GEOTECHNICAL ENGINEER

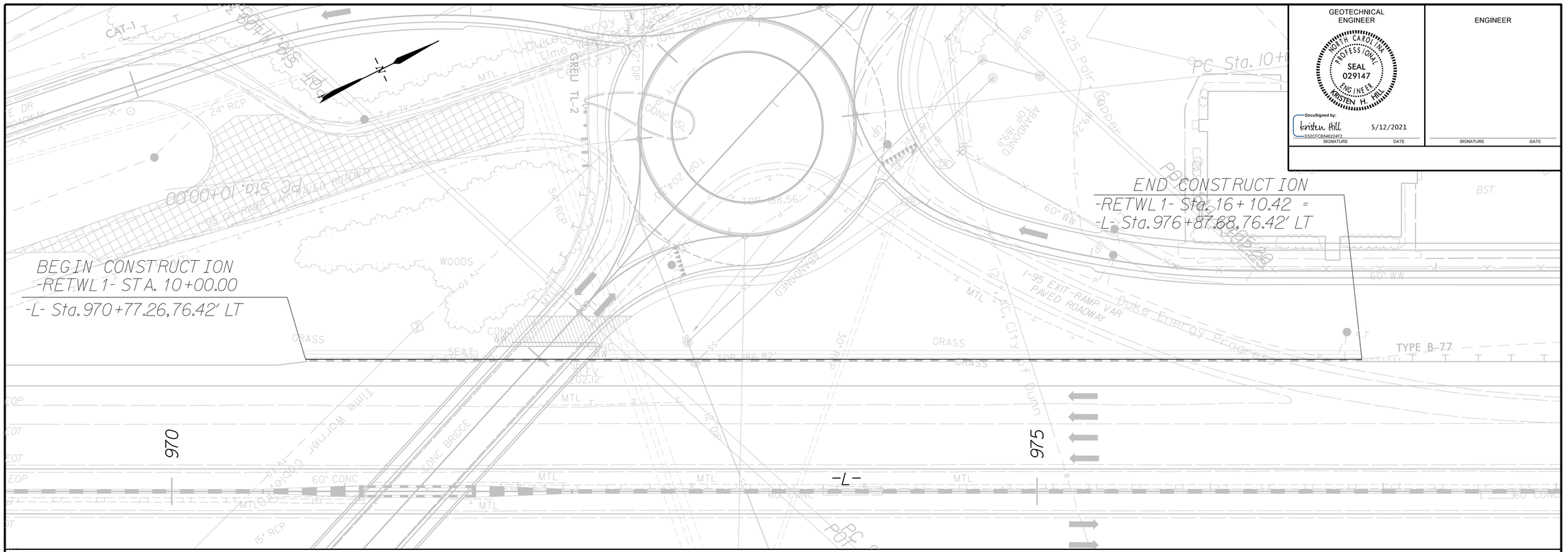
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

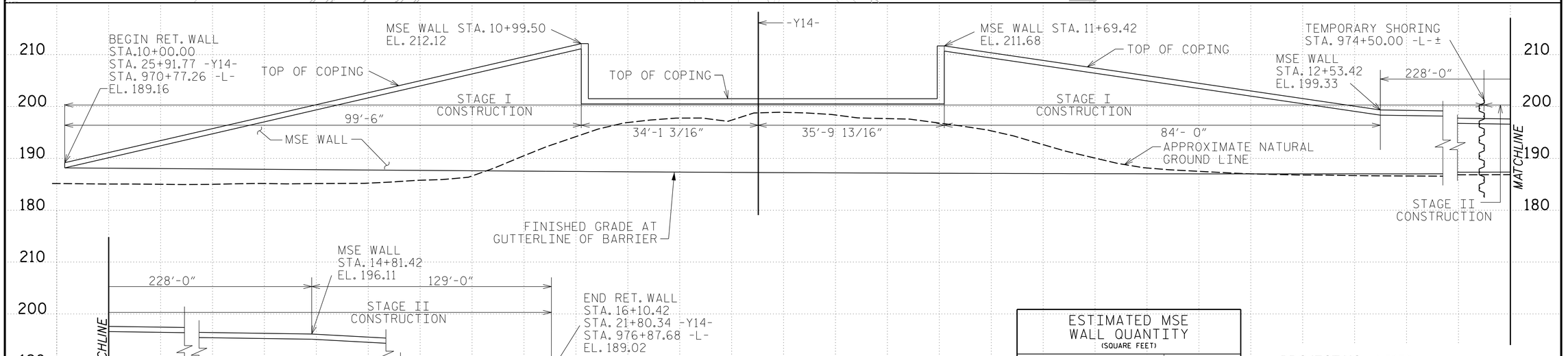
DocuSigned by: kristen Hill E52CFCB546224F2 — 5/12/2021

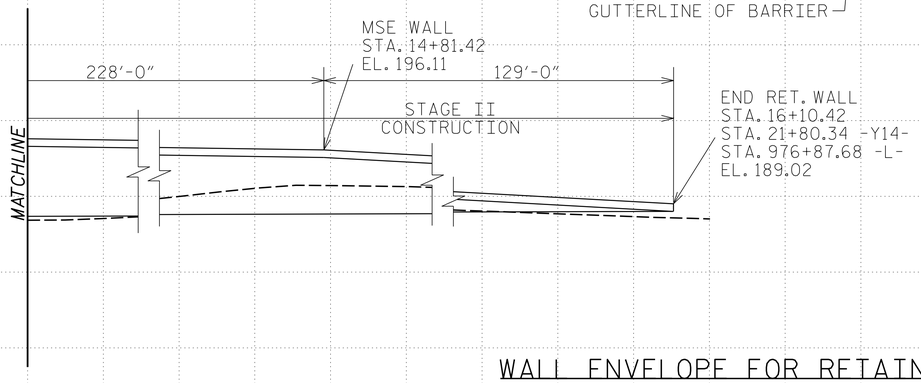
SIGNATURE DATE

ENGINEER

SIGNATURE DATE







WALL ENVELOPE FOR RETAINING WALL NO. 1

LOOKING BACKSTATION (-Y14-) AT FRONT FACE OF MSE WALL AT END BENT 1

ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 1	8,300 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	6,830 SF

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: 26+05.28 -Y14- / 971+41.06 -L-

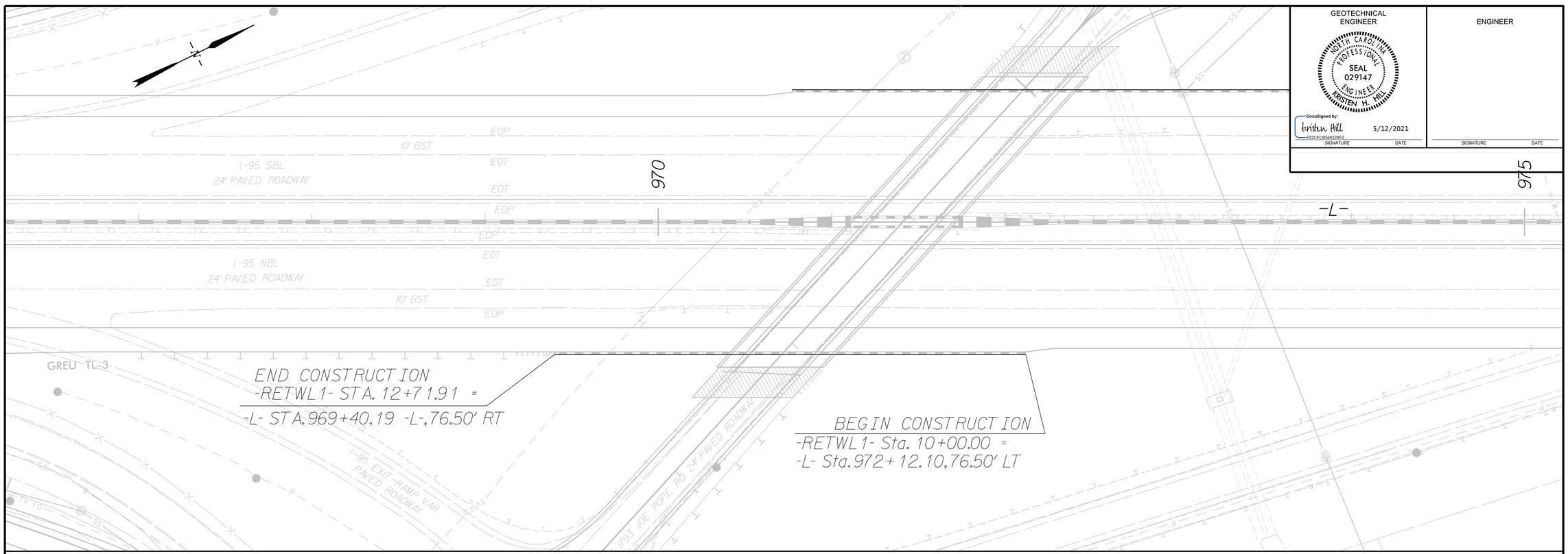
SHEET 1 OF 5

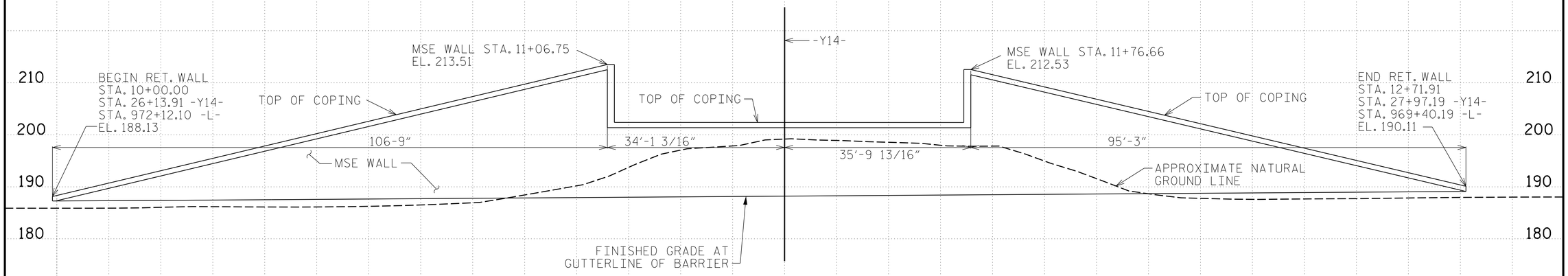
PREPARED BY: KHH	DATE: 3/12/20
REVIEWED BY: SEM	DATE: 3/12/20

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

MSE RETAINING WALL NO. 1 WALL ENVELOPES

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-1
2			4			





WALL ENVELOPE FOR RETAINING WALL NO. 2

LOOKING UPSTATION (-Y14-) AT FRONT FACE OF MSE WALL AT END BENT 2

ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 1	4,275 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	3,324 SF

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen Hill E52CFCB546224F2 — 5/12/2021

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: 26+05.28 -Y14- / 971+41.06 -L-

SHEET 2 OF 5

PREPARED BY: KHH	DATE: 3/12/20
REVIEWED BY: SEM	DATE: 3/12/20

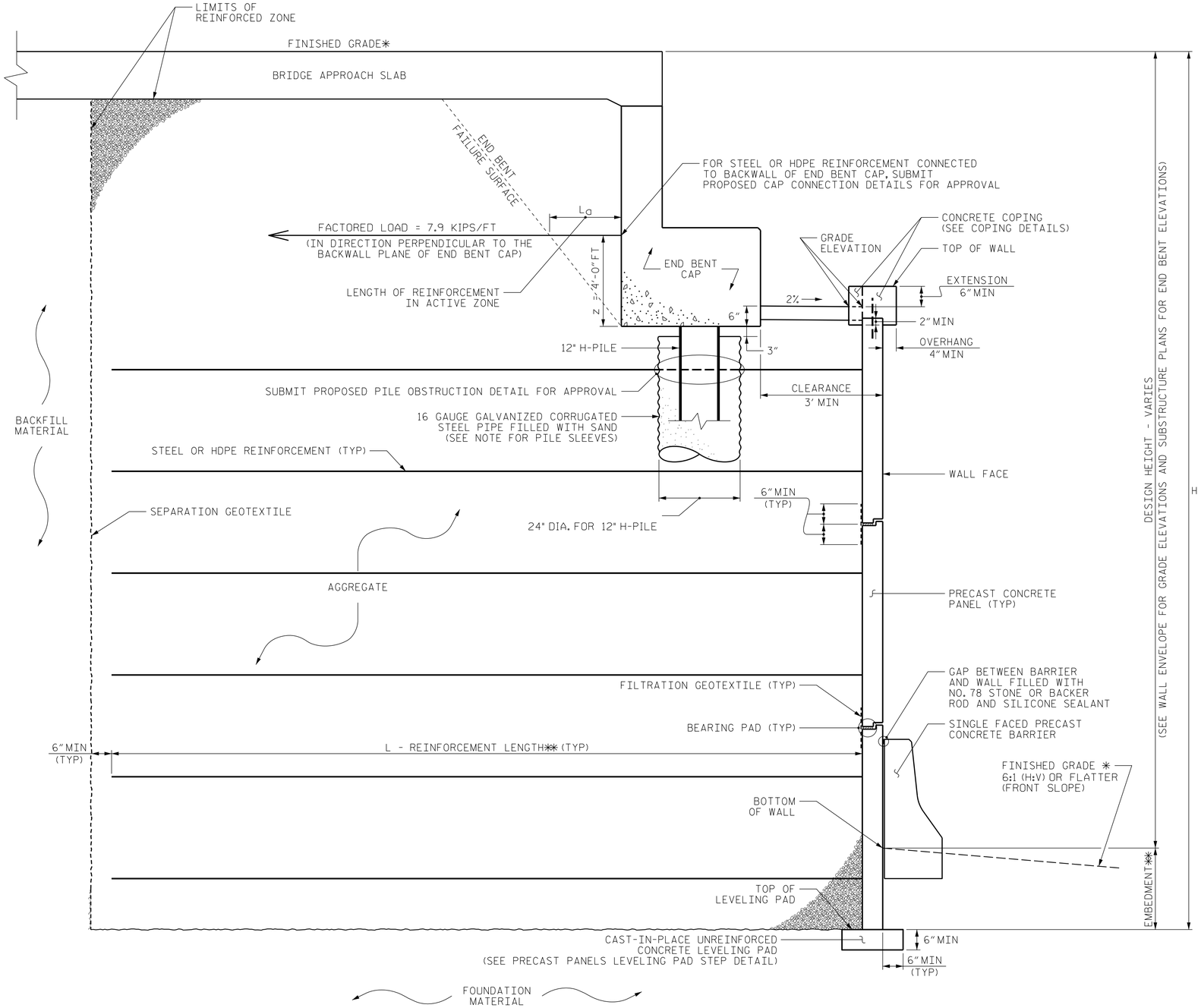
9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

MSE RETAINING WALL NO. 2 WALL ENVELOPES

REVISIONS

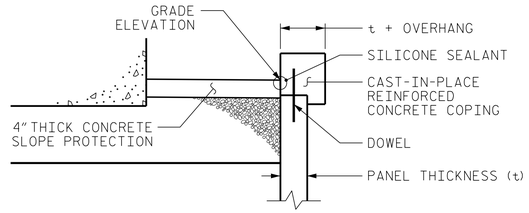
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

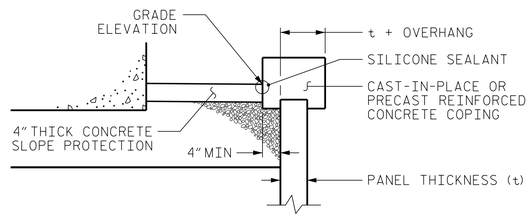
SHEET NO. W-2



MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.





COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2... 5/12/2021
SIGNATURE DATE

ENGINEER
SIGNATURE DATE

PROJECT NO.: I-5878
HARNETT COUNTY
STATION: 26+05.28 -Y14- / 971+41.06 -L-
SHEET 3 OF 5

PREPARED BY: KHH	DATE: 03/19/20
REVIEWED BY: SEM	DATE: 03/19/20

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO. 1 AND NO. 2 TYPICAL SECTION AT BRIDGE ABUTMENT

REVISIONS

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

SHEET NO. W-3

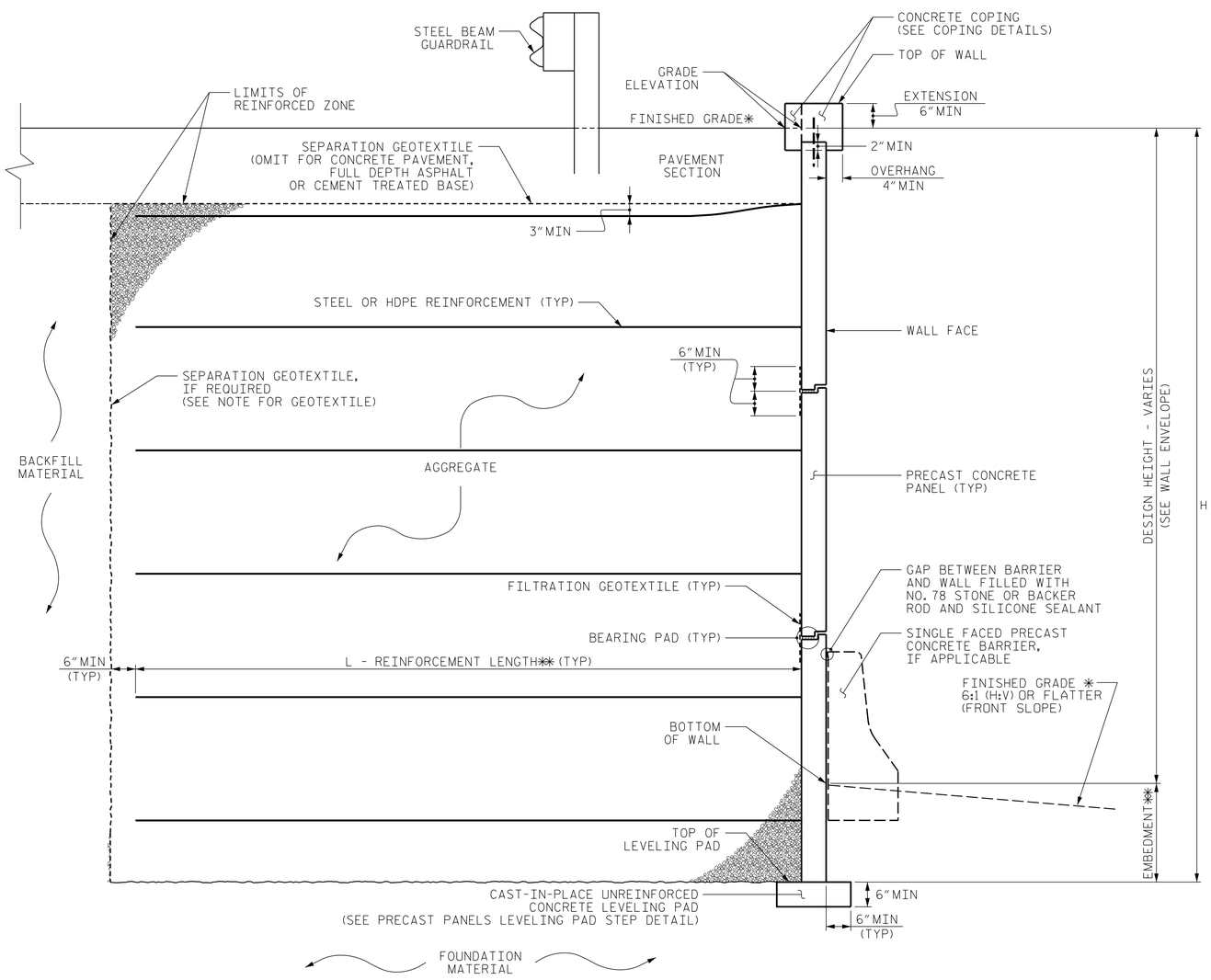
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen Hill 5/12/2021
E52CFCB546224F2...
SIGNATURE DATE

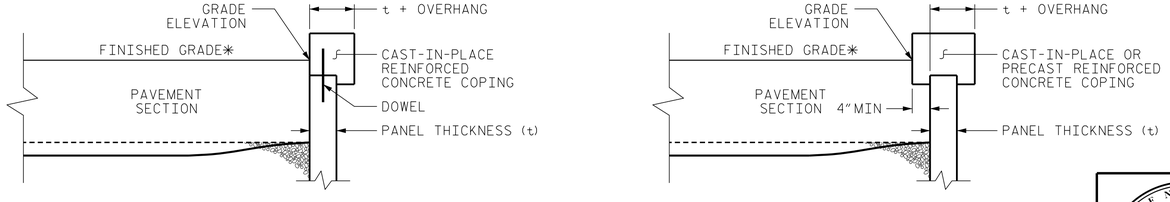
ENGINEER

SIGNATURE DATE



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PREPARED BY: KHH	DATE: 03/19/20
REVIEWED BY: SEM	DATE: 03/19/20

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: 26+05.28 -Y14- / 971+41.06 -L-

SHEET 4 OF 5

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO. 1 AND NO. 2 TYPICAL SECTION AND COPING DETAILS

REVISIONS

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

SHEET NO. W-4

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H HILL DocuSigned by: kristen hill 5/12/2021 E52CFCB546224F2	
SIGNATURE DATE	SIGNATURE DATE

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

FOR TYPE III REINFORCED BRIDGE APPROACH FILL SEE BRIDGE FILL PROVISION AND ROADWAY DETAIL DRAWING NO. 422D10.

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

USE AN MSE WALL SYSTEM WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALLS AT END BENT NO. 1 AND END BENT NO. 2.

AN ASHLAR STONE PATTERN ARCHITECTURAL FINISH IS REQUIRED FOR PRECAST PANELS FOR RETAINING WALLS AT END BENT NO. 1 AND END BENT NO. 2. FOR ARCHITECTURAL FINISH, SEE THE ARCHITECTURAL CONCRETE SURFACE TREATMENT SPECIAL PROVISION. ANTI-GRAFFITI COATING IS REQUIRED FOR THE PRECAST PANELS FOR RETAINING WALLS NO.1 AND NO.2.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 1 AND NO. 2.

AT THE CONTRACTOR'S OPTION USE FINE AGGREGATE IN THE REINFORCED ZONE FOR RETAINING WALLS NO. 1 AND NO. 2.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 1 AND NO. 2, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 6,100 LB/SF FOR WALL NO. 1 AND FOR WALL NO. 2
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT WHICH EVER IS LONGER FOR WALL NO. 1 AND WALL NO. 2.
5) MINIMUM EMBEDMENT DEPTH = 2.4 FT
6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

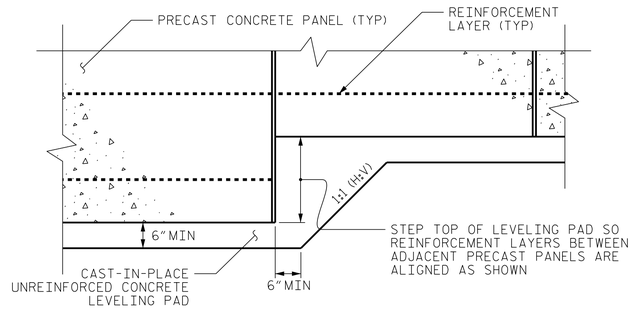
DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L_a) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 1 LOCATED AT STATION 24+91.78 -Y14- AND END BENT NO. 2 LOCATED AT STATION 27+18.78 -Y14-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAILS, FENCE OR HANDRAIL POST, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1 AND NO. 2

FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION 24+91.78 -Y14- AND END BENT NO. 2 AT STATION 27+18.78 -Y14-, WILL INTERFERE WITH REINFORCMENT FOR RETAINING WALL NO. 1 AND RETAINING WALL NO. 2. SEE FOUNDATION LAYOUT SHEET FOR FOUNDATION LOCATIONS.

INSTALL PILE SLEEVES FOR END BENT NO. 1 LOCATED AT STATION 24+91.78 -Y14- WHILE CONSTRUCTING RETAINING WALL NO. 1. INSTALL PILE SLEEVES FOR END BENT NO. 2 LOCATED AT STATION 27+18.78 -Y14-. THEN, INSTALL PILES THROUGH THE CORRUGATED STEEL PIPES AND FILL PIPES WITH LOOSE UNCOMPACTED SAND BEFORE CONSTRUCTING END BENT CAPS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 1 AND NO. 2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: 26+05.28 -Y14- / 971+41.06 -L-

SHEET 5 OF 5

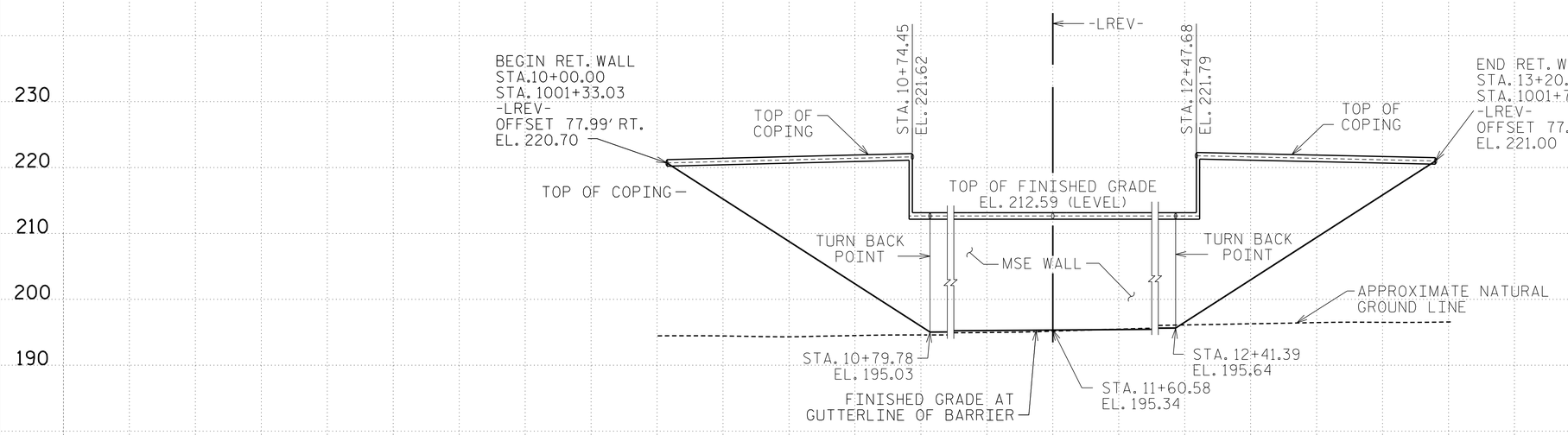
PREPARED BY: KHH	DATE: 03/23/20
REVIEWED BY: SEM	DATE: 03/23/20

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL
NO. 1 AND NO. 2
NOTES

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-5
1			3			
2			4			



WALL ENVELOPE FOR RETAINING WALL NO. 1

LOOKING BACK STATION (-LREV-) AT FRONT FACE OF MSE WALL

THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL.

ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 1	5,750 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	4,611 SF

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: Kristen Hill E52CFCB548224F2... 5/12/2021

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: 1002+79.68 -LREV- / 28+40.13 -Y15-

SHEET 1 OF 5

PREPARED BY: KHH	DATE: 5/14/2020
REVIEWED BY: SEM	DATE: 5/14/2020

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

MSE RETAINING WALL NO. 1 WALL ENVELOPES

REVISIONS

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

SHEET NO. W-6

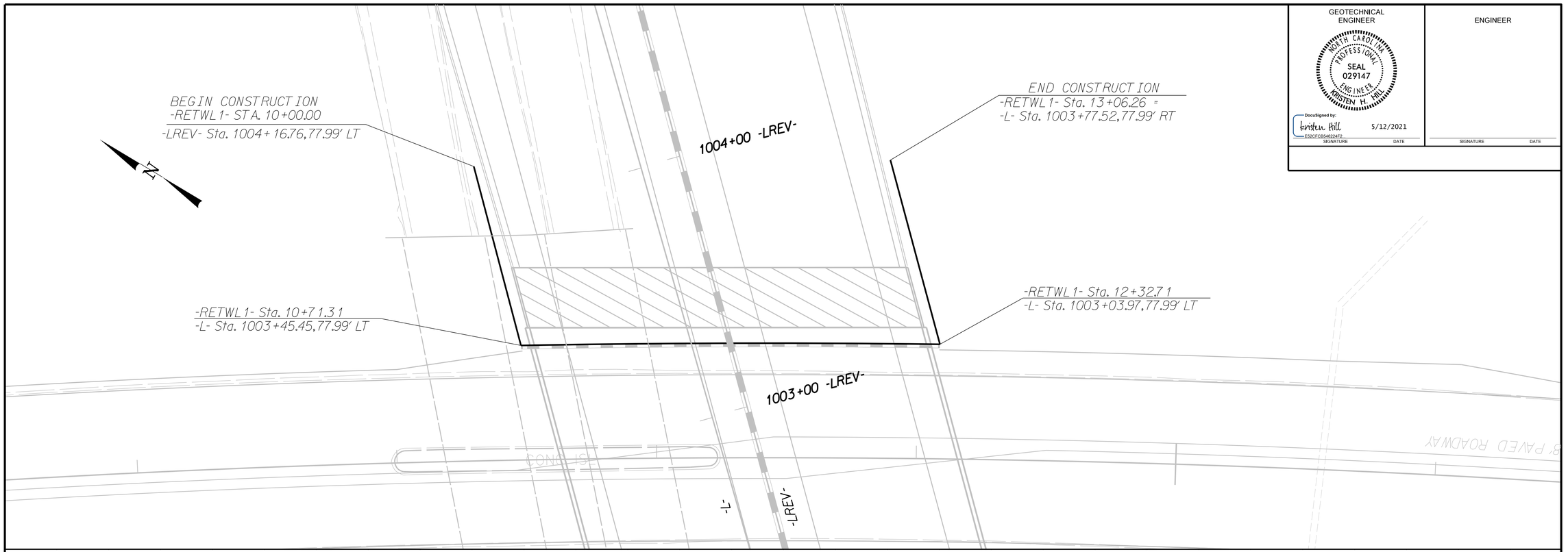
GEOTECHNICAL ENGINEER

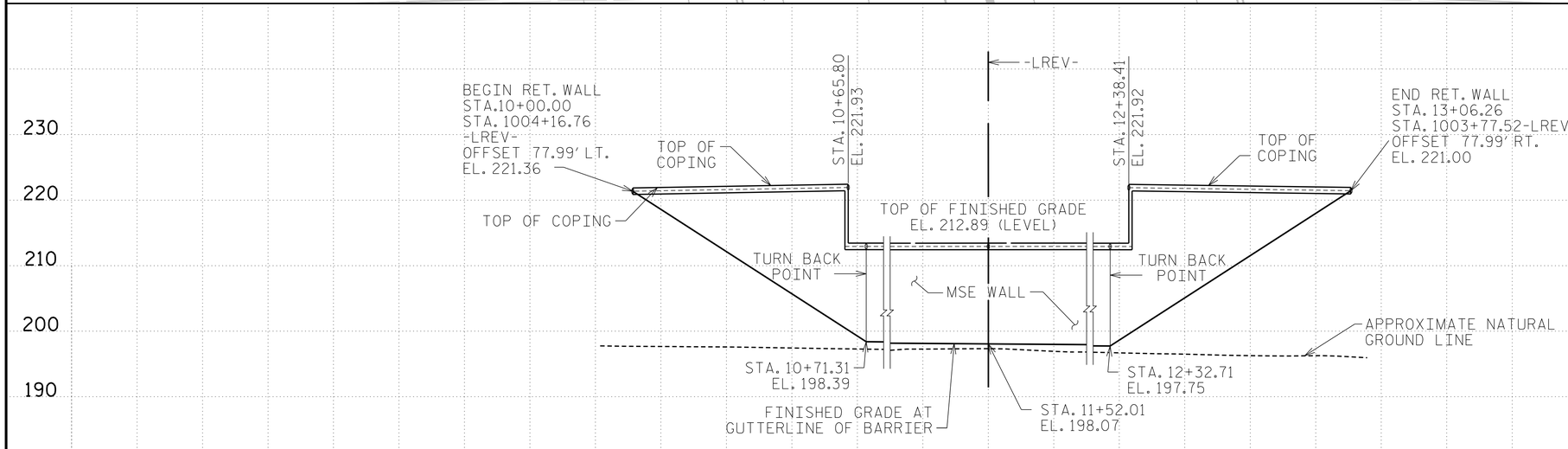
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen Hill 5/12/2021
E52CFCB546224F2...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE





WALL ENVELOPE FOR RETAINING WALL NO. 2

LOOKING AHEAD STATION (-LREV-) AT FRONT FACE OF MSE WALL

THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL.

ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 1	4,880 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	3,860SF

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: 1002+79.68 -LREV- / 28+40.13 -Y15-

SHEET 2 OF 5

PREPARED BY: KHH	DATE: 5/14/2020
REVIEWED BY: SEM	DATE: 5/14/2020

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

MSE RETAINING WALL NO. 2 WALL ENVELOPES

REVISIONS

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

SHEET NO. W-7

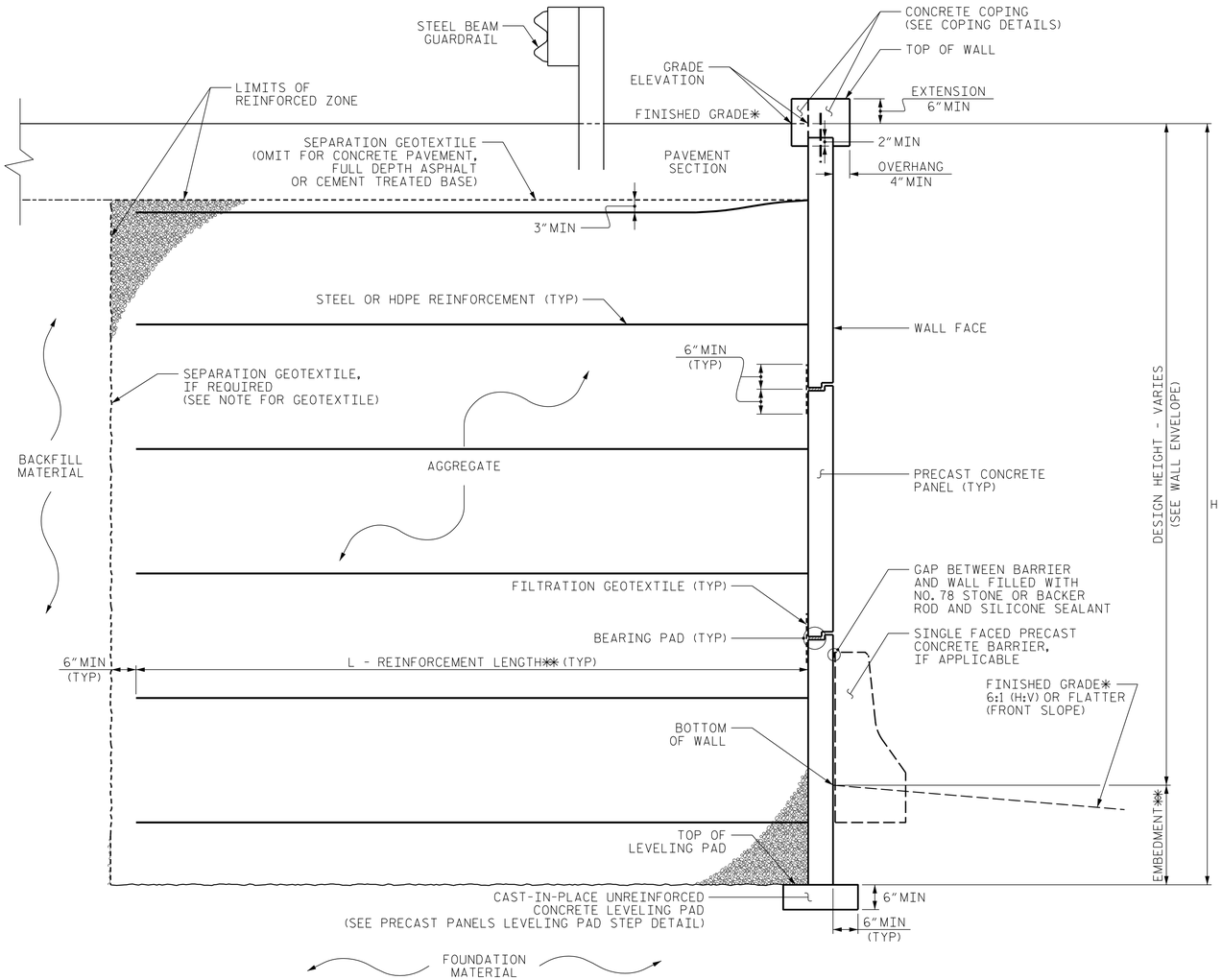
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2 SIGNATURE 5/12/2021 DATE

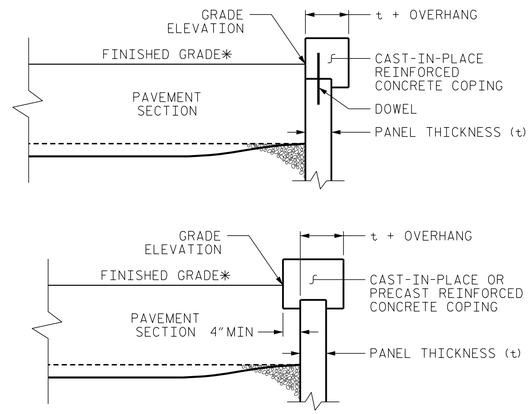
ENGINEER

SIGNATURE DATE



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: 1002+79.68 -LREV- / 28+40.13 -Y15-

SHEET 3 OF 5

PREPARED BY: KHH	DATE: 5/14/2020
REVIEWED BY: SEM	DATE: 5/14/2020

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

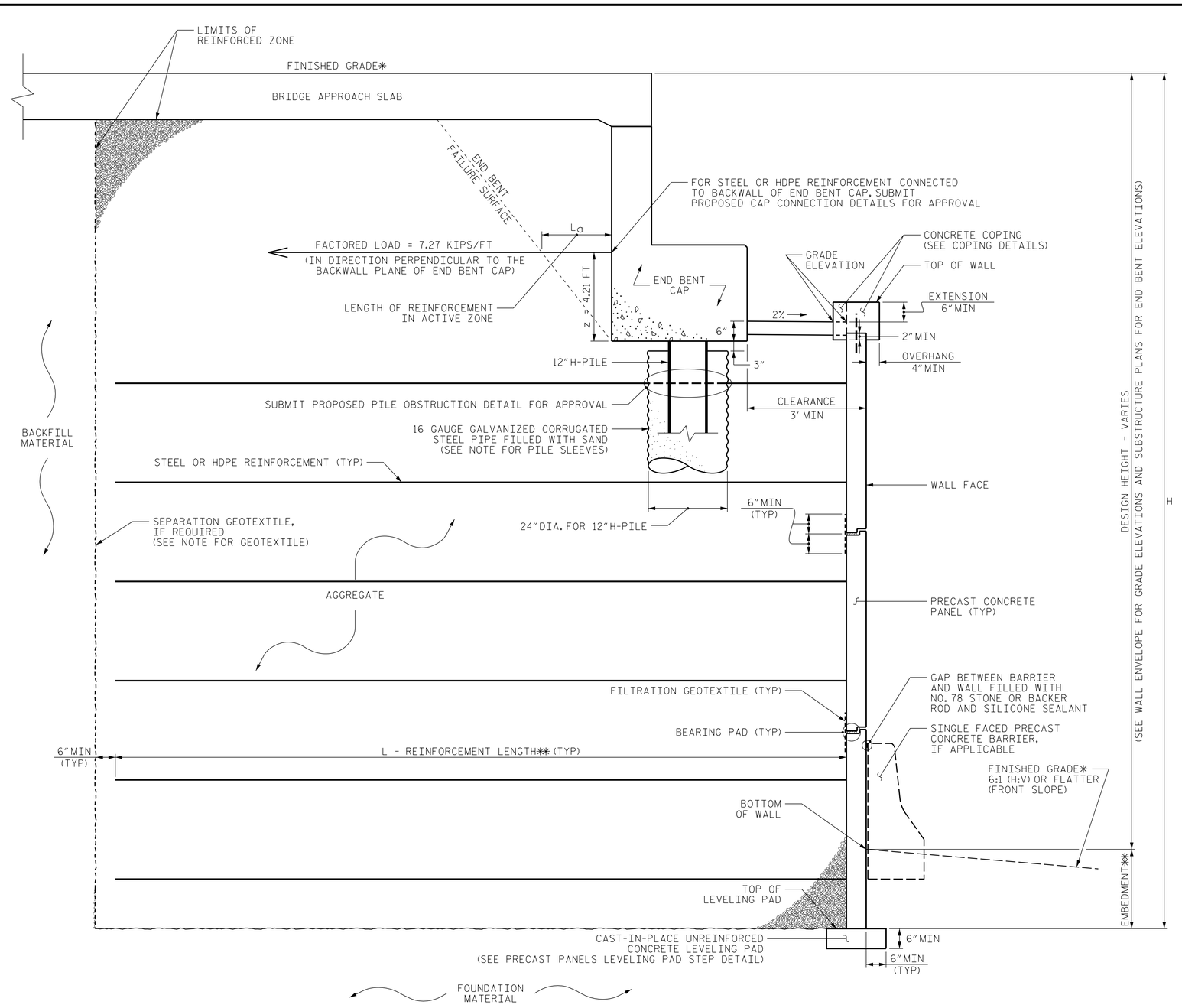
GEOTECHNICAL ENGINEERING UNIT

MSE WALL WITH PANELS AND GUARDRAIL - TYPICAL & COPING DETAILS

REVISIONS

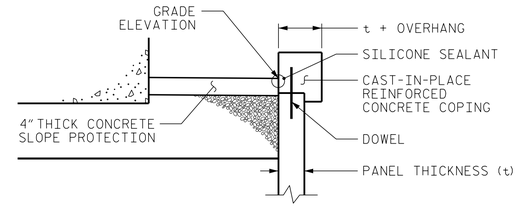
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

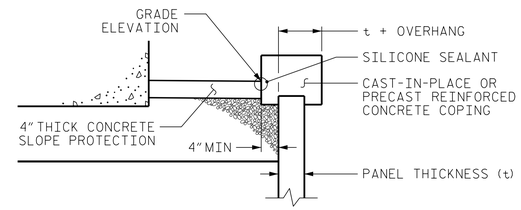
SHEET NO. W-8



MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.





COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2 SIGNATURE 5/12/2021 DATE

ENGINEER SIGNATURE DATE

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: 1002+79.68 -LREV- / 28+40.13 -Y15-

SHEET 4 OF 5

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE ABUTMENT WALL WITH PANELS, END BENT ON H-PILES AND PILE SLEEVES - TYPICAL & COPING DETAILS

PREPARED BY: KHH	DATE: 5/14/2020
REVIEWED BY: SEM	DATE: 5/14/2020

REVISIONS

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

SHEET NO. W-9

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2 5/12/2021

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

FOR TYPE III REINFORCED BRIDGE APPROACH FILLS, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY DETAIL DRAWING NO. 422D10.

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

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

AN ASHLAR STONE PATTERN ARCHITECTURAL FINISH IS REQUIRED FOR PRECAST CONCRETE PANELS FOR RETAINING WALLS NO. 1 AND NO.2. FOR ARCHITECTURAL FINISH, SEE THE ARCHITECTURAL CONCRETE SURFACE TREATMENT SPECIAL PROVISION. ANTI-GRAFFITI COATING ON THE PRECAST CONCRETE PANELS IS REQUIRED FOR RETAINING WALLS NO. 1 AND NO.2

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 1 AND NO. 2.

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 1 AND NO. 2.

PILE SLEEVES ARE REQUIRED AROUND PILES FOR END BENT NO. 1 LOCATED AT STATION -LREV- 1002+26.85 AND END BENT NO. 2 LOCATED AT STATION -LREV- 1003+31.60.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 1 AND NO. 2, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 6500 PSF
4) MINIMUM REINFORCEMENT LENGTH (L) = .7 H OR 6 FT, WHICHEVER IS LONGER.
5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	110	30	0
FOUNDATION	115	30	0

DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L_D) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 1 LOCATED AT -LREV- STA. 1002+26.85 AND END BENT NO. 2 LOCATED AT -LREV- STA. 1003+31.60. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1 AND NO. 2.

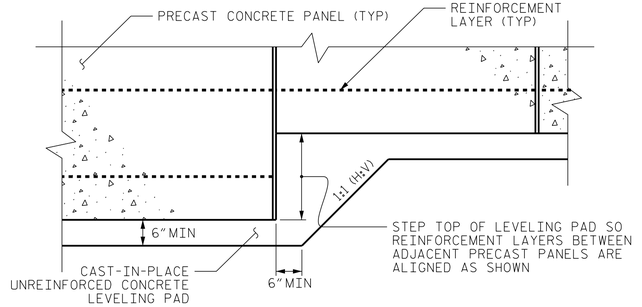
FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION -LREV- 1002+26.85 WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

FOUNDATIONS FOR END BENT NO. 2 LOCATED AT STATION -LREV- 1003+31.60 WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 2. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

INSTALL PILE SLEEVES FOR END BENT NO. 1 LOCATED AT STATION -LREV- 1002+26.85 WHILE CONSTRUCTING RETAINING WALL NO. 1. INSTALL PILES THROUGH THE CORRUGATED STEEL PIPES AND FILL PIPES WITH LOOSE UNCOMPACTED SAND BEFORE CONSTRUCTING END BENT CAPS.

INSTALL PILE SLEEVES FOR END BENT NO. 2 LOCATED AT STATION -LREV- 1003+31.60 WHILE CONSTRUCTING RETAINING WALL NO. 2. INSTALL PILES THROUGH THE CORRUGATED STEEL PIPES AND FILL PIPES WITH LOOSE UNCOMPACTED SAND BEFORE CONSTRUCTING END BENT CAPS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 1 AND NO. 2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: 1002+79.68 -LREV- / 28+40.13 -Y15-

SHEET 5 OF 5

PREPARED BY: KHH	DATE: 5/14/2020
REVIEWED BY: SEM	DATE: 5/14/2020

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

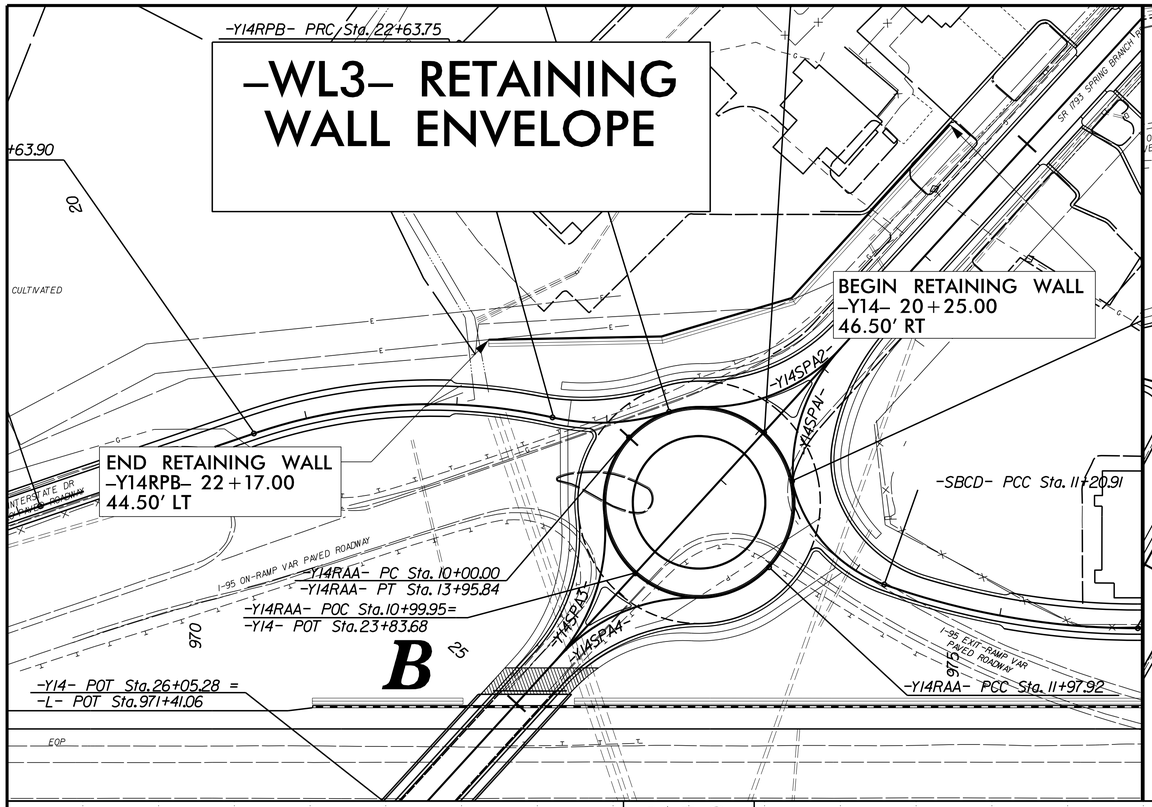
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

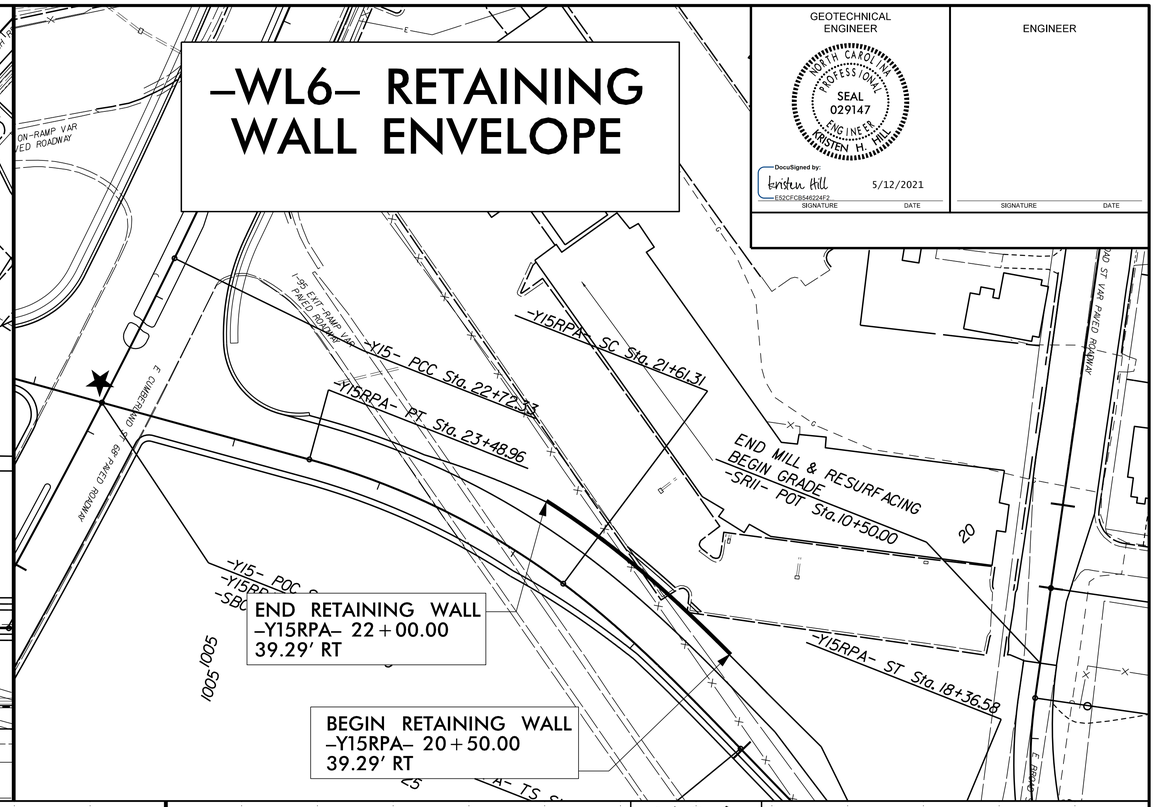
MSE WALL NO. 1 AND NO. 2
NOTES & PRECAST PANELS
LEVELING PAD STEP DETAIL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-10
2			4			

–WL3– RETAINING WALL ENVELOPE



–WL6– RETAINING WALL ENVELOPE



GEOTECHNICAL ENGINEER

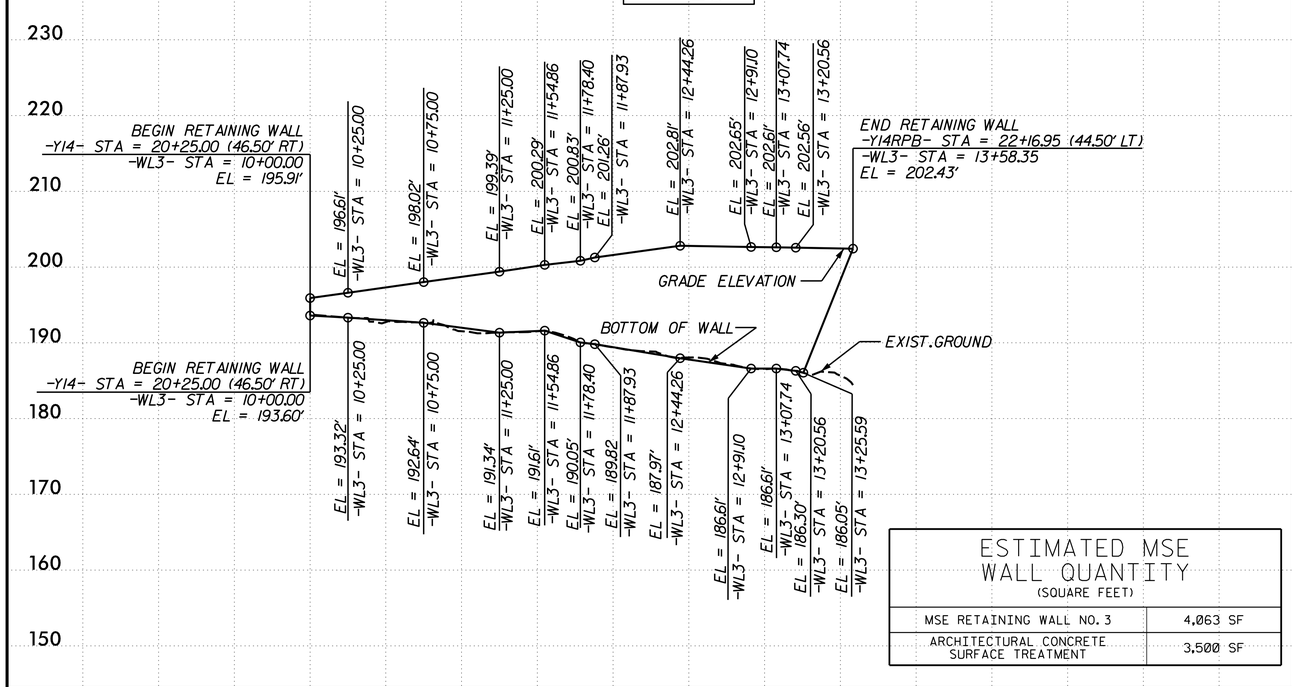
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H HILL

DocuSigned by: kristen Hill 5/12/2021
E52CFCB546224F2
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

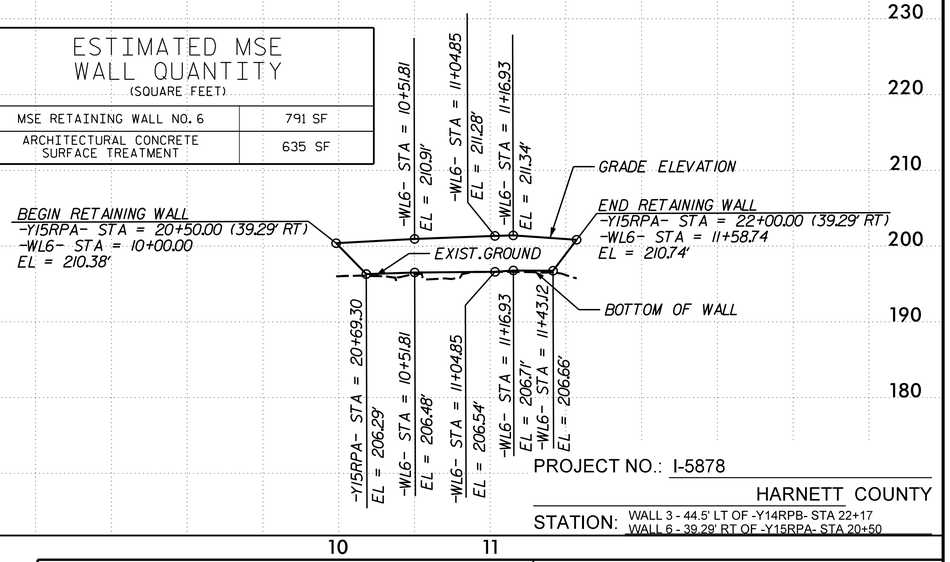
–WL3–



ESTIMATED MSE WALL QUANTITY
(SQUARE FEET)

MSE RETAINING WALL NO. 3	4,063 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	3,500 SF

–WL6–



ESTIMATED MSE WALL QUANTITY
(SQUARE FEET)

MSE RETAINING WALL NO. 6	791 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	635 SF

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: WALL 3 - 44.5' LT OF -Y14RPB- STA 22+17
WALL 6 - 39.29' RT OF -Y15RPA- STA 20+50

PREPARED BY: KHH	DATE: 09/10/20
REVIEWED BY: SEM	DATE: 09/10/20

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

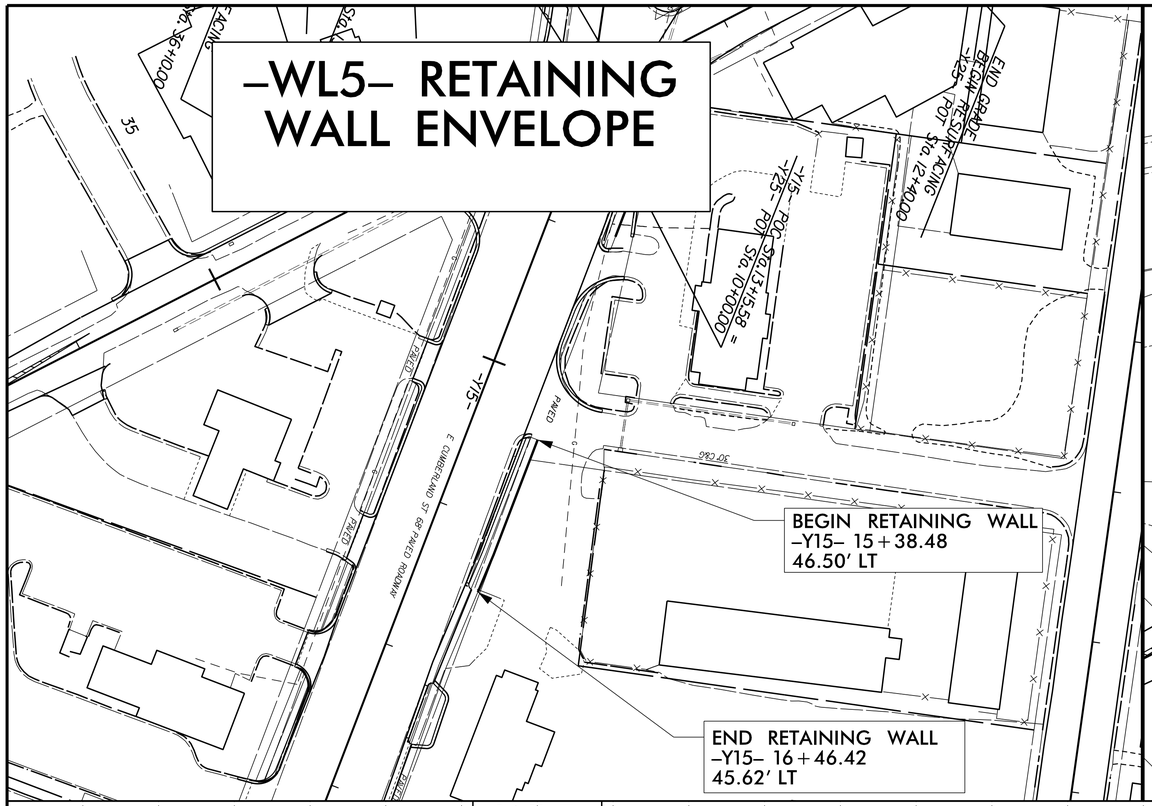
MSE RETAINING WALL -WL3- AND -WL6- WALL ENVELOPES

REVISIONS

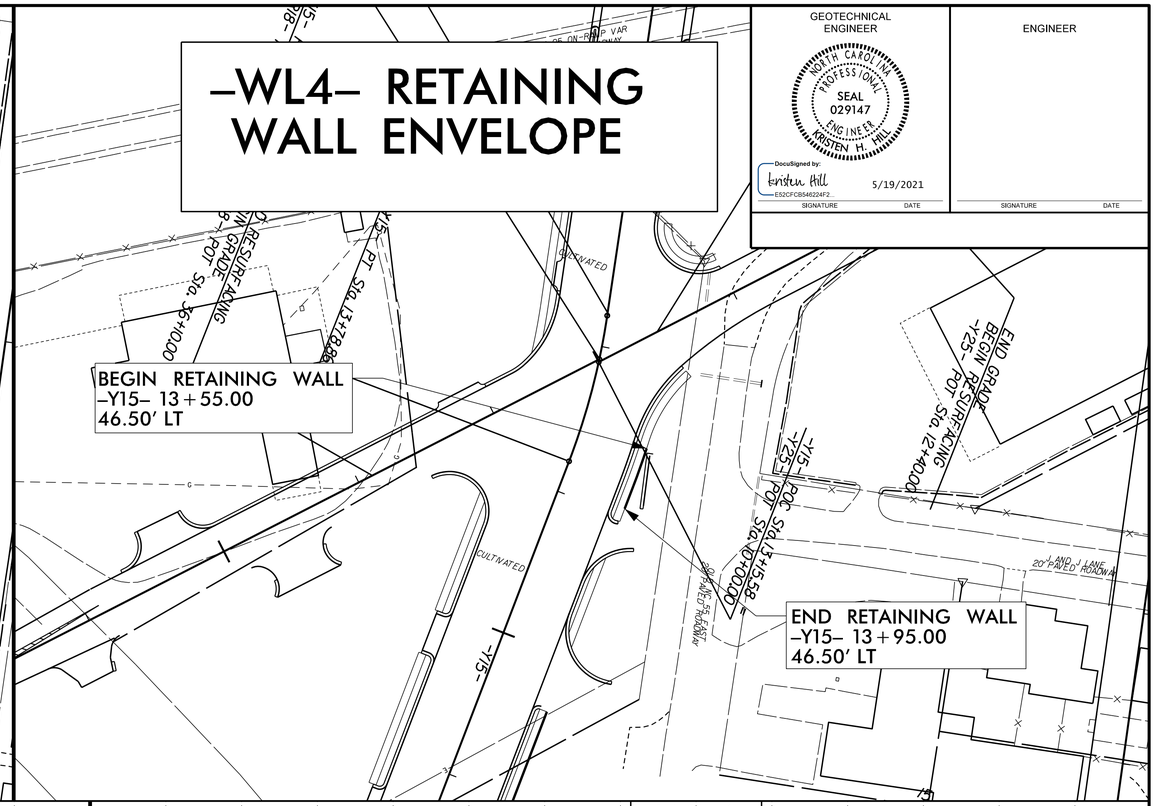
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. W-11

–WL5– RETAINING WALL ENVELOPE



–WL4– RETAINING WALL ENVELOPE



GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H HILL

DocuSigned by: kristen Hill E52CFC8546224F2...

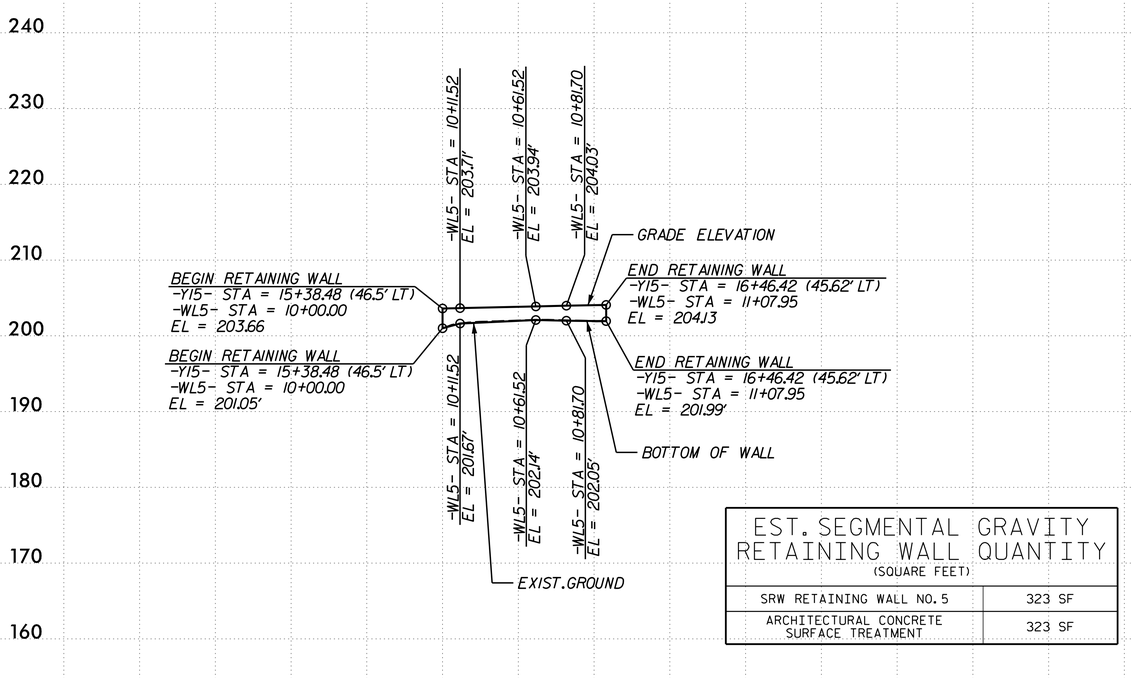
5/19/2021

SIGNATURE DATE

ENGINEER

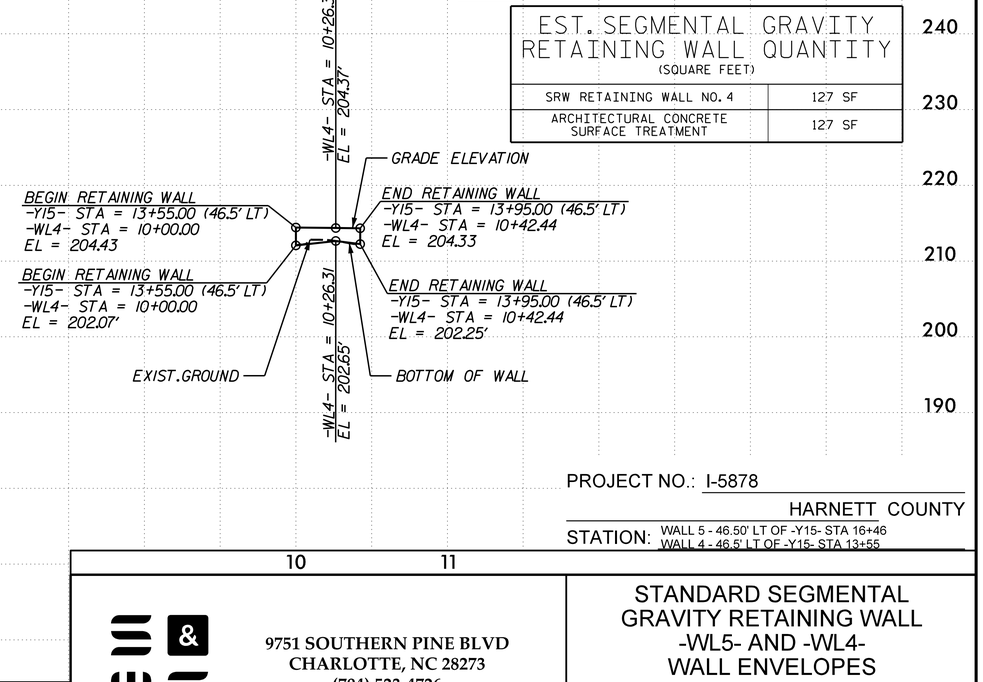
SIGNATURE DATE

–WL5–



EST. SEGMENTAL GRAVITY RETAINING WALL QUANTITY (SQUARE FEET)	
SRW RETAINING WALL NO. 5	323 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	323 SF

–WL4–



EST. SEGMENTAL GRAVITY RETAINING WALL QUANTITY (SQUARE FEET)	
SRW RETAINING WALL NO. 4	127 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	127 SF

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: WALL 5 - 46.50' LT OF -Y15- STA 16+46
WALL 4 - 46.5' LT OF -Y15- STA 13+55

