED RIGHT OF WAY AND EASEMENTS ARE SHOWN ON THE PLANS.



DF18314.2045465

FINAL 8

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION HENDERSON COUNTY

ROADWAY DESIGN ENGINEER

7/29/2025

SEAL 039234

Signature: Jackie Honeycutt

HYDRAULICS ENGINEER

7/29/2025

SEAL 049338

Signature: Erik P. Aadland

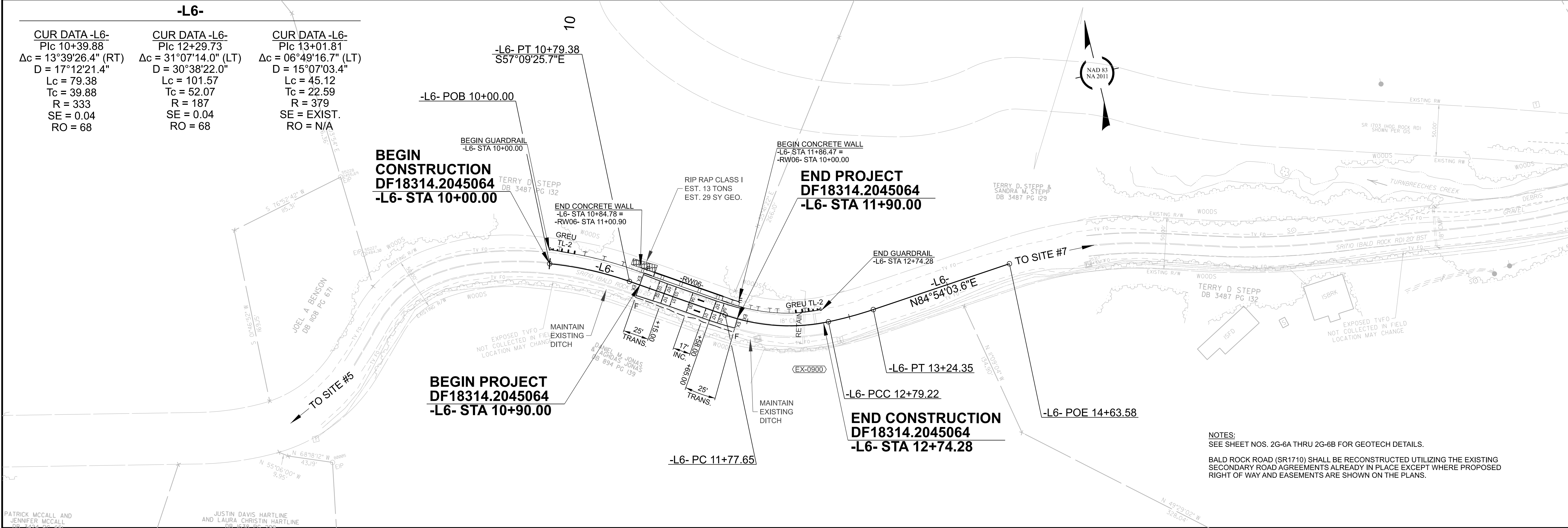
PREPARED BY

KCA

KISINGER CAMPO & ASSOCIATES

NC FIRM LICENSE No: C-1506
301 Fayetteville St., Suite 1500
Raleigh, NC 27601
(919) 882-7839

REVISIONS



DF18314.
2045064

FINAL 9

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDESON COUNTY

HIGHWAY DIVISION 14
ROADWAY DESIGN
ENGINEER

8/26/2025

PROFESSIONAL
ENGINEER
SEAL
039234
MARK HONEYCUTT

Signed by: *Mark Honeycutt*

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

HYDRAULICS
ENGINEER

8/26/2025

PROFESSIONAL
ENGINEER
SEAL
049338
ERIK P. AADLAND

Signed by: *Erik P. Aadland*

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KCA
KISINGER CAMPO
& ASSOCIATES

NC FIRM LICENSE No: C-1506
301 Fayetteville St.,
Suite 1500
Raleigh, NC 27601
(919) 882-7839

