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GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

DocuSigned by: 6/25/2019

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
HIGHWAY BUILDING
PO BOX 25201
RALEIGH, NORTH CAROLINA 27611

RETAINING WALL SUMMARY

SUBJECT: I-4400BB - I-26 from US 25 Business (Exit 44) to NC 280 (Exit 40)

PREPARED BY:	MHS	PROJECT:	34232.1.FS3
DATE:	--	TIP:	I-4400BB
CHECKED BY:	--	COUNTY:	Buncombe

SNW Soil Nail Wall — MSE w/ MS Mechanically Stabilized Earth Retaining Wall with Moment Slab
MSE Mechanically Stabilized Earth Retaining Wall

Retaining Wall No.	Begin Alignment	Begin Station	Offset (LT / RT)	End Alignment	End Station	Offset (LT / RT)	Length (ft)	Excavation Type (Cut or Fill)	Exposed Wall Area (sft)	Minimum Embedment (ft)	Installed Area (sft)*	Avg. Height (ft)	Max. Design Height (ft)	Back Slope (Yes or No)	Wall Type
RW2	-L-	400+97.	64.5' (RT)	-L-	403+13.	64.5' (RT)	216	Fill	1262	1.0	1478	6.8	8.5	No	MSE w/ MS
RW4A	-L-	408+73.	64.5' (RT)	-L-	418+48.4	75.4' (RT)	975.4	Cut	8360	2.0	10311	10.6	13.4	Yes	SNW
RW4B	-L-	418+48.	75.4' (RT)	-L-	420+66.	74.5' (RT)	218	Fill	4867	4.4	5826	26.7	35.2	No	MSE w/ MS
RW4C	-L-	420+65.9	74.5' (RT)	-L-	420+66.3	61.1' (RT)	13.4	Fill	87	2.0	114	8.5	14.9	Yes	MSE
RW5A	-L-	422+99.2	74.5' (RT)	-L-	424+14.	75' (RT)	114.8	Fill	866	2.2	1119	9.7	17.6	No	MSE w/ MS
RW5B	-L-	424+14.	75' (RT)	-L-	429+13.	64.5' (RT)	499	Cut	3179	1.0	3678	7.4	13.2	No	SNW
RW6	-L-	438+79.	80.5' (RT)	-L-	440+65.	80.5' (RT)	186	Fill	3220	2.5	3685	19.8	27.1	No	MSE
RW7	-L-	437+77.	80.5' (LT)	-L-	439+51.	80.5' (LT)	174	Fill	3298	2.9	3803	21.9	31.5	No	MSE
RW8A	-L-	533+52.	80.5' (LT)	-L-	538+96.	80.5' (LT)	544	Cut	4584	1.0	5128	9.4	11.6	Yes	SNW
RW8B	-L-	538+96.	80.5' (LT)	-L-	540+68.	80.5' (LT)	172	Fill	3084	2.5	3514	20.4	27.3	No	MSE
RW9	-L-	539+30.	80.5' (RT)	-L-	541+29.	80.5' (RT)	199	Fill	3644	2.7	4181	21.0	29.2	No	MSE
RW10	-L-	637+28.	80.5' (RT)	-L-	639+55.	80.5' (RT)	227	Fill	4967	3.2	5693	25.1	34.8	No	MSE
RW11	-L-	638+98.	80.5' (LT)	-L-	640+91.	80.5' (LT)	193	Fill	3490	2.6	3992	20.7	28.5	No	MSE
RW12	-Y7-	25+75.	17.5' (RT)	-Y7-	19+97.	17.5' (RT)	578	Fill	7628	3.3	9535	16.5	26.6	No	MSE w/ MS
RW13	-L-	385+88.	76.5' (LT)	-L-	388+32.	76.5' (LT)	244	Fill	1414	2.0	1902	7.8	9.0	No	MSE

* Beginning with the 2018 Standard Specifications, retaining walls are paid for on a per square foot of installed facing, which now includes the embedded portion. For estimating purposes, we have included an embedded quantity based on the slopes in the provided cross sections. The minimum embedment listed was determined from a global stability analysis. It is the Contractor and Designer's responsibility to evaluate site conditions and adjust embedment as required while maintaining the minimum values, or deeper if warranted, along the length of the wall.

WALL EMBEDMENT

SLOPE IN FRONT OF STRUCTURES		MINIMUM EMBEDMENT DEPTH
HORIZONTAL	FOR WALLS	H/20
	FOR ABUTMENTS	H/10
3.0H:1.0V	WALLS	H/10
2.5H:1.0V	WALLS	H/8.5
2.0H:1.0V	WALLS	H/7
1.5H:1.0V	WALLS	H/5
1.25H:1.0V	WALLS	H/4
1.0H:1.0V	WALLS	H/3

NOTE:
1) MAINTAIN A MINIMUM BENCH WIDTH OF 4.0 IN FRONT OF THE WALL FOR ITS ENTIRE LENGTH.
2) MINIMUM EMBEDMENT DEPTH OF 2 FT FOR MSE WALLS AND 1 FT FOR SOIL NAIL WALLS, UNLESS LARGER DEPTHS DICTATED BY THE ABOVE TABLE.
3) MAXIMUM SLOPE OF 1H:1V WILL BE MAINTAINED ON FRONT SLOPES FOR THE ENTIRE LENGTH OF THE WALL.
4) SUBMIT WITH THE WALL DESIGN INTERNAL, EXTERNAL, AND GLOBAL STABILITY ANALYSISES.

ESTIMATED MSE WALL QUANTITIES

RETAINING WALL NO.	SOIL NAIL RETAINING WALLS (SQUARE FEET)	ARCHITECTURAL CONCRETE SURFACE TREATMENT (SQUARE FEET)
MSE RETAINING WALL NO. RW2	1,478	1,478
MSE RETAINING WALL NO. RW4B	5,826	5,826
MSE RETAINING WALL NO. RW4C	114	114
MSE RETAINING WALL NO. RW5A	1,119	1,119
MSE RETAINING WALL NO. RW6	3,685	3,685
MSE RETAINING WALL NO. RW7	3,803	3,803
MSE RETAINING WALL NO. RW8B	3,514	3,514
MSE RETAINING WALL NO. RW9	4,181	4,181
MSE RETAINING WALL NO. RW10	5,693	5,693
MSE RETAINING WALL NO. RW11	3,992	3,992
MSE RETAINING WALL NO. RW12	9,535	9,535
MSE RETAINING WALL NO. RW13	1,902	1,902
TOTAL QUANTITIES	44,842 SF	44,842 SF

ESTIMATED SOIL NAIL WALL QUANTITIES

RETAINING WALL NO.	SOIL NAIL RETAINING WALLS (SQUARE FEET)	ARCHITECTURAL CONCRETE SURFACE TREATMENT (SQUARE FEET)	SOIL NAIL VERIFICATION TESTS	SOIL NAIL PROOF TESTS
RW4A	10,311	10,311	6	30
RW5B	3,678	3,678	3	11
RW8A	5,128	5,128	4	17
TOTAL QUANTITIES	19,117 SF	19,117 SF	13	58

PROJECT NO.: 34232.1.FS4 (I-4400BB)
HENDERSON COUNTY
STATION:
SHEET1 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL SUMMARY

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

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

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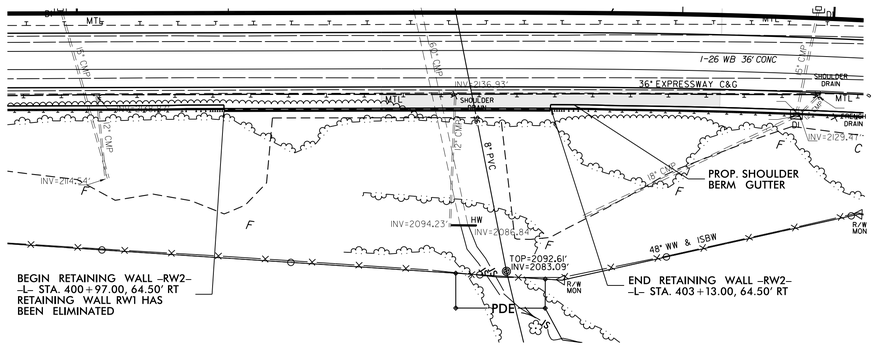
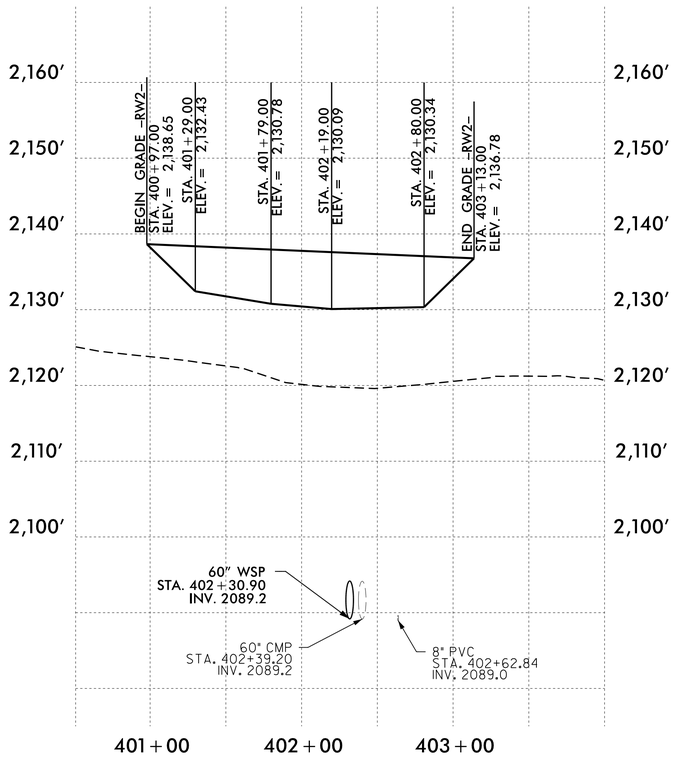
ENGINEER

SIGNATURE DATE

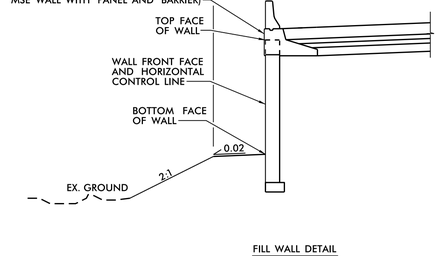


NAD 83 NOV 2011

RETAINING WALL -RW2-



NOTE:
1) THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF WALL
2) APPROXIMATE WALL FACE AREA=1,262 SF



FILL WALL DETAIL

DESIGN RETAINING WALL NO. RW2 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 2,800 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 1.5 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = H/20 OR 2 FT, WHICHEVER IS DEEPER
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

NOTES:
1) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

PROJECT NO.: 34232.1.FS4 (I-4400BB)
HENDERSON COUNTY
STATION: STA 400+97 -L-
SHEET 2 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

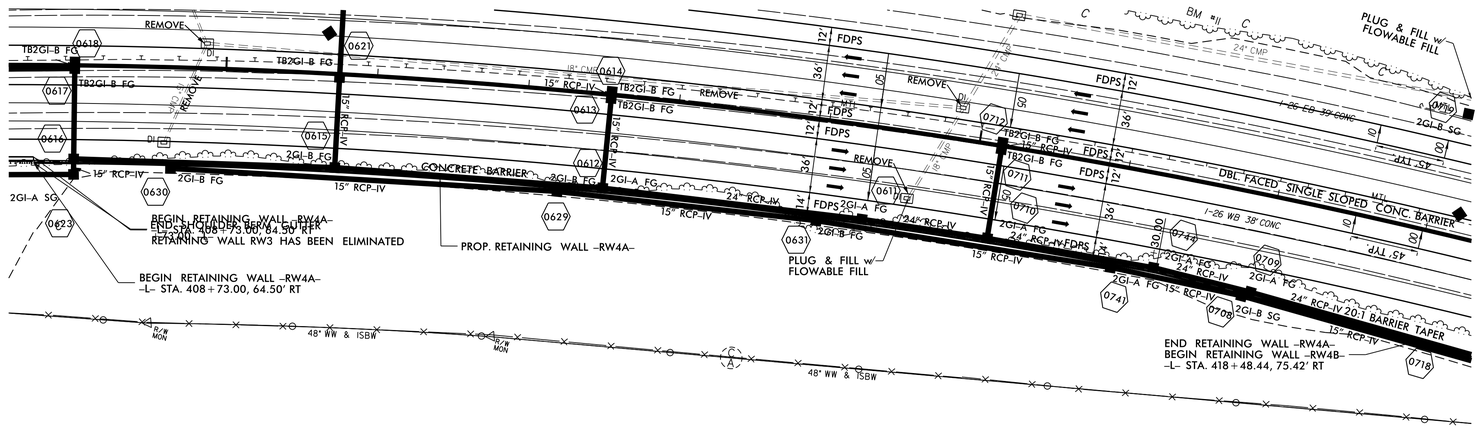
GEOTECHNICAL ENGINEERING UNIT

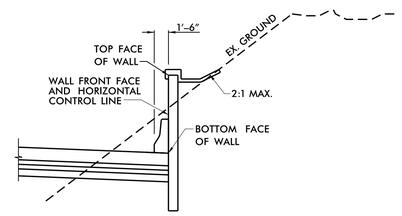
MSE RETAINING WALL WITH MOMENT SLAB

REVISIONS

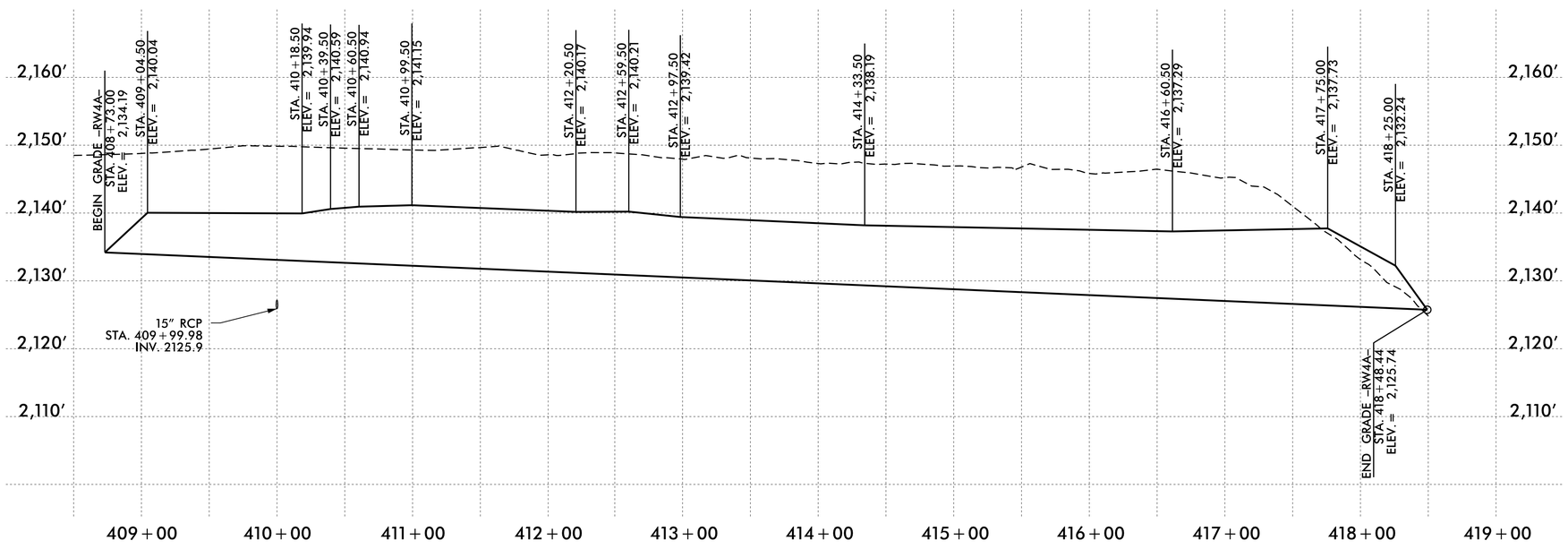
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. W-2





CUT WALL DETAIL



IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT, γ (LB/CF)	FRICTION ANGLE, ϕ DEGREES	COHESION, c (LB/SF)
RESIDUAL	115	28	0
WEATHERED ROCK	135	36	0

NOTES:
1) A FENCE MAYBE REQUIRED ON TOP OF THE RETAINING WALLS. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.
2) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

RETAINING WALL -RW4A-

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

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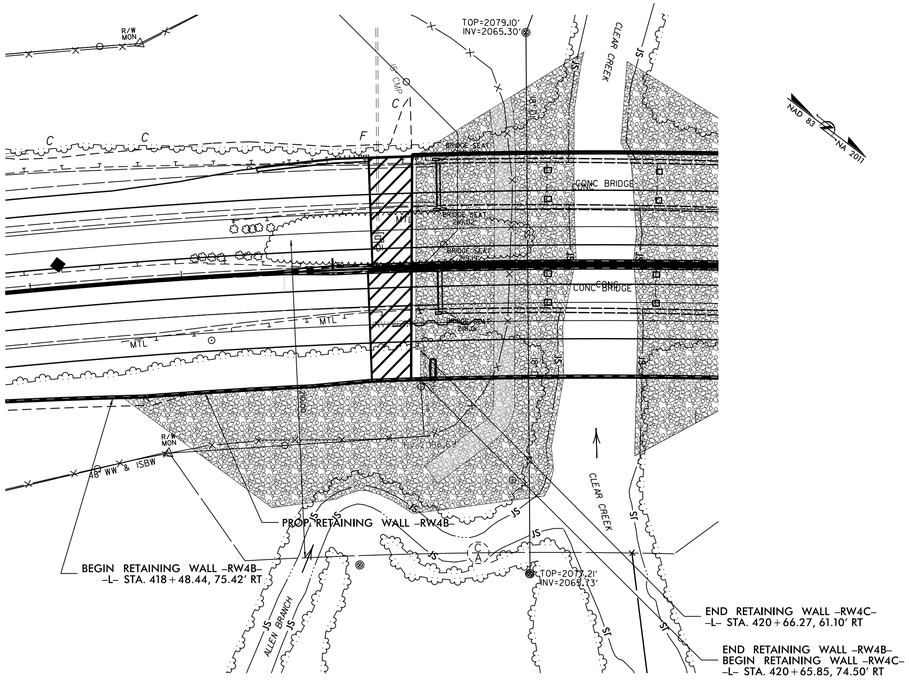
PROJECT NO.: 34232.1.FS4 (I-4400BB)
HENDERSON COUNTY
STATION: STA 408+73 -L-
SHEET 3 OF 20

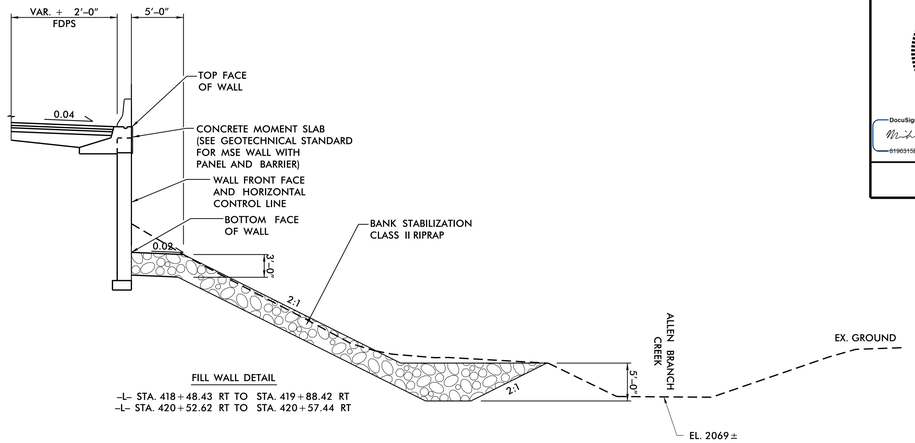
PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SOIL NAIL RETAINING WALL

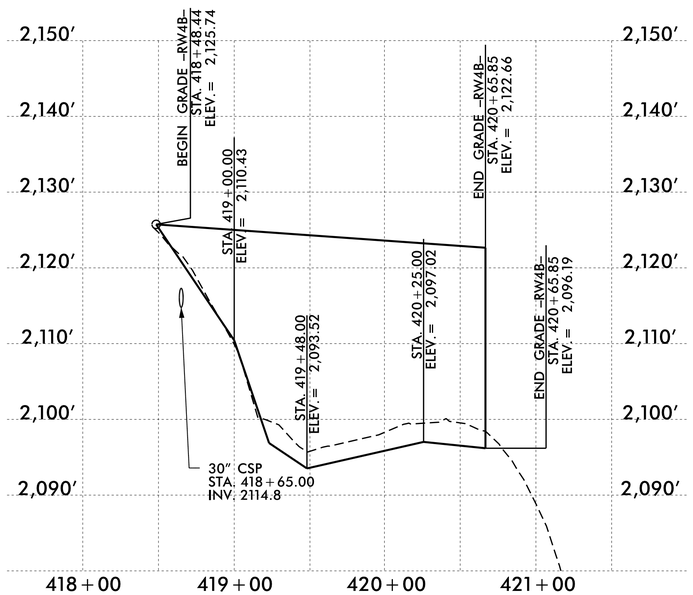
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-3
2			4			

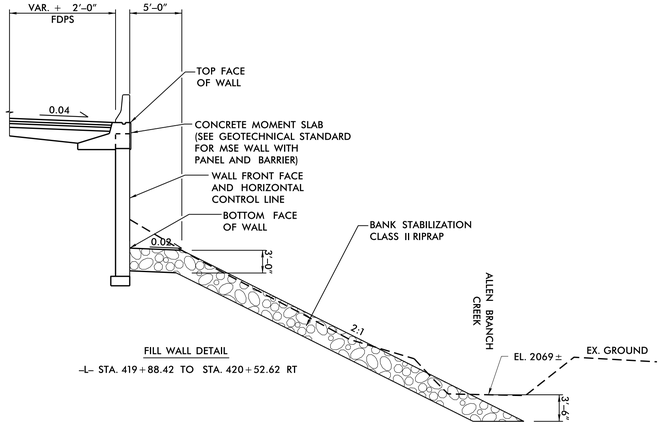




FILL WALL DETAIL

-L- STA. 418+48.43 RT TO STA. 419+88.42 RT
-L- STA. 420+52.62 RT TO STA. 420+57.44 RT





FILL WALL DETAIL

-L- STA. 419+88.42 TO STA. 420+52.62 RT

RETAINING WALL -RW4B-

DESIGN RETAINING WALL NO. RW4B FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 8,350 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 1.5 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = H/7 OR 2 FT, WHICHEVER IS DEEPER
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

NOTES:
1) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

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PROJECT NO.: 34232.1.FS4 (I-4400BB)

HENDERSON COUNTY

STATION: STA 418+48 -L-

SHEET 4 OF 20

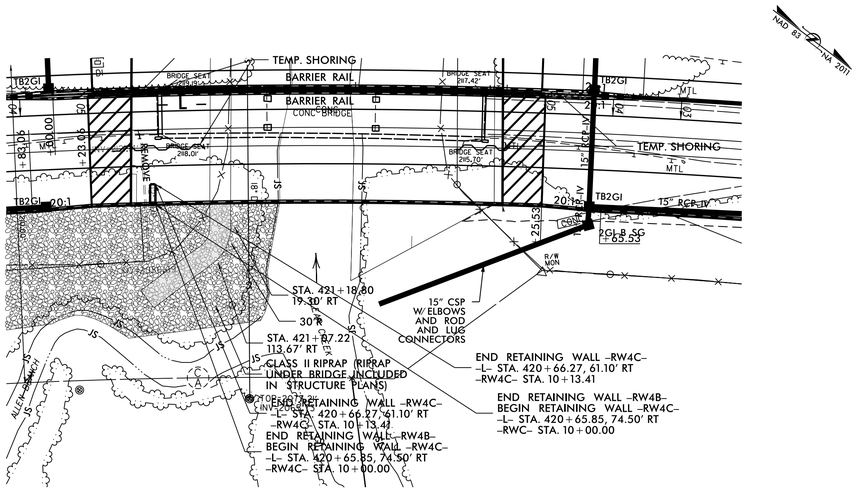
PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

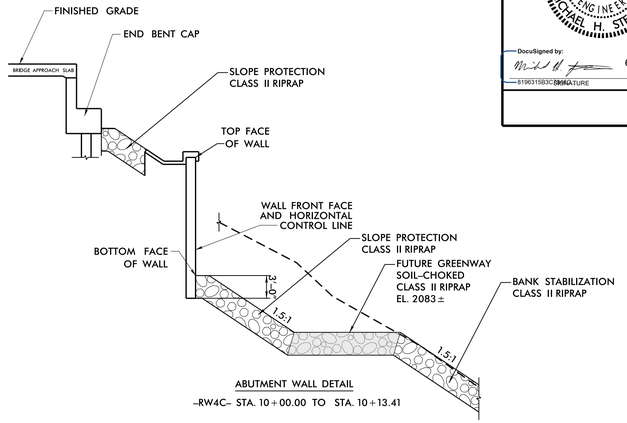
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE WALL WITH MOMENT SLAB

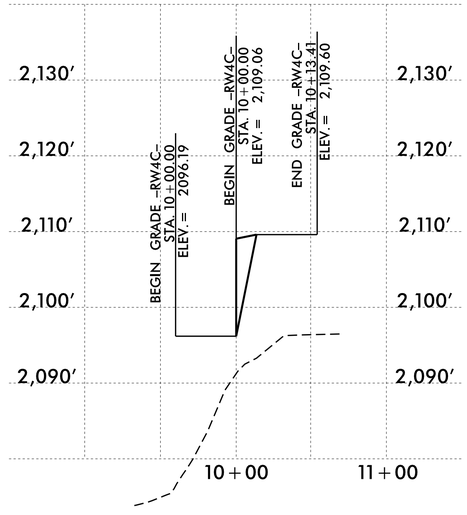
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-4
2			4			





