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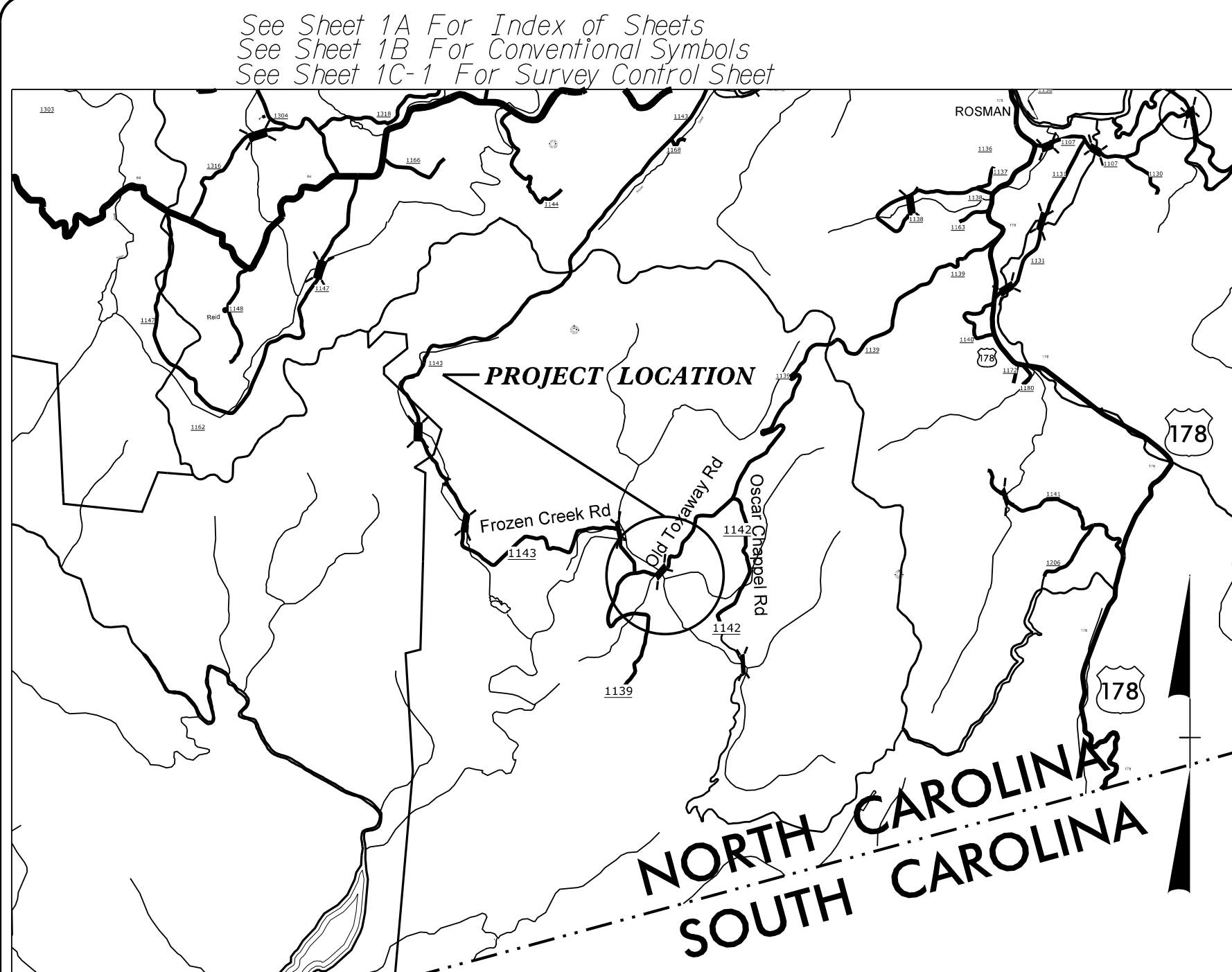
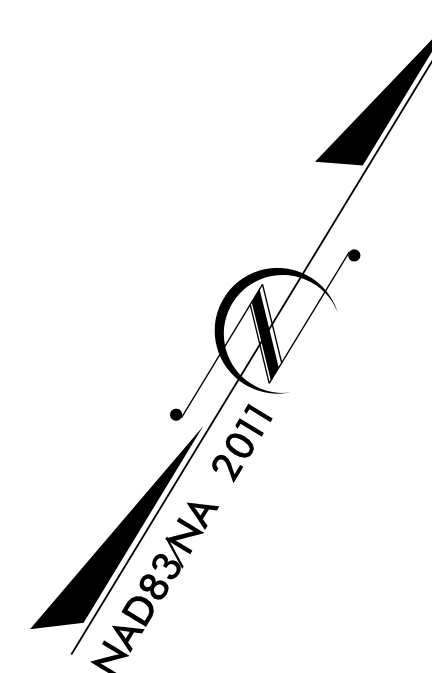
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5405	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46120.1.1	BRZ-1139(6)	PE	
46120.2.1		RW, UTIL	
46120.3.1		CONST.	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

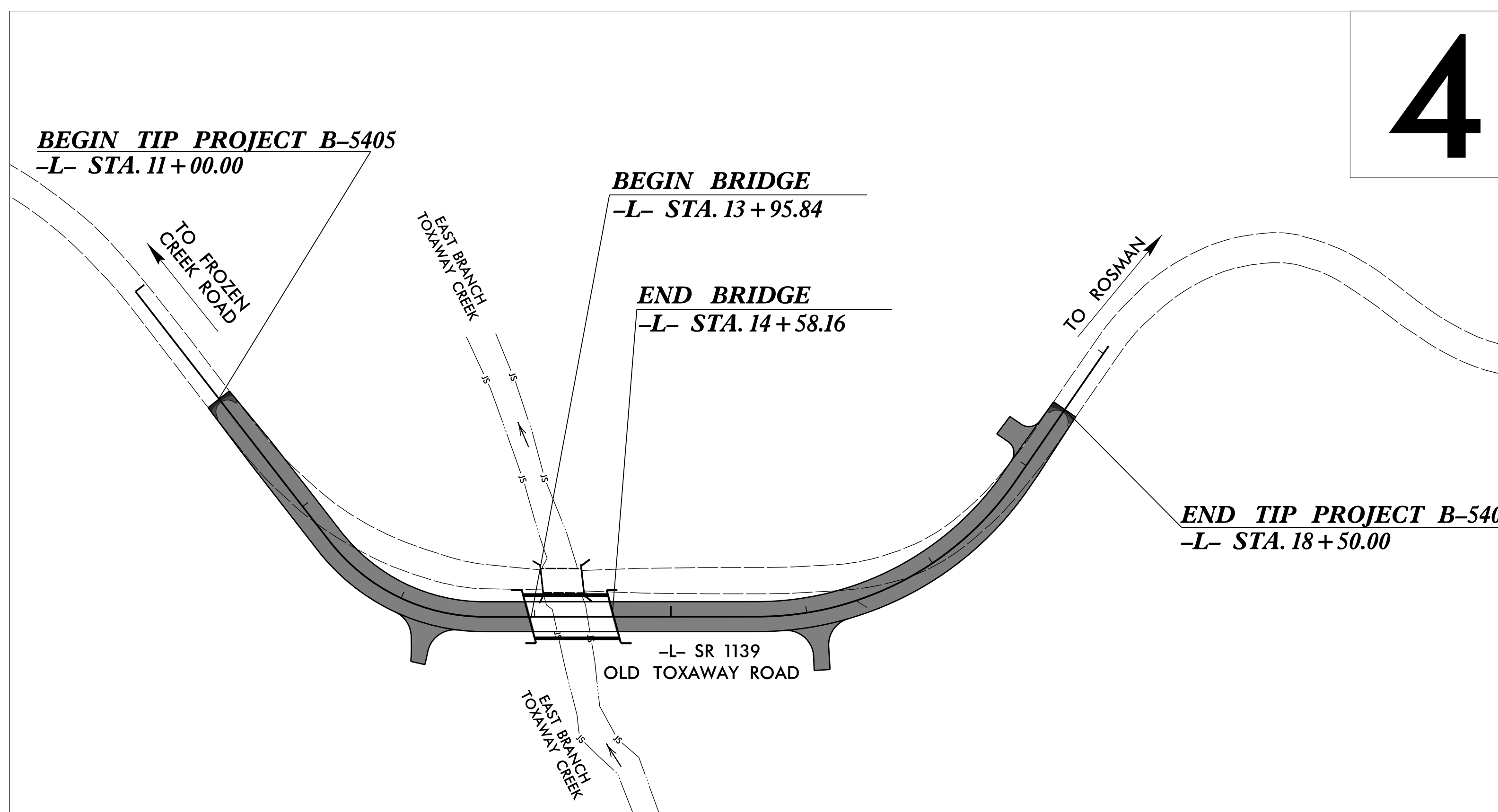
TRANSYLVANIA COUNTY

LOCATION: REPLACE BRIDGE NO. 139 OVER EAST BRANCH TOXAWAY CREEK ON SR 1139 (OLD TOXAWAY ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE



VICINITY MAP

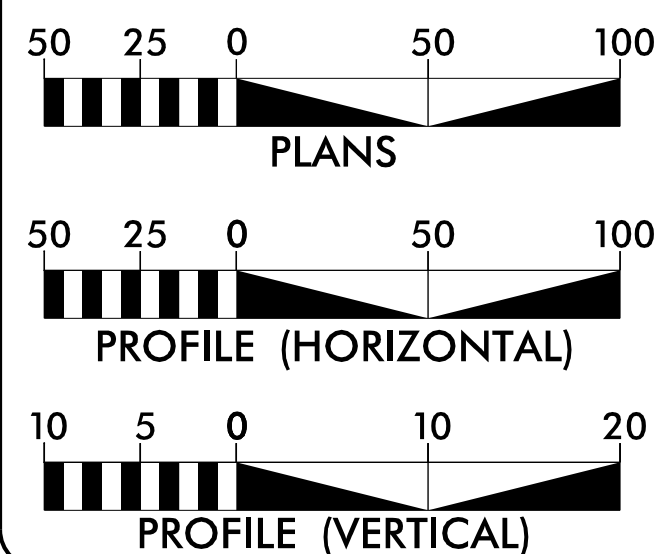


4

* DESIGN EXCEPTION REQUIRED FOR:
HORIZONTAL CURVE RADIUS, HORIZONTAL STOPPING
SIGHT DISTANCE, VERTICAL STOPPING SIGHT DISTANCE
AND SAG VERTICAL CURVE K VALUE.

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

GRAPHIC SCALES



DESIGN DATA

ADT 2018 = 223
ADT 2038 = 314
K = 10 %
D = 55 %
T = 22 % *
V = 40 MPH
* TTST = 2% + DUALS = 20%
FUNC CLASS =
RURAL LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT B-5405 = 0.130
LENGTH STRUCTURE T.I.P. PROJECT B-5405 = 0.012
TOTAL LENGTH OF T.I.P. PROJECT B-5405 = 0.142

LOCHNER

H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919)571-7111



NC FIRM LICENSE No: F-1148
1151 SE Cary Parkway
Suite 101
Cary, NC 27518
(919) 557-0929

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 17, 2017

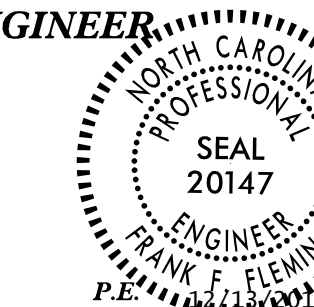
LETTING DATE:
FEBRUARY 20, 2018

BRIAN K. EASON, PE
PROJECT ENGINEER

CHRISTINA YOKEYLEY, EI
PROJECT DESIGN ENGINEER

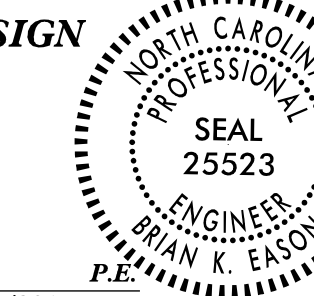
DAVID STUTTS, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

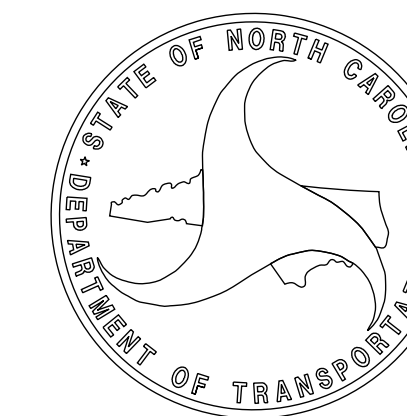


DocuSigned by:
Frank F. Fleming
SIGNATURE:
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ROADWAY DESIGN ENGINEER

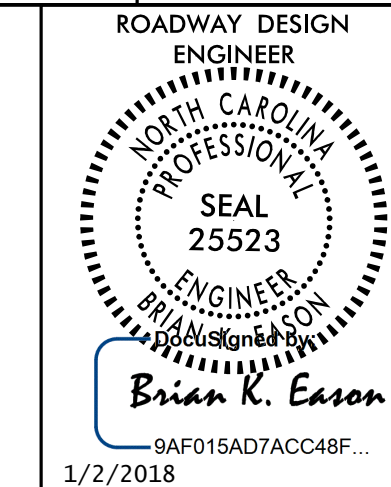


DocuSigned by:
Brian K. Eason
SIGNATURE:
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12/13/2017



TIP PROJECT: B-5405

CONTRACT: C204067



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UNLESS ALL SIGNATURES COMPLETED**

EFF. 01-16-2018
REV.