10 11

PREPARED BY: KHH	DATE: 09/10/20
REVIEWED BY: SEM	DATE: 09/10/20

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

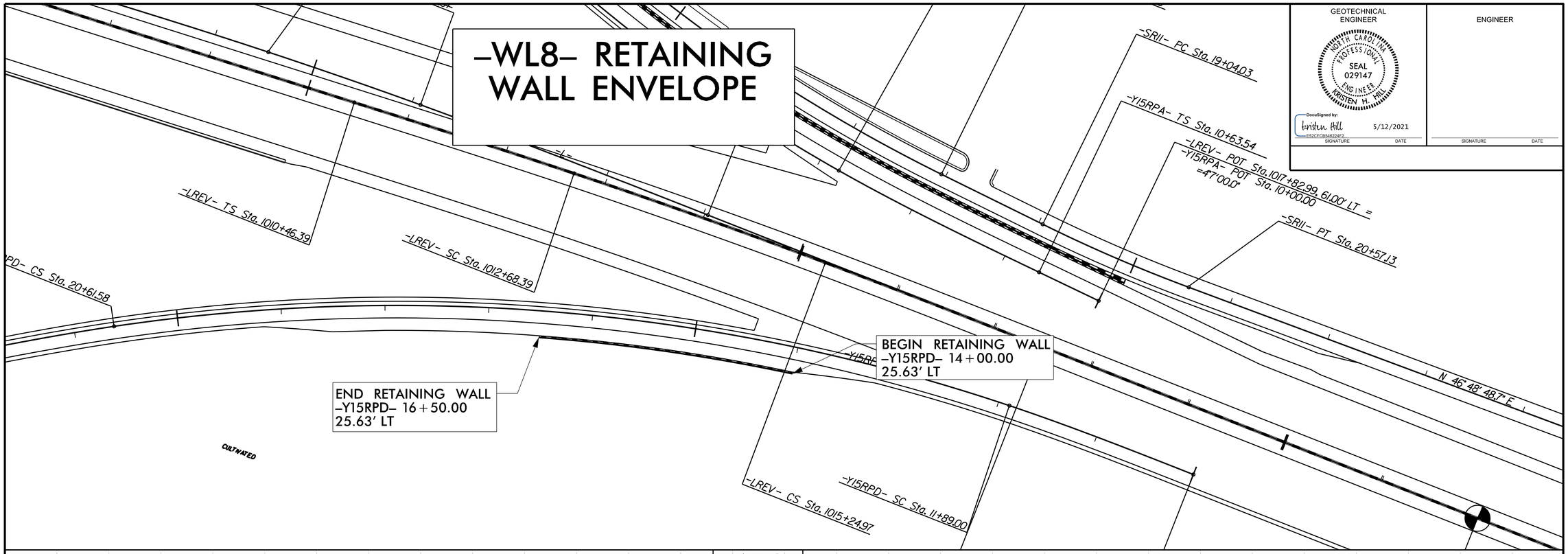
STANDARD SEGMENTAL GRAVITY RETAINING WALL -WL5- AND -WL4- WALL ENVELOPES

REVISIONS

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

SHEET NO. W-12

–WL8– RETAINING WALL ENVELOPE



GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H HILL

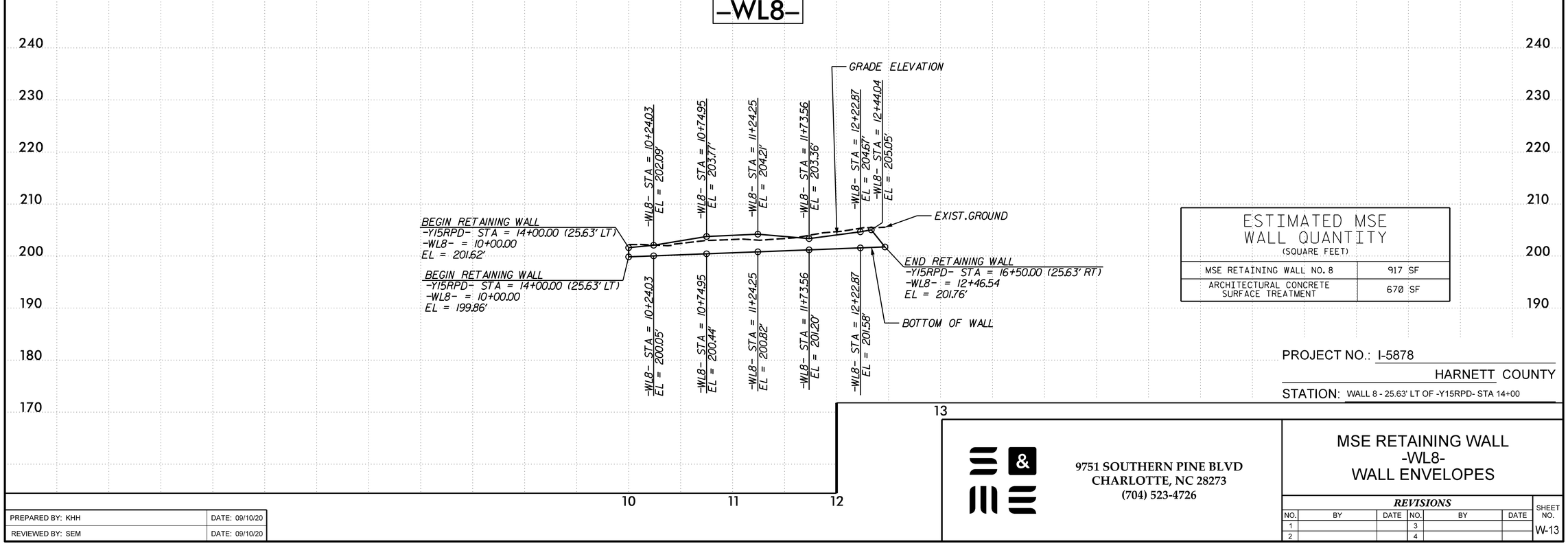
DocuSigned by: kristen Hill E52CFCB546224F2 5/12/2021

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

–WL8–



ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 8	917 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	670 SF

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: WALL 8 - 25.63' LT OF -Y15RPD- STA 14+00

PREPARED BY: KHH	DATE: 09/10/20
REVIEWED BY: SEM	DATE: 09/10/20

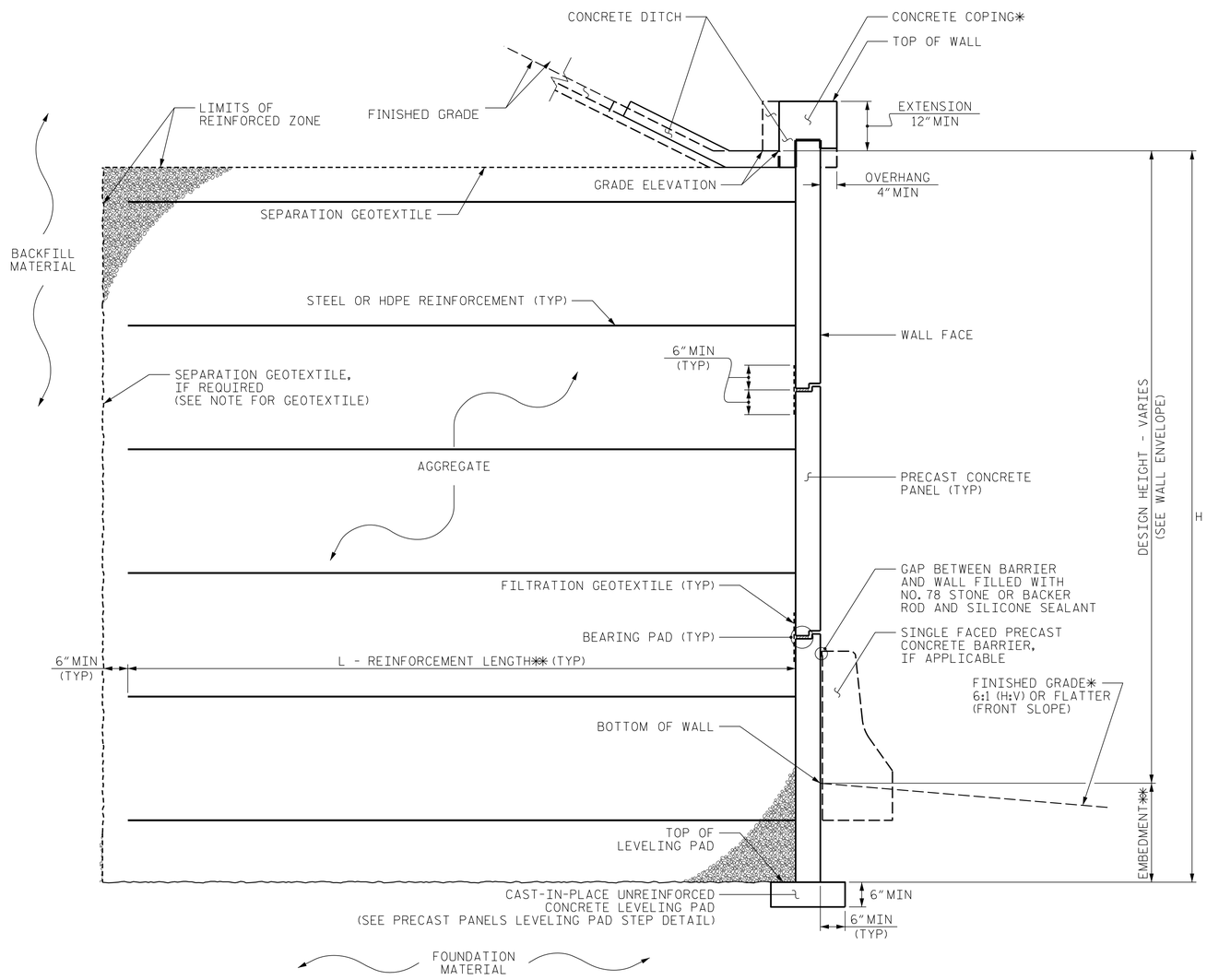
9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

MSE RETAINING WALL
-WL8-
WALL ENVELOPES

REVISIONS

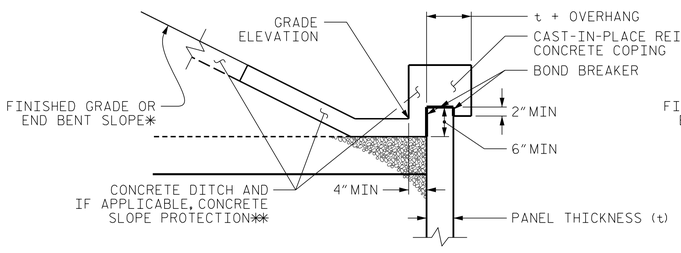
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

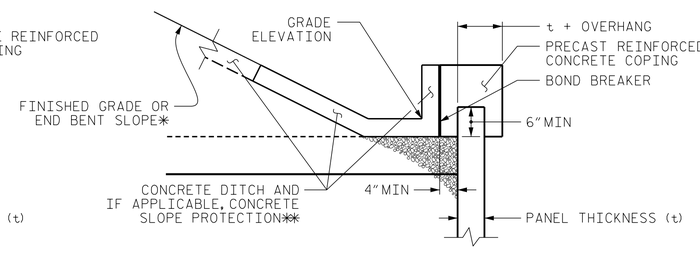
SHEET NO. W-13



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE COPING DETAILS AND PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.





COPING DETAILS

*SEE PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.
**SEE CONCRETE DITCH BEHIND WALL DETAILS.

PREPARED BY: KHH	DATE: 09/10/20
REVIEWED BY: SEM	DATE: 09/10/20

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HALL

DocuSigned by: kristen Hill E52CFCB546224F2... 5/12/2021
SIGNATURE DATE

ENGINEER
SIGNATURE DATE

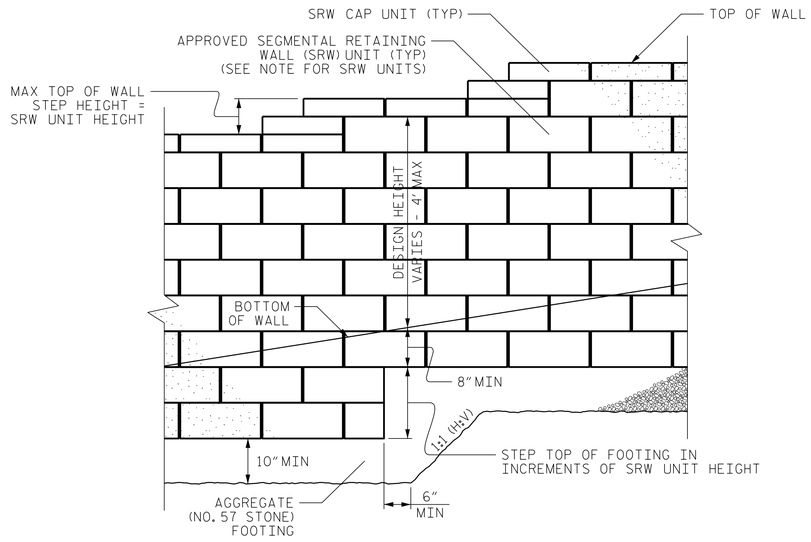
PROJECT NO.: I-5878
HARNETT COUNTY
STATION: 20+25.00 46.50' RT -Y14-

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

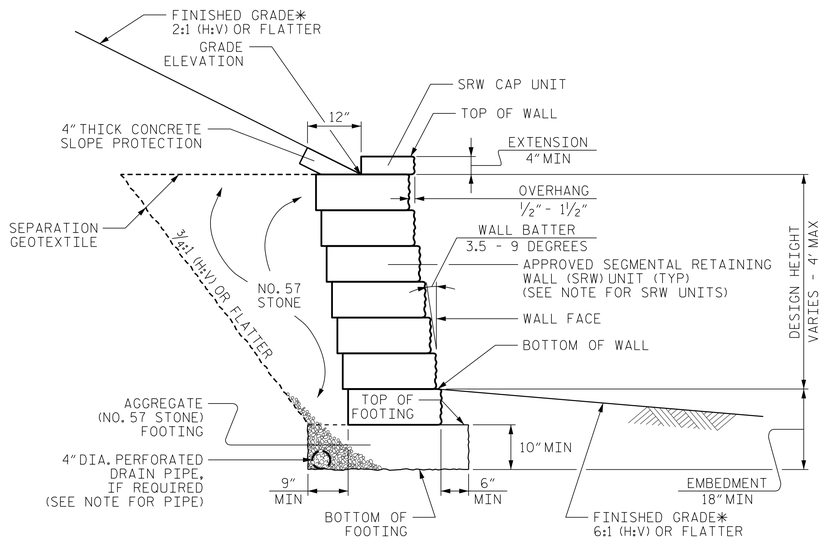
GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO. 3 TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-14
1			3			
2			4			



STANDARD SEGMENTAL GRAVITY WALL - PARTIAL ELEVATION



STANDARD SEGMENTAL GRAVITY WALL WITH SLOPE

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

NOTES:

FOR STANDARD SEGMENTAL GRAVITY RETAINING WALLS, SEE SECTION 454 OF THE STANDARD SPECIFICATIONS.

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

DO NOT ATTACH FENCES OR HANDRAILS TO STANDARD SEGMENTAL GRAVITY WALLS.

DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS FOR INTERSTATE HIGHWAY OR RAILROAD PROJECTS.

DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS WHEN SURCHARGE LOADS WILL BE WITHIN 5'-6" OF THE BACK OF SRW CAP UNITS.

DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW WALLS.

SEGMENTAL RETAINING WALL (SRW) UNITS ARE APPROVED FOR EITHER 2' OR 4' MAXIMUM DESIGN HEIGHTS. FOR DETAILS AND DIMENSIONS OF APPROVED SRW UNITS AND MAXIMUM DESIGN HEIGHTS, SEE connect.ncdot.gov/resources/Geological/Pages/Products.aspx

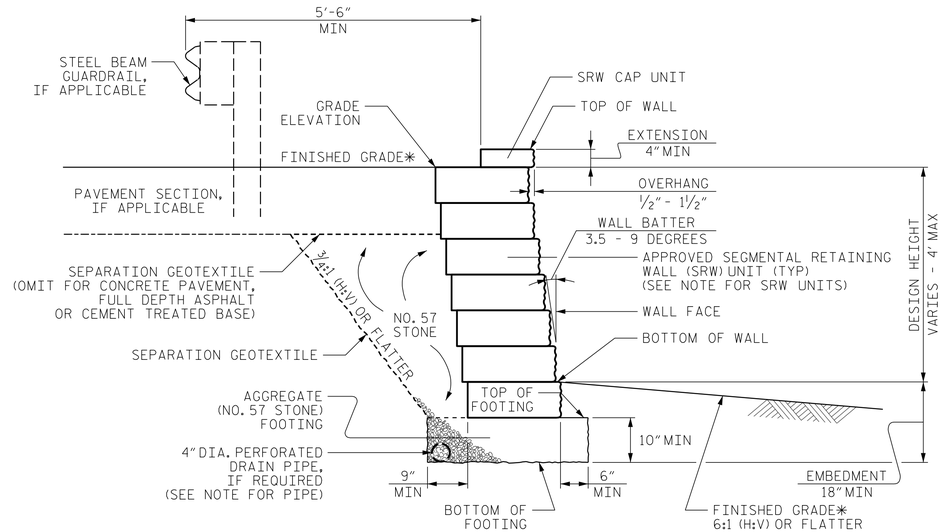
AN ASHLAR BLEND PATTERN SIMILAR TO THE PRECAST IS REQUIRED FOR THE SRW UNITS. NCDOT APPROVAL IS REQUIRED PRIOR TO CONSTRUCTION TO CONFIRM COMFORMANCE WITH OTHER WALLS ON THE PROJECT.

DO NOT MIX APPROVED SRW UNITS FROM DIFFERENT VENDORS ON THE SAME STANDARD SEGMENTAL GRAVITY WALL. USE THE SAME SIZE APPROVED SRW UNITS FOR EACH WALL SECTION.

BEFORE BEGINNING STANDARD SEGMENTAL GRAVITY WALL CONSTRUCTION, SURVEY WALL LOCATIONS AND SUBMIT WALL PROFILE VIEWS (WALL ENVELOPES) FOR REVIEW. FOR WALL ENVELOPES, INCLUDE BOTTOM OF WALL, EXISTING GROUND AND GRADE ELEVATIONS AND OTHER ELEVATIONS AS NEEDED AT INTERVALS OF 25' OR LESS ALONG WALLS. DO NOT START WALL CONSTRUCTION UNTIL WALL ENVELOPES ARE ACCEPTED.

A DRAIN PIPE IS REQUIRED IF GROUNDWATER IS ABOVE BOTTOM OF FOOTINGS.

DO NOT PLACE NO. 57 STONE FOR FOOTINGS UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



STANDARD SEGMENTAL GRAVITY WALL WITHOUT SLOPE

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2... 5/12/2021

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: VARIOUS

PREPARED BY: KHH	DATE: 09/10/20
REVIEWED BY: SEM	DATE: 09/10/20

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD SEGMENTAL GRAVITY RETAINING WALL WALLS NO. 4 AND NO.5

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-15
1			3			
2			4			

GEOTECHNICAL ENGINEER

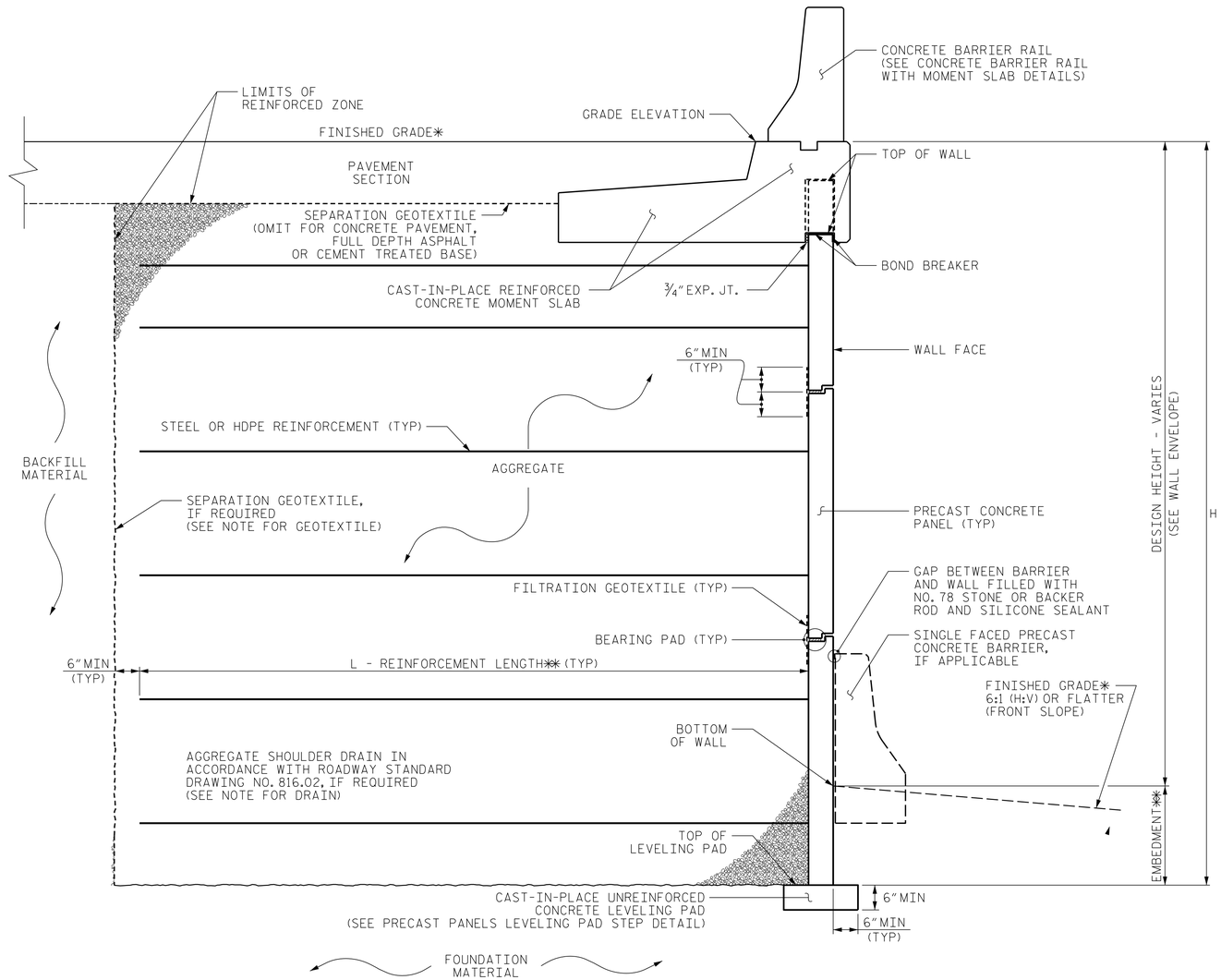
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen Hill E52CFCB546224F2... 5/12/2021

SIGNATURE DATE

ENGINEER

SIGNATURE DATE



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: VARIOUS

PREPARED BY: KHH	DATE: 09/10/20
REVIEWED BY: SEM	DATE: 09/10/20

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO. 6 TYPICAL SECTION AND COPING DETAILS

REVISIONS

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

SHEET NO. W-16

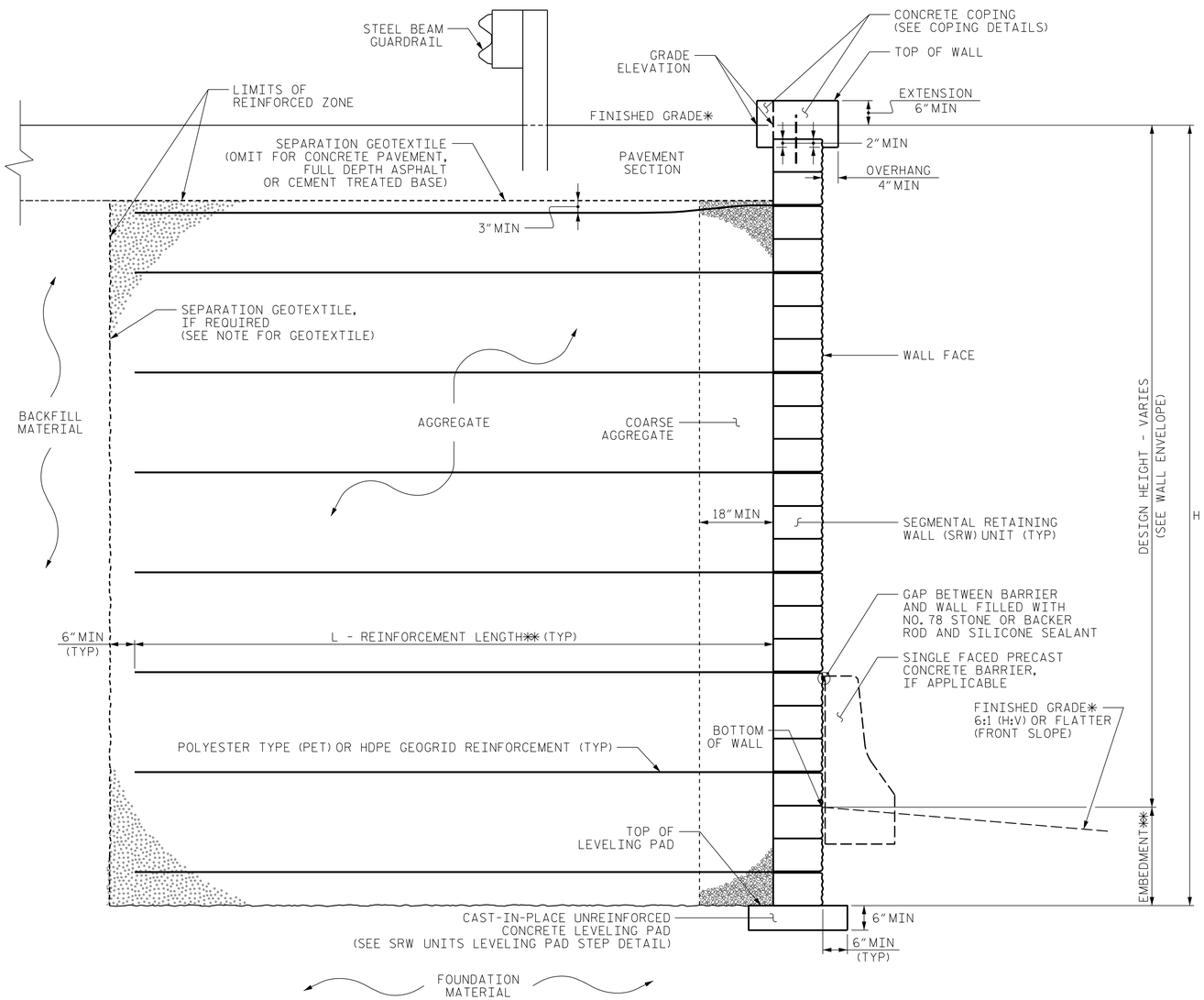
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen Hill 5/12/2021
E52CFCB546224F2...
SIGNATURE DATE

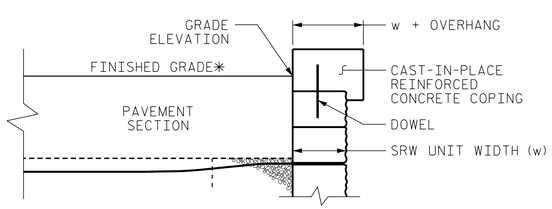
ENGINEER

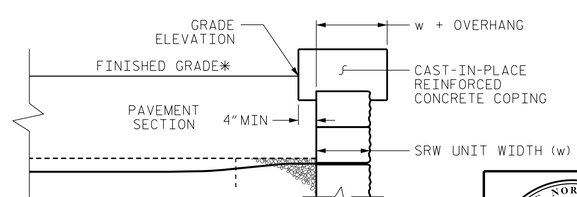
SIGNATURE DATE



MSE WALL WITH SRW UNITS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.





COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO SRW UNITS WITH DOWELS OR EXTEND COPING DOWN BACK OF SRW UNITS.
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PREPARED BY: KHH	DATE: 09/10/20
REVIEWED BY: SEM	DATE: 09/10/20

PROJECT NO.: I-5878
HARNETT COUNTY
STATION: VARIOUS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO.8 TYPICAL SECTION AND COPING DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-17
2			4			

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill 5/12/2021
E52CFCB546224F2...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

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

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

A CONCRETE BARRIER RAIL WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO. 6. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS.

AT THE CONTRACTOR'S OPTION, USE AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL (SRW) UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO.8.

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 3, NO.6 AND NO. 8.

AN ASHLAR STONE PATTERN ARCHITECTURAL FINISH AND ANTI-GRAFFITI COATING IS REQUIRED FOR PRECAST CONCRETE PANELS AND SRW UNITS. FOR ARCHITECTURAL FINISH, SEE THE ARCHITECTURAL CONCRETE SURFACE TREATMENT SPECIAL PROVISION.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 3, NO.6 AND NO. 8.

A DRAIN IS NOT REQUIRED FOR RETAINING WALL NO.3, NO.6 AND NO.8.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 3, NO. 6, AND NO. 8, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 3, NO.6 AND NO. 8 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 6,300 LB/SF (WALL NO. 3), 4,900 LB/SF (WALL NO. 6), 3,000 LB/SF (WALL NO. 8)
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT, WHICHEVER IS LONGER
5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

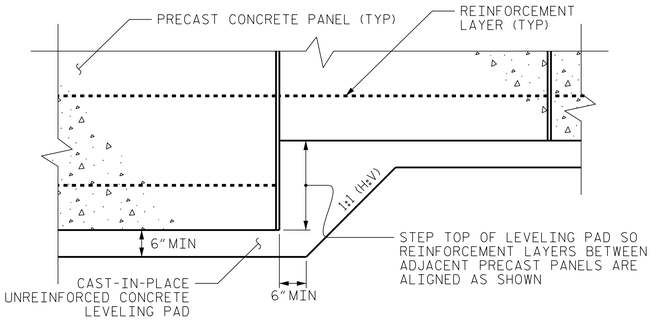
MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO. 3, NO.6 AND NO. 8 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

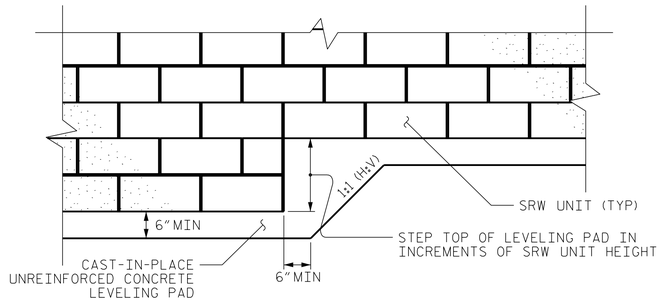
FOUNDATIONS FOR SIGNS, LIGHTING MAY BE LOCATED BEHIND RETAINING WALLS AND MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALLS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALLS UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



PRECAST PANELS
LEVELING PAD STEP DETAIL



SRW UNITS LEVELING PAD STEP DETAIL

PROJECT NO.: I-5878

HARNETT COUNTY

STATION: VARIOUS

PREPARED BY: KHH	DATE: 09/10/20
REVIEWED BY: SEM	DATE: 09/10/20

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

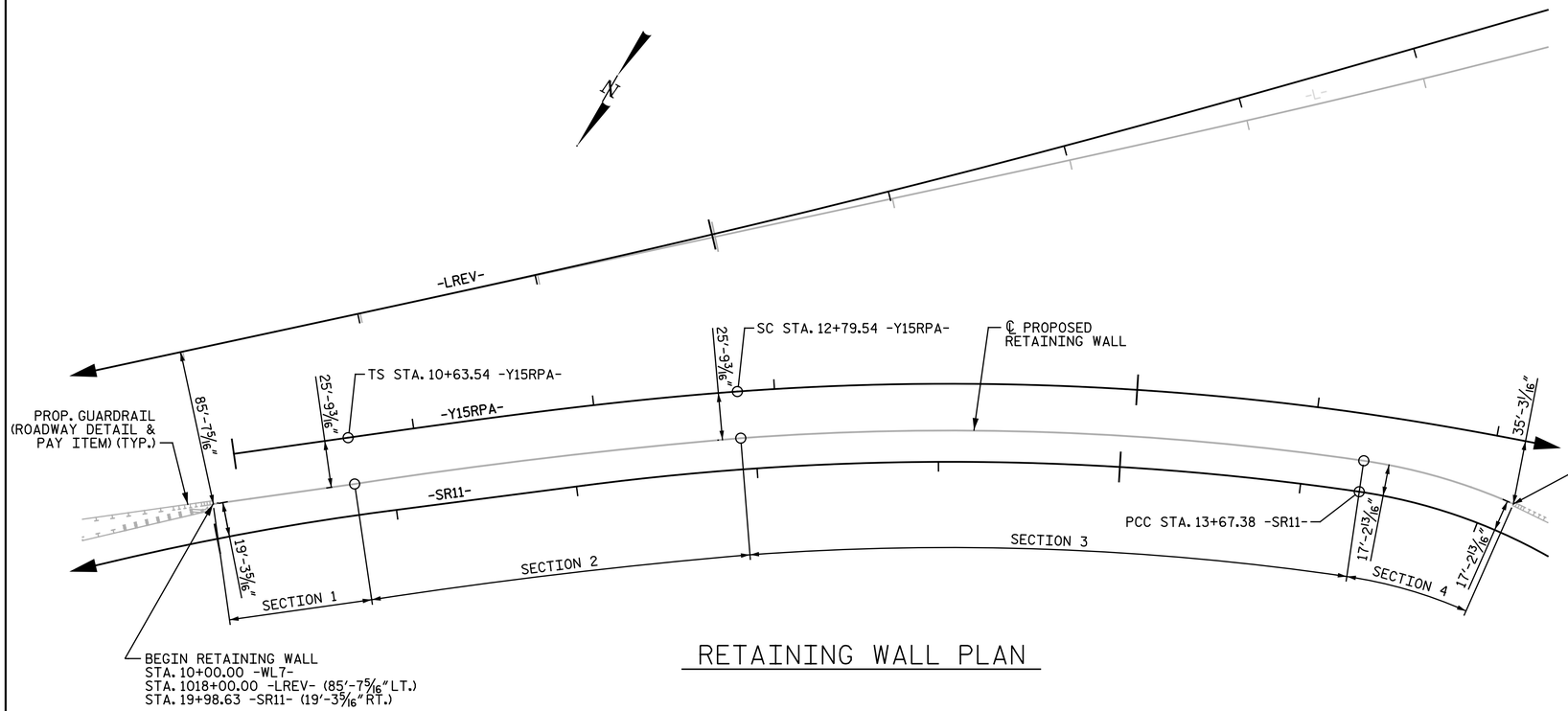
GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL
NO. 3, NO. 6 AND NO. 8
NOTES & DETAILS

REVISIONS

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

SHEET NO. W-18



RETAINING WALL PLAN

NOTES:

ALL ELEVATIONS ARE IN FEET.

THE RETAINING WALL HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THE RETAINING WALL HAS BEEN DESIGNED FOR A NOMINAL BEARING RESISTANCE OF 4.6 KSF.

THE RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 453 OF THE STANDARD SPECIFICATIONS.

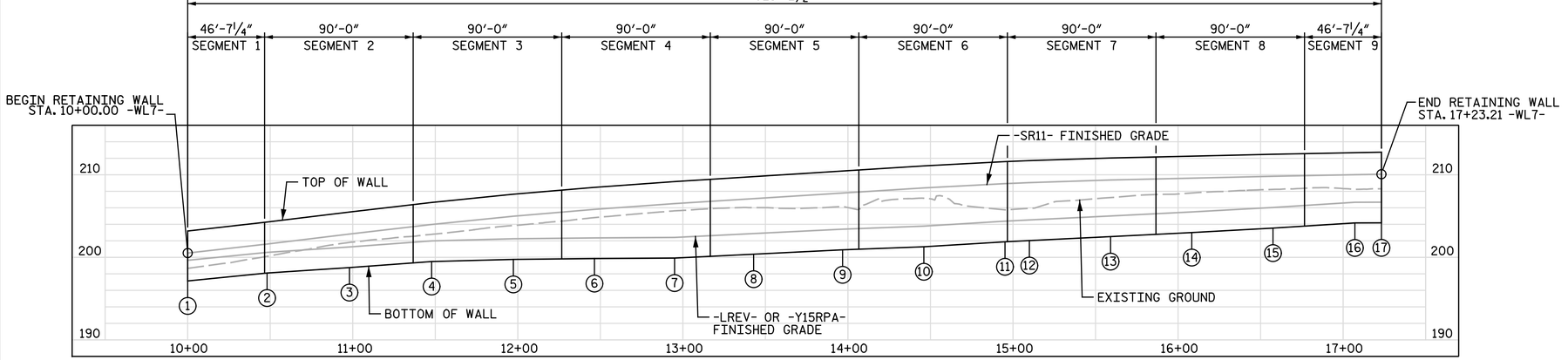
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

WALL SECTION	SECTION LENGTH	HORIZONTAL ALIGNMENT	FROM	TO
1	78'-8 15/16"	TANGENT	BEGIN RETAINING WALL	TS STA. 10+63.54 -Y15RPA- (25'-9 3/16" RT.)
2	214'-3 1/8"	CURVED TO RT. R = 3,180.60'	TS STA. 10+63.54 -Y15RPA- (25'-9 3/16" RT.)	SC STA. 12+79.54 -Y15RPA- (25'-9 3/16" RT.)
3	344'-1 13/16"	CURVED TO RT. R = 1,574.23'	SC STA. 12+79.54 -Y15RPA- (25'-9 3/16" RT.)	PCC STA. 13+67.38 -SR11- (17'-2 13/16" RT.)
4	86'-0 5/8"	CURVED TO RT. R = 317.23'	PCC STA. 13+67.38 -SR11- (17'-2 13/16" RT.)	END RETAINING WALL



RETAINING WALL ELEVATION

BOTTOM OF WALL ELEVATIONS ARE TAKEN AT TOP OF FOOTING.

FOR BOTTOM OF WALL, -LREV- OR -Y15RPA- FINISHED GRADE, -SR11- FINISHED GRADE, AND TOP OF WALL ELEVATIONS AT VARIOUS POINTS ALONG THE WALL, SEE WALL ELEVATIONS TABLE ON "WALL DETAILS" SHEET.

BILL OF MATERIAL	
CIP GRAVITY RETAINING WALL	6,180 SF

PROJECT NO. I-5878

HARNETT COUNTY

STATION: 10+00.00 -WL7-

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: T. M. Garrison 61EAF7523943466...