ABUTMENT WALL DETAIL

–RW4C– STA. 10+00.00 TO STA. 10+13.41



RETAINING WALL –RW4C–

DESIGN RETAINING WALL NO. RW4C FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 5,400 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = H/10 OR 2 FT, WHICHEVER IS DEEPER
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

NOTES:
1) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

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PROJECT NO.: 34232.1.FS4 (I-4400BB)

HENDERSON COUNTY

STATION: STA 420+66 -L-

SHEET 5 OF 20

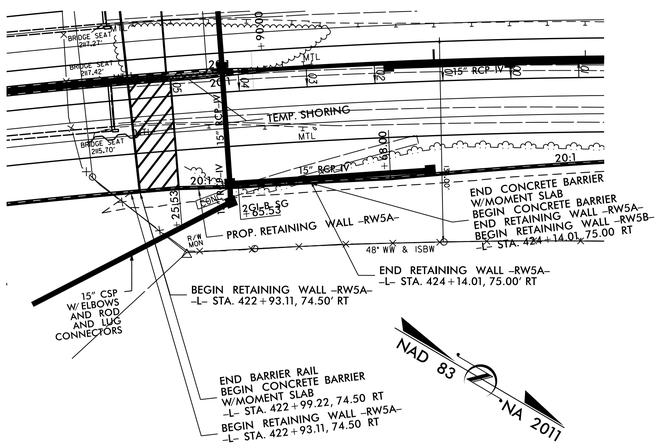
PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

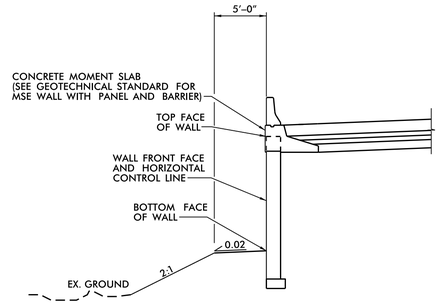
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE ABUTMENT RETAINING WALL

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





FILL WALL DETAIL

RETAINING WALL –RW5A–

DESIGN RETAINING WALL NO. RW5A FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 3,000 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = H/7 OR 2 FT, WHICHEVER IS DEEPER
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

NOTES:
1) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

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PROJECT NO.: 34232.1.FS4 (I-4400BB)
HENDERSON COUNTY
STATION: STA 422+99 -L-
SHEET 6 OF 20

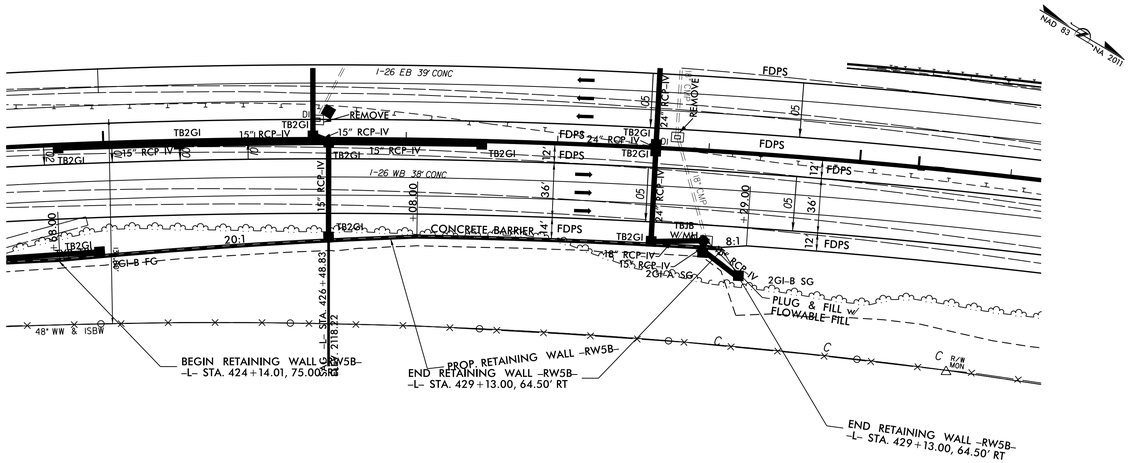
PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

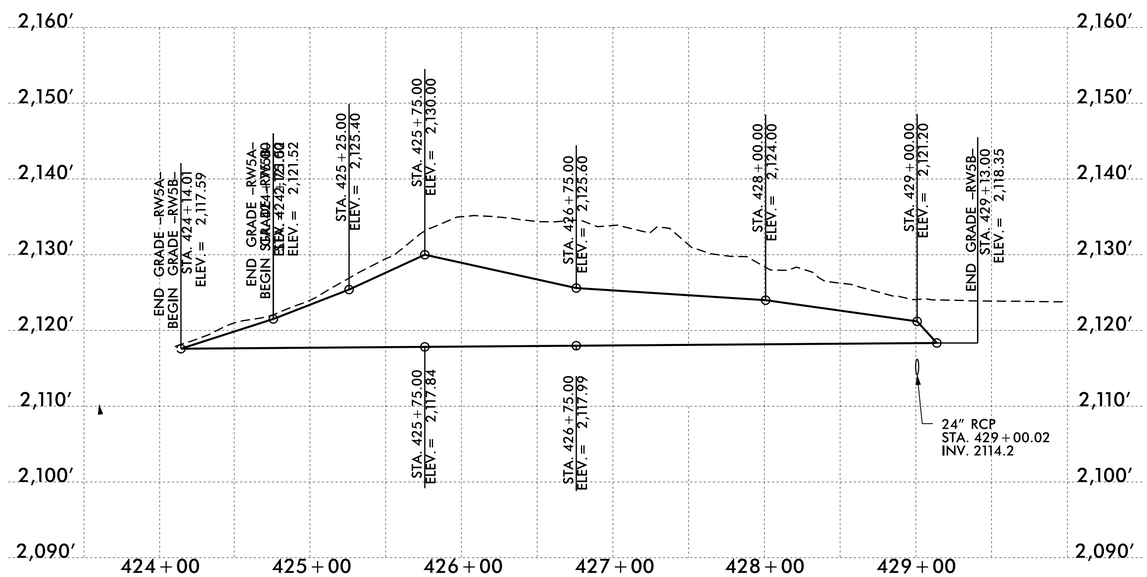
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

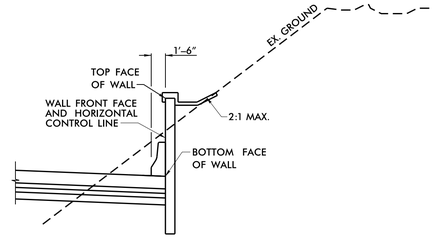
GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL WITH MOMENT SLAB

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







CUT WALL DETAIL

RETAINING WALL -RW5B-

IN-SITU ASSUMED MATERIAL PARAMETERS:			
MATERIAL TYPE	UNIT WEIGHT, γ (LB/CF)	FRICTION ANGLE, ϕ DEGREES	COHESION, c (LB/SF)
EMBANKMENT FILL	115	28	0
RESIDUAL	120	30	0
WEATHERED ROCK	135	36	0

NOTES:
1) A FENCE MAYBE REQUIRED ON TOP OF THE RETAINING WALLS. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.
2) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

DocuSigned by: 6/25/2019
8196315B3C7046C...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

PROJECT NO.: 34232.1.FS4 (I-4400BB)
HENDERSON COUNTY
STATION: STA 424+14 -L-
SHEET 7 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SOIL NAIL RETAINING WALL

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

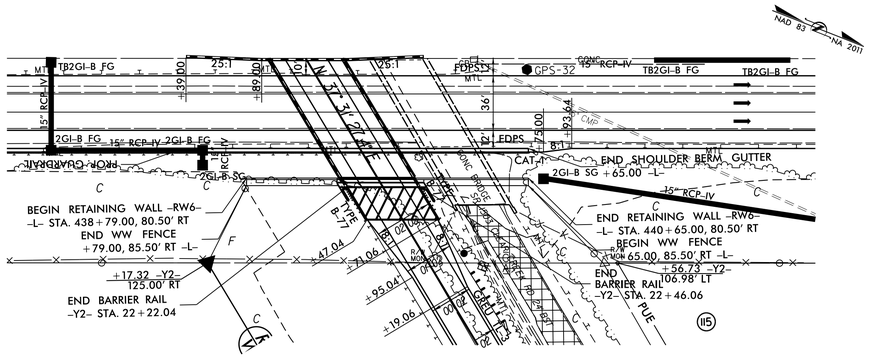
GEOTECHNICAL ENGINEER

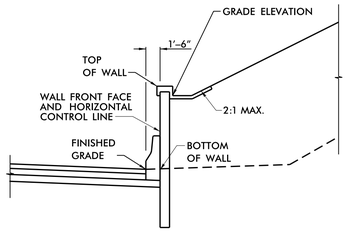
NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

DocuSigned by: 6/25/2019
81960158B07D4BC... SIGNATURE DATE

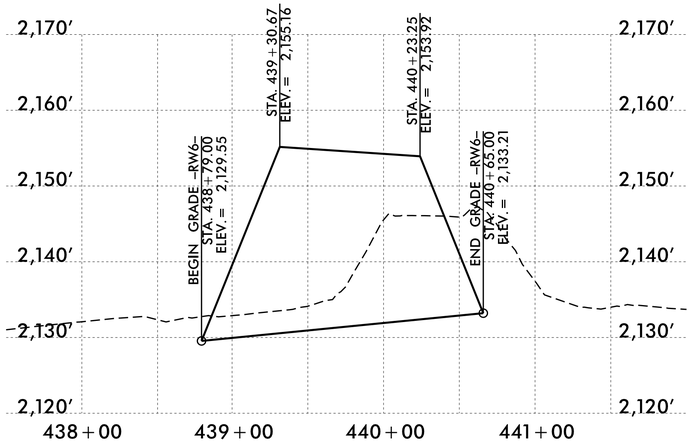
ENGINEER

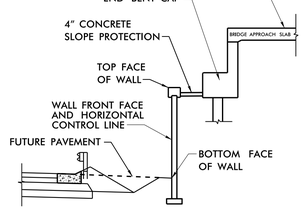
SIGNATURE DATE





FILL WALL DETAIL -RW6-
-L- STA 438+79.00 TO STA 439+38.77
-L- STA 439+69.02 TO STA 440+65.00





OFFSET ABUTMENT WALL DETAIL -RW6-
-L- STA 439+38.77 TO -L- STA 439+69.02

RETAINING WALL -RW6-

DESIGN RETAINING WALL NO. RW6 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 7,500 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = H/10 OR 2 FT, WHICHEVER IS DEEPER
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

NOTES:
1) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

PROJECT NO.: 34232.1.FS4 (I-4400BB)
HENDERSON COUNTY
STATION: STA 438+79 -L-
SHEET 8 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

MSE ABUTMENT RETAINING WALL

REVISIONS

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

SHEET NO. W-8

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

DocuSigned by: 6/25/2019
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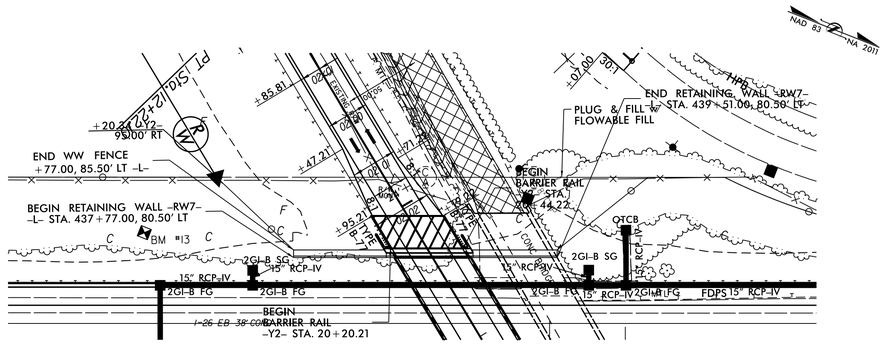
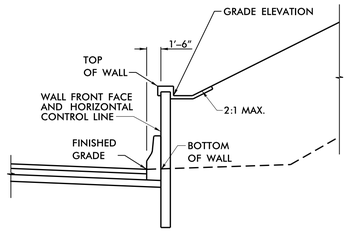
ENGINEER

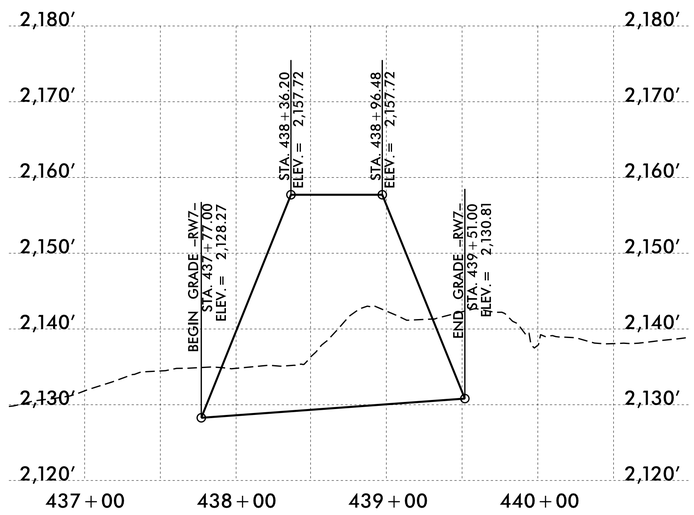
SIGNATURE DATE

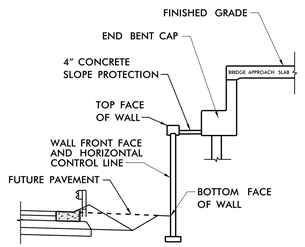




FILL WALL DETAIL -RW7-
-L- STA 437+77.00 TO STA 438+38.22
-L- STA 438+95.47 TO STA 439+51.00

APPROXIMATE WALL FACE AREA = 3,298 SF





OFFSET ABUTMENT WALL DETAIL -RW7-
-L- STA 438+38.22 TO -L- STA 438+95.47

RETAINING WALL -RW7-

DESIGN RETAINING WALL NO. RW7 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 8,300 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = H/10 OR 2 FT, WHICHEVER IS DEEPER
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

NOTES:
1) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

PROJECT NO.: 34232.1.FS4 (I-4400BB)
HENDERSON COUNTY
STATION: STA 437+77 -L-
SHEET 9 OF 20

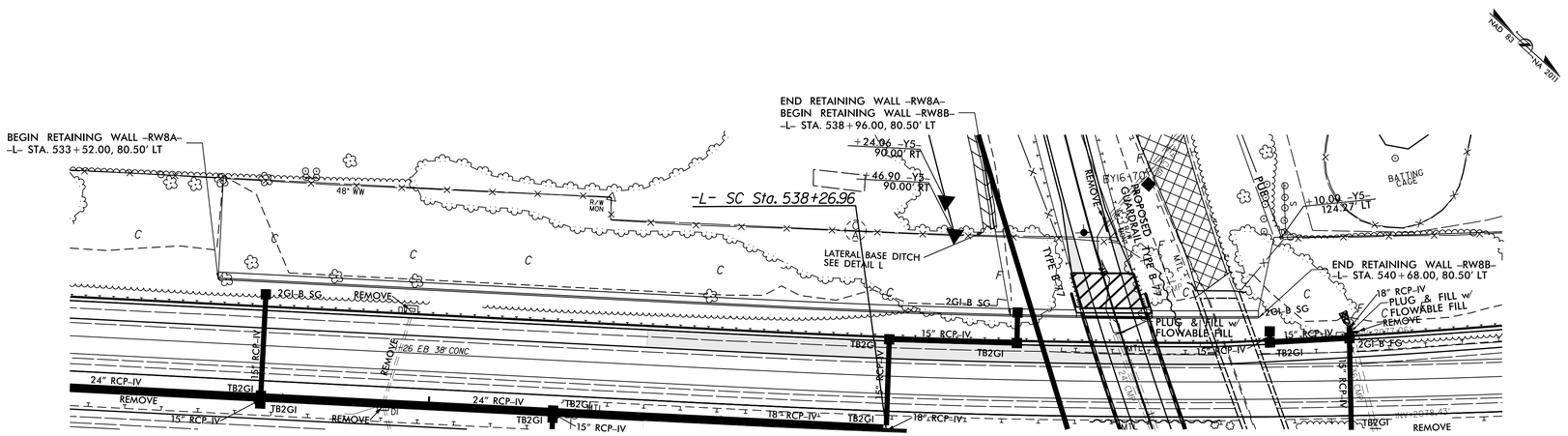
PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE ABUTMENT RETAINING WALL

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



GEOTECHNICAL ENGINEER

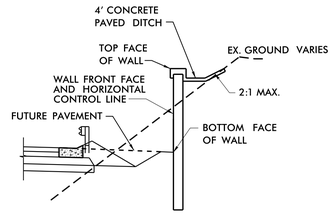
NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

DocuSigned by: 819631583C7B4A1... SIGNATURE

6/25/2019 DATE

ENGINEER

SIGNATURE DATE



OFFSET CUT WALL DETAIL

–L– STA 533+52.00 TO STA 538+96.00

RETAINING WALL –RW8A–

IN-SITU ASSUMED MATERIAL PARAMETERS:			
MATERIAL TYPE	UNIT WEIGHT, γ (LB/CF)	FRICTION ANGLE, ϕ DEGREES	COHESION, c (LB/SF)
RESIDUAL	115	28	0
WEATHERED ROCK	135	36	0

NOTES:
1) A FENCE MAYBE REQUIRED ON TOP OF THE RETAINING WALLS. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.
2) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

PROJECT NO.: 34232.1.FS4 (I-4400BB)

HENDERSON COUNTY

STATION: STA 533+52 -L-

SHEET 10 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SOIL NAIL RETAINING WALL

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

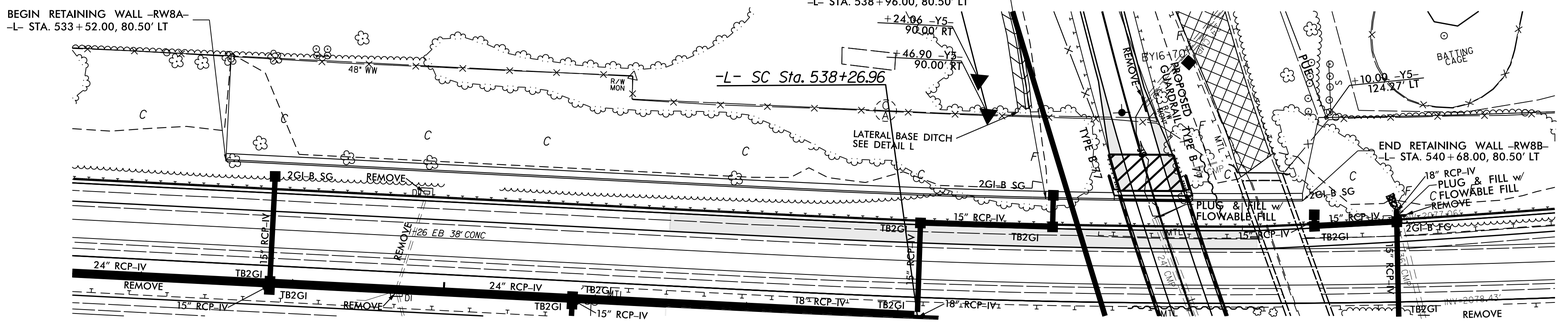
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

DocuSigned by: 6/25/2019
81963158B3074A0... SIGNATURE DATE

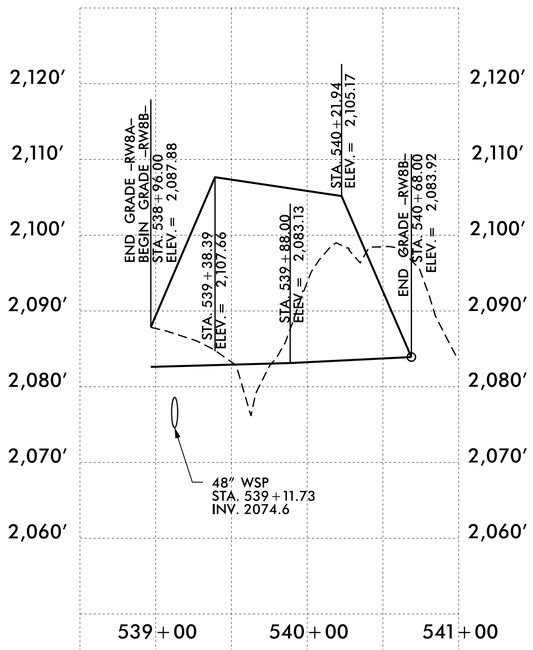
ENGINEER

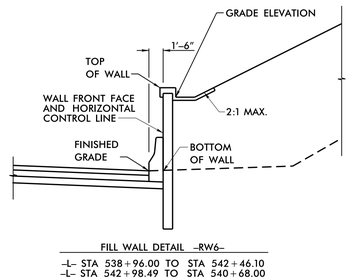
SIGNATURE DATE



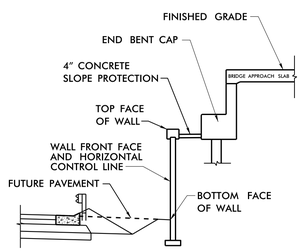
NAD 83 – NA 2011

PRELIMINARY RETAINING WALL ENVELOPE
APPROXIMATE WALL FACE AREA = 3084 SF





FILL WALL DETAIL –RW6–
–L– STA 538+96.00 TO STA 542+46.10
–L– STA 542+98.49 TO STA 540+68.00



OFFSET ABUTMENT WALL DETAIL
–L– STA 542+46.10 TO –L– STA 542+98.49

RETAINING WALL –RW8B–

DESIGN RETAINING WALL NO. RW8B FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 7,600 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = H/10 OR 2 FT, WHICHEVER IS DEEPER
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	115	28	0

NOTES:
1) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

PROJECT NO.: 34232.1.FS4 (I-4400BB)
HENDERSON COUNTY
STATION: STA 538+96 -L-
SHEET 11 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE ABUTMENT RETAINING WALL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-11
1			3			
2			4			

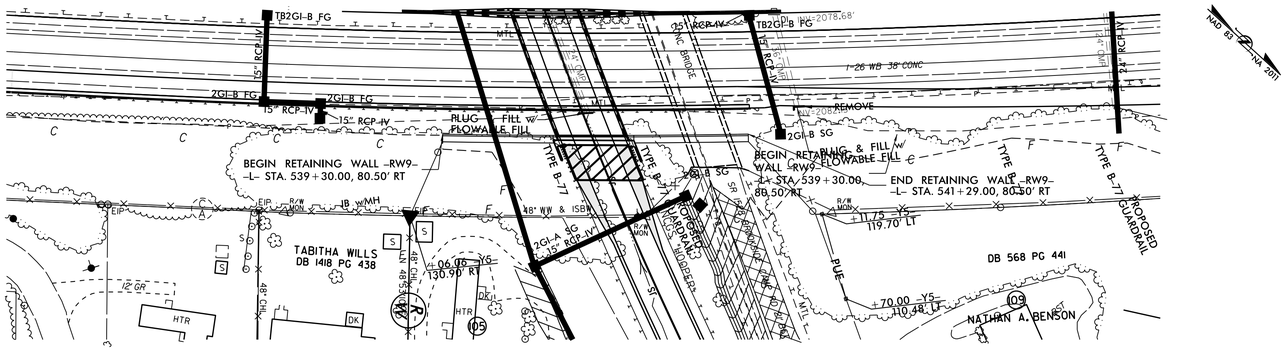
GEOTECHNICAL ENGINEER

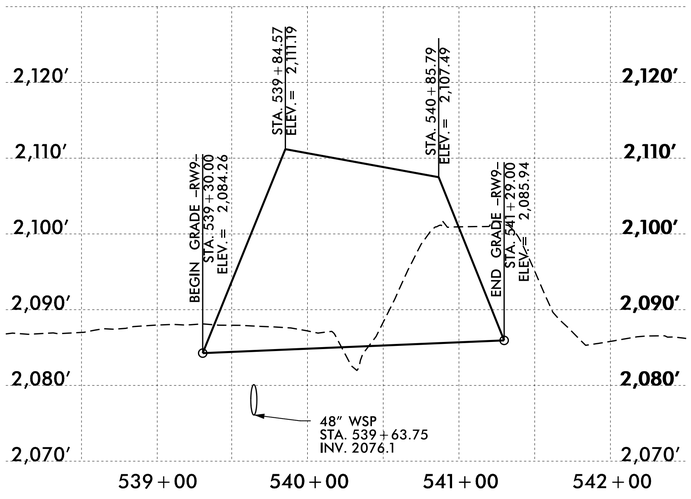
NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

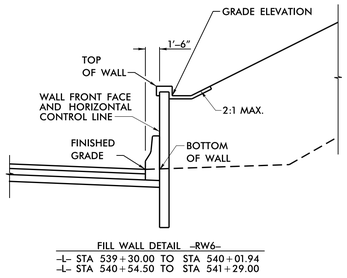
DocuSigned by: 6/25/2019
SIGNATURE DATE

ENGINEER

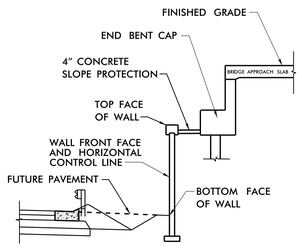
SIGNATURE DATE







FILL WALL DETAIL -RW6-
-L- STA 539+30.00 TO STA 540+01.94
-L- STA 540+54.50 TO STA 541+29.00



OFFSET ABUTMENT WALL DETAIL
-L- STA 540+01.94 TO -L- STA 540+54.50

RETAINING WALL -RW9-

DESIGN RETAINING WALL NO. RW9 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 7,900 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = H/10 OR 2 FT, WHICHEVER IS DEEPER
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	115	28	0