INDEX OF SHEETS B-5405

SHEET NUMBER	TITLE
1	TITLE SHEET
1A	INDEX OF SHEETS
1B	CONVENTIONAL SYMBOLS
1C-1	SURVEY CONTROL SHEET
1D-1	CENTERLINE COORDINATE LIST
2A-1	PAVEMENT SCHEDULE, TYPICAL SECTIONS, and WEDGING DETAILS
2G-1 thru 2G-3	STANDARD DETAILS FOR TEMPORARY WALL
3B-1	SUMMARY OF EARTHWORK, TEMPORARY FENCE SUMMARY, SHOULDER BERM GUTTER SUMMARY, GUARDRAIL SUMMARY, and REMOVAL OF EXISTING ASPHALT SUMMARY
3D-1	DRAINAGE SUMMARY
3G-1	SUMMARY OF AGGREGATE SUBGRADE STABILIZATION, SUMMARY OF SUBSURFACE DRAINAGE
4	PLAN
5	PROFILE
TMP-1 thru TMP-5	TRANSPORTATION MANAGEMENT PLANS
PMP-1	PAVEMENT MARKING PLANS
EC-1 thru EC-5	EROSION CONTROL PLANS
RF-1	REFORESTATION DETAIL SHEET
SIGN-1 thru SIGN-2	SIGNING PLANS
UO-1 thru UO-2	UTILITY BY OTHERS PLANS
X-1A	CROSS SECTION SUMMARY
X-1 thru X-8	CROSS-SECTIONS
S-1 thru S-22	STRUCTURE PLANS

2018 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings"
Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C.,
Dated January, 2018 are applicable to this project
and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 4 - MAJOR STRUCTURES	
422.02	Bridge Approach Fills - Type II Modified Approach Fill
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.02	Subsurface Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
846.01	Concrete Curb, Gutter and Curb & Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
866.02	Woven Wire Fence with Wood Post
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

GENERAL NOTES:

2018 SPECIFICATIONS
EFFECTIVE: 01-16-2018
REVISED:

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01

SUBSURFACE DRAINS:

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE
HAYWOOD ELECTRIC MEMBERSHIP (POWER)
COMPORIUM COMMUNICATIONS (TELEPHONE)
ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT.

ROCK:

ROCK IS ANTICIPATED AT BRIDGE ENDBENTS. BLASTING MAY BE REQUIRED FOR EXCAVATION ON THE PROJECT. SEE SECTION 220 OF THE STANDARD SPECIFICATIONS AND IF APPLICABLE, ROCK BLASTING PROVISION.

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EIP
Computed Property Corner	-----
Property Monument	□ EGM
Parcel/Sequence Number	(123)
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	----- WLB
Proposed Wetland Boundary	----- WLB
Existing Endangered Animal Boundary	----- EAB
Existing Endangered Plant Boundary	----- EPB
Existing Historic Property Boundary	----- HPB
Known Contamination Area: Soil	☠-S-☠
Potential Contamination Area: Soil	??-S-??
Known Contamination Area: Water	☠-W-☠
Potential Contamination Area: Water	??-W-??
Contaminated Site: Known or Potential	☠??

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○
Well	○ W
Small Mine	✕
Foundation	□
Area Outline	□
Cemetery	□
Building	□
School	□
Church	□
Dam	□

HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	-----
Jurisdictional Stream	----- JS
Buffer Zone 1	----- BZ 1
Buffer Zone 2	----- BZ 2
Flow Arrow	←
Disappearing Stream	-----
Spring	○
Wetland	-----
Proposed Lateral, Tail, Head Ditch	-----
False Sump	-----

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○
Switch	□
RR Abandoned	-----
RR Dismantled	-----

Note: Not to Scale

*S.U.E. = Subsurface Utility Engineering

RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	◆
Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	●
Exist Permanent Easement Pin and Cap	◇
New Permanent Easement Pin and Cap	◆
Vertical Benchmark	⊠
Existing Right of Way Marker	△
Existing Right of Way Line	-----
New Right of Way Line	-----
New Right of Way Line with Pin and Cap	-----
New Right of Way Line with Concrete or Granite RW Marker	-----
New Control of Access Line with Concrete CA Marker	-----
Existing Control of Access	-----
New Control of Access	-----
Existing Easement Line	-----
New Temporary Construction Easement	-----
New Temporary Drainage Easement	-----
New Permanent Drainage Easement	-----
New Permanent Drainage / Utility Easement	-----
New Permanent Utility Easement	-----
New Temporary Utility Easement	-----
New Aerial Utility Easement	-----

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-----
Proposed Slope Stakes Fill	-----
Proposed Curb Ramp	-----
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	-----

VEGETATION:

Single Tree	○
Single Shrub	○

Hedge	-----
Woods Line	-----
Orchard	-----
Vineyard	-----

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	-----
Bridge Wing Wall, Head Wall and End Wall	-----
MINOR:	
Head and End Wall	-----
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	□
Paved Ditch Gutter	-----
Storm Sewer Manhole	○
Storm Sewer	-----

UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	⊕
Power Line Tower	⊠
Power Transformer	⊠
U/G Power Cable Hand Hole	-----
H-Frame Pole	●
U/G Power Line LOS B (S.U.E.*)	-----
U/G Power Line LOS C (S.U.E.*)	-----
U/G Power Line LOS D (S.U.E.*)	-----

TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	⊕
Telephone Pedestal	⊠
Telephone Cell Tower	⊠
U/G Telephone Cable Hand Hole	-----
U/G Telephone Cable LOS B (S.U.E.*)	-----
U/G Telephone Cable LOS C (S.U.E.*)	-----
U/G Telephone Cable LOS D (S.U.E.*)	-----
U/G Telephone Conduit LOS B (S.U.E.*)	-----
U/G Telephone Conduit LOS C (S.U.E.*)	-----
U/G Telephone Conduit LOS D (S.U.E.*)	-----
U/G Fiber Optics Cable LOS B (S.U.E.*)	-----
U/G Fiber Optics Cable LOS C (S.U.E.*)	-----
U/G Fiber Optics Cable LOS D (S.U.E.*)	-----

WATER:

Water Manhole	⊕
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
U/G Water Line LOS B (S.U.E.*)	-----
U/G Water Line LOS C (S.U.E.*)	-----
U/G Water Line LOS D (S.U.E.*)	-----
Above Ground Water Line	-----

TV:

TV Pedestal	⊕
TV Tower	⊗
U/G TV Cable Hand Hole	-----
U/G TV Cable LOS B (S.U.E.*)	-----
U/G TV Cable LOS C (S.U.E.*)	-----
U/G TV Cable LOS D (S.U.E.*)	-----
U/G Fiber Optic Cable LOS B (S.U.E.*)	-----
U/G Fiber Optic Cable LOS C (S.U.E.*)	-----
U/G Fiber Optic Cable LOS D (S.U.E.*)	-----

GAS:

Gas Valve	◇
Gas Meter	⊕
U/G Gas Line LOS B (S.U.E.*)	-----
U/G Gas Line LOS C (S.U.E.*)	-----
U/G Gas Line LOS D (S.U.E.*)	-----
Above Ground Gas Line	-----

SANITARY SEWER:

Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	-----
SS Forced Main Line LOS B (S.U.E.*)	-----
SS Forced Main Line LOS C (S.U.E.*)	-----
SS Forced Main Line LOS D (S.U.E.*)	-----

MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	⊠
Utility Located Object	○
Utility Traffic Signal Box	⊠
Utility Unknown U/G Line LOS B (S.U.E.*)	-----
U/G Tank; Water, Gas, Oil	-----
Underground Storage Tank, Approx. Loc.	-----
A/G Tank; Water, Gas, Oil	-----
Geoenvironmental Boring	⊕
U/G Test Hole LOS A (S.U.E.*)	-----
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

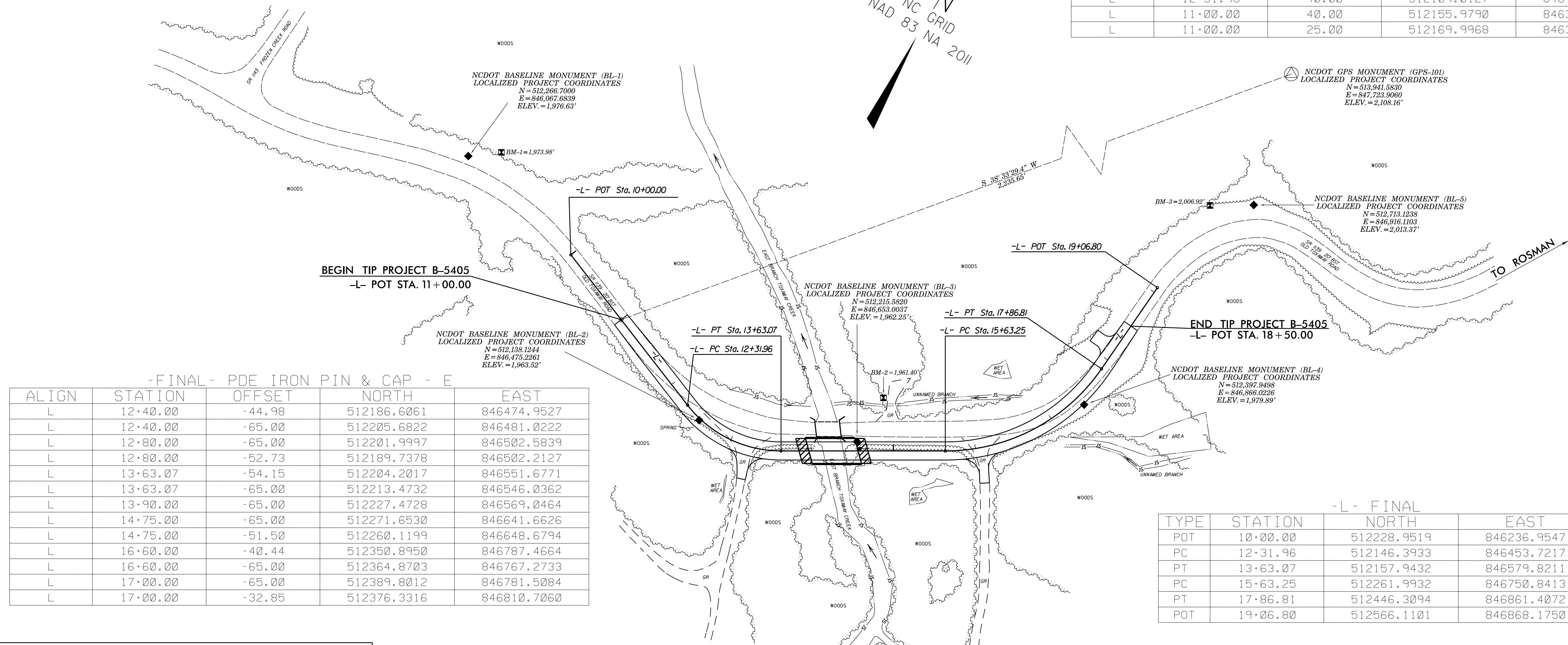
SURVEY CONTROL SHEET B-5405

-FINAL-

-FINAL- ROW IRON PIN & CAP - E

BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	512266.7000	846067.6839	1976.63	OUTSIDE PROJECT LIMITS	
2	BL-2	512138.1244	846475.2261	1963.52	12+54.79	1.90 RT
3	BL-3	512215.5820	846653.0037	1962.25	14+55.54	11.20 LT
4	BL-4	512397.9498	846866.0226	1979.89	17+40.88	12.13 RT
5	BL-5	512713.1238	846916.1103	2013.37	OUTSIDE PROJECT LIMITS	

