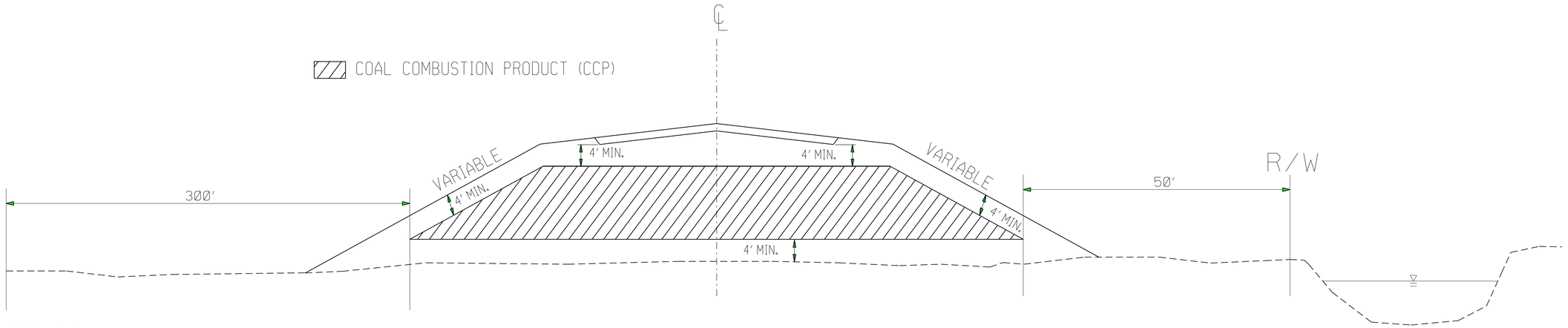
PROJECT REFERENCE NO.	SHEET NO.
B-5980	2C-5

COAL COMBUSTION PRODUCT PLACEMENT



PLACE CCP IN HATCHED AREA IN ACCORDANCE WITH THE PROJECT SPECIAL PROVISIONS

PLACE CCP A MINIMUM OF 5' ABOVE SEASONAL HIGH GROUND WATER

PLACE AT LOCATIONS AS APPROVED BY THE ENGINEER

PLACE SOIL BORROW MATERIAL ON THE OUTSIDE OF CCP AS EACH LIFT OF CCP IS PLACED

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton
4/15/2020

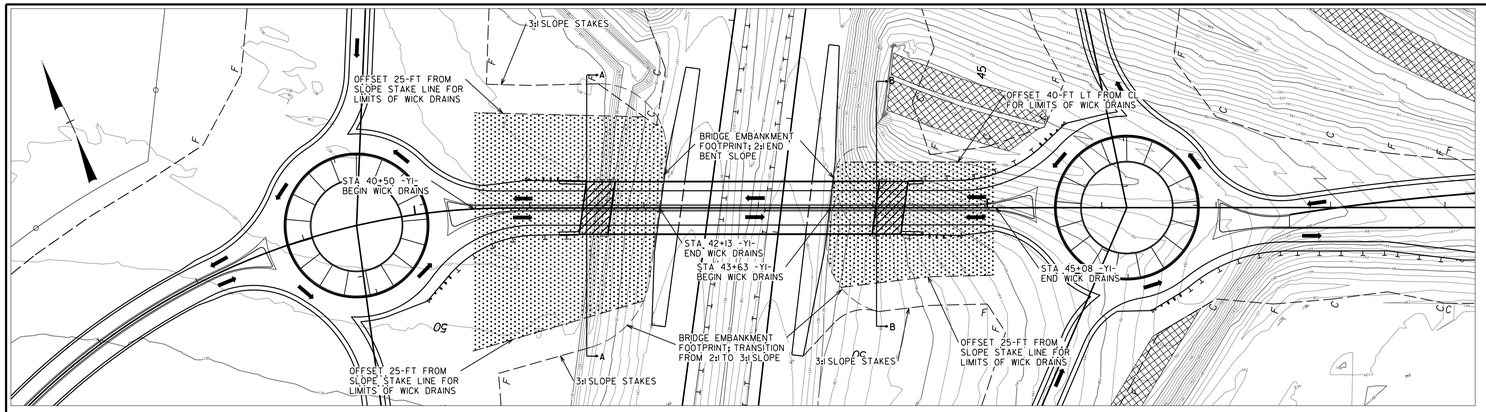
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

COAL COMBUSTION PRODUCT PLACEMENT DETAIL

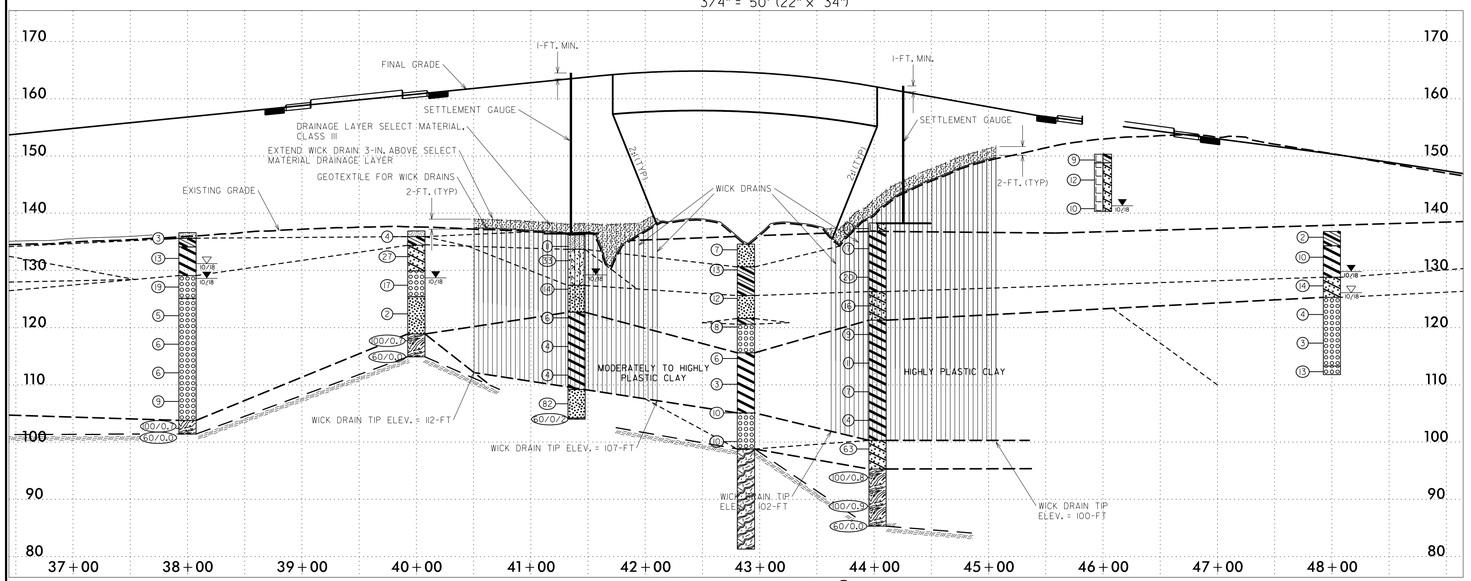
ORIGINAL BY: J.S.H. DATE: 3/16/15
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: joel/coal combustion material detail.dgn

07-SEP-2017 08:21
S:\Contracts\Special Details\jhowerton\Coal Combustion Product Detail.dgn
jhowerton AT CSD-292595



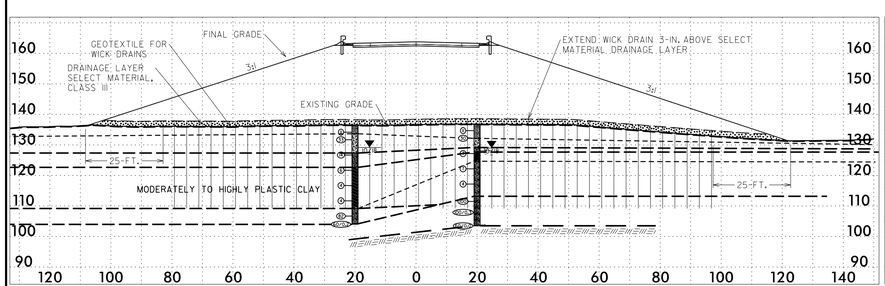
EMBANKMENT PLAN VIEW

3/4" = 50' (22" x 34")



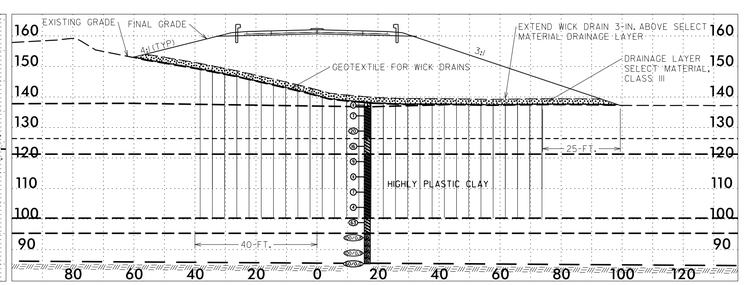
SECTION ALONG ℄ -Y1-

3/4" = 50' HORIZ. (5:1 VE) (22" x 34")



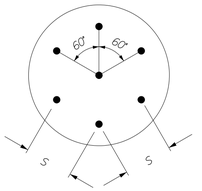
A-A CROSS SECTION

1" = 25' (22" x 34")



B-B CROSS SECTION

1" = 25' (22" x 34")



FOR WICK DRAIN SPACING, S SEE TABLE

PROJECT REFERENCE NO.	SHEET NO.
B-5980	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 045161 ENGINEER RYAN PATRICK DOYLE

Docusigned by: Ryan Patrick Doyle
SIGNATURE 4/15/2020 DATE

GEOTECHNICAL ENGINEER
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

WICK DRAIN SYSTEM CONFIGURATION				
STATIONS		LINE	WICK DRAIN SPACING, S	MINIMUM WAITING PERIOD
FROM	TO			
40 + 50	42 + 13	- Y1 -	4 FT.	6 MONTHS
43 + 63	45 + 08	- Y1 -	4 FT.	6 MONTHS

NOTES

1. FOR WICK DRAINS, SEE INSTALLATION OF VERTICAL WICK DRAINS AND DRAINAGE LAYER SPECIAL PROVISION.
2. GEOTEXTILE FOR WICK DRAINS SHALL BE PLACED ON EXISTING GROUND AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
3. THE DRAINAGE LAYER OF SELECT MATERIAL CLASS III SHALL BE INSTALLED AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
4. INSTALL WICK DRAINS AS DIRECTED BY PROVISIONS, PLANS, AND/OR ENGINEER AFTER THE SELECT BACKFILL HAS BEEN PLACED AND COMPACTED. WICK DRAINS SHALL PENETRATE THE BACKFILL AND SHALL BE INSTALLED TO THE LENGTH SHOWN ON THE PLANS AND/OR DIRECTED BY THE ENGINEER.
5. PRE-AUGERING MAY BE REQUIRED TO INSTALL THE WICK DRAINS. IF PRE-AUGERING IS NECESSARY, THE COST OF PRE-AUGERING IS INCIDENTAL TO THE COST OF THE WICK DRAINS.
6. CONSTRUCT EMBANKMENT TO THE FINAL GRADE.
7. MAINTAIN EMBANKMENT ELEVATIONS THROUGHOUT THE WAITING PERIODS.
8. FOR SETTLEMENT GAUGE, SEE SECTION 235 OF STANDARD SPECIFICATION AND ROADWAY STANDARD DRAWING NO. 235.01.
9. WAITING PERIOD BEGINS AFTER INSTALLING EMBANKMENT.

ESTIMATED QUANTITIES	
WICK DRAINS	108,000 FT.
SELECT MATERIAL, CLASS III	3,600 CY.
GEOTEXTILE FOR WICK DRAINS	5,000 SY.

PREPARED BY: RPD	DATE: 03/19/19
REVIEWED BY: ZAA	DATE: 03/19/19

AECOM

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

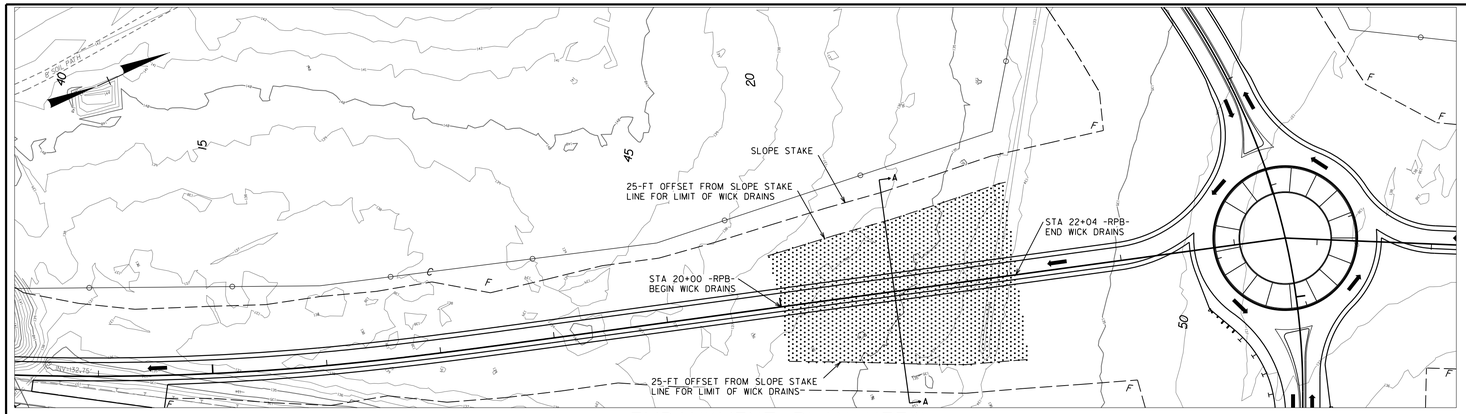
GEOTECHNICAL ENGINEERING UNIT

WICK DRAIN DETAILS - Y1 - BRIDGE OVER I-95

REVISIONS

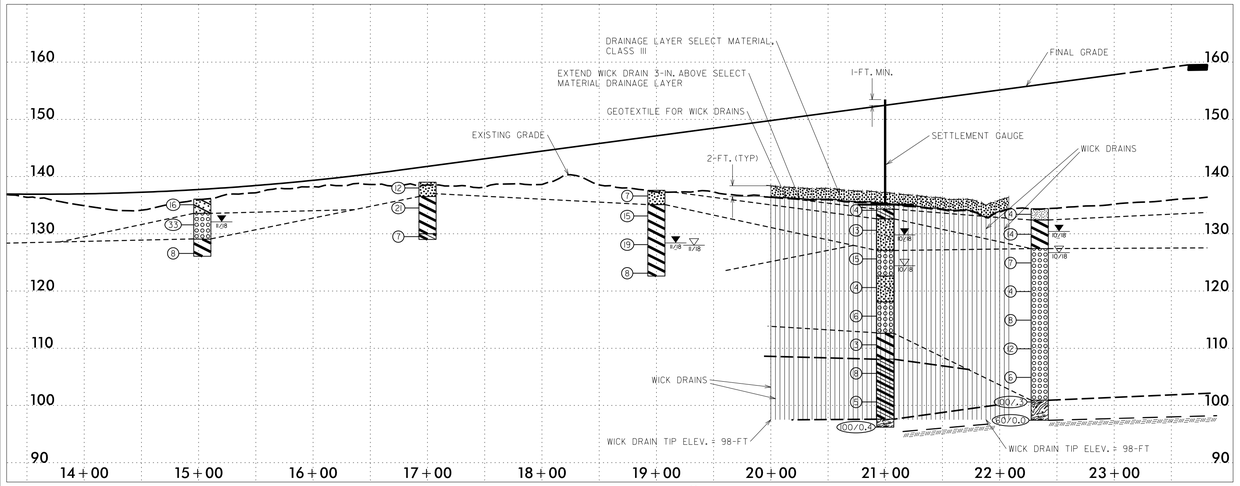
NO.	BY	DATE	NO.	BY	DATE
1	RPD	05/24/19	3	_	_
2	RPD	06/20/19	4	_	_

DGN: G:\DCS\Projects\L-URS\Jobs\4_Projects\NCDOT\60557176_B-5980-Halifax Rd Interchange\400_Technical\431_Geotechnical\B5980_GEO_RDWY\CADD_GEOTECH\PlanProf\B5980_GEO_WickDrain_Bridge.dgn
USER: ryan.doyle



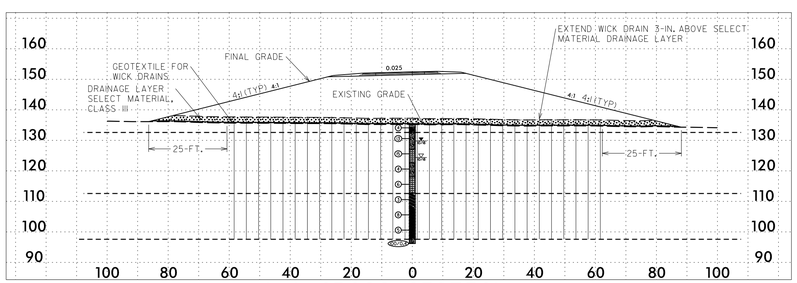
EMBANKMENT PLAN VIEW

3/4" = 50' (22" x 34")



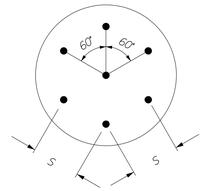
SECTION ALONG ℄ -RPB-

3/4" = 50' HORIZ. (5:1 VE) (22" x 34")



A-A CROSS SECTION

1" = 25' (22" x 34")



FOR WICK DRAIN SPACING, S SEE TABLE

PROJECT REFERENCE NO.	SHEET NO.
B-5980	2G-2

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 045161 ENGINEER RYAN PATRICK DOYLE

Docusigned by: Ryan Patrick Doyle

4/15/2020

SIGNATURE DATE

GEOTECHNICAL ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

WICK DRAIN SYSTEM CONFIGURATION				
STATIONS		LINE	WICK DRAIN SPACING, S	MINIMUM WAITING PERIOD
FROM	TO			
20 + 00	22 + 04	- RPB -	4 FT.	6 MONTHS

NOTES

1. FOR WICK DRAINS, SEE INSTALLATION OF VERTICAL WICK DRAINS AND DRAINAGE LAYER SPECIAL PROVISION.
2. GEOTEXTILE FOR WICK DRAINS SHALL BE PLACED ON EXISTING GROUND AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
3. THE DRAINAGE LAYER OF SELECT MATERIAL CLASS III SHALL BE INSTALLED AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
4. INSTALL WICK DRAINS AS DIRECTED BY PROVISIONS, PLANS, AND/OR ENGINEER AFTER THE SELECT BACKFILL HAS BEEN PLACED AND COMPACTED. WICK DRAINS SHALL PENETRATE THE BACKFILL AND SHALL BE INSTALLED TO THE LENGTH SHOWN ON THE PLANS AND/OR DIRECTED BY THE ENGINEER.
5. PRE-AUGERING MAY BE REQUIRED TO INSTALL THE WICK DRAINS. IF PRE-AUGERING IS NECESSARY, THE COST OF PRE-AUGERING IS INCIDENTAL TO THE COST OF THE WICK DRAINS.
6. CONSTRUCT EMBANKMENT TO THE FINAL GRADE.
7. MAINTAIN EMBANKMENT ELEVATIONS THROUGHOUT THE WAITING PERIODS.
8. FOR SETTLEMENT GAUGE, SEE SECTION 235 OF STANDARD SPECIFICATION AND ROADWAY STANDARD DRAWING NO. 235.01.
9. WAITING PERIOD BEGINS AFTER INSTALLING EMBANKMENT.