NOTES:
1) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

PROJECT NO.: 34232.1.FS4 (I-4400BB)
HENDERSON COUNTY
STATION: STA 539+30 -L-
SHEET 12 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE ABUTMENT RETAINING WALL

REVISIONS

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

SHEET NO. W-12

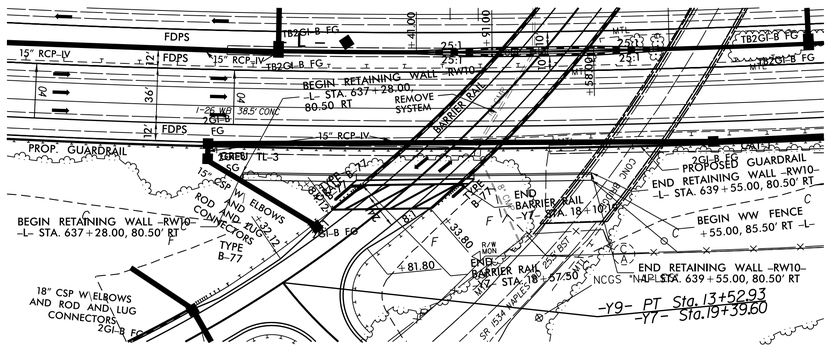
GEOTECHNICAL ENGINEER

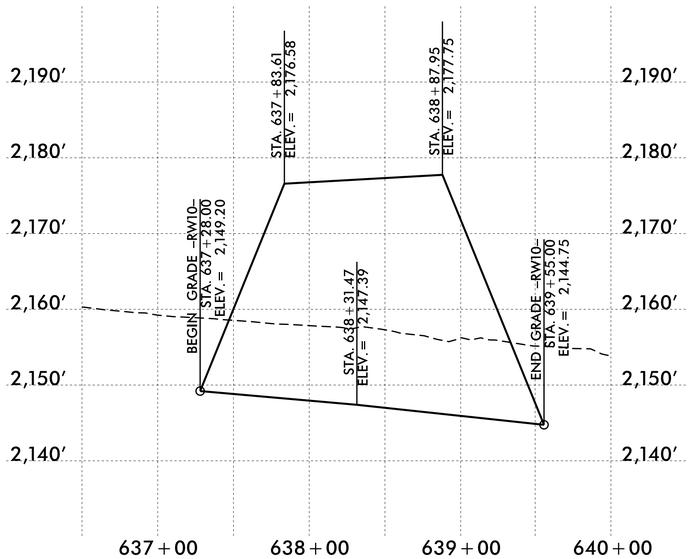
NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

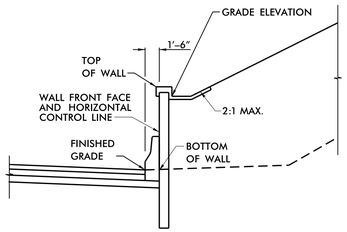
DocuSigned by: 6/25/2019
819631583C3F4DA... SIGNATURE DATE

ENGINEER

SIGNATURE DATE

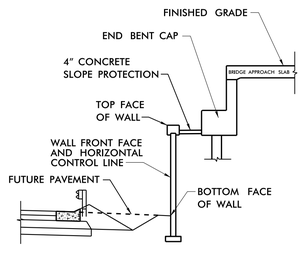






FILL WALL DETAIL -RW6-

-L- STA 637+28.00 TO STA 638+02.04
-L- STA 638+78.55 TO STA 639+55.00



OFFSET ABUTMENT WALL DETAIL

-L- STA 638+02.04 TO -L- STA 638+78.55

RETAINING WALL -RW10-

DESIGN RETAINING WALL NO. RW10 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 6,800 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = H/10 OR 2 FT, WHICHEVER IS DEEPER
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

NOTES:
1) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

PROJECT NO.: 34232.1.FS4 (I-4400BB)

HENDERSON COUNTY

STATION: STA 637+28 -L-

SHEET 13 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE ABUTMENT RETAINING WALL

REVISIONS

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

SHEET NO. W-13

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

DocuSigned by: 6/25/2019
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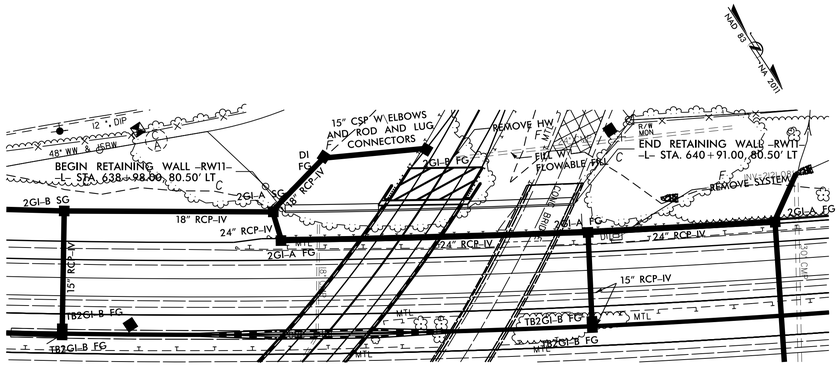
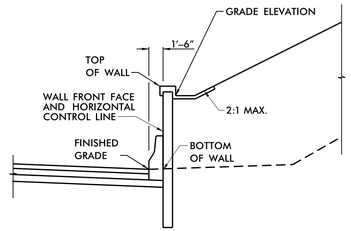
SIGNATURE DATE

ENGINEER

SIGNATURE DATE





FILL WALL DETAIL –RW11–
–L– STA 638+98.00 TO STA 639+60.49
–L– STA 640+20.39 TO STA 640+91.00

RETAINING WALL –RW11–

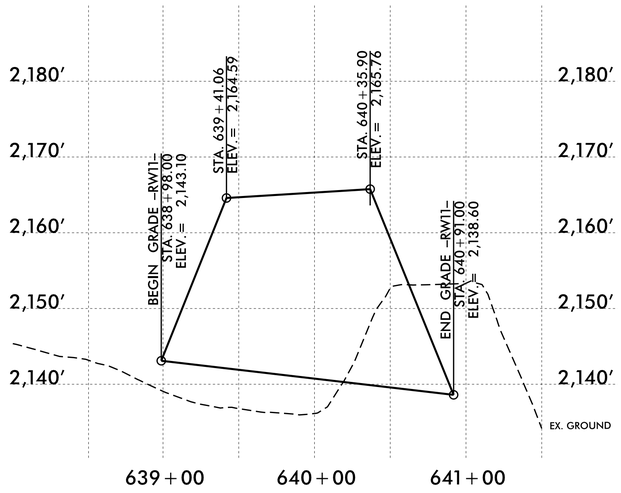
DESIGN RETAINING WALL NO. RW11 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 5,700 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = H/10 OR 2 FT, WHICHEVER IS DEEPER
6) REINFORCED ZONE AGGREGATE PARAMETERS:

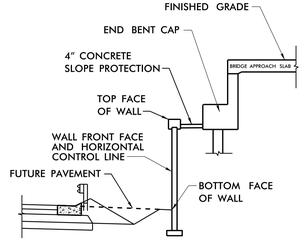
AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

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	115	28	0

NOTES:
1) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.





OFFSET ABUTMENT WALL DETAIL – RW11–
–L– STA 639+60.49 TO –L– STA 640+20.39

PROJECT NO.: 34232.1.FS4 (I-4400BB)
HENDERSON COUNTY
STATION: STA 638+98 -L-
SHEET 14 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

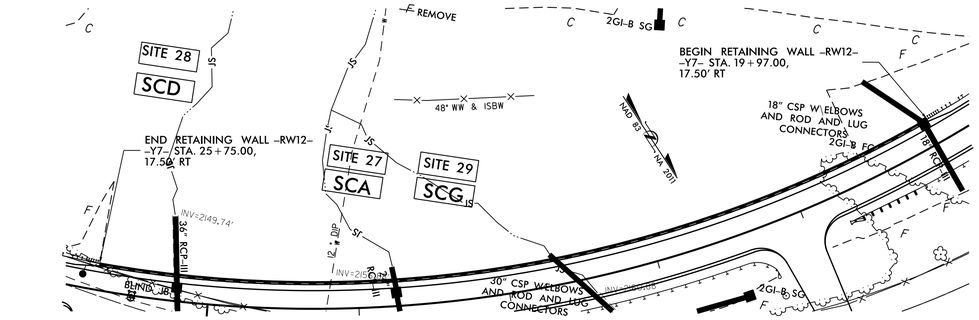
GEOTECHNICAL ENGINEERING UNIT

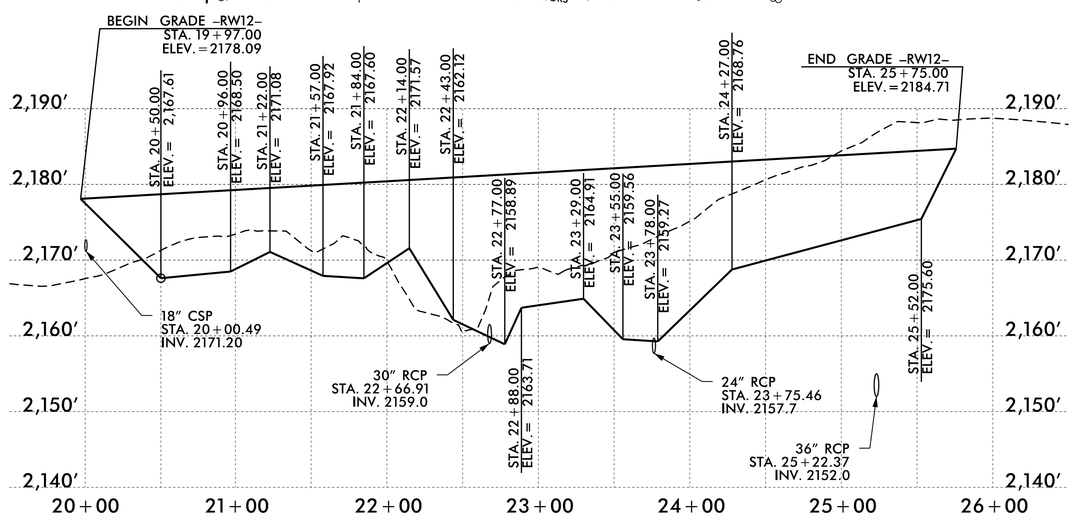
MSE ABUTMENT RETAINING WALL

REVISIONS

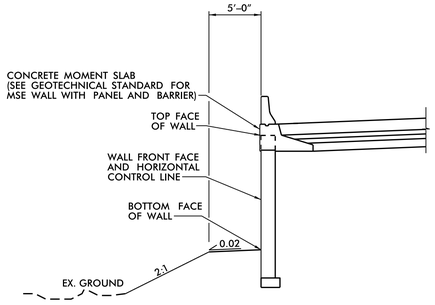
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. W-14

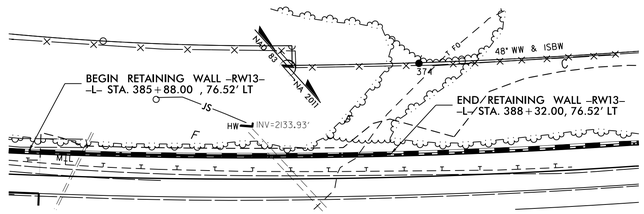


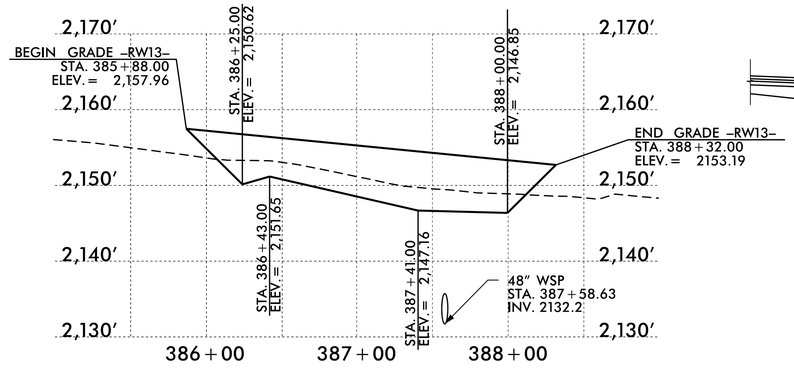


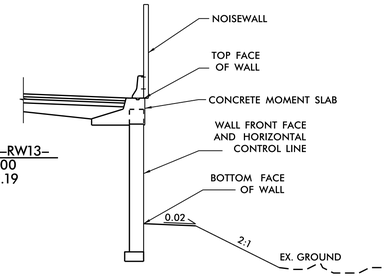
RETAINING WALL –RW12–



FILL WALL DETAIL







FILL WALL WITH NOISEWALL DETAIL

RETAINING WALL –RW13–

DESIGN RETAINING WALL NOS. RW12 AND RW13 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL =
RW12 - 5,100 LB/SF AND RW13 - 2,100 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = H/7 OR 2 FT, WHICHEVER IS DEEPER
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	115	28	0

NOTES:
1) THE WALL ENVELOPE SHOWN AND AREA DOES NOT INCLUDE THE WALL EMBEDMENT. SEE SUMMARY TABLE FOR TOTAL INSTALLED WALL AREA.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

DocuSigned by: 6/25/2019
81963150B3C1495...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

PROJECT NO.: 34232.1.FS4 (I-4400BB)

HENDERSON COUNTY

STATION: STA 25+75 -Y7-

SHEET 15 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL WITH MOMENT SLAB

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

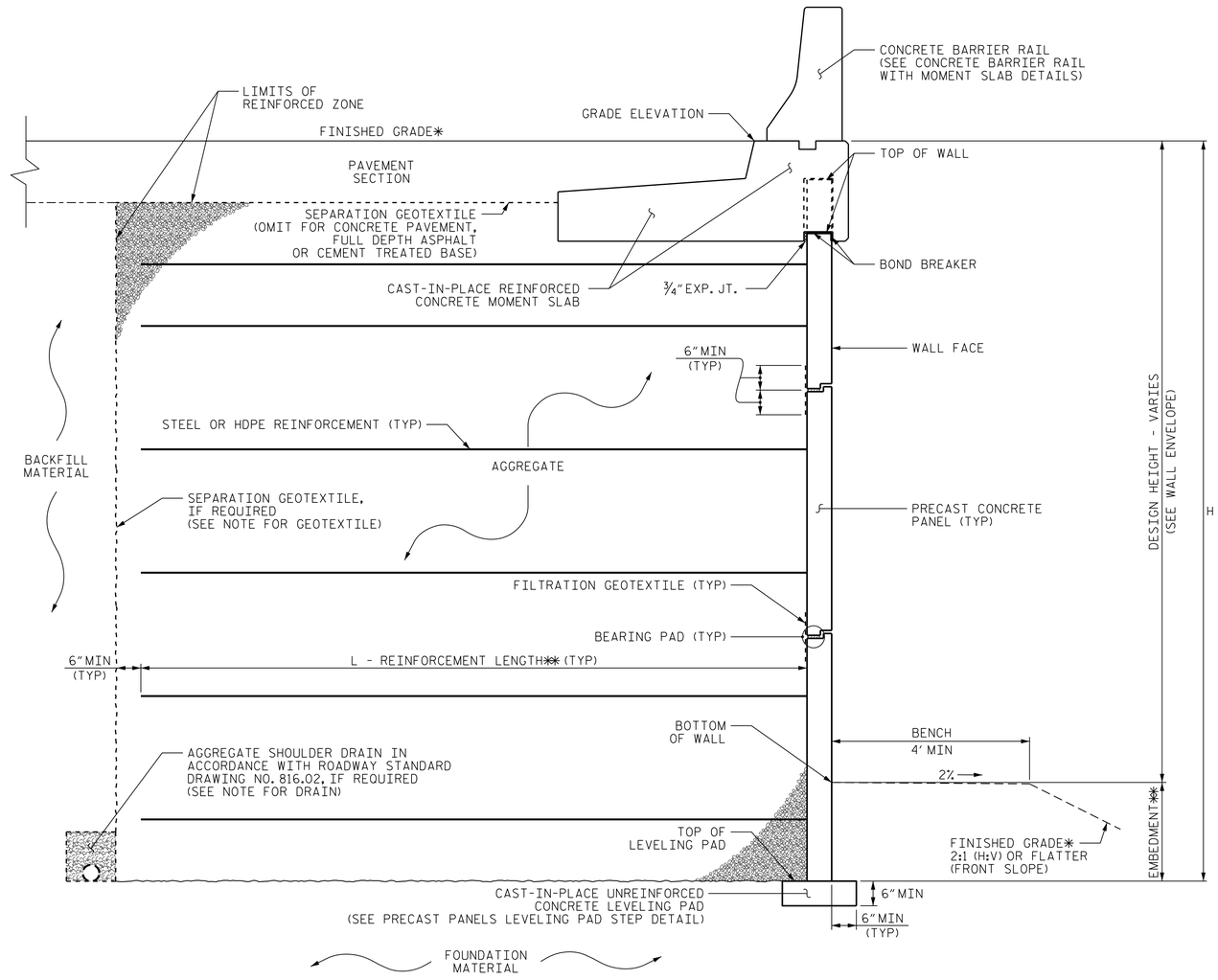
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STERLING

DocuSigned by: 6/25/2019
8196315B3C7046C
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.: 36030.1.1 (I-4400BB)

HENDERSON COUNTY

STATION: VARIES

SHEET 16 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE WALL WITH MOMENT SLAB DETAIL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-16
2			4			

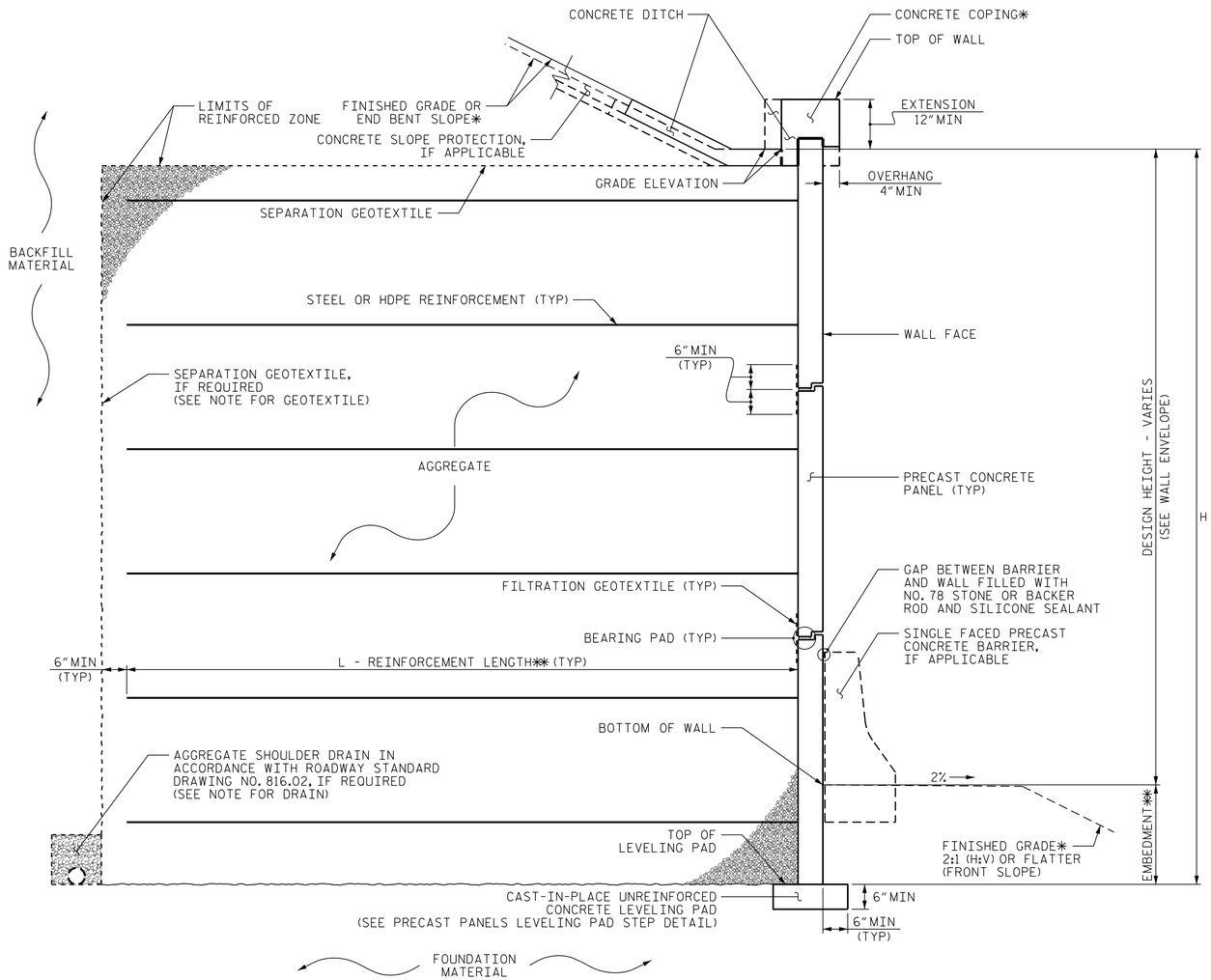
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

DocuSigned by: 6/25/2019
819631583C3B4A4... SIGNATURE DATE

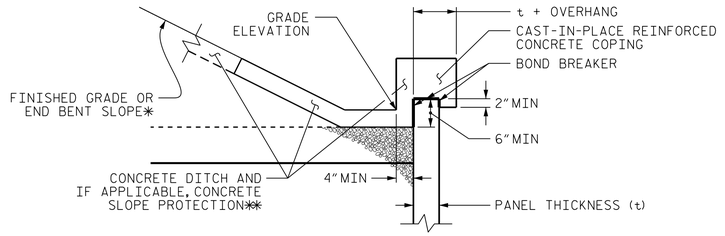
ENGINEER

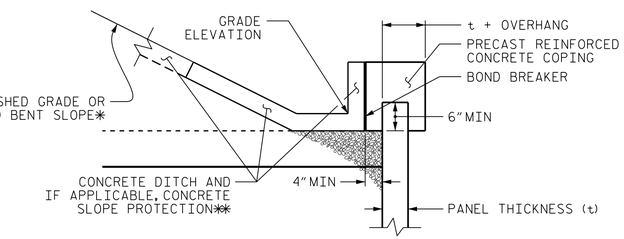
SIGNATURE DATE



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.

PROJECT NO.: 36030.1.1 (I-4400BB)

HENDERSON COUNTY

STATION: VARIES

SHEET 17 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

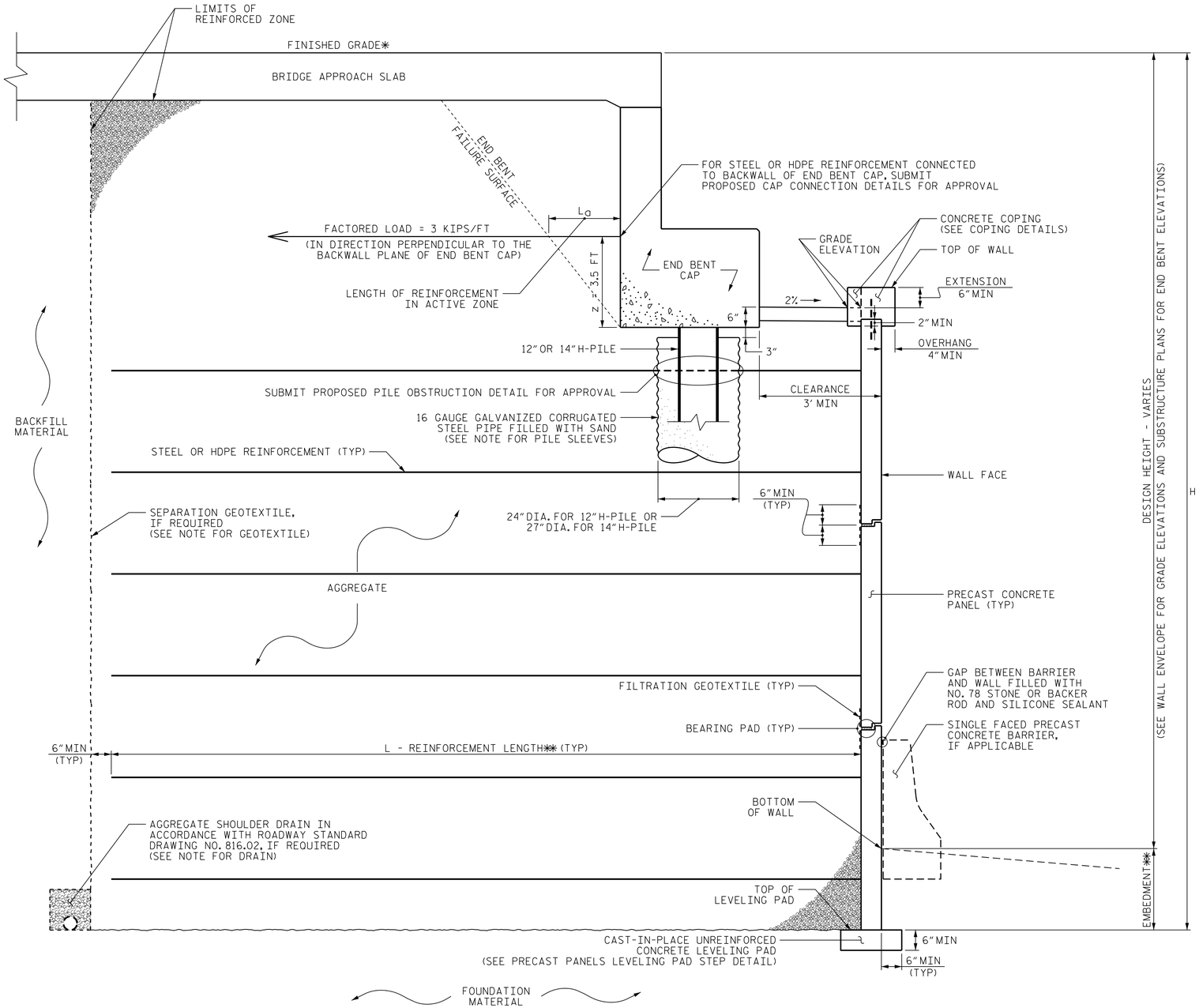
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

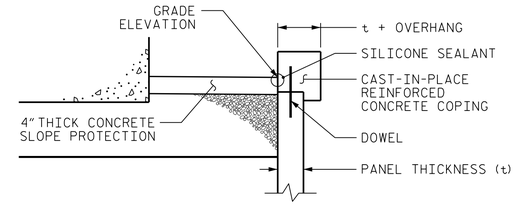
MSE WALL WITH BACKSLOPE DETAIL

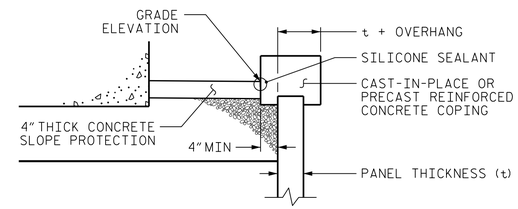
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-17
2			4			



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 028893 ENGINEER MICHAEL H. STEPHENS

DocuSigned by: 6/25/2019
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SIGNATURE DATE

ENGINEER

SIGNATURE DATE

PROJECT NO.: 36030.1.1 (I-4400BB)
HENDERSON COUNTY
STATION: -Y14- 12+50 AND -Y14- 12+90
SHEET 18 OF 20

PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE WALL WITH ABUTMENT DETAIL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-18
1			3			
2			4			

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS	
DocuSigned by: 6/25/2019 — 819631583C2B4A0...	
SIGNATURE DATE	SIGNATURE DATE

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION (PAY ITEMS UPDATED WITH 2018 EDITION).