4/28/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WALL LAYOUT

FOR RETAINING WALL -WL7- BETWEEN -Y15RPA- AND -SR11-

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

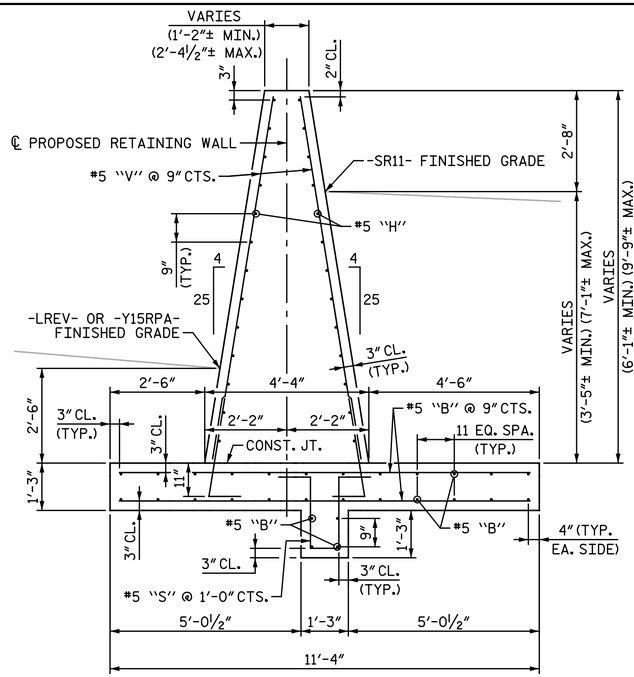
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. W-19

TOTAL SHEETS 28

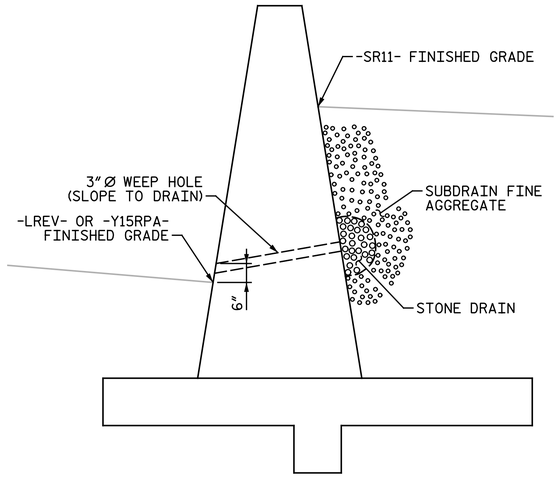
DRAWN BY : M. D. MAYHEW DATE : 2-9-21

CHECKED BY : T. M. GARRISON DATE : 3-18-21



WALL SECTION

6'-1"± MIN. WALL HEIGHT AND 2'-4½"± MAX. TOP WALL WIDTH @ STA. 10+00.00 -WL7-
9'-9"± MAX. WALL HEIGHT AND 1'-2"± MIN. TOP WALL WIDTH @ STA. 14+95.15 -WL7-



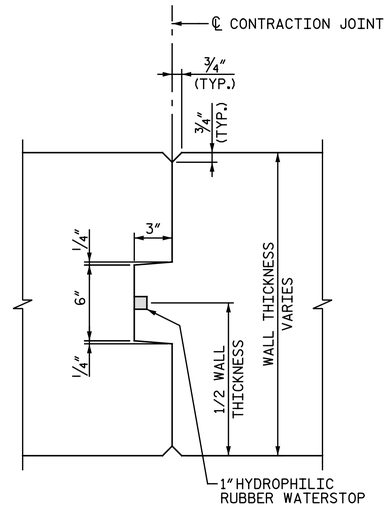
DRAINAGE DETAIL

WEEP HOLES SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 453-4 OF THE STANDARD SPECIFICATIONS.

SUBSURFACE DRAINAGE AT WEEP HOLES SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 414-8 OF THE STANDARD SPECIFICATIONS.

WALL ELEVATIONS

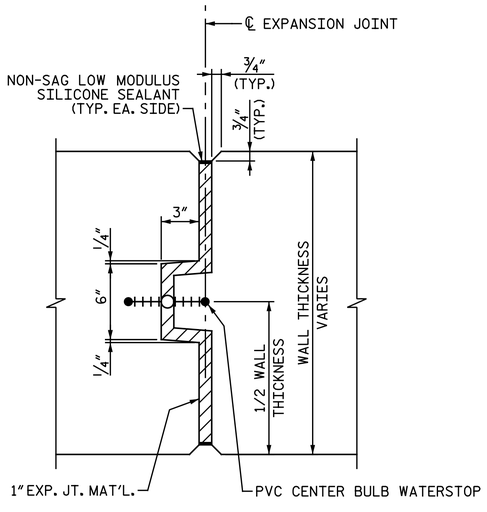
WALL POINT	-WL7- STATION	-LREV- OR -Y15RPA- STATION	-LREV- OR -Y15RPA- OFFSET	BOTTOM OF WALL ELEVATION	-LREV- OR -Y15RPA- FINISHED GRADE ELEVATION	-SR11- FINISHED GRADE ELEVATION	TOP OF WALL ELEVATION
1	10+00.00 -WL7-	1018+00.00 -LREV-	85.61' LT	197.14	199.64	200.52	203.19
2	10+48.28 -WL7-	10+33.07 -Y15RPA-	25.77' RT	198.10	200.60	201.61	204.28
3	10+98.44 -WL7-	10+83.25 -Y15RPA-	25.60' RT	198.76	201.26	202.82	205.49
4	11+48.58 -WL7-	11+33.56 -Y15RPA-	25.58' RT	199.49	201.99	203.98	206.65
5	11+98.72 -WL7-	11+84.05 -Y15RPA-	25.84' RT	199.75	202.25	204.98	207.65
6	12+48.92 -WL7-	12+34.80 -Y15RPA-	26.00' RT	199.85	202.35	205.81	208.48
7	12+99.29 -WL7-	12+85.92 -Y15RPA-	25.77' RT	199.91	202.41	206.51	209.18
8	13+42.88 -WL7-	13+30.23 -Y15RPA-	25.77' RT	200.38	202.88	207.11	209.78
9	13+96.76 -WL7-	13+85.00 -Y15RPA-	25.77' RT	200.91	203.41	207.79	210.46
10	14+45.96 -WL7-	14+35.00 -Y15RPA-	25.77' RT	201.40	203.90	208.41	211.08
11	14+95.15 -WL7-	14+85.00 -Y15RPA-	25.77' RT	201.88	204.38	208.93	211.60
12	15+09.91 -WL7-	15+00.00 -Y15RPA-	25.77' RT	202.03	204.53	209.05	211.72
13	15+59.11 -WL7-	15+50.00 -Y15RPA-	25.77' RT	202.51	205.01	209.37	212.04
14	16+08.30 -WL7-	16+00.00 -Y15RPA-	25.77' RT	203.00	205.50	209.59	212.26
15	16+57.51 -WL7-	16+50.00 -Y15RPA-	26.29' RT	203.54	206.04	209.82	212.49
16	17+07.12 -WL7-	17+00.00 -Y15RPA-	32.01' RT	204.17	206.67	210.01	212.68
17	17+23.21 -WL7-	17+15.98 -Y15RPA-	35.26' RT	204.18	206.68	210.07	212.74



PLAN OF CONTRACTION JOINT

REINFORCING STEEL SHALL EXTEND THROUGH EACH CONTRACTION JOINT.

CONTRACTION JOINTS IN FOOTING ARE OPTIONAL.



PLAN OF EXPANSION JOINT

NON-SAG LOW MODULUS SILICONE SEALANT SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 1028-3 OF THE STANDARD SPECIFICATIONS. SEALANT SHALL BE APPLIED ALONG EACH FACE AND TOP OF WALL.

EXPANSION JOINT MATERIAL SHALL BE PROVIDED FROM BOTTOM OF SHEAR KEY TO TOP OF WALL.

WATERSTOPS SHALL BE PROVIDED FROM TOP OF FOOTING TO 6" BELOW TOP OF WALL.

DRAWN BY : M. D. MAYHEW DATE : 4-21-21
CHECKED BY : T. M. GARRISON DATE : 4-21-21

PROJECT NO. I-5878
HARNETT COUNTY
STATION: 10+00.00 -WL7-

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison
61EAF75239434B6...
4/28/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

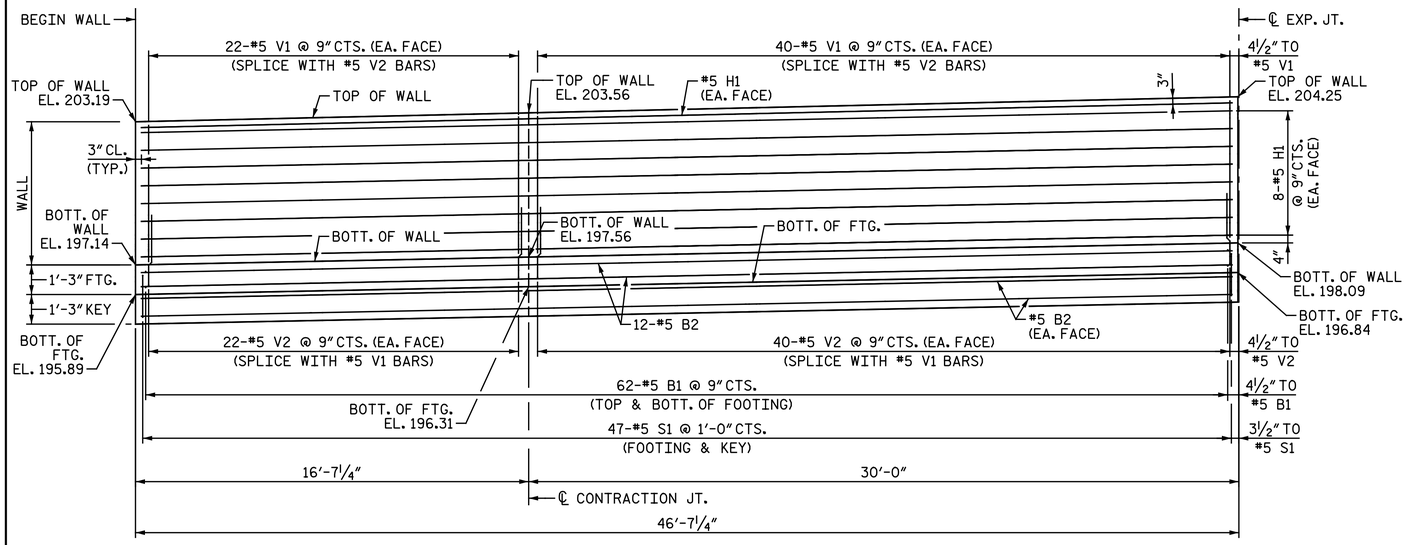
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WALL DETAILS

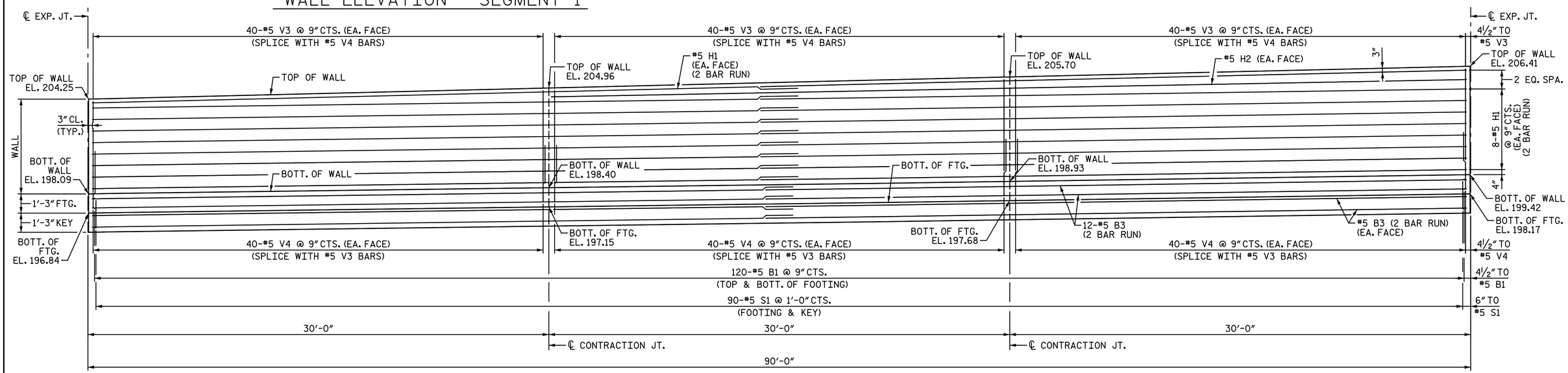
FOR RETAINING WALL -WL7- BETWEEN -Y15RPA- AND -SR11-

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-20
1			3			TOTAL SHEETS
2			4			28



WALL ELEVATION - SEGMENT 1

SPLICE LENGTHS		
BAR	SIZE	MIN. SPLICE
''B''	#5	1′-9″
''H''	#5	2′-5″
''V''	#5	1′-9″



WALL ELEVATION - SEGMENT 2

PROJECT NO. I-5878

HARNETT COUNTY

STATION: 10+00.00 -WL7-

SHEET 1 OF 6

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: T. M. Garrison 61EAF75230434B6...

4/28/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

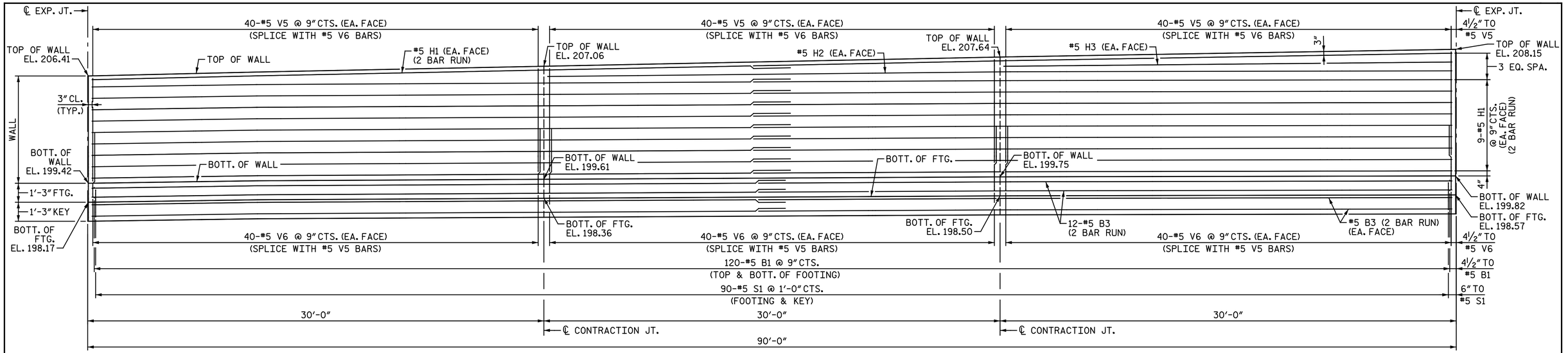
WALL ELEVATIONS

FOR RETAINING WALL -WL7- BETWEEN -Y15RPA- AND -SR11-

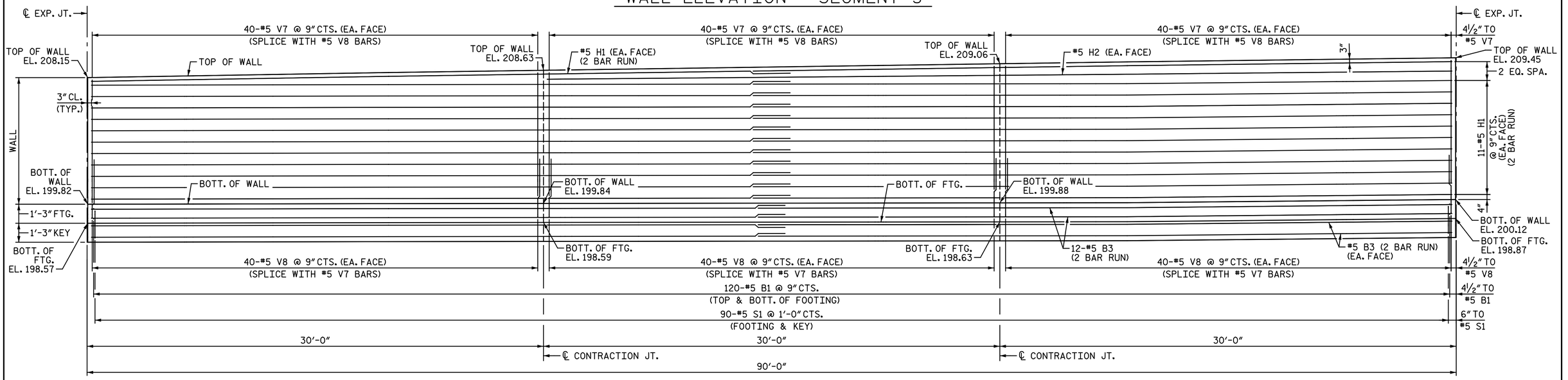
DRAWN BY : M. D. MAYHEW DATE : 3-28-21
CHECKED BY : T. M. GARRISON DATE : 3-28-21

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-21
1			3			TOTAL SHEETS
2			4			28



WALL ELEVATION - SEGMENT 3



WALL ELEVATION - SEGMENT 4

SPLICE LENGTHS		
BAR	SIZE	MIN. SPLICE
''B''	#5	1′-9″
''H''	#5	2′-5″
''V''	#5	1′-9″

PROJECT NO. I-5878

HARNETT COUNTY

STATION: 10+00.00 -WL7-

SHEET 2 OF 6

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

4/28/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WALL ELEVATIONS

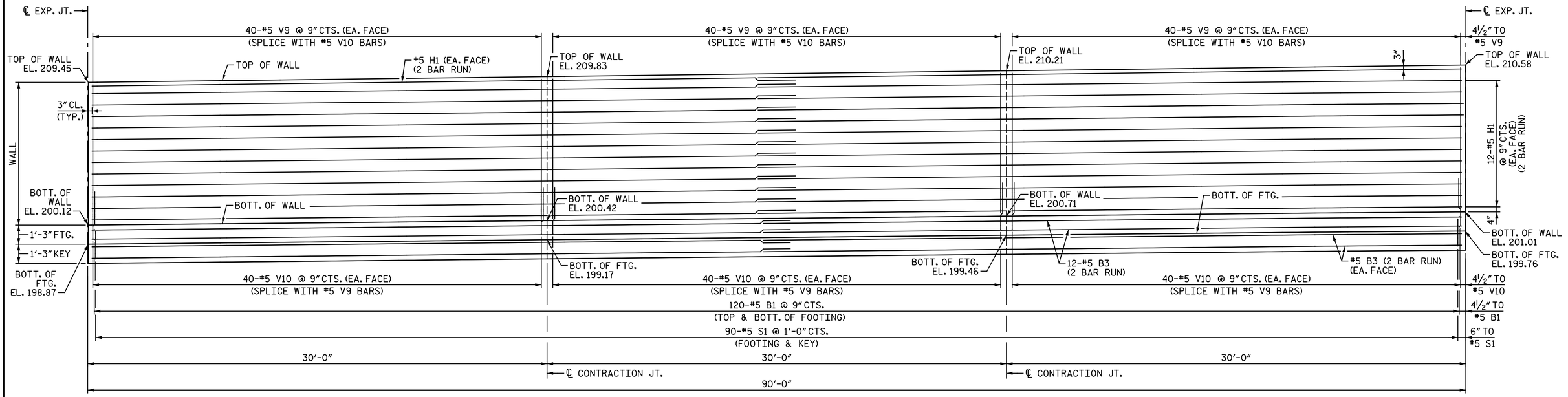
FOR RETAINING WALL -WL7-
BETWEEN -Y15RPA- AND -SR11-

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : M. D. MAYHEW DATE : 3-28-21
CHECKED BY : T. M. GARRISON DATE : 3-28-21

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-22
1			3			TOTAL SHEETS
2			4			28



WALL ELEVATION - SEGMENT 5

SPLICE LENGTHS		
BAR	SIZE	MIN. SPLICE
''B''	#5	1′-9″
''H''	#5	2′-5″
''V''	#5	1′-9″

PROJECT NO. I-5878

HARNETT COUNTY

STATION: 10+00.00 -WL7-

SHEET 3 OF 6

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523043466...

4/28/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

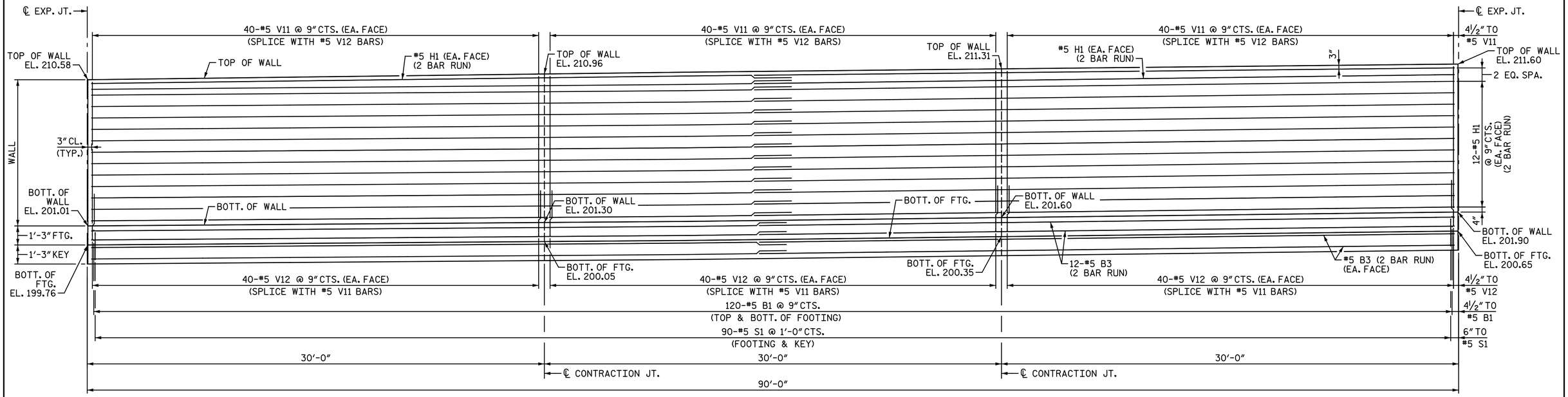
WALL ELEVATIONS

FOR RETAINING WALL -WL7- BETWEEN -Y15RPA- AND -SR11-

DRAWN BY : M. D. MAYHEW DATE : 3-28-21
CHECKED BY : T. M. GARRISON DATE : 3-28-21

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-23
1			3			TOTAL SHEETS
2			4			28



WALL ELEVATION - SEGMENT 6

SPLICE LENGTHS		
BAR	SIZE	MIN. SPLICE
''B''	#5	1′-9″
''H''	#5	2′-5″
''V''	#5	1′-9″

PROJECT NO. I-5878

HARNETT COUNTY

STATION: 10+00.00 -WL7-

SHEET 4 OF 6

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523043466...

4/28/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

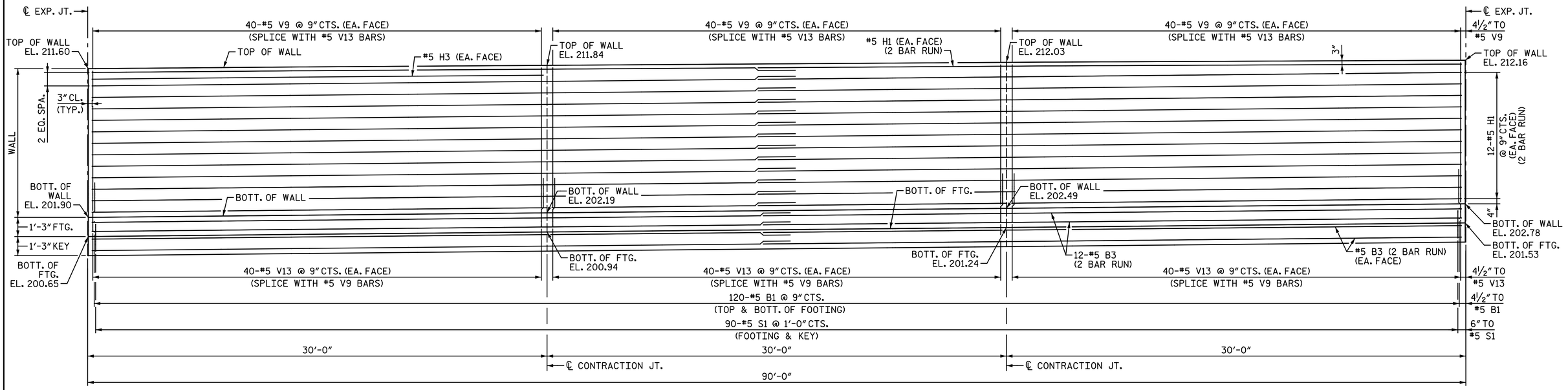
WALL ELEVATIONS

FOR RETAINING WALL -WL7- BETWEEN -Y15RPA- AND -SR11-

DRAWN BY : M. D. MAYHEW DATE : 3-28-21
CHECKED BY : T. M. GARRISON DATE : 3-28-21

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-24
1			3			TOTAL SHEETS
2			4			28



WALL ELEVATION - SEGMENT 7

SPLICE LENGTHS		
BAR	SIZE	MIN. SPLICE
''B''	#5	1′-9″
''H''	#5	2′-5″
''V''	#5	1′-9″

PROJECT NO. I-5878

HARNETT COUNTY

STATION: 10+00.00 -WL7-

SHEET 5 OF 6

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523043466...

4/28/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

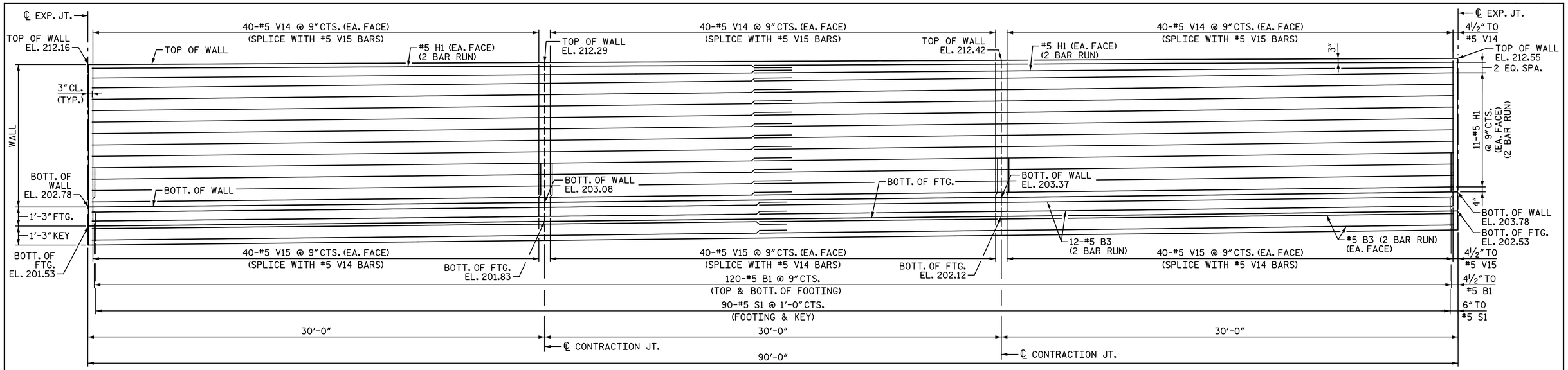
WALL ELEVATIONS

FOR RETAINING WALL -WL7- BETWEEN -Y15RPA- AND -SR11-

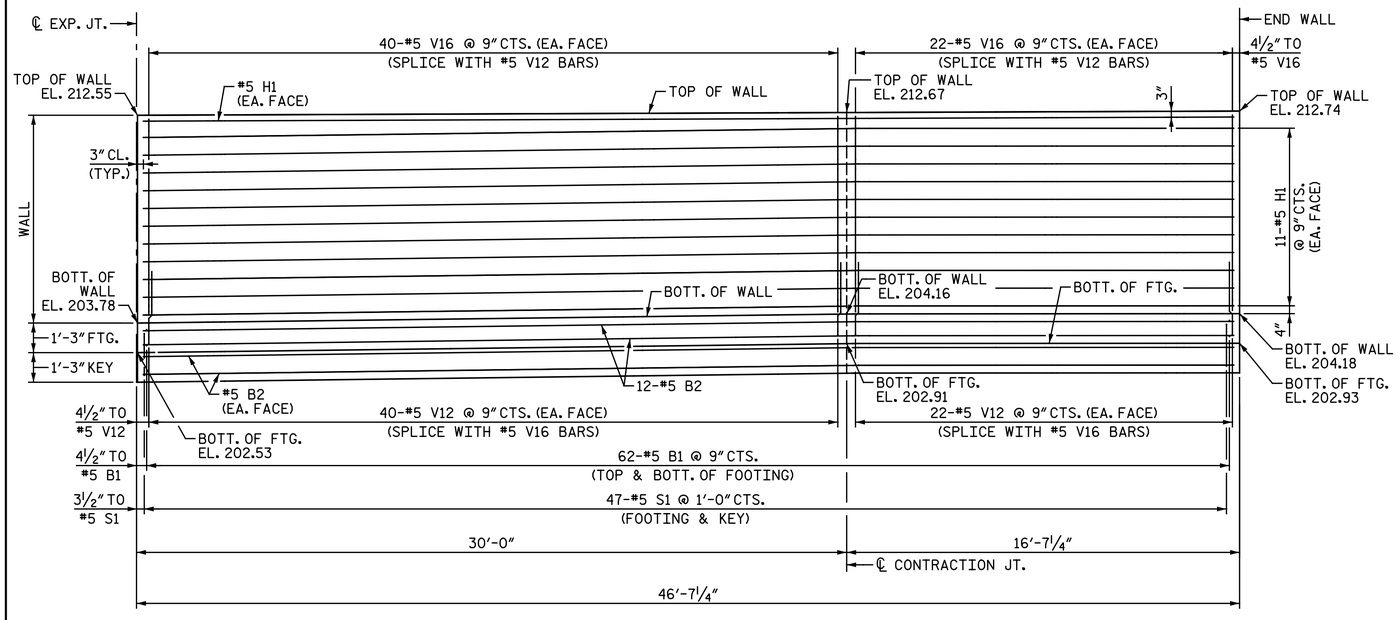
DRAWN BY : M. D. MAYHEW DATE : 3-28-21
CHECKED BY : T. M. GARRISON DATE : 3-28-21

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-25
1			3			TOTAL SHEETS
2			4			28



WALL ELEVATION - SEGMENT 8



WALL ELEVATION - SEGMENT 9

SPLICE LENGTHS		
BAR	SIZE	MIN. SPLICE
"B"	#5	1′-9″
"H"	#5	2′-5″
"V"	#5	1′-9″

PROJECT NO. I-5878

HARNETT COUNTY

STATION: 10+00.00 -WL7-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WALL ELEVATIONS

FOR RETAINING WALL -WL7-
BETWEEN -Y15RPA- AND -SR11-

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: T. M. Garrison 61EAF7523943466...
4/28/2021

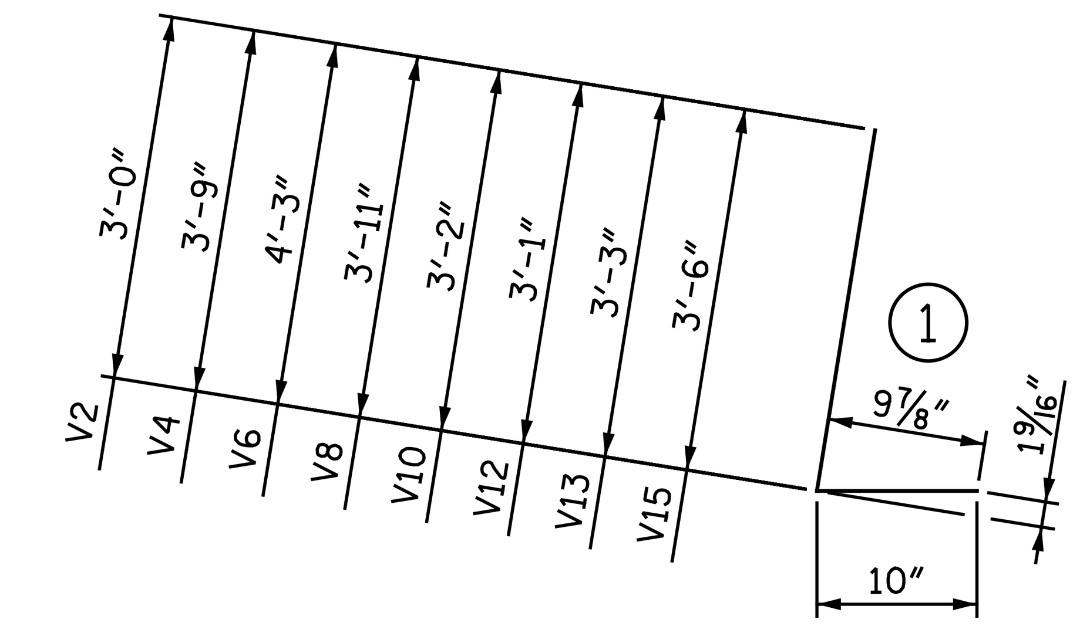
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

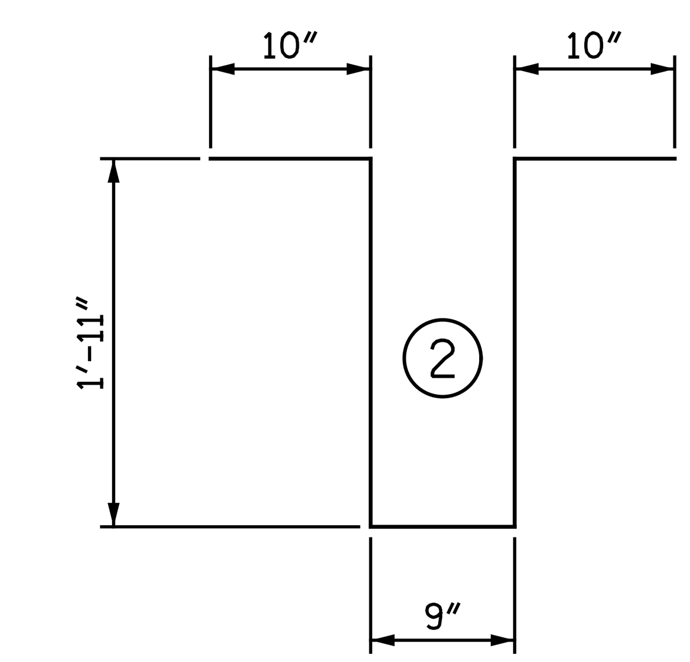
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-26
1			3			TOTAL SHEETS
2			4			28

DRAWN BY : M. D. MAYHEW DATE : 3-28-21
CHECKED BY : T. M. GARRISON DATE : 3-28-21

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

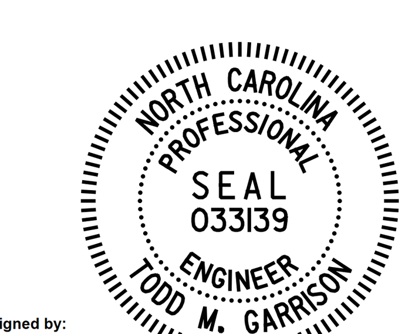
RETAINING WALL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	1928	#5	STR.	10' - 10"	21,785
B2	56	#5	STR.	46' - 0"	2,687
B3	392	#5	STR.	45' - 8"	18,671
H1	378	#5	STR.	46' - 0"	18,136
H2	6	#5	STR.	59' - 5"	372
H3	4	#5	STR.	29' - 5"	123
V1	124	#5	STR.	5' - 10"	754
V2	124	#5	1	3' - 10"	496
V3	240	#5	STR.	5' - 11"	1,481
V4	240	#5	1	4' - 7"	1,147
V5	240	#5	STR.	6' - 9"	1,690
V6	240	#5	1	5' - 1"	1,272
V7	240	#5	STR.	8' - 2"	2,044
V8	240	#5	1	4' - 9"	1,189
V9	480	#5	STR.	9' - 2"	4,589
V10	240	#5	1	4' - 0"	1,001
V11	240	#5	STR.	9' - 5"	2,357
V12	364	#5	1	3' - 11"	1,487
V13	240	#5	1	4' - 1"	1,022
V14	240	#5	STR.	8' - 7"	2,149
V15	240	#5	1	4' - 4"	1,085
V16	124	#5	STR.	8' - 4"	1,078
S1	724	#5	2	6' - 3"	4,720
REINFORCING STEEL				LBS.	91,335
CLASS A CONCRETE					
FOOTING & SHEAR KEY				C.Y.	421.3
WALL				C.Y.	672.2
TOTAL				C.Y.	1,093.5