ESTIMATED QUANTITIES	
WICK DRAINS	56,000 FT.
SELECT MATERIAL, CLASS III	2,000 CY.
GEOTEXTILE FOR WICK DRAINS	3,000 SY.

PREPARED BY: RPD	DATE: 03/19/19
REVIEWED BY: ZAA	DATE: 03/19/19

AECOM

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

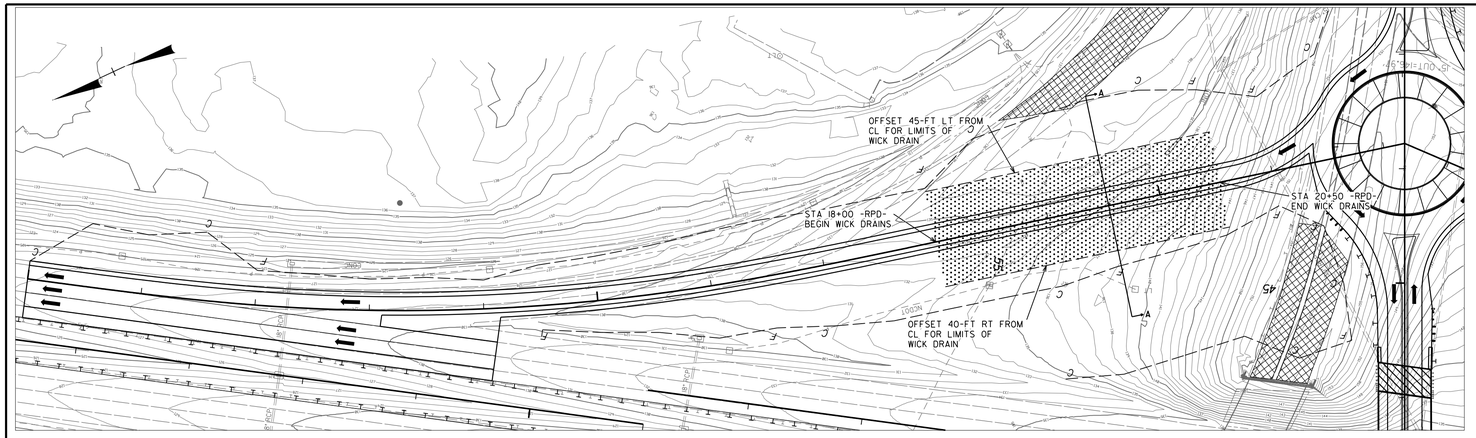
GEOTECHNICAL ENGINEERING UNIT

WICK DRAIN DETAILS - RPB - ROADWAY

REVISIONS

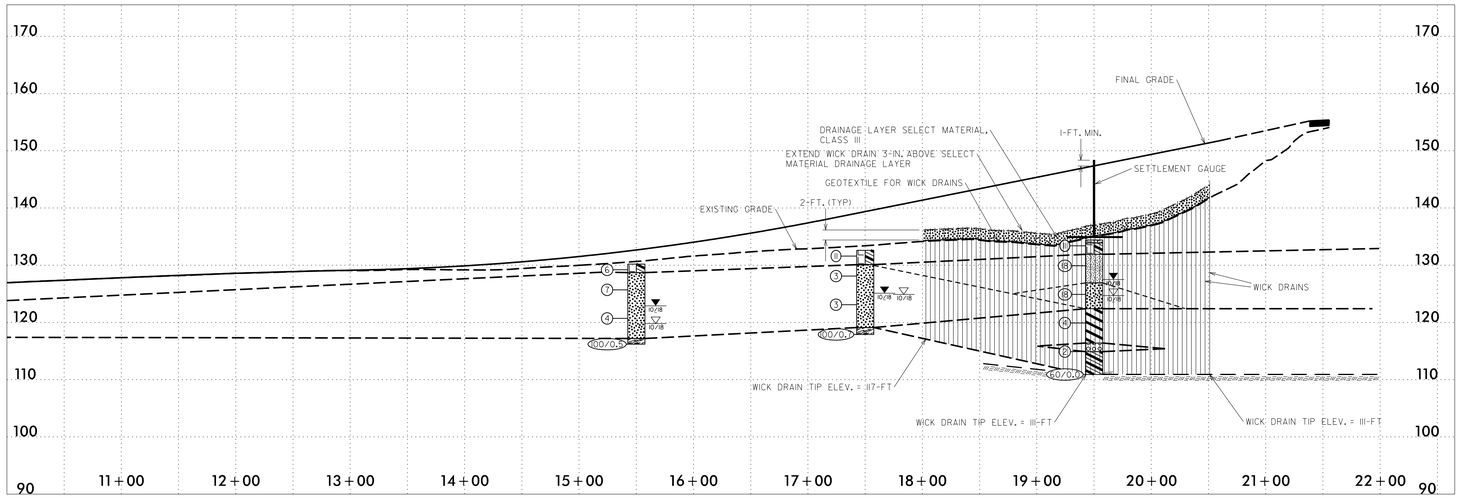
NO.	BY	DATE	NO.	BY	DATE
1	RPD	05/24/19	3	-	-
2	-	-	4	-	-

DGN: G:\DCS\Projects\L-URS\Jobs\4_Projects\NCDOT\60557176_B-5980-Halifax Rd Interchange\400_Technical\431_Geotechnical\B5980_GEO_RDWY\CADD_GEOTECH\PlanProf\B5980_GEO_WickDrain_RPB.dgn
USER: ryan.pdoyle



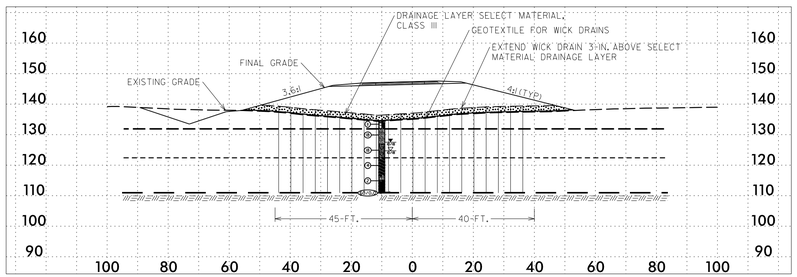
EMBANKMENT PLAN VIEW

3/4" = 50' (22" x 34")



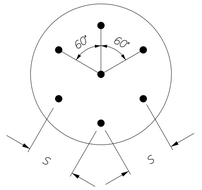
SECTION ALONG ℄ -RPD-

3/4" = 50' HORIZ. (5:1 VE) (22" x 34")



A-A CROSS SECTION

1" = 25' (22" x 34")



FOR WICK DRAIN SPACING, S SEE TABLE

PROJECT REFERENCE NO.	SHEET NO.
B-5980	2G-3

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 045161 ENGINEER RYAN PATRICK DOYLE

Docusigned by: Ryan Patrick Doyle

4/15/2020

SIGNATURE DATE

GEOTECHNICAL ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

WICK DRAIN SYSTEM CONFIGURATION				
STATIONS		LINE	WICK DRAIN SPACING, S	MINIMUM WAITING PERIOD
FROM	TO			
18 + 00	20 + 50	- RPD -	4 FT.	6 MONTHS

NOTES

1. FOR WICK DRAINS, SEE INSTALLATION OF VERTICAL WICK DRAINS AND DRAINAGE LAYER SPECIAL PROVISION.
2. GEOTEXTILE FOR WICK DRAINS SHALL BE PLACED ON EXISTING GROUND AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
3. THE DRAINAGE LAYER OF SELECT MATERIAL CLASS III SHALL BE INSTALLED AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
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6. CONSTRUCT EMBANKMENT TO THE FINAL GRADE.
7. MAINTAIN EMBANKMENT ELEVATIONS THROUGHOUT THE WAITING PERIODS.
8. FOR SETTLEMENT GAUGE, SEE SECTION 235 OF STANDARD SPECIFICATION AND ROADWAY STANDARD DRAWING NO. 235.01.
9. WAITING PERIOD BEGINS AFTER INSTALLING EMBANKMENT.

ESTIMATED QUANTITIES	
WICK DRAINS	41,000 FT.
SELECT MATERIAL, CLASS III	1,600 CY.
GEOTEXTILE FOR WICK DRAINS	2,400 SY.

PREPARED BY: RPD	DATE: 03/19/19
REVIEWED BY: ZAA	DATE: 03/19/19

AECOM

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

WICK DRAIN DETAILS - RPD - ROADWAY

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1	RPD	05/23/19	3	-	-
2	-	-	4	-	-

DGN: G:\DCS\Projects\L-URS\Jobs\A_Projects\NCDOT\60557176_B-5980-Halifax Rd Interchange\400_Technical\431_Geotechnical\B5980_GEO_RDWY\CADD_GEOTECH\PlanProf\B5980_GEO_WickDrain_RPD.dgn
USER: ryan.p.doyle

PROJECT REFERENCE NO.	SHEET NO.
B-5980	2G-4

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 045161 ENGINEER RYAN PATRICK DOYLE

Docusigned by: Ryan Patrick Doyle — SIGNATURE — 4/15/2020 DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

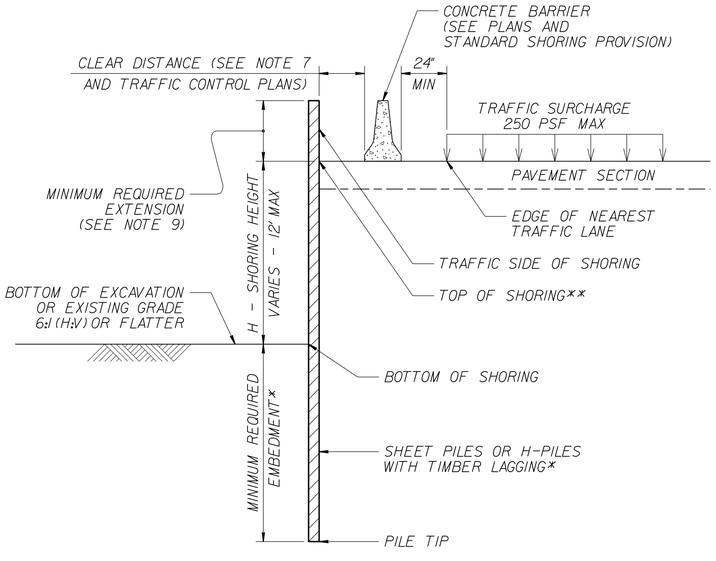
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

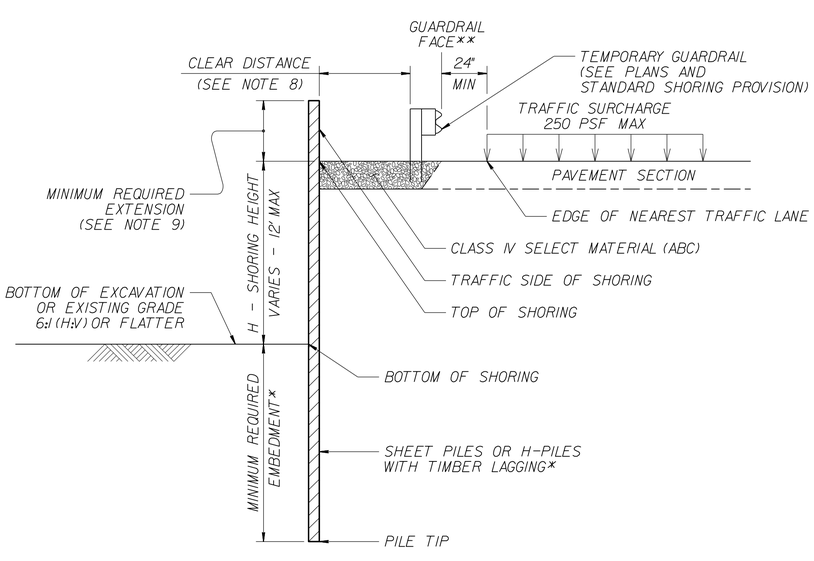
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 PSF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



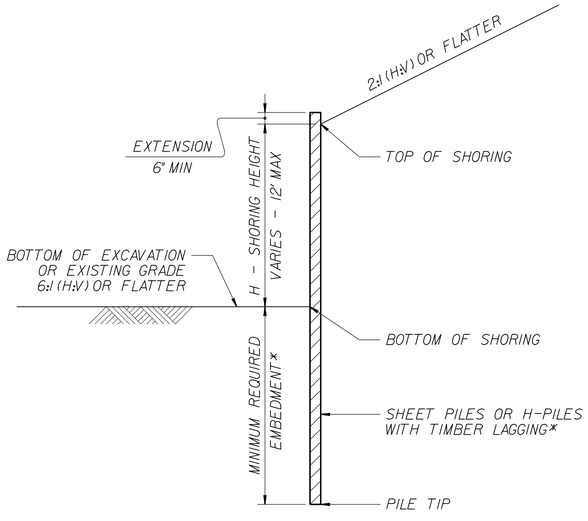
CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT



TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT



STANDARD TEMPORARY SHORING

(SLOPE CASE)
*SEE TABLE ABOVE.

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
*SEE TABLE ABOVE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-19-13

PROJECT REFERENCE NO.	SHEET NO.
B-5980	2G-5

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 045161 ENGINEER RYAN PATRICK DOYLE

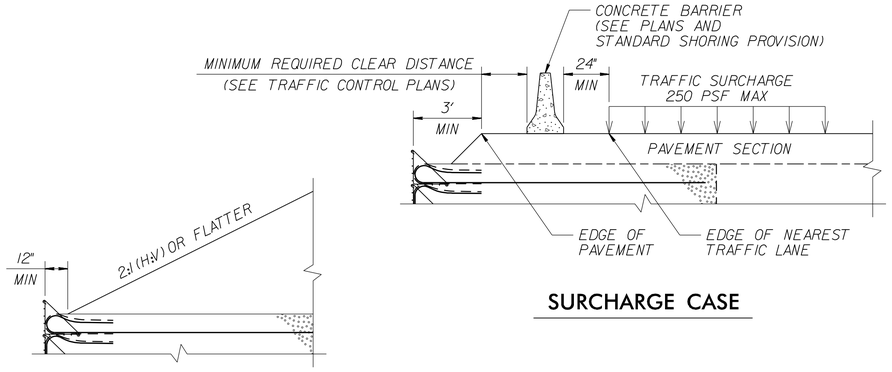
Docusigned by: Ryan Patrick Doyle 4/15/2020

SIGNATURE DATE

ENGINEER

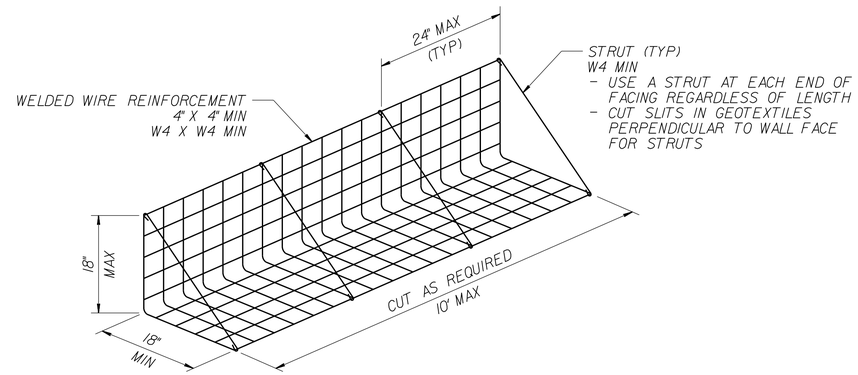
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

