

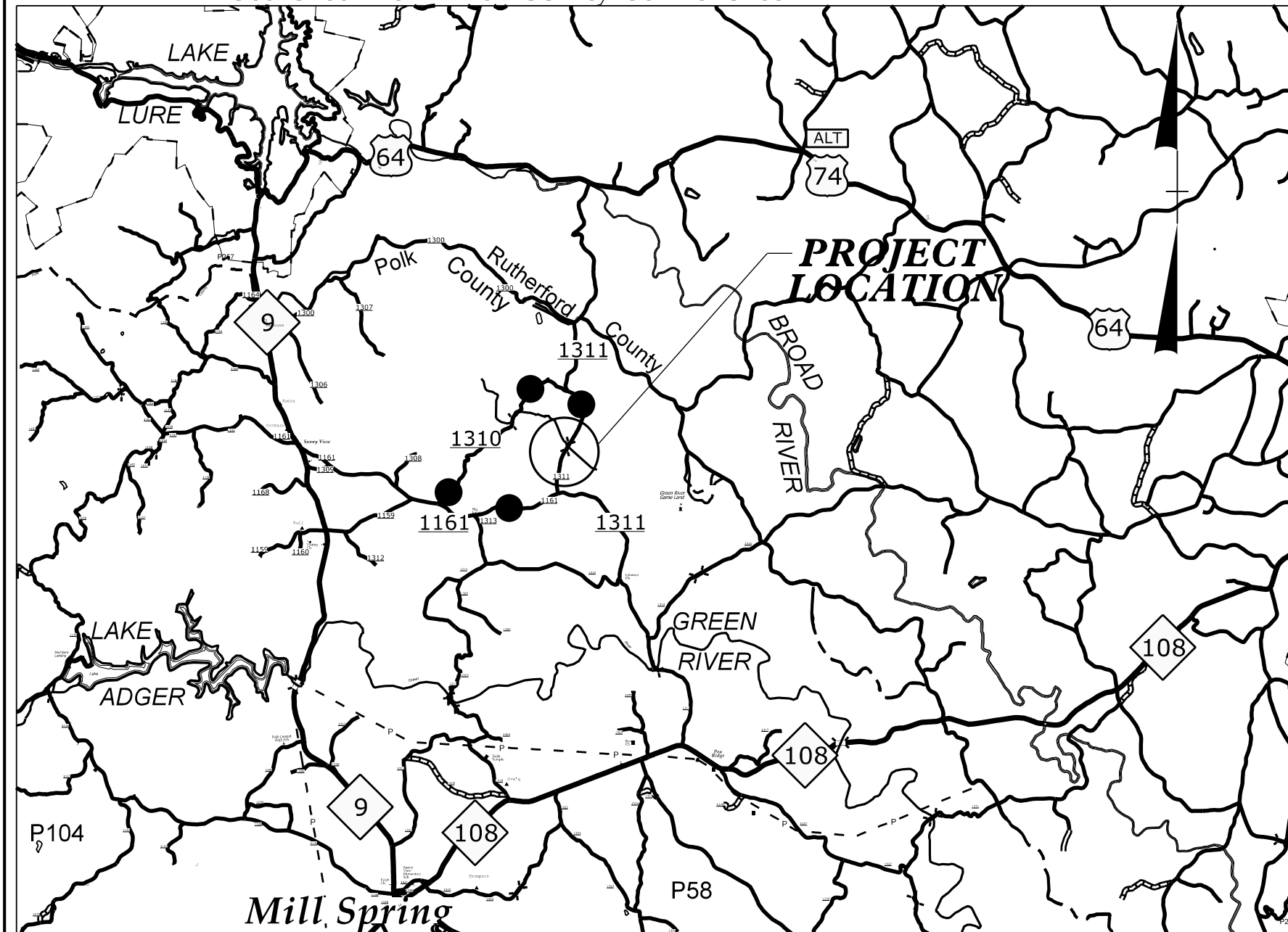
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**This file or an individual page
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09/08/19

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet 1C-1 For Survey Control Sheet



VICINITY MAP

●●●●● OFF-SITE DETOUR

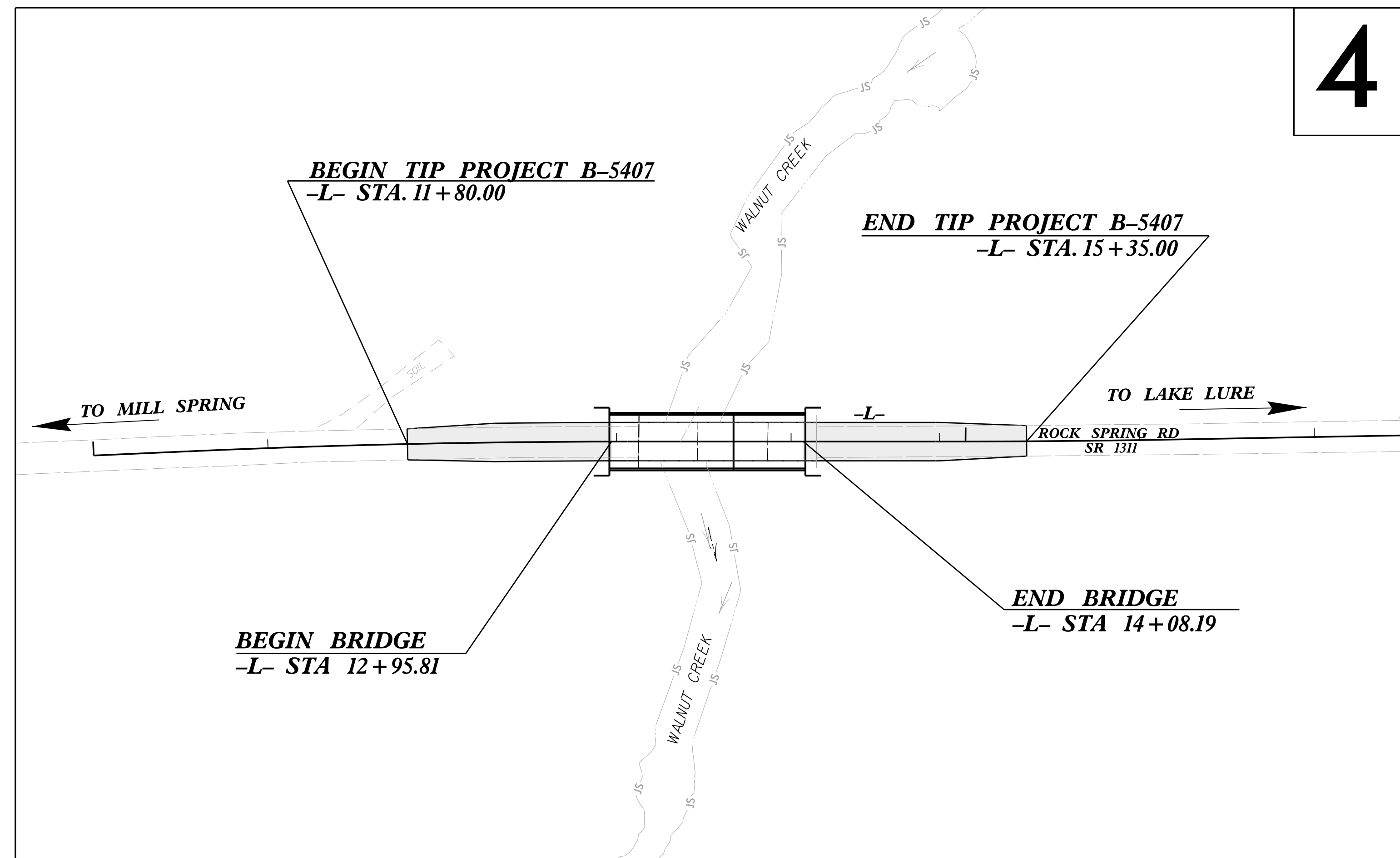
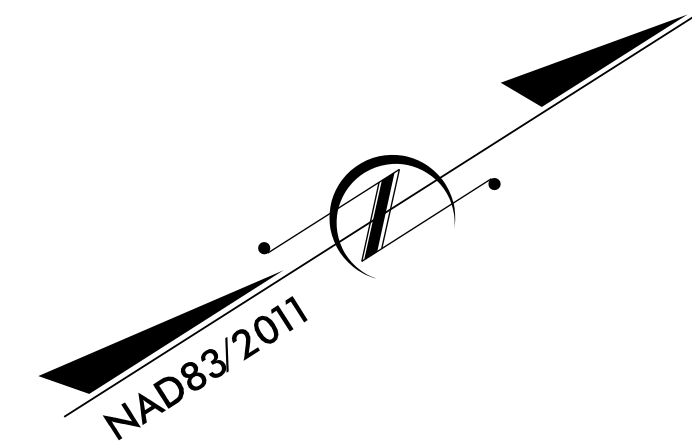
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

POLK COUNTY

**LOCATION: BRIDGE NO. 34 OVER WALNUT CREEK
ON SR 1311 (ROCK SPRING ROAD)**

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

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-----------------|-----------------------------|--------------|--------------|
| N.C. | B-5407 | 1 | |
| STATE PROJ. NO. | F. A. PROJ. NO. | DESCRIPTION | |
| 46122.1.1 | BRZ-1311(13) | PE | |
| 46122.2.1 | | RW & UTILITY | |
| 46122.3.1 | BRZ-1311(13) | CONST. | |
| | | | |
| | | | |
| | | | |

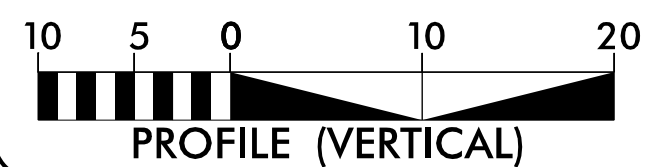
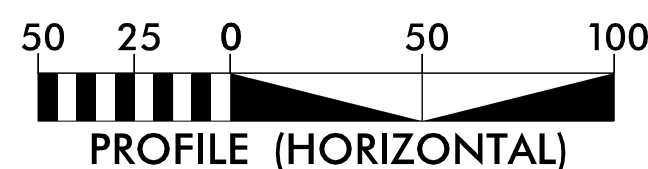
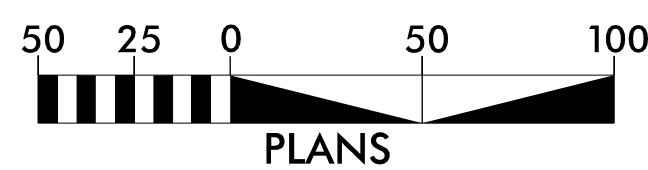


DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

TIP PROJECT: B-5407

CONTRACT: C204079

GRAPHIC SCALES



DESIGN DATA

ADT 2018 = 523
ADT 2038 = 623
K = 12 %
D = 60 %
T = 11 % *
V = 60 MPH
* TTST = 2% + DUALS = 9%
FUNC CLASS =
MINOR COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT B-5407 = 0.046
LENGTH STRUCTURE T.I.P. PROJECT B-5407 = 0.021
TOTAL LENGTH OF T.I.P. PROJECT B-5407 = 0.067

Prepared in the Office of:

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

ECOLOGICAL ENGINEERING
NC FIRM LICENSE No: F-1148
1151 SE Cary Parkway
Suite 101
Cary, NC 27518
(919) 557-0029

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY 1, 2017

LETTING DATE:
MAY 15, 2018

BRIAN K. EASON, PE
PROJECT ENGINEER

CHRISTINA YOKELEY
PROJECT DESIGN ENGINEER

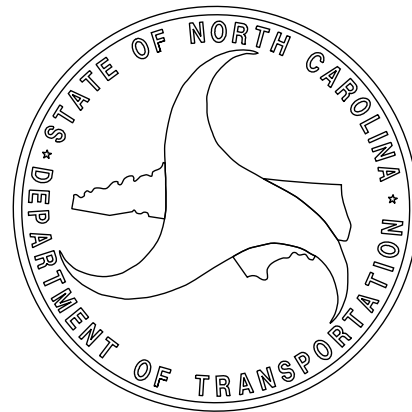
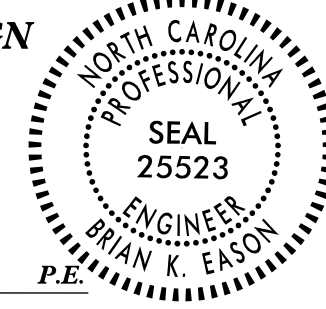
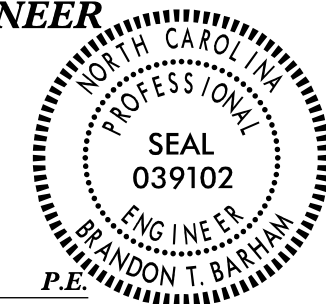
DAVID STUTTS, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

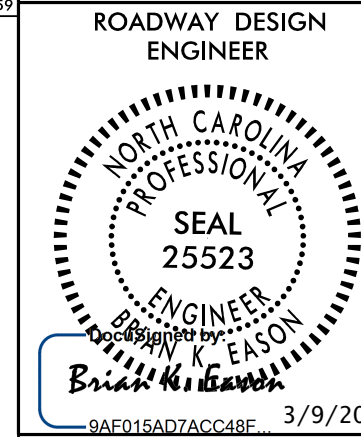
DocuSigned by:
Brandon Barham
3/14/2018
SIGNATURE:

ROADWAY DESIGN ENGINEER

DocuSigned by:
Brian K. Eason
3/14/2018
SIGNATURE:



3/14/2018
B-5407_Rdy_psh_01_tsh.dgn
cyokeley



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

EFF. 01-16-2018
 REV.

INDEX OF SHEETS B-5407

| SHEET NUMBER | TITLE SHEET |
|------------------|--|
| 1 | TITLE SHEET |
| 1-A | INDEX OF SHEETS, STANDARD DRAWINGS, GENERAL NOTES |
| 1-B | CONVENTIONAL SYMBOLS |
| 1C-1 | SURVEY CONTROL SHEET |
| 2A-1 | PAVEMENT SCHEDULE AND TYPICAL SECTIONS |
| 2C-1 | STRUCTURE ANCHOR UNITS DETAIL |
| 2C-2 | GUARDRAIL INSTALLATION DETAIL |
| 3B-1 | SUMMARY OF EARTHWORK, ASPHALT PAVEMENT REMOVAL SUMMARY, FENCE SUMMARY, SHOULDER BERM GUTTER SUMMARY, AND GUARDRAIL SUMMARY |
| 3D-1 | SUMMARY OF DRAINAGE QUANTITIES |
| 3G-1 | SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION AND SUMMARY OF SUBSURFACE DRAINAGE |
| 4 | PLAN SHEET |
| 5 | PROFILE SHEET |
| TMP-1 THRU TMP-5 | TRANSPORTATION MANAGEMENT PLAN & SIGN DESIGN PLANS |
| PMP-1 | PAVEMENT MARKING PLAN |
| EC-1 THRU EC-5 | EROSION CONTROL PLANS |
| UD-1 THRU UD-2 | UTILITIES BY OTHERS PLANS |
| X-1A | CROSS-SECTIONS SUMMARY |
| X-1 THRU X-4 | CROSS-SECTIONS |
| S-1 THRU S-24 | 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 Superlevation - 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 |
| 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 |
| 840.46 | Traffic Bearing Precast Drainage Structure |
| 840.66 | Drainage Structure Steps |
| 846.01 | Concrete Curb, Gutter and Curb & Gutter |
| 846.04 | Drop Inlet Installation in Shoulder Berm Gutter |
| 862.01 | Guardrail Placement |
| 862.02 | Guardrail Installation |
| 862.03 | Structure Anchor Units |
| 876.01 | Rip Rap in Channels |
| 876.02 | Guide for Rip Rap at Pipe Outlets |

GENERAL NOTES:

2018 SPECIFICATIONS
 EFFECTIVE: 01-16-2018
 REVISED:

GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. 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 WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

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

AT&T

REMC

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.

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 | ○ MILEPOST 35 |
| Switch | □ 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 | ----- (RW) |
| New Right of Way Line with Pin and Cap | ----- (RW) ▲ |
| New Right of Way Line with Concrete or Granite RW Marker | ----- (RW) ● |
| New Control of Access Line with Concrete CA Marker | ----- (CA) ● |
| Existing Control of Access | ----- (CA) |
| New Control of Access | ----- (CA) |
| Existing Easement Line | ----- E |
| New Temporary Construction Easement | ----- E |
| New Temporary Drainage Easement | ----- TDE |
| New Permanent Drainage Easement | ----- PDE |
| New Permanent Drainage / Utility Easement | ----- DUE |
| New Permanent Utility Easement | ----- PUE |
| New Temporary Utility Easement | ----- TUE |
| New Aerial Utility Easement | ----- AUE |

ROADS AND RELATED FEATURES:

| | |
|----------------------------|------------|
| Existing Edge of Pavement | ----- |
| Existing Curb | ----- |
| Proposed Slope Stakes Cut | ----- C |
| Proposed Slope Stakes Fill | ----- F |
| Proposed Curb Ramp | ----- (CR) |
| 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 | ----- Vineyard |

EXISTING STRUCTURES:

| | |
|--|---------------|
| MAJOR: | |
| Bridge, Tunnel or Box Culvert | ----- CONC |
| Bridge Wing Wall, Head Wall and End Wall | ----- CONC WW |
| MINOR: | |
| Head and End Wall | ----- CONC HW |
| Pipe Culvert | ----- |
| Footbridge | ----- |
| Drainage Box: Catch Basin, DI or JB | □ CB |
| Paved Ditch Gutter | ----- |
| Storm Sewer Manhole | ⊙ |
| Storm Sewer | ----- S |

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.*) | ----- P |
| U/G Power Line LOS C (S.U.E.*) | ----- P |
| U/G Power Line LOS D (S.U.E.*) | ----- P |

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.*) | ----- T |
| U/G Telephone Cable LOS C (S.U.E.*) | ----- T |
| U/G Telephone Cable LOS D (S.U.E.*) | ----- T |
| U/G Telephone Conduit LOS B (S.U.E.*) | ----- TC |
| U/G Telephone Conduit LOS C (S.U.E.*) | ----- TC |
| U/G Telephone Conduit LOS D (S.U.E.*) | ----- TC |
| U/G Fiber Optics Cable LOS B (S.U.E.*) | ----- T FO |
| U/G Fiber Optics Cable LOS C (S.U.E.*) | ----- T FO |
| U/G Fiber Optics Cable LOS D (S.U.E.*) | ----- T FO |

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

| | |
|--|-----------|
| Utility Pole | ● |
| Utility Pole with Base | ⊠ |
| Utility Located Object | ○ |
| Utility Traffic Signal Box | ⊠ |
| Utility Unknown U/G Line LOS B (S.U.E.*) | ----- TUL |
| U/G Tank; Water, Gas, Oil | ----- |
| Underground Storage Tank, Approx. Loc. | ⊠ UST |
| 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-5407 -FINAL-

| BL POINT | DESC. | NORTH | EAST | ELEVATION | L STATION | OFFSET |
|----------|-------|-------------|--------------|-----------|------------------------|----------|
| 1 | BL-1 | 605585.6930 | 1066566.3653 | 919.37 | OUTSIDE PROJECT LIMITS | |
| 2 | BL-2 | 605817.9470 | 1066691.6819 | 905.72 | 10+09.90 | 17.02 RT |
| 3 | BL-3 | 606168.4227 | 1066903.2592 | 891.70 | 14+20.05 | 14.93 RT |
| 4 | BL-4 | 606635.6631 | 1067190.7813 | 895.04 | OUTSIDE PROJECT LIMITS | |