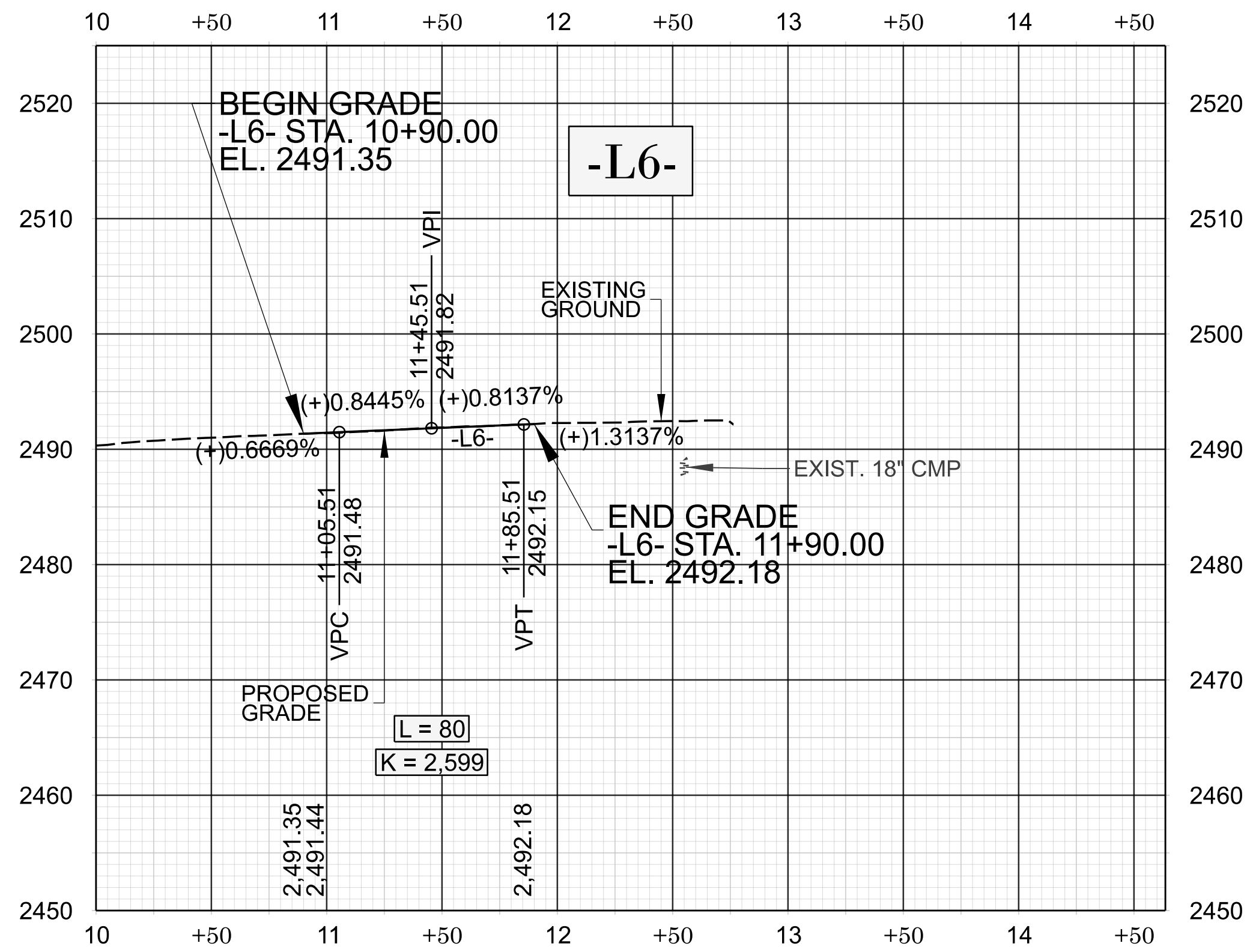
PATRICK MCCALL AND JENNIFER MCCALL

JUSTIN DAVIS HARTLINE AND LAURA CHRISTIN HARTLINE

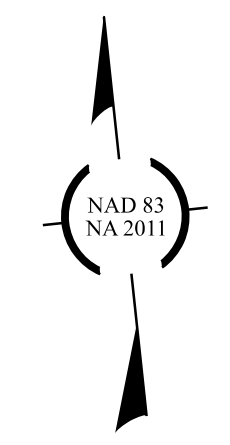
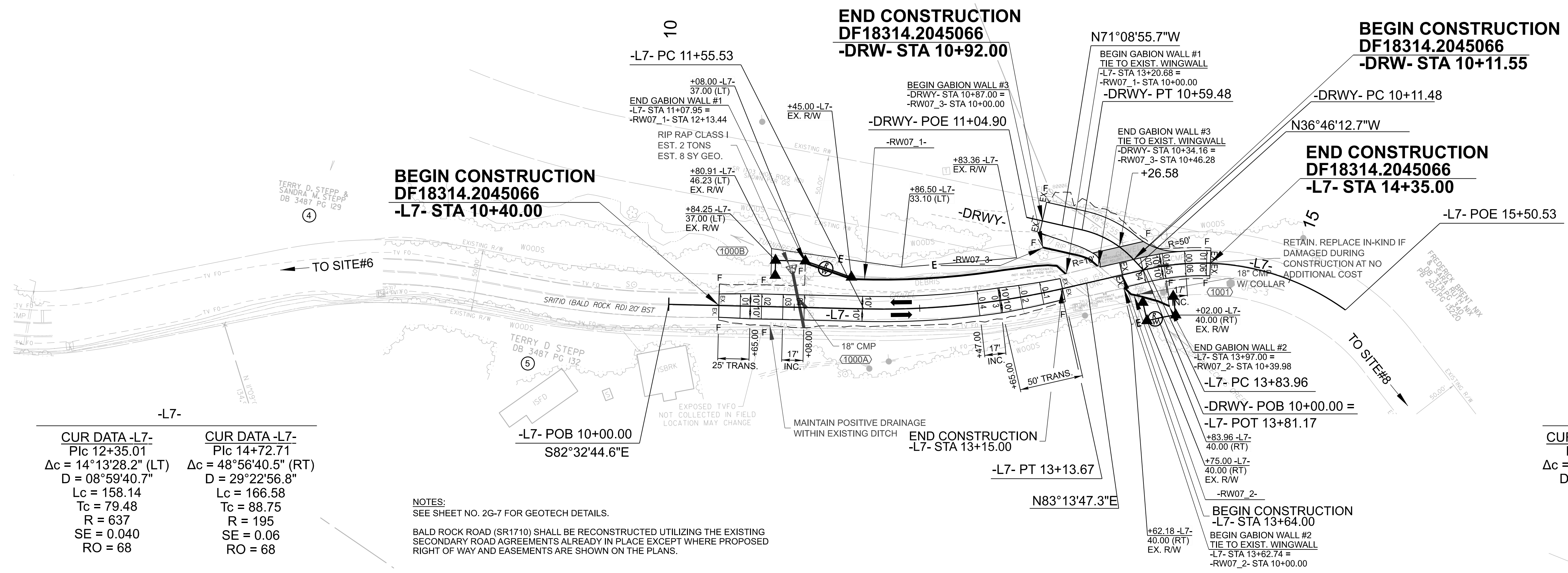
18" CMP -L6- 12+55
PIPE HYDRAULIC DATA EX-0900

DESIGN DISCHARGE	=	13 CFS
DESIGN FREQUENCY	=	25 YRS
DESIGN HW ELEVATION	=	2492.5 FT
BASE DISCHARGE	=	16 CFS
BASE FREQUENCY	=	100 YRS
BASE HW ELEVATION	=	2492.5 FT
OVERTOPPING DISCHARGE	=	11 CFS
OVERTOPPING FREQUENCY	=	10 +/- YRS
OVERTOPPING ELEVATION	=	2492.4 FT

*OT IS ROADWAY CREST.



REVISIONS



CUR DATA -L7-	
Pic 12+35.01	Pic 14+72.71
$\Delta c = 14^{\circ}13'28.2''$ (LT)	$\Delta c = 48^{\circ}56'40.5''$ (RT)
$D = 08^{\circ}59'40.7''$	$D = 29^{\circ}22'56.8''$
$Lc = 158.14$	$Lc = 166.58$
$Tc = 79.48$	$Tc = 88.75$
$R = 637$	$R = 195$
$SE = 0.040$	$SE = 0.06$
$RO = 68$	$RO = 68$

NOTES:
SEE SHEET NO. 2G-7 FOR GEOTECH DETAILS.
BALD ROCK ROAD (SR1710) SHALL BE RECONSTRUCTED UTILIZING THE EXISTING SECONDARY ROAD AGREEMENTS ALREADY IN PLACE EXCEPT WHERE PROPOSED RIGHT OF WAY AND EASEMENTS ARE SHOWN ON THE PLANS.