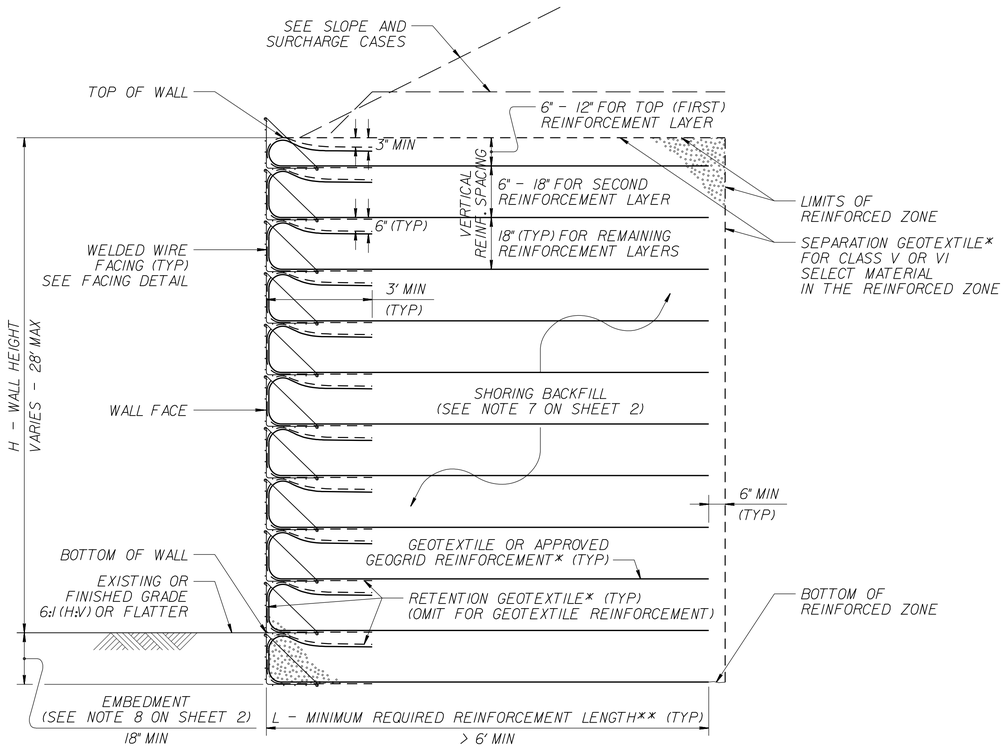


SURCHARGE CASE

SLOPE CASE

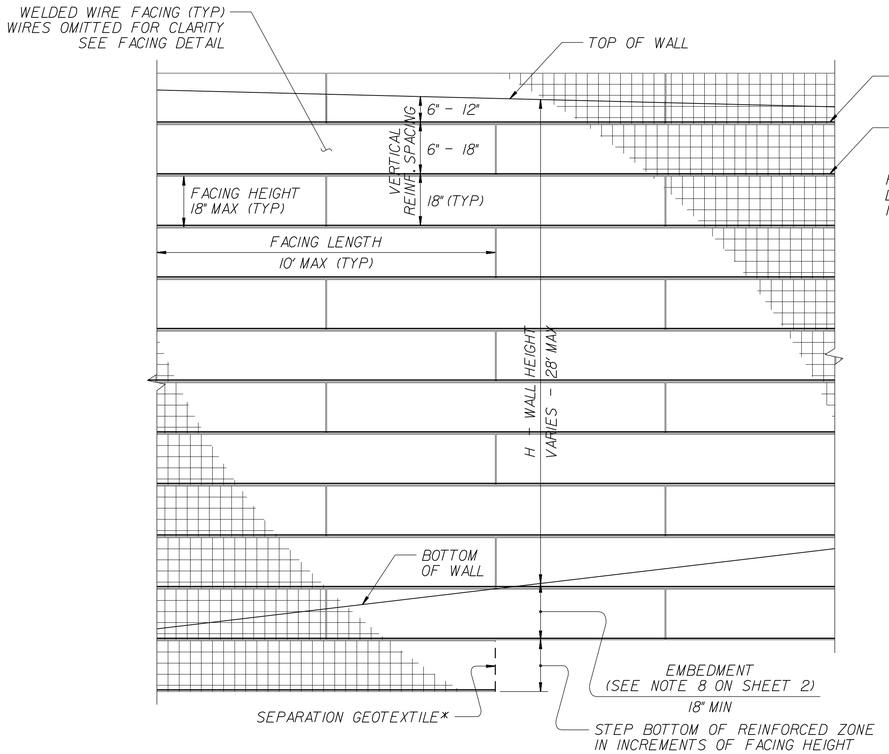


FACING DETAIL



STANDARD TEMPORARY WALL

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.



STANDARD TEMPORARY WALL – PARTIAL ELEVATION

*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD TEMPORARY WALL SHEET 1 OF 3

DATE: 11-19-13

PROJECT REFERENCE NO.	SHEET NO.
B-5980	2G-6

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 045161 ENGINEER RYAN PATRICK DOYLE

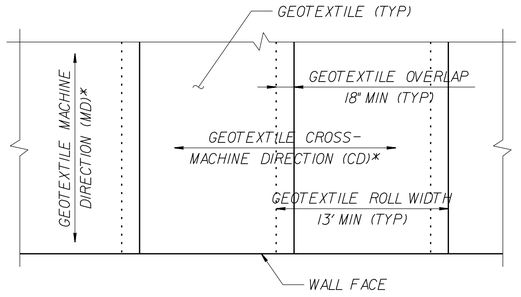
Docusigned by: Ryan Patrick Doyle 4/15/2020

SIGNATURE DATE

ENGINEER

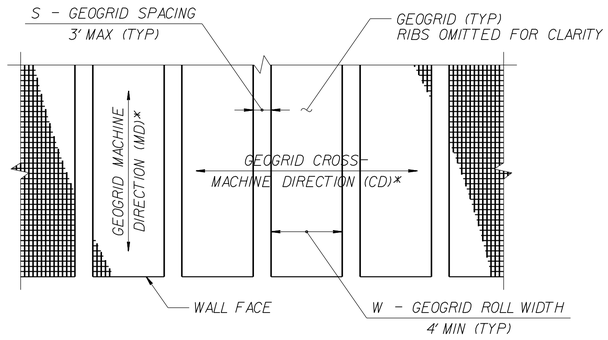
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

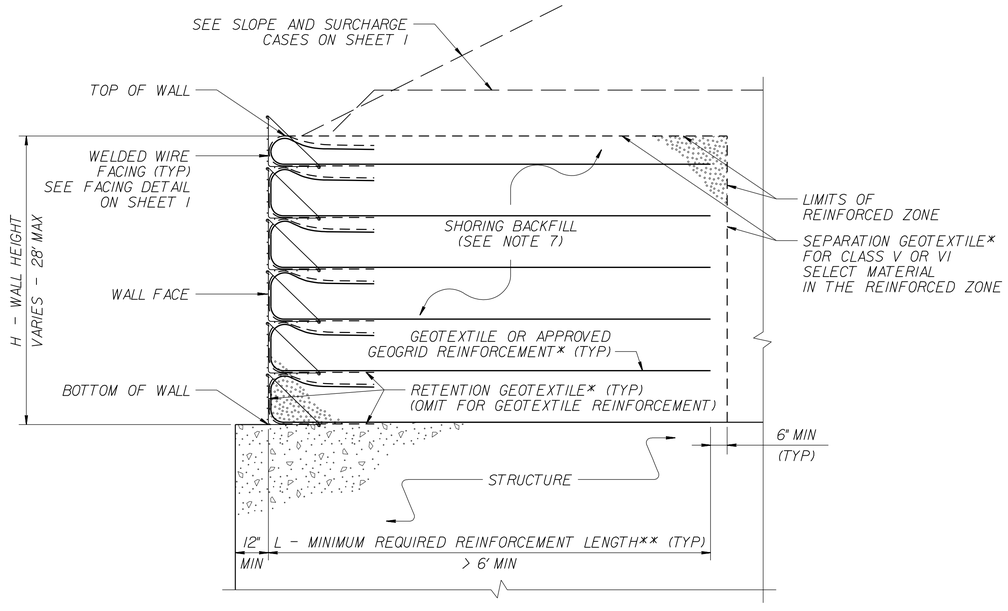


GEOGRID PLACEMENT

(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT – $\frac{W}{W+S}$ x 100 $\geq$ 80%, SEE NOTE 11)

GEOSYNTHETIC PLACEMENT DETAILS

(PLAN VIEW)
*SEE NOTE 12.



TEMPORARY WALL ON STRUCTURE DETAIL

*SEE GEOSYNTHETIC PLACEMENT DETAILS.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 PSF
4. DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
7. DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
8. EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
9. DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
10. GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) OR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Manual.aspx
    DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

    IF THE WEBSITE DOES NOT LIST A SHORT-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID, USE A SHORT-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 3.5 FOR THE GEOGRID REINFORCEMENT.
11. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
12. AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:
    - W (REINFORCEMENT ROLL WIDTH) $\geq$ (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
    - REINFORCEMENT STRENGTH IN CD $\geq$ MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
13. SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
14. DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
15. FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
16. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
17. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
18. FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
19. FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD TEMPORARY WALL SHEET 2 OF 3

DATE: 11-19-13

PROJECT REFERENCE NO.	SHEET NO.
B-5980	2G-7

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 045161 ENGINEER RYAN PATRICK DOYLE

Docusigned by: Ryan Patrick Doyle 4/15/2020

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H – WALL HEIGHT (FT)																								
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SLOPE CASE	> 0	CLASS II,TYPE I, CLASS III,CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27
SURCHARGE CASE	> 0 TO 7 FOR H < 20′ > 0 TO 10 FOR H ≥ 20′	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22
	> 7 FOR H < 20′ > 10 FOR H ≥ 20′	A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21
		CLASS II,TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20
		CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19

L – MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)

(FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 – 4	3
4 – 5.5	4
5.5 – 7	5
7 – 8.5	6
8.5 – 10	7
10 – 11.5	8
11.5 – 13	9
13 – 14.5	10
14.5 – 16	11
16 – 17.5	12
17.5 – 19	13
19 – 20.5	14
20.5 – 22	15
22 – 23.5	16
23.5 – 25	17
25 – 26.5	18
26.5 – 28	19
28 – 29.5	20

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

GEOGRID REINFORCEMENT
SHORT–TERM DESIGN STRENGTH (LB/FT)
(SEE NOTE 10 ON SHEET 2.)

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD
(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1
FOR REINFORCEMENT LAYER NUMBERING.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 3 OF 3

DATE: 11-19-13

COMPUTED BY: KK
CHECKED BY: MF

PROJECT REFERENCE NO.	SHEET NO.
B-5980	3B-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Undercut	Embank. +%	Borrow	Waste
PHASE I						
-Y1- 15+00.00	41+72 +/- (BEGIN BRIDGE)	4541	2247	118555	117279	5512
-Y1- 44+03 +/- (END BRIDGE)	45+00.00	23		5288	5264	0
-Y2- 10+12.00	13+59.00	56		1492	1436	0
-Y3- 21+28.22	26+38.18	310		289	0	21
-RPA- 23+00.00	31+43.86	168		48435	48268	0
-RPB- 16+50.00	23+60.76	147		37979	37832	0
-RPD- 15+90.00	18+50.00	25		896	870	0
-DW1- 10+12.00	12+80.00	53		2289	2287	50
	SUBTOTAL	5323	2247	215223	213237	5583
	PHASE I TOTAL	**5323**	**2247**	**215223**	**213216**	**5562**
PHASE II						
-RPC_DET 10+78.93	14+46.64	37		4725	4688	0
-RPD_DET 10+56.17	13+67.94	0		2177	2177	0
-Y1- 45+00.00	52+50.00	1549		4232	3463	780
-Y2- 13+59.00	24+85.00	113		383	330	60
-RPC- 14+00.00	21+57.92	181	905	3265	3084	905
REMOVE '-RPC_DET 10+78.93	14+46.64	2864		0	0	2864
	SUBTOTAL	4744	905	14782	13742	4610
	PHASE II TOTAL	**4744**	**905**	**14782**	**13742**	**4610**
Phase III						
REMOVE '-RPD_DET 10+56.17	13+67.94	1734		0	0	1734
-L1- 27+17.92	43+50.00	7649		1587	0	6062
-RPB- 14+60.11	16+50.00	726		486	0	239
	SUBTOTAL	10109	0	2074	0	8035
	PHASE III TOTAL	**10109**	**0**	**2074**	**0**	**8035**
Phase IV						
-L- 60+35.90	64+50.07	406		44	0	363
-L1- 50+27.00	54+50.00	5607		13269	7661	0
-RPD- 15+90.00	18+50.00	101		3582	3481	0
-RPD- 18+50.00	21+25.00	519		4679	4160	0
	SUBTOTAL	6634	0	21574	15301	363
	PHASE IVTOTAL	**6634**	**0**	**21574**	**14939**	**0**
PROJECT TOTALS:		26,810	3,153	253,653	241,897	18,207
ESTIMATED SHOULDER MATERIAL				1,150	1,150	
LOSS DUE TO CLEARING & GRUBBING		-10,000			10,000	
ADDITIONAL UNDERCUT			2,000	2,500	2,500	2,000
WASTE IN LIEU OF BORROW					-6,099	18,207
PROJECT TOTALS:		16,810	5,153	257,303	249,448	20,207
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT					12,472	
GRAND TOTALS:		16,810	5,153	257,303	261,920	20,207
SAY:		**16,900**	**5,200**		**262,000**	

CONTINGENCY ITEMS PER NCDOT GEOTECHNICAL REPORT - DESIGN AND CONSTRUCTION RECOMMENDATIONS, DATED JUNE 11,2019:
EST. DDE = 3,640 CUBIC YARDS
EST. SHALLOW UNDERCUT = 500 CUBIC YARDS
EST.SHALLOW UNDERCUT BY STATIONS =1200 CUBIC YARDS
TOTAL SHALLOW UNDERCUT = 1700 CUBIC YARDS
EST. UNCLASSIFIED EXCAVATION - ACCEPTABLE (NOT TO BE USED IN THE TOP 3 FEET) BY STATIONS = 290 CUBIC YARDS
CLASS IV SUBGRADE STABILIZATION = 3200 TONS
PER GEOTECH RECOMMENDATION, ESTIMATED 2,000 CUBIC YARDS OF UNDERCUT TO BE USED AT THE DISCRETION OF THE RESIDENT ENGINEER.
PAVEMENT STRUCTURE VOLUME (L1, Y1, RPA, RPB) = 977 CUBIC YARDS

SHOULDER BERM GUTTER SUMMARY

IN LINEAR FEET

LINE	Station	Station	LENGTH
-Y1-	41+26	41+49	23.4
-Y1-	41+26	41+50	17.8
-Y1-	44+25	44+44	19.2
-Y1-	44+30	44+44	13.6
		TOTAL:	74
		SAY:	74

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP	REMARKS
-L1-	27+18	41+28	LT	1583.38				
-L1-	20+80	49+00	RT	3132.37				
-L-	60+36	62+64	LT	349.43				
-Y1-	18+00	23+16	RT	1409.87				
-Y1-	44+12	52+27	CL	4622.27				
-Y1-	53+20	55+80	LT	301.26				
-Y2-	14+00	17+14	CL	832.17				
-Y2-	20+36	24+15	CL	1020.94				
-Y3-	23+38	26+38	LT	110.79				EXIST SHOULDER REMOVAL
-Y3-	23+74	26+38	RT	103.16				EXIST SHOULDER REMOVAL
-RPA-	22+13	29+83	LT			4088.91		EXIST LOOP A
-RPC-	14+00	22+41	RT			1595.10		EXIST RAMP C
-RPD-	10+00	22+18	LT			3516.35		EXIST RAMP D
		TOTAL:		13,465.65		9200.37		
		SAY:		13,470		9210		

SUMMARY OF CABLE GUIDERAIL

SURVEY LINE	Station	Station	LOC.	LENGTH		CABLE GUIDRAIL ANCHOR UNIT	REMARKS
				SINGLE FACED	DOUBLE FACED		
L1'	35+75.00	45+45.34	LT MED		975.00	2	
		SUBTOTAL:			975	2	
		ANCHOR UNIT DEDUCTIONS					
CABLE GUIDERAIL ANCHOR UNIT @ 25.00' EACH					925		
		TOTAL			925	2	
		SAY:			925	2	

SUMMARY OF GUARDRAIL

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
NG = NON-GATING IMPACT ATTENUATOR TYPE 350
G = GATING IMPACT ATTENUATOR TYPE 350

LINE	BEG. STA.	END STA.	LOC.	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHLDR WIDTH	FLARE LENGTH		W		ANCHORS							IMP. ATTEN. MIA-2			REMOVE EXISTING GUARDRAIL	SINGLE FACE CONCRETE BARRIER	REMOVE AND STOCKPILE EXISTING	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPR. END	TRAIL. END			APPR. END	TRAIL. END	APPR. END	TRAIL. END	III	B-77	GREU TL-2	GREU TL-3	CABLE GUIDERAIL	CAT-1	TES	EA	G	NG				
Y1	40+03.01	41+68.52	RT	87.50	87.5		41+68.52		8	13	127		2			1	1											
Y1	40+99.75	41+74.74	LT	75.00				41+74.74	8	13	27			0.5		1	1											
Y1	43+99.52	44+74.51	RT	75.00			43+99.52		8	13	27			0.5		1	1											
Y1	44+05.74	45+66.10	LT	100.00	87.5			44+05.74	8	13	127		2			1	1											
Y1	46+46.51	49+16.21	RT	275.00			47+10.00	49+00.00	8	13							1			1								
Y2	14+30.00	14+30.00	CL	50.00																								
Y2	24+00.00	24+00.00	CL	50.00																								
RPA	17+75.00	28+56.25	RT	1087.50			19+00.00	28+50.00	12	17	102		2					1		1					1315			
L1	44+50.00	58+10.57	RT MED	1362.50				47+62.78	10	15								1							1840			
L2	44+31.09	57+88.82	LT MED	1362.50			47+41.22		10	15								1							1860			
L	59+00.00	74+09.52	RT MED	1512.50			74+09.52		10	15	300		6		1										1510			
L	59+00.00	74+35.68	LT MED	1537.50				74+35.68	10	13		310		6	1										1540			
L	72+45.71	74+58.17	LT	212.50			74+58.17	72+63.03	2	17	187.5		4		1					1					205			
L	69+43.26	73+95.43	RT	462.50			70+93.22	73+95.37	12	17					1			1							390			
L2	38+65.72	40+19.74	RT	162.50			39+99.19		12	17								1							1550			
Y1	44+18.76	46+13.08	LT																						205			
L1	39+96.77	55+73.50	LT																						632			Three runs of existing guardrail
L2	50+97.91	52+30.04	RT																						132			
Y2	14+49.12	23+16.46	Both												1										935			Remove guardrail all four quadrants
RPC_DET	10+49.73	10+63.03	RT																									
RPD_DET	10+00.00	10+30.00	LT	37.50																								
			SUBTOTAL	**8450.00**	**175.00**										**5**	**4**	**5**	**5**	**0**	**3**	**0**	**0**			**12114.08**			
	ANCHOR UNIT DEDUCTIONS																											
		GREU TL-3 @ 50.00' EACH		-250.00																								
		GREU TL-2 @ 25.00' EACH		-125.00																								
		TYPE III @ 18.75' EACH		-93.75																								
		CAT-1 @ 6.25' EACH		-18.75																								
		Type B-77 @ 22.875'		-91.50																								
			TOTAL	**7871.00**	**175.00**										**5**	**4**	**5**	**5**	**0**	**3**	**0**	**0**			**12115**			
			SAY	**7875.0**	**175.0**										**5**	**4**	**5**	**5**	**0**	**3**	**0**	**0**			**12115**			