ALIGN	STATION	OFFSET	NORTH	EAST
L	11+00.00	-25.00	512216.7225	846339.3043
L	11+42.84	-25.00	512201.4758	846379.3363
L	13+98.05	-51.50	512220.1249	846582.9423
L	15+91.38	-50.16	512317.4067	846742.8397
L	16+79.97	-36.40	512362.8242	846799.7548
L	17+27.70	-30.51	512397.7346	846821.5660
L	18+50.00	-25.00	512510.8091	846840.0111
L	18+50.00	25.00	512507.9890	846889.9315
L	18+50.00	40.00	512507.1430	846904.9076
L	17+86.81	40.00	512444.0533	846901.3435
L	15+63.25	40.00	512227.8209	846771.6320
L	13+63.07	40.00	512123.7709	846600.6118
L	12+31.96	40.00	512109.0127	846439.4848
L	11+00.00	40.00	512155.9790	846316.1694
L	11+00.00	25.00	512169.9968	846321.5082



-FINAL- PDE IRON PIN & CAP - E

ALIGN	STATION	OFFSET	NORTH	EAST
L	12+40.00	-44.98	512186.6061	846474.9527
L	12+40.00	-65.00	512205.6822	846481.0222
L	12+80.00	-65.00	512201.9997	846502.5839
L	12+80.00	-52.73	512189.7378	846502.2127
L	13+63.07	-54.15	512204.2017	846551.6771
L	13+63.07	-65.00	512213.4732	846546.0362
L	13+90.00	-65.00	512227.4728	846569.0464
L	14+75.00	-65.00	512271.6530	846641.6626
L	14+75.00	-51.50	512260.1199	846648.6794
L	16+60.00	-40.44	512350.8950	846787.4664
L	16+60.00	-65.00	512364.8703	846767.2733
L	17+00.00	-65.00	512389.8012	846781.5084
L	17+00.00	-32.85	512376.3316	846810.7060

-L- FINAL

TYPE	STATION	NORTH	EAST
POT	10+00.00	512228.9519	846236.9547
PC	12+31.96	512146.3933	846453.7217
PT	13+63.07	512157.9432	846579.8211
PC	15+63.25	512261.9932	846750.8413
PT	17+86.81	512446.3094	846861.4072
POT	19+06.80	512566.1101	846868.1750

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "GPS-101" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 513941.5830(ft) EASTING: 847723.9060(ft) ELEVATION: 2108.16(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99978022

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS-101" TO -L- STATION 11+00.00 IS S 38°33'29.4" W 2235.65'

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

BM1 ELEVATION = 1973.98' N 512291.58 E 846099.79 BL STATION 5+23.13 33.38' LEFT R/R SPIKE IN BASE OF 10' POPLAR	BM3 ELEVATION = 2006.92' N 512685.03 E 846870.89 BL STATION 16+85.97 40.25' LEFT R/R SPIKE IN BASE OF 16' POPLAR
*****	*****
BM2 ELEVATION = 1961.40' N 512278.09 E 846652.75 BL STATION 11+61.72 47.65' LEFT R/R SPIKE IN BASE OF 24' WHITE PINE	

GEOID MODEL: G12NC
NOTE: DRAWING NOT TO SCALE

NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/](https://connect.ncdot.gov/resources/location/)

THE FILES TO BE FOUND ARE AS FOLLOWS:
B-5405_LS_CONTROL.TXT

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

⊕ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

8/17/17

FINAL PAVEMENT SCHEDULE

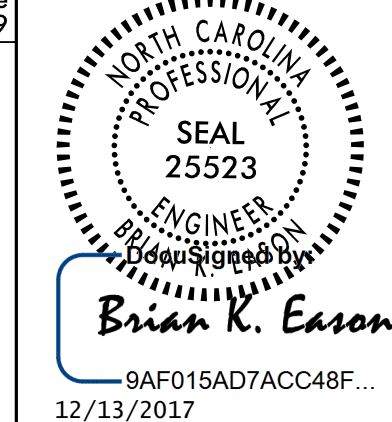
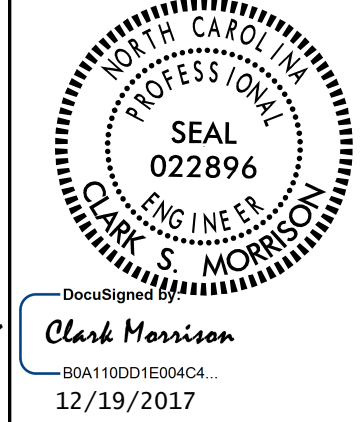
C1	PROP. APPROX. 1.25" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD.	T	EARTH MATERIAL.
C2	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	U	EXISTING PAVEMENT.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS PER SQ YD PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1 1/2" IN DEPTH	V	INCIDENTAL MILLING (VARIABLE DEPTH- SEE DETAIL)
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.		

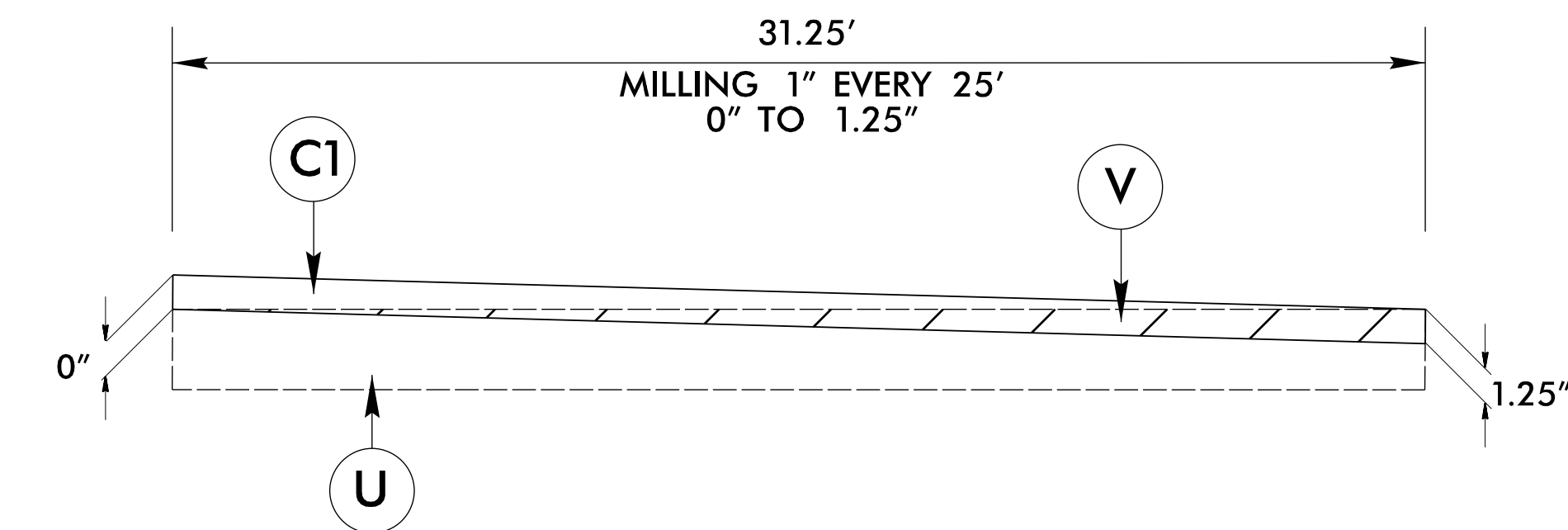
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

LOCHNER

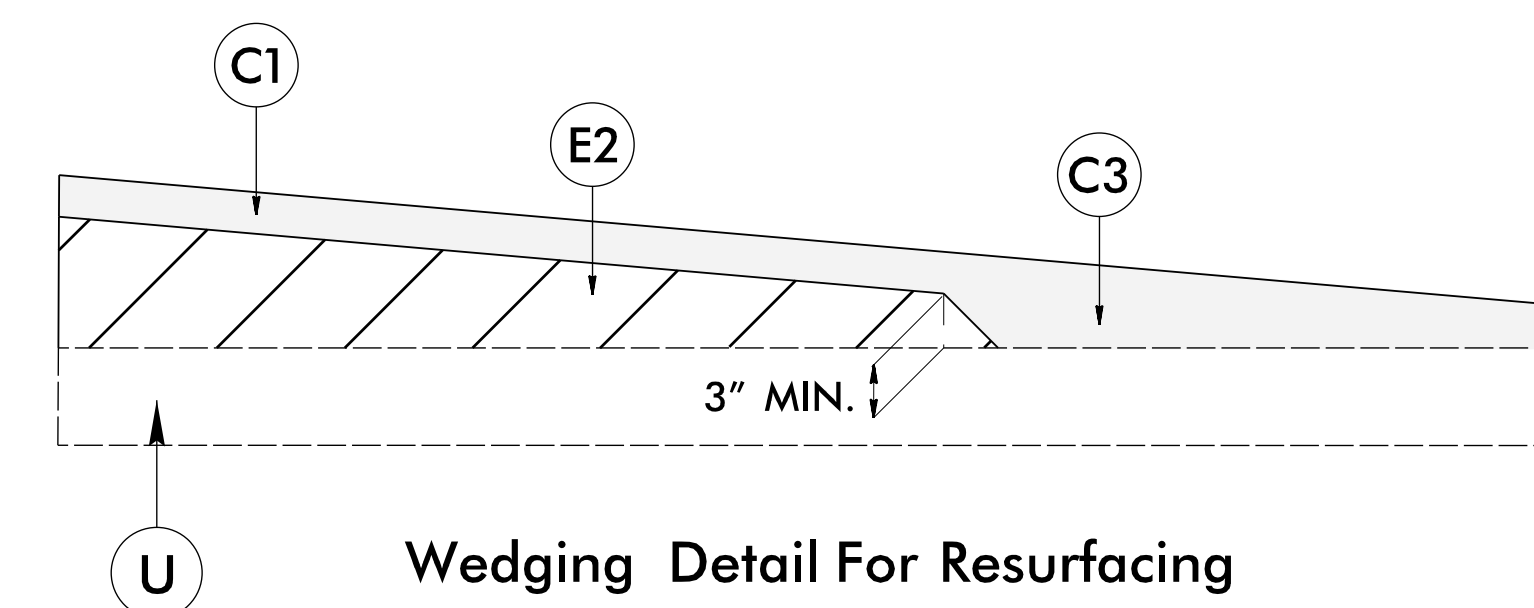
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919)571-7111

NC License
Number F-0159

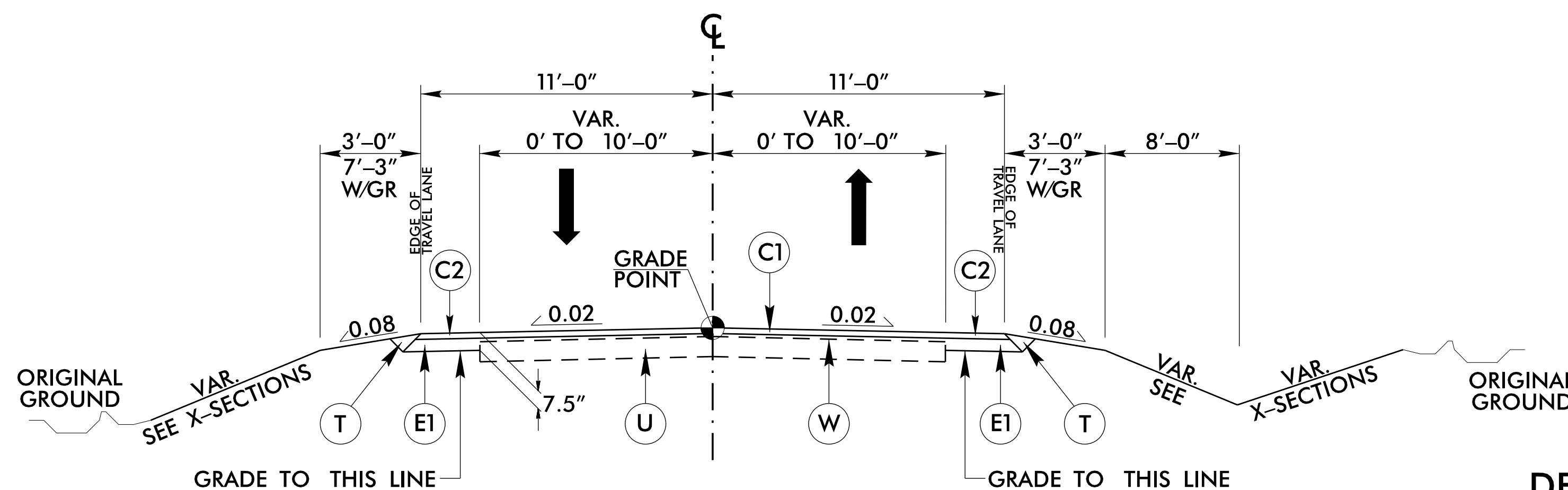
PROJECT REFERENCE NO. B-5405	SHEET NO. 2A-1
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
 Brian K. Esson 9AF015AD7ACC48F... 12/13/2017	 Clark Morrison B0A1100D1E004C4... 12/19/2017
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