DF18314.2045066
FINAL 10

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION HENDERSON COUNTY

ROADWAY DESIGN ENGINEER

3/26/2025

SEAL 039234

MAKI HONEYCUTT

HYDRAULICS ENGINEER

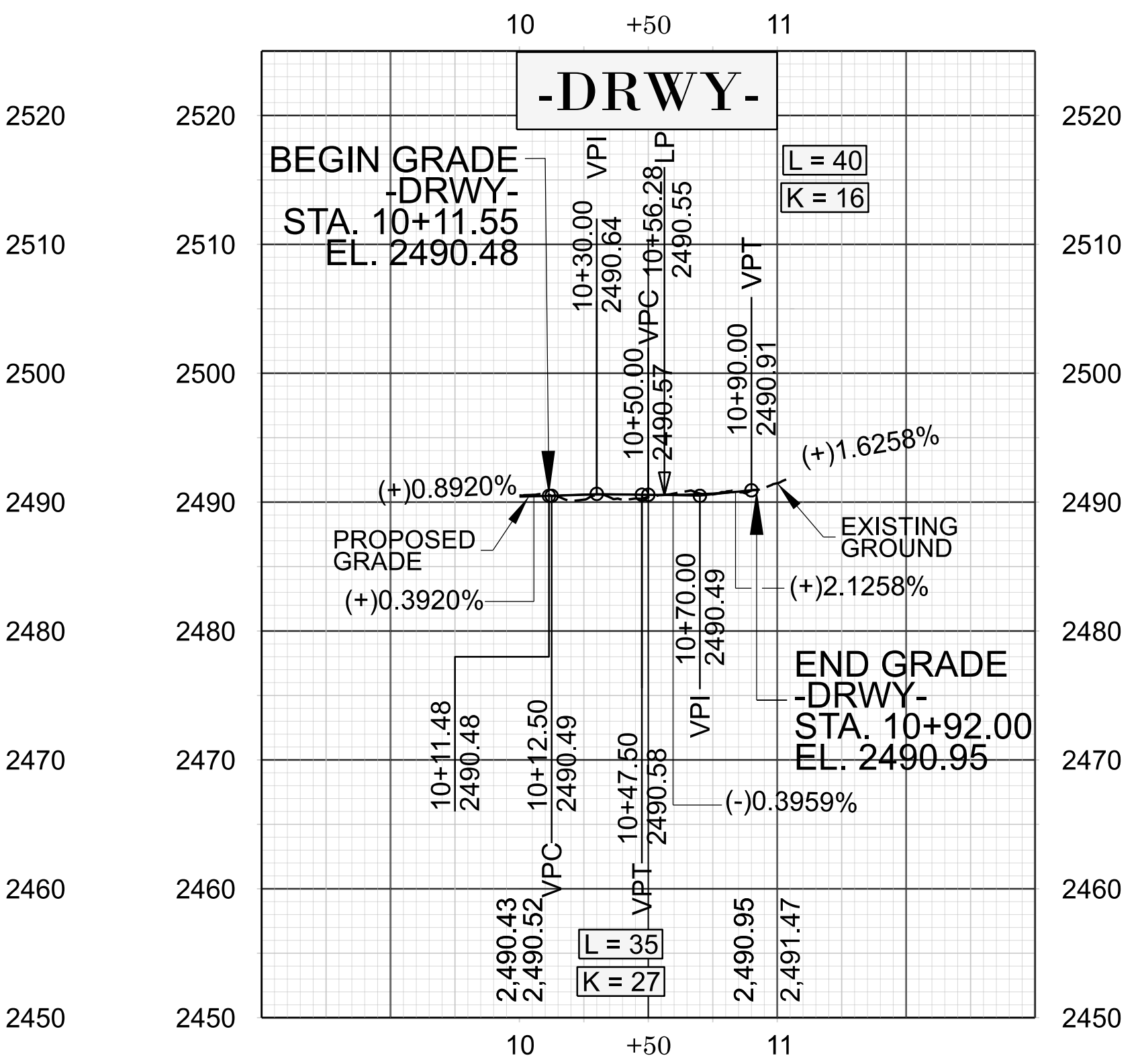
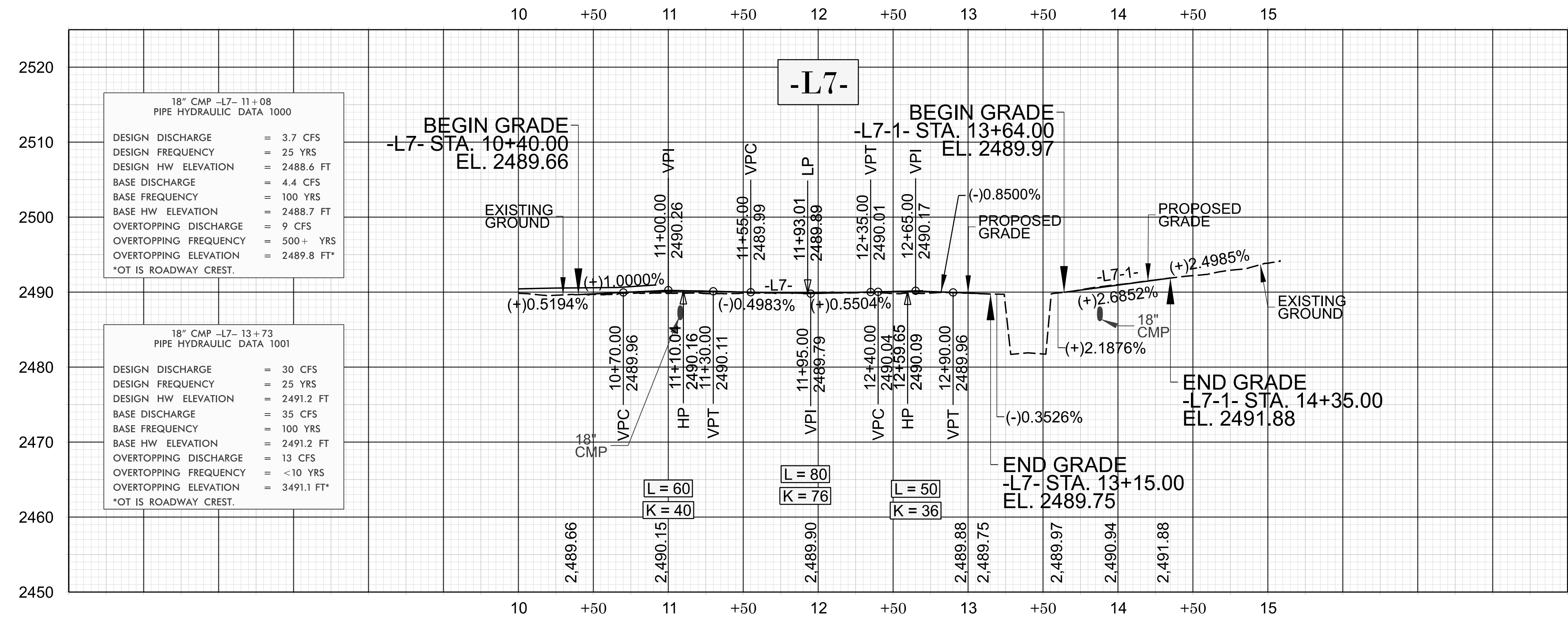
3/26/2025

SEAL 049338

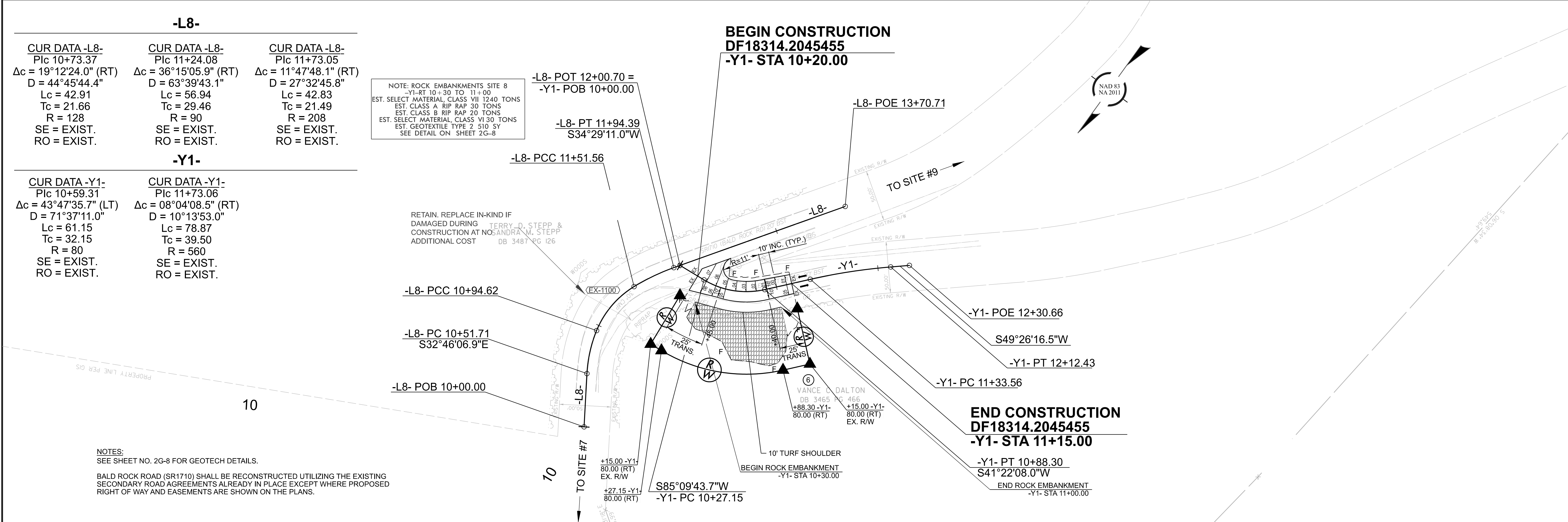
ERIK P. AADLAND

Prepared by Erik P. Aadland

KCA
KISINGER CAMPO & ASSOCIATES
NC FIRM LICENSE No: C-1506
301 Fayetteville St., Suite 1500
Raleigh, NC 27601
(919) 882-7839