(ADDITIONAL POSTS = 10 EACH)

1625LP-R00100

COMPUTED BY: M Kemp DATE: 2/24/2021

CHECKED BY: M. Buscemi DATE: 2/24/2021

PROJECT NO.	SHEET NO.
B-5980	3D-1

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)

Line & Station / Size / Thickness or Gauge	Offset	Structure Number From	Structure Number To	Top Elevation FT.	Invert Elevation FT.	Invert Elevation FT.	Minimum Required Slope %	C.S. Pipe 15 (.064)	C.S. Pipe 18 (.064)	C.S. Pipe 24 (.064)	C.S. Pipe 30 (.079)	C.S. Pipe 36 (.079)	C.S. Pipe 42 (.109)	C.S. Pipe 48 (.109)	R.C. Pipe Class III 15	R.C. Pipe Class III 18	R.C. Pipe Class III 24	R.C. Pipe Class III 30	R.C. Pipe Class III 36	R.C. Pipe Class III 42	R.C. Pipe Class IV 15	R.C. Pipe Class IV 18	R.C. Pipe Class IV 24	R.C. Pipe Class IV 30	R.C. Pipe Class IV 36	R.C. Pipe Class IV 42	R.C. Pipe Class IV 48	R.C. Pipe Class V 15	R.C. Pipe Class V 18	R.C. Pipe Class V 24	R.C. Pipe Class V 30	R.C. Pipe Class V 36	R.C. Pipe Class V 42	R.C. Pipe Class V 48	30" Welded Steel Pipe 0.5" Thick, Grade B in Soil	30" Welded Steel Pipe 0.5" Thick, Grade B Not in Soil	36" Welded Steel Pipe 0.375" Thick, Grade B in Soil	36" Welded Steel Pipe 0.375" Thick, Grade B Not in Soil	15" Side Drain Pipe	18" Side Drain Pipe	24" Side Drain Pipe		Endwalls Std. 838.01 or Std. 838.11 (Unless Noted Otherwise) CY	Reinforced Endwalls CY	Quantities for Drainage Structures (Note: Total Lin. Ft. for Pay Quantity shall be A + (1.3 X B)) 0' thru 5' Each	A 5' thru 10' Lin. Ft.	B 10' and Above Lin. Ft.	C.B. Std. 840.01 or Std. 840.02	Frame, Grates, and Hood Std. 840.03 Grate Type E	F	G		Concrete Transitional Section D.I. Std. 852.04 or Std. 852.06	Concrete Transitional Section C.B. Std. 852.05	Open Throat C.B. Std. 840.04 or Std. 840.05	D.I. Std. 840.14 or Std. 840.15	D.I. Frame and Grates Std. 840.16	G.D.I. Type "A" Std. 840.17 or Std. 840.26	G.D.I. Type "B" Std. 840.18 or Std. 840.27	G.D.I. Type "D" Std. 840.19 or Std. 840.28	G.D.I. (W.S. Flat) Frame with Grate Std. 840.20	G.D.I. (W.S. Flat) Frame w/ 2 Grates Std. 840.20	G.D.I. (W.S. Sag) Frame w/ Grate Std. 840.22	G.D.I. (W.S. Sag) Frame w/ 2 Grates Std. 840.22	G.D.I. (N.S. Sag) Frame w/ Grate Std. 840.24	G.D.I. (N.S. Sag) Frame w/ 2 Grates Std. 840.24	G.D.I. (N.S. Flat) Frame w/ Grate Std. 840.29	G.D.I. (N.S. Flat) Frame w/ 2 Grates Std. 840.29	J.B. Std. 840.31 or Std. 840.32	T.B.D.I. for Steel Grates Std. 840.36	Steel Frame with Two Grates Std. 840.37	Temp Steel Plate Cover Masonry Drainage	M.H. Std. 840.51, Std. 840.52, or Std. 840.53	M.H. Frame and Cover Std. 840.54		15" C.S. Elbow	Rod and Lug Connectors	Flowable Fill CY	Concrete Collars Cl. "B" Std. 840.72 CY	Pipe Removal Lin. Ft.	Remarks
L1 40+42	79 LT	0501																																									2.300																																					
		0501	0502		130.7	129.0	0.9																												138	138																																												
RPB 21+55	96 RT	0503																																																																																
		0503	0504		133.5	132.5										220																																																																		
Y1 36+41	100 RT	0505																																																																																
		0505	0506		132.3	129.9	0.3											232																																																																	
		0510	0511		117.5	117.2																		12																																																												
Y1 21+52	78 LT	0511		127.3																																									1	5.0	1.0																								1					1							
		0511	0512		117.2	108.0	3.5																												88	88																																												
RPB 16+96	58 RT	0520																																																																																
		0520	0521		134.9	134.3										112																																																																		
Y1 41+33	21 RT	0530		162.9																																									1														1			1																						
		0530	0531		160.1	159.9															40																																																													
Y1 41+33	21 LT	0531		162.9																																									1														1			1																						
		0531	0532		159.9	135.7		84																																																																						2					
L1 49+95	76 LT	0540																																																																																
		0540	0541		131.0	125.6																	244																																																													
Y1 44+37	21 LT	0550		160.3																																									1														1			1																						
		0550	0551		157.6	157.4															40																																																													
Y1 44+37	21 RT	0551		160.3																																									1														1			1																						
		0551	0572		157.4	135.8		88																																																																						2					
Y1 46+85	163 LT	0561		133.6																																									1														1					1																				
		0561	0562		129.1	128.1	0.4																		292																																																										
L2 53+70	54 RT	0562		135.7																																									1	1.9																									1					1							
		0562	0563		128.1	127.7	0.4																		148																																																										
L2 52+23	54 RT	0563		140.7																																									1	5.0	7.0																												1	1							
		0563	0564		127.7	125.6	0.4																														96	96																																											
Y1 42+00	120 LT	0564																																									5.800																																					Refer to detail 2C-1
		0568	0570		135.2	132.7	4.6														20																																																														
Y1 47+60	74 RT	0570		135.5																																									1													1							1																				
		0570	0572		131.5	130.5																													162	162																																												
RAB2 10+39	1 LT	0571		156.4																																									1	2.5								1																		1	1											
		0571	0572		149.0	135.8															156																																																													
Y1 44+37	110 RT	0572		139.4																																									1	3.9																												1	1							
		0572	0573		130.5	130.3																		80																																																											
Y1 43+58	119 RT	0573		134.5																																									1													1							1																				
		0573	0574		130.3	129.7																		108																																																											
Y1 43+69	13 RT	0574		134.8																																									1	0.9												1							1																				
RAB1 11+14	1 LT	0580		160.1																																									1								1																		1	1											
		0580	0581		156.9	156.4															100																																																													
RAB1 12+33	1 LT	0581		160.7																																									1								1																		1	1											
		0581	0582		156.4	135.9		112																																																																						2					
Y1 45+49	69 LT	0590		152.7																																									1														1					1																				
		0590	0591		150.0	149.8															40																																																													
RAB2 13+45	1 LT	0591		156.1																																									1	1.4								1																		1	1											
		0591	0571		149.8	149.4															80																																																													
Y1 17+03	25 LT	0701																											96																																																						
Y1 21+00	33 RT	0801																																																																																
		0801	0802		151.4	151.0																							64																																																						
Y2 12+73	33 RT	0803																			40																																																													
							SHEET TOTALS	284								332		232			516		244	200	440				160						388	388	96	96					8.100		17	20.6	8.0						4					3	6			4		5					2	4	4		2	4		6					

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

1625LP-R00100

COMPUTED BY: M Kemp DATE: 2/24/2021

CHECKED BY: M. Buscemi DATE: 2/24/2021

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
B-5980	3D-2

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)

Line & Station / Size / Thickness or Gauge	Offset		Structure Number From	Structure Number To	Top Elevation FT.	Invert Elevation FT.	Invert Elevation FT.	Minimum Required Slope %	C.S. Pipe 15 (.064)	18 (.064)	24 (.064)	30 (.079)	36 (.079)	42 (.109)	48 (.109)	R.C. Pipe Class III 15	18	24	30	36	42	R.C. Pipe Class IV 15	18	24	30	36	42	48	R.C. Pipe Class V 15	18	24	30	36	42	48
Y2 13+28	26	LT	0804																			116													
Y2 13+90	34	RT	0805																			40													
Y1 26+51	35	LT	0806																			40													
Y1 50+00	16	RT	0901		144.5																														
			0901	0902		141.5	139.2															100													
Y1 51+00	4	RT	0902		142.2																														
			0902	0904		139.2	138.0															100													
Y1 51+97	78	RT	0903		137.4																														
			0903	0904		134.7	134.4															72													
Y1 52+00	4	RT	0904		141.0																														
			0904	0905		134.4	133.7	0.4														100													
RPD_DET 12+63	17	RT	DET01	DET02		148.1	134.5		68																										
Y1 47+67	80	RT																																	
Y1 16+94	25	LT																																	
Y2 10+85	30	RT																																	
RPA 24+03	23	LT																																	
RPA 23+09	178	LT																																	
RPA 23+84	82	LT																																	
RPA 20+93	16	LT																																	
L1 39+59	12	LT																																	
Y1 45+28	74	LT																																	
Y1 47+28	95	LT																																	
Y1 45+62	43	RT																																	
Y1 52+43	48	LT																																	
Y1 52+23	34	RT																																	
SHEET TOTALS									68													568													
PROJECT TOTALS									352								332		232			1084		244	200	440				160					

Line & Station	From	To	30" Welded Steel Pipe 0.5" Thick, Grade B In Soil	30" Welded Steel Pipe 0.5" Thick, Grade B Not In Soil	36" Welded Steel Pipe 0.375" Thick, Grade B In Soil	36" Welded Steel Pipe 0.375" Thick, Grade B Not In Soil	15" Side Drain Pipe	18" Side Drain Pipe	24" Side Drain Pipe		Endwalls Std. 838.01 or Std. 838.11 (Unless Noted Otherwise) CY	Reinforced Endwalls CY	Quantities for Drainage Structures (Note: Total Lin. Ft. for Pay Quantity shall be A + (1.3 X B)) 0' Thru 5' EACH	A: 5' Thru 10' LIN. FT.	B: 10' and Above LIN. FT.	C.B. Std. 840.01 or Std. 840.02	Frame, Grates, and Hood Std. 840.03 Grate Type E	F	G		Concrete Transitional Section: D.I. Std. 852.04 or Std. 852.06	C.B. Std. 852.05
Y1 50+00	0901												1			1		1				1
Y1 51+00	0902												1			1		1				1
Y1 51+97	0903												1									
Y1 52+00	0904												1	1.5		1		1				1
SHEET TOTALS													4	1.5		3		3				3
PROJECT TOTALS			388	388	96	96					8.100		21	32.5		3		3			4	3

Line & Station	From	To	Open Throat C.B. Std. 840.04 or Std. 840.05	D.I. Std. 840.14 or Std. 840.15	D.I. Frame and Grates Std. 840.16	G.D.I. Type "A" Std. 840.17 or Std. 840.26	G.D.I. Type "B" Std. 840.18 or Std. 840.27	G.D.I. Type "D" Std. 840.19 or Std. 840.28	G.D.I. (W.S. Flat) Frame with Grate Std. 840.20	G.D.I. (W.S. Flat) Frame w/ 2 Grates Std. 840.20	G.D.I. (W.S. Sag) Frame w/ Grate Std. 840.22	G.D.I. (W.S. Sag) Frame w/ 2 Grates Std. 840.22	G.D.I. (N.S. Sag) Frame w/ Grate Std. 840.24	G.D.I. (N.S. Sag) Frame w/ 2 Grates Std. 840.24	G.D.I. (N.S. Flat) Frame w/ Grate Std. 840.29	G.D.I. (N.S. Flat) Frame w/ 2 Grates Std. 840.29	J.B. Std. 840.31 or Std. 840.32	T.B.D.I. for Steel Grates Std. 840.36	Steel Frame with Two Grates Std. 840.37	Temp Steel Plate Cover Masonry Drainage	M.H. Std. 840.51, Std. 840.52, or Std. 840.53	M.H. Frame and Cover Std. 840.54		15" C.S. Elbow	Rod and Lug Connectors	Flowable Fill CY	Concrete Collars Cl. "B" Std. 840.72 CY	Pipe Removal LIN. FT.	Remarks
Y1 51+97	0903						1					1																	
Y1 47+67																												18	
Y1 16+94																												61	
Y2 10+85																												42	
RPA 24+03																												29	
RPA 23+09																										6			
RPA 23+84																										4			
RPA 20+93																										20			
L1 39+59																										12			
Y1 45+28																										65			
Y1 47+28																										7			
Y1 45+62																										25			
Y1 52+43																										5			
Y1 52+23																										6			
SHEET TOTALS							1					1														150		150	
PROJECT TOTALS						3	7			4		6					2	4	4		2	4		6		150		150	

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

1625LP-R00100

COMPUTED BY:	M Kemp	DATE:	2/24/2021
CHECKED BY:	M. Buscemi	DATE:	2/24/2021

PROJECT NO.	SHEET NO.
B-5980	3D-3

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 54 INCHES & OVER)

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Side Drain Pipe (RCP CLASS IV) 54	60	66	72	78	84		DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 54	60	66	72	78	84	
RPA 29+65	116 LT	0507																								
		0507	0508		124.1	122.5																				
SHEET TOTALS																										
PROJECT TOTALS																										

LINE & STATION	R. C. PIPE CLASS III 54	60	66	72	78	84		R. C. PIPE CLASS IV 54	60	66	72	78	84		R. C. PIPE CLASS V 54	60	66	72	78	84	
RPA 29+65																					
															256						
SHEET TOTALS															256						
PROJECT TOTALS															256						

LINE & STATION	STRUCTURAL PLATE PIPE 60	66	72		ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A: 5' THRU 10' LIN. FT.	B: 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G	
RPA 29+65						5.000									
SHEET TOTALS						5.000									
PROJECT TOTALS						5.000									

LINE & STATION	CONCRETE TRANSITIONAL SECTION: D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
RPA 29+65																								
SHEET TOTALS																								
PROJECT TOTALS																								

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

COMPUTED BY: ALP DATE: 03/28/2019
CHECKED BY: RPD DATE: 03/28/2019
REVISED BY: RPD DATE: 03/04/2020

(5-15-18)

PROJECT NO.	SHEET NO.
B-5980	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	1000
				TOTAL LF:	1000

*UD = Underdrain
*BD = Blind Drain
*SD = Subsurface Drain

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
L1	27+18	41+28	ASU (1)	12	1060	1945	3075		
Y1	15+00	19+25	ASU(1)	12	120	220	375		
DW1	12+49	12+80	ASU(1)	12	20	35	50		
CONTINGENCY			ASU(1)	12	500	1000	1500		
			TOTAL CY/TONS/SY:		1700	3200**	5000**	0	0

*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)
*AST = Aggregate Stabilization
**Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Soil Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.

SUMMARY OF ROCK PLATING

LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
RPA	2:1	23+00	3:1	28+25	RT	2		4150
Y1	2:1	22+00	2:1	22+50	LT	3		360
							TOTAL SY:	4510

*Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.