MILLING DETAIL
USE MILLING DETAIL AT RESURFACING TIES



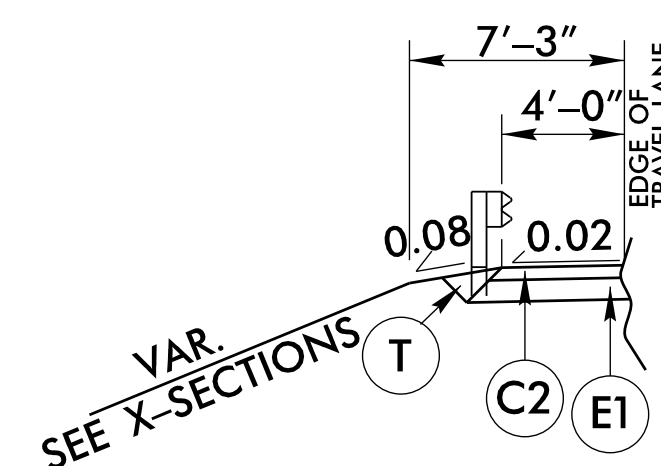
Wedging Detail For Resurfacing
WEDGING DETAIL



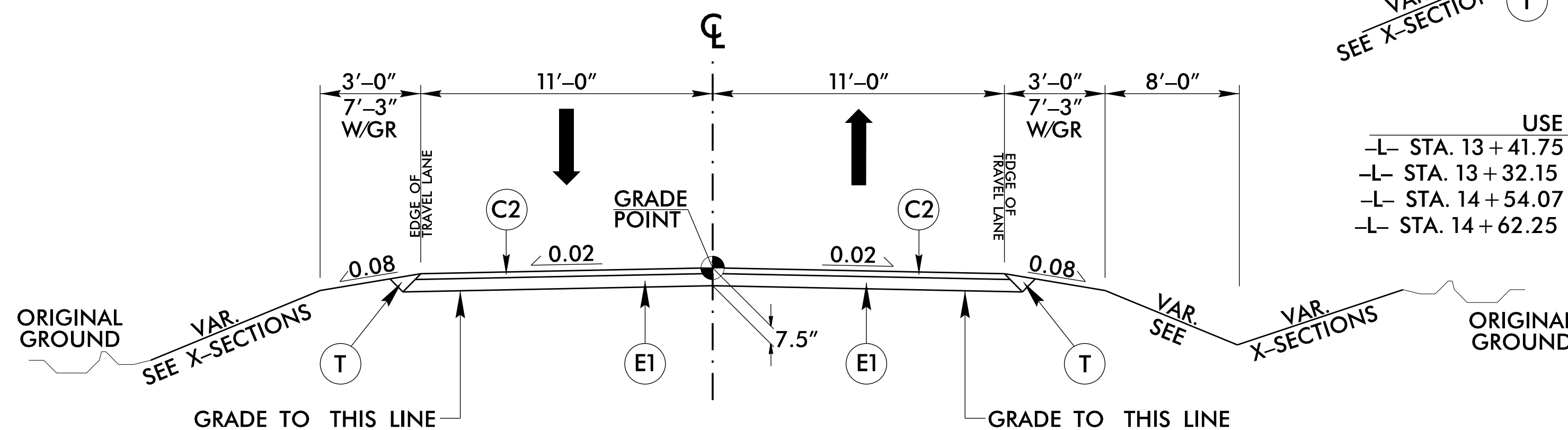
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
-L- STA. 11+00.00 TO STA. 12+50.35
-L- STA. 16+26.06 TO STA. 18+50.00

**DETAIL A
PAVED SHOULDER
WITH GUARDRAIL**

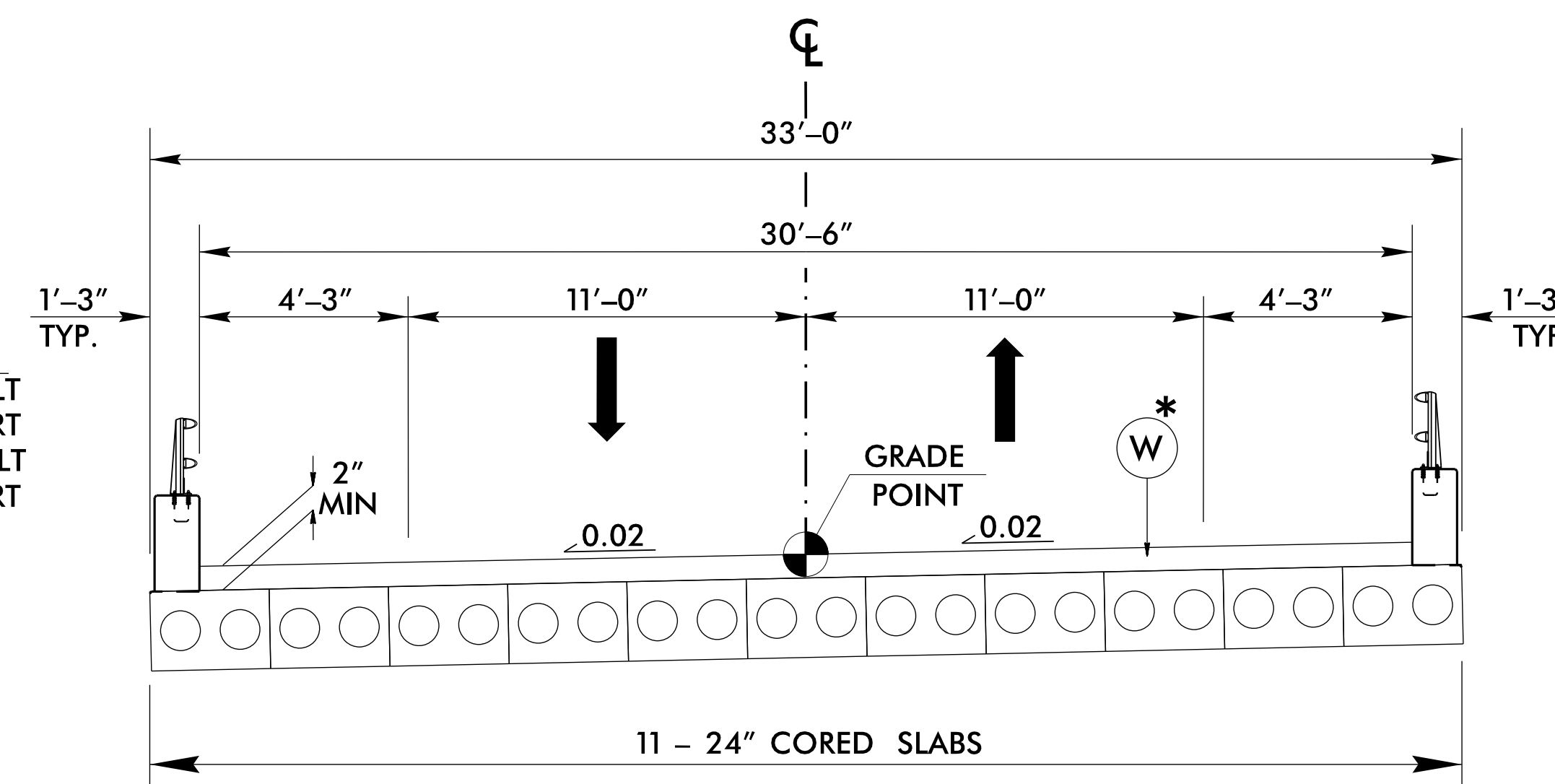


USE DETAIL A
-L- STA. 13+41.75 TO STA. 13+91.75 LT
-L- STA. 13+32.15 TO STA. 14+00.00 RT
-L- STA. 14+54.07 TO STA. 15+04.57 LT
-L- STA. 14+62.25 TO STA. 15+95.35 RT



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2
-L- STA. 12+50.35 TO STA. 13+95.84 (BEGIN BRIDGE)
-L- STA. 14+58.16 (END BRIDGE) TO STA. 16+26.06



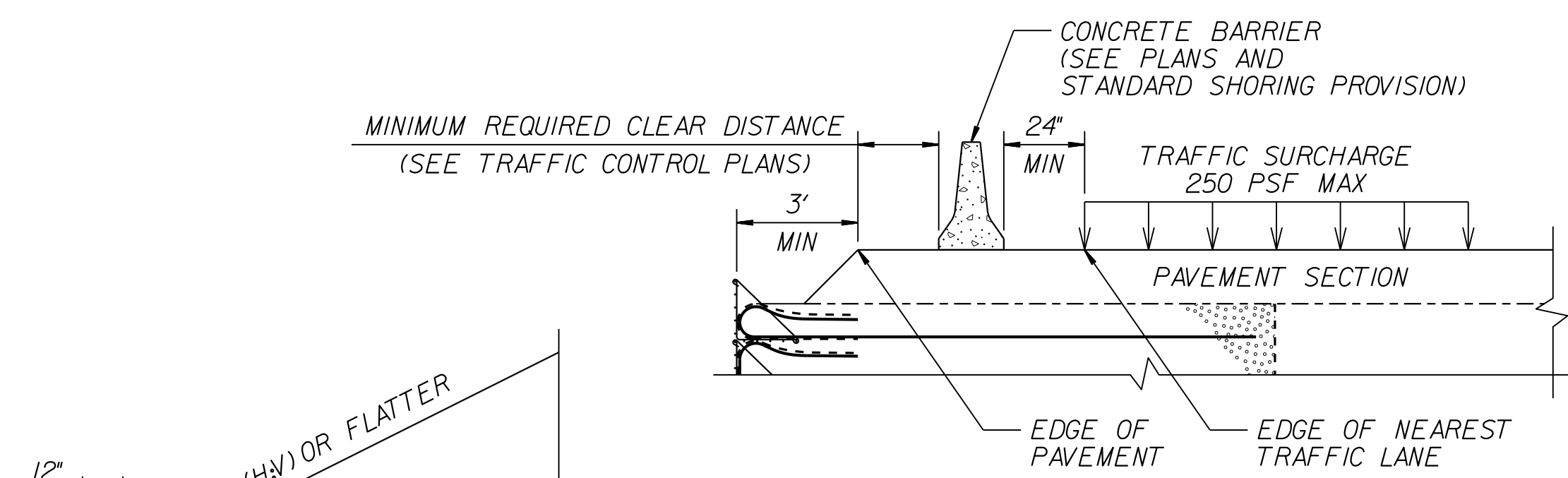
TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3
-L- STA. 13+95.84 (BEGIN BRIDGE) TO STA. 14+58.16 (END BRIDGE)