THE FOLLOWING NOTES ARE FOR RETAINING WALL NOS. RW2, RW4B, RW4C, RW5A, RW5B, RW6, RW7, RW8B, RW9, RW10, RW11, AND RW12, UNLESS OTHERWISE INDICATED.

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 NOS. RW2, RW4B, RW5A, AND RW12. SEE STRUCTURE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS AND QUANTITIES.

A FENCE OR HANDRAIL IS REQUIRED ON TOP OF THE RETAINING WALLS. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF THE RETAINING WALLS.

CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR THE RETAINING WALLS.

A SIMULATED STONE FORM LINER ARCHITECTURAL FINISH IS REQUIRED FOR PRECAST CONCRETE PANELS FOR THE RETAINING WALLS. SEE SIMULATED STONE LINE FORM LINER FINISH SPECIAL PROVISION.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALLS CONSTRUCTED WITH COARSE AGGREGATE.

A DRAIN IS REQUIRED FOR THE RETAINING WALLS.

BEFORE BEGINNING MSE WALL DESIGN FOR THE RETAINING WALLS, 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 THE RETAINING WALLS FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

AS REQUIRED, DESIGN RETAINING WALLS FOR A PIPE EXTENDING THROUGH THE WALL AS SHOWN. VERIFY PIPE LOCATION AND ELEVATION BEFORE BEGINNING MSE WALL DESIGN OR CONSTRUCTION. SEE HYDRO PLANS FOR ADDITIONAL INFORMATION.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (La) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENTS LOCATED AT RETAINING WALL NOS. RW4C, RW6, RW7, RW8B, RW9, RW10 AND RW11 . MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR SIGNS, LIGHTING AND SIGNALS MAY BE LOCATED BEHIND THE 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 MAY INTERFERE WITH REINFORCEMENT FOR THE RETAINING WALLS.

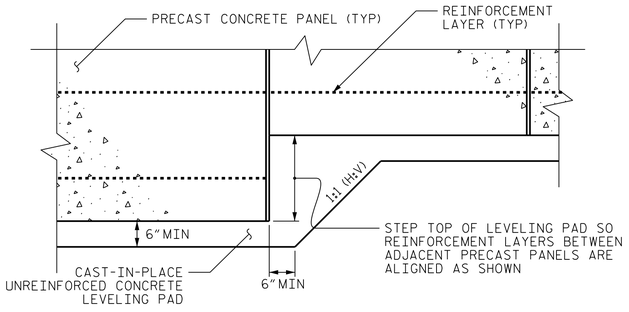
FOUNDATIONS FOR END BENT NOS. 1 LOCATED AT STATION 912+55.14 -EBL- AND 2 LOCATED AT STATION 913+23.64 -EBL- AND WEST BOUND END BENT NOS. 1 LOCATED AT STATION 913+0.37 -WBL- AND 2 LOCATED AT STATION 913+68.75 -WBL- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NOS RW4 AND RW5. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

INSTALL PILE SLEEVES FOR END BENT LOCATED AT RETAINING WALL NOS. RW4C, RW6, RW8B, RW9, AND RW11 . OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE MSE ABUTMENT WALL 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.

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

"TEMPORARY SHORING" MAY BE REQUIRED FOR SOME OF THE RETAINING WALLS IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY, STRUCTURE AND TRAFFIC CONTROL PLANS. TEMPORARY THAT IS REQUIRED FOR THE CONSTRUCTION OF THE MSE WALLS WILL BE INSIDENTAIL TO THE RETAINING WALLS.

AT THE CONTRACTOR'S OPTION, "TEMPORARY SHORING FOR WALL CONSTRUCTION" MAY BE USED TO CONSTRUCT THE RETAINING WALLS. SEE MSE RETAINING WALLS PROVISION FOR TEMPORARY SHORING FOR WALL CONSTRUCTION.



PRECAST PANELS LEVELING PAD STEP DETAIL

PROJECT NO.: 36030.1.1 (I-4400BB)

HENDERSON COUNTY

STATION: VARIES

SHEET 19 OF 20

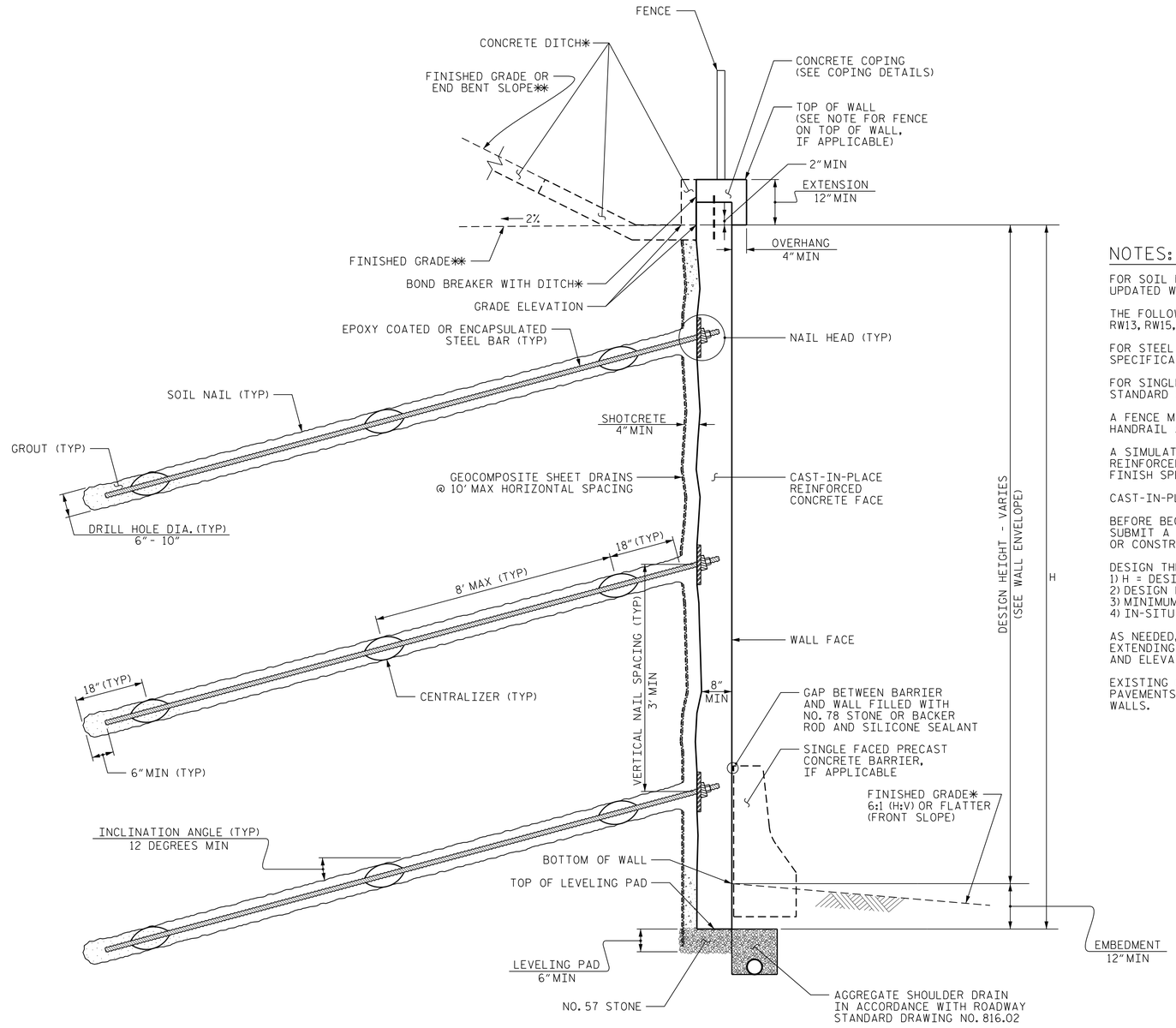
PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE WALL NOTES

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-19
2			4			



SOIL NAIL WALL - TYPICAL SECTION

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

NOTES:

FOR SOIL NAIL RETAINING WALLS, SEE SOIL NAIL RETAINING WALLS PROVISION (PAY ITEMS UPDATED WITH 2018 EDITION).

THE FOLLOWING NOTES ARE FOR RETAINING WALL NOS. RW0, RW7, RW8, RW9, RW10, RW11, RW12, RW13, RW15, RW16, RW17, AND R21 UNLESS OTHERWISE INDICATED.

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 FENCE MAYBE REQUIRED ON TOP OF THE RETAINING WALLS. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

A SIMULATED STONE FORM LINER ARCHITECTURAL FINISH IS REQUIRED FOR THE CAST-IN-PLACE REINFORCED CONCRETE FACE FOR THE RETAINING WALLS. SEE SIMULATED STONE LINE FORM LINER FINISH SPECIAL PROVISION.

CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR THE RETAINING WALLS.

BEFORE BEGINNING SOIL NAIL WALL DESIGN FOR THE RETAINING WALLS, 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 THE RETAINING WALLS FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MINIMUM EMBEDMENT DEPTH = 1 FT
4) IN-SITU ASSUMED MATERIAL PARAMETERS, SEE PLAN SHEETS

AS NEEDED, DESIGN RETAINING WALLS NO. RW8, RW17 AND RW21 FOR A PIPE AND DRAINAGE BOX EXTENDING BEHIND AND THROUGH THE WALL AS SHOWN. VERIFY PIPE AND DRAINAGE BOX LOCATIONS AND ELEVATION BEFORE BEGINNING SOIL NAIL WALL DESIGN OR CONSTRUCTION.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH SOIL NAILS FOR THE RETAINING WALLS.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

DocuSigned by: 6/25/2019
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

PROJECT NO.: 36030.1.1 (I-4400BB)
HENDERSON COUNTY
STATION: VARIES
SHEET 20 OF 20

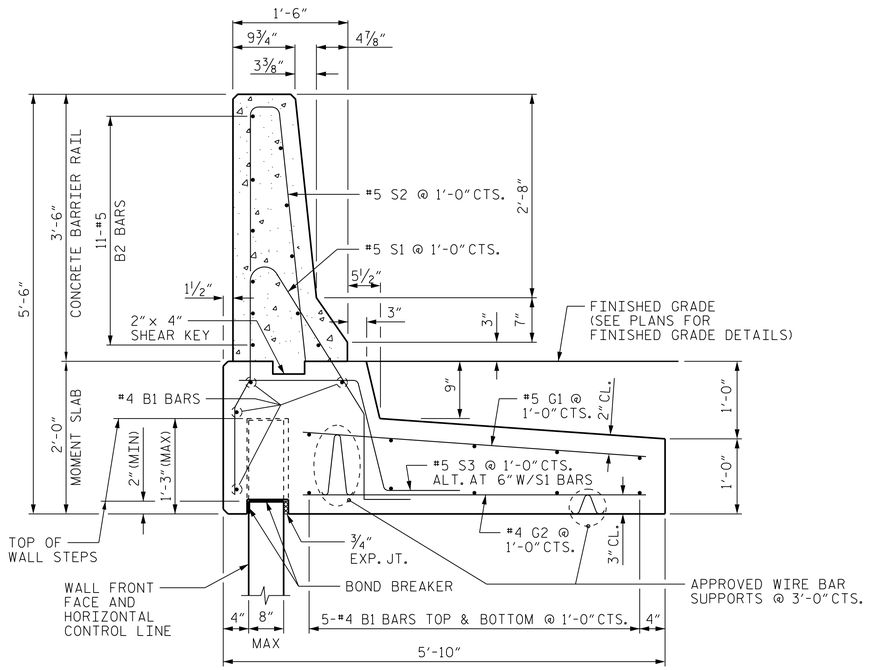
PREPARED BY: MHS	DATE: 6/25/19
REVIEWED BY: SCC	DATE: 6/25/19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

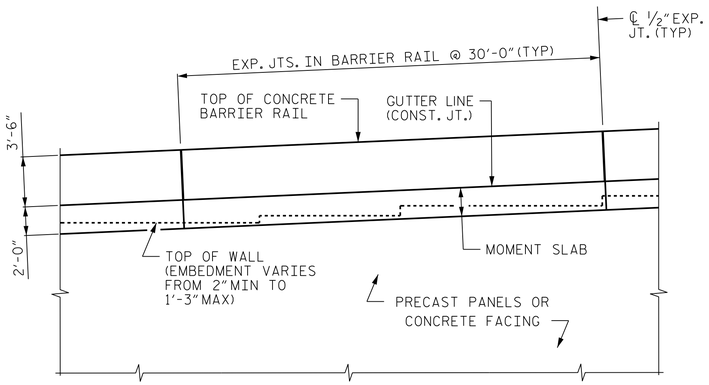
GEOTECHNICAL ENGINEERING UNIT

SOIL NAIL WALL DETAIL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-20
1			3			
2			4			



CONCRETE BARRIER RAIL WITH MOMENT SLAB



CONCRETE BARRIER RAIL WITH MOMENT SLAB - PARTIAL ELEVATION

NOTES:

FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB, SEE SECTION 460 OF THE STANDARD SPECIFICATIONS.

CONCRETE BARRIER RAIL WITH MOMENT SLAB SHALL BE A MINIMUM OF 15' IN LENGTH.

EXPANSION JOINTS SHALL BE PLACED IN THE BARRIER RAIL AND MOMENT SLAB AT A MAXIMUM SPACING OF 30'.

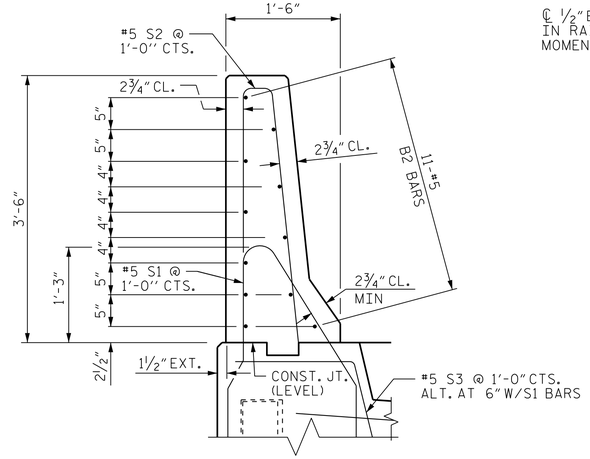
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED SURFACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MID-POINT OF BARRIER RAIL SEGMENTS LESS THAN 20' IN LENGTH.

THE BARRIER RAIL SHALL NOT BE CAST UNTIL THE MOMENT SLAB HAS ATTAINED AN AGE OF THREE CURING DAYS OR A MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI. IN ADDITION, NO FILL MATERIAL, ASPHALT, OR CONSTRUCTION EQUIPMENT IS ALLOWED ON THE MOMENT SLAB PRIOR TO SATISFYING THE MINIMUM CONCRETE CURING AND STRENGTH REQUIREMENTS.

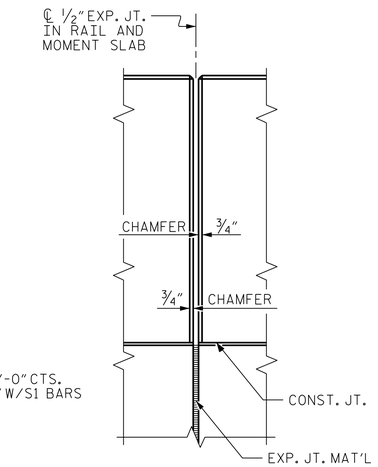
ALL REINFORCING STEEL IN THE BARRIER RAIL SHALL BE EPOXY COATED.

IF EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, BARRIERS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH CONCRETE BARRIER RAIL WITH MOMENT SLAB OR CONCRETE FACING FOR RETAINING WALL WILL BE THICKER THAN 8", CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS SHALL BE REVISED AND SUBMITTED FOR APPROVAL.

CONCRETE BARRIER RAIL WITH MOMENT SLAB
PAY LENGTH = 1126.8 LIN FT



SECTION THRU RAIL



ELEV. @ EXP. JOINTS

BARRIER RAIL DETAILS

ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029869 ENGINEER SHANE C CLARK

DocuSigned by: Shane C. Clark 1F4E87E6C6AC4EB... 6/27/2019

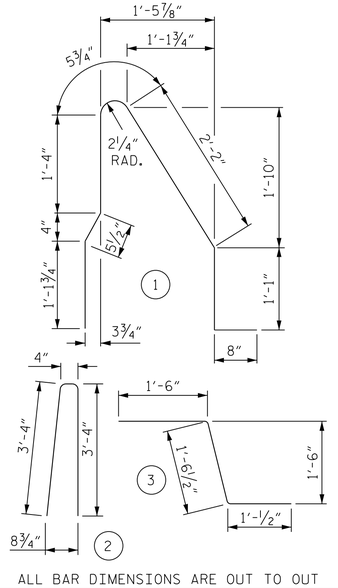
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE 30'-0" SECTION OF CONCRETE BARRIER RAIL WITH MOMENT SLAB

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	14	#4	STR	29'-7"	277
✳ B2	11	#5	STR	29'-7"	339
G1	31	#5	STR	4'-4"	140
G2	31	#4	STR	4'-4"	90
✳ S1	31	#5	1	7'-4"	237
✳ S2	31	#5	2	7'-0"	226
S3	30	#5	3	4'-1"	128
REINFORCING STEEL					635 LB
✳ EPOXY COATED REINFORCING STEEL					802 LB
CLASS AA CONCRETE BARRIER RAIL					4.1 CY
CLASS A CONCRETE MOMENT SLAB					9.1 CY
CONCRETE BARRIER RAIL WITH MOMENT SLAB					30 LIN FT

PROJECT NO.: 34232.1.FS3 (I-4400BB)

HENDERSON COUNTY

STATION: VARIES, SEE INDIVIDUAL WALL PLANS

SHEET 1 OF 1

PREPARED BY: SCC	DATE: 5-20-19
REVIEWED BY: SCC	DATE: 5-20-19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

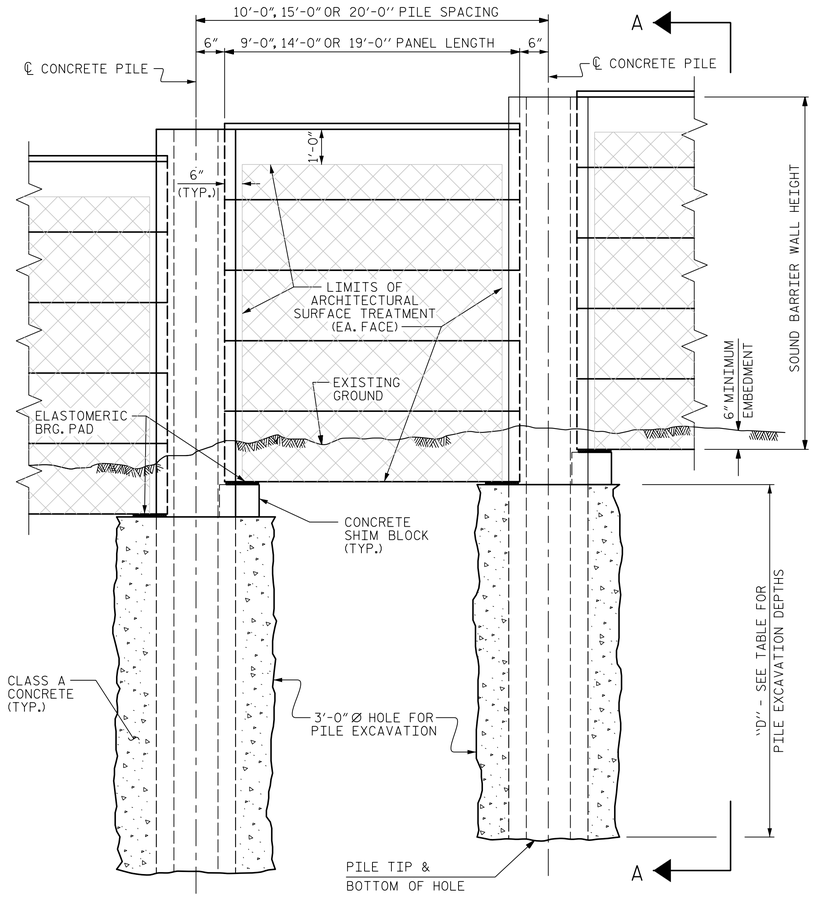
GEOTECHNICAL ENGINEERING UNIT

CONCRETE BARRIER RAIL WITH MOMENT SLAB FOR PRECAST PANELS AND CONCRETE FACING

REVISIONS

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

SHEET NO. W-21



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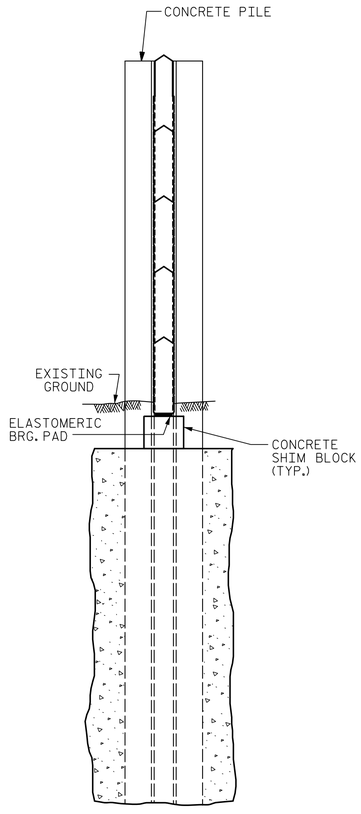
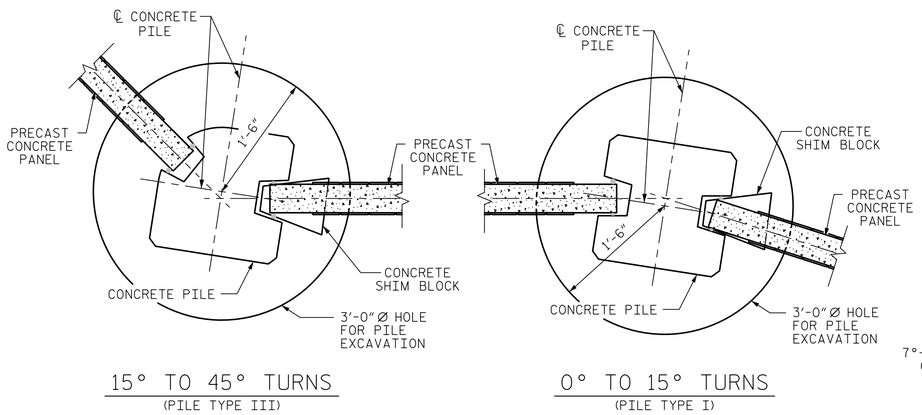


SECTION A-A



TYPICAL WALL TURN DETAILS

PILE EXCAVATION DEPTHS ″D″

WALL -NW4.1- FROM : STA. 10+00.00 TO : STA. 25+75.00

	PILE SPACING	WALL HEIGHT		
		H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
3′-0″ Ø HOLE	10′-0″	10′	12′	13′
	15′-0″	11′	13′	16′
	20′-0″	12′	15′	18′

WALL -NW4.1- FROM : STA. 26+50.00 TO : STA. 40+10.00

	PILE SPACING	WALL HEIGHT		
		H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
3′-0″ Ø HOLE	10′-0″	10′	12′	13′
	15′-0″	11′	13′	16′
	20′-0″	12′	15′	18′

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.

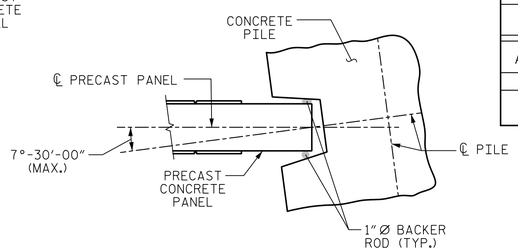
PILE REINFORCING STEEL
DESIGN WIND PRESSURE = 40 PSF

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.				