SUMMARY OF EMBANKMENT WAITING PERIODS

LINE	Station	Station	MONTHS
Y1	40+50	46+08	6
RPB	20+00	22+04	6
RPD	18+00	20+50	6

SUMMARY OF SETTLEMENT GAUGES

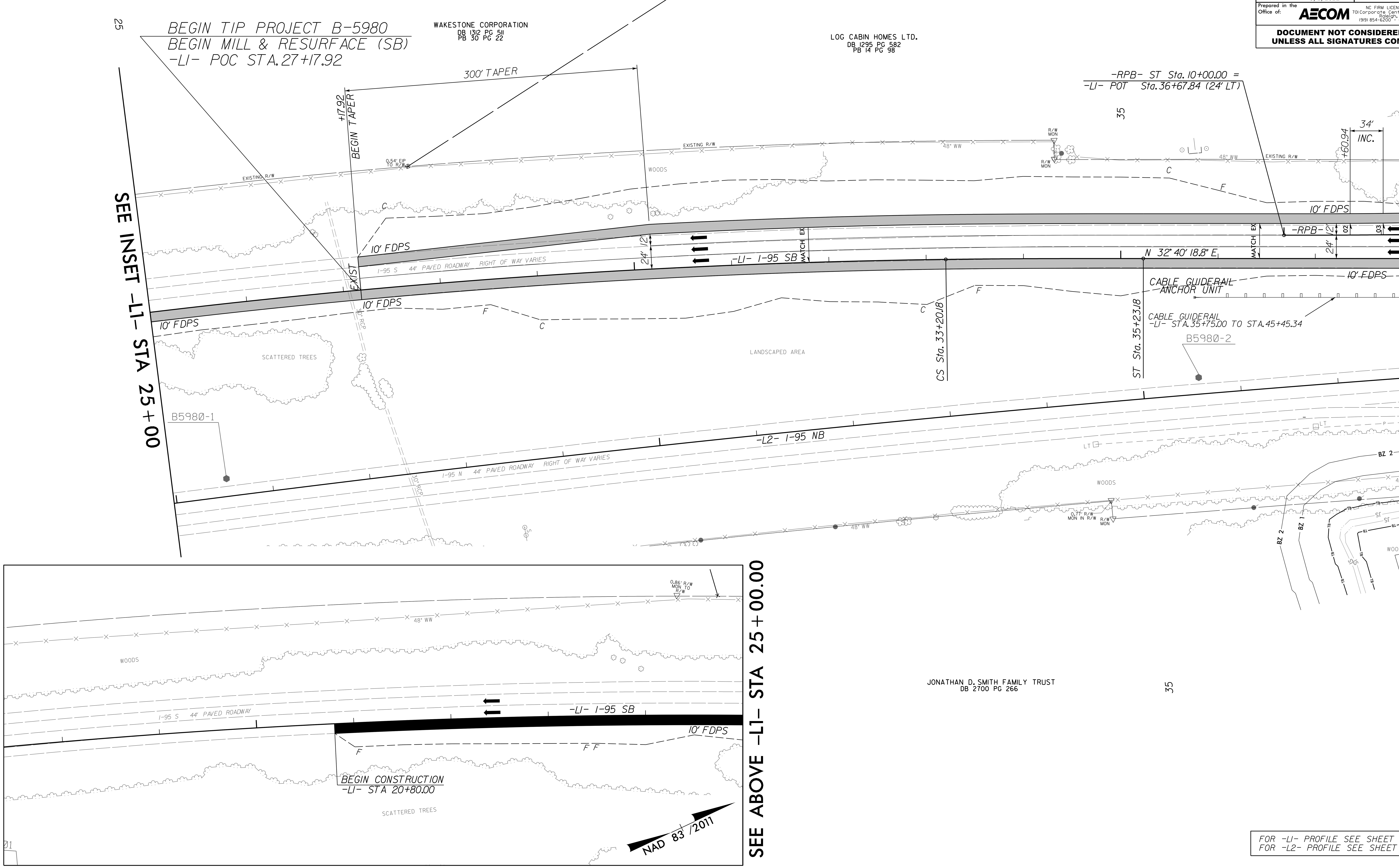
Gauge No.	LINE and Station	Offset	
		Distance FT	Direction LT/RT
1	Y1 41+25	28	LT
2	Y1 41+25	28	RT
3	Y1 44+50	28	LT
4	Y1 44+50	28	RT
5	RPB 21+00	24	LT
6	RPB 21+00	15	RT
7	RPD 19+50	24	LT
8	RPD 19+50	15	RT
	TOTAL GAUGES (EACH):		8

PROJECT REFERENCE NO.	SHEET NO.
B-5980	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18470 EDWARD GLENN EDSON, JR. 3/2/2021	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 10746 DENNIS K. HOYLE 3/2/2021

Prepared in the Office of: AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 · (919) 854-6259 (FAX)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-L1-		-L2-	-RPB-
PI Sta 23+89.16	PIs Sta 33+87.85	PI Sta 33+24.86	PIs Sta 11+36.02
Δ = 13° 55' 27.8" (RT)	Θs = 0° 45' 18.9"	Δ = 10° 42' 53.6" (RT)	Θs = 2° 39' 23.2"
D = 0° 44' 38.8"	Ls = 203.00'	D = 0° 14' 56.8"	Ls = 204.00'
L = 1,871.30'	LT = 135.33'	L = 4,301.23'	LT = 136.02'
T = 940.28'	ST = 67.67'	T = 2,156.90'	ST = 68.01'
R = 7,700.00'		R = 23,000.00'	
e = MATCH EXISTING		e = MATCH EXISTING	



FOR -L1- PROFILE SEE SHEET 10
FOR -L2- PROFILE SEE SHEET 10

PROJECT REFERENCE NO.	SHEET NO.
B-5980	5

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18470 EDWARD GLENN EDENS, JR. 3/2/2021

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 10746 DENNIS K. HOYLE 3/2/2021

Prepared in the Office of: AECOM — NC FIRM LICENSE No: F-0342, 701 Corporate Center Drive, Suite 475, Raleigh, NC 27607, (919) 854-6200 · (919) 854-6259 (FAX)

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-Y1-

PI Sta 37+41.69
Δ = 86° 34' 32.0" (RT)
D = 9° 32' 57.5"
L = 906.62'
T = 565.17'
R = 600.00'
e = 8%
RUNOFF = 184'
DS = 45 MPH

-RAB1- / -RAB2-

-RAB1-	-RAB2-
PI Sta 10+00.00	PI Sta 10+00.00
Δ = 360° 00' 00.0" (LT)	Δ = 360° 00' 00.0" (LT)
D = 90° 56' 44.5"	D = 90° 56' 44.5"
L = 395.84'	L = 395.84'
T = 0.00'	T = 0.00'
R = 63.00'	R = 63.00'

-L2-

PI Sta 33+24.86
Δ = 10° 42' 53.6" (RT)
D = 0° 14' 56.8"
L = 4,301.23'
T = 2,156.90'
R = 23,000.00'
e = MATCH EXISTING (NC)

-DW1-

PI Sta 10+43.27	PI Sta 11+94.17	PI Sta 13+08.54
Δ = 47° 28' 10.0" (RT)	Δ = 17° 24' 02.9" (RT)	Δ = 17° 03' 14.8" (RT)
D = 114° 35' 29.6"	D = 10° 03' 06.8"	D = 30° 09' 20.4"
L = 41.42'	L = 173.11'	L = 56.55'
T = 21.98'	T = 87.23'	T = 28.49'
R = 50.00'	R = 570.00'	R = 190.00'

-RPA-

PIs Sta 16+77.05	PIs Sta 20+61.32	PI Sta 22+24.72	PIs Sta 23+87.16
θs = 4° 35' 01.2"	θs = 8° 11' 06.4"	Δ = 15° 45' 29.1" (LT)	θs = 8° 11' 06.4"
Ls = 208.00'	Ls = 200.00'	D = 8° 11' 06.4"	Ls = 200.00'
LT = 138.71'	LT = 133.48'	L = 192.52'	LT = 133.48'
ST = 69.38'	ST = 66.80'	T = 96.87'	ST = 66.80'
		R = 700.00'	
		e = 6%	
		RUNOFF = 200'	
		DS = 45 MPH	

-RPB-

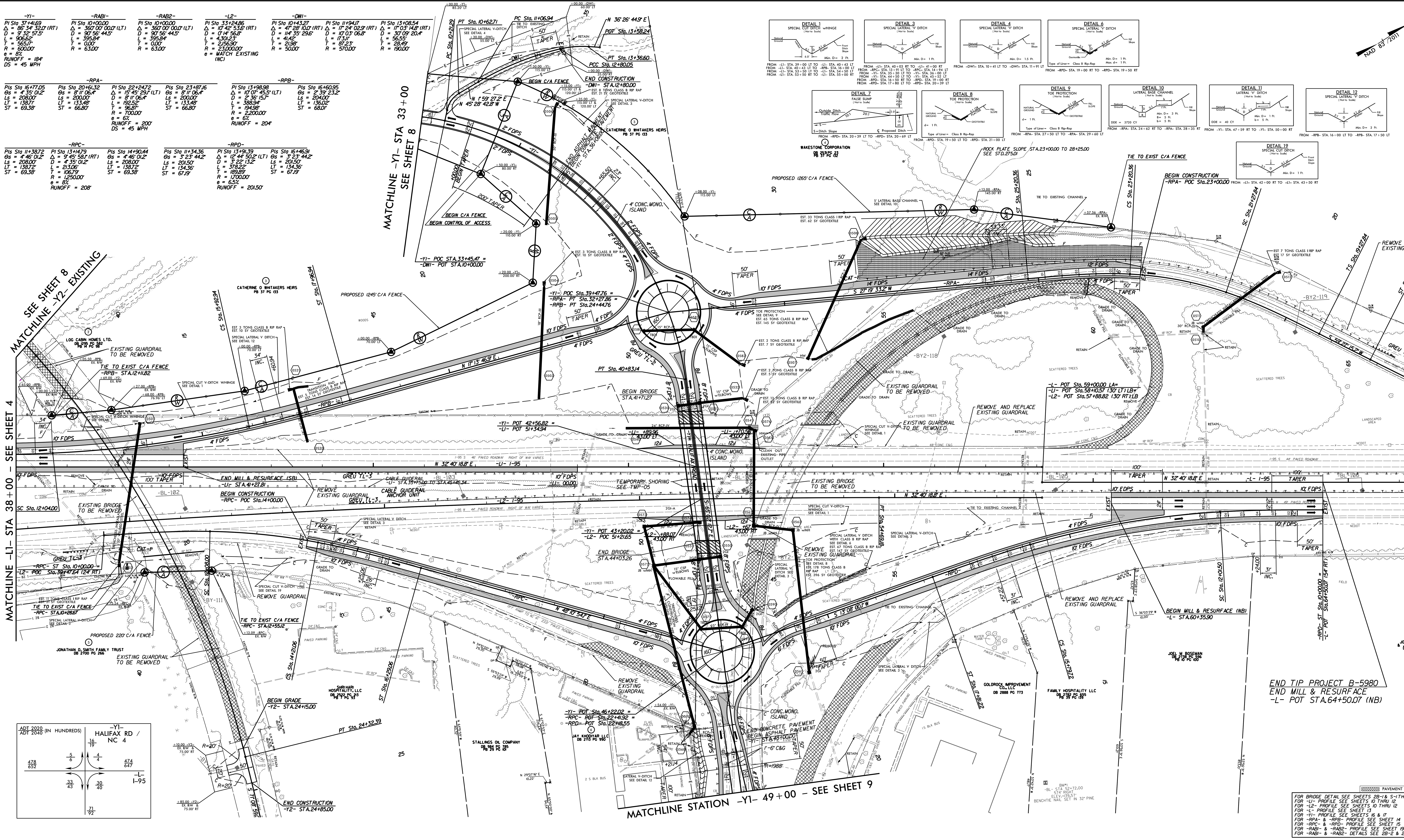
PI Sta 13+98.98	PIs Sta 16+60.95
Δ = 10° 07' 45.5" (LT)	θs = 2° 39' 23.2"
D = 2° 36' 15.7"	Ls = 204.00'
L = 388.94'	LT = 136.02'
T = 194.98'	ST = 68.01'
R = 2,200.00'	
e = 6%	
RUNOFF = 204'	

-RPC-

PIs Sta 11+38.72	PI Sta 13+14.79	PIs Sta 14+90.44
θs = 4° 46' 01.2"	Δ = 9° 45' 58.1" (RT)	θs = 4° 46' 01.2"
Ls = 208.00'	D = 4° 35' 01.2"	Ls = 208.00'
LT = 138.72'	L = 213.06'	LT = 138.72'
ST = 69.38'	T = 106.79'	ST = 69.38'
	R = 1,250.00'	
	e = 8%	
	RUNOFF = 208'	

-RPD-

PIs Sta 11+34.36	PI Sta 13+91.39	PIs Sta 16+46.91
θs = 3° 23' 44.2"	Δ = 12° 44' 50.2" (LT)	θs = 3° 23' 44.2"
Ls = 201.50'	D = 3° 22' 13.2"	Ls = 201.50'
LT = 134.36'	L = 378.22'	LT = 134.36'
ST = 67.19'	T = 189.89'	ST = 67.19'
	R = 1,700.00'	
	e = 6.5%	
	RUNOFF = 201.50'	



ADT 2020 / ADT 2040 (IN HUNDREDS)	
-Y1- HALIFAX RD / NC 4	16/19, 5/6, 4/4, 33/43, 30/40, 71/92
-L- I-95	478/652, 474/647

PAVEMENT REMOVAL

- FOR BRIDGE DETAIL SEE SHEETS 2B-1 & S-1 THRU S-33
- FOR -L1- PROFILE SEE SHEETS 10 THRU 12
- FOR -L2- PROFILE SEE SHEETS 10 THRU 12
- FOR -L- PROFILE SEE SHEET 13
- FOR -Y1- PROFILE SEE SHEETS 16 & 17
- FOR -RPA- & -RPB- PROFILE SEE SHEET 14
- FOR -RPC- & -RPD- PROFILE SEE SHEET 15
- FOR -RAB1- & -RAB2- PROFILE SEE SHEET 19
- FOR -RAB1- & -RAB2- DETAILS SEE 2B-2 & 2B-3

GRAPHIC SCALE 50 25 0 50 100 PLANS

3/1/2021 R:\Roadway\Proj\B5980_rdy_psh05.dgn Morgan.Nelson

PROJECT REFERENCE NO.	SHEET NO.
B-5980	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18470 EDWARD GLENN EDENS JR. 3/2/2021	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 10746 DENNIS K. HOWE 3/2/2021

Prepared in the Office of: AECOM NC FIRM LICENSE No. F-0342 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 (919) 854-6200 · (919) 854-6259 (FAX)

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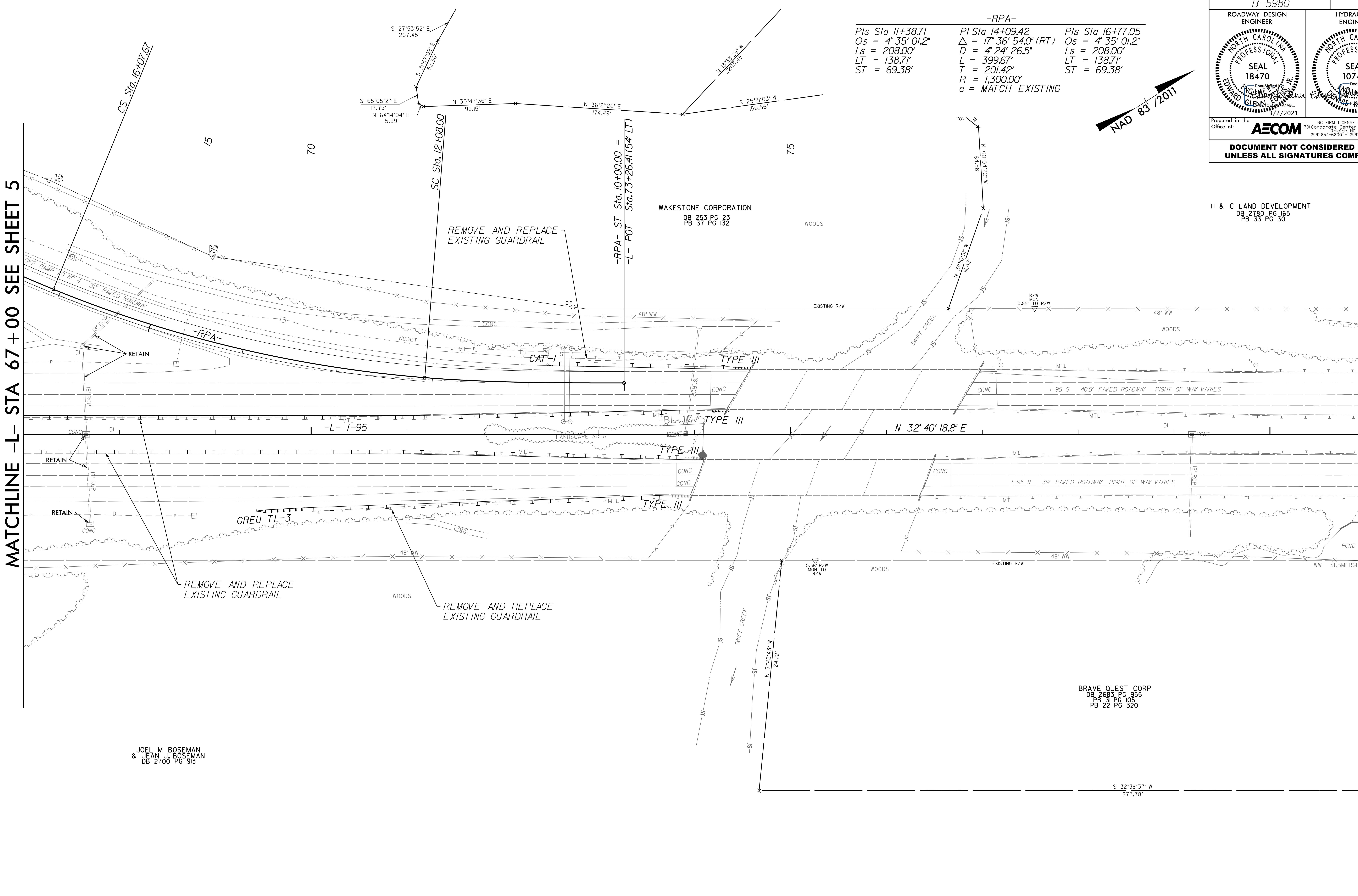

NOTE: SHEET PROVIDED FOR REFERENCE. PAVEMENT MARKING AND TRAFFIC CONTROL WORK ONLY WILL BE COMPLETED IN THIS AREA.