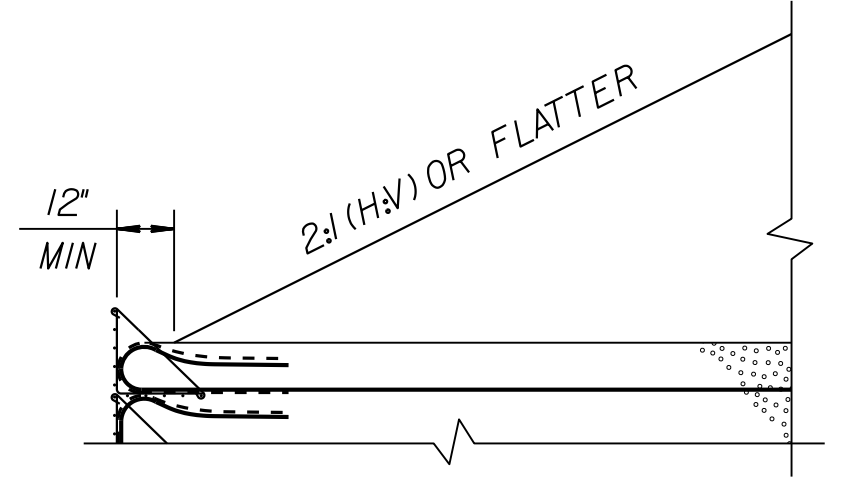
* VARIABLE PAVEMENT DEPTH
SEE STRUCTURE PLANS

REVISIONS

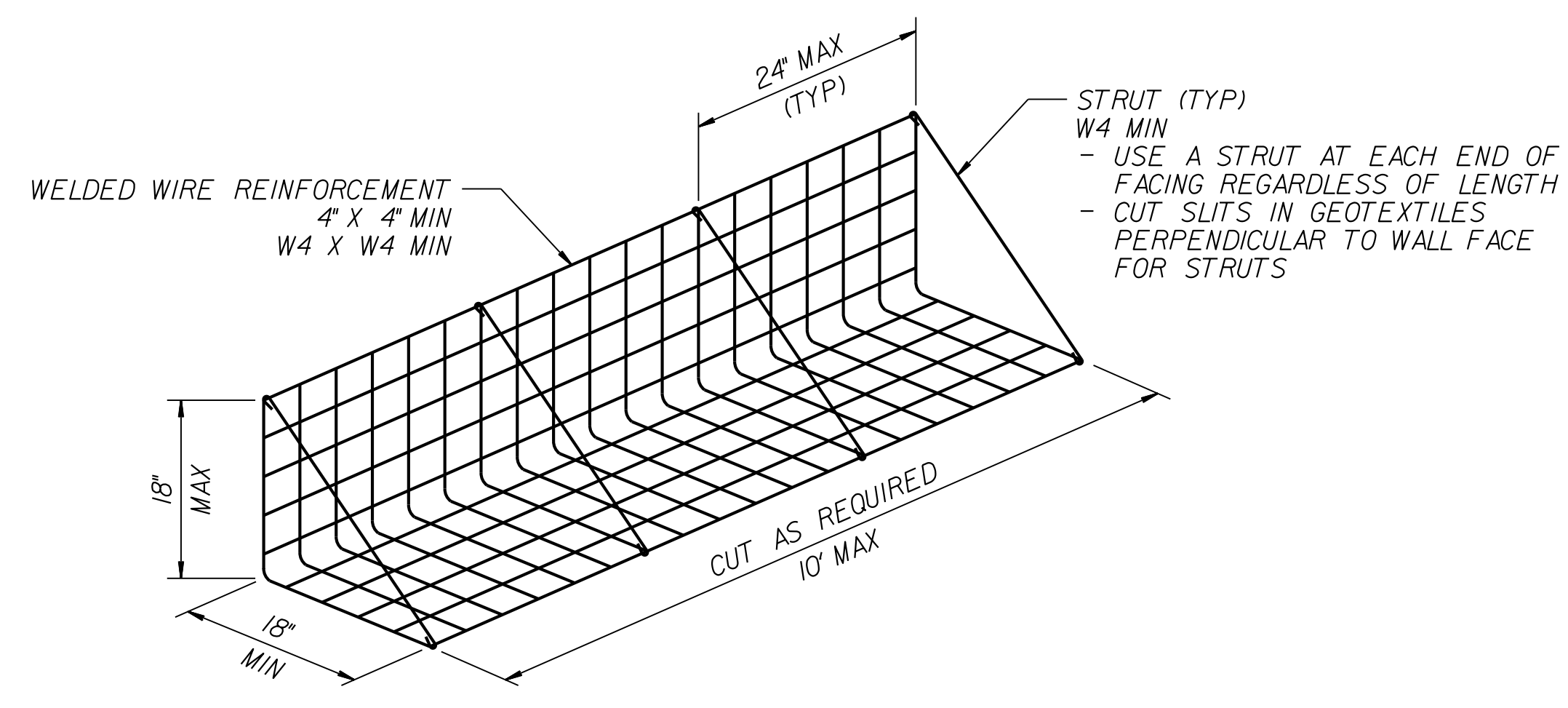
12/17/2017 RDY_PSH_02A-1_TYP.dgn
B. K. ESSON