PROJECT NO. I-5878

HARNETT COUNTY

STATION: 10+00.00 -WL7-



DocuSigned by:
61EAF7523943466...
4/28/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

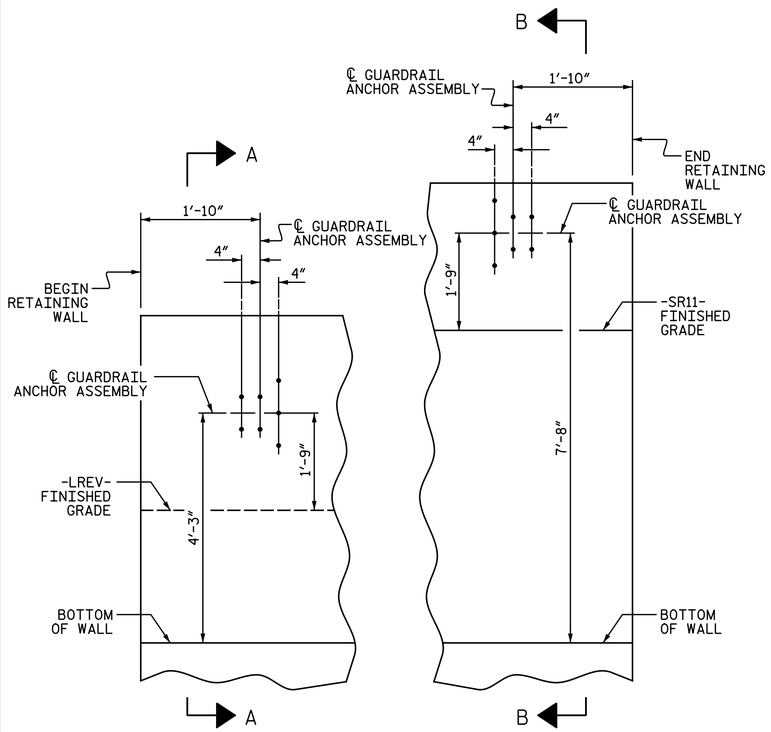
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WALL BILL OF MATERIAL

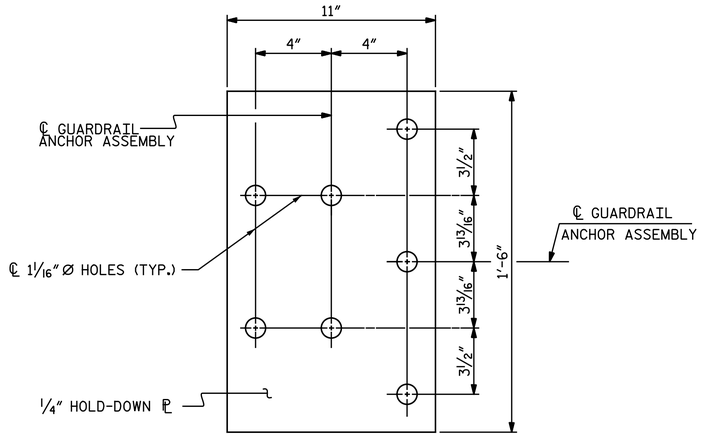
FOR RETAINING WALL -WL7-
BETWEEN -Y15RPA- AND -SR11-

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		W-27
1				3				TOTAL SHEETS
2				4				28

DRAWN BY : M. D. MAYHEW DATE : 3-28-21
CHECKED BY : T. M. GARRISON DATE : 3-28-21



ELEVATION



PLAN

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼" HOLD DOWN PLATE AND 7 - ⅞" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ⅞" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

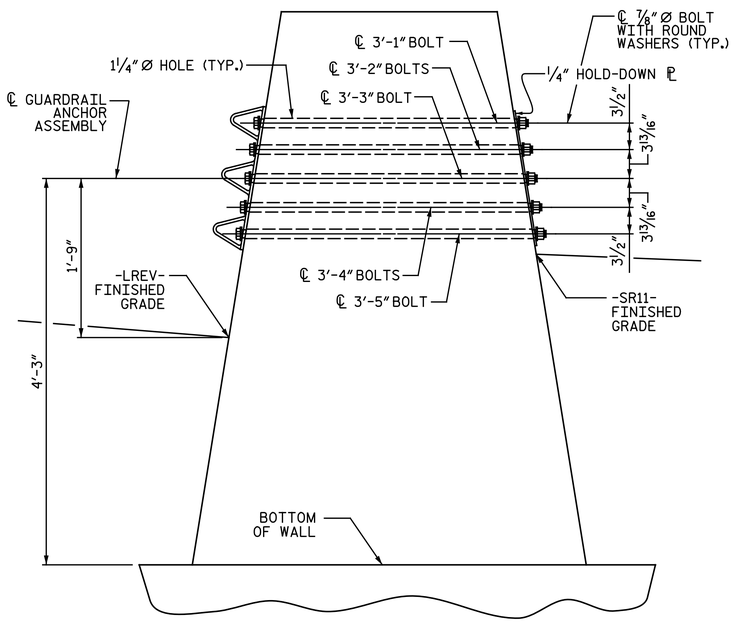
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE BEGINNING AND END OF RETAINING WALL.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

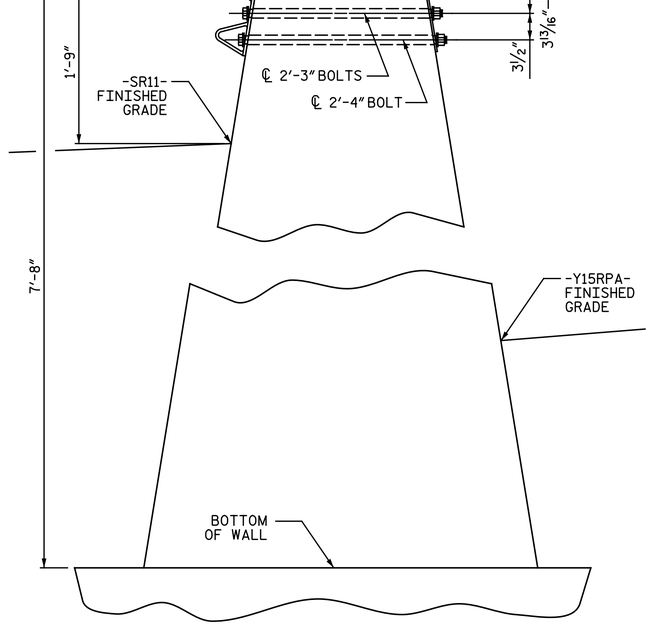
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CIP GRAVITY RETAINING WALL.

THE VERTICAL AND HORIZONTAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE RETAINING WALL TO CLEAR ASSEMBLY BOLTS.

THE 1 ¼" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SECTION A-A



SECTION B-B

GUARDRAIL ANCHOR ASSEMBLY DETAILS

PROJECT NO. I-5878

HARNETT COUNTY

STATION: 10+00.00 -WL7-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GUARDRAIL ANCHORAGE DETAILS FOR RETAINING WALL

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/28/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-28
1			3			TOTAL SHEETS
2			4			28

DRAWN BY : M. D. MAYHEW DATE : 4-20-21
CHECKED BY : T. M. GARRISON DATE : 4-21-21

-L- POC Sta. 1101+61.98=
-Y16- POT Sta. 27+09.19

END MSE WALL
STA. 12+65.30 MSE WALL
STA. 25+60.63 –Y16–
42.69′ LT

BEGIN CONC. BARRIER
STA. 11+81.30 MSE WALL
26+47.95 –Y16–
42.69′ LT

36" MTL

CONCRETE BRIDGE

-L- 102+00

-L- 103+00

W.P. #1
STA. 26+14.44 -Y16-

-Y16-

Century Link, FO, 1" Interduct

6" RCP

25+00 -Y16-

BEGIN MSE WALL
STA. 10+00 MSE WALL
STA. 25+15.06 –Y16–
42.63′ RT

END CONC. BARRIER
STA. 10+82.00 MSE WALL
25+97.06 –Y12–
42.63′ RT

26+00 -Y16-

-L- 100+00

27+00 -Y16-

-L- 100+00

END CONC. BARRIER
STA. 10+80.00 MSE WALL
28+20.49 –Y16–
42.63′ LT

BEGIN MSE WALL
STA. 10+00.00 MSE WALL
STA. 29+09.66 –Y16–
42.63′ LT

BY75-

36" MTL

W.P. #3
STA. 28+03.94 -Y16-

-Y16-

28+00 -Y16-

29+00 -Y16-

BEGIN CONC. BARRIER
STA. 11+78.85 MSE WALL
27+70.57 –Y16–
42.69′ RT

END MSE WALL
STA. 12+61.37 MSE WALL
28+57.57 –Y16–
42.69′ RT

DI

N

0 30 60
FEET

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen Hill E52CFCB546224F2...
5/12/2021
SIGNATURE DATE

ENGINEER
SIGNATURE DATE

PROJECT NO.: I-5883
HARNETT COUNTY
STATION: 27+09.19 -Y16- / 1101+61.98 -L-
SHEET 1 OF 5

PREPARED BY: KHH DATE: 10/02/18
REVIEWED BY: REK DATE: 10/02/18

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

MSE RETAINING WALL NO. 1 AND NO. 2 LOCATION PLAN

REVISIONS

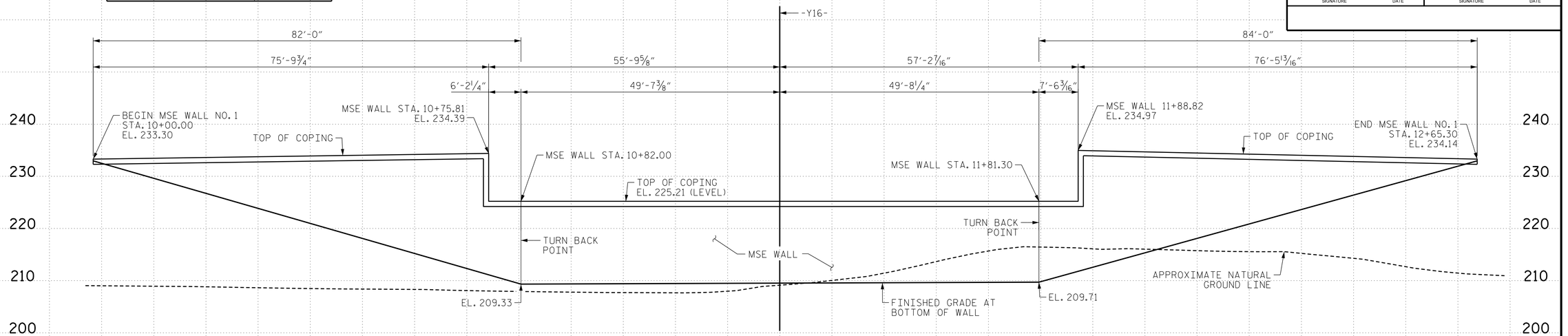
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. W-1

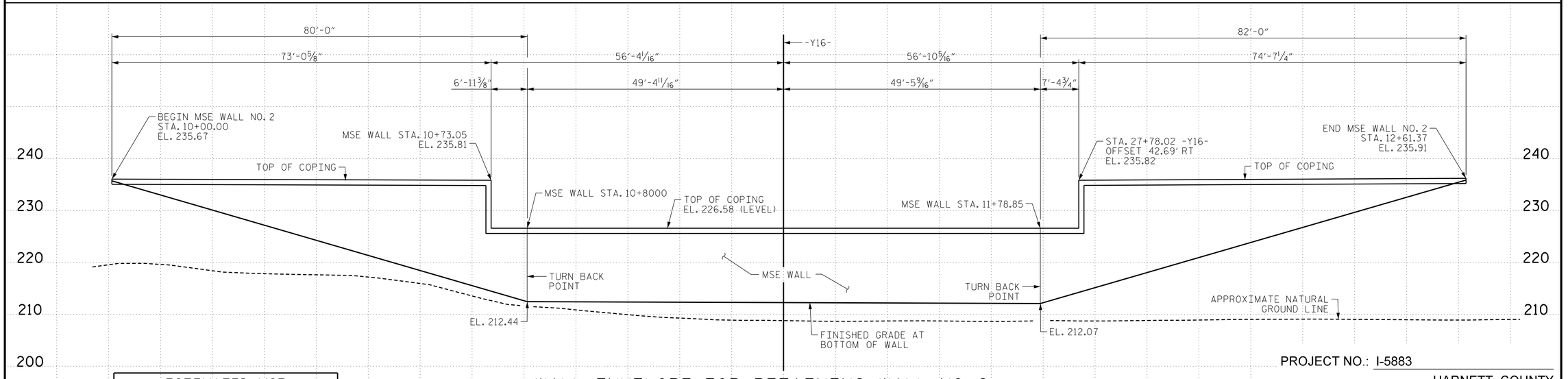
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H HILL	
DocuSigned by: kristen Hill E52CFCB546224F2 SIGNATURE	SIGNATURE
5/12/2021 DATE	DATE

ESTIMATED MSE WALL QUANTITY
(SQUARE FEET)

MSE RETAINING WALL NO. 1	3,800 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	3,270 SF



WALL ENVELOPE FOR RETAINING WALL NO. 1
LOOKING BACKSTATION (-Y16-) AT FRONT FACE OF MSE WALL AT END BENT 1



WALL ENVELOPE FOR RETAINING WALL NO. 2
LOOKING AHEAD STATION (-Y16-) AT FRONT FACE OF MSE WALL AT END BENT 2

ESTIMATED MSE WALL QUANTITY
(SQUARE FEET)

MSE RETAINING WALL NO. 2	3,400 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	2,940 SF

PROJECT NO.: I-5883

HARNETT COUNTY

STATION: 27+09.19 -Y16- / 1101+61.98 -L-

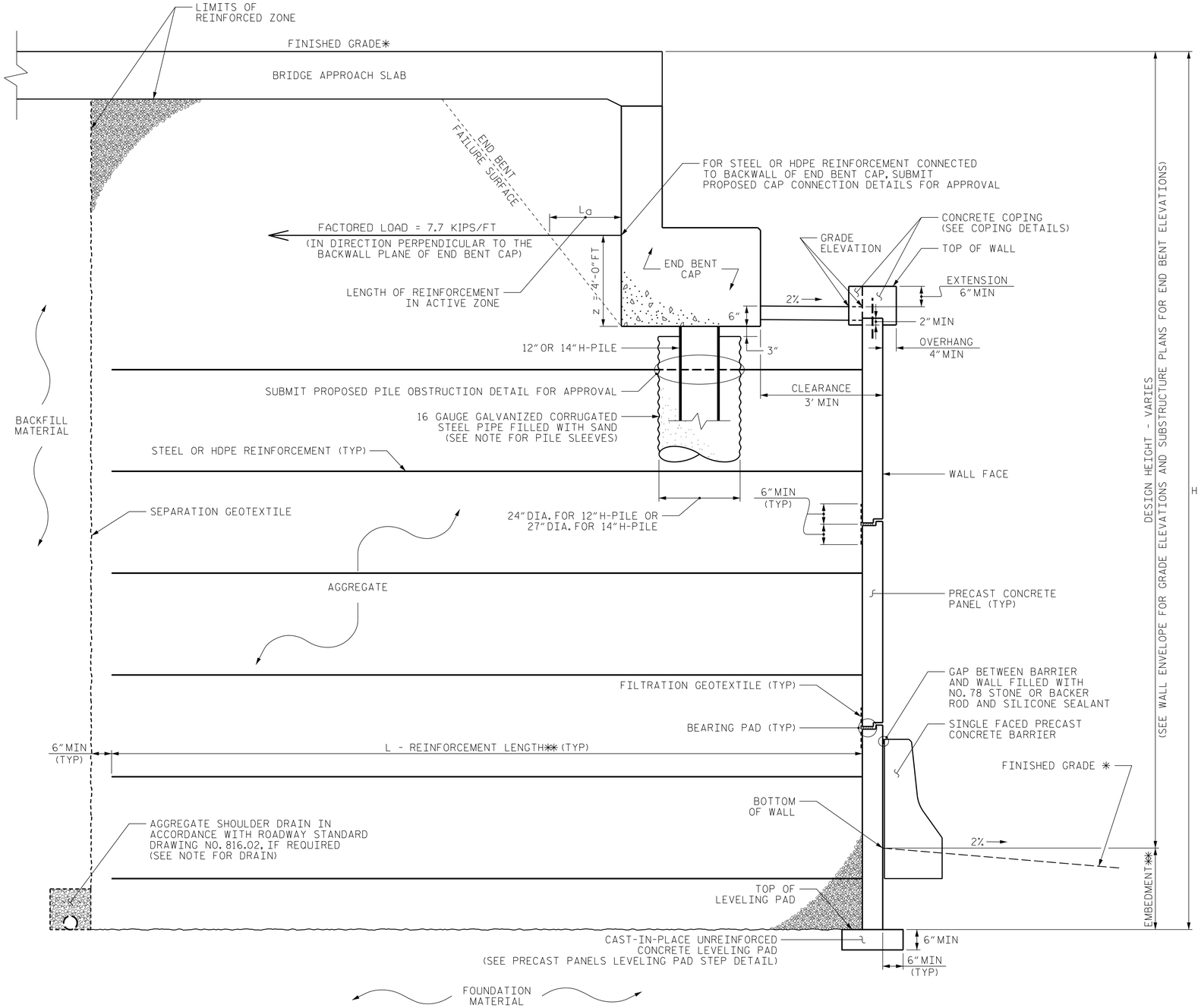
SHEET 2 OF 5

PREPARED BY: KHH	DATE: 10/02/18
REVIEWED BY: REK	DATE: 10/02/18

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

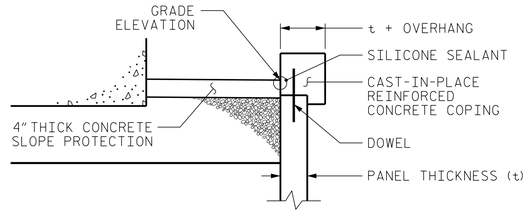
MSE RETAINING WALL NO. 1 AND NO. 2 WALL ENVELOPES

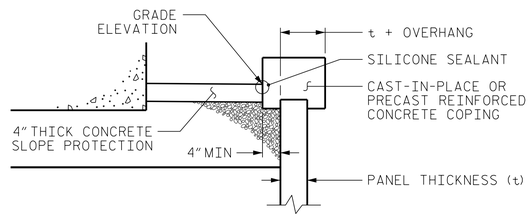
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-2
1			3			
2			4			



MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.





COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H HILL

DocuSigned by: kristen Hill E52CFCB546224F2 5/12/2021
SIGNATURE DATE

ENGINEER
SIGNATURE DATE

PROJECT NO.: I-5883
HARNETT COUNTY
STATION: 27+09.19 -Y16- / 1101+61.98 -L-
SHEET 3 OF 5

PREPARED BY: KHH	DATE: 2/7/19
REVIEWED BY: SEM	DATE: 2/7/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO. 1 AND NO. 2 TYPICAL SECTION AT BRIDGE ABUTMENT

REVISIONS

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

SHEET NO. W-3

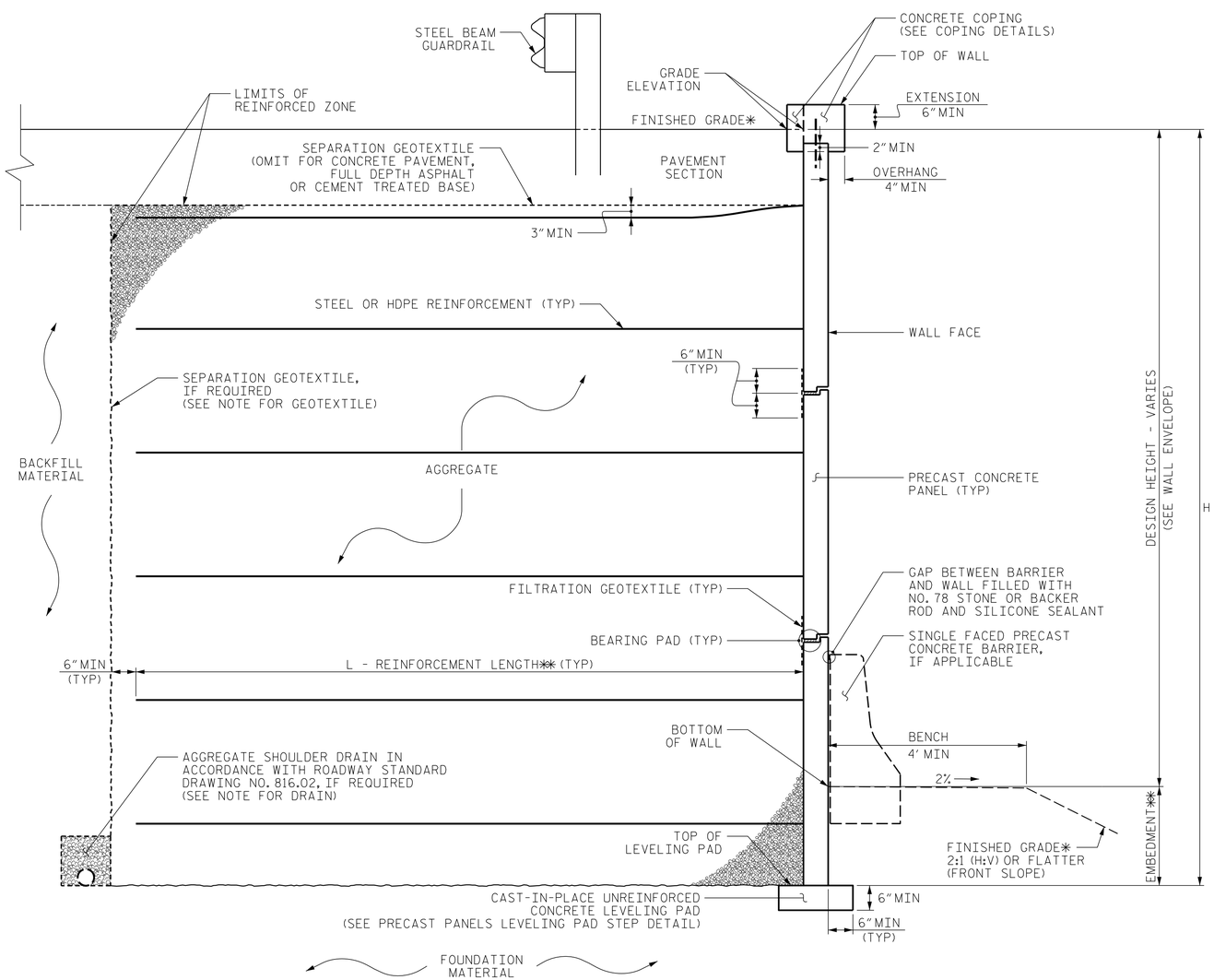
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2 SIGNATURE 5/12/2021 DATE

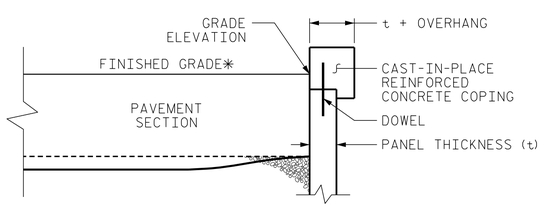
ENGINEER

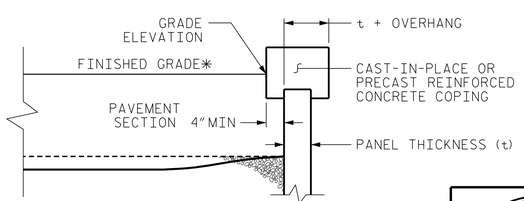
SIGNATURE DATE



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.





COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PREPARED BY: KHH	DATE: 2/7/19
REVIEWED BY: SEM	DATE: 2/7/19

PROJECT NO.: I-5883

HARNETT COUNTY

STATION: 27+09.19 -Y16- / 1101+61.98 -L-

SHEET 4 OF 5

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO. 1 AND NO. 2 TYPICAL SECTION AND COPING DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-4
1			3			
2			4			

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2... 5/12/2021
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

FOR TYPE III REINFORCED BRIDGE APPROACH FILL SEE BRIDGE FILL PROVISION AND ROADWAY DETAIL DRAWING NO. 422D10.

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

FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION 26+14.44 -Y1- AND END BENT NO. 2 AT STATION 28+03.94 -Y1-, WILL INTERFERE WITH REINFORCMENT FOR RETAINING WALL NO. 1 AND RETAINING WALL NO. 2. SEE FOUNDATION LAYOUT SHEET FOR FOUNDATION LOCATIONS.

USE AN MSE WALL SYSTEM WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALLS AT END BENT NO. 1 AND END BENT NO. 2.

AN ASHLAR STONE PATTERN ARCHITECTURAL FINISH AND ANTI-GRAFFITI COATING IS REQUIRED FOR PRECAST CONCRETE PANELS. FOR ARCHITECTURAL FINISH, SEE THE ARCHITECTURAL CONCRETE SURFACE TREATMENT SPECIAL PROVISION.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 1 AND NO. 2.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 1 AND NO. 2.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 1 AND NO. 2, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 5910 LB/SF FOR WALL NO. 1 AND WALL NO. 2
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT WHICH EVER IS LONGER.
5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

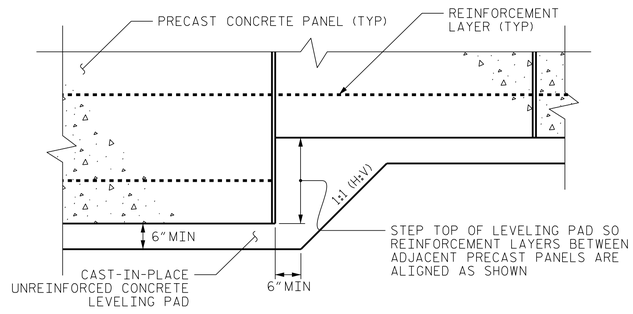
DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L_a) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 1 LOCATED AT STATION 26.14.44 -Y1- AND END BENT NO. 2 LOCATED AT STATION 28+03.94 -Y1-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

INSTALL PILE SLEEVES FOR END BENT NO. 1 LOCATED AT STATION 26.14.44 -Y1- WHILE CONSTRUCTING RETAINING WALL NO. 1. INSTALL PILE SLEEVES FOR END BENT NO. 2 LOCATED AT STATION 28+03.94 -Y1-. OBSERVE A 3 MONTH WAITING PERIOD AFTER CONSTRUCTING THE THE MSE ABUTMENT TO WITHIN 1 FT OF THE BOTTOM OF CAP ELEVATION. THEN, INSTALL PILES THROUGH THE CORRUGATED STEEL PIPES AND FILL PIPES WITH LOOSE UNCOMPACTED SAND BEFORE CONSTRUCTING END BENT CAPS.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAILS, FENCE OR HANDRAIL POST, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1 AND NO. 2

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 1 AND NO. 2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: I-5883

HARNETT COUNTY

STATION: 27+09.19 -Y16- / 1101+61.98 -L-

SHEET 5 OF 5

PREPARED BY: KHH	DATE: 2/7/19
REVIEWED BY: SEM	DATE: 2/7/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL
NO. 1 AND NO. 2
NOTES

REVISIONS

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

SHEET NO. W-5

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2... 5/12/2021

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

-L- POT Sta.1206+59.51=
-Y17- POT Sta.26+80.73

END MSE WALL
STA. 12+56.71 MSE WALL
STA. 24+69.63 –Y17–
28.63' LT

BEGIN CONC. BARRIER
STA. 11+66.71 MSE WALL
25+59.63 –Y17–
28.63' LT

END CONC. BARRIER
STA. 10+99.00 MSE WALL
27+53.92 –Y17–
28.63' LT

BEGIN MSE WALL
STA. 10+00.00 MSE WALL
STA. 28+52.92 –Y17–
28.63' LT

W.P. #3
STA. 27+87.48 -Y17-

-Y17-

W.P. #1
STA. 25+73.98 -Y17-

BEGIN MSE WALL
STA. 10+00 MSE WALL
STA. 25+15.54 –Y17–
28.63' RT

END CONC. BARRIER
STA. 10+92 MSE WALL
26+07.54 –Y17–
28.63' RT

BEGIN CONC. BARRIER
STA. 11+73.71 MSE WALL
28+01.84 –Y17–
28.63' RT

END MSE WALL
STA. 12+69.71 MSE WALL
28+97.84 –Y17–
28.63' RT

35+00 -Y12-

36+00 -Y12-

37+00 -Y12-

38+00 -Y12-

WOODS

N

0 30 60
FEET

PROJECT NO.: I-5883

HARNETT COUNTY

STATION: 26+80.73 -Y17- / 1206+59.51 -L-

SHEET 1 OF 5

PREPARED BY: KHH	DATE: 2/12/19
REVIEWED BY: REK	DATE: 2/12/19

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

MSE RETAINING WALL NO. 1 AND NO. 2 LOCATION PLAN

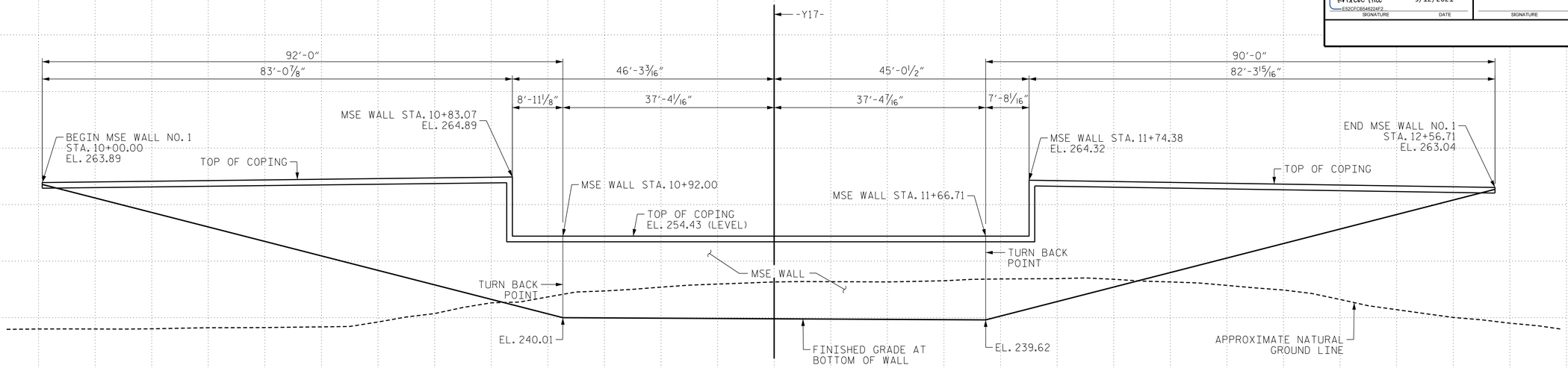
REVISIONS

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

SHEET NO. W-6

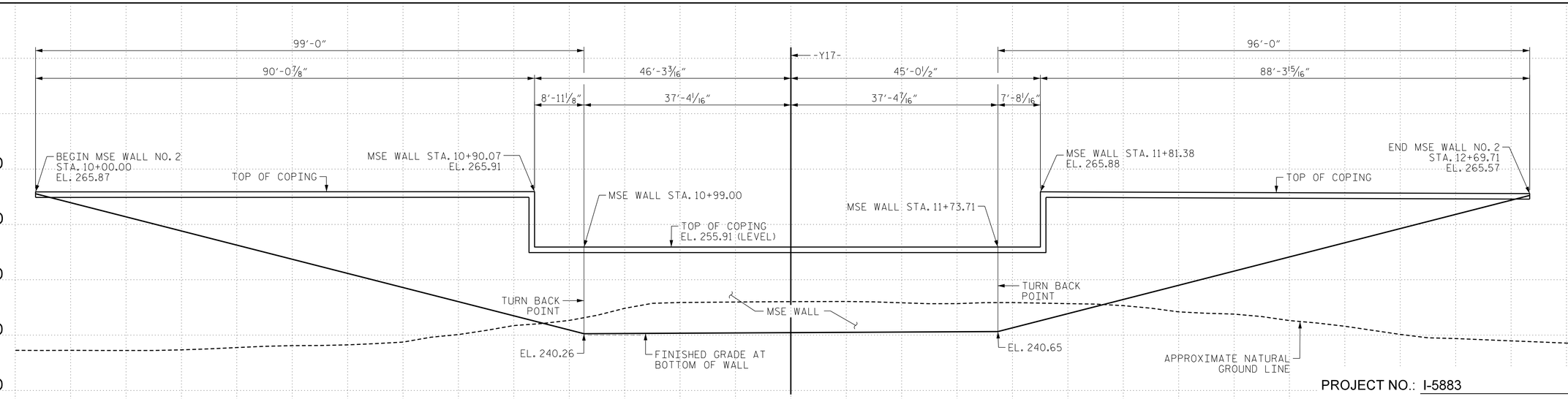
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H HILL	
DocuSigned by: kristen hill E52CFCB546224F2 SIGNATURE	5/12/2021 DATE
SIGNATURE	DATE

ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 1	3,500 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	2,940 SF



WALL ENVELOPE FOR RETAINING WALL NO. 1

LOOKING BACKSTATION (-Y17-) AT FRONT FACE OF MSE WALL AT END BENT 1



WALL ENVELOPE FOR RETAINING WALL NO. 2

LOOKING AHEAD STATION (-Y17-) AT FRONT FACE OF MSE WALL AT END BENT 2

ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 2	3,800 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	3,215 SF

PROJECT NO.: I-5883

HARNETT COUNTY

STATION: 26+80.73 -Y17- / 1206+59.51 -L-

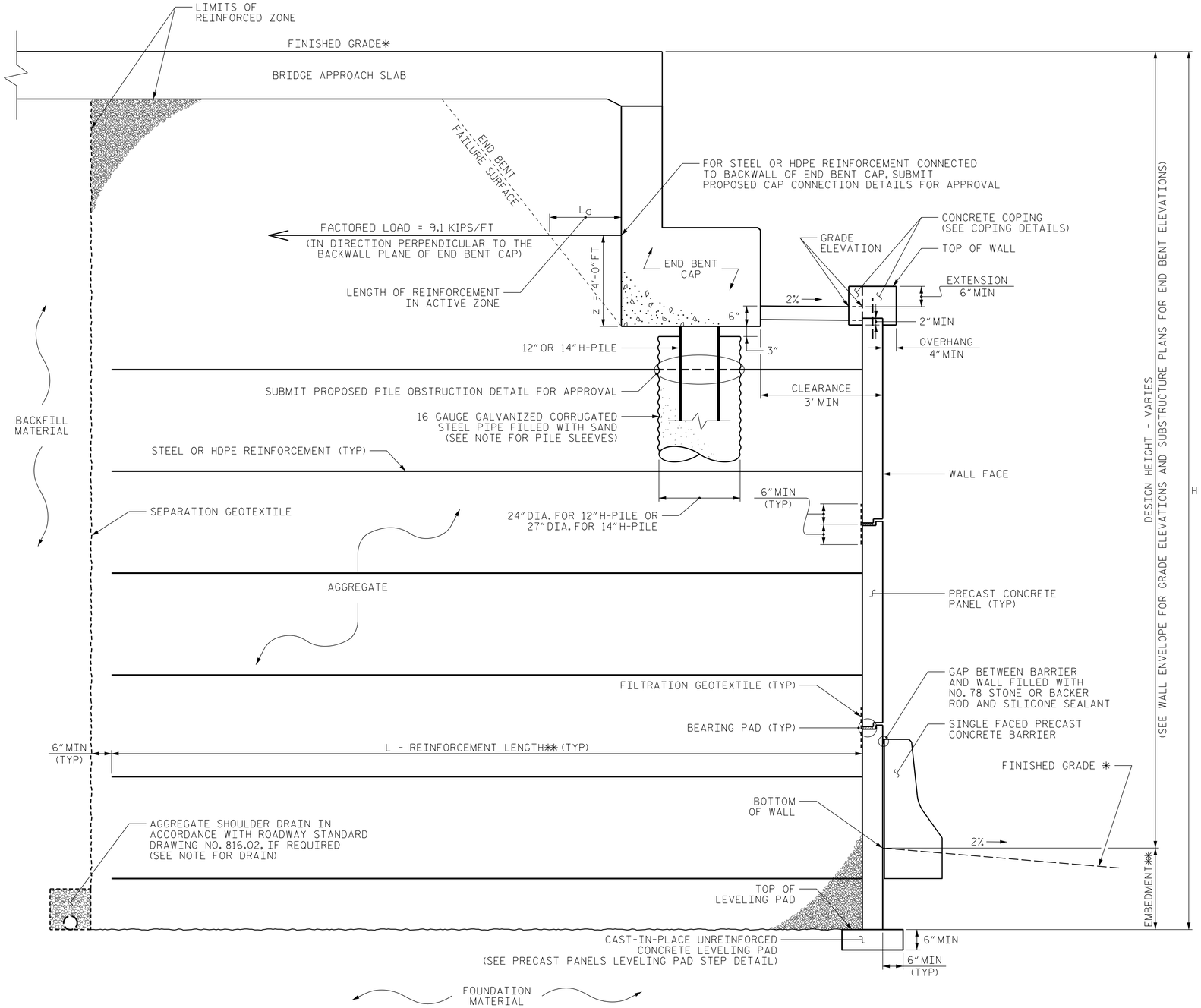
SHEET 2 OF 5

PREPARED BY: KHH	DATE: 2/12/19
REVIEWED BY: SEM	DATE: 2/12/19

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

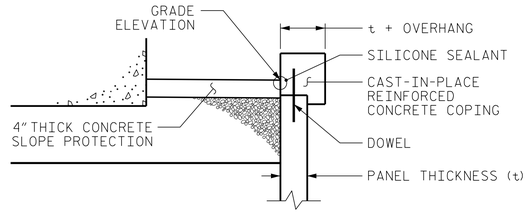
MSE RETAINING WALL NO. 1 AND NO. 2 WALL ENVELOPES

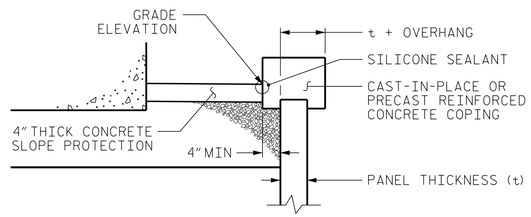
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-7
1			3			
2			4			



MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.





COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2... 5/12/2021
SIGNATURE DATE

ENGINEER
SIGNATURE DATE

PROJECT NO.: I-5883
HARNETT COUNTY
STATION: 26+80.73 -Y17- / 1206+59.51 -L-
SHEET 3 OF 5

PREPARED BY: KHH	DATE: 2/12/19
REVIEWED BY: SEM	DATE: 2/12/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO. 1 AND NO. 2 TYPICAL SECTION AT BRIDGE ABUTMENT

REVISIONS

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

SHEET NO. W-8

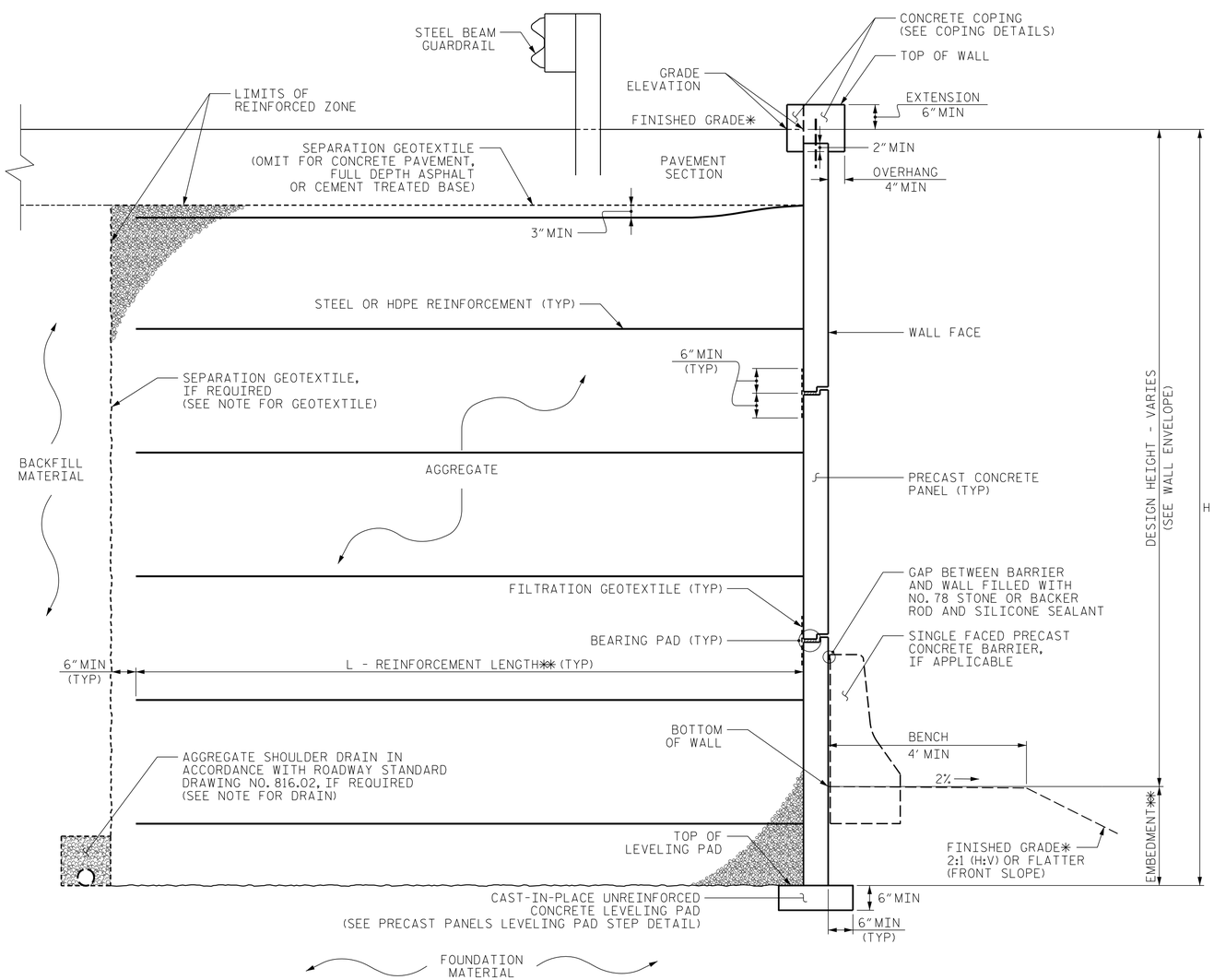
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2 SIGNATURE 5/12/2021 DATE

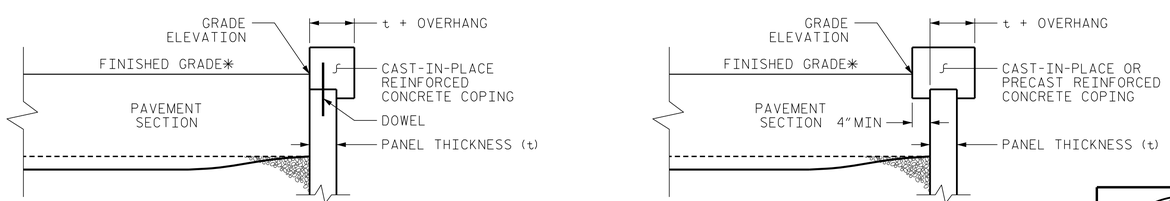
ENGINEER

SIGNATURE DATE



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PREPARED BY: KHH	DATE: 2/12/19
REVIEWED BY: SEM	DATE: 2/12/19

PROJECT NO.: I-5883 SECTION

HARNETT COUNTY

STATION: 26+80.73 -Y17- / 1206+59.51 -L-

SHEET 4 OF 5

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO. 1 AND NO. 2 TYPICAL SECTION AND COPING DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-9
1			3			
2			4			

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL DocuSigned by: kristen hill E52CFCB546224F2... 5/12/2021	
SIGNATURE DATE	SIGNATURE DATE

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

FOR TYPE III REINFORCED BRIDGE APPROACH FILL SEE BRIDGE FILL PROVISION AND ROADWAY DETAIL DRAWING NO. 422D10.

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

FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION 25+73.98 -Y17- AND END BENT NO. 2 AT STATION 27+87.48 -Y17-, WILL INTERFERE WITH REINFORCMENT FOR RETAINING WALL NO. 1 AND RETAINING WALL NO. 2. SEE FOUNDATION LAYOUT SHEET FOR FOUNDATION LOCATIONS.

USE AN MSE WALL SYSTEM WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALLS AT END BENT NO. 1 AND END BENT NO. 2.

AN ASHLAR STONE PATTERN ARCHITECTURAL FINISH AND ANTI-GRAFFITI COATING IS REQUIRED FOR PRECAST CONCRETE PANELS. FOR ARCHITECTURAL FINISH, SEE THE ARCHITECTURAL CONCRETE SURFACE TREATMENT SPECIAL PROVISION.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 1 AND NO. 2.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 1 AND NO. 2.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 1 AND NO. 2, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 5,600 LB/SF FOR WALL NO. 1 AND FOR WALL NO. 2

4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT WHICH EVER IS LONGER FOR WALL NO. 1 AND WALL NO. 2.

5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

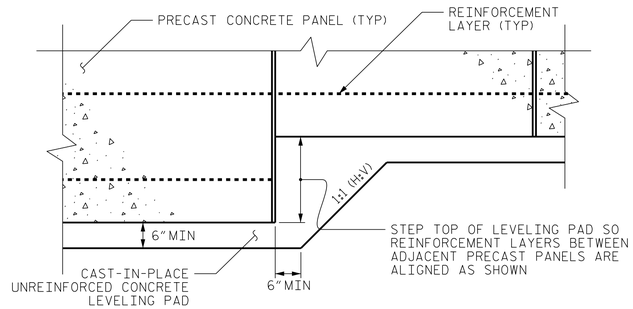
DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 1 LOCATED AT STATION 25+73.98 -Y17- AND END BENT NO. 2 LOCATED AT STATION 27+87.48 -Y17-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

INSTALL PILE SLEEVES FOR END BENT NO. 1 LOCATED AT STATION 25+73.98 -Y17- WHILE CONSTRUCTING RETAINING WALL NO. 1. INSTALL PILE SLEEVES FOR END BENT NO. 2 LOCATED AT STATION 27+87.48 -Y17-. THEN, INSTALL PILES THROUGH THE CORRUGATED STEEL PIPES AND FILL PIPES WITH LOOSE UNCOMPACTED SAND BEFORE CONSTRUCTING END BENT CAPS.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAILS, FENCE OR HANDRAIL POST, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1 AND NO. 2

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 1 AND NO. 2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



PRECAST PANELS LEVELING PAD STEP DETAIL

PROJECT NO.: I-5883 SECTION
HARNETT COUNTY
STATION: 26+80.73 -Y17- / 1206+59.51 -L-
SHEET 5 OF 5

PREPARED BY: KHH	DATE: 2/12/19
REVIEWED BY: SEM	DATE: 2/12/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL
NO. 1 AND NO. 2
NOTES

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-10
1			3			
2			4			

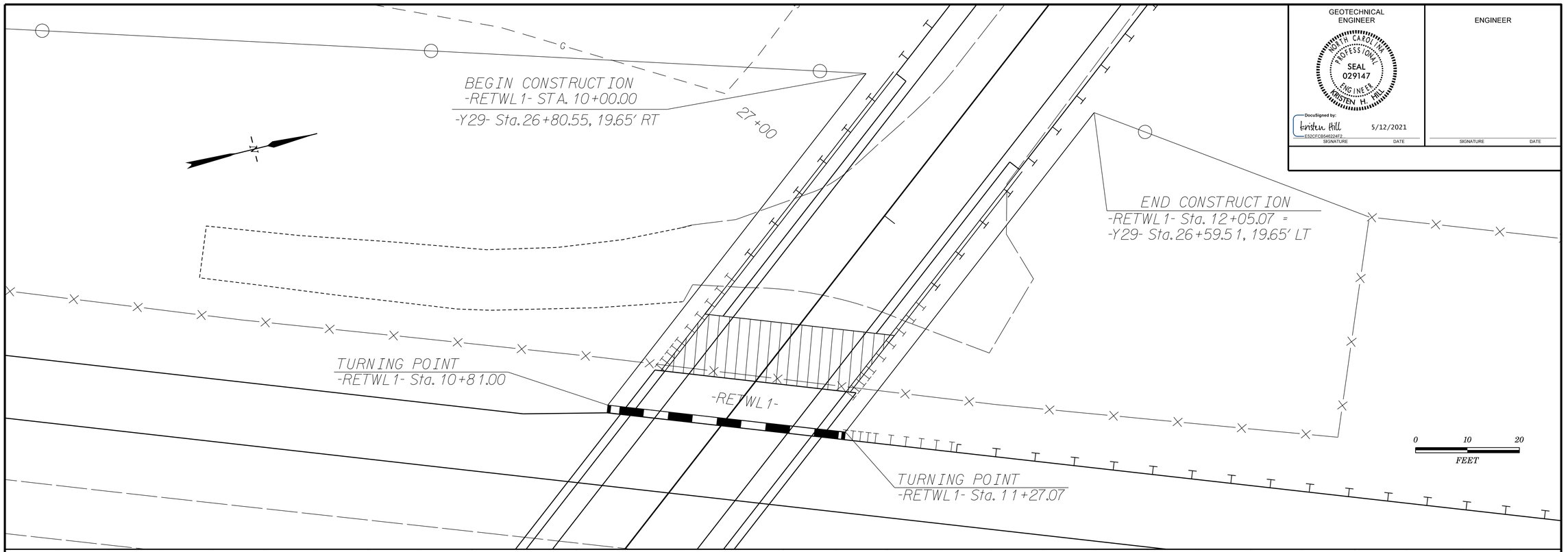
GEOTECHNICAL ENGINEER

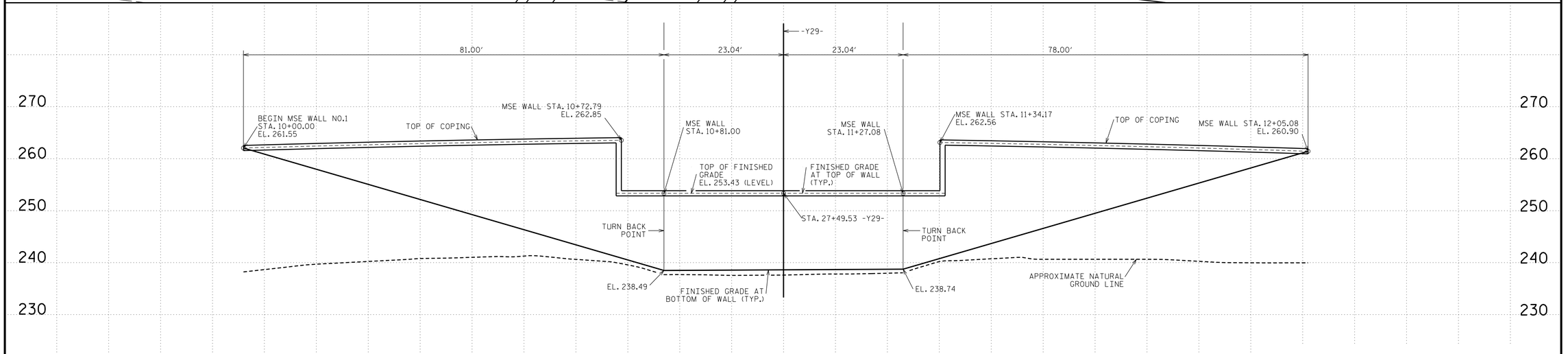
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen Hill 5/12/2021
E52CFCB546224F2...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE





ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 1	2,830 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	2,395 SF

WALL ENVELOPE FOR RETAINING WALL NO. 1

LOOKING BACKSTATION (-Y29-) AT FRONT FACE OF MSE WALL AT END BENT 1

PROJECT NO.: I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29- / 1294+89.16 -L-

SHEET 1 OF 5

PREPARED BY: KHH	DATE: 3/12/20
REVIEWED BY: SEM	DATE: 3/12/20

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

MSE RETAINING WALL NO. 1 WALL ENVELOPES

REVISIONS

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

SHEET NO. W-1

GEOTECHNICAL ENGINEER

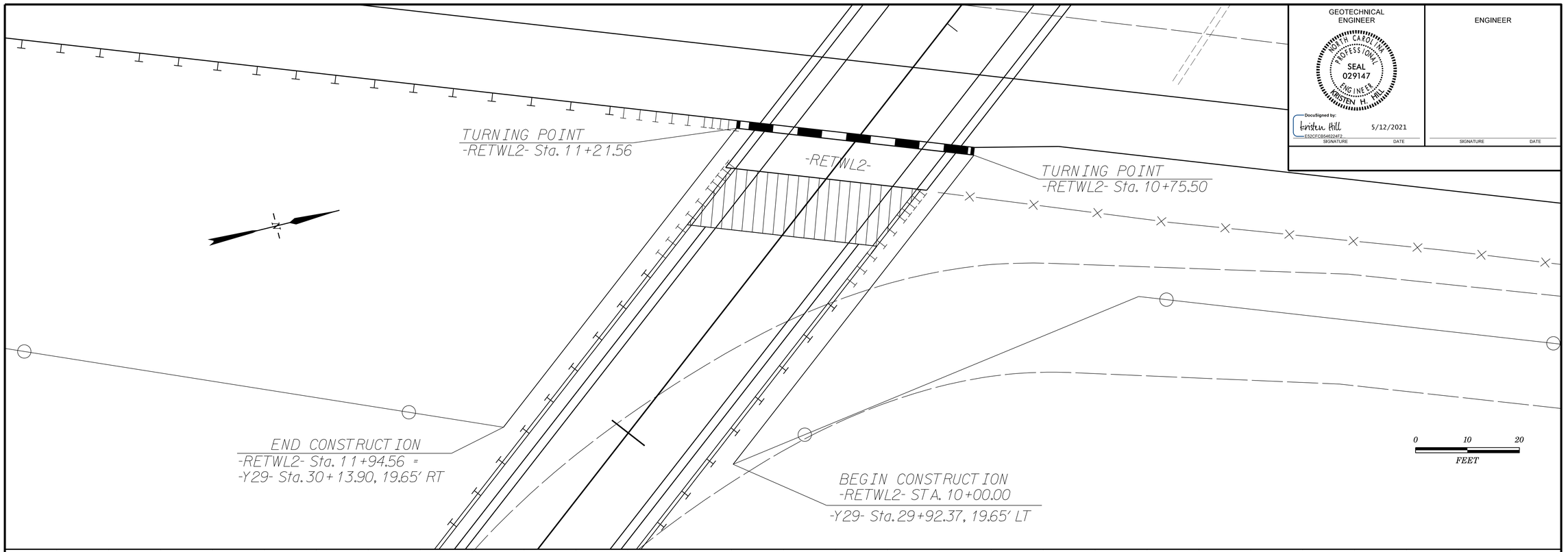
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

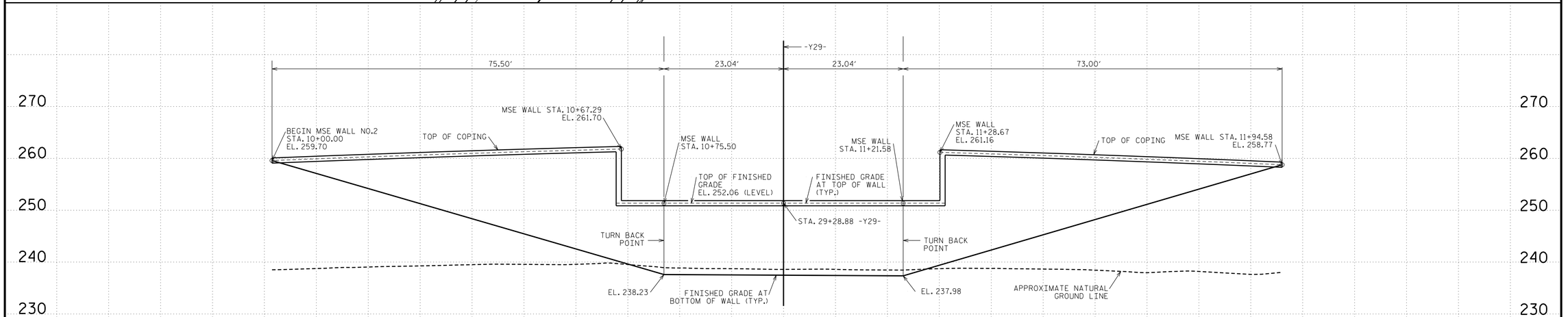
DocuSigned by: kristen Hill E52CFCB546224F2... 5/12/2021

SIGNATURE DATE

ENGINEER

SIGNATURE DATE





ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 2	2,770 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	2,178 SF

WALL ENVELOPE FOR RETAINING WALL NO. 2

LOOKING AHEAD STATION (-Y29-) AT FRONT FACE OF MSE WALL AT END BENT 2

PROJECT NO.: I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29- / 1294+89.16 -L-

SHEET 2 OF 5

PREPARED BY: KHH	DATE: 3/10/20
REVIEWED BY: SEM	DATE: 3/10/20

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

MSE RETAINING WALL NO. 2 WALL ENVELOPES

REVISIONS

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

SHEET NO. W-2

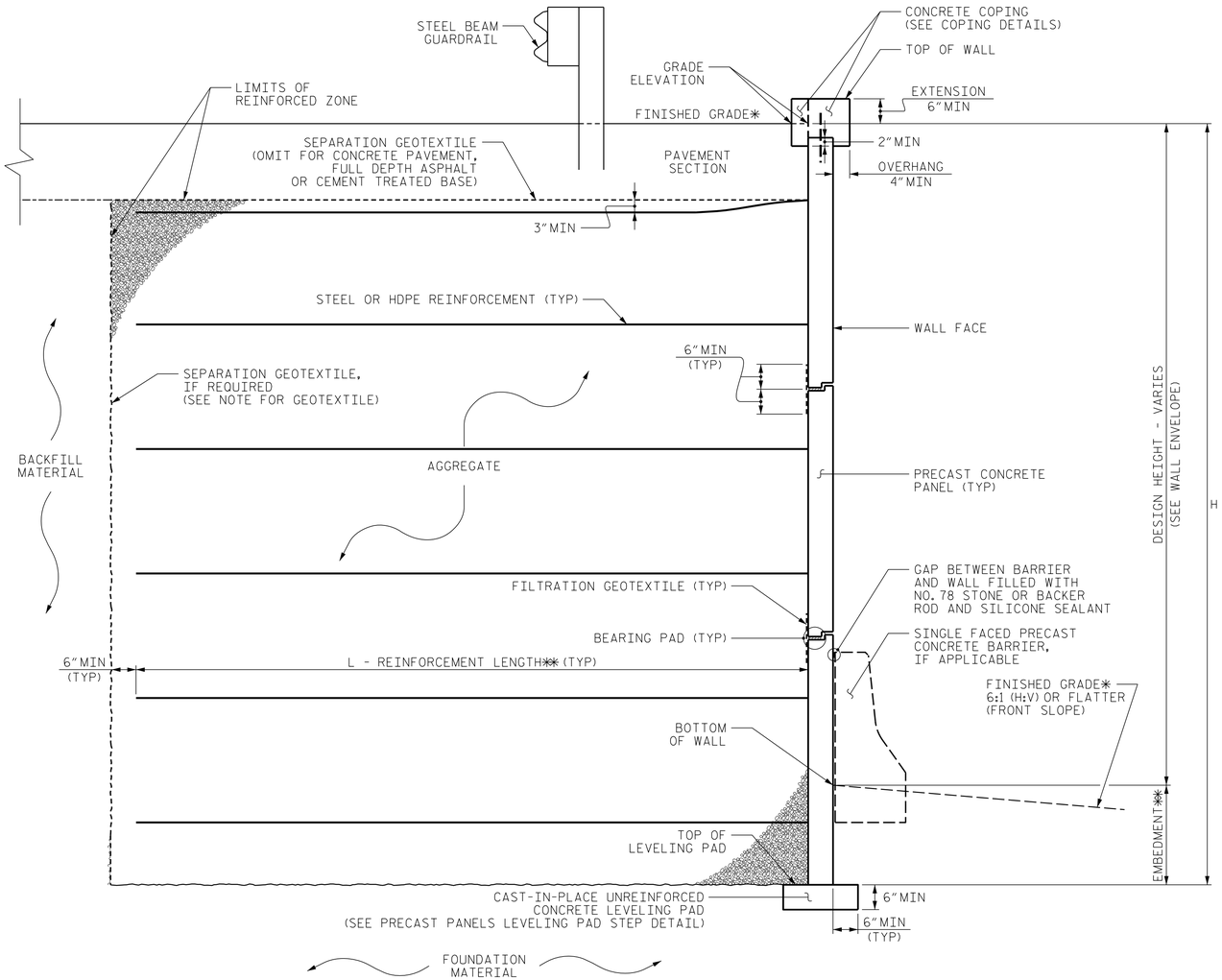
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2 SIGNATURE 5/12/2021 DATE

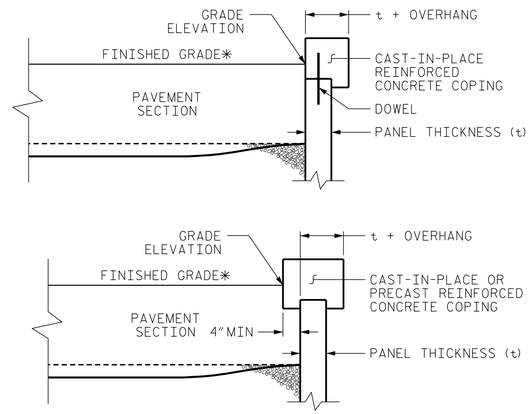
ENGINEER

SIGNATURE DATE



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PROJECT NO.: I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29- / 1294+89.16 -L-

SHEET 3 OF 5

PREPARED BY: KHH	DATE: 3/12/20
REVIEWED BY: SEM	DATE: 3/12/20

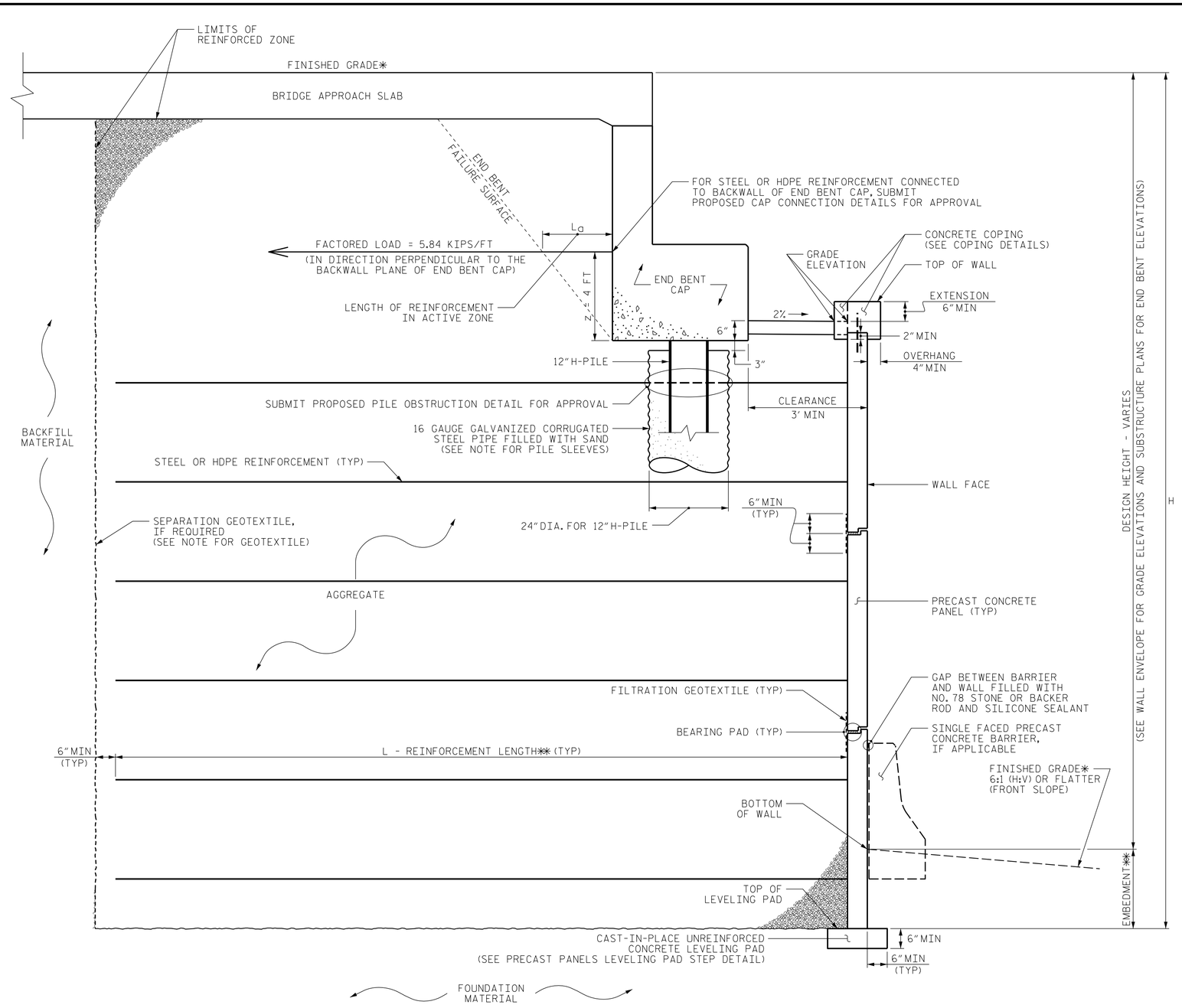
9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

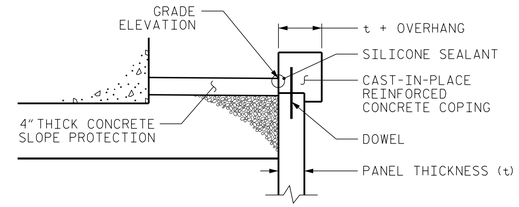
MSE WALL WITH PANELS AND GUARDRAIL - TYPICAL & COPING DETAILS

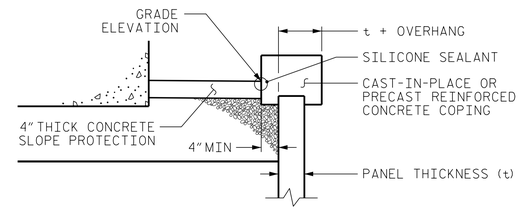
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	W-3
2	-	-	4	-	-	



MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.





COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2 SIGNATURE 5/12/2021 DATE

ENGINEER SIGNATURE DATE

PROJECT NO.: I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29- / 1294+89.16 -L-

SHEET 4 OF 5

PREPARED BY: KHH	DATE: 3/12/20
REVIEWED BY: SEM	DATE: 3/12/20

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE ABUTMENT WALL WITH PANELS, END BENT ON H-PILES AND PILE SLEEVES - TYPICAL & COPING DETAILS

REVISIONS

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

SHEET NO. W-4

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: Kristen Hill 5/12/2021
E52CFCB546224F2
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

FOR TYPE III REINFORCED BRIDGE APPROACH FILLS, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY DETAIL DRAWING NO. 422D10.

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

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

AN ASHLAR STONE PATTERN ARCHITECTURAL FINISH IS REQUIRED FOR PRECAST CONCRETE PANELS FOR RETAINING WALLS NO. 1 AND NO.2. FOR ARCHITECTURAL FINISH, SEE THE ARCHITECTURAL CONCRETE SURFACE TREATMENT SPECIAL PROVISION. ANTI-GRAFFITI COATING ON THE PRECAST CONCRETE PANELS IS REQUIRED FOR RETAINING WALLS NO. 1 AND NO.2

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 1 AND NO. 2.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 1 AND NO. 2, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 5800 PSF
4) MINIMUM REINFORCEMENT LENGTH (L) = .7 H OR 6 FT, WHICHEVER IS LONGER.
5) MINIMUM EMBEDMENT = DEPTH H/10 OR 2 FEET WHICH EVER IS GREATER
6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
•SEE MSE RETAINING WALLS PROVISION FOR COARSE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	32	0

DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L_D) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 1 LOCATED AT STATION 27+40.46 AND END BENT NO. 2 LOCATED AT 29+37.96. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1 AND NO. 2.

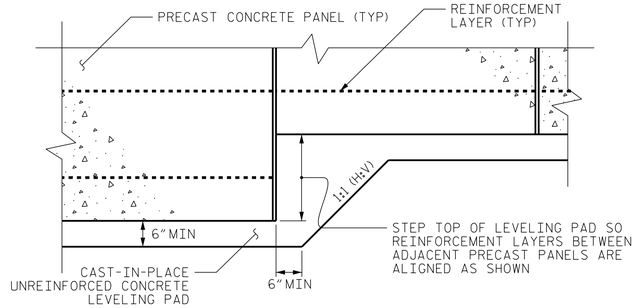
FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION 27+40.46 WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

FOUNDATIONS FOR END BENT NO. 2 LOCATED AT STATION 29+37.96 WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 2. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

INSTALL PILE SLEEVES FOR END BENT NO. 1 LOCATED AT STATION 27+40.46 WHILE CONSTRUCTING RETAINING WALL NO. 1. INSTALL PILES THROUGH THE CORRUGATED STEEL PIPES AND FILL PIPES WITH LOOSE UNCOMPACTED SAND BEFORE CONSTRUCTING END BENT CAPS.