FOR -L- PROFILE SEE SHEET 13
FOR -RPA- PROFILE SEE SHEET 14

PROJECT REFERENCE NO.	SHEET NO.
B-5980	7

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD GLENN EDENS, JR. 3/2/2021

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 10746 ENGINEER DENNIS K. HOLT 3/2/2021

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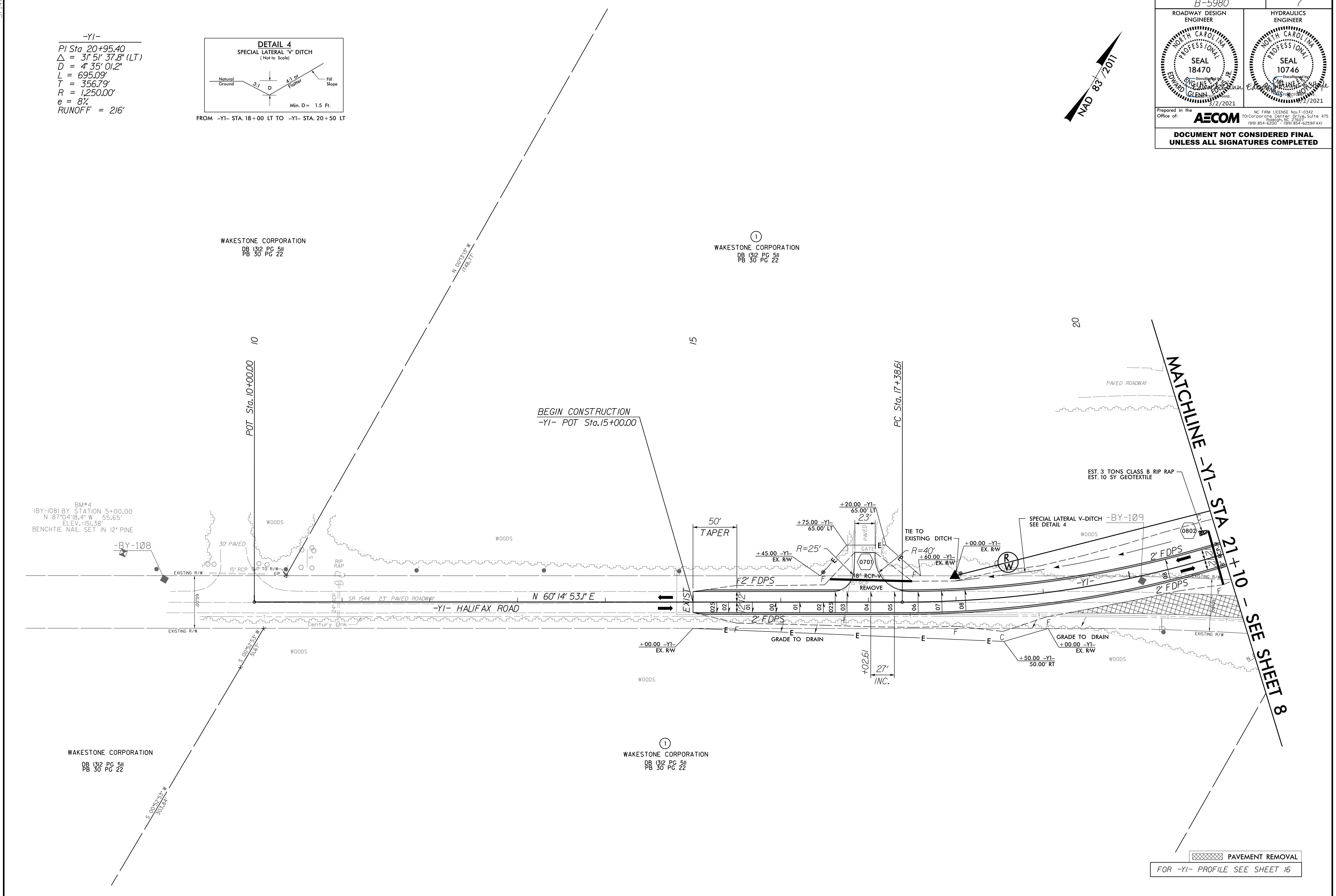

-Y1-
PI Sta 20+95.40
△ = 31° 51' 37.8" (LT)
D = 4° 35' 01.2"
L = 695.09'
T = 356.79'
R = 1,250.00'
e = 8%
RUNOFF = 216'
DETAIL 4
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
3:1
D
4:1 or Flatter
Fill Slope
Min. D = 1.5 Ft.
FROM -Y1- STA. 18+00 LT TO -Y1- STA. 20+50 LT
NAD 83/2011
WAKESTONE CORPORATION
DB 1312 PG 511
PB 30 PG 22
POT Sta. 10+00.00
BEGIN CONSTRUCTION
-Y1- POT Sta.15+00.00
PC Sta. 17+38.61
BM#4
(BY-108) BY STATION 5+00.00
N 87°04'18.4" W 55.65'
ELEV.=151.38'
BENCHTIE NAIL SET IN 12" PINE
-BY-108
-BY-109
N 60° 14' 53.1" E
-Y1- HALIFAX ROAD
SR 1544 23' PAVED ROADWAY
50' TAPER
2' FDPS
R=25'
R=40'
+20.00 -Y1- 65.00' LT
+75.00 -Y1- 65.00' LT
+45.00 -Y1- EX. R/W
+60.00 -Y1- EX. R/W
+00.00 -Y1- EX. R/W
18" RCP
REMOVE
TIE TO EXISTING DITCH
SPECIAL LATERAL V-DITCH SEE DETAIL 4
EST. 3 TONS CLASS B RIP RAP
EST. 10 SY GEOTEXTILE
GRADE TO DRAIN
+50.00 -Y1- 50.00' RT
+02.61
27' INC.
MATCHLINE -Y1- STA 21+10 - SEE SHEET 8
PAVEMENT REMOVAL
FOR -Y1- PROFILE SEE SHEET 16
WOODS
PAVED ROADWAY
EXISTING R/W
Century Link

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PROJECT REFERENCE NO.	SHEET NO.
B-5980	8

ROADWAY DESIGN ENGINEER — SEAL 18470 — EDWARD GLENN EDENS, JR. — 3/2/2021

HYDRAULICS ENGINEER — SEAL 10746 — DENNIS K. HOYLE — 3/2/2021

Prepared in the Office of: AECOM — NC FIRM LICENSE No: F-0342, 701 Corporate Center Drive, Suite 475, Raleigh, NC 27607, (919) 854-6200 - (919) 854-6259 (FAX)

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-Y1-		-Y2-	
PI Sta 20+95.40	PI Sta 37+41.69	PI Sta 11+30.99	PI Sta 18+48.15
Δ = 31° 51' 37.8" (LT)	Δ = 86° 34' 32.0" (RT)	Δ = 55° 30' 55.2" (LT)	Δ = 37° 09' 42.4" (RT)
D = 4° 35' 01.2"	D = 9° 32' 57.5"	D = 28° 38' 52.4"	D = 3° 03' 50.2"
L = 695.09'	L = 906.62'	L = 193.79'	L = 1,212.87'
T = 356.79'	T = 565.17'	T = 105.26'	T = 628.63'
R = 1,250.00'	R = 600.00'	R = 200.00'	R = 1,870.00'
e = 8%	e = 8%	e = 2.5%	e = MATCH EXISTING
RUNOFF = 216'	RUNOFF = 184'	RUNOFF = 45'	
	DS = 45 MPH	DS = 25 MPH	

DETAIL 3 — SPECIAL LATERAL 'V' DITCH (Not to Scale)

Natural Ground, 3:1, D, 4:1 or Flatter, Fill Slope, Min. D = 1 Ft.

FROM -Y2- STA. 11+50 RT TO -Y2- STA. 13+69 RT

DETAIL 4 — SPECIAL LATERAL 'V' DITCH (Not to Scale)

Natural Ground, 3:1, D, 4:1 or Flatter, Fill Slope, Min. D = 1.5 Ft.

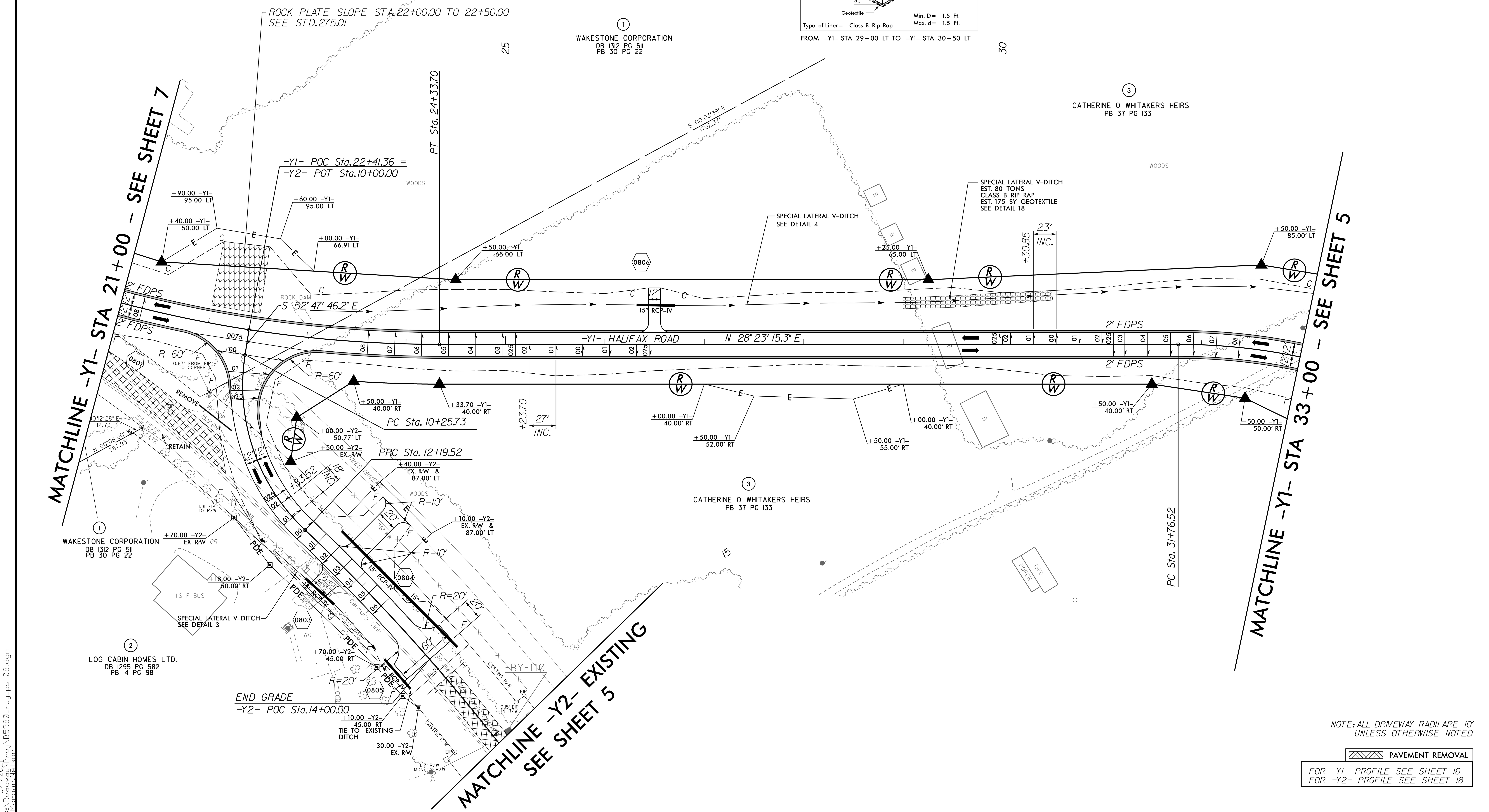
FROM -Y1- STA. 23+00 LT TO -Y1- STA. 29+00 LT
FROM -Y1- STA. 30+50 LT TO -Y1- STA. 33+00 LT
FROM -DW1- STA. 10+41 LT TO -DW1- STA. 11+91 LT

DETAIL 18 — SPECIAL LATERAL 'V' DITCH (Not to Scale)

Natural Ground, 3:1, D, d, 4:1 or Flatter, Fill Slope, Geotextile
Type of Liner = Class B Rip-Rap
Min. D = 1.5 Ft.
Max. d = 1.5 Ft.

FROM -Y1- STA. 29+00 LT TO -Y1- STA. 30+50 LT

NAD 83 / 2011



NOTE: ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PAVEMENT REMOVAL

FOR -Y1- PROFILE SEE SHEET 16
FOR -Y2- PROFILE SEE SHEET 18

5/14/99

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3/1/2021
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PROJECT REFERENCE NO.	SHEET NO.
B-5980	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD GLENN EDGE, JR. 5/2/2021

NORTH CAROLINA PROFESSIONAL SEAL 10746 ENGINEER DENNIS K. HOYLE 5/2/2021

Prepared in the Office of: AECOM — NC FIRM LICENSE No: F-0342, 701 Corporate Center Drive, Suite 475, Raleigh, NC 27607, (919) 854-6200 (919) 854-6259(FAX)

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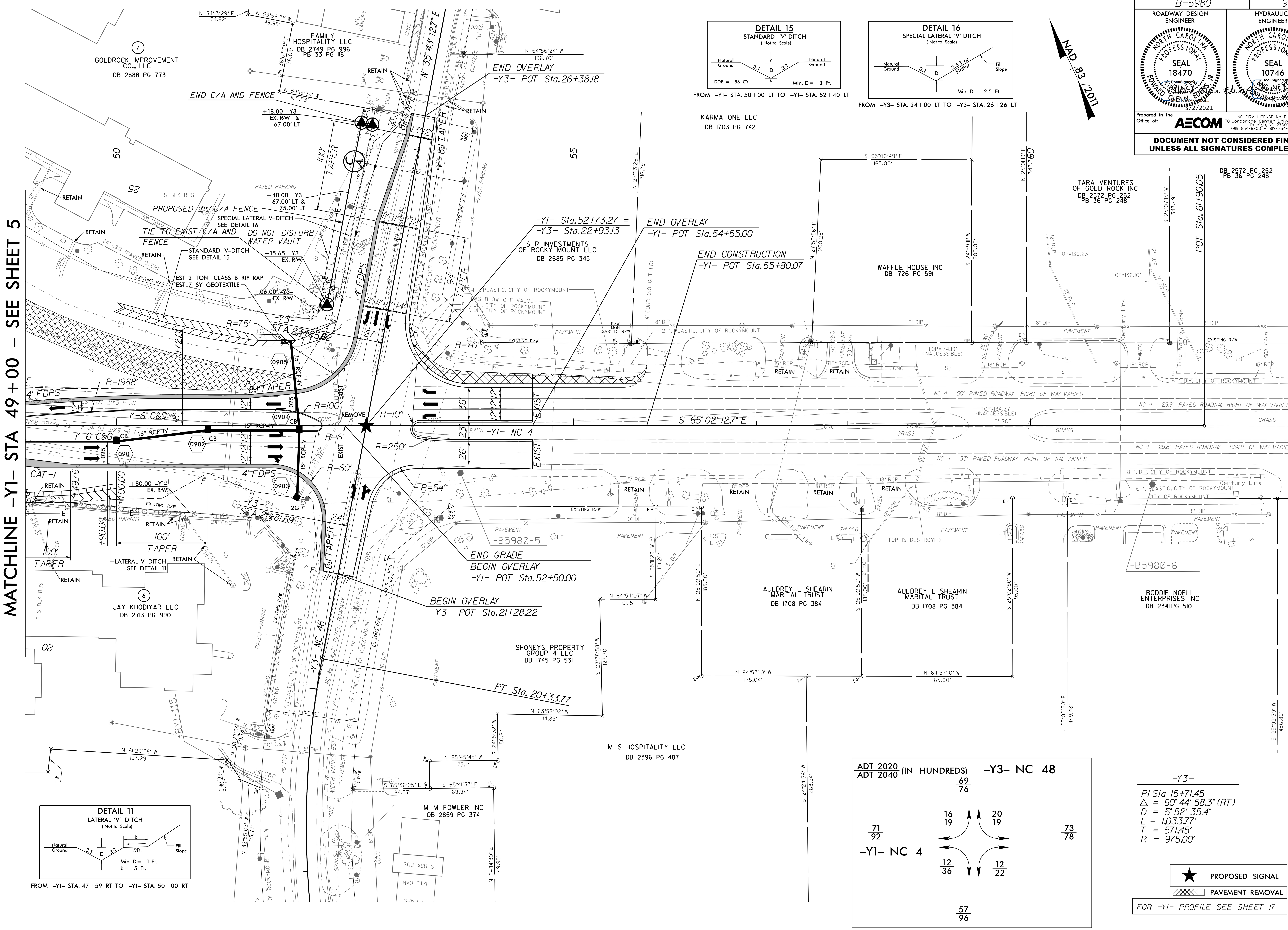

ADT 2020 / ADT 2040 (IN HUNDREDS)	-Y3- NC 48
-Y3- NC 48 north leg	69 / 76
-Y3- NC 48 south leg	57 / 96
-Y1- NC 4 west leg	71 / 92
-Y1- NC 4 east leg	73 / 78
Turning movements	16/19, 20/19, 12/36, 12/22

-Y3-

PI Sta 15+71.45
Δ = 60° 44' 58.3" (RT)
D = 5° 52' 35.4"
L = 1,033.77'
T = 571.45'
R = 975.00'

★ PROPOSED SIGNAL

PAVEMENT REMOVAL

FOR -Y1- PROFILE SEE SHEET 17

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5/14/99

5/28/99

-L1-

BEGIN MILL AND RESURFACE (SB)
-L1- STA. 27+17.92
EL = 146.41'

-L1- STA. 36+67.84 (24' LT)
-RPB- STA. 10+00.00 =

PROPOSED MILL AND RESURFACE

EXISTING GROUND

0.30'

FOR -L1- PLAN VIEW SEE SHEET 4 & 5

PIPE HYDRAULIC DATA
-L1- Sta.38+33

DRAINAGE AREA	= 10.9	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 49.0	CFS
DESIGN HW ELEVATION	= 137.33	FT
100 YEAR DISCHARGE	= 55.0	CFS
100 YEAR HW ELEVATION	= 138.18	FT
OVERTOPPING FREQUENCY	= 100-	YRS
OVERTOPPING DISCHARGE	= 53.0	CFS
OVERTOPPING ELEVATION	= 137.69	FT

PROJECT REFERENCE NO.	SHEET NO.
B-5980	10

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD T. EGGERS, JR.
Digitally signed by EDWARD T. EGGERS, JR.
3/2/2021

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 10746 ENGINEER DENNIS K. HOWE
DocuSigned by: Dennis K. Howe
3/2/2021

Prepared in the Office of: AECOM
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-L2-

EXISTING GROUND

FOR -L2- PLAN VIEW SEE SHEET 4 & 5

3/4/2021
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5/28/99

PIPE HYDRAULIC DATA
-LI- Sta.40+30

DRAINAGE AREA	= 9.2	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 28.0	CFS
DESIGN HW ELEVATION	= 133.45	FT
100 YEAR DISCHARGE	= 31.0	CFS
100 YEAR HW ELEVATION	= 133.68	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 53.0	CFS
OVERTOPPING ELEVATION	= 137.04	FT

PROJECT REFERENCE NO.	SHEET NO.
B-5980	11

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD T. ELDRIDGE, JR. 3/2/2021

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 10746 ENGINEER GLENN E. HOWARD 3/2/2021

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-L1-

END MILL AND RESURFACE (SB)
-L1- STA. 41+27.81
EL = 137.95'

PROPOSED MILL AND RESURFACE

(-) 1.95|10%

30'