BILL OF MATERIAL

SOUND BARRIER WALL	51,463 S.F.
ARCHITECTURAL SURFACE TREATMENT	90,300 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	DRY STACK STONE
STAIN OPTION:	GRAY (FS36173)



PILE ROTATION LIMIT FOR WALL TURN

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

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
Docusigned by: Paul J. Barber 1B5B1B57368741E...
8/29/2019

PROJECT NO. I-4400BB

HENDERSON COUNTY

STATION: 510+50.81 -L- = 10+00.00 -NW4.1-

SHEET 1 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL No. -NW4.1-

ASSEMBLED BY : M. WRIGHT	DATE : 6/19
CHECKED BY : N. HART	DATE : 6/19
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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

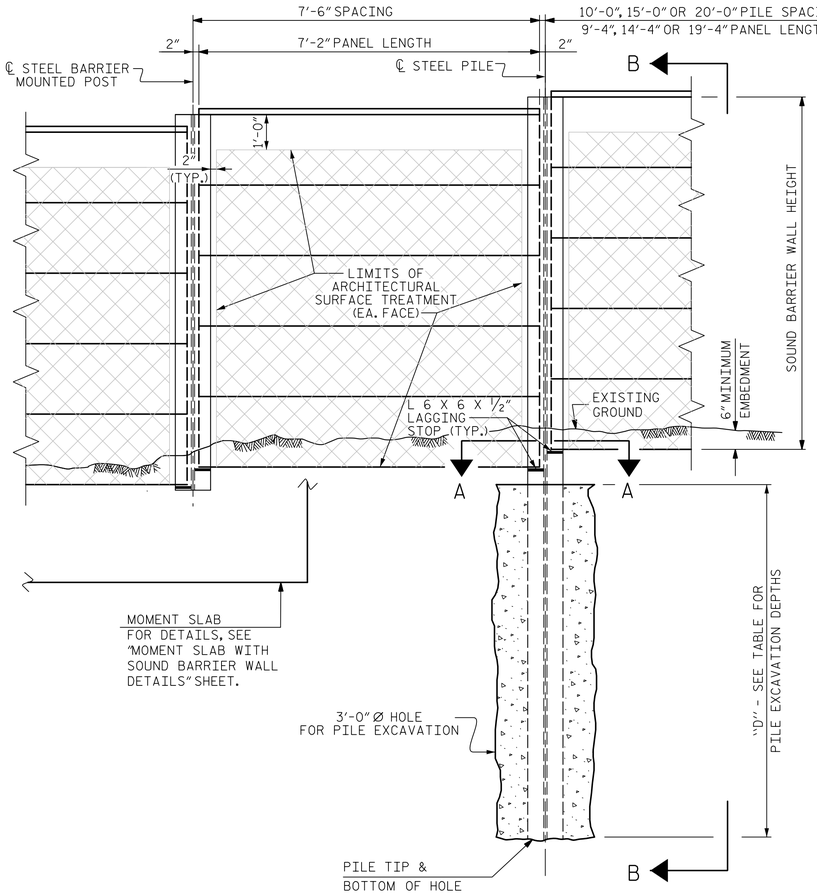
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 6/19
CHECKED BY	N. HART	DATE 6/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 7/19

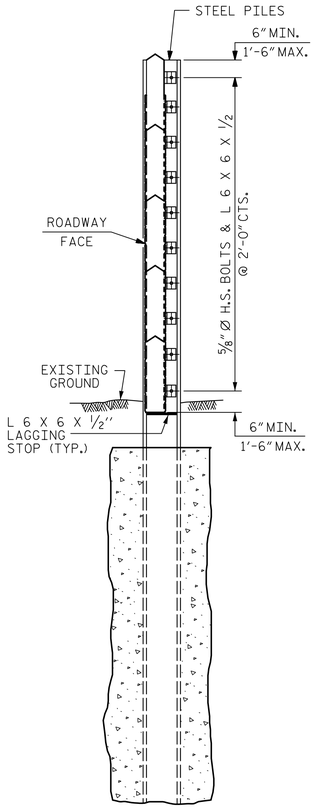
DWG. NO. 1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-1
1			3			TOTAL SHEETS
2			4			13

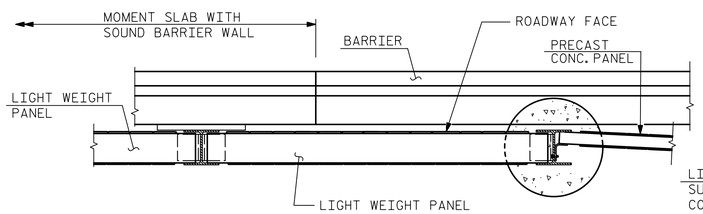
STD. NO. SBW1



ELEVATION

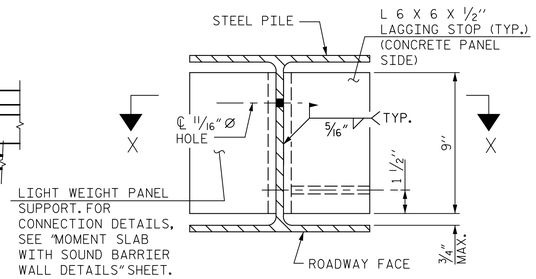


SECTION B-B

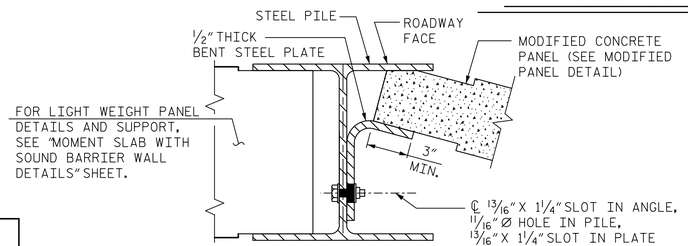


PLAN AT MOMENT SLAB TRANSITION PANEL

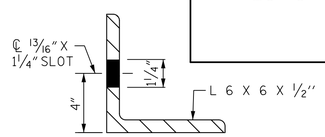
(SIMILAR AT WALL BEGIN)



SECTION A-A

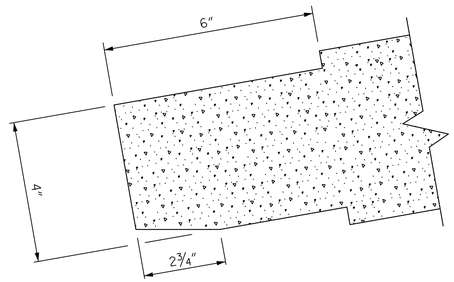


CONNECTION DETAIL



ANGLE DETAIL

PILE EXCAVATION DEPTH "D"				
WALL -NW4.1-	AT: STA. 25+75.00 AT: STA. 26+50.00			
3′-0″ Ø HOLE	PILE SPACING	WALL HEIGHT		
		H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
	10′-0″	10′	12′	13′
	15′-0″	11′	13′	16′
	20′-0″	12′	15′	18′



MODIFIED PANEL DETAIL

(USE ONLY FOR TURNS 15° OR LESS, CONVEX TOWARD ROADWAY)

STEEL PILES DESIGN WIND PRESSURE = 40 PSF			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	MINIMUM W SIZE STEEL PILES	MINIMUM HP SIZE STEEL PILES
10′-0″	H ≤ 15′	W 12 X 40 W 14 X 48	HP 12 X 53 HP 14 X 73
	15′< H ≤ 20′	W 12 X 45 W 14 X 48	HP 12 X 53 HP 14 X 73
	20′< H ≤ 25′	W 12 X 65 W 14 X 61	HP 12 X 53 HP 14 X 73
	25′< H ≤ 29′	W 12 X 87 W 14 X 90	HP 14 X 73
15′-0″	H ≤ 15′	W 12 X 40 W 14 X 48	HP 12 X 53 HP 14 X 73
	15′< H ≤ 20′	W 12 X 53 W 14 X 61	HP 12 X 53 HP 14 X 73
	20′< H ≤ 25′	W 12 X 72 W 14 X 90	HP 12 X 74 HP 14 X 73
	25′< H ≤ 29′	W 12 X 120 W 14 X 90	HP 14 X 89
20′-0″	H ≤ 15′	W 12 X 40 W 14 X 48	HP 12 X 53 HP 14 X 73
	15′< H ≤ 20′	W 12 X 58 W 14 X 61	HP 12 X 63 HP 14 X 73
	20′< H ≤ 25′	W 12 X 96 W 14 X 90	HP 14 X 89
	25′< H ≤ 29′	W 12 X 152 W 14 X 109	HP 14 X 117

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.

USE STEEL PILES, ANGLES, AND LAGGING STOPS MEETING THE REQUIREMENTS OF AASHTO M270, GRADE 50. GALVANIZE ALL STEEL COMPONENTS INCLUDING PILES, ANGLES, LAGGING STOPS, BOLTS, NUTS, AND WASHERS IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. REPAIR ANY DAMAGED GALVANIZATION IN ACCORDANCE WITH ARTICLE 1076-7 OF THE STANDARD SPECIFICATIONS.

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

AT THE CONTRACTOR'S OPTION, USE AN APPROVED NON-SHRINK NON-METALLIC GROUT BETWEEN THE FLANGES OF THE STEEL PILES TO SUPPORT THE BOTTOM PANEL IN LIEU OF LAGGING STOPS.

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.

PROVIDE PLATES AND ANGLES TO SECURE PANELS 6″ LONG AS MEASURED ALONG THE STEEL PILE.

AT THE CONTRACTOR'S OPTION, USE EITHER 'W' OR 'HP' PILES THAT SATISFY THE MINIMUM PILE SIZE REQUIRED IN THE "STEEL PILES" TABLE. PILES SMALLER THAN W12 OR HP12 ARE NOT PERMITTED. AT TURNS WITH A 3′-0″ DIAMETER HOLE FOR PILE EXCAVATION, USE ONLY W12 OR HP12 PILES, AS SHOWN.

AT THE CONTRACTOR'S OPTION, USE 10′-0″, 15′-0″, OR 20′-0″ PILE SPACINGS, AND EITHER 2′-6″ OR 3′-0″ DIAMETER HOLES FOR PILE EXCAVATION. 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.

DO NOT SPLICE STEEL PILES.

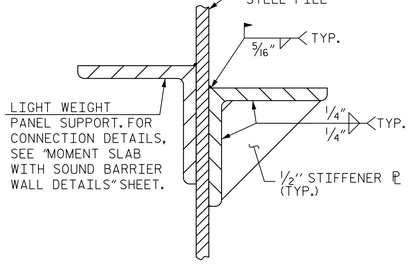
FOR SOUND BARRIER WALL STATIONS, OFFSETS, AND WALL ENVELOPE, SEE ROADWAY PLANS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR MOMENT SLAB WITH SOUND BARRIER WALL, SEE SPECIAL PROVISIONS.

PILE EXCAVATION DEPTHS SHOWN ARE ASSUMED AND ARE SUBJECT TO CHANGE BASED ON FURTHER GEOTECHNICAL INVESTIGATION.



SECTION X-X

PROJECT NO. I-4400BB

HENDERSON COUNTY

STATION: 510+50.81 -L- = 10+00.00 -NW4.1-

SHEET 2 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL
(STEEL PILES)
NO. -NW4.1-

ASSEMBLED BY : D. WITHERSPOON	DATE : 7/19
CHECKED BY : N. HART	DATE : 7/19
DRAWN BY : JAD 5/01	REV. 9/26/14 MAA/TMG
CHECKED BY : RDR 5/01	REV. 10/17 MAA/THC
	REV. 5/18 MAA/THC

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
DocuSigned by: Paul J. Barber
8/29/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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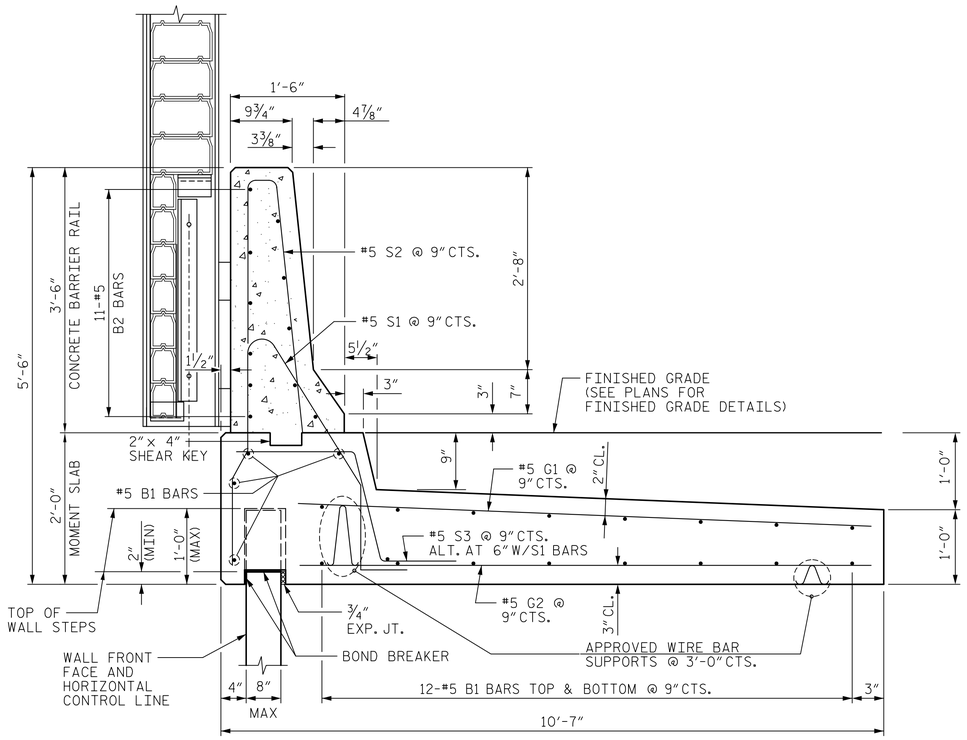
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY D. WITHERSPOON DATE 7/19	DWG. NO. 2
CHECKED BY N. HART DATE 7/19	
DESIGN ENGINEER OF RECORD P. BARBER DATE 7/19	

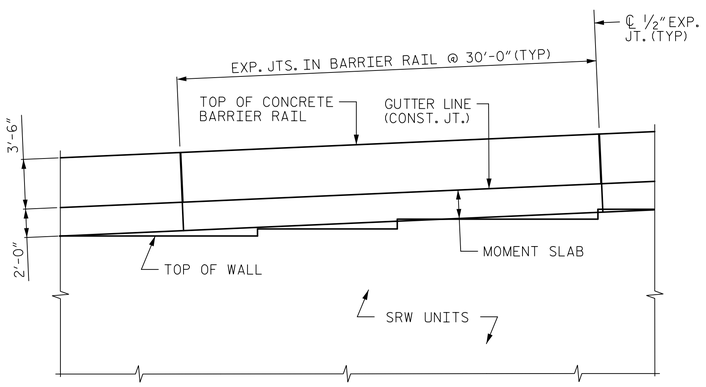
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-2
1			3			TOTAL SHEETS
2			4			13

STD. NO. SBW4



CONCRETE BARRIER RAIL WITH MOMENT SLAB

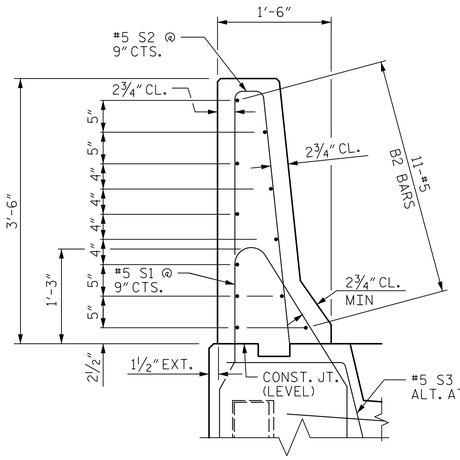
NOTE: SOUND WALL TO BARRIER RAIL BOLTS NOT SHOWN FOR CLARITY.



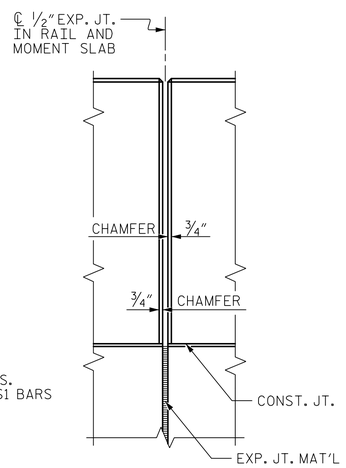
CONCRETE BARRIER RAIL WITH MOMENT SLAB - PARTIAL ELEVATION

MOMENT SLAB WITH SOUND BARRIER WALL FROM STA. 25+77.50 -NW4.1- TO STA. 26+47.50 -NW4.1-
† LENGTH = 70' LIN. FT.
† SOUND BARRIER WALL = 1,648 S.F.

† QUANTITIES ARE FOR INFORMATION ONLY. MOMENT SLAB WITH SOUND BARRIER WALL SHALL BE PAID AS A LUMP SUM.



SECTION THRU RAIL



ELEV. @ EXP. JOINTS

BARRIER RAIL DETAILS

NOTES:

THE MOMENT SLAB WITH SOUND BARRIER WALL SHALL BE PAID AS A LUMP SUM PAY ITEM, SEE SPECIAL PROVISIONS.

CONCRETE BARRIER RAIL WITH MOMENT SLAB SHALL BE A MINIMUM OF 15' IN LENGTH.

EXPANSION JOINTS SHALL BE PLACED IN THE BARRIER RAIL AND MOMENT SLAB AT A MAXIMUM SPACING OF 30'.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED SURFACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MID-POINT OF BARRIER RAIL SEGMENTS LESS THAN 20' IN LENGTH.

THE BARRIER RAIL SHALL NOT BE CAST UNTIL THE MOMENT SLAB HAS ATTAINED AN AGE OF THREE CURING DAYS OR A MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI. IN ADDITION, NO FILL MATERIAL, ASPHALT, OR CONSTRUCTION EQUIPMENT IS ALLOWED ON THE MOMENT SLAB PRIOR TO SATISFYING THE MINIMUM CONCRETE CURING AND STRENGTH REQUIREMENTS.

ALL REINFORCING STEEL IN THE BARRIER RAIL SHALL BE EPOXY COATED.

IF STEPS ARE REQUIRED AT TOP OF WALL, DETAILS SHOWING INTERFACE BETWEEN BOTTOM OF MOMENT SLAB AND STEPS SHALL BE SUBMITTED FOR APPROVAL.

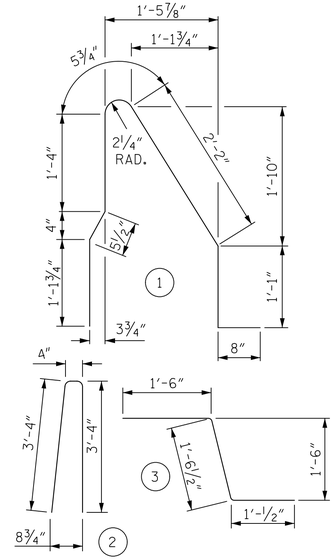
IF EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, BARRIERS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH CONCRETE BARRIER RAIL WITH MOMENT SLAB, CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS SHALL BE REVISED AND SUBMITTED FOR APPROVAL.

FOR MOMENT SLAB SECTIONS LESS THAN 30' IN LENGTH, CONTRACTOR MUST SUBMIT BILL OF MATERIAL FOR APPROVAL.

MOMENT SLAB WITH SOUND BARRIER WALL BEGINS AT STA. 25+77.50 -NW4.1- AND ENDS AT STA. 26+47.50 -NW4.1-.

FOR SOUND BARRIER WALL CONNECTIONS AND DETAILS, SEE "MOMENT SLAB WITH SOUND BARRIER WALL DETAILS" SHEET.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE 30'-0" SECTION OF CONCRETE BARRIER RAIL WITH MOMENT SLAB

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	28	5	STR	29'-7"	864
✳ B2	11	5	STR	29'-7"	339
G1	41	5	STR	9'-2"	392
G2	41	5	STR	9'-2"	392
✳ S1	41	5	1	7'-4"	314
✳ S2	41	5	2	7'-0"	299
S3	40	5	3	4'-1"	170
REINFORCING STEEL					1,818 LB
✳ EPOXY COATED REINFORCING STEEL					952 LB
CLASS AA CONCRETE BARRIER RAIL					4.1 CY
CLASS A CONCRETE MOMENT SLAB					15.0 CY
CONCRETE BARRIER RAIL WITH MOMENT SLAB					30 LIN FT

PROJECT NO. I-4400BB

HENDERSON COUNTY

STATION: 510+50.81 -L- =
10+00.00 -NW4.1-

SHEET 3 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MOMENT SLAB WITH SOUND BARRIER WALL NO. -NW4.1-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER
DocuSigned by: Paul J. Barber 18DF5B57368741E...
8/29/2019

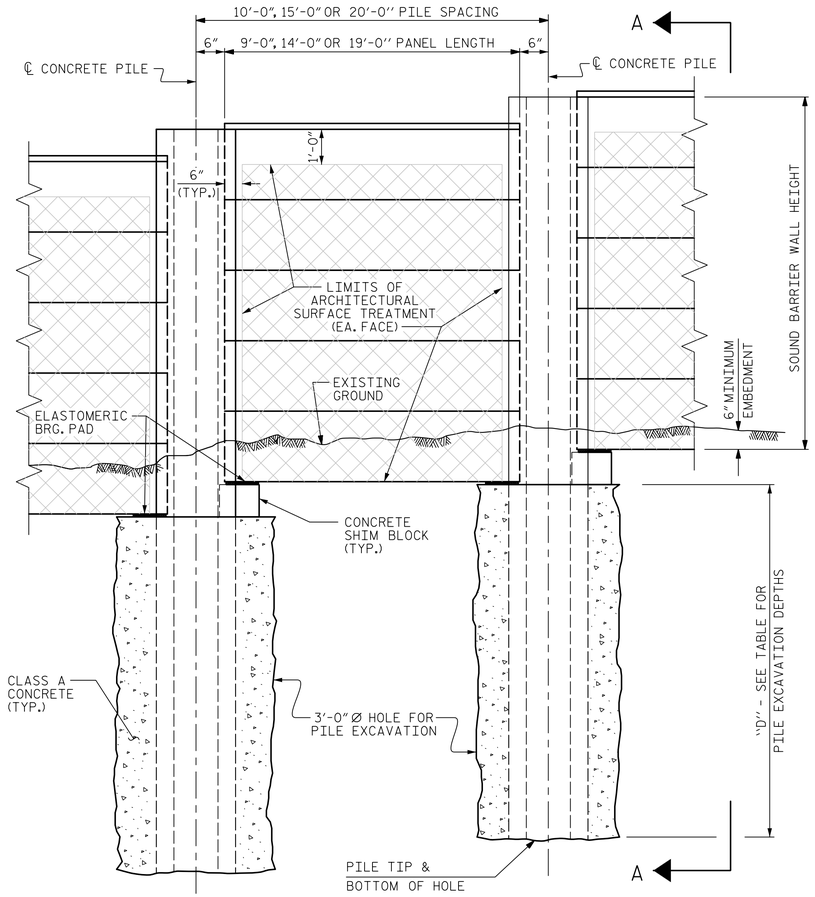
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

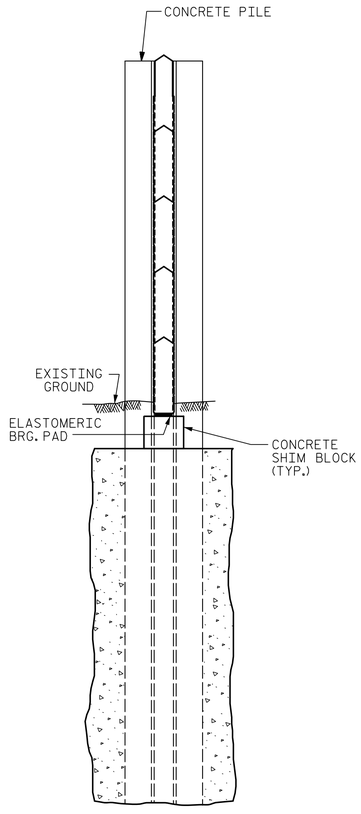
DRAWN BY D. WITHERSPOON DATE 7/19
CHECKED BY N. HART DATE 7/19
DESIGN ENGINEER OF RECORD P. BARBER DATE 7/19

DWG. NO. 3

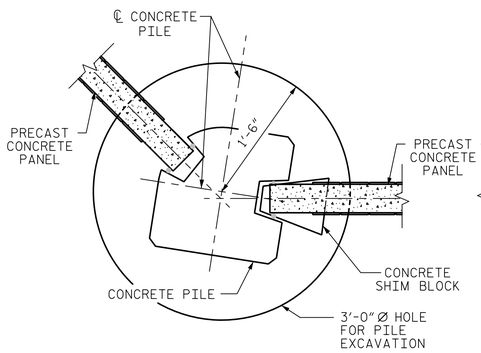
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-3
1			3			TOTAL SHEETS
2			4			13



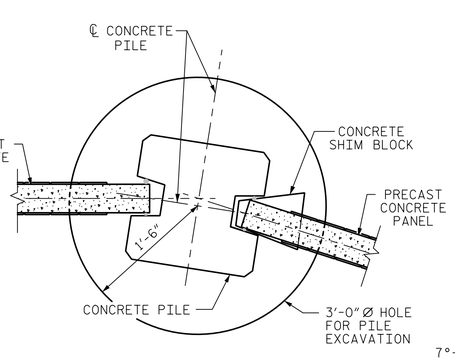
ELEVATION



SECTION A-A

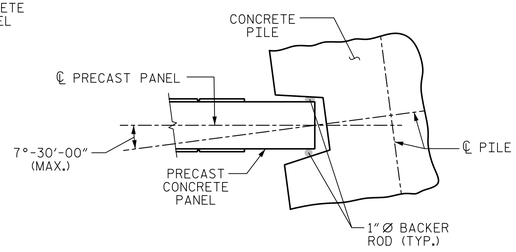


15° TO 45° TURNS
(PILE TYPE III)



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.)