INSTALL PILE SLEEVES FOR END BENT NO. 2 LOCATED AT STATION 29+37.96 WHILE CONSTRUCTING RETAINING WALL NO. 2. INSTALL PILES THROUGH THE CORRUGATED STEEL PIPES AND FILL PIPES WITH LOOSE UNCOMPACTED SAND BEFORE CONSTRUCTING END BENT CAPS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 1 AND NO. 2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29- / 1294+89.16 -L-

SHEET 5 OF 5

PREPARED BY: KHH	DATE: 3/12/20
REVIEWED BY: SEM	DATE: 3/12/20

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE WALL NO. 1 AND NO. 2 NOTES & PRECAST PANELS LEVELING PAD STEP DETAIL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	_	_	3	_	_	W-5
2	_	_	4	_	_	

–WL9– RETAINING WALL ENVELOPE

GEOTECHNICAL ENGINEER

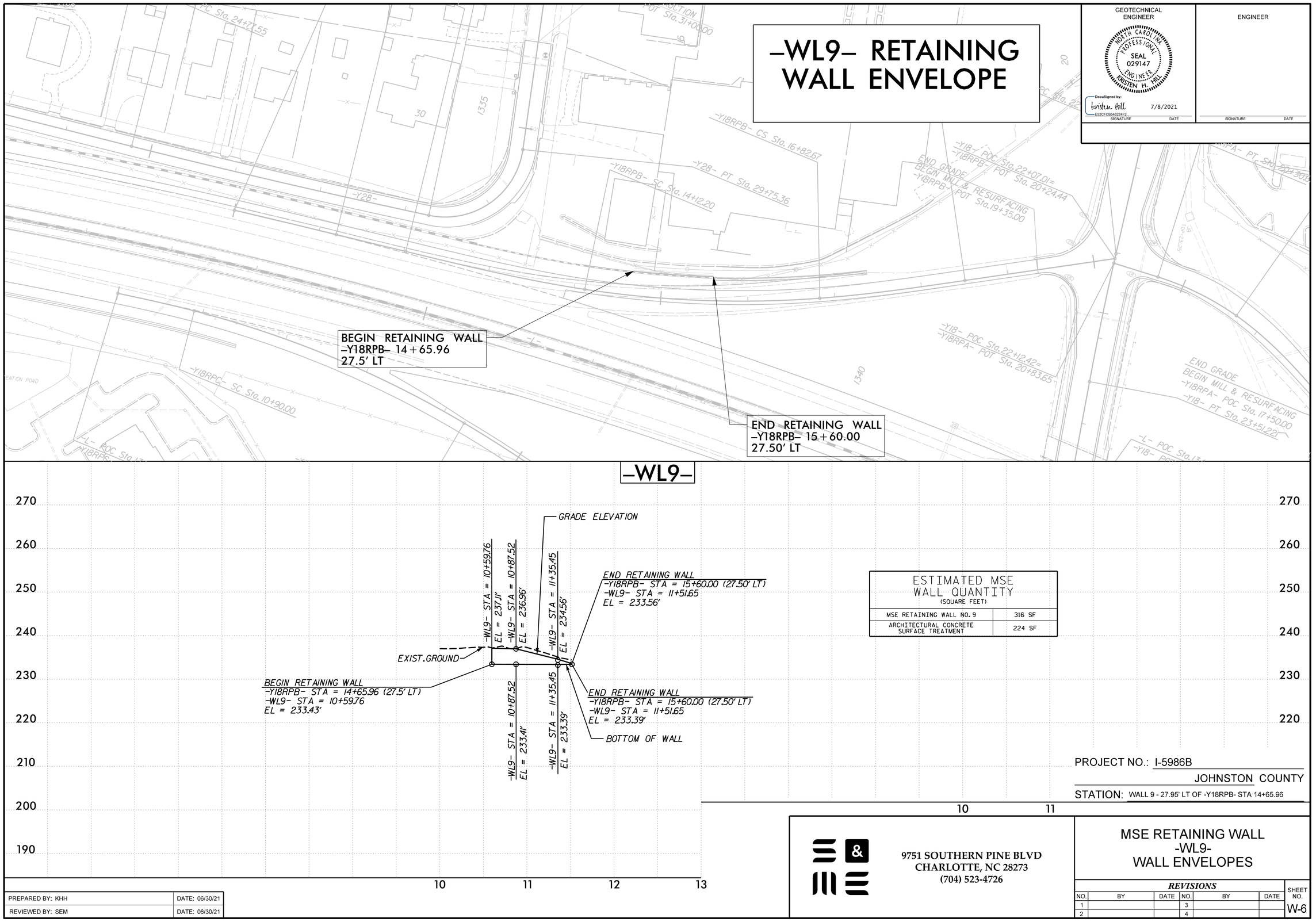
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H HILL

DocuSigned by: kristen Hill E52CFCB546224F2 — 7/8/2021

SIGNATURE DATE

ENGINEER

SIGNATURE DATE



–WL9–

ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 9	316 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	224 SF

PROJECT NO.: I-5986B

JOHNSTON COUNTY

STATION: WALL 9 - 27.95' LT OF -Y18RPB- STA 14+65.96

PREPARED BY: KHH	DATE: 06/30/21
REVIEWED BY: SEM	DATE: 06/30/21

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

MSE RETAINING WALL
-WL9-
WALL ENVELOPES

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-6
2			4			

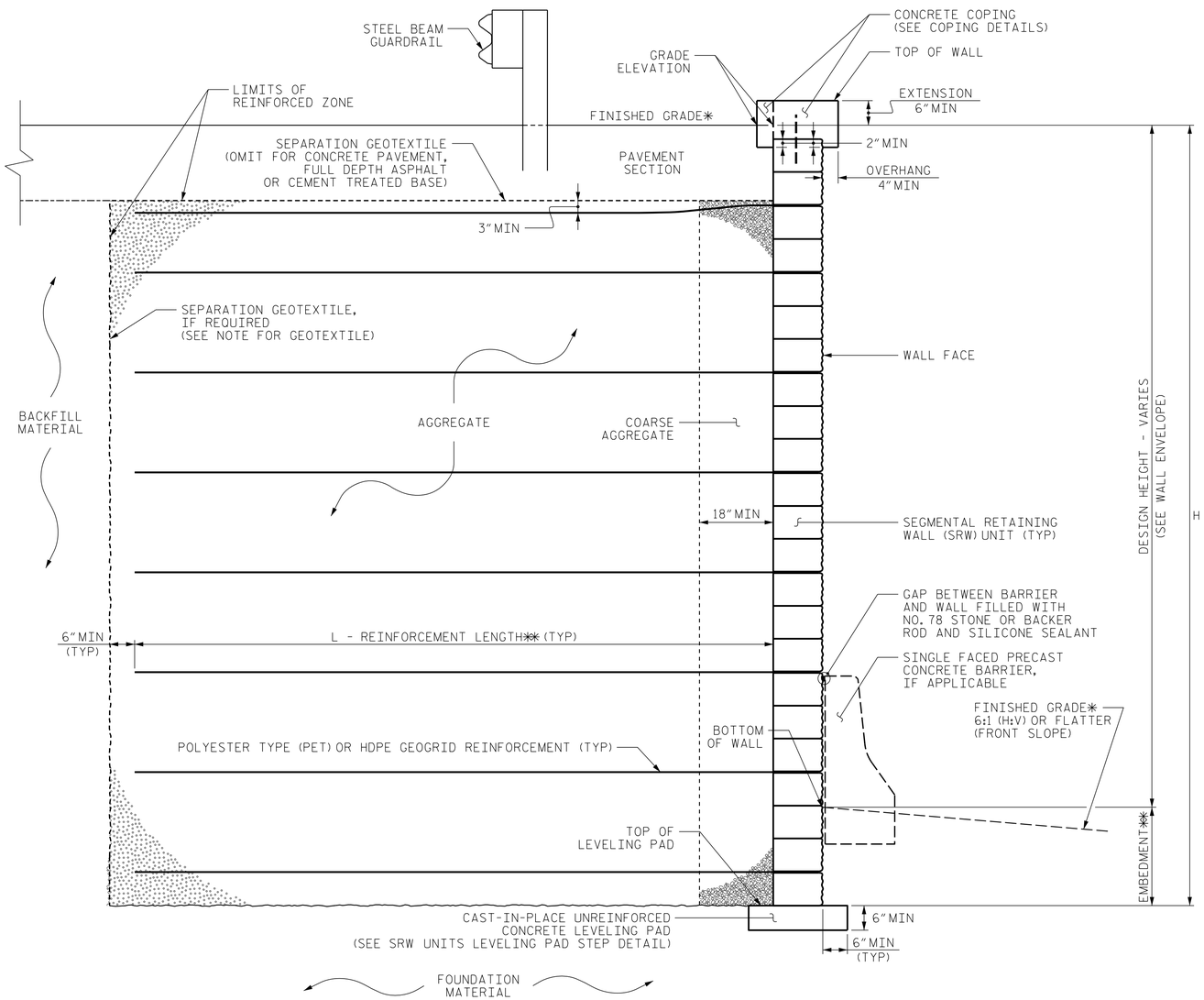
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill 7/8/2021
E52CFCB546224F2...
SIGNATURE DATE

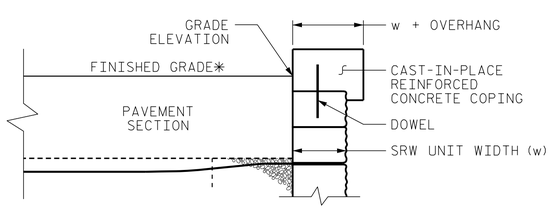
ENGINEER

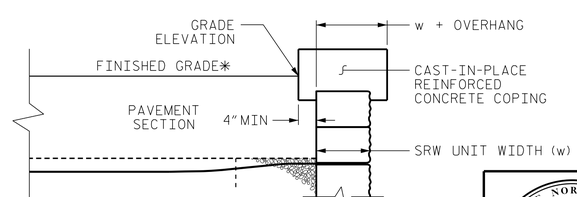
SIGNATURE DATE



MSE WALL WITH SRW UNITS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.





COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO SRW UNITS WITH DOWELS OR EXTEND COPING DOWN BACK OF SRW UNITS.
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PREPARED BY: KHH	DATE: 06/29/21
REVIEWED BY: SEM	DATE: 06/29/21

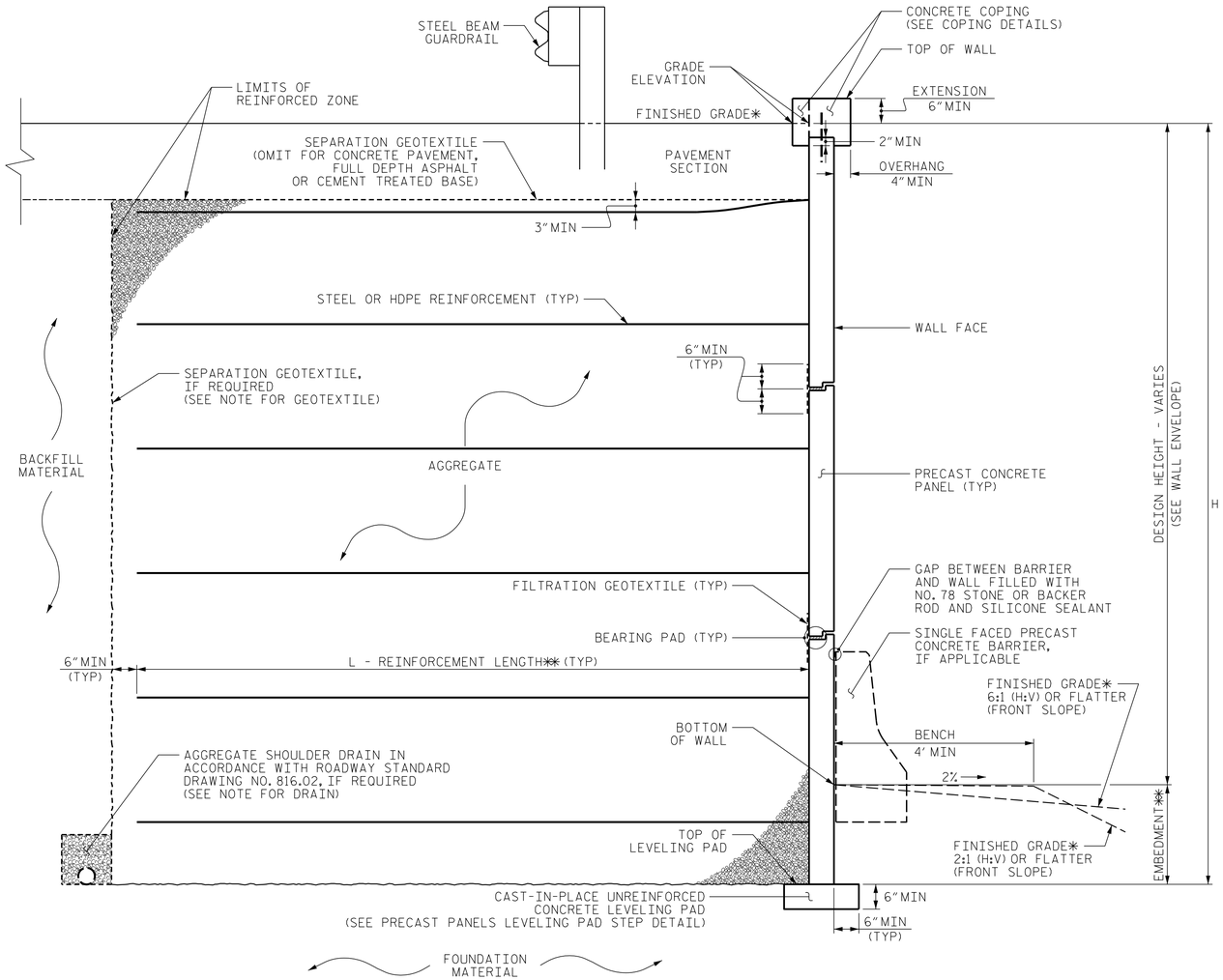
PROJECT NO.: I-5986B
JOHNSTON COUNTY
STATION: -Y18RPB- STATION 14+65.96 27.95' LT

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

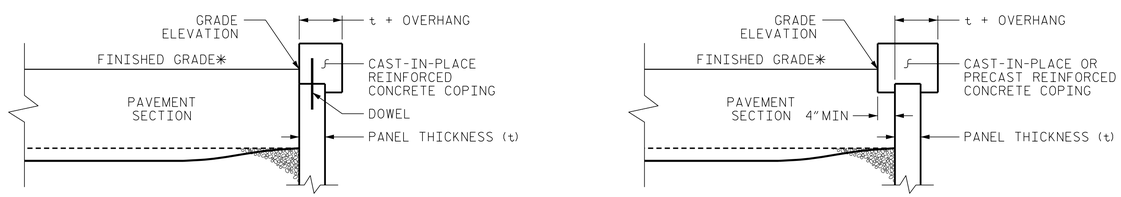
MSE RETAINING WALL NO. 9 TYPICAL SECTION AND COPING DETAILS

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



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

STRUCTURE ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL	
DocuSigned by: kristen hill E52CFCB546224F2 — SIGNATURE	SIGNATURE
7/8/2021 — DATE	DATE

PROJECT NO.: I-5986B
JOHNSTON COUNTY
STATION: -Y18RPB- STATION 14+65.96 27.95' LT

PREPARED BY: KHH	DATE: 06/29/21
REVIEWED BY: SEM	DATE: 06/29/21

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

MSE WALL NO. 9 WITH PANELS AND GUARDRAIL - TYPICAL AND COPING DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-8
1			3			
2			4			

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill E52CFCB546224F2 7/8/2021

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

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

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, USE AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL (SRW) UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO. 9

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO.9.

AN ASHLAR STONE PATTERN ARCHITECTURAL FINISH AND ANTI-GRAFFITI COATING IS REQUIRED FOR PRECAST CONCRETE PANELS OR SRW UNITS. FOR ARCHITECTURAL FINISH, SEE THE ARCHITECTURAL CONCRETE SURFACE TREATMENT SPECIAL PROVISION.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO.9.

A DRAIN IS NOT REQUIRED FOR RETAINING WALL NO.9.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO.9, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO.9 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 2,500 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT, WHICHEVER IS LONGER
5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

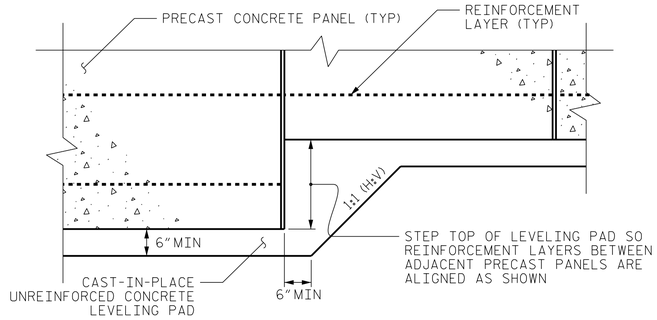
7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

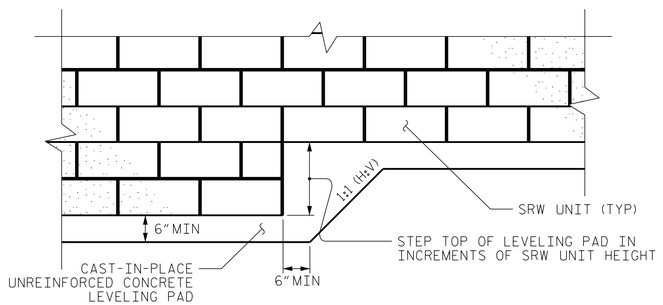
FOUNDATIONS FOR SIGNS, LIGHTING MAY BE LOCATED BEHIND RETAINING WALLS AND MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALLS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALLS UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



PRECAST PANELS
LEVELING PAD STEP DETAIL



SRW UNITS LEVELING PAD STEP DETAIL

PROJECT NO.: I-5986B

JOHNSTON COUNTY

STATION: -Y18RPB- STATION 14+65.96 27.95' LT

PREPARED BY: KHH	DATE: 06/29/21
REVIEWED BY: SEM	DATE: 06/29/21

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

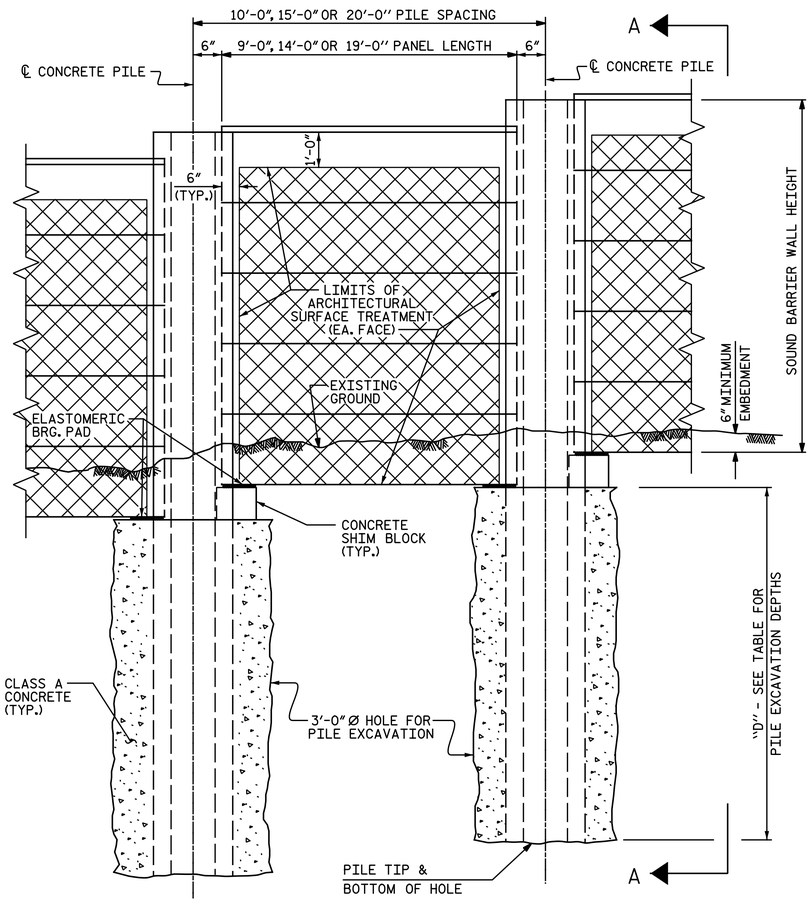
GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL 9
NOTES & DETAILS

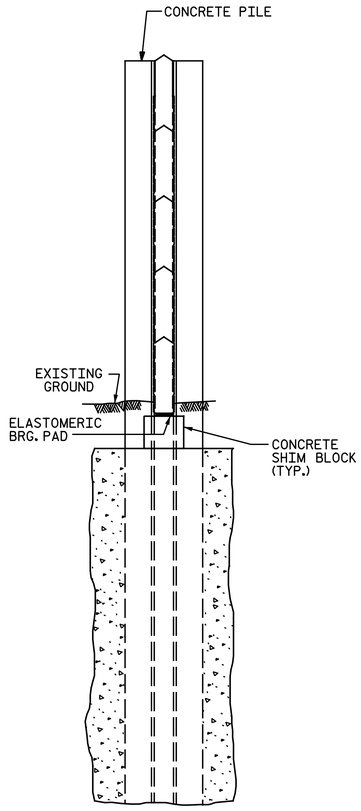
REVISIONS

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

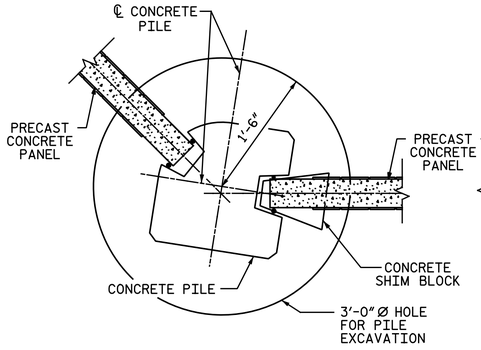
SHEET NO. W-9



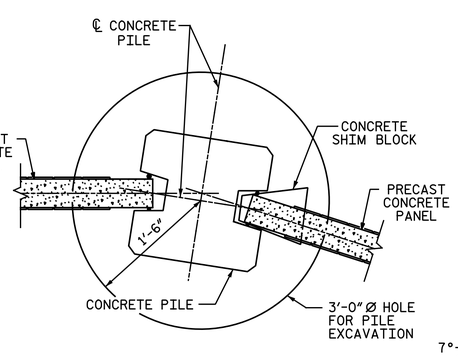
ELEVATION



SECTION A-A

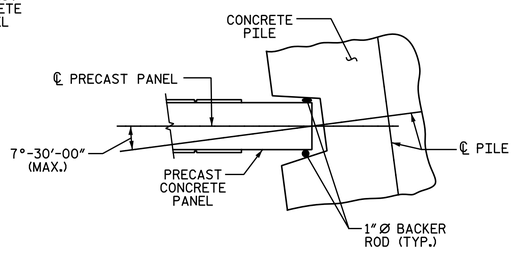


15° TO 45° TURNS
(PILE TYPE III)



0° TO 15° TURNS
(PILE TYPE I)

TYPICAL WALL TURN DETAILS



PILE ROTATION LIMIT FOR WALL TURN

(ROTATE THE CONCRETE PILE ±7°-30′-00″ TO ACCOMMODATE WALL TURN.)

NOTES

FOR SOUND BARRIER WALL, SEE SPECIAL PROVISIONS.

CONSTRUCT SOUND BARRIER WALL TO LINES AND GRADES SHOWN ON THE ROADWAY PLANS.

PROVIDE PANELS WITH A FLAT BOTTOM.

VERIFY THE LOCATION OF UNDERGROUND UTILITIES BEFORE DRILLING HOLES TO ENSURE SUFFICIENT CLEARANCE IS AVAILABLE.

ADJUST PILE EXCAVATION ELEVATIONS TO MAINTAIN 6″ MINIMUM EMBEDMENT OF THE BOTTOM PANEL.

USE CLASS AA FOR PANELS AND CLASS A CONCRETE PILE EXCAVATION BACKFILL, IN ACCORDANCE WITH ARTICLE 1000-4 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, USE 10′-0″, 15′-0″, OR 20′-0″ PILE SPACINGS. STANDARD PRECAST CONCRETE PANELS MAY BE USED WITH THE 10′-0″ AND 15′-0″ PILE SPACING. FOR 20′-0″ PILE SPACING, PANELS DESIGNED AND MANUFACTURED BY A THIRD PARTY VENDER SHALL BE USED.

FOR SOUND BARRIER WALL STATIONS, OFFSETS, AND WALL ENVELOPE, SEE ROADWAY PLANS.

PLACE 1″ Ø BACKER RODS FULL HEIGHT ON EACH SIDE OF THE PRECAST PANELS. SET AND SEAL THE BACKER ROD IN PLACE WITH SEALANT THAT CONFORMS WITH ARTICLE 1028-3 OF THE STANDARD SPECIFICATIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

PILE REINFORCING STEEL
DESIGN WIND PRESSURE = 40 PSF

PILE TYPE I				PILE TYPE III			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10′-0″	H ≤ 25′	4 - #8 EA. FACE	#3 @ 1′-4″CTS.	10′-0″	H ≤ 25′	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1′-4″CTS.
15′-0″	H ≤ 20′	4 - #8 EA. FACE	#3 @ 1′-4″CTS.	15′-0″	H ≤ 20′	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1′-4″CTS.
	20′< H ≤ 25′	4 - #10 EA. FACE	#3 @ 1′-4″CTS.		20′< H ≤ 25′	3 - #11 SHORT FACE 4 - #11 LONG FACE	#3 @ 1′-4″CTS.
20′-0″	H ≤ 20′	4 - #9 EA. FACE	#3 @ 1′-4″CTS.	20′-0″	H ≤ 20′	3 - #10 SHORT FACE 4 - #10 LONG FACE	#3 @ 1′-4″CTS.
	20′< H ≤ 25′	4 - #11 EA. FACE	#3 @ 1′-4″CTS.				

PILE TYPE II				PILE TYPE III ALT.			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10′-0″	H ≤ 25′	4 - #6 EA. FACE	#3 @ 1′-4″CTS.	10′-0″	H ≤ 25′	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1′-4″CTS.
15′-0″	H ≤ 20′	4 - #6 EA. FACE	#3 @ 1′-4″CTS.	15′-0″	H ≤ 20′	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1′-4″CTS.
	20′< H ≤ 25′	4 - #7 EA. FACE	#3 @ 1′-4″CTS.		20′< H ≤ 25′	3 - #11 SHORT FACE 4 - #11 LONG FACE	#3 @ 1′-4″CTS.
20′-0″	H ≤ 20′	4 - #6 EA. FACE	#3 @ 1′-4″CTS.	20′-0″	H ≤ 20′	3 - #10 SHORT FACE 4 - #10 LONG FACE	#3 @ 1′-4″CTS.
	20′< H ≤ 25′	4 - #8 EA. FACE	#3 @ 1′-4″CTS.				

PROJECT NO. I-5883

HARNETT COUNTY

STATION: 10+00.00 NW29-1

SHEET 1 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 01EAF7523043466...

7/8/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL

ASSEMBLED BY : N. B. SPEAKS	DATE : 7-8-21		
CHECKED BY : V. A. PATEL	DATE : 7-8-21		
DRAWN BY : MAA 6/11	REV. 9/26/14	MAA/TMG	
CHECKED BY : GM 6/11	REV. 10/17	MAA/THC	
	REV. 5/18	MAA/THC	

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	NW-1
1			3			TOTAL SHEETS
2			4			4

STD. NO. SBW1

WALL NW29-1

PILE EXCAVATION DEPTHS "D"

HOLE	FROM	TO	PILE SPACING	WALL HEIGHT H ≤ 15′	WALL HEIGHT 15′ < H ≤ 20′	WALL HEIGHT 20′ < H ≤ 25′
3′-0″ Ø HOLE	STA. 10+00.00	STA. 11+25.00	10′-0″	11′-0″		
	STA. 11+25.00	STA. 11+75.00	10′-0″	11′-0″		
	STA. 11+75.00	STA. 13+00.00	10′-0″	11′-0″		
3′-0″ Ø HOLE	STA. 10+00.00	STA. 11+30.00	15′-0″	13′-0″		
	STA. 11+30.00	STA. 11+70.00	15′-0″	13′-0″		
	STA. 11+70.00	STA. 13+00.00	15′-0″	13′-0″		
3′-0″ Ø HOLE	STA. 10+00.00	STA. 11+30.00	20′-0″	15′-0″		
	STA. 11+30.00	STA. 11+70.00	20′-0″	14′-0″		
	STA. 11+70.00	STA. 13+00.00	20′-0″	14′-0″		

WALL NW29-1

BILL OF MATERIAL

SOUND BARRIER WALL	3,720 S.F.
ARCHITECTURAL SURFACE TREATMENT	5,920 S.F.

QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.

ARCHITECTURAL SURFACE TREATMENT

TEXTURE OPTION:	ASHLAR STONE PATTERN
STAIN OPTION:	GRAY PALETTE COLOR #FS 36270

PROJECT NO. I-5883

HARNETT COUNTY

STATION: 10+00.00 NW29-1

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOUND BARRIER WALL

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: 61EAF7523943466

7/8/2021

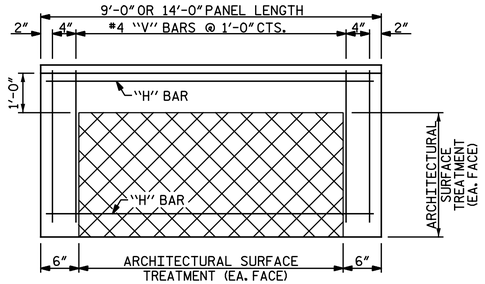
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

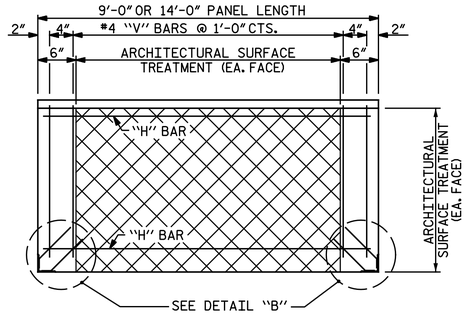
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	NW-2
1			3			TOTAL SHEETS
2			4			4

DRAWN BY : N. B. SPEAKS DATE : 7-8-21
CHECKED BY : V. A. PATEL DATE : 7-8-21



FRONT ELEVATION OF UPPER PRECAST PANEL



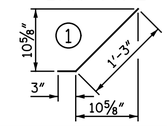
FRONT ELEVATION OF BOTTOM PRECAST PANEL

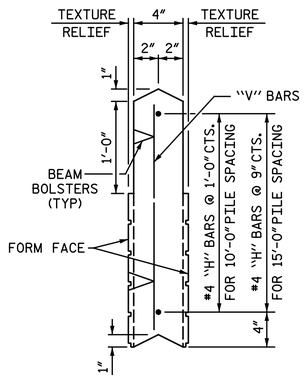
QUANTITIES FOR ONE PRECAST PANEL (FOR 10′-0″ PILE SPACING)													
PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES											
		HORIZONTAL						VERTICAL					
	C.Y.	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
2′-0″	0.22	3	H1	#4	STR	8′-8″	17	11	V1	#4	STR	1′-8″	12
3′-0″	0.33	4	H2	#4	STR	8′-8″	23	11	V2	#4	STR	2′-8″	20
4′-0″	0.44	5	H3	#4	STR	8′-8″	29	11	V3	#4	STR	3′-8″	27

QUANTITIES FOR ONE PRECAST PANEL (FOR 15′-0″ PILE SPACING)													
PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES											
		HORIZONTAL						VERTICAL					
	C.Y.	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
3′-0″	0.52	5	H1	#4	STR	13′-8″	46	16	V1	#4	STR	2′-8″	29
4′-0″	0.69	6	H2	#4	STR	13′-8″	55	16	V2	#4	STR	3′-8″	39
5′-0″	0.86	7	H3	#4	STR	13′-8″	64	16	V3	#4	STR	4′-8″	50
6′-0″	1.04	8	H4	#4	STR	13′-8″	73	16	V4	#4	STR	5′-8″	61

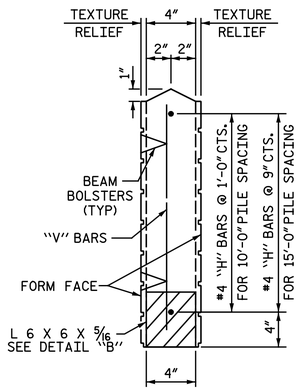
ADDITIONAL BARS FOR ONE BOTTOM PANEL					
NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
4	S1	#5	1	1′-6″	6

BAR TYPE

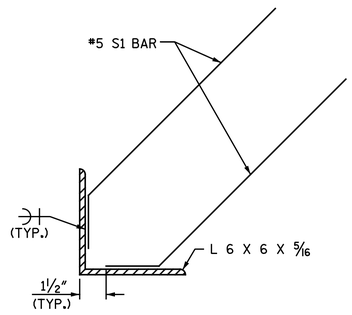




UPPER PANEL

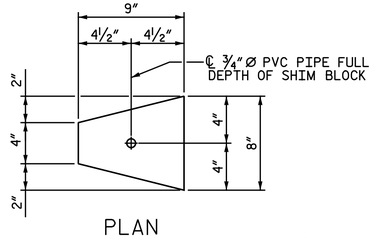


BOTTOM PANEL

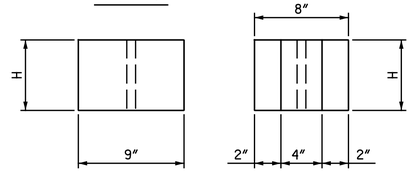


DETAIL ''B''

SECTION THROUGH PRECAST PANELS



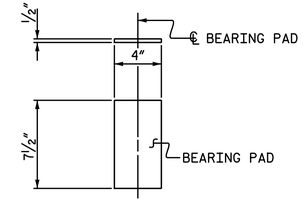
PLAN



ELEVATION END

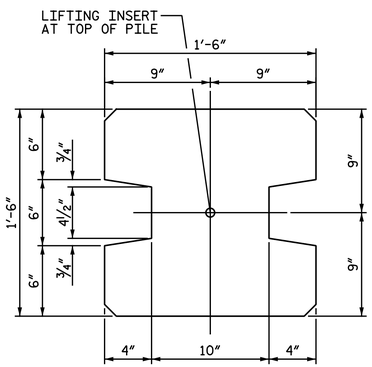
CONCRETE SHIM BLOCK

H = 3″, 6″ or 1′-0″

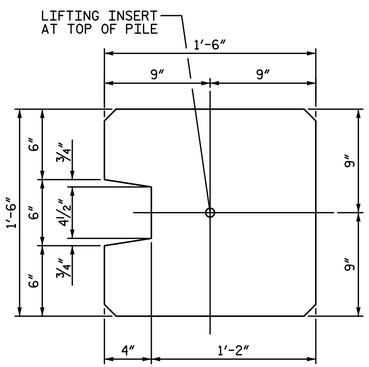


ELASTOMERIC BEARING DETAILS

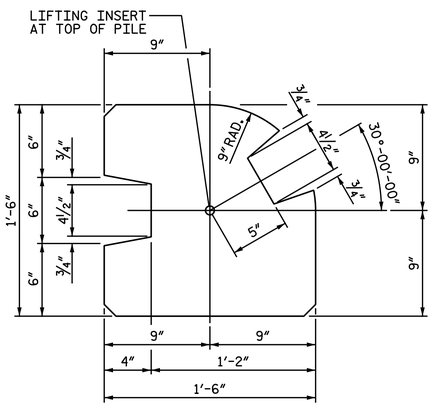
ELASTOMER IN BEARINGS SHALL BE 50 DUROMETER HARDNESS.



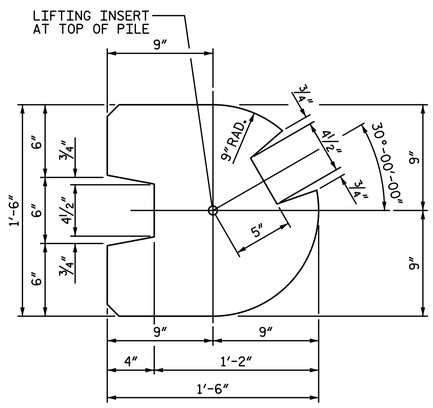
TYPE - I
(AREA = 1.9444 SQ. FT.)



TYPE - II
(AREA = 2.0903 SQ. FT.)



TYPE - III
(AREA = 1.8336 SQ. FT.)



TYPE - III (ALT.)
(AREA = 1.7163 SQ. FT.)