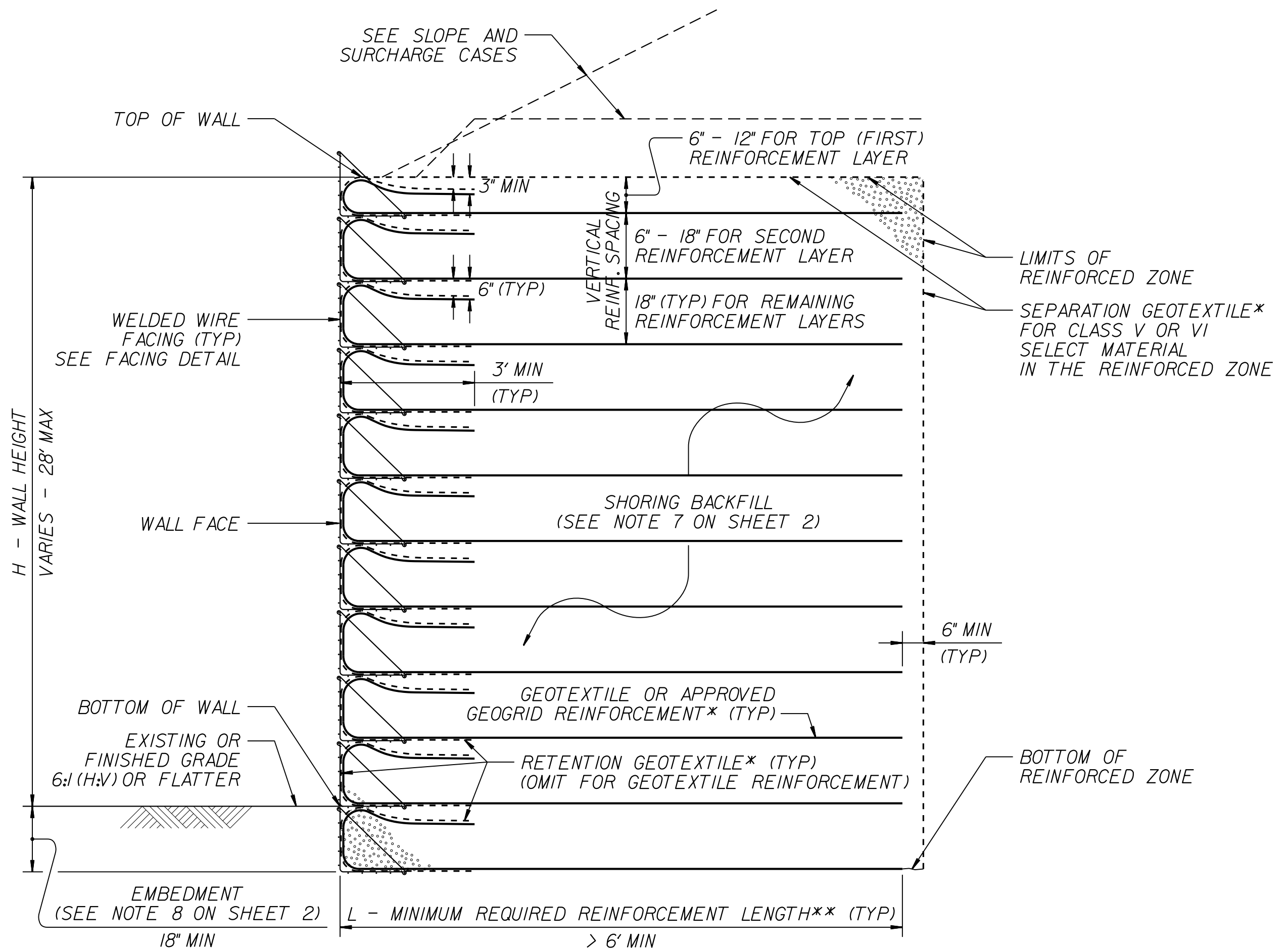
SURCHARGE CASE



SLOPE CASE

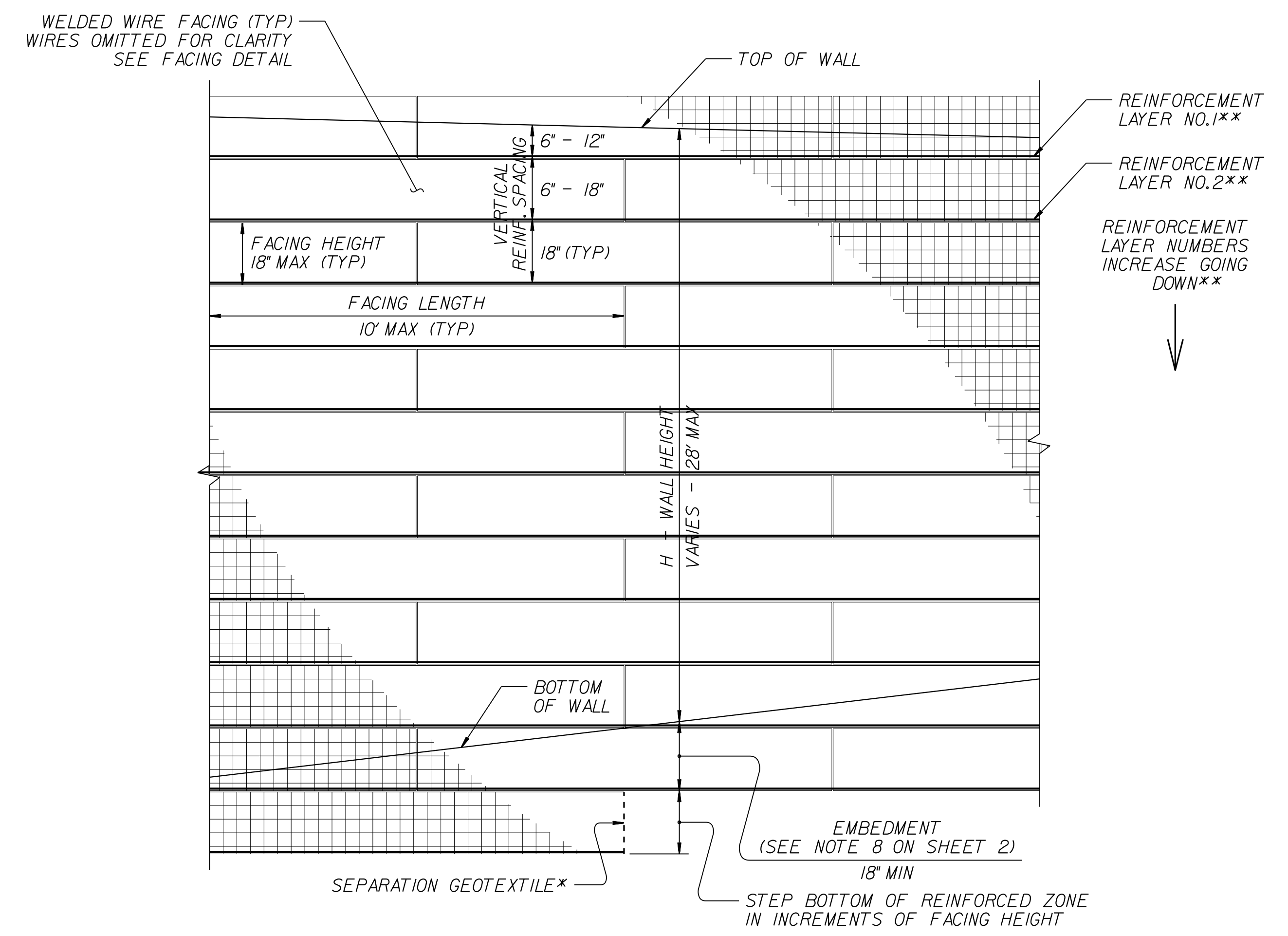


FACING DETAIL



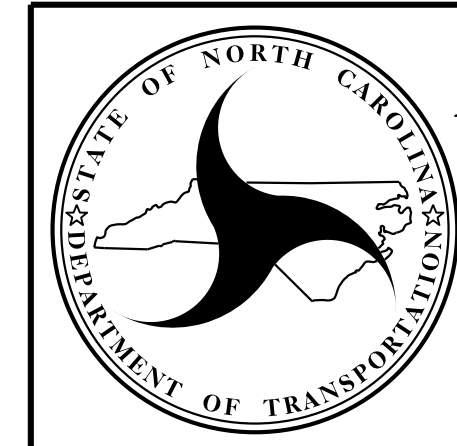
STANDARD TEMPORARY WALL

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



STANDARD TEMPORARY WALL - PARTIAL ELEVATION


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

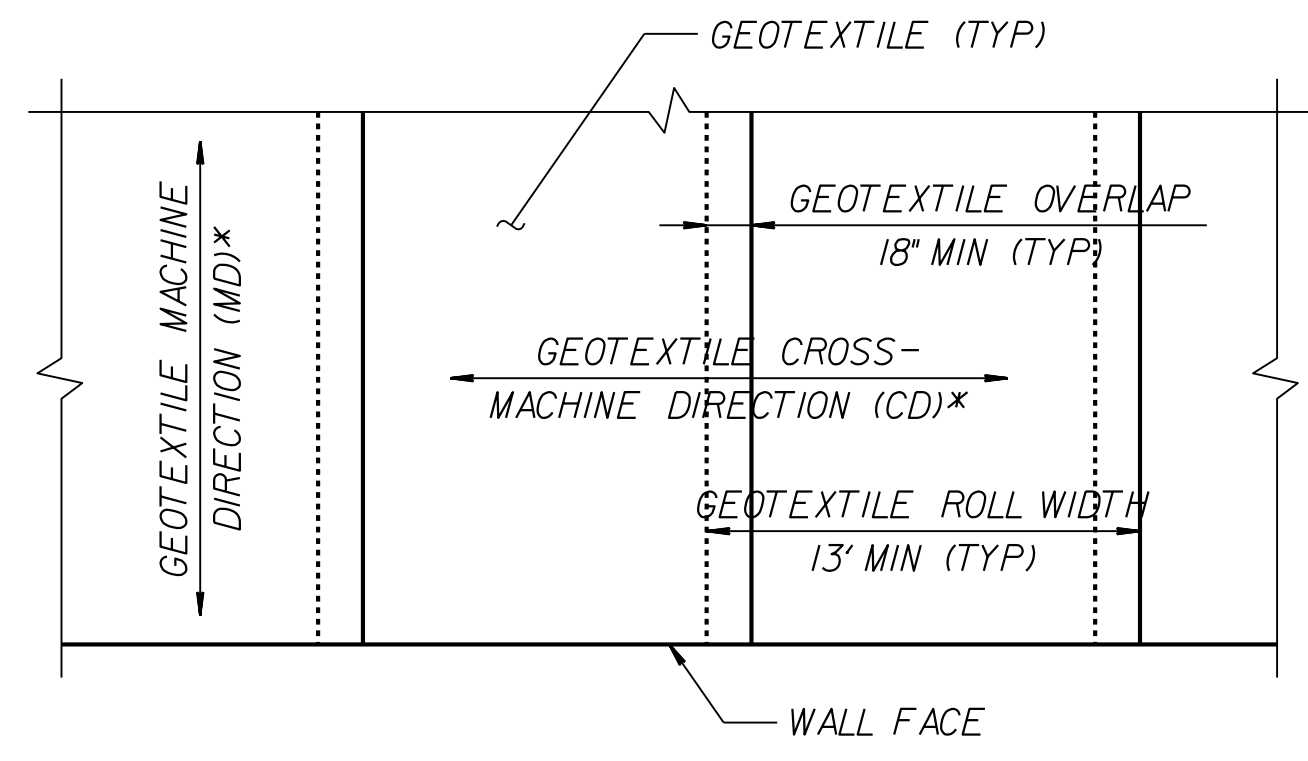


NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
**GEOTECHNICAL
 ENGINEERING UNIT**

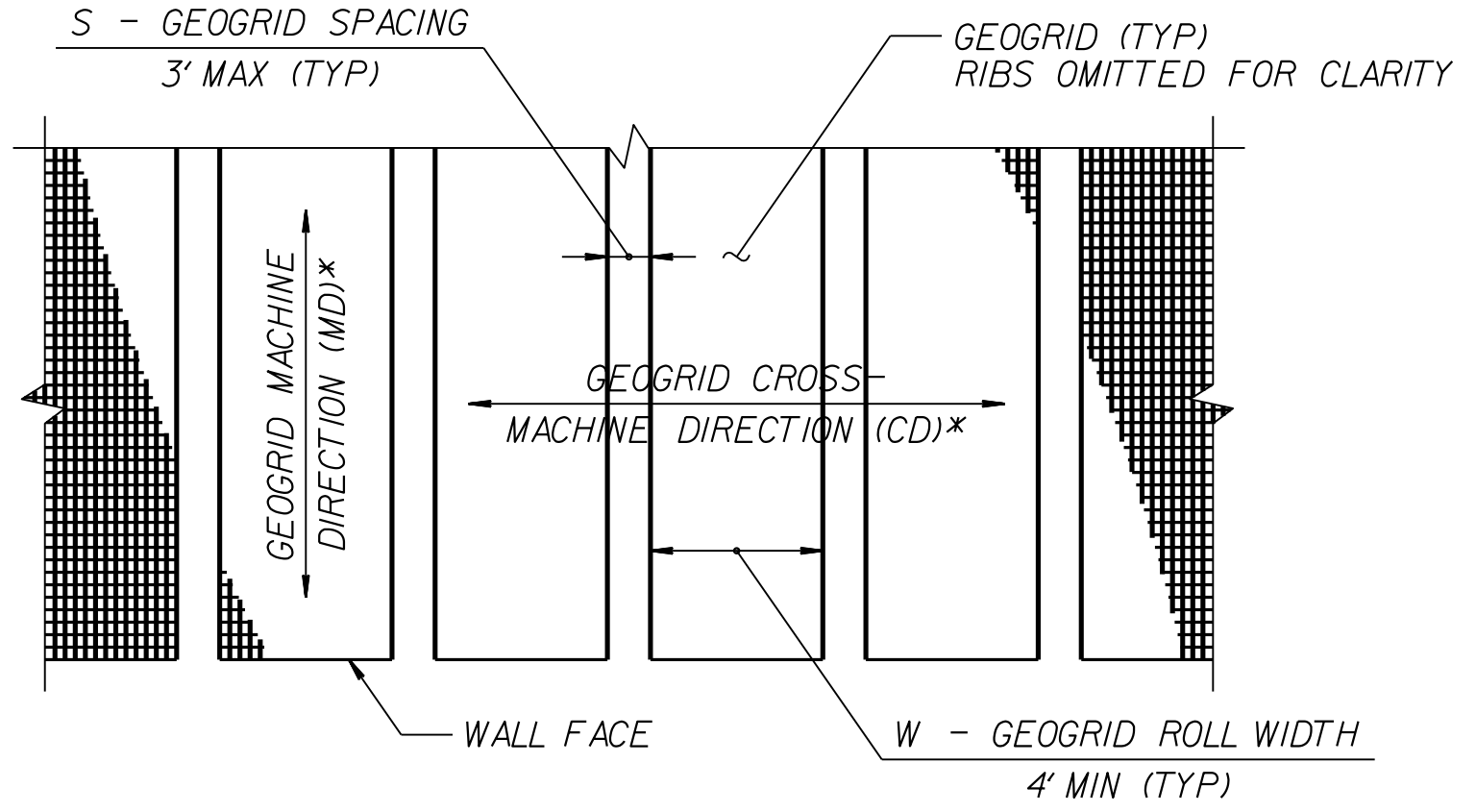
STANDARD DETAIL NO. 1801.02

STANDARD
 TEMPORARY WALL
 SHEET 1 OF 3

PROJECT REFERENCE NO. B-5405		SHEET NO. 2G-2
GEOTECHNICAL ENGINEER  Documented by: <i>Scott A. Hadden</i> 11/22/2017 <small>DATE SIGNATURE DATE</small>		ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

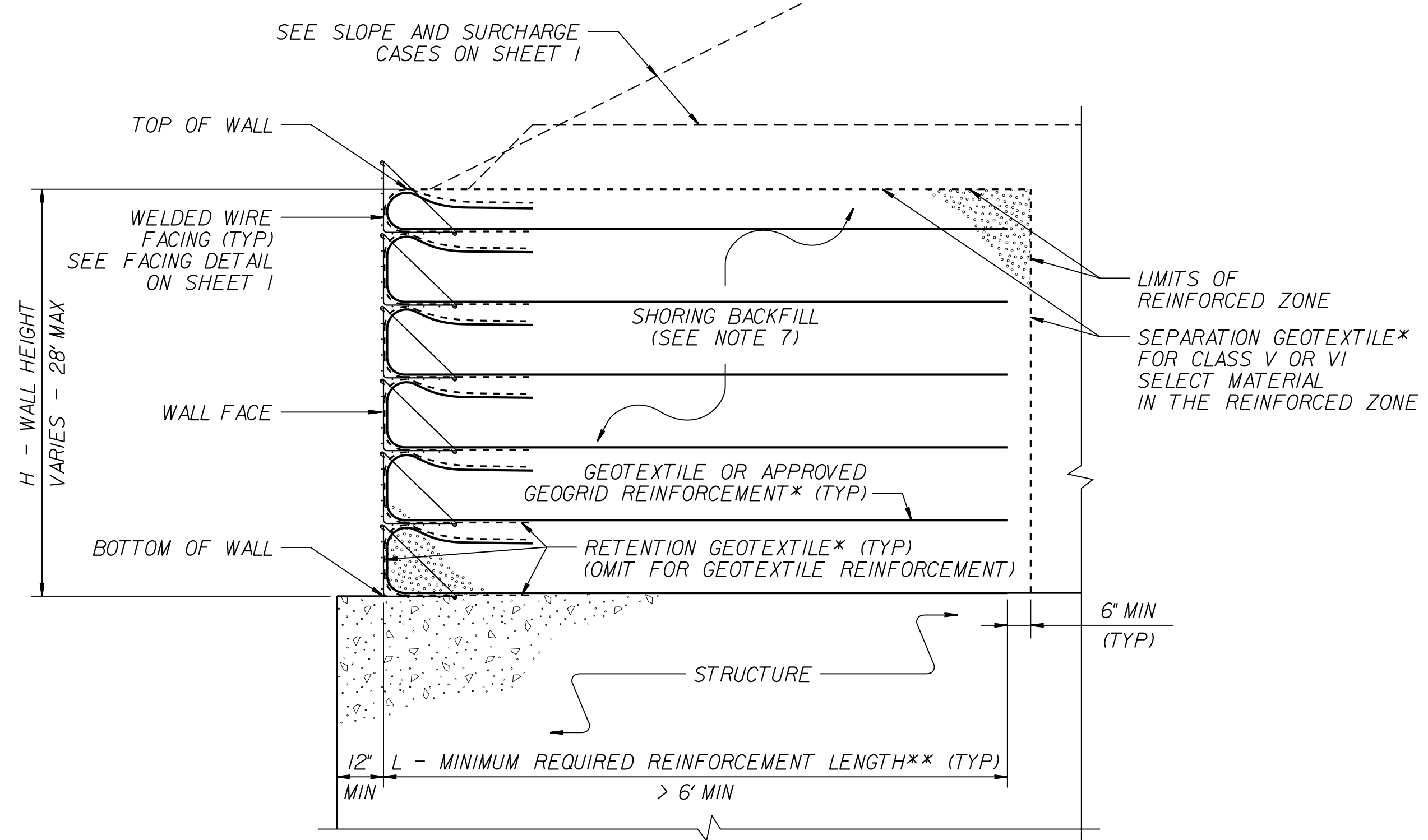


GEOTEXTILE PLACEMENT
(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



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

GEOSYNTHETIC PLACEMENT DETAILS
(PLAN VIEW)
*SEE NOTE 12.