(+) 1.12|7%

EXISTING GROUND

BEGIN V-DITCH RT
-LI- STA. 40+03
ELEV = 129.00

END V-DITCH LT
-LI- STA. 40+43
ELEV = 130.70

BEGIN V-DITCH LT
-LI- STA. 39+00
ELEV = 133.49

END V-DITCH RT
-LI- STA. 41+00
ELEV = 129.72

BEGIN V-DITCH LT
-LI- STA. 40+42
ELEV = 130.70

BEGIN V-DITCH RT
-LI- STA. 42+00
ELEV = 130.47

CONTINUE V-DITCH
-LI- STA. 41+58 LT
-RPB- STA. 15+00 LT
ELEV = 131.99

END V-DITCH RT
-LI- STA. 43+50
ELEV = 130.97

LEFT DITCH

FOR -LI- PLAN VIEW SEE SHEET 5

-L2-

-L2- STA. 39+47.64 (24' RT) =
-RPC- STA. 10+00.00

EXISTING GROUND

FOR -L2- PLAN VIEW SEE SHEET 5

3/4/2021
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Morgan Nelson

PROJECT REFERENCE NO.	SHEET NO.
B-5980	12

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD GLENN EDENS, JR. — DocuSigned by: Edward Glenn Edens, Jr. — 3/2/2021	NORTH CAROLINA PROFESSIONAL SEAL 10746 ENGINEER DENNIS K. HOYLE — DocuSigned by: Dennis K. Hoyle — 3/2/2021

Prepared in the Office of: AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

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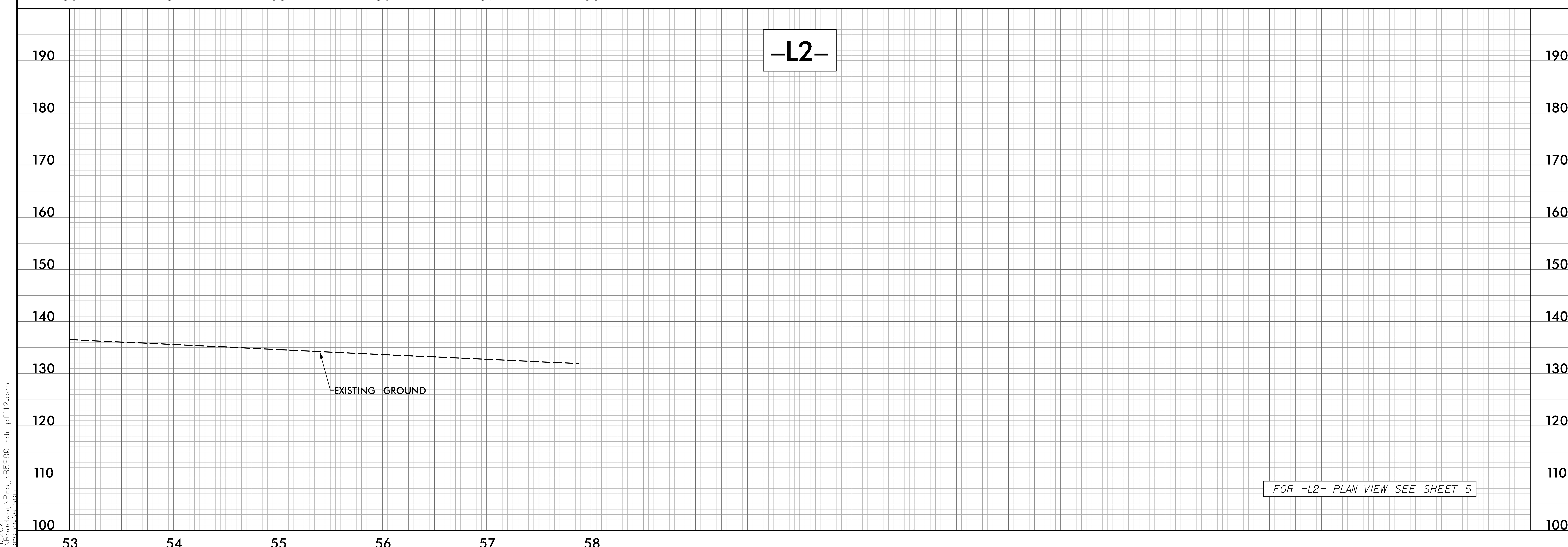

5/28/99

–L– LT

PROJECT REFERENCE NO.	SHEET NO.
B-5980	13

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD T. GLENN, JR.
DocuSigned by: Edward T. Glenn
3/2/2021

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 10746 ENGINEER CHRISTOPHER M. HOWE
DocuSigned by: Christopher M. Howe
3/2/2021

Prepared in the Office of: AECOM
NC FIRM LICENSE No: F-0342
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Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

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EXISTING GROUND

FOR –L– PLAN VIEW SEE SHEET 5 & 6

–L– RT

BEGIN MILL AND RESURFACE (NB)
–L– RT STA. 60+35.90
EL = 130.71'

END MILL & RESURFACE (NB)
–L– RT STA. 64+50.07 (54' RT)=
–RPD– STA. 10+00.00
EL = 126.94'

PROPOSED MILL AND RESURFACE

EXISTING GROUND

FOR –L– PLAN VIEW SEE SHEET 5 & 6

3/4/2021
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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-5980	14

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD GLENN JR.

5/2/2021

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 10746 ENGINEER CHRISTINE L. HOWARD

5/2/2021

Prepared in the Office of: AECOM

NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

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-RPA-

END GRADE
-RPA- STA. 31+43.86 =
-RAB1- STA. 12+76.76 (21' RT)
EL = 159.78'

BEGIN GRADE
-RPA- STA. 23+00.00
EL = 139.61'

PI = 27+20.00
EL = 153.89'
VC = 230'
K = 114

PI = 30+96.96
EL = 159.12'

PROPOSED GRADE

(+)3.4000%
(+)1.3883%
(+)1.3883%
(+)1.4311%

EXISTING GROUND

42"

(+)0.2501%

BEGIN V-DITCH RT
-RPA- STA.24+62
ELEV=122.53

END V-DITCH RT
-RPA- STA.28+35
ELEV=123.46

PIPE HYDRAULIC DATA
-RPA- Sta.28+66

DRAINAGE AREA	=	18.8	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	75.0	CFS
DESIGN HW ELEVATION	=	128.95	FT
100 YEAR DISCHARGE	=	85.0	CFS
100 YEAR HW ELEVATION	=	129.72	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	249.0	CFS
OVERTOPPING ELEVATION	=	152.85	FT

RIGHT DITCH --------

FOR -RPA- PLAN VIEW SEE SHEET 5

-RPB-

BEGIN GRADE
-RPB- STA. 10+00.00 =
-L1- STA. 36+67.84 (24' LT)
EL = 138.97'

END GRADE
-RPB- STA. 23+60.76 =
-RAB1- STA. 10+89.94 (21' RT)
EL = 159.61'

PI = 10+70.00
EL = 138.42'
VC = 100'
K = 37.3

PI = 11+80.00
EL = 137.85'
VC = 120'
K = 8.17

PI = 14+75.00
EL = 135.88'
VC = 390'
K = 1.17

PI = 22+99.10
EL = 157.96'

PROPOSED GRADE

(-)0.7864%
(-)0.5182%
(-)0.5182%
(-)0.6650%
(-)0.6650%
(+)2.6790%
(+)2.6790%
(+)2.6790%
(+)0.3367%

EXISTING GROUND

18"
(+) 1.1300%
(+) 8.7500%
18"

CONTINUE V-DITCH
-RPB- STA.15+00 LT
-L1- STA.41+58 LT
ELEV = 131.99

PI =17+00
EL = 134.25

END V-DITCH
-RPB- STA.17+50 LT
ELEV = 138.63

LEFT DITCH -·-·-·-·-·-

FOR -RPB- PLAN VIEW SEE SHEET 4 & 5

3/1/2021
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Morgan Nelson

PROJECT REFERENCE NO.	SHEET NO.
B-5980	15

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18470 EDWARD GLENN EDENS, JR. — DocuSigned by: Edward Glenn Edens, Jr. 5A6D1CECAFFA4AB... 3/2/2021

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 10746 DENNIS K. HOYLE — DocuSigned by: Dennis K. Hoyle F008CFDA9777419... 3/2/2021

Prepared in the Office of: AECOM — NC FIRM LICENSE No: F-0342, 701 Corporate Center Drive, Suite 475, Raleigh, NC 27607, (919) 854-6200 - (919) 854-6259(FAX)

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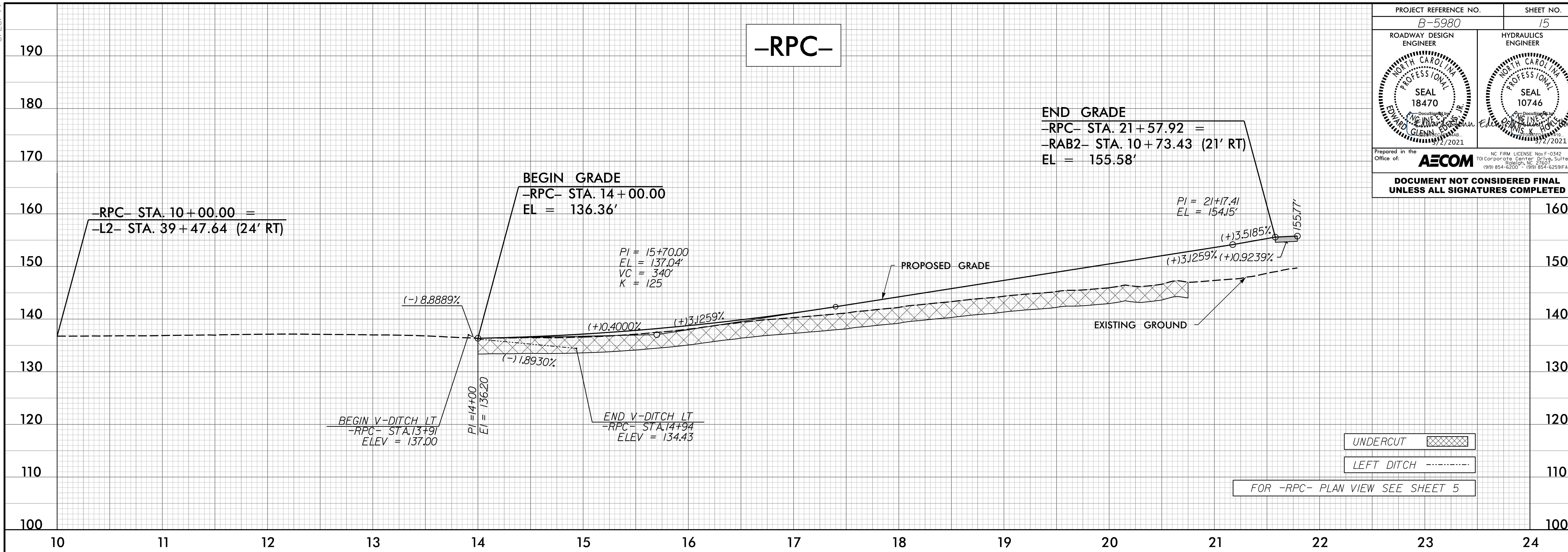

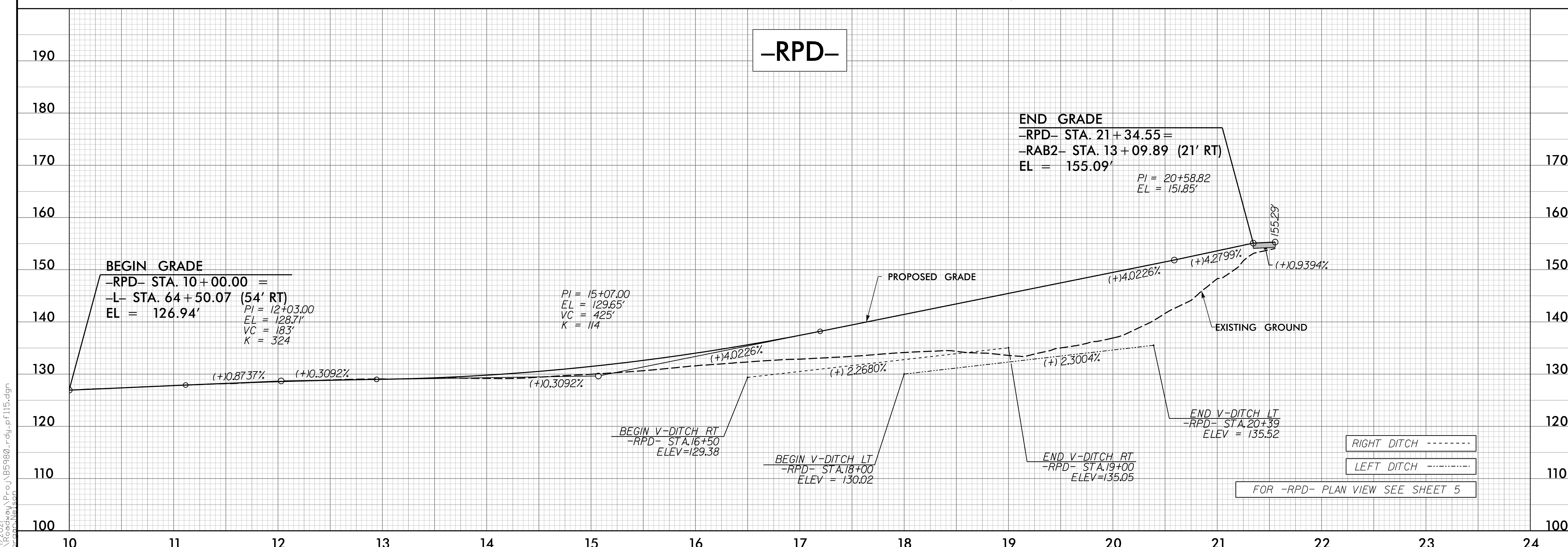

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PROJECT REFERENCE NO.	SHEET NO.
B-5980	16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18470 EDWARD GLENN EDENS JR. 3/2/2021	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 10746 DENNIS K. HOYLE 3/2/2021

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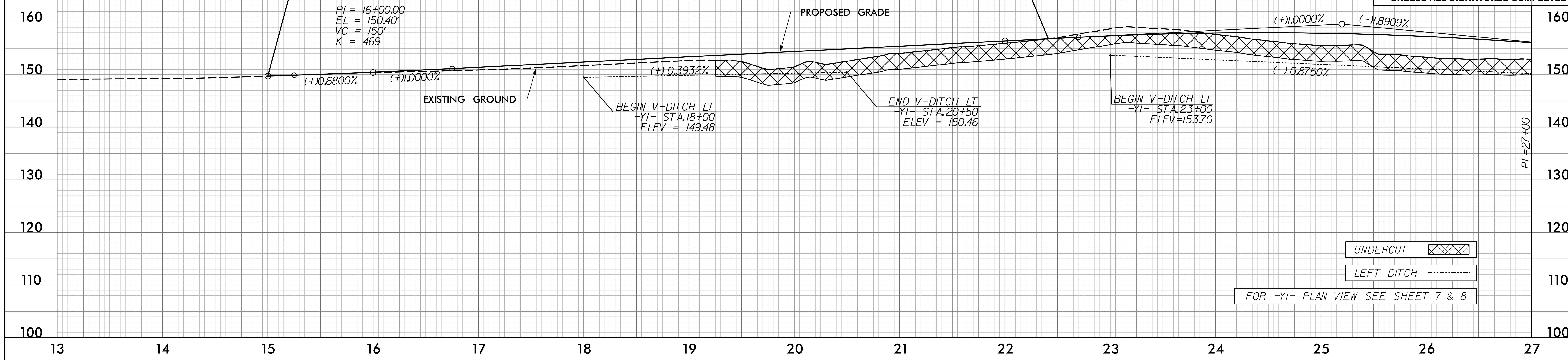

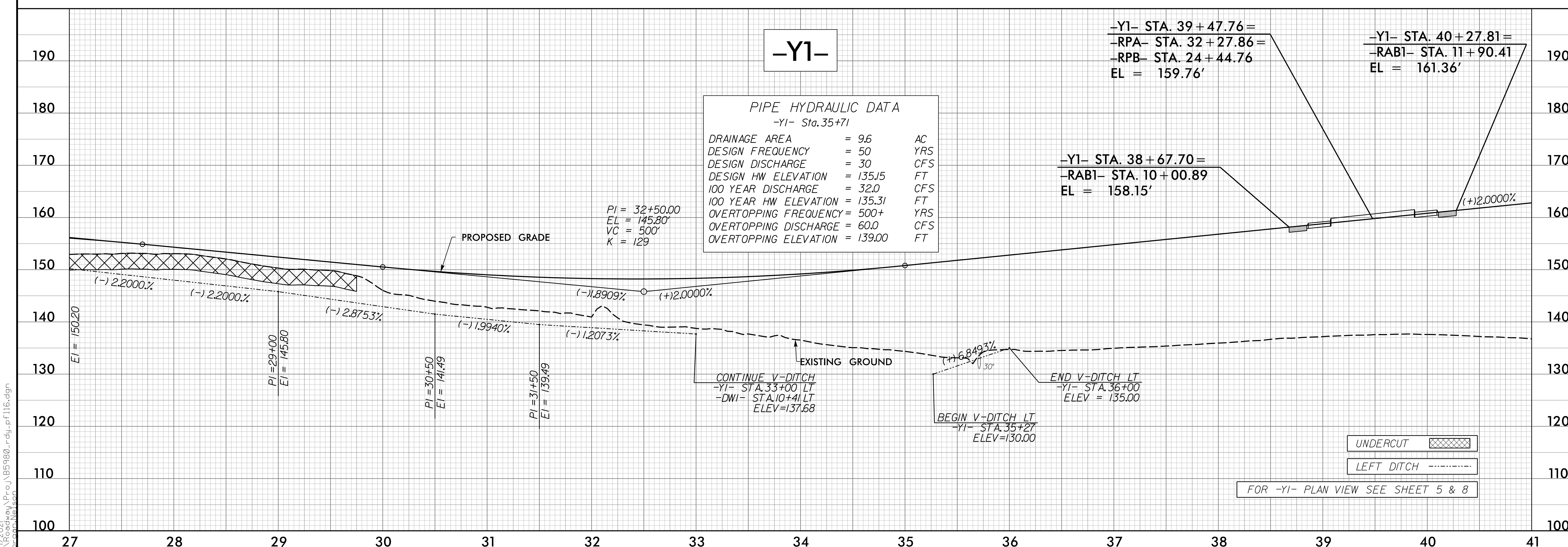

PIPE HYDRAULIC DATA
-Y1- Sta. 35+71

DRAINAGE AREA	=	9.6	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	30	CFS
DESIGN HW ELEVATION	=	135.15	FT
100 YEAR DISCHARGE	=	32.0	CFS
100 YEAR HW ELEVATION	=	135.31	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	60.0	CFS
OVERTOPPING ELEVATION	=	139.00	FT

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PROJECT REFERENCE NO.	SHEET NO.
B-5980	17

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD C. EDWARDS JR.