REVISIONS



-L8-

CUR DATA -L8-	CUR DATA -L8-	CUR DATA -L8-
Pic 10+73.37	Pic 11+24.08	Pic 11+73.05
$\Delta c = 19^\circ 12' 24.0''$ (RT)	$\Delta c = 36^\circ 15' 05.9''$ (RT)	$\Delta c = 11^\circ 47' 48.1''$ (RT)
D = 44°45'44.4"	D = 63°39'43.1"	D = 27°32'45.8"
Lc = 42.91	Lc = 56.94	Lc = 42.83
Tc = 21.66	Tc = 29.46	Tc = 21.49
R = 128	R = 90	R = 208
SE = EXIST.	SE = EXIST.	SE = EXIST.
RO = EXIST.	RO = EXIST.	RO = EXIST.

-Y1-

CUR DATA -Y1-	CUR DATA -Y1-
Pic 10+59.31	Pic 11+73.06
$\Delta c = 43^\circ 47' 35.7''$ (LT)	$\Delta c = 08^\circ 04' 08.5''$ (RT)
D = 71°37'11.0"	D = 10°13'53.0"
Lc = 61.15	Lc = 78.87
Tc = 32.15	Tc = 39.50
R = 80	R = 560
SE = EXIST.	SE = EXIST.
RO = EXIST.	RO = EXIST.

NOTE: ROCK EMBANKMENTS SITE 8
 -Y1-RT 10+30 TO 11+00
 EST. SELECT MATERIAL, CLASS VII 1240 TONS
 EST. CLASS A RIP RAP 30 TONS
 EST. CLASS B RIP RAP 20 TONS
 EST. SELECT MATERIAL, CLASS VI 30 TONS
 EST. GEOTEXTILE TYPE 2 510 SY
 SEE DETAIL ON SHEET 2G-8

RETAIN, REPLACE IN-KIND IF
 DAMAGED DURING CONSTRUCTION AT
 TERRY D. STEPP & ASSOCIATES
 ANDRAN M. STEPP
 ADDITIONAL COST DB 3487 PG 126

NOTES:
 SEE SHEET NO. 2G-8 FOR GEOTECH DETAILS.
 BALD ROCK ROAD (SR1710) SHALL BE RECONSTRUCTED UTILIZING THE EXISTING
 SECONDARY ROAD AGREEMENTS ALREADY IN PLACE EXCEPT WHERE PROPOSED
 RIGHT OF WAY AND EASEMENTS ARE SHOWN ON THE PLANS.

DF18314.
2045455

FINAL II

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY

HIGHWAY DIVISION 14
ROADWAY DESIGN
ENGINEER

7/29/2025

SEAL
039234
MATT HONEYCUTT
ENGINEER

Signed by: *Jakei Honeycutt*

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HYDRAULICS
ENGINEER

7/29/2025

SEAL
049338
ERIK P. AADLAND
ENGINEER

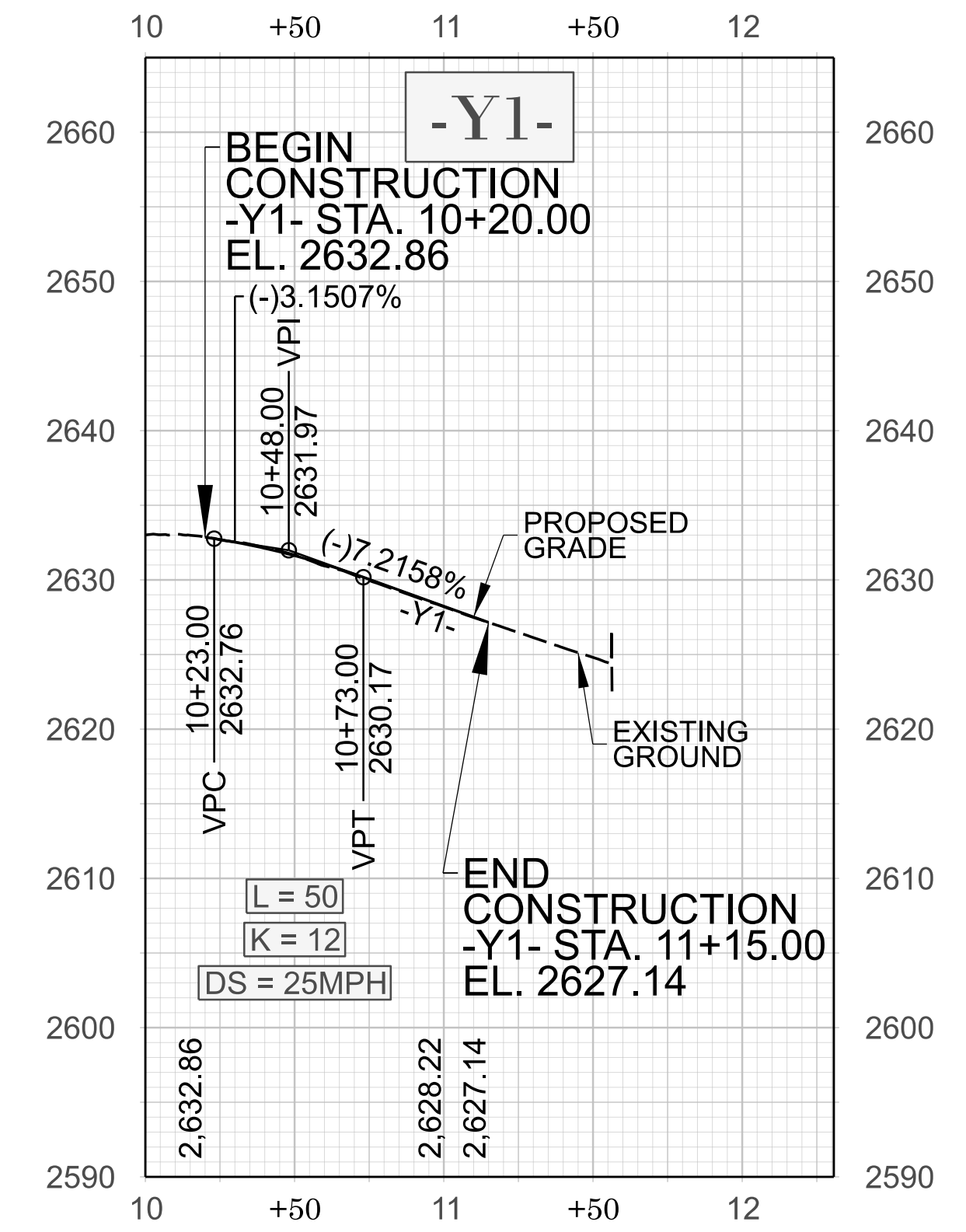
Signed by: *Erik P. Aadland*

151095624802481
PREPARED BY
KCA
KISINGER CAMPO
& ASSOCIATES
NC FIRM LICENSE No: C-1506
301 Fayetteville St.,
Suite 1500
Raleigh, NC 27601
(919) 882-7839