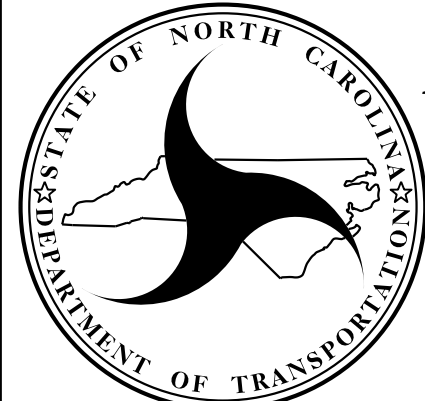
TEMPORARY WALL ON STRUCTURE DETAIL
*SEE GEOSYNTHETIC PLACEMENT DETAILS.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NOTES:

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

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

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



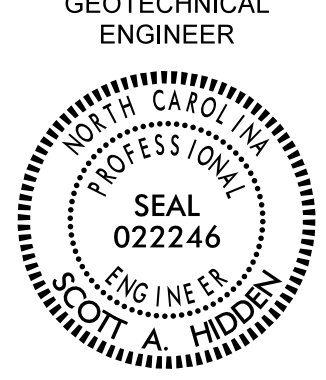
**NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**GEOTECHNICAL
ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.02

**STANDARD
TEMPORARY WALL
SHEET 2 OF 3**

DATE: 11-19-13

PROJECT REFERENCE NO. B-5405	SHEET NO. 2G-3
GEOTECHNICAL ENGINEER  ENGINEER	ENGINEER DATE: 11/22/2017 SIGNATURE: Scott A. Hidden
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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

L - MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)
(FOR ALL REINFORCEMENT TYPES)

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

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

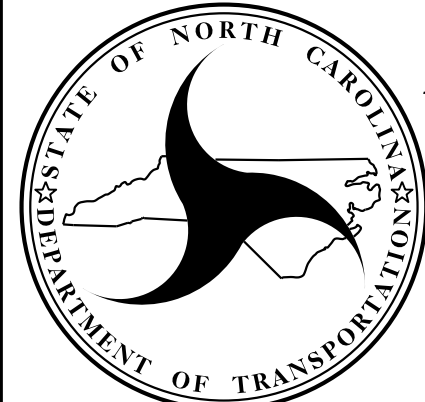
REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400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

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

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

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

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



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 3 OF 3

DATE: 11-19-13

SUMMARY OF EARTHWORK

STATION	STATION	UNCLASSIFIED EXCAVATION CY	EMBANK +% CY	BORROW CY	WASTE CY
SUMMARY 1					
-L- 11+00.00 -LT- BEGIN PROJECT	13+95.84 -LT- BEG. BRIDGE	15	17	2	0
SUMMARY 1 TOTAL					
		15	17	2	0
SUMMARY 2					
-L- 11+00.00 -RT- BEGIN PROJECT	13+95.84.00 -RT- BEG. BRIDGE	48	319	271	0
SUMMARY 2 TOTAL					
		48	319	271	0
SUMMARY 3					
-L- 14+58.16 -LT- END BRIDGE	18+50 -LT- END PROJECT	0	26	26	0
SUMMARY 3 TOTAL					
		0	26	26	0
SUMMARY 4					
-L- 14+58.16 -RT- END BRIDGE	18+50.00 -RT- END PROJECT	7	1,089	1,082	0
SUMMARY 4 TOTAL					
		7	1,089	1,082	0
PROJECT SUB-TOTALS					
		70	1,451	1,381	0
LOSS DUE TO CLEARING & GRUBBING					
		-50		50	
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT					
				69	
GRAND TOTAL					
		20		1,500	
SAY					
		50		1,600	

UNDERCUT (CONTINGENCY) = 350 CY
SELECT GRANULAR MATERIAL = 350 CY
CLASS IV SUBGRADE STABILIZATION = 100 TON

NOTE: Earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

NOTE: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing and Removal of Existing Pavement will be paid for at the contract lump sum price for "Grading".

TEMPORARY FENCE SUMMARY

LINE	STATION	STATION	SIDE	WOVEN WIRE LENGTH (FT)	4" POSTS (EA.)	5" POSTS (EA.)
-L-	12+95.08	14+20.00	RT.	156.00'	5	11
-L-	14+52.00	15+93.85	RT.	150.00'	7	7
TOTAL				306.00'	12	18
SAY				310.00'	20	20

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
L (LT)	13+67	13+81	14
TOTAL		SAY	14 20 LF

REMOVAL OF EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	AREA (SY)
L	12+10	14+04	257
L	14+35	17+10	350
TOTAL		SAY	607 610

GUARDRAIL SUMMARY

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

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS										IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	TEMP. CRASH CUSHIONS	REMARKS							
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GREU TL-2	M-350	TYPE III	CAT-1	VI MOD	BIC	AT-1	EA	G	NG												
-L-	13+41.75	13+91.75	LT	50.00'				13+91.75 (BRIDGE)	4'-3"	7'-3"		25'-0"		1'-0"			1		1																			
-L-	13+32.15	14+00.00	RT	50.00'	50.00'			14+00.00 (BRIDGE)	4'-3"	7'-3"							1		1																			
-L-	14+54.07	15+04.57	LT	50.00'				14+54.07 (BRIDGE)	4'-3"	7'-3"		25'-0"		1'-0"			1		1																			
-L-	14+62.25	15+95.35	RT	125.00'	50.00'			14+62.25 (BRIDGE)	4'-3"	7'-3"									1																			
-L-	12+82 +/-		LT																																			
-L-	15+82 +/-		LT																																			
PROJECT SUB-TOTAL				275.00'	100.00'												2		4																			
LESS ANCHORS:																																						
			GREU TL-2	2@25.00'																																		
			TYPE-III	4@18.75'																																		
			AT-1	2@6.25'																																		
PROJECT TOTAL				150.00'	87.50'													2		4																		
SAY				162.5'	100.00'																																	

ADDITIONAL GUARDRAIL POSTS = 5 EA.

REVISIONS

8/17/99
1/3/2018 RDY_PSH_03B-1_SUM.dgn
B-5405 REVISION

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

SUB-REGIONAL & REGIONAL LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION	SIZE	THICKNESS OR GAUGE	LOCATION (L/R, OR CL)	STRUCTURE NO.	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC)						CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE)						CLASS IV R.C. PIPE (UNLESS OTHERWISE NOTED)						ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE)	CU. YDS.	PER EACH (0' THRU 5.0')	QUANTITIES FOR DRAINAGE STRUCTURES * TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL. 'B')	FRAME, GRATES AND HOOD STANDARD 840.03	TYPE OF GRATE	D.I. STD. 840.14 OR STD. 840.15 D.I. FRAME & GRATE STD. 840.16 G.D.I. TYPE "A" STD. 840.17 OR 840.26 G.D.I. TYPE "B" STD. 840.18 OR 840.27 G.D.I. TYPE "D" STD. 840.19 OR 840.28 G.D.I. FRAME WITH GRATE STD. 840.22 G.D.I. FRAME WITH TWO GRATES STD. 840.22 G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24 G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24 J.B. STD. 840.31 OR 840.32 G.D.I. (N.S.) FRAME (N.S. FLAT) W/2 GRATES STD. 840.29 T.B.D.I. STD. 840.35	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS	ABBREVIATIONS												
									12"	15"	30"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	12"	15"	18"	24"	30"	36"	42"	48"	12"	15"													18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	R.C.P.	C.S.P.	A	B
13+72 -L-	LT	0401			1,963.6	1,960.9																																													
13+72 -L-	LT	0401	0402			1,960.9	1,957.0		40	X																																									
12+51 -L-	CL	0403	OUT			1961.4	1958.9																																												
16+05 -L-	RT	0404	OUT																																																
16+91 -L-	CL	0405	OUT			1961.9	1959.0																																												
18+15 -L-	LT	0406	OUT																																																
TOTALS									40																																										

REVISIONS

COMPUTED BY: JCK DATE: 12/17
 CHECKED BY: SCC DATE: 12/8/17

(2-16-16)

B-5405
46120

SHEET NO.
3G-1

**STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS**

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	200
				TOTAL LF:	200

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

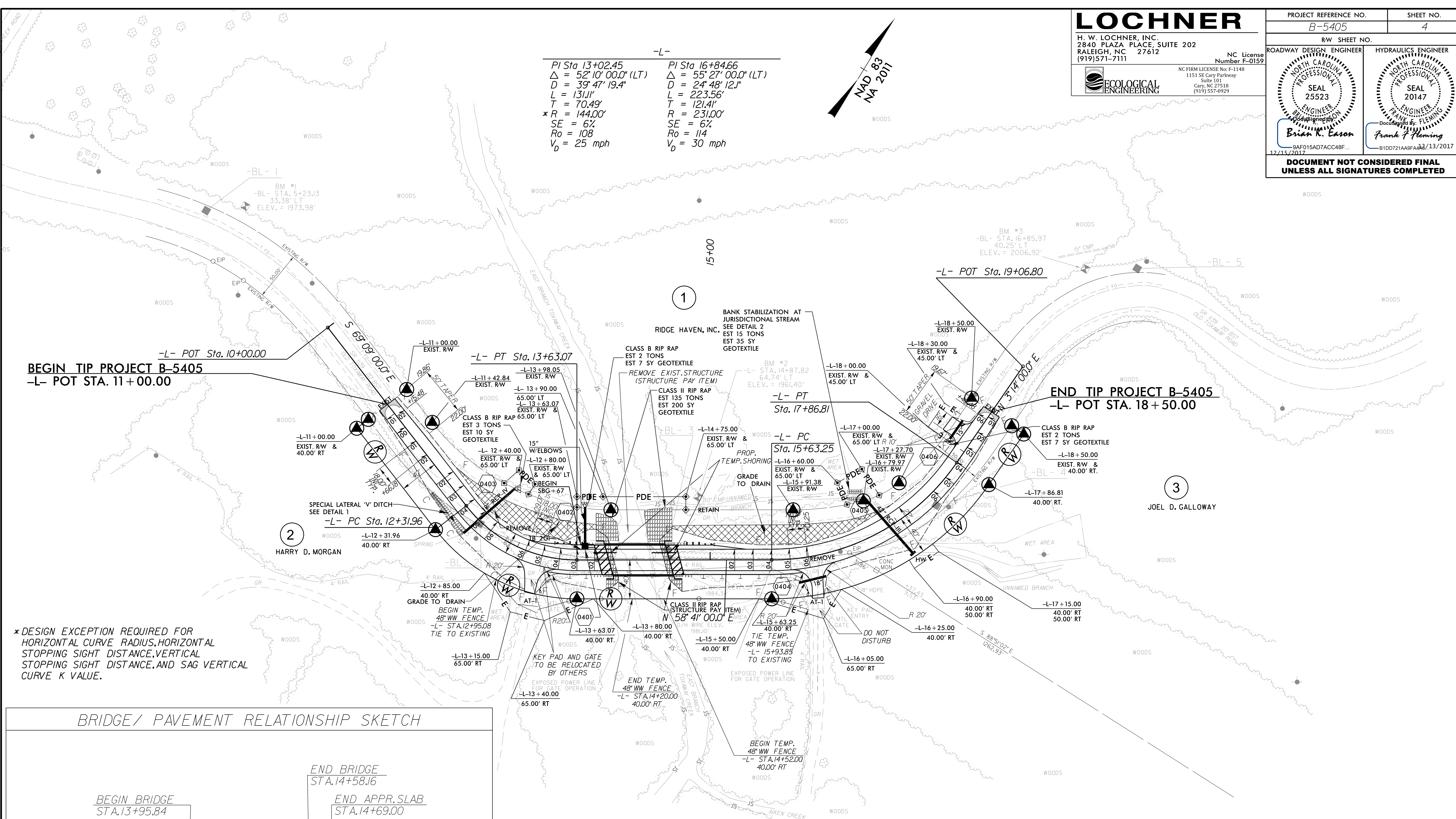
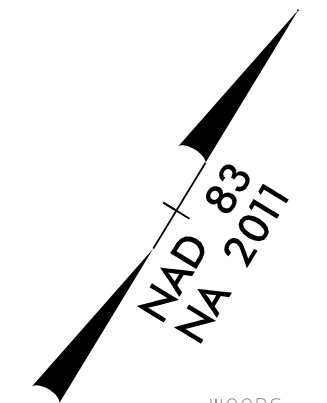
SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU	18	50	100	250		
					TOTAL CY/TONS/SY:	50	100	250**	0

*ASU = Aggregate Subgrade
 *AST = Aggregate Stabilization
 **Total square yards of "Geotextile for Soil Stabilization" is only the estimated quantity for ASU/AST and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.