PILE EXCAVATION DEPTHS ″D″

WALL -NW4.2- FROM : STA. 10+00.00
TO : STA. 46+45.00

	PILE SPACING	WALL HEIGHT		
		H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
3′-0″ Ø HOLE	10′-0″	10′	12′	13′
	15′-0″	11′	13′	16′
	20′-0″	12′	15′	18′

BILL OF MATERIAL

SOUND BARRIER WALL	69,213 S.F.
ARCHITECTURAL SURFACE TREATMENT	121,932 S.F.

QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.

ARCHITECTURAL SURFACE TREATMENT

TEXTURE OPTION:	DRY STACK STONE
STAIN OPTION:	GRAY (FS36173)

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-4400BB
HENDERSON COUNTY
STATION: 541+80.45 -L- =
10+00.00 -NW4.2-

SHEET 4 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SOUND BARRIER WALL
No. -NW4.2-

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
Docusigned by: Paul J. Barber 165F1B573687414...
8/29/2019

ASSEMBLED BY : M. WRIGHT	DATE : 6/19
CHECKED BY : N. HART	DATE : 6/19
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

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

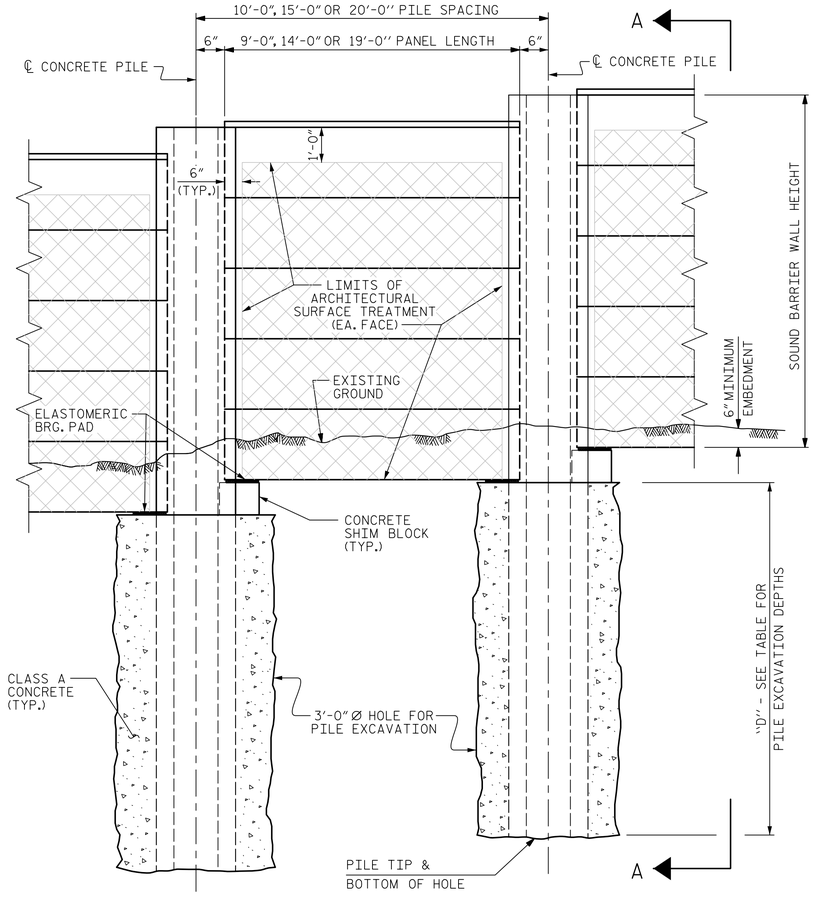
DRAWN BY M. WRIGHT DATE 6/19
CHECKED BY N. HART DATE 6/19
DESIGN ENGINEER OF RECORD P. BARBER DATE 7/19

DWG. NO. 4

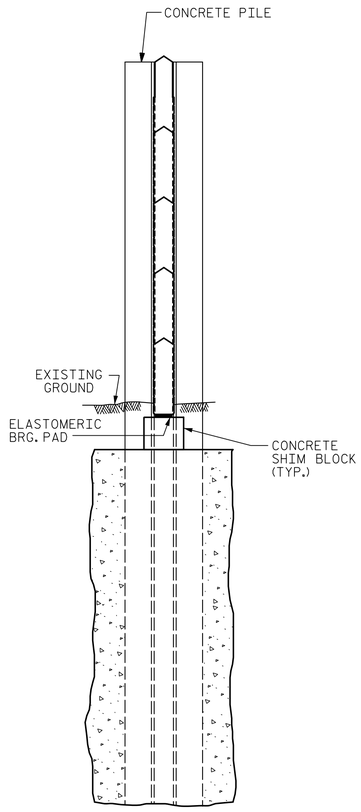
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-4
1			3			TOTAL SHEETS
2			4			13

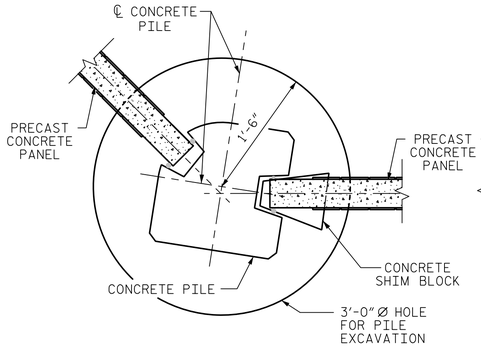
STD. NO. SBW1



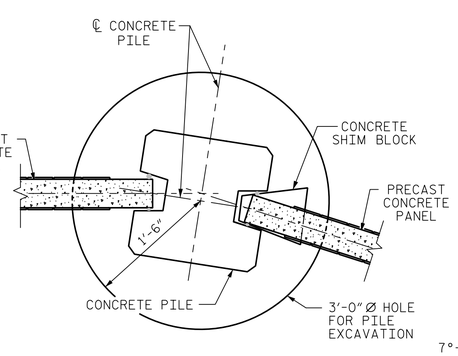
ELEVATION



SECTION A-A

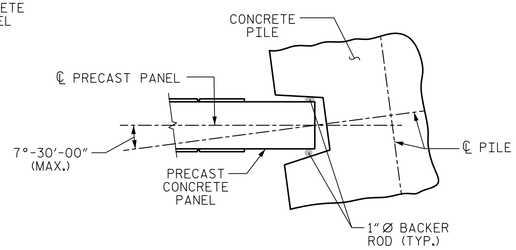


15° TO 45° TURNS
(PILE TYPE III)



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.)

PILE EXCAVATION DEPTHS ″D″

WALL -NW12.2A- FROM : STA. 10+00.00 TO : STA. 18+55.00

	PILE SPACING	WALL HEIGHT		
		H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
3′-0″ Ø HOLE	10′-0″	10′	12′	13′
	15′-0″	11′	13′	16′
	20′-0″	12′	15′	18′

WALL -NW12.2A- FROM : STA. 21+60.00 TO : STA. 43+60.00

	PILE SPACING	WALL HEIGHT		
		H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
3′-0″ Ø HOLE	10′-0″	10′	12′	13′
	15′-0″	11′	13′	16′
	20′-0″	12′	15′	18′

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.				

BILL OF MATERIAL

SOUND BARRIER WALL	35,692 S.F.
ARCHITECTURAL SURFACE TREATMENT	60,931 S.F.

QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.

ARCHITECTURAL SURFACE TREATMENT

TEXTURE OPTION:	DRY STACK STONE
STAIN OPTION:	GRAY (FS36173)

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

DocuSigned by: Paul J. Barber 8/29/2019

PROJECT NO. I-4400BB

HENDERSON COUNTY

STATION: 431+65.89 -L- =
10+00.00 -NW12.2A-

SHEET 5 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL
No. -NW12.2A-

ASSEMBLED BY : M. WRIGHT	DATE : 6/19
CHECKED BY : N. HART	DATE : 6/19
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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

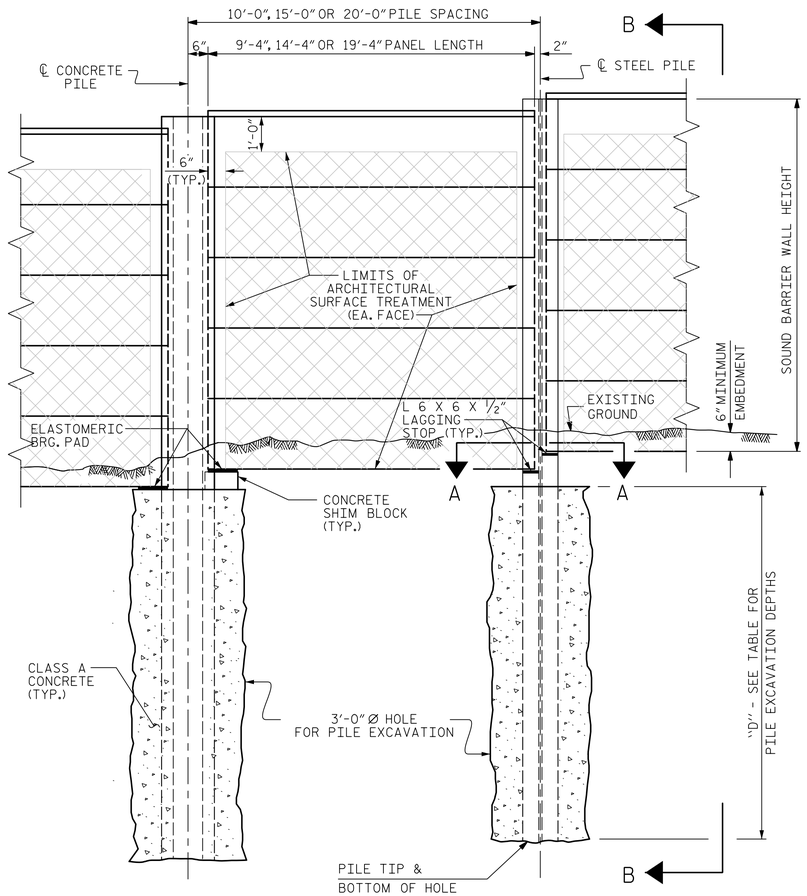
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 6/19
CHECKED BY	N. HART	DATE 6/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 7/19

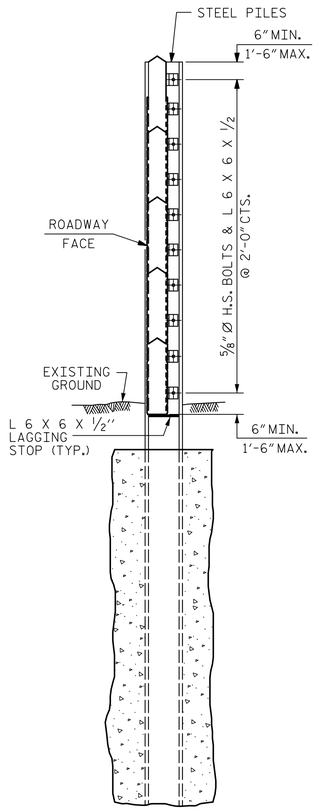
DWG. NO. 5

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-5
1			3			TOTAL SHEETS
2			4			13

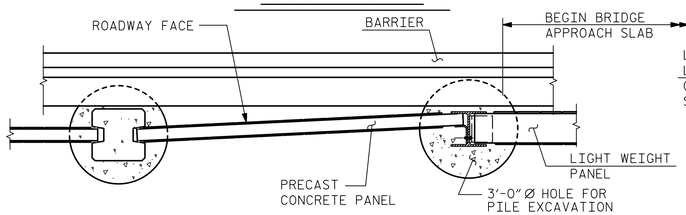
STD. NO. SBW1



ELEVATION

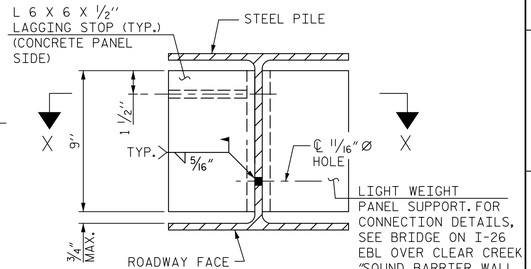


SECTION B-B



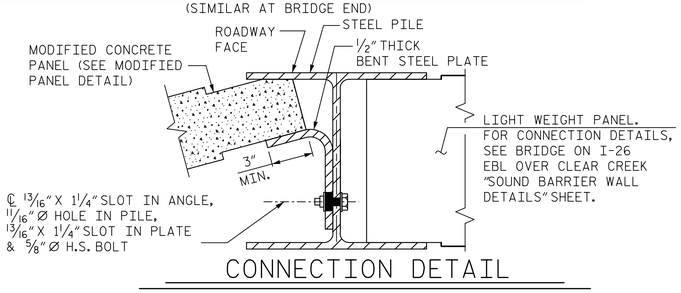
PLAN AT BRIDGE TRANSITION PANEL

(SIMILAR AT BRIDGE END)

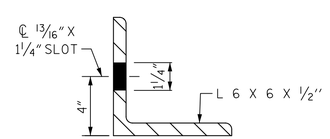


SECTION A-A

(ABOVE BARRIER RAIL HEIGHT)



CONNECTION DETAIL



ANGLE DETAIL

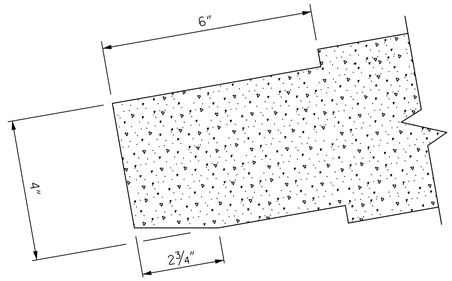
PILE EXCAVATION DEPTH "D"

WALL -NW12.2A- AT: STA. 18+55.00

3′-0″ Ø HOLE	PILE SPACING	WALL HEIGHT		
		H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
	10′-0″	10′	12′	13′
	15′-0″	11′	13′	16′
	20′-0″	12′	15′	18′

WALL -NW12.2A- AT: STA. 21+60.00

3′-0″ Ø HOLE	PILE SPACING	WALL HEIGHT		
		H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
	10′-0″	10′	12′	13′
	15′-0″	11′	13′	16′
	20′-0″	12′	15′	18′

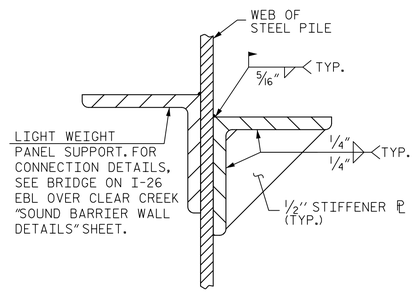


MODIFIED PANEL DETAIL

(USE ONLY FOR TURNS 15° OR LESS, CONVEX TOWARD ROADWAY)

STEEL PILES
DESIGN WIND PRESSURE = 40 PSF

PILE SPACING	MAXIMUM WALL HEIGHT (H)	MINIMUM W SIZE STEEL PILES	MINIMUM HP SIZE STEEL PILES
10′-0″	H ≤ 15′	W 12 X 40 W 14 X 48	HP 12 X 53 HP 14 X 73
	15′< H ≤ 20′	W 12 X 45 W 14 X 48	HP 12 X 53 HP 14 X 73
	20′< H ≤ 25′	W 12 X 65 W 14 X 61	HP 12 X 53 HP 14 X 73
	25′< H ≤ 29′	W 12 X 87 W 14 X 90	HP 14 X 73
15′-0″	H ≤ 15′	W 12 X 40 W 14 X 48	HP 12 X 53 HP 14 X 73
	15′< H ≤ 20′	W 12 X 53 W 14 X 61	HP 12 X 53 HP 14 X 73
	20′< H ≤ 25′	W 12 X 72 W 14 X 90	HP 12 X 74 HP 14 X 73
	25′< H ≤ 29′	W 12 X 120 W 14 X 90	HP 14 X 89
20′-0″	H ≤ 15′	W 12 X 40 W 14 X 48	HP 12 X 53 HP 14 X 73
	15′< H ≤ 20′	W 12 X 58 W 14 X 61	HP 12 X 63 HP 14 X 73
	20′< H ≤ 25′	W 12 X 96 W 14 X 90	HP 14 X 89
	25′< H ≤ 29′	W 12 X 152 W 14 X 109	HP 14 X 117



SECTION X-X

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.

USE STEEL PILES, ANGLES, AND LAGGING STOPS MEETING THE REQUIREMENTS OF AASHTO M270, GRADE 50. GALVANIZE ALL STEEL COMPONENTS INCLUDING PILES, ANGLES, LAGGING STOPS, BOLTS, NUTS, AND WASHERS IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. REPAIR ANY DAMAGED GALVANIZATION IN ACCORDANCE WITH ARTICLE 1076-7 OF THE STANDARD SPECIFICATIONS.

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

AT THE CONTRACTOR'S OPTION, USE AN APPROVED NON-SHRINK NON-METALLIC GROUT BETWEEN THE FLANGES OF THE STEEL PILES TO SUPPORT THE BOTTOM PANEL IN LIEU OF LAGGING STOPS.

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.

PROVIDE PLATES AND ANGLES TO SECURE PANELS 6″LONG AS MEASURED ALONG THE STEEL PILE.

AT THE CONTRACTOR'S OPTION, USE EITHER 'W' OR 'HP' PILES THAT SATISFY THE MINIMUM PILE SIZE REQUIRED IN THE "STEEL PILES" TABLE. PILES SMALLER THAN W12 OR HP12 ARE NOT PERMITTED. AT TURNS WITH A 3′-0″ DIAMETER HOLE FOR PILE EXCAVATION, USE ONLY W12 OR HP12 PILES, AS SHOWN.

AT THE CONTRACTOR'S OPTION, USE 10′-0″, 15′-0″, OR 20′-0″PILE SPACINGS, AND EITHER 2′-6″OR 3′-0″DIAMETER HOLES FOR PILE EXCAVATION. 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.

DO NOT SPLICE STEEL PILES.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SOUND BARRIER WALL (BRIDGE MOUNTED), SEE BRIDGE PLANS.

PROJECT NO. I-4400BB

HENDERSON COUNTY

STATION: 431+65.89 -L- =
10+00.00 -NW12.2A-

SHEET 6 OF 13

ASSEMBLED BY : M. WRIGHT		DATE : 6/19			
CHECKED BY : N. HART		DATE : 6/19			
DRAWN BY : JAD 5/01	REV. 9/26/14	MAA/TMG			
CHECKED BY : RDR 5/01	REV. 10/17	MAA/THC			
	REV. 5/18	MAA/THC			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	6/19
CHECKED BY	N. HART	DATE	6/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	7/19

DWG. NO. 6

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
DocuSigned by: Paul J. Barber 8/29/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

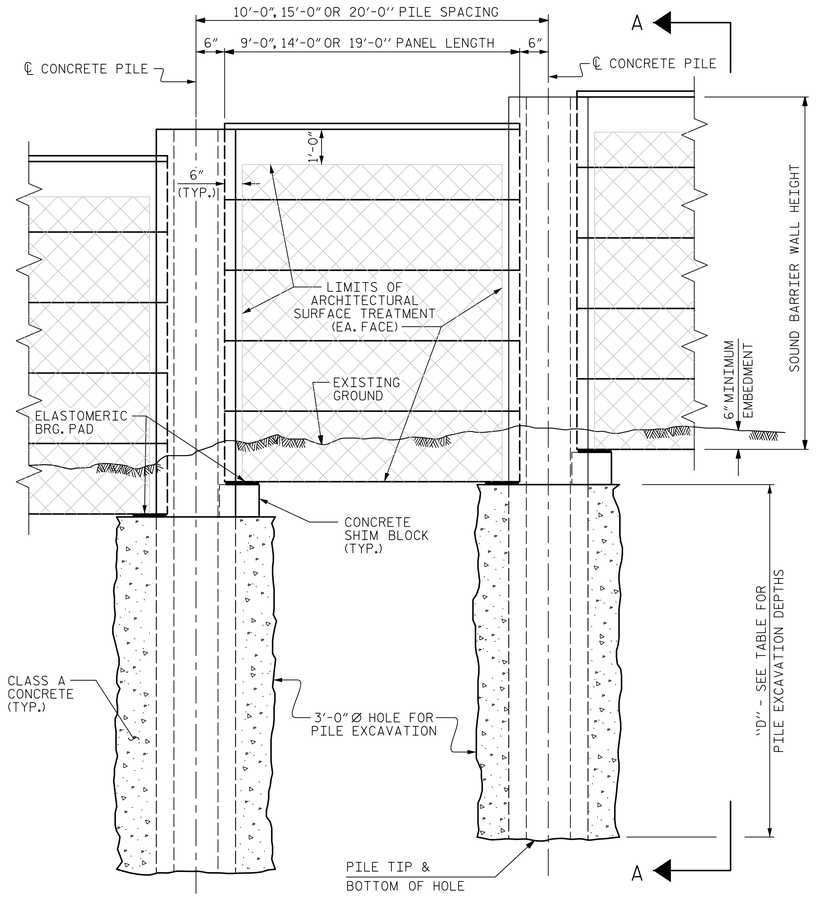
STANDARD

SOUND BARRIER WALL
(STEEL PILES)

No. -NW12.2A-

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-6
1			3			TOTAL SHEETS
2			4			13

STD. NO. SBW4



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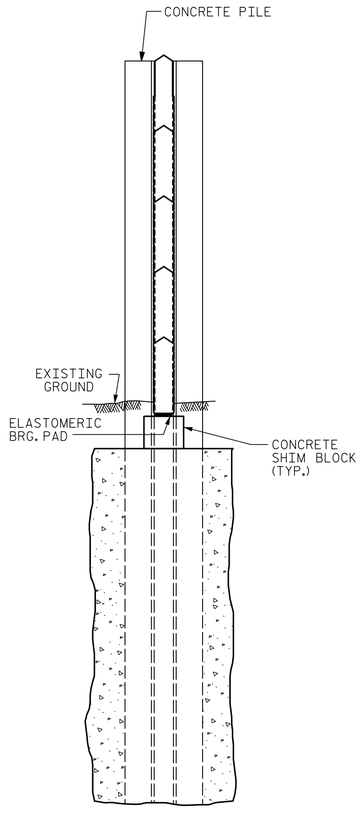


SECTION A-A

PILE EXCAVATION DEPTHS ″D″

WALL -NW12.2B- FROM : STA. 10+00.00
TO : STA. 21+45.00

	PILE SPACING	WALL HEIGHT		
		H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
3′-0″ Ø HOLE	10′-0″	10′	12′	13′
	15′-0″	11′	13′	16′
	20′-0″	12′	15′	18′

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.

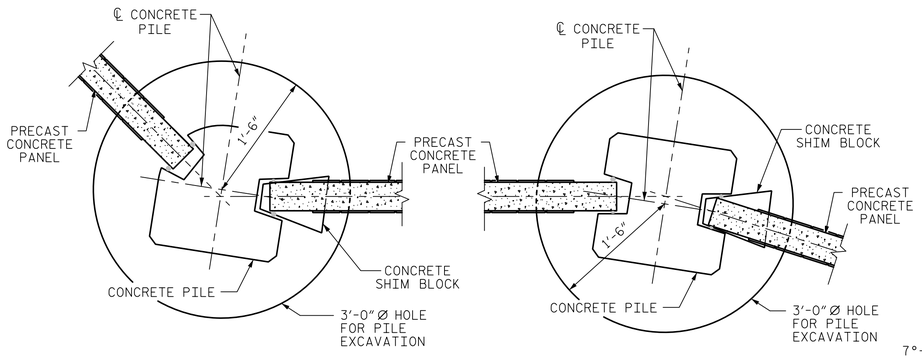
FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

PILE EXCAVATION DEPTHS SHOWN ARE ASSUMED AND ARE SUBJECT TO CHANGE BASED ON FURTHER GEOTECHNICAL INVESTIGATION.

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.				

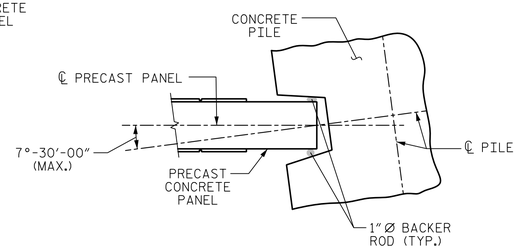
PILE TYPE II				PILE TYPE III ALT.			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10′-0″	H ≤ 25′	4 - #6 EA. FACE	#3 @ 1′-4″CTS.	10′-0″	H ≤ 25′	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1′-4″CTS.
15′-0″	H ≤ 20′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



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.)