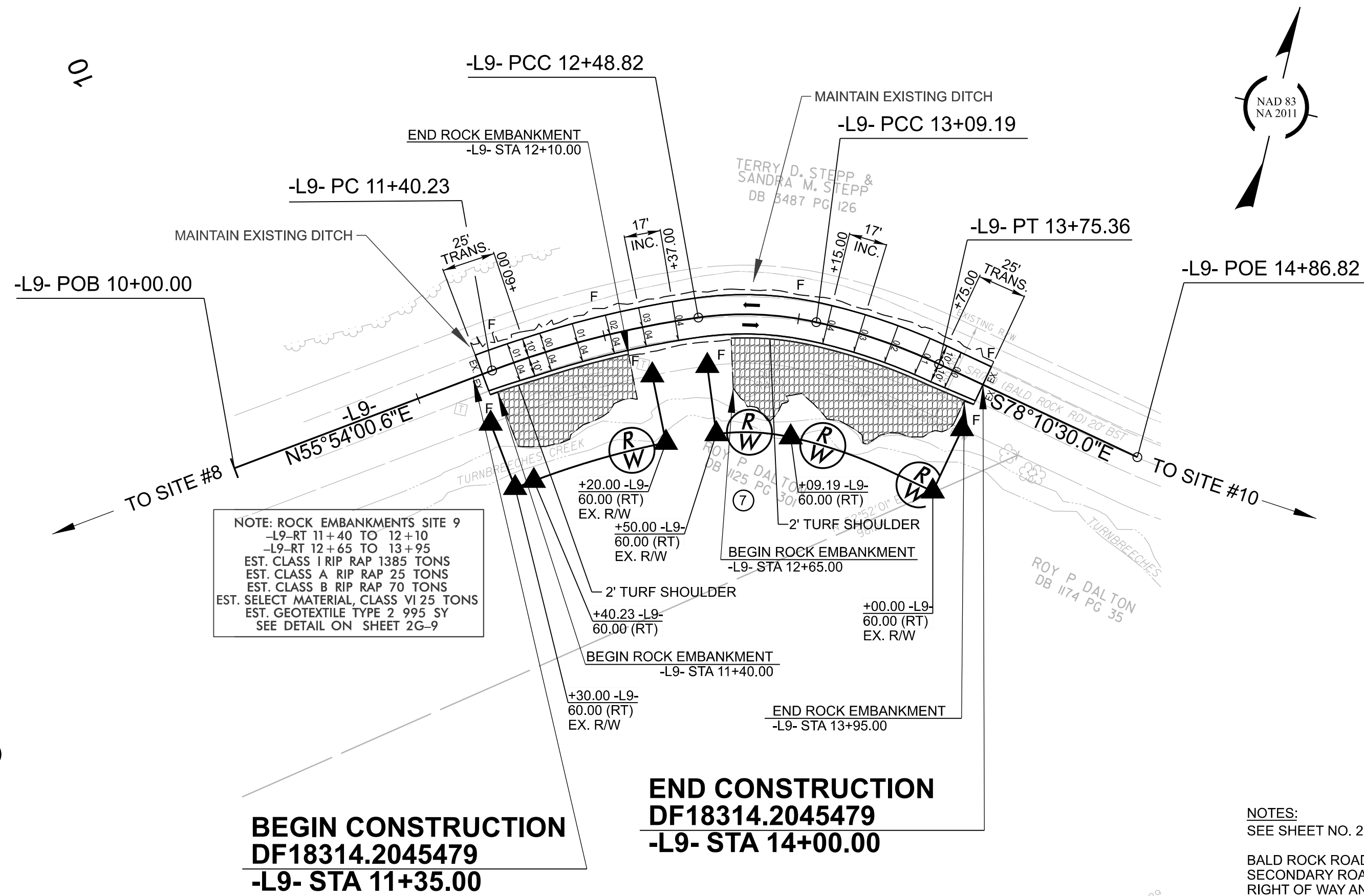
30" CMP -L8- 11+20
PIPE HYDRAULIC DATA EX-1100

DESIGN DISCHARGE	=	34 CFS
DESIGN FREQUENCY	=	25 YRS
DESIGN HW ELEVATION	=	2625.6 FT
BASE DISCHARGE	=	41 CFS
BASE FREQUENCY	=	100 YRS
BASE HW ELEVATION	=	2626.8 FT
OVERTOPPING DISCHARGE	=	54 CFS
OVERTOPPING FREQUENCY	=	500+ YRS
OVERTOPPING ELEVATION	=	2629.6 FT

*OT IS LT ROADWAY SHOULDER (HIGH SIDE).

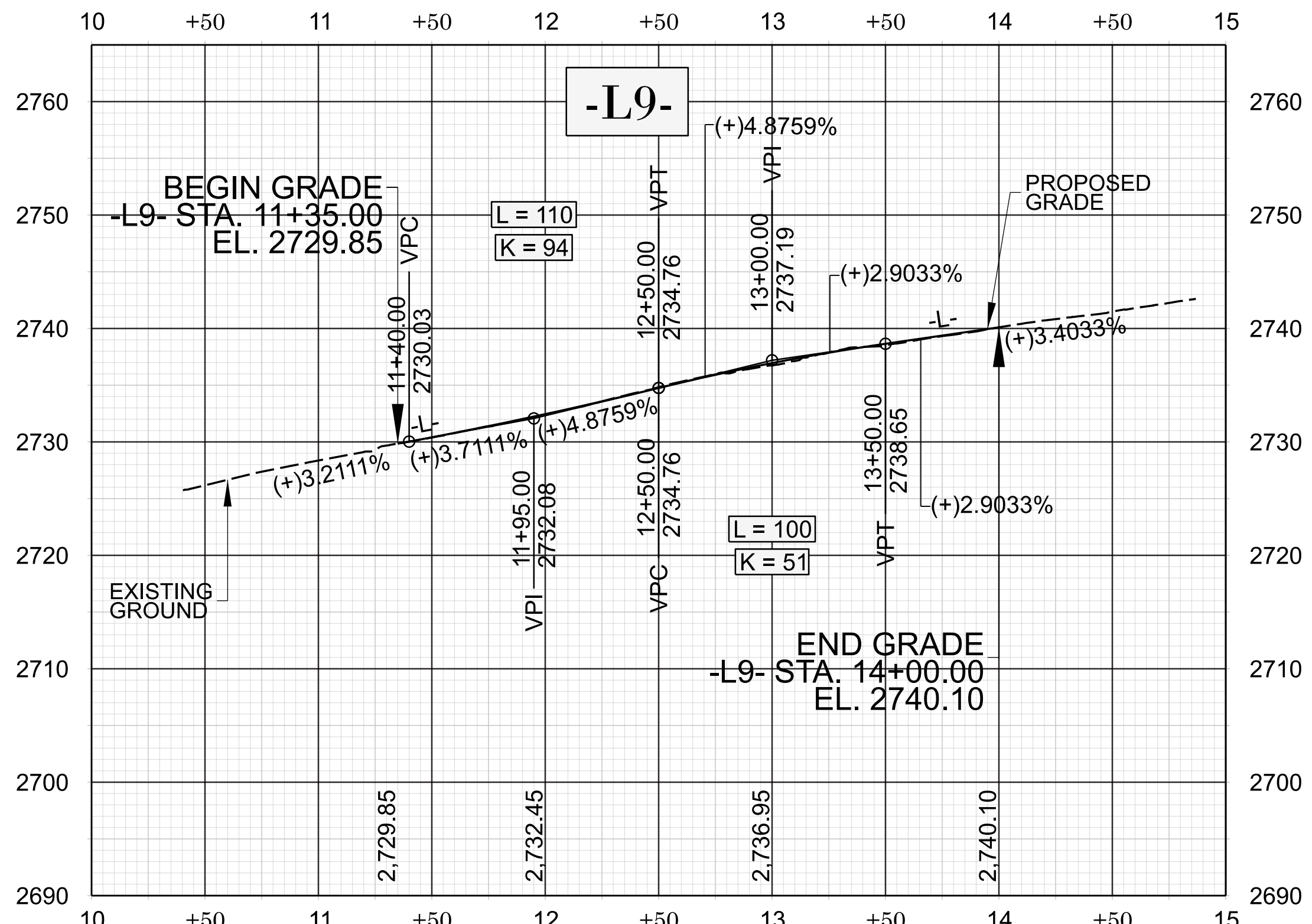


REVISIONS



NOTE: ROCK EMBANKMENTS SITE 9
-L9-RT 11+40 TO 12+10
-L9-RT 12+65 TO 13+95
EST. CLASS 1 RIP RAP 1385 TONS
EST. CLASS A RIP RAP 25 TONS
EST. CLASS B RIP RAP 70 TONS
EST. SELECT MATERIAL CLASS VI 25 TONS
EST. GEOTEXTILE TYPE 2 995 SY
SEE DETAIL ON SHEET 2G-9

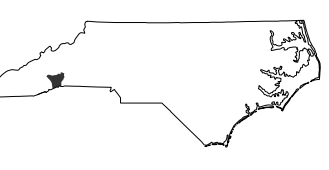
-L9-		
CUR DATA -L9- P/c 11+94.74	CUR DATA -L9- P/c 12+79.33	CUR DATA -L9- P/c 13+42.41
$\Delta c = 12^\circ 41' 49.8''$ (RT)	$\Delta c = 20^\circ 35' 29.2''$ (RT)	$\Delta c = 12^\circ 38' 10.3''$ (RT)
D = 11°41'34.9"	D = 34°06'16.7"	D = 19°05'54.9"
Lc = 108.59	Lc = 60.38	Lc = 66.16
Tc = 54.52	Tc = 30.52	Tc = 33.22
R = 490	R = 168	R = 300
SE = 0.04	SE = 0.04	SE = 0.04
RO = 68	RO = 68	RO = 68



DF18314.
2045479

FINAL 12

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY



HIGHWAY DIVISION 14
ROADWAY DESIGN
ENGINEER

7/29/2025



Signed by: J. H. Honeycutt

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HYDRAULICS
ENGINEER

7/29/2025



Signed by: Erik P. Aadland

PREPARED BY



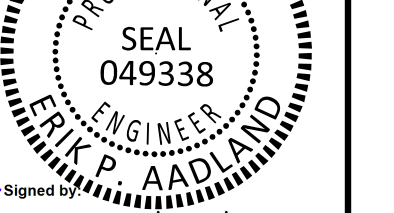
NC FIRM LICENSE No: C-1506
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Suite 1500
Raleigh, NC 27601
(919)882-7839

REVISIONS



Signed by: *J. Honeycutt*

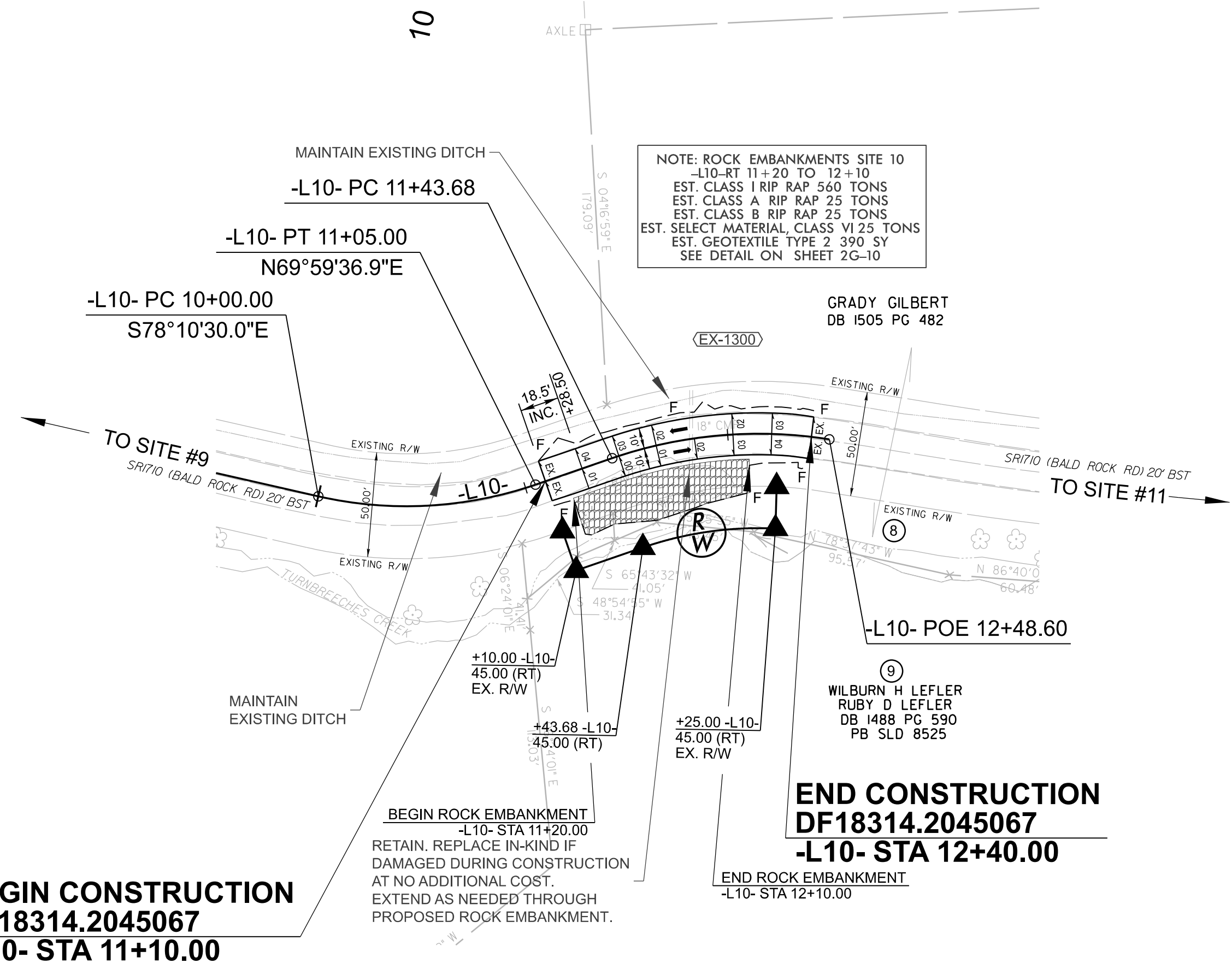
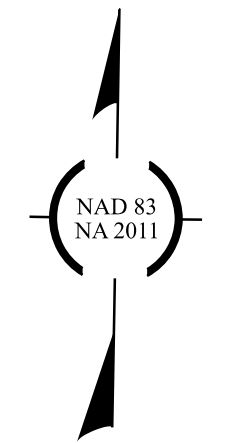
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Raleigh, NC 27601
(919) 882-7839



NOTE: ROCK EMBANKMENTS SITE 10
-L10-RT 11+20 TO 12+10
EST. CLASS I RIP RAP 560 TONS
EST. CLASS A RIP RAP 25 TONS
EST. CLASS B RIP RAP 25 TONS
EST. SELECT MATERIAL CLASS VI 25 TONS
EST. GEOTEXTILE TYPE 2 390 SY
SEE DETAIL ON SHEET 2G-10

END CONSTRUCTION
DF18314.2045067
-L10- STA 12+40.00

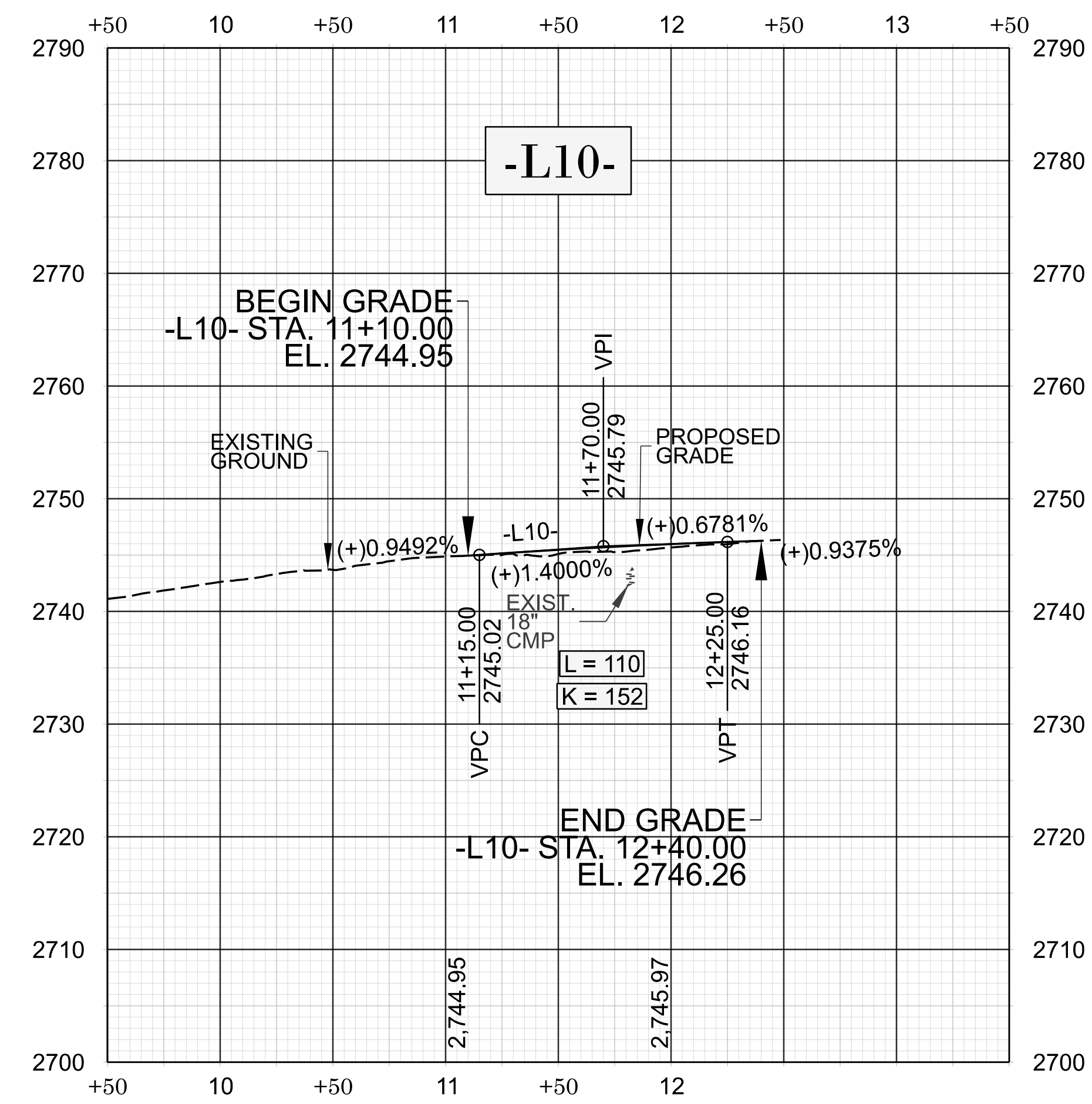
BEGIN CONSTRUCTION
DF18314.2045067
-L10- STA 11+10.00

NOTES:
SEE SHEET NO. 2G-10 FOR GEOTECH DETAILS.

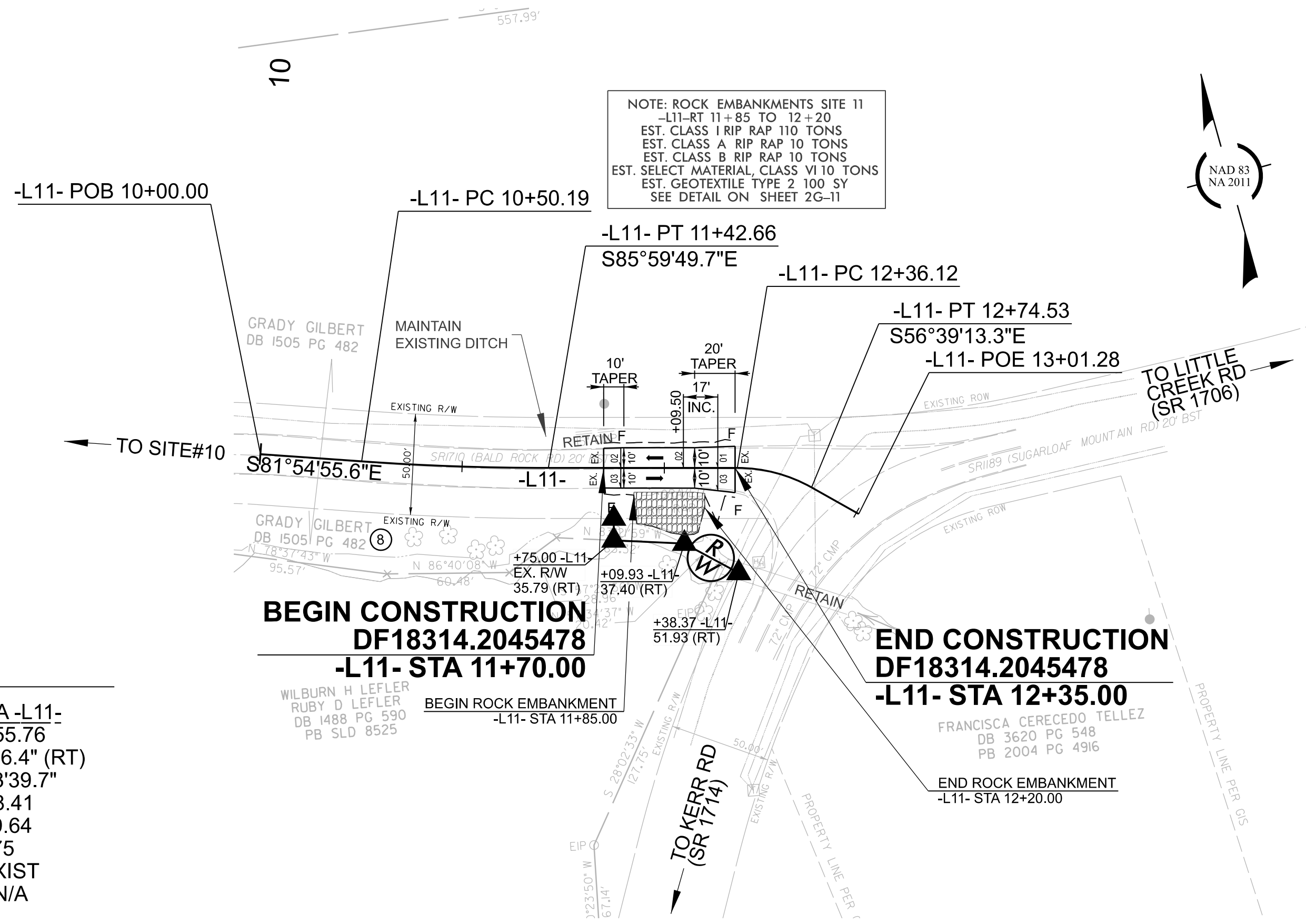
BALD ROCK ROAD (SR1710) SHALL BE RECONSTRUCTED UTILIZING THE EXISTING
SECONDARY ROAD AGREEMENTS ALREADY IN PLACE EXCEPT WHERE PROPOSED
RIGHT OF WAY AND EASEMENTS ARE SHOWN ON THE PLANS.

-L10-	
CUR DATA -L10- P/c 10+53.89 $\Delta c = 31^\circ 49' 53.2''$ (LT) D = 30°18'54.8" Lc = 105.00 Tc = 53.89 R = 189 SE = EXIST. RO = N/A	CUR DATA -L10- P/c 11+97.21 $\Delta c = 28^\circ 05' 27.5''$ (RT) D = 26°46'25.4" Lc = 104.92 Tc = 53.54 R = 214 SE = EXIST. RO = N/A

18" CMP -L10- 11+82 PIPE HYDRAULIC DATA EX-1300	
DESIGN DISCHARGE	= 13 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 2475.9 FT
BASE DISCHARGE	= 15 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 2745.9 FT
OVERTOPPING DISCHARGE	= 10 CFS
OVERTOPPING FREQUENCY	= 10 +/- YRS
OVERTOPPING ELEVATION	= 2745.80 FT*
*OT IS ROADWAY CREST.	

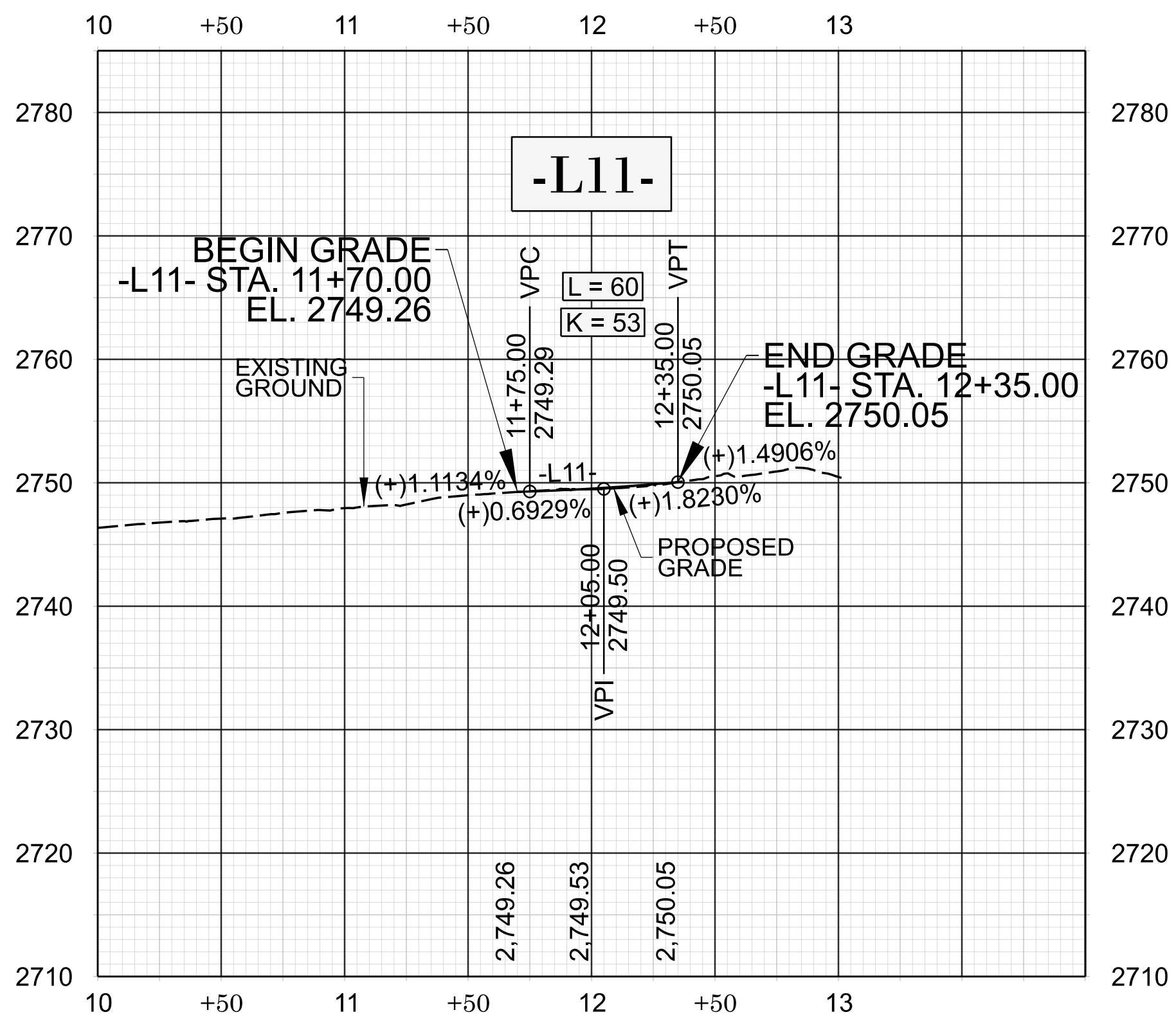


REVISIONS



-L11-	
<u>CUR DATA -L11-</u>	<u>CUR DATA -L11-</u>
Pic 10+96.44	Pic 12+55.76
$\Delta c = 04^{\circ}04'54.1''$ (LT)	$\Delta c = 29^{\circ}20'36.4''$ (RT)
D = $04^{\circ}24'51.0''$	D = $76^{\circ}23'39.7''$
Lc = 92.47	Lc = 38.41
Tc = 46.25	Tc = 19.64
R = 1,298	R = 75
SE = EXIST	SE = EXIST
RO = N/A	RO = N/A

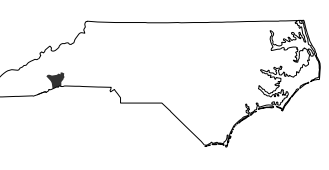
NOTES:
 SEE SHEET NO. 2G-11 FOR GEOTECH DETAILS.
 BALD ROCK ROAD (SR1710) SHALL BE RECONSTRUCTED UTILIZING THE EXISTING SECONDARY ROAD AGREEMENTS ALREADY IN PLACE EXCEPT WHERE PROPOSED RIGHT OF WAY AND EASEMENTS ARE SHOWN ON THE PLANS.



DF18314.
2045478

FINAL 14

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDESON COUNTY



HIGHWAY DIVISION 14
ROADWAY DESIGN
ENGINEER

7/29/2025



Signed by: Jackie Honeycutt

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HYDRAULICS
ENGINEER

7/29/2025



Signed by: Erik P. Aadland

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