-L-

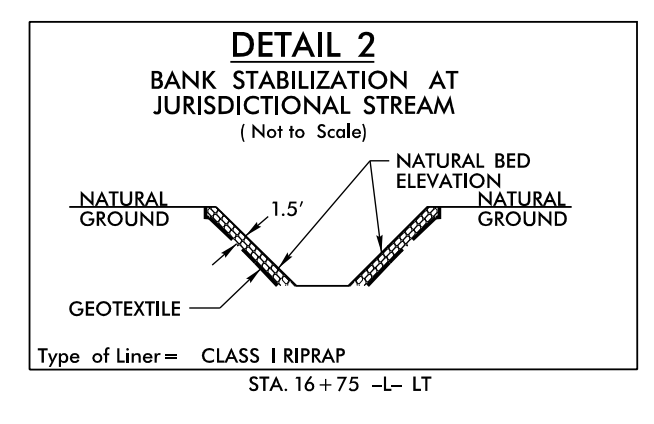
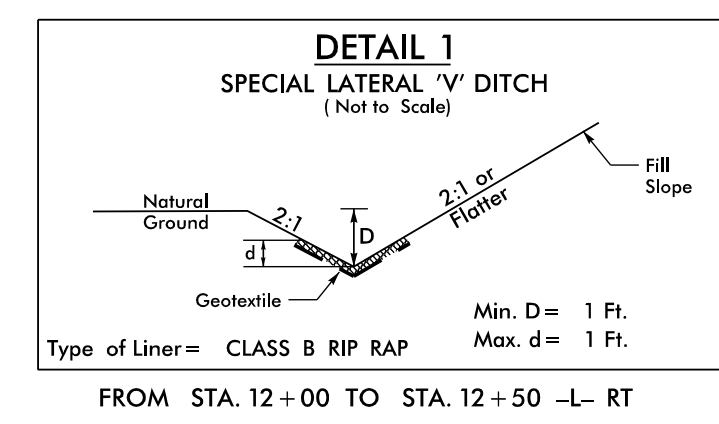
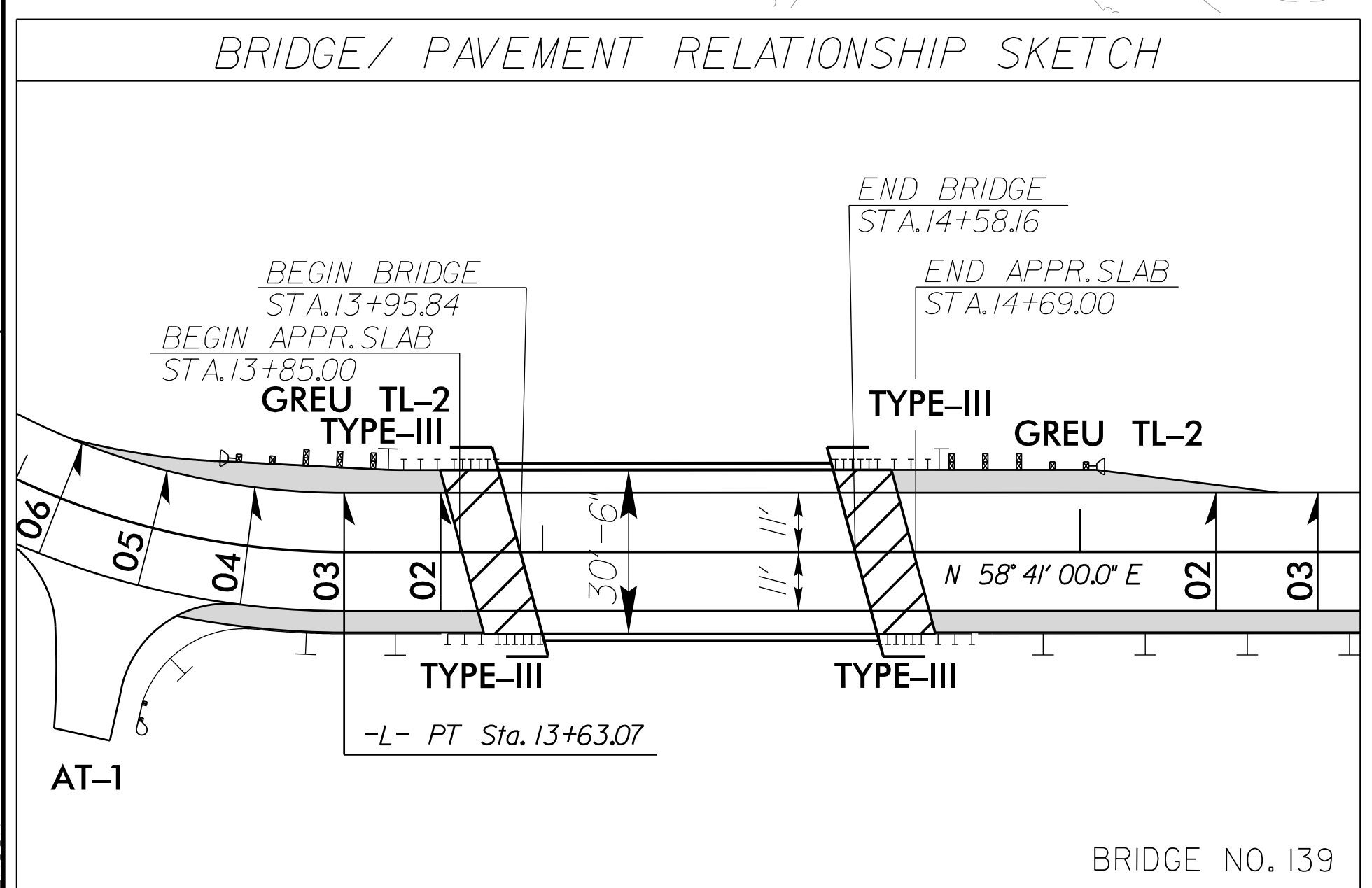
PI Sta 13+02.45 $\Delta = 52^{\circ} 10' 00.0''$ (LT) $D = 39^{\circ} 47' 19.4''$ $L = 131.1'$ $T = 70.49'$ $* R = 144.00'$ $SE = 6\%$ $Ro = 108$ $V_d = 25$ mph	PI Sta 16+84.66 $\Delta = 55^{\circ} 27' 00.0''$ (LT) $D = 24^{\circ} 48' 12.1''$ $L = 223.56'$ $T = 121.41'$ $R = 231.00'$ $SE = 6\%$ $Ro = 114$ $V_d = 30$ mph
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BEGIN TIP PROJECT B-5405
 -L- POT STA. 11+00.00

END TIP PROJECT B-5405
 -L- POT STA. 18+50.00

* DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVE RADIUS, HORIZONTAL STOPPING SIGHT DISTANCE, VERTICAL STOPPING SIGHT DISTANCE, AND SAG VERTICAL CURVE K VALUE.



BRIDGE DESCRIPTION:
 TWO LANE SINGLE SPAN BRIDGE WITH A WOOD DECK AND BST OVERLAY ON STEEL BEAMS. GUARDRAILS, HEADWALLS, AND WINGWALLS ARE WOOD.

HIGH WATER ELEV. 1960' +/-

UTILITY OWNERS
 POWER:
 HAYWOOD ELECTRIC MEMBERSHIP
 298 BLUE RIDGE ROAD
 LAKE TOXAWAY, NC 28747

TELEPHONE:
 COMPTON COMMUNICATIONS
 190 E. MAIN STREET
 BREVARD, NC 28712

SEE SHEET 5 FOR -L- PROFILE

SEE SHEET TMP-4 FOR TEMP. SHORING LOCATION

SEE SHEETS S-1 TO S-22 FOR STRUCTURE PLANS

REVISIONS

12/17/2017
 B-5405-Roy_PSH-04.dgn
 BEASON

BRIDGE NO. 139

5/14/99

LOCHNER

H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111



NC License
Number F-0159
NC FIRM LICENSE No. F-1148
1151 SE Cary Parkway
Suite 101
Cary, NC 27518
(919) 557-0929

PROJECT REFERENCE NO. B-5405	SHEET NO. 5
ROADWAY DESIGN ENGINEER SEAL 25523 12/13/2017 Brian K. Eason	HYDRAULICS ENGINEER SEAL 20147 12/13/2017 Frank F. Fleming

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

CL STA.14+27.00 -L-
1@ 60.32' 24" CORED SLAB
GP = 1964.39'
SKEW = 75°

PIPE HYDRAULIC DATA
18" RCP Sta. 12+51

DRAINAGE AREA	= 1.3	AC
DESIGN FREQUENCY	= 25	YR
DESIGN DISCHARGE	= 2.5	CFS
DESIGN HW ELEVATION	= 1962.4	FT
100 YEAR DISCHARGE	= 3.0	CFS
100 YEAR HW ELEVATION	= 1962.5	FT
OVERTOPPING FREQUENCY	= 500+	YR
OVERTOPPING DISCHARGE	= 14.8	CFS
OVERTOPPING ELEVATION	= 1964.8	FT

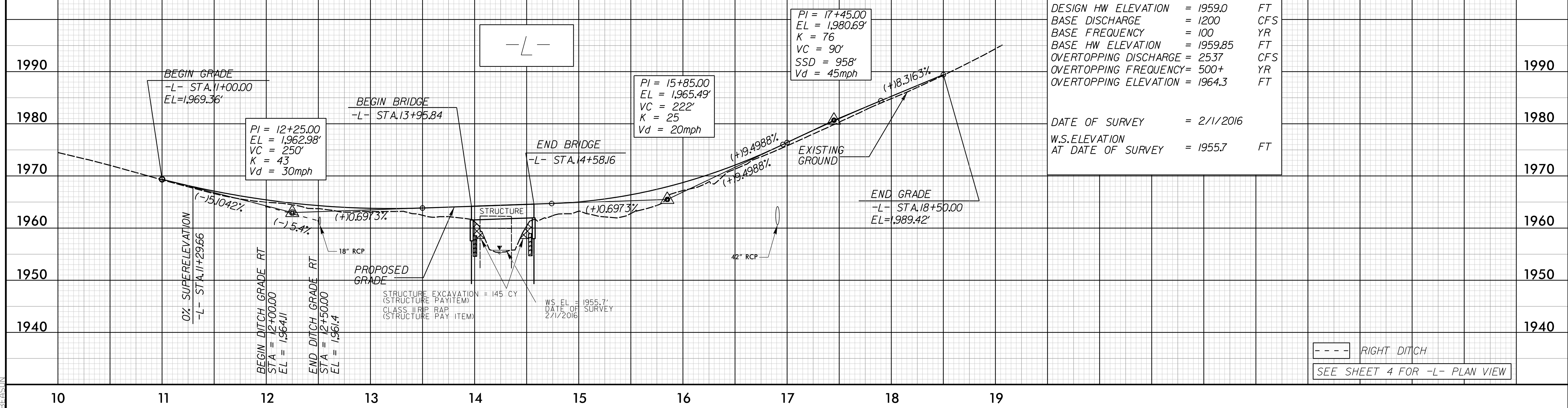
PIPE HYDRAULIC DATA
42" RCP Sta. 16+91

DRAINAGE AREA	= 43.6	AC
DESIGN FREQUENCY	= 25	YR
DESIGN DISCHARGE	= 51.7	CFS
DESIGN HW ELEVATION	= 1965.1	FT
100 YEAR DISCHARGE	= 82.3	CFS
100 YEAR HW ELEVATION	= 1966.6	FT
OVERTOPPING FREQUENCY	= 500+	YR
OVERTOPPING DISCHARGE	= 194.9	CFS
OVERTOPPING ELEVATION	= 1976.4	FT

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 850	CFS
DESIGN FREQUENCY	= 25	YR
DESIGN HW ELEVATION	= 1959.0	FT
BASE DISCHARGE	= 1200	CFS
BASE FREQUENCY	= 100	YR
BASE HW ELEVATION	= 1959.85	FT
OVERTOPPING DISCHARGE	= 2537	CFS
OVERTOPPING FREQUENCY	= 500+	YR
OVERTOPPING ELEVATION	= 1964.3	FT

DATE OF SURVEY = 2/1/2016
W.S.ELEVATION AT DATE OF SURVEY = 1955.7 FT



--- RIGHT DITCH
SEE SHEET 4 FOR -L- PLAN VIEW

12-14-2017 RDY_PSH_05.dgn
BEGANSON