BILL OF MATERIAL

SOUND BARRIER WALL	14,835 S.F.
ARCHITECTURAL SURFACE TREATMENT	25,538 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	DRY STACK STONE
STAIN OPTION:	GRAY (FS36173)

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
Docusigned by: Paul J. Barber 18DF3837B7418...
8/29/2019

PROJECT NO. I-4400BB
HENDERSON COUNTY
STATION: 399+73.84 -L- =
10+00.00 -NW12.2B-

SHEET 7 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SOUND BARRIER WALL
No. -NW12.2B-

ASSEMBLED BY : M. WRIGHT	DATE : 6/19
CHECKED BY : N. HART	DATE : 6/19
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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

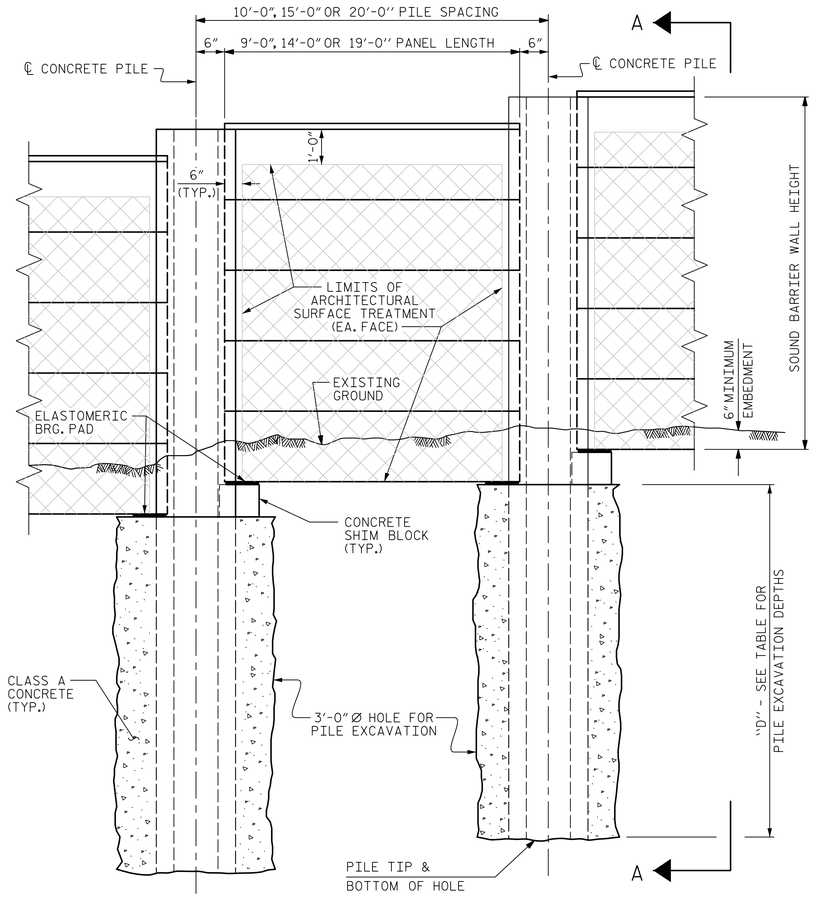
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 6/19
CHECKED BY	N. HART	DATE 6/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 7/19

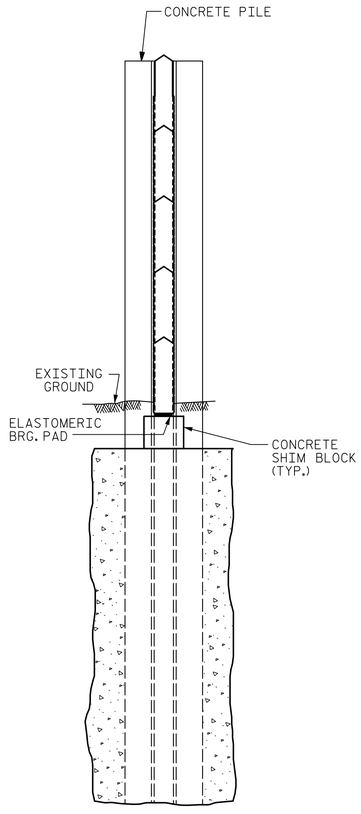
DWG. NO. 7

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-7
1			3			TOTAL SHEETS
2			4			13

STD. NO. SBW1



ELEVATION



SECTION A-A

PILE EXCAVATION DEPTHS ″D″

WALL -NW12.2C- FROM : STA. 12+20.00
TO : STA. 19+80.00

	PILE SPACING	WALL HEIGHT		
		H ≤ 15′	15′ < H ≤ 20′	20′ < H ≤ 25′
3′-0″ Ø HOLE	10′-0″	8′	10′	11′
	15′-0″	9′	11′	13′
	20′-0″	10′	13′	15′

BILL OF MATERIAL

SOUND BARRIER WALL	10,724 S.F.
ARCHITECTURAL SURFACE TREATMENT	18,541 S.F.

QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.

ARCHITECTURAL SURFACE TREATMENT

TEXTURE OPTION:	DRY STACK STONE
STAIN OPTION:	GRAY (FS36173)

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.

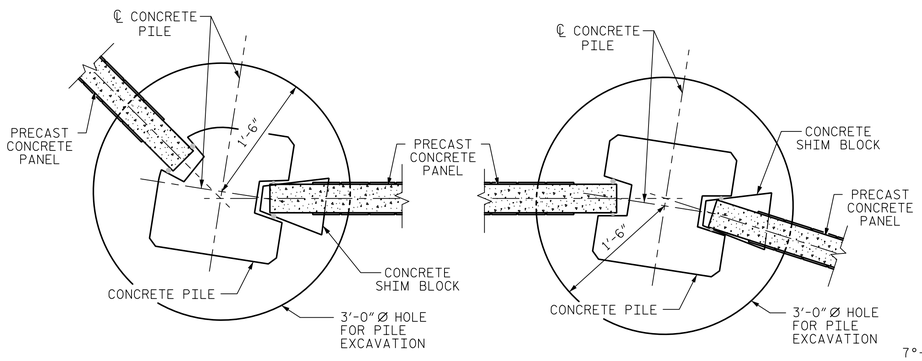
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

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.				

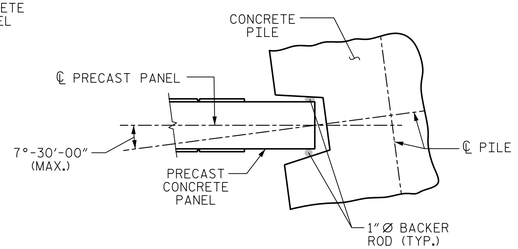
PILE TYPE II				PILE TYPE III ALT.			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10′-0″	H ≤ 25′	4 - #6 EA. FACE	#3 @ 1′-4″ CTS.	10′-0″	H ≤ 25′	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1′-4″ CTS.
15′-0″	H ≤ 20′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



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.)

PROJECT NO. I-4400BB
HENDERSON COUNTY
STATION: 387+97.17 -L- =
10+00.00 -NW12.2C-

SHEET 8 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SOUND BARRIER WALL
No. -NW12.2C-

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
Docusigned by: Paul J. Barber 1805B57368741E...
8/29/2019

ASSEMBLED BY : M. WRIGHT	DATE : 6/19	
CHECKED BY : N. HART	DATE : 6/19	
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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

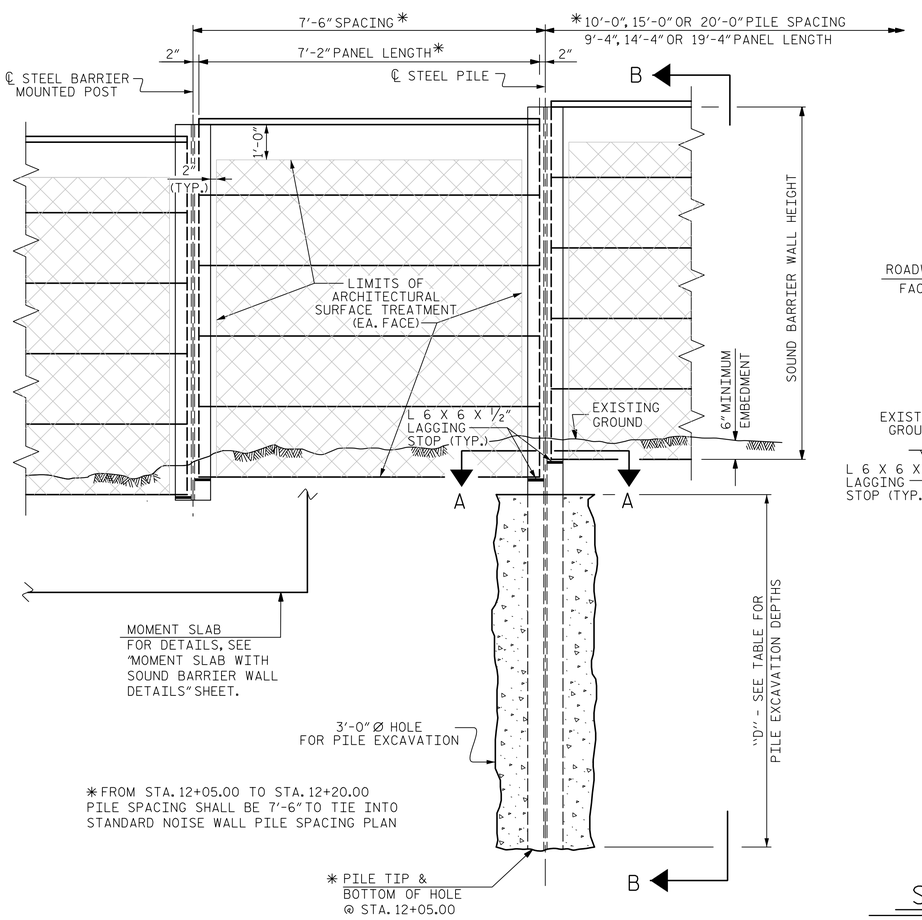
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 6/19
CHECKED BY	N. HART	DATE 6/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 7/19

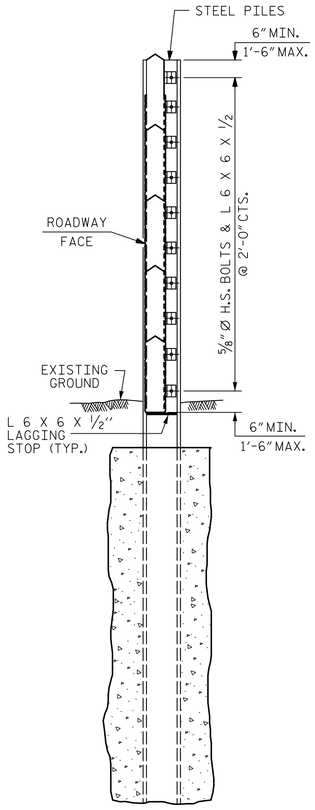
DWG. NO. 8

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-8
1			3			TOTAL SHEETS
2			4			13

STD. NO. SBW1

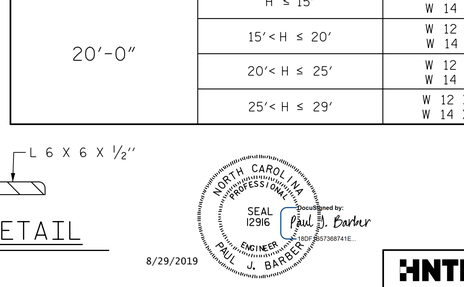


ELEVATION



SECTION B-B

PILE EXCAVATION DEPTH "D"				
WALL -NW12.2B-	FROM : STA. 12+05.00 TO : STA. 12+20.00			
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT		
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'
	10'-0"	10'	12'	13'
	15'-0"	11'	13'	16'
	20'-0"	12'	15'	18'



MODIFIED PANEL DETAIL

(USE ONLY FOR TURNS 15° OR LESS, CONVEX TOWARD ROADWAY)

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.

USE STEEL PILES, ANGLES, AND LAGGING STOPS MEETING THE REQUIREMENTS OF AASHTO M270, GRADE 50. GALVANIZE ALL STEEL COMPONENTS INCLUDING PILES, ANGLES, LAGGING STOPS, BOLTS, NUTS, AND WASHERS IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. REPAIR ANY DAMAGED GALVANIZATION IN ACCORDANCE WITH ARTICLE 1076-7 OF THE STANDARD SPECIFICATIONS.

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

AT THE CONTRACTOR'S OPTION, USE AN APPROVED NON-SHRINK NON-METALLIC GROUT BETWEEN THE FLANGES OF THE STEEL PILES TO SUPPORT THE BOTTOM PANEL IN LIEU OF LAGGING STOPS.

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.

PROVIDE PLATES AND ANGLES TO SECURE PANELS 6" LONG AS MEASURED ALONG THE STEEL PILE.

AT THE CONTRACTOR'S OPTION, USE EITHER 'W' OR 'HP' PILES THAT SATISFY THE MINIMUM PILE SIZE REQUIRED IN THE "STEEL PILES" TABLE. PILES SMALLER THAN W12 OR HP12 ARE NOT PERMITTED. AT TURNS WITH A 3'-0" DIAMETER HOLE FOR PILE EXCAVATION, USE ONLY W12 OR HP12 PILES, AS SHOWN.

AT THE CONTRACTOR'S OPTION, USE 10'-0", 15'-0", OR 20'-0" PILE SPACINGS, AND EITHER 2'-6" OR 3'-0" DIAMETER HOLES FOR PILE EXCAVATION. 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.

DO NOT SPLICE STEEL PILES.

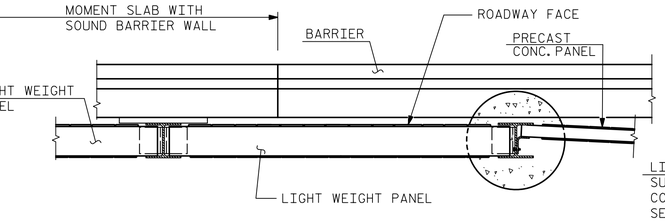
FOR SOUND BARRIER WALL STATIONS, OFFSETS, AND WALL ENVELOPE, SEE ROADWAY PLANS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

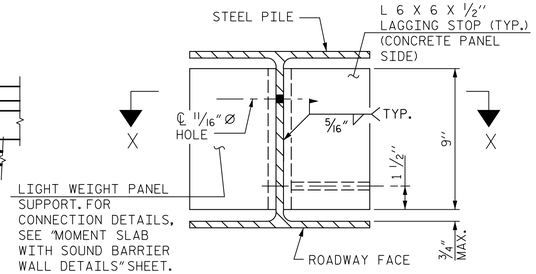
FOR MOMENT SLAB WITH SOUND BARRIER WALL, SEE SPECIAL PROVISIONS.

PILE EXCAVATION DEPTHS SHOWN ARE ASSUMED AND ARE SUBJECT TO CHANGE BASED ON FURTHER GEOTECHNICAL INVESTIGATION.

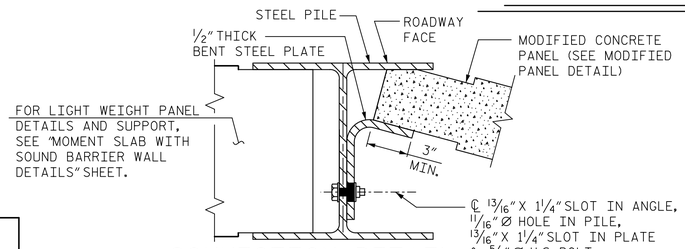


PLAN AT MOMENT SLAB TRANSITION PANEL

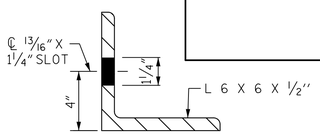
(SIMILAR AT WALL BEGIN)



SECTION A-A

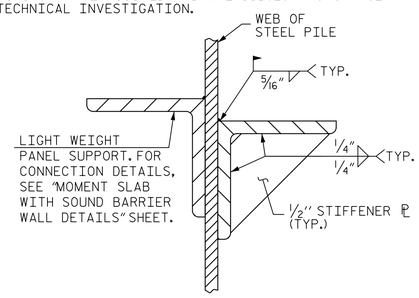


CONNECTION DETAIL



ANGLE DETAIL

STEEL PILES DESIGN WIND PRESSURE = 40 PSF			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	MINIMUM W SIZE STEEL PILES	MINIMUM HP SIZE STEEL PILES
10'-0"	H ≤ 15'	W 12 X 40 W 14 X 48	HP 12 X 53 HP 14 X 73
	15' < H ≤ 20'	W 12 X 45 W 14 X 48	HP 12 X 53 HP 14 X 73
	20' < H ≤ 25'	W 12 X 65 W 14 X 61	HP 12 X 53 HP 14 X 73
	25' < H ≤ 29'	W 12 X 87 W 14 X 90	HP 14 X 73
15'-0"	H ≤ 15'	W 12 X 40 W 14 X 48	HP 12 X 53 HP 14 X 73
	15' < H ≤ 20'	W 12 X 53 W 14 X 61	HP 12 X 53 HP 14 X 73
	20' < H ≤ 25'	W 12 X 72 W 14 X 90	HP 12 X 74 HP 14 X 73
	25' < H ≤ 29'	W 12 X 120 W 14 X 90	HP 14 X 89
20'-0"	H ≤ 15'	W 12 X 40 W 14 X 48	HP 12 X 53 HP 14 X 73
	15' < H ≤ 20'	W 12 X 58 W 14 X 61	HP 12 X 63 HP 14 X 73
	20' < H ≤ 25'	W 12 X 96 W 14 X 90	HP 14 X 89
	25' < H ≤ 29'	W 12 X 152 W 14 X 109	HP 14 X 117



SECTION X-X

PROJECT NO. I-4400BB

HENDERSON COUNTY

STATION: 387+97.17 -L- =
10+00.00 -NW12.2C-

SHEET 9 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL
(STEEL PILES)

NO. -NW12.2C-

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-9
1			3			TOTAL SHEETS
2			4			13

STD. NO. SBW4

ASSEMBLED BY : D. WITHERSPOON DATE : 7/19
CHECKED BY : N. HART DATE : 7/19

DRAWN BY : JAD 5/01
CHECKED BY : RDR 5/01

REV. 9/26/14 MAA/TMG
REV. 10/17 MAA/THC
REV. 5/18 MAA/THC

8/29/2019

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
Docusigned by: Paul J. Barber
E1605F857368741E...

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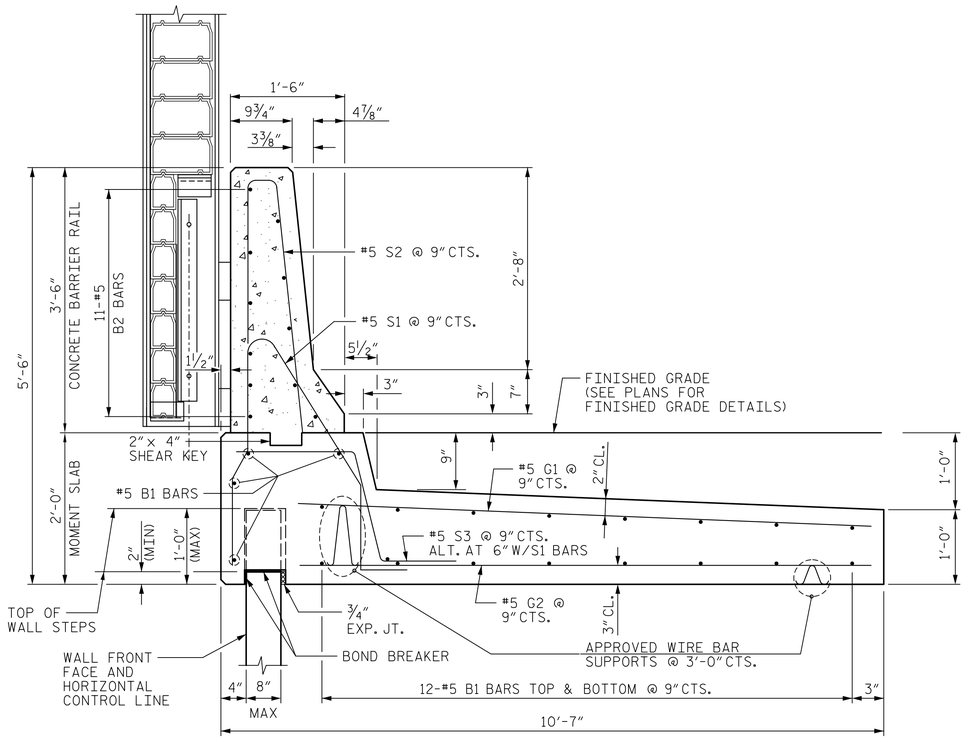
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

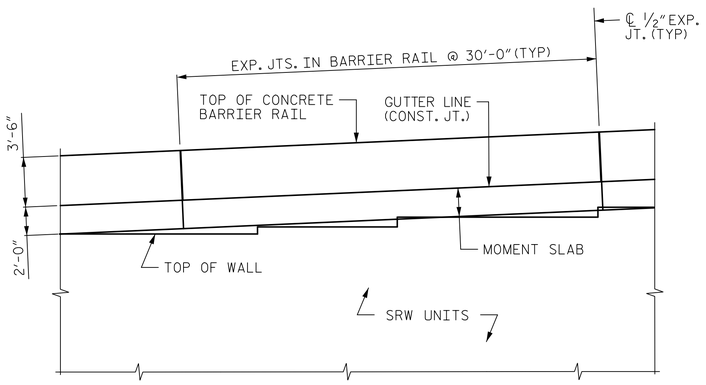
DRAWN BY D. WITHERSPOON DATE 7/19
CHECKED BY N. HART DATE 7/19
DESIGN ENGINEER OF RECORD P. BARBER DATE 7/19

DWG. NO. 9



CONCRETE BARRIER RAIL WITH MOMENT SLAB

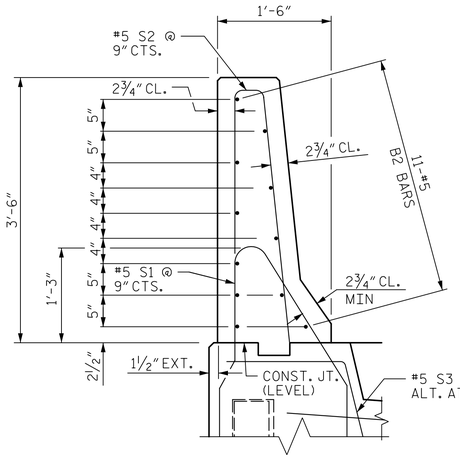
NOTE: SOUND WALL TO BARRIER RAIL BOLTS NOT SHOWN FOR CLARITY.



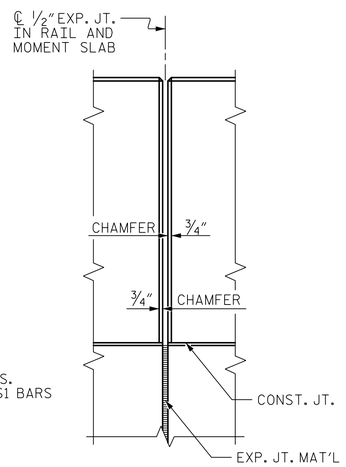
CONCRETE BARRIER RAIL WITH MOMENT SLAB - PARTIAL ELEVATION

MOMENT SLAB WITH SOUND BARRIER WALL FROM STA. 387+95.17 -L- TO STA. 12+07.00 -NW12.2C-
† LENGTH = 209' LIN. FT.
† SOUND BARRIER WALL = 4,620 S.F.

† QUANTITIES ARE FOR INFORMATION ONLY. MOMENT SLAB WITH SOUND BARRIER WALL SHALL BE PAID AS A LUMP SUM.



SECTION THRU RAIL



ELEV. @ EXP. JOINTS

BARRIER RAIL DETAILS

NOTES:

THE MOMENT SLAB WITH SOUND BARRIER WALL SHALL BE PAID AS A LUMP SUM PAY ITEM, SEE SPECIAL PROVISIONS.

CONCRETE BARRIER RAIL WITH MOMENT SLAB SHALL BE A MINIMUM OF 15' IN LENGTH.

EXPANSION JOINTS SHALL BE PLACED IN THE BARRIER RAIL AND MOMENT SLAB AT A MAXIMUM SPACING OF 30'.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED SURFACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MID-POINT OF BARRIER RAIL SEGMENTS LESS THAN 20' IN LENGTH.

THE BARRIER RAIL SHALL NOT BE CAST UNTIL THE MOMENT SLAB HAS ATTAINED AN AGE OF THREE CURING DAYS OR A MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI. IN ADDITION, NO FILL MATERIAL, ASPHALT, OR CONSTRUCTION EQUIPMENT IS ALLOWED ON THE MOMENT SLAB PRIOR TO SATISFYING THE MINIMUM CONCRETE CURING AND STRENGTH REQUIREMENTS.

ALL REINFORCING STEEL IN THE BARRIER RAIL SHALL BE EPOXY COATED.

IF STEPS ARE REQUIRED AT TOP OF WALL, DETAILS SHOWING INTERFACE BETWEEN BOTTOM OF MOMENT SLAB AND STEPS SHALL BE SUBMITTED FOR APPROVAL.

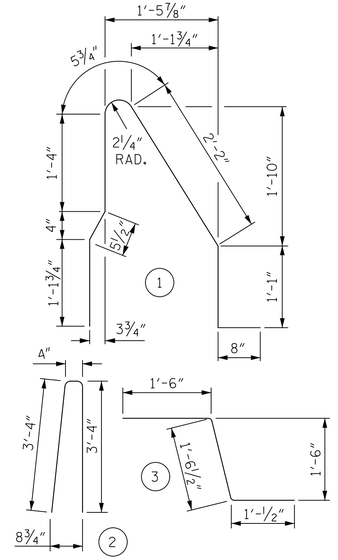
IF EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, BARRIERS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH CONCRETE BARRIER RAIL WITH MOMENT SLAB, CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS SHALL BE REVISED AND SUBMITTED FOR APPROVAL.

FOR MOMENT SLAB SECTIONS LESS THAN 30' IN LENGTH, CONTRACTOR MUST SUBMIT BILL OF MATERIAL FOR APPROVAL.

MOMENT SLAB WITH SOUND BARRIER WALL BEGINS AT STA. 387+95.17 -L- AND ENDS AT STA. 12+07.00 -NW12.2C-.