PILE DETAIL

(ALL CORNERS TO BE CHAMFERED 1″)

PROJECT NO. I-5883
HARNETT COUNTY
STATION: 10+00.00 NW29-1

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

SOUND BARRIER WALL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523043466...
7/8/2021

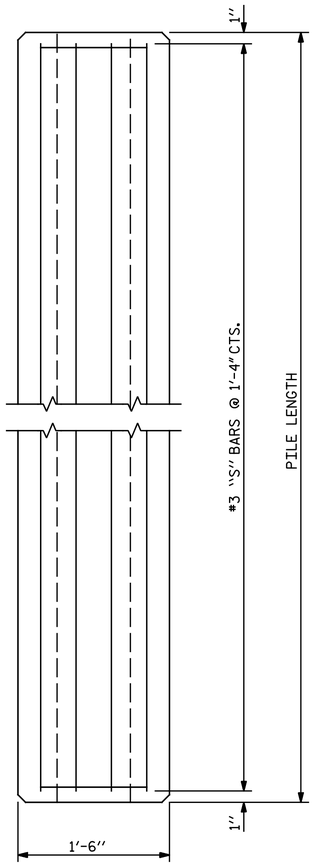
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

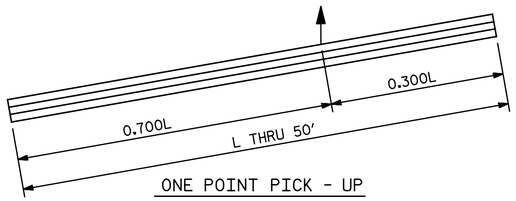
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	NW-3
1			3			TOTAL SHEETS
2			4			4

ASSEMBLED BY : N. B. SPEAKS		DATE : 7-8-21
CHECKED BY : V. A. PATEL		DATE : 7-8-21
DRAWN BY : MAA 6/11	REV. 1/15/14	RWW/TMG
CHECKED BY : GM 6/11	REV. 10/17	MAA/THC
	REV. 5/18	MAA/THC

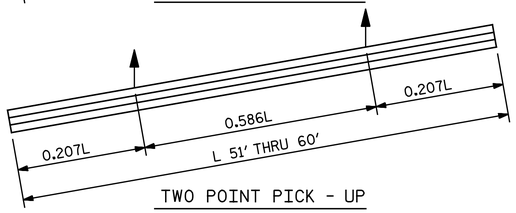
STD. NO. SBW2



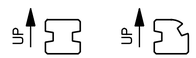
ELEVATION



ONE POINT PICK - UP



TWO POINT PICK - UP



PICK - UP POINTS

NOTES

CONCRETE DESIGN DATA : f'c= 5,000 PSI

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS TO BE INDICATED WITH A BLACK MARK 2" WIDE.

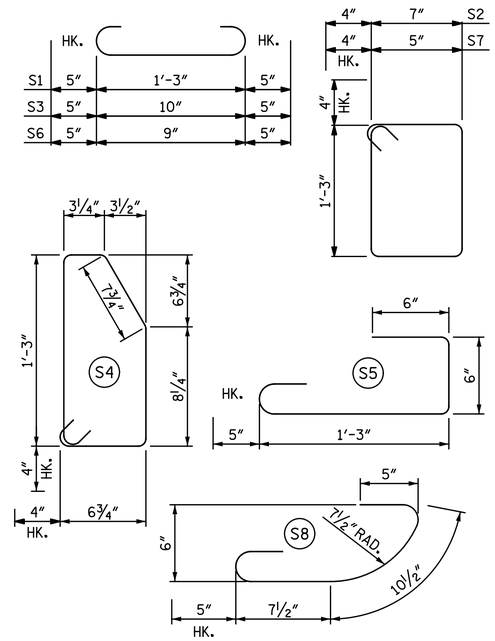
THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

ALL CORNERS TO BE CHAMFERED 1".

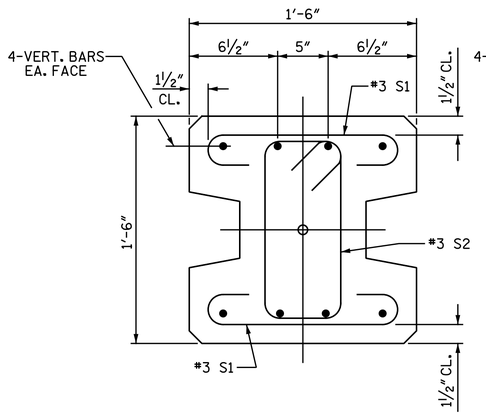
QUANTITIES FOR ONE PRECAST CONCRETE PILE

LENGTH	APPROX. PILE WT. TONS	ONE PICK-UP POINT		TWO PICK-UP POINT	
		0.300L	0.700L	0.207L	0.586L
10'-0''	1.56	3'-0''	7'-0''		
15'-0''	2.35	4'-6''	10'-6''		
20'-0''	3.14	6'-0''	14'-0''		
25'-0''	3.93	7'-6''	17'-6''		
30'-0''	4.70	9'-0''	21'-0''		
35'-0''	5.49	10'-6''	24'-6''		
40'-0''	6.28	12'-0''	28'-0''		
45'-0''	7.05	13'-6''	31'-6''		
50'-0''	7.84	15'-0''	35'-0''		
55'-0''	8.63			11'-4½''	32'-3''
60'-0''	9.42			12'-5''	35'-2''

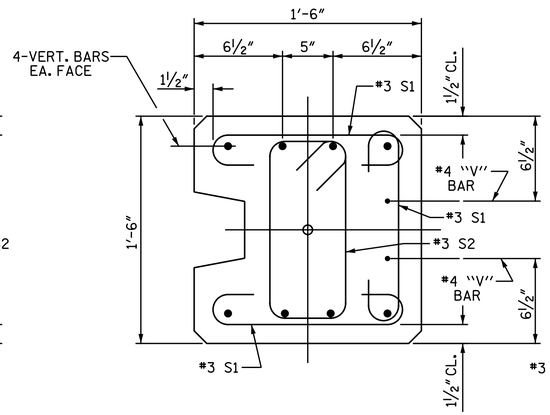
BAR TYPES



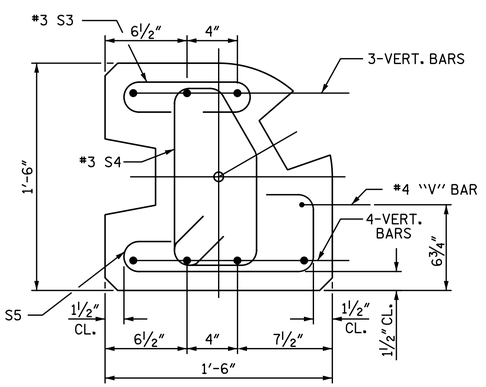
ALL BAR DIMENSIONS ARE OUT TO OUT.



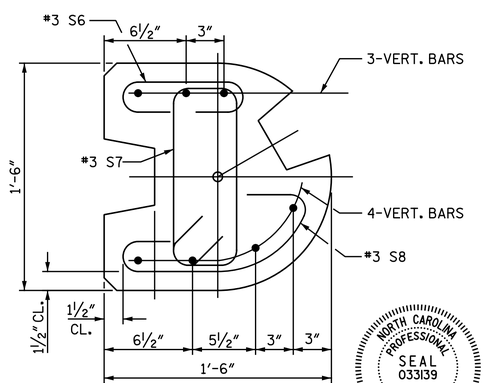
TYPE - I



TYPE - II



TYPE - III



TYPE - III (ALT.)

STATE OF NORTH CAROLINA
PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523043466 7/8/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PILE DETAIL

FOR VERTICAL BAR PILE REINFORCING, SEE SHEET 1 OF 3

ASSEMBLED BY : N. B. SPEAKS	DATE : 7-8-21		
CHECKED BY : V. A. PATEL	DATE : 7-8-21		
DRAWN BY : MAA 6/11	REV. 1/15/14	RWW/TMG	
CHECKED BY : GM 6/11	REV. 12/17	MAA/THC	

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

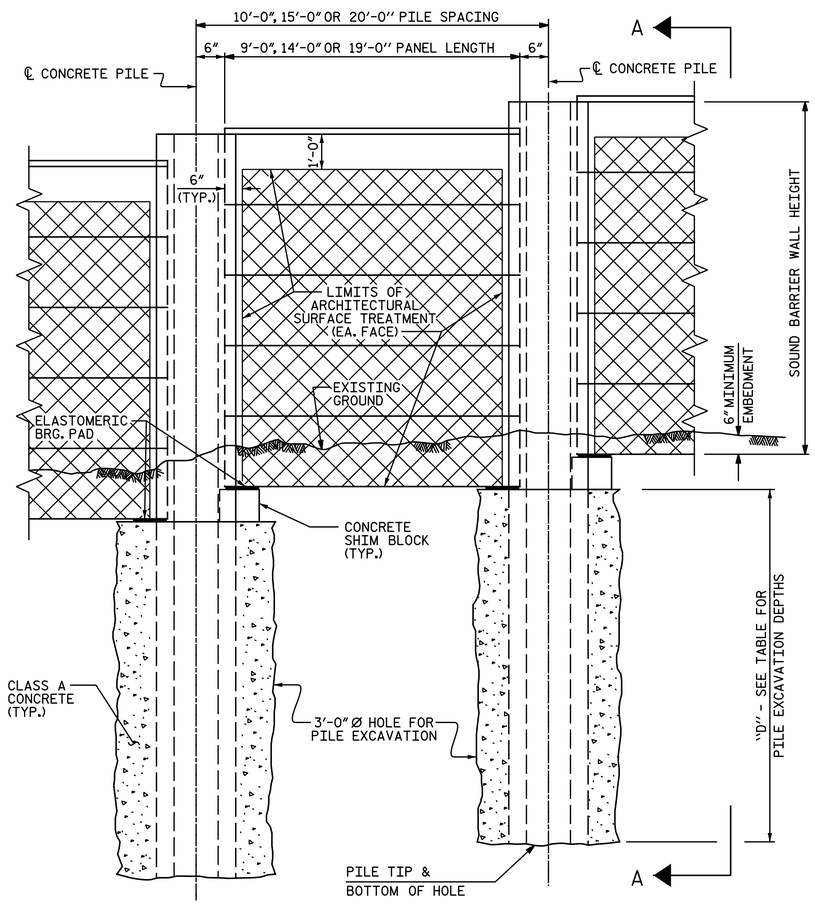
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	NW-4
1			3			TOTAL SHEETS
2			4			4

PROJECT NO. I-5883
HARNETT COUNTY
STATION: 10+00.00 NW29-1
SHEET 4 OF 4

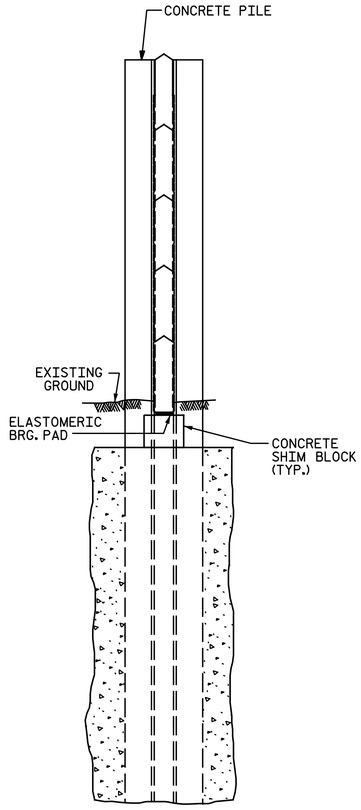
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

SOUND BARRIER WALL DETAILS

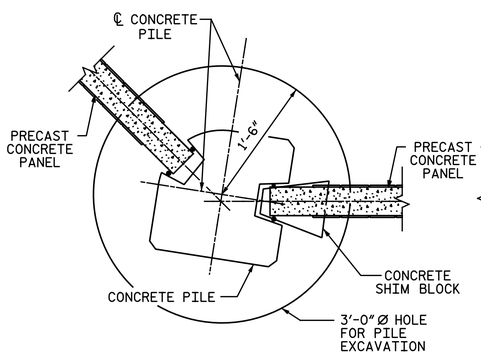
STD. NO. SBW3



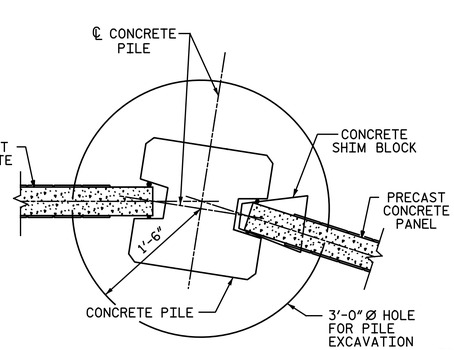
ELEVATION



SECTION A-A

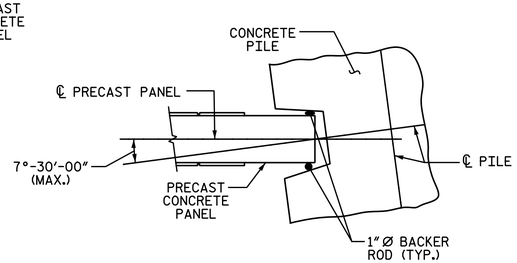


15° TO 45° TURNS
(PILE TYPE III)



0° TO 15° TURNS
(PILE TYPE I)

TYPICAL WALL TURN DETAILS



PILE ROTATION LIMIT FOR WALL TURN

(ROTATE THE CONCRETE PILE ±7°-30′-00″ TO ACCOMMODATE WALL TURN.)

NOTES

FOR SOUND BARRIER WALL, SEE SPECIAL PROVISIONS.

CONSTRUCT SOUND BARRIER WALL TO LINES AND GRADES SHOWN ON THE ROADWAY PLANS.

PROVIDE PANELS WITH A FLAT BOTTOM.

VERIFY THE LOCATION OF UNDERGROUND UTILITIES BEFORE DRILLING HOLES TO ENSURE SUFFICIENT CLEARANCE IS AVAILABLE.

ADJUST PILE EXCAVATION ELEVATIONS TO MAINTAIN 6″ MINIMUM EMBEDMENT OF THE BOTTOM PANEL.

USE CLASS AA FOR PANELS AND CLASS A CONCRETE PILE EXCAVATION BACKFILL, IN ACCORDANCE WITH ARTICLE 1000-4 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, USE 10′-0″, 15′-0″, OR 20′-0″ PILE SPACINGS. STANDARD PRECAST CONCRETE PANELS MAY BE USED WITH THE 10′-0″ AND 15′-0″ PILE SPACING. FOR 20′-0″ PILE SPACING, PANELS DESIGNED AND MANUFACTURED BY A THIRD PARTY VENDER SHALL BE USED.

FOR SOUND BARRIER WALL STATIONS, OFFSETS, AND WALL ENVELOPE, SEE ROADWAY PLANS.

PLACE 1″ Ø BACKER RODS FULL HEIGHT ON EACH SIDE OF THE PRECAST PANELS. SET AND SEAL THE BACKER ROD IN PLACE WITH SEALANT THAT CONFORMS WITH ARTICLE 1028-3 OF THE STANDARD SPECIFICATIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

PILE REINFORCING STEEL
DESIGN WIND PRESSURE = 40 PSF

PILE TYPE I				PILE TYPE III			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10′-0″	H ≤ 25′	4 - #8 EA. FACE	#3 @ 1′-4″ CTS.	10′-0″	H ≤ 25′	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1′-4″ CTS.
15′-0″	H ≤ 20′	4 - #8 EA. FACE	#3 @ 1′-4″ CTS.	15′-0″	H ≤ 20′	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1′-4″ CTS.
	20′< H ≤ 25′	4 - #10 EA. FACE	#3 @ 1′-4″ CTS.		20′< H ≤ 25′	3 - #11 SHORT FACE 4 - #11 LONG FACE	#3 @ 1′-4″ CTS.
20′-0″	H ≤ 20′	4 - #9 EA. FACE	#3 @ 1′-4″ CTS.	20′-0″	H ≤ 20′	3 - #10 SHORT FACE 4 - #10 LONG FACE	#3 @ 1′-4″ CTS.
	20′< H ≤ 25′	4 - #11 EA. FACE	#3 @ 1′-4″ CTS.				

PILE TYPE II				PILE TYPE III ALT.			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10′-0″	H ≤ 25′	4 - #6 EA. FACE	#3 @ 1′-4″ CTS.	10′-0″	H ≤ 25′	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1′-4″ CTS.
15′-0″	H ≤ 20′	4 - #6 EA. FACE	#3 @ 1′-4″ CTS.	15′-0″	H ≤ 20′	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1′-4″ CTS.
	20′< H ≤ 25′	4 - #7 EA. FACE	#3 @ 1′-4″ CTS.		20′< H ≤ 25′	3 - #11 SHORT FACE 4 - #11 LONG FACE	#3 @ 1′-4″ CTS.
20′-0″	H ≤ 20′	4 - #6 EA. FACE	#3 @ 1′-4″ CTS.	20′-0″	H ≤ 20′	3 - #10 SHORT FACE 4 - #10 LONG FACE	#3 @ 1′-4″ CTS.
	20′< H ≤ 25′	4 - #8 EA. FACE	#3 @ 1′-4″ CTS.				

PROJECT NO. I-5986B

HARNETT & JOHNSTON COUNTY

STATION: 10+00.00 NW32-1
10+00.00 NW33-1

SHEET 1 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466... 7/8/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : N. B. SPEAKS	DATE : 7-8-21
CHECKED BY : V. A. PATEL	DATE : 7-8-21

DRAWN BY : MAA 6/11	REV. 9/26/14 MAA/TMG
CHECKED BY : GM 6/11	REV. 10/17 MAA/THC
	REV. 5/18 MAA/THC

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	NW-1
1			3			TOTAL SHEETS
2			4			4

STD. NO. SBW1

WALL NW32-1

PILE EXCAVATION DEPTHS ''D''

3′-0″Ø HOLE

FROM : STA. 10+00.00
TO : STA. 10+95.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
10′-0″		11′-0″	

TO : STA. 10+95.00
TO : STA. 12+90.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
10′-0″		10′-0″	

TO : STA. 12+90.00
TO : STA. 14+25.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
10′-0″	9′-0″		

TO : STA. 14+25.00
TO : STA. 15+00.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
10′-0″	9′-0″		

3′-0″Ø HOLE

FROM : STA. 10+00.00
TO : STA. 10+95.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
15′-0″		13′-0″	

TO : STA. 10+95.00
TO : STA. 12+90.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
15′-0″		12′-0″	

TO : STA. 12+90.00
TO : STA. 14+25.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
15′-0″	11′-0″		

TO : STA. 14+25.00
TO : STA. 15+00.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
15′-0″	10′-0″		

3′-0″Ø HOLE

FROM : STA. 10+00.00
TO : STA. 10+95.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
20′-0″		15′-0″	

TO : STA. 10+95.00
TO : STA. 12+90.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
20′-0″		13′-0″	

TO : STA. 12+90.00
TO : STA. 14+25.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
20′-0″	12′-0″		

TO : STA. 14+25.00
TO : STA. 15+00.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
20′-0″	11′-0″		

WALL NW32-1	
BILL OF MATERIAL	
SOUND BARRIER WALL	7,570 S.F.
ARCHITECTURAL SURFACE TREATMENT	9,750 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	ASHLAR STONE PATTERN
STAIN OPTION:	GRAY PALETTE COLOR #FS 36270

WALL NW33-1

PILE EXCAVATION DEPTHS ''D''

3′-0″Ø HOLE

FROM : STA. 10+00.00
TO : STA. 10+75.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
10′-0″	7′-0″		

FROM : STA. 10+75.00
TO : STA. 13+55.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
10′-0″	9′-0″		

FROM : STA. 13+55.00
TO : STA. 14+35.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
10′-0″	9′-0″		

FROM : STA. 14+35.00
TO : STA. 20+15.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
10′-0″	9′-0″		

FROM : STA. 20+15.00
TO : STA. 22+25.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
10′-0″	9′-0″		

FROM : STA. 22+25.00
TO : STA. 23+00.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
10′-0″	9′-0″		

3′-0″Ø HOLE

FROM : STA. 10+00.00
TO : STA. 10+80.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
15′-0″	9′-0″		

FROM : STA. 10+80.00
TO : STA. 13+55.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
15′-0″	10′-0″		

FROM : STA. 13+55.00
TO : STA. 14+40.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
15′-0″	11′-0″		

FROM : STA. 14+40.00
TO : STA. 20+25.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
15′-0″	11′-0″		

FROM : STA. 20+25.00
TO : STA. 22+20.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
15′-0″	10′-0″		

FROM : STA. 22+20.00
TO : STA. 23+00.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
15′-0″	11′-0″		

3′-0″Ø HOLE

FROM : STA. 10+00.00
TO : STA. 10+75.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
20′-0″	10′-0″		

FROM : STA. 10+75.00
TO : STA. 13+50.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
20′-0″	11′-0″		

FROM : STA. 13+50.00
TO : STA. 14+35.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
20′-0″	12′-0″		

FROM : STA. 14+35.00
TO : STA. 20+15.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
20′-0″	12′-0″		

FROM : STA. 20+15.00
TO : STA. 22+25.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
20′-0″	11′-0″		

FROM : STA. 22+25.00
TO : STA. 23+00.00

PILE SPACING	WALL HEIGHT		
	H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
20′-0″	12′-0″		

WALL NW33-1	
BILL OF MATERIAL	
SOUND BARRIER WALL	16,160 S.F.
ARCHITECTURAL SURFACE TREATMENT	21,780 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	ASHLAR STONE PATTERN
STAIN OPTION:	GRAY PALETTE COLOR #FS 36270

DRAWN BY : N. B. SPEAKS DATE : 7-8-21
CHECKED BY : V. A. PATEL DATE : 7-8-21

PROJECT NO. I-5986B
HARNETT & JOHNSTON COUNTY
STATION: 10+00.00 NW32-1
10+00.00 NW33-1
SHEET 2 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON
DocuSigned by: Todd M. Garrison 61EAF7523943466...
7/8/2021

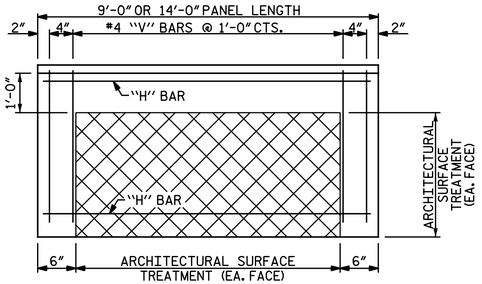
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

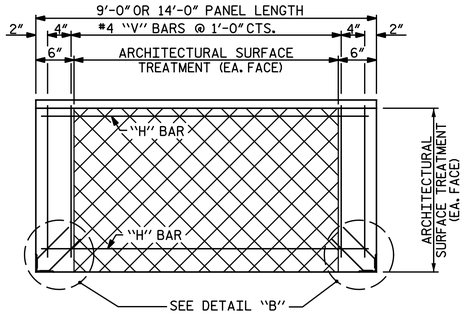
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOUND BARRIER WALL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	NW-2
1			3			TOTAL SHEETS
2			4			4



FRONT ELEVATION OF UPPER PRECAST PANEL



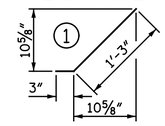
FRONT ELEVATION OF BOTTOM PRECAST PANEL

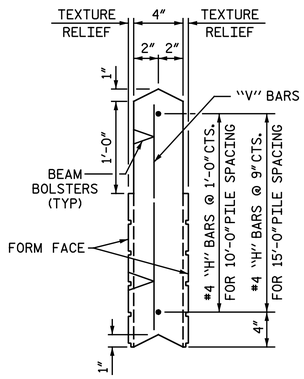
QUANTITIES FOR ONE PRECAST PANEL (FOR 10′-0″ PILE SPACING)													
PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES											
		HORIZONTAL						VERTICAL					
	C.Y.	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
2′-0″	0.22	3	H1	#4	STR	8′-8″	17	11	V1	#4	STR	1′-8″	12
3′-0″	0.33	4	H2	#4	STR	8′-8″	23	11	V2	#4	STR	2′-8″	20
4′-0″	0.44	5	H3	#4	STR	8′-8″	29	11	V3	#4	STR	3′-8″	27

QUANTITIES FOR ONE PRECAST PANEL (FOR 15′-0″ PILE SPACING)													
PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES											
		HORIZONTAL						VERTICAL					
	C.Y.	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
3′-0″	0.52	5	H1	#4	STR	13′-8″	46	16	V1	#4	STR	2′-8″	29
4′-0″	0.69	6	H2	#4	STR	13′-8″	55	16	V2	#4	STR	3′-8″	39
5′-0″	0.86	7	H3	#4	STR	13′-8″	64	16	V3	#4	STR	4′-8″	50
6′-0″	1.04	8	H4	#4	STR	13′-8″	73	16	V4	#4	STR	5′-8″	61

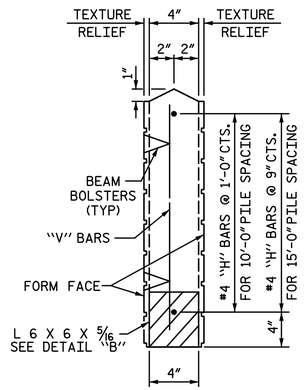
ADDITIONAL BARS FOR ONE BOTTOM PANEL					
NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
4	S1	#5	1	1′-6″	6

BAR TYPE

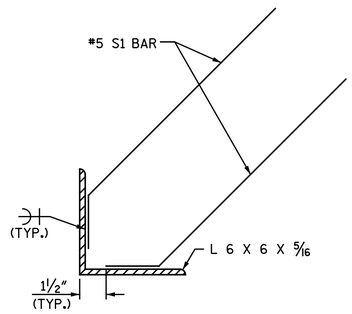




UPPER PANEL

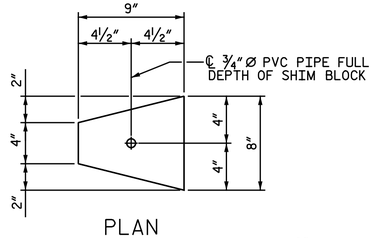


BOTTOM PANEL



DETAIL ″B″

SECTION THROUGH PRECAST PANELS

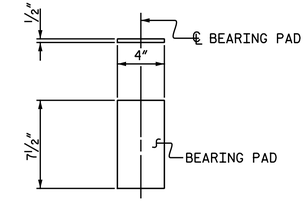


PLAN

ELEVATION END

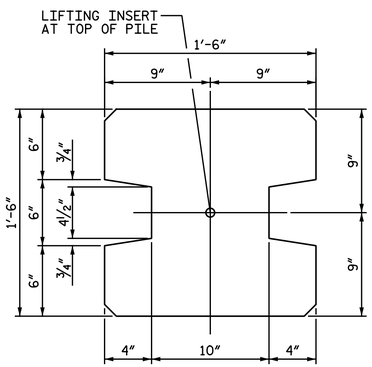
CONCRETE SHIM BLOCK

H = 3″, 6″ or 1′-0″

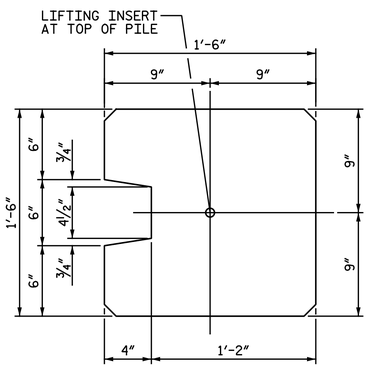


ELASTOMERIC BEARING DETAILS

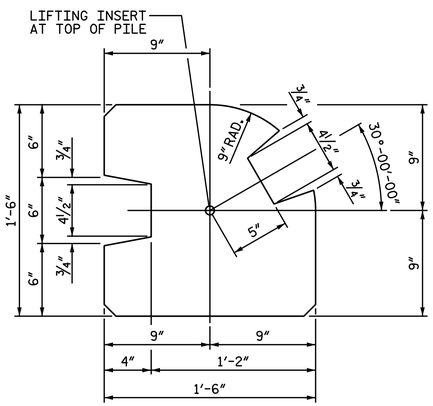
ELASTOMER IN BEARINGS SHALL BE 50 DUROMETER HARDNESS.



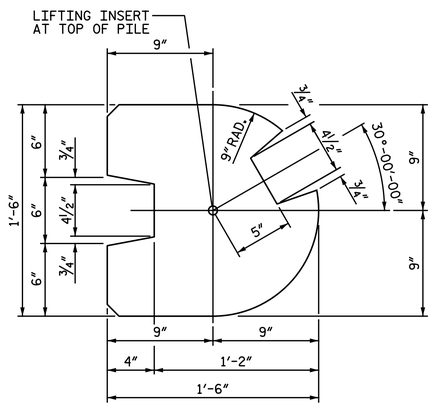
TYPE - I
(AREA = 1.9444 SQ. FT.)



TYPE - II
(AREA = 2.0903 SQ. FT.)



TYPE - III
(AREA = 1.8336 SQ. FT.)



TYPE - III (ALT.)
(AREA = 1.7163 SQ. FT.)

PILE DETAIL

(ALL CORNERS TO BE CHAMFERED 1″)

PROJECT NO. I-5986B

HARNETT & JOHNSTON COUNTY

STATION: 10+00.00 NW32-1
10+00.00 NW33-1

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

7/8/2021

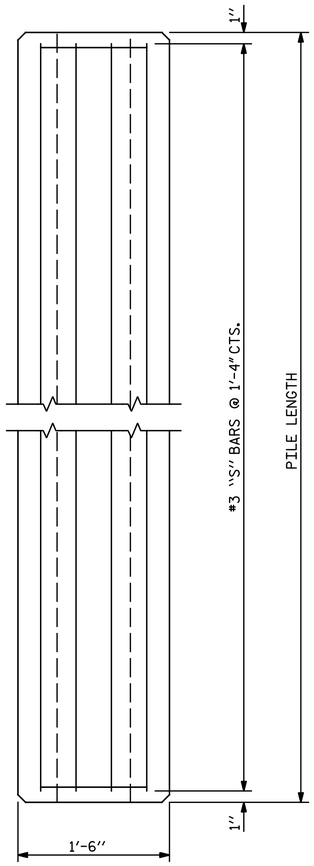
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

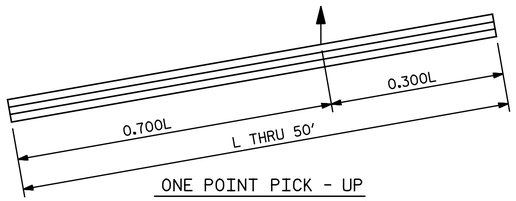
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	NW-3
1			3			TOTAL SHEETS
2			4			4

ASSEMBLED BY : N. B. SPEAKS		DATE : 7-8-21	
CHECKED BY : V. A. PATEL		DATE : 7-8-21	
DRAWN BY : MAA 6/11	REV. 1/15/14	RWW/TMG	
CHECKED BY : GM 6/11	REV. 10/17	MAA/THC	
	REV. 5/18	MAA/THC	

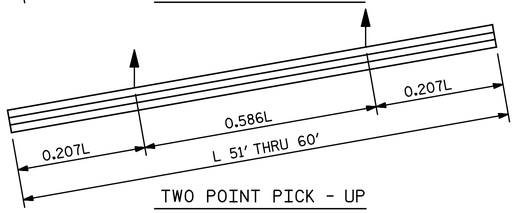
STD. NO. SBW2



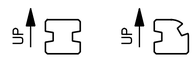
ELEVATION



ONE POINT PICK - UP



TWO POINT PICK - UP



PICK - UP POINTS

NOTES

CONCRETE DESIGN DATA : f'c= 5,000 PSI

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS TO BE INDICATED WITH A BLACK MARK 2" WIDE.

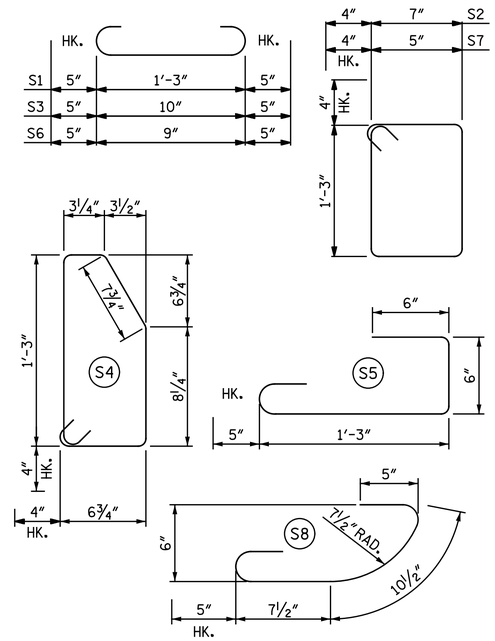
THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

ALL CORNERS TO BE CHAMFERED 1".

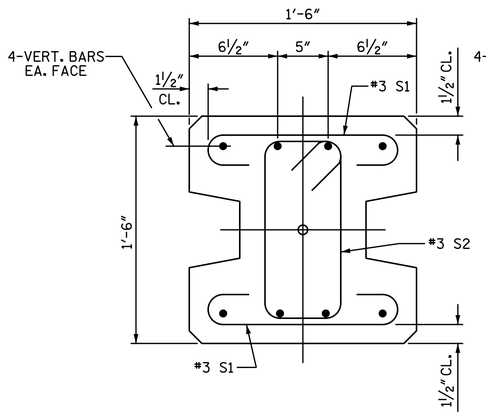
QUANTITIES FOR ONE PRECAST CONCRETE PILE

LENGTH	APPROX. PILE WT. TONS	ONE PICK-UP POINT		TWO PICK-UP POINT	
		0.300L	0.700L	0.207L	0.586L
10'-0''	1.56	3'-0''	7'-0''		
15'-0''	2.35	4'-6''	10'-6''		
20'-0''	3.14	6'-0''	14'-0''		
25'-0''	3.93	7'-6''	17'-6''		
30'-0''	4.70	9'-0''	21'-0''		
35'-0''	5.49	10'-6''	24'-6''		
40'-0''	6.28	12'-0''	28'-0''		
45'-0''	7.05	13'-6''	31'-6''		
50'-0''	7.84	15'-0''	35'-0''		
55'-0''	8.63			11'-4½''	32'-3''
60'-0''	9.42			12'-5''	35'-2''

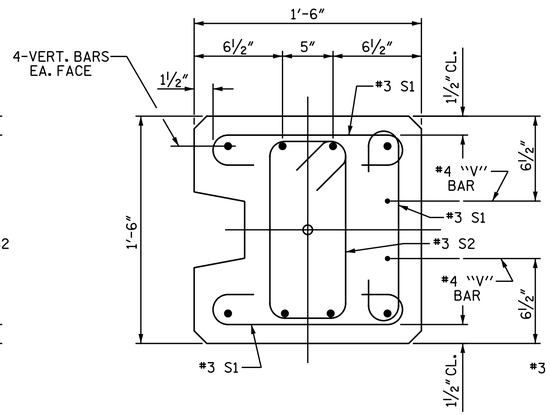
BAR TYPES



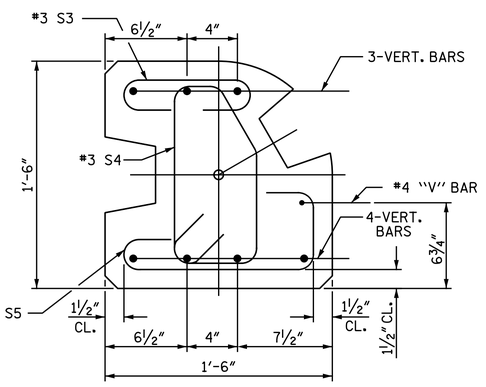
ALL BAR DIMENSIONS ARE OUT TO OUT.



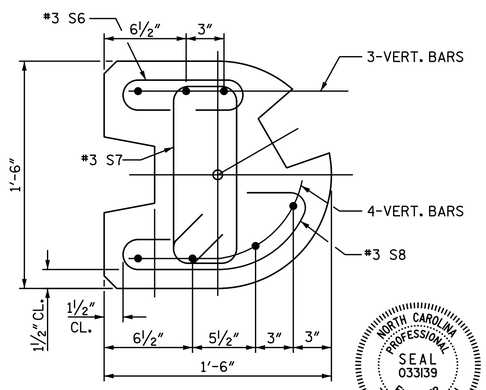
TYPE - I



TYPE - II



TYPE - III



TYPE - III (ALT.)

STATE OF NORTH CAROLINA
PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
7/8/2021

PILE DETAIL

FOR VERTICAL BAR PILE REINFORCING, SEE SHEET 1 OF 3

ASSEMBLED BY : N. B. SPEAKS	DATE : 7-8-21
CHECKED BY : V. A. PATEL	DATE : 7-8-21
DRAWN BY : MAA 6/11	REV. 1/15/14 RWW/TMG
CHECKED BY : GM 6/11	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	NW-4
1			3			TOTAL SHEETS
2			4			4

PROJECT NO. I-5986B
HARNETT & JOHNSTON COUNTY
STATION: 10+00.00 NW32-1
10+00.00 NW33-1
SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

SOUND BARRIER WALL DETAILS

STD. NO. SBW3