DocuSigned by: Edward C. Edwards Jr. 5/2/2021

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 10746 ENGINEER DENNIS G. HOYLE

DocuSigned by: Dennis G. Hoyle 5/2/2021

Prepared in the Office of: AECOM

NC FIRM LICENSE No: F-0342 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 (919) 854-6200 (FAX) (919) 854-6259

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–Y1–

BEGIN BRIDGE
STA. 41+71.27

PI = 42+80.00
EL = 166.40'
VC = 245'
K = 44
DS = 40 MPH

(+)2.0000%

(–)3.5500%

END BRIDGE
STA. 44+03.26

PI = 45+42.02
EL = 157.10'

MINIMUM VERTICAL CLEARANCE 18.907' STA. 43+29.46

EXISTING GROUND

PROPOSED GRADE

(–)3.5500%

(–)2.1313%

(–)12.5966%

–Y1– STA. 45+42.02 =
–RAB2– STA. 10+00.00
EL = 157.10'

BEGIN V-DITCH LT
–Y1– STA.44+50
ELEV = 154.81

END V-DITCH LT
–Y1– STA.45+49
ELEV = 152.70

–Y1– STA. 46+22.02 =
–RPC– STA. 22+41.92 =
–RPD– STA. 22+18.55
EL = 155.02'

–Y1– STA. 47+02.02 =
–RAB2– STA. 11+97.92
EL = 152.94'

PI = 48+15.00
EL = 150.01'
VC = 150'
K = 298

(–)12.5966%

(–)3.1000%

SEE PROFILES BELOW FOR –Y1– LT & RT

END –Y1– GRADE
BEGIN –Y1– LT & RT GRADE
–Y1– STA. 49+50.00
EL = 145.82'

(+)1.2574%

(+)0.9570%

BEGIN V-DITCH RT
–Y1– STA.47+59
ELEV=135.49

PI =49+00
EI = 137.26

BEGIN V-DITCH
–Y1– STA.50+00 LT
ELEV = 133.29

END V-DITCH RT
–Y1– STA.50+00
ELEV=138.22

(+)0.2059%

CONTINUE V-DITCH
–Y1– STA.52+40 LT
–Y3– STA.24+00 LT
ELEV = 133.78

END –Y1– LT & RT GRADE
BEGIN OVERLAY
–Y1– STA. 52+50.00
EL = 140.44'

PROPOSED 1.5" OVERLAY

–Y1– STA. 52+73.27 =
–Y3– STA. 22+93.13
EL = 140.33'

END OVERLAY
–Y1– STA. 54+55.00
EL = 138.95'

RIGHT DITCH --------

LEFT DITCH –·–·–·–

FOR –Y1– PLAN VIEW SEE SHEET 5 & 9

–Y1– LT

END –Y1– GRADE
BEGIN –Y1– LT GRADE
–Y1– STA. 49+50.00
EL = 145.47'

PI = 50+70.00
EL = 141.75'
VC = 240'
K = 97

PROPOSED GRADE

(–)3.1000%

(–)10.6282%

EXISTING GROUND

END –Y1– LT GRADE
BEGIN –Y1– OVERLAY (SEE ABOVE)
–Y1– STA. 52+50.00
EL = 140.62'

FOR –Y1– LT PLAN VIEW SEE SHEET 9

–Y1– RT

END –Y1– GRADE
BEGIN –Y1– RT GRADE
–Y1– STA. 49+50.00
EL = 146.14'

PI = 50+90.00
EL = 141.80'
VC = 240'
K = 96

PROPOSED GRADE

(–)3.1000%

(–)10.6054%

EXISTING GROUND

END –Y1– RT GRADE
BEGIN –Y1– OVERLAY (SEE ABOVE)
–Y1– STA. 52+50.00
EL = 140.83'

FOR –Y1– RT PLAN VIEW SEE SHEET 9

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–Y2–

PROJECT REFERENCE NO.	SHEET NO.
B-5980	18

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD GLENN EDGERTON JR.

5/2/2021

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 10746 ENGINEER CHRISTOPHER GLENN HOWARD

5/2/2021

Prepared in the Office of: AECOM

NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
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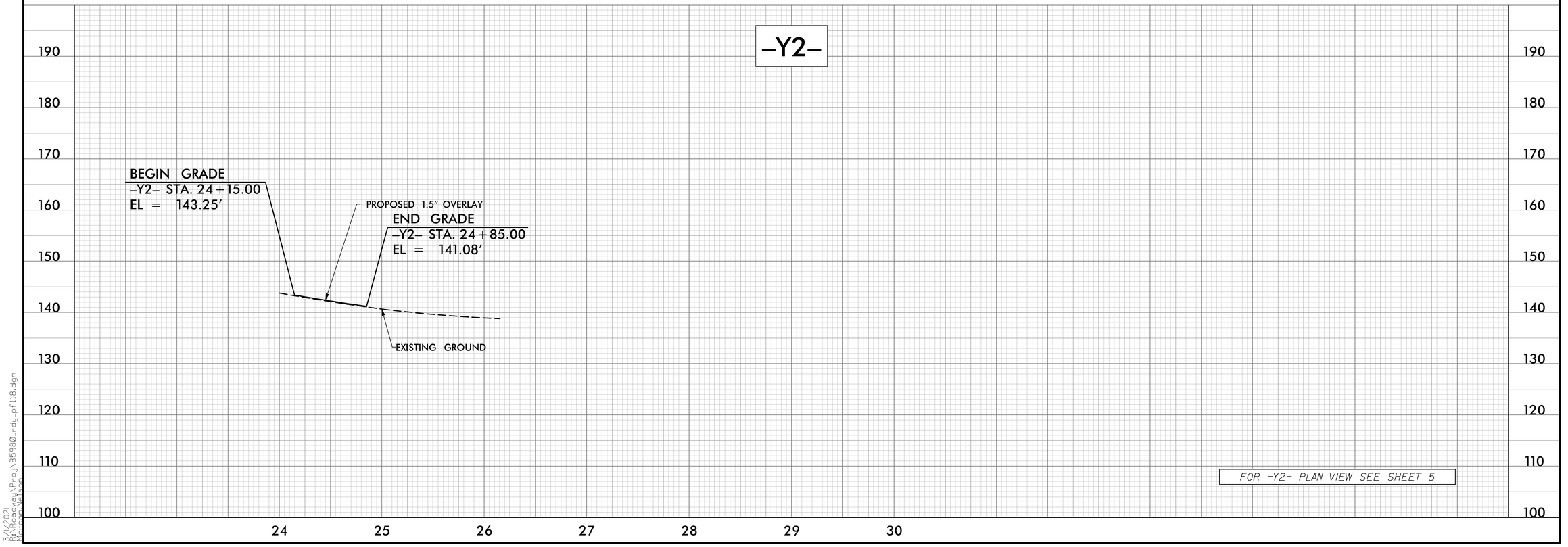

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PROJECT REFERENCE NO.	SHEET NO.
B-5980	19

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD GLENN EDENS, JR. — DocuSigned by: Edward Glenn Edens, Jr. 5A6D1CECAFFA4AB... 3/2/2021

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 10746 ENGINEER DENNIS K. HOYLE — DocuSigned by: Dennis K. Hoyle F008CFDA9777419... 3/2/2021

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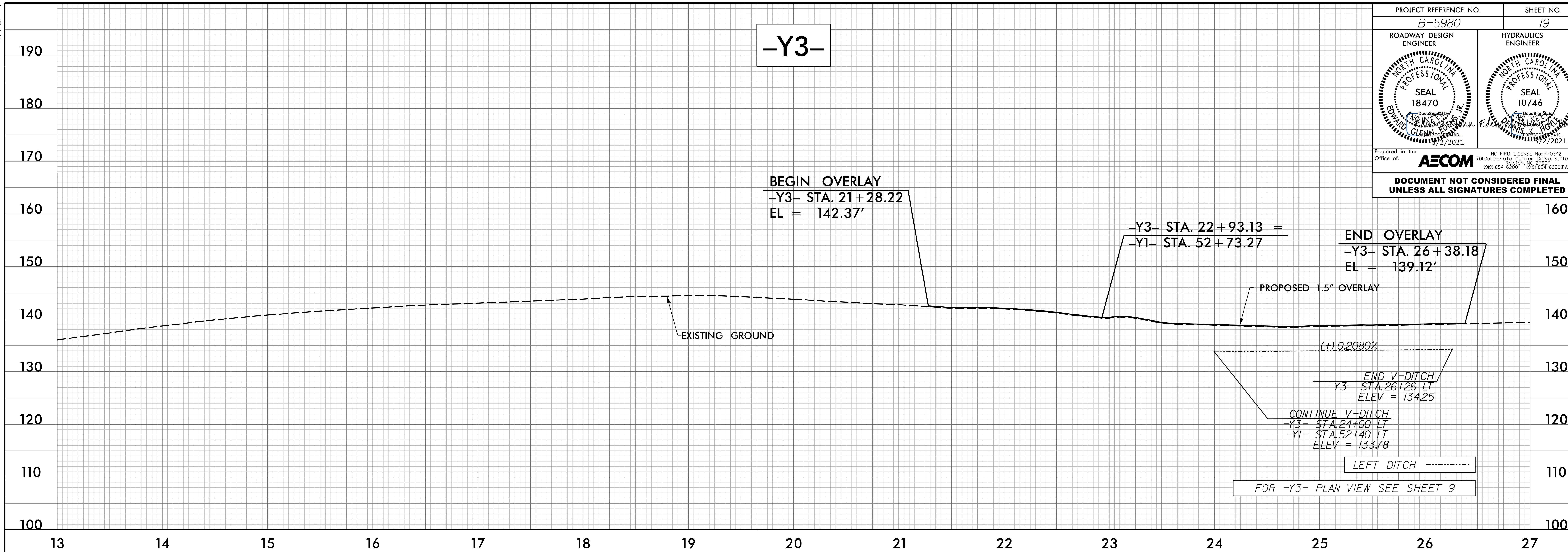

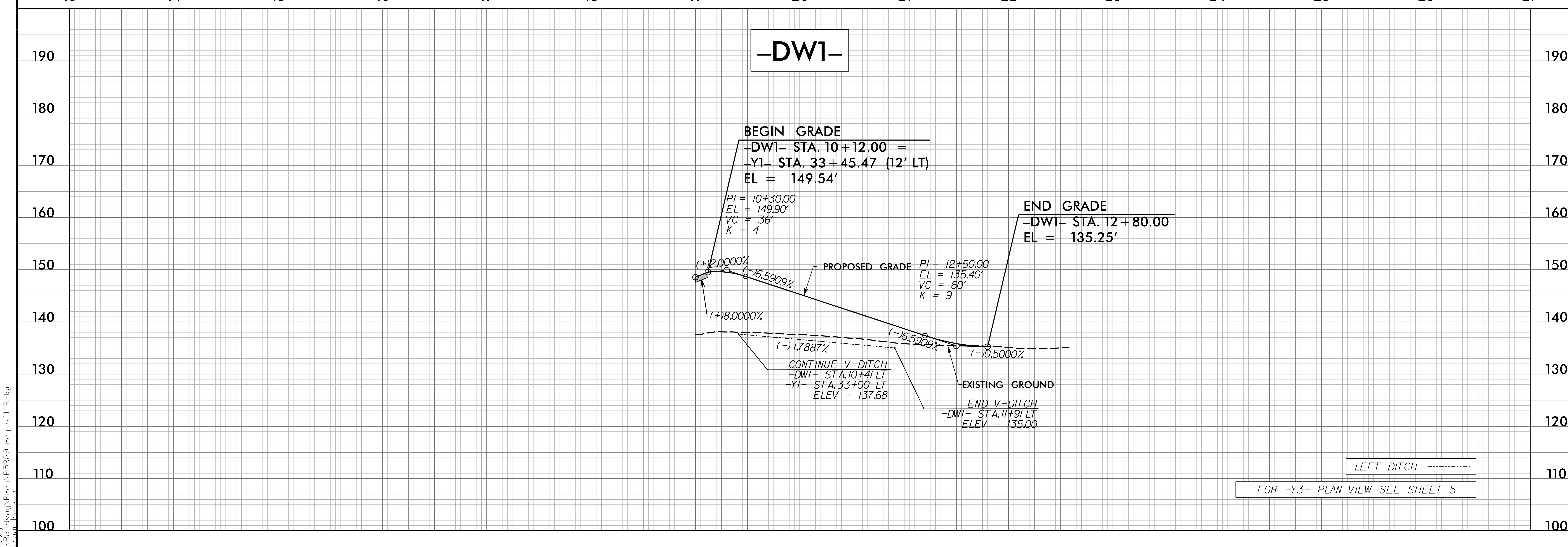

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PROJECT REFERENCE NO.	SHEET NO.
B-5980	20

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD C. EDWARDS JR. 3/2/2021

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 10746 ENGINEER GLENN L. HOWELL 3/2/2021

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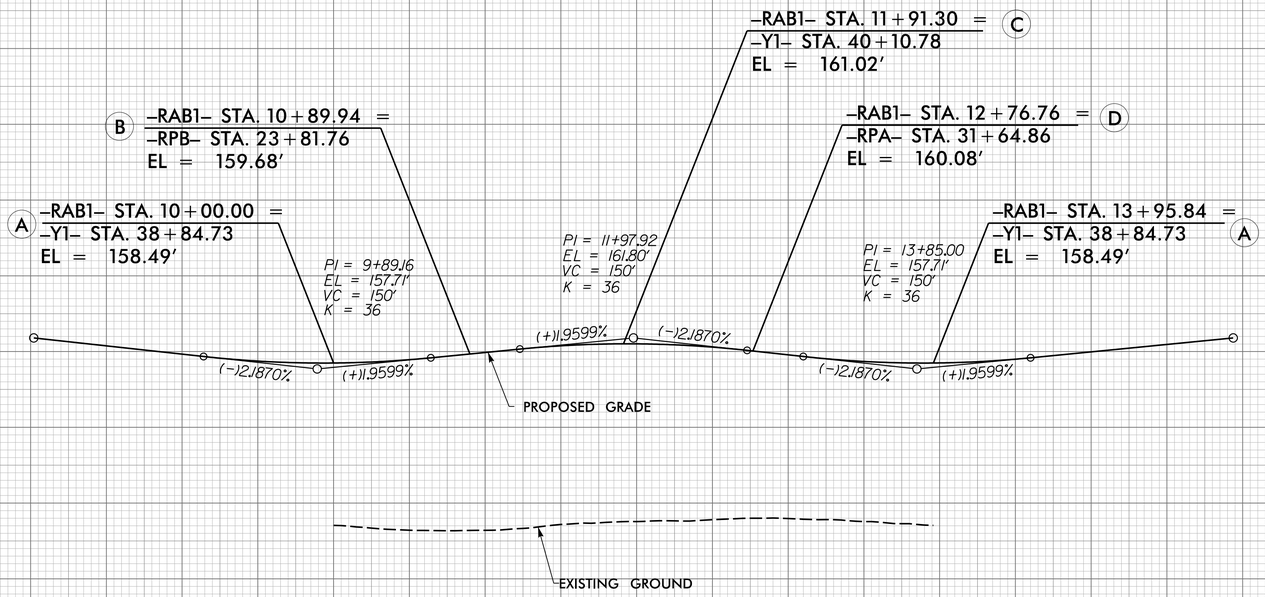
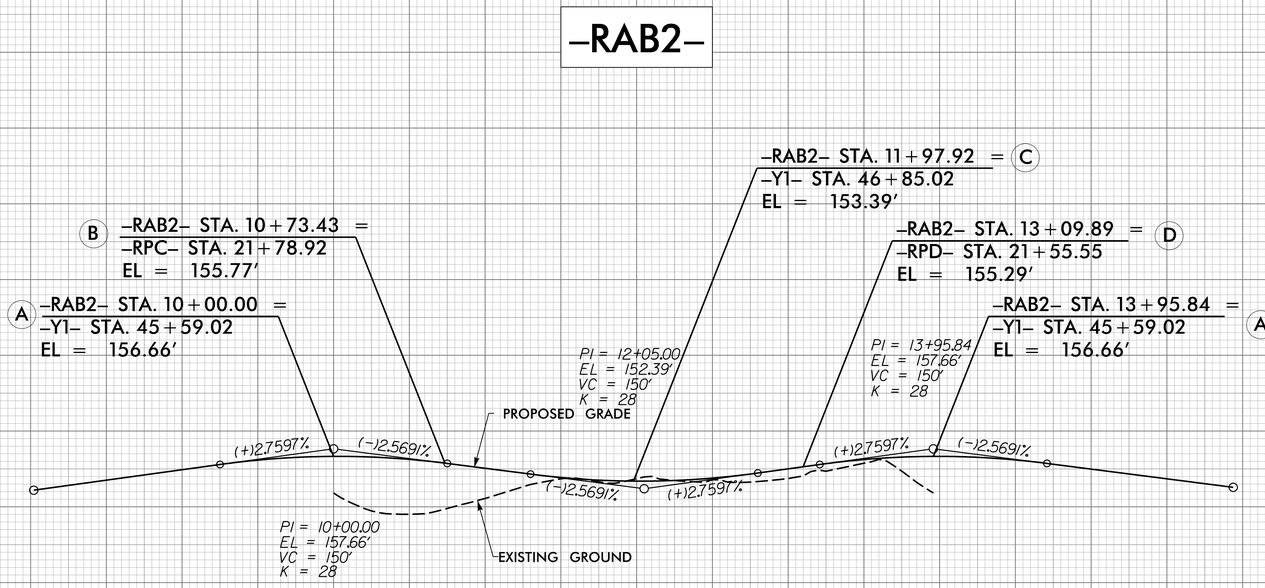
–RAB1–



FOR –RABI– PLAN VIEW SEE SHEET 5

–RAB2–



FOR –RAB2– PLAN VIEW SEE SHEET 5

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