FOR SOUND BARRIER WALL CONNECTIONS AND DETAILS, SEE "MOMENT SLAB WITH SOUND BARRIER WALL DETAILS" SHEET.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE 30'-0" SECTION OF CONCRETE BARRIER RAIL WITH MOMENT SLAB

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	28	5	STR	29'-7"	864
✳ B2	11	5	STR	29'-7"	339
G1	41	5	STR	9'-2"	392
G2	41	5	STR	9'-2"	392
✳ S1	41	5	1	7'-4"	314
✳ S2	41	5	2	7'-0"	299
S3	40	5	3	4'-1"	170
REINFORCING STEEL					1,818 LB
✳ EPOXY COATED REINFORCING STEEL					952 LB
CLASS AA CONCRETE BARRIER RAIL					4.1 CY
CLASS A CONCRETE MOMENT SLAB					15.0 CY
CONCRETE BARRIER RAIL WITH MOMENT SLAB					30 LIN FT

PROJECT NO. I-4400BB

HENDERSON COUNTY

STATION: 387+97.17 -L- = 10+00.00 -NW12.2C-

SHEET 10 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MOMENT SLAB WITH SOUND BARRIER WALL NO. -NW12.2C-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER

Docusigned by: Paul J. Barber 18DF8B57368741E...

8/29/2019

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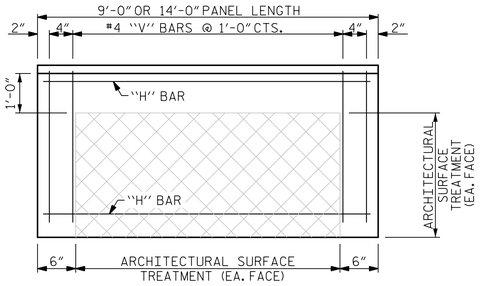
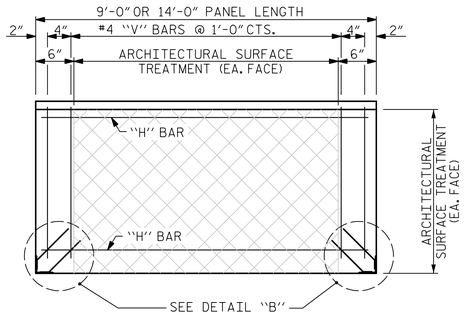
CHECKED BY N. HART DATE 7/19
DESIGN ENGINEER OF RECORD P. BARBER DATE 7/19

DWG. NO. 10

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-10
1			3			TOTAL SHEETS
2			4			13



FRONT ELEVATION OF UPPER PRECAST PANEL



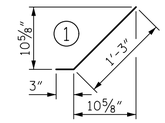
FRONT ELEVATION OF BOTTOM PRECAST PANEL

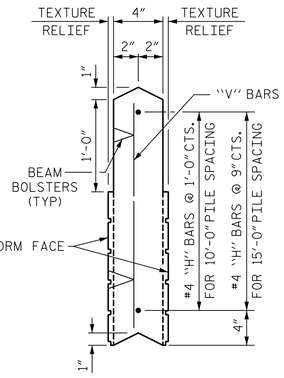
QUANTITIES FOR ONE PRECAST PANEL (FOR 10′-0″ PILE SPACING)													
PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES											
		HORIZONTAL						VERTICAL					
	C.Y.	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
2′-0″	0.22	3	H1	#4	STR	8′-8″	17	11	V1	#4	STR	1′-8″	12
3′-0″	0.33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

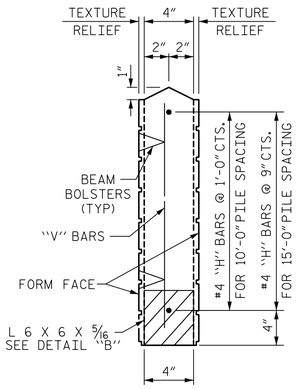
ADDITIONAL BARS FOR ONE BOTTOM PANEL					
NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
4	S1	#5	1	1′-6″	6

BAR TYPE

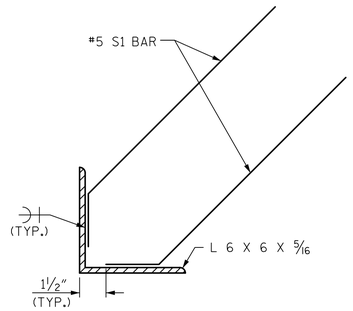




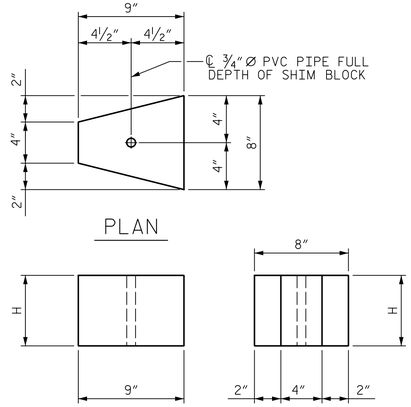
UPPER PANEL



BOTTOM PANEL

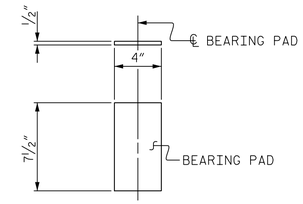


DETAIL ''B''



CONCRETE SHIM BLOCK

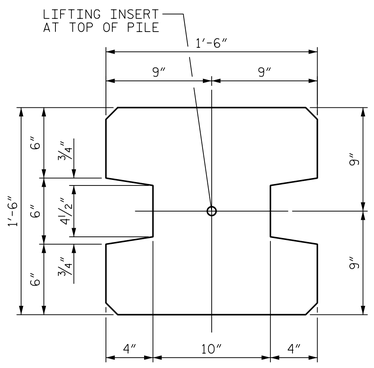
H = 3″, 6″ or 1′-0″



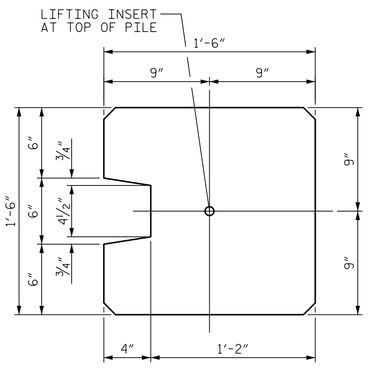
ELASTOMERIC BEARING DETAILS

ELASTOMER IN BEARINGS SHALL BE 50 DUROMETER HARDNESS.

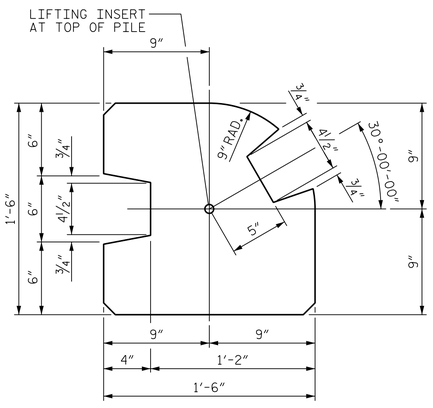
SECTION THROUGH PRECAST PANELS



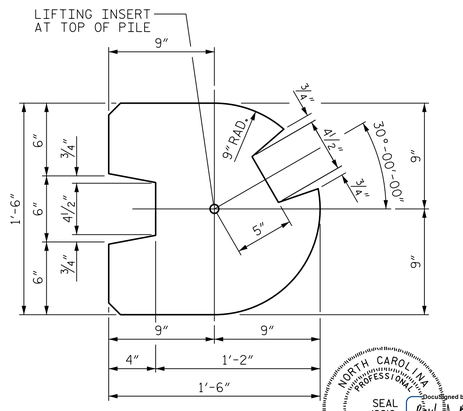
TYPE - I
(AREA = 1.9444 SQ. FT.)



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″)

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
DocuSigned by: Paul J. Barber
8/29/2019

PROJECT NO. I-4400BB
HENDERSON COUNTY
STATION: VARIES

SHEET 11 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL DETAILS

ASSEMBLED BY : M. WRIGHT	DATE : 6/19
CHECKED BY : N. HART	DATE : 6/19
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

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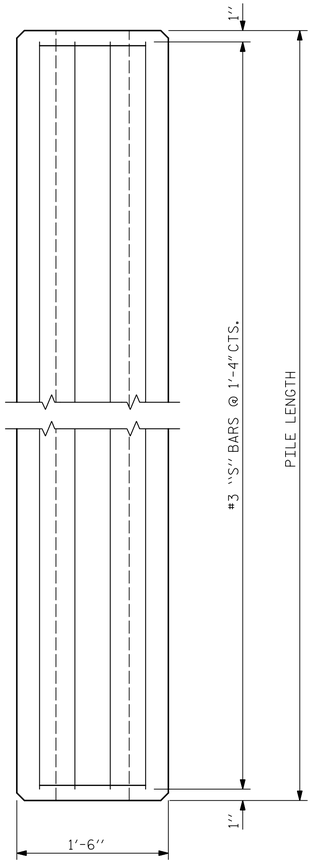
DRAWN BY	M. WRIGHT	DATE	6/19
CHECKED BY	N. HART	DATE	6/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	7/19

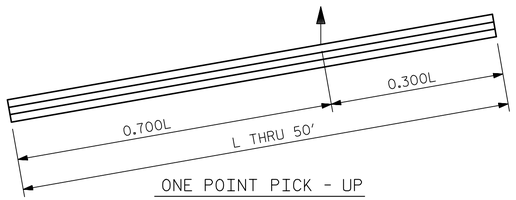
DWG. NO. 11

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-11
1			3			TOTAL SHEETS
2			4			13

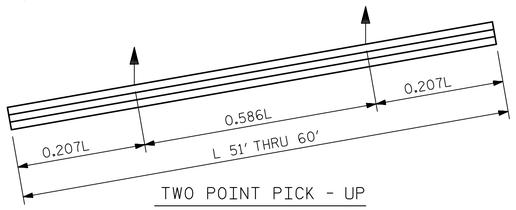
STD. NO. SBW2



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.

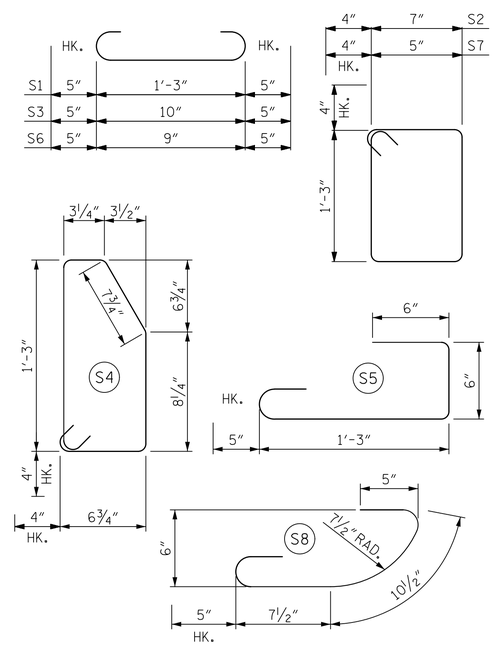
THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

ALL CORNERS TO BE CHAMFERED 1".

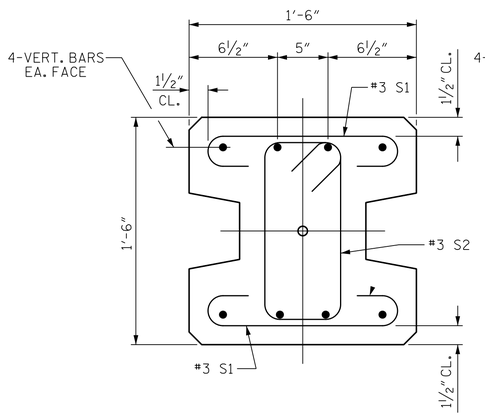
QUANTITIES FOR ONE PRECAST CONCRETE PILE

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''

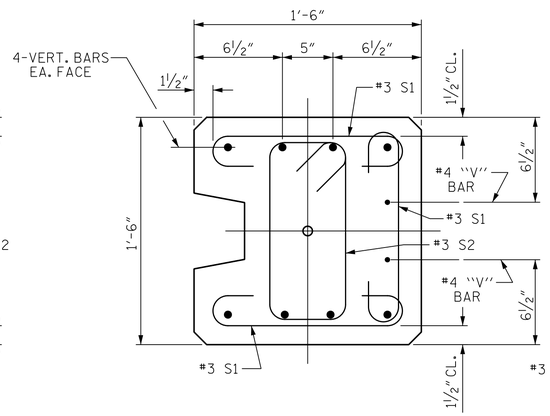
BAR TYPES



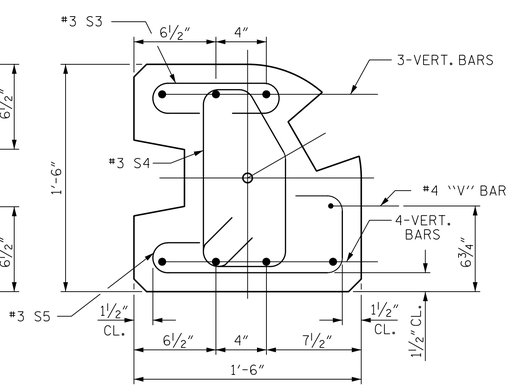
ALL BAR DIMENSIONS ARE OUT TO OUT.



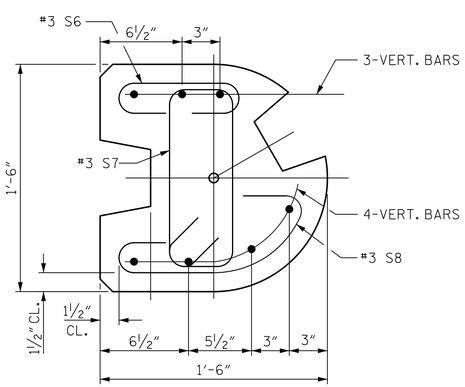
TYPE - I



TYPE - II



TYPE - III



TYPE - III (ALT.)

PILE DETAIL

FOR VERTICAL BAR PILE REINFORCING, SEE SHEET 1 OF 3

8/29/2019

DocuSigned by: Paul J. Barber

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ASSEMBLED BY : M. WRIGHT	DATE : 6/19		
CHECKED BY : N. HART	DATE : 6/19		
DRAWN BY : MAA 6/11	REV. 1/15/14	RWW/TMG	
CHECKED BY : GM 6/11	REV. 12/17	MAA/THC	

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DESIGN ENGINEER OF RECORD	P. BARBER	DATE	7/19

DWG. NO. 12

PROJECT NO. I-4400BB
HENDERSON COUNTY
STATION: VARIES

SHEET 12 OF 13

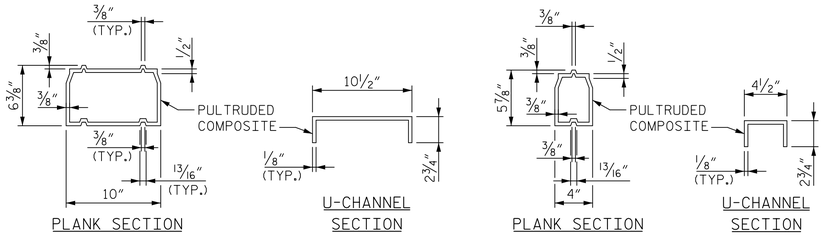
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL DETAILS

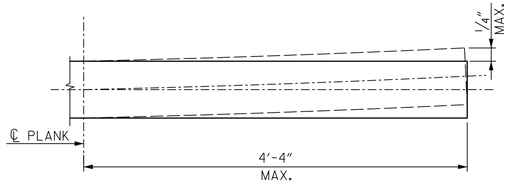
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-12
1			3			TOTAL SHEETS
2			4			13

STD. NO. SBW3

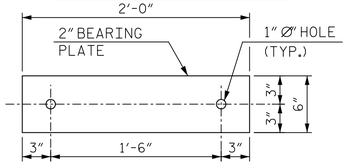


PANEL TYPE 1

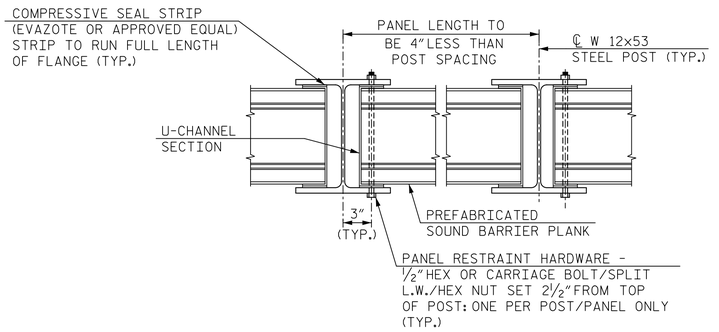
PANEL TYPE 2



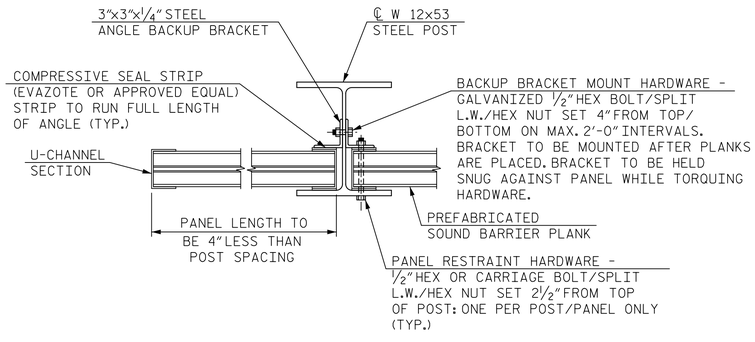
PLANK BOW TOLERANCE



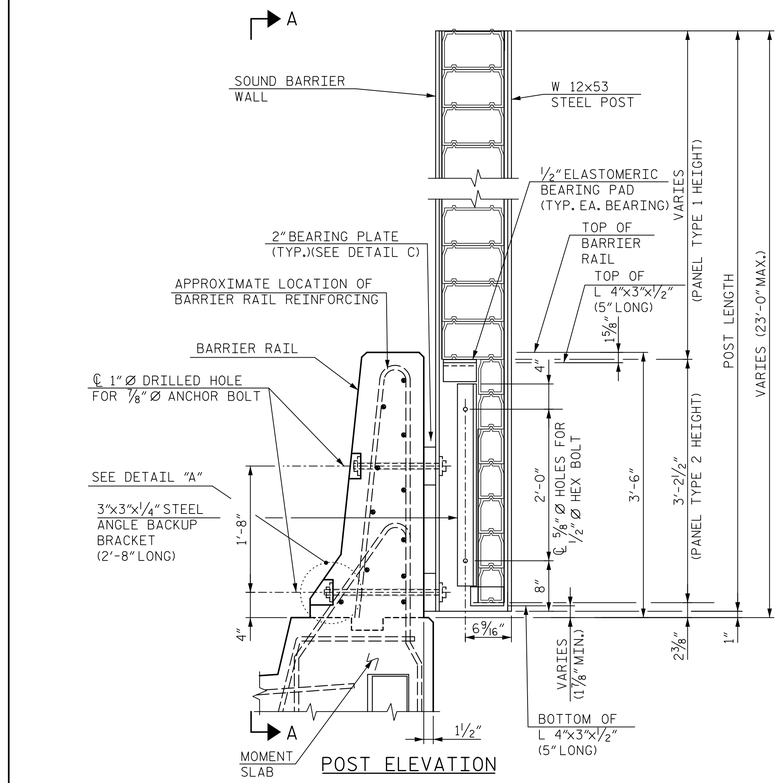
DETAIL "C"



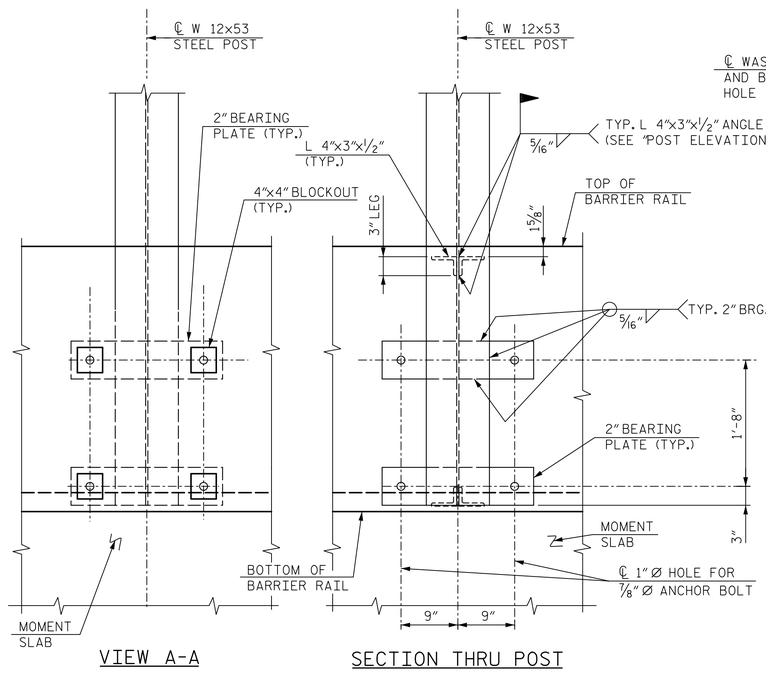
MOUNTING DETAIL - PANEL TYPE 1



MOUNTING DETAIL - PANEL TYPE 2

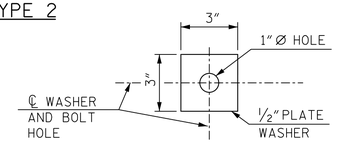


POST ELEVATION

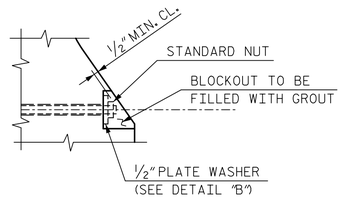


VIEW A-A

SECTION THRU POST



DETAIL "B"



DETAIL "A"

(GROUT SHALL BE IN ACCORDANCE WITH SPECIAL PROVISIONS) (LOWER BLOCKOUT SHOWN, UPPER BLOCKOUT SIMILAR)

NOTES

WALL SUPPORT SYSTEM

POSTS, BEARING PLATES AND MISCELLANEOUS STEEL SHALL BE AASHTO 270 GRADE 50 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111 AND IN ACCORDANCE TO SECTION 1076 OF THE STANDARD SPECIFICATIONS.

BOLTS, NUTS AND WASHERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325 AND SHALL BE GALVANIZED IN ACCORDANCE TO AASHTO M111.

ALL POSTS SHALL BE PLUMB.

W12x53 STEEL POST SHALL BE A MINIMUM OF TWO FEET FROM ℄ OF POST TO ℄ OF BARRIER RAIL EXPANSION JOINT OR END OF RAIL. POSTS SHALL BE SPACED AT A MAXIMUM OF 7'-6".

SOUND BARRIER WALL

COLOR OF THE SOUND BARRIER WALL PANEL SHALL BE UNIFORM THOUGHOUT THE PULTRUDED COMPOSITE AND IS TO BE APPROVED BY THE ENGINEER. SOUND BARRIER WALL PANEL SHALL HAVE A DRY STACK PATTERN WITH STAIN COLOR FS36173.

SOUND BARRIER WALL SHALL BE DESIGNED TO WITHSTAND A MINIMUM WIND VELOCITY OF 115 MPH AND A MINIMUM WIND PRESSURE OF 0.04 KSF.

WEIGHT OF SOUND BARRIER WALL INCLUDING POSTS AND PANELS SHALL NOT EXCEED 590 LBS/FT.

SOUND BARRIER WALL SHALL CONSIST OF STACKED TONGUE AND GROOVE STRUCTURAL PLANKS AS DETAILED ON PLANS. THE PLANKS SHALL BE COMPRISED OF A PULTRUDED GLASS REINFORCED THERMOSET COMPOSITE STRUCTURAL BOX FILLED WITH RECYCLED TIRE RUBBER OR ANOTHER SUBSTANCE OF COMPARABLE DENSITY AND NOISE REDUCTION CAPABILITY. ENDS SHALL BE CAPPED SO NOT TO ALLOW FILL MATERIAL TO FALL OUT.

LENGTH OF PLANKS SHALL BE CUT TO A LENGTH NO LESS THAN 4" LESS THAN THE CLEAR SPACING PROVIDED BETWEEN SUPPORT POSTS, NOR SHALL THE LENGTH BE GREATER THAN 3" LESS THAN THE CLEAR SPACING PROVIDED BETWEEN SUPPORT POSTS.

PLANKS SHALL BE CUT SO THAT THE ENDS ARE SMOOTH AND PERPENDICULAR TO EACH PLANKS BASE AND SHALL BE APPROVED BY THE ENGINEER.

EACH PANEL SHALL BE PLACED SO THAT THE TOP OF THE FINISHED PANEL MEETS FLUSH WITH THE TOP OF EACH SUPPORT POST.

FOR PREFORMED BEARING PADS AND ELASTOMERIC BEARING, SEE SECTION 1079 OF THE STANDARD SPECIFICATIONS.

FOR SOUND BARRIER WALL, SEE SPECIAL PROVISION MOMENT SLAB WITH SOUND BARRIER WALL.

PRIOR TO DRILLING HOLES FOR ANCHOR BOLTS, CONTRACTOR SHALL LOCATE BARRIER RAIL REINFORCING. CONTRACTOR SHALL AVOID DRILLING THROUGH REINFORCING STEEL.

CONTRACTOR SHALL DRILL HOLES FOR ANCHOR BOLTS PRIOR TO PANEL FABRICATION.

PROJECT NO. I-4400BB

HENDERSON COUNTY

STATION: 388+32.00 -L-

SHEET 13 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE MOMENT SLAB WITH SOUND BARRIER WALL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

Digitally signed by: Paul J. Barber
8/29/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	D.WITHERSPOON	DATE	7/19
CHECKED BY	N. HART	DATE	7/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	7/19

DWG. NO. 13

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	SW-13
1			3			TOTAL SHEETS
2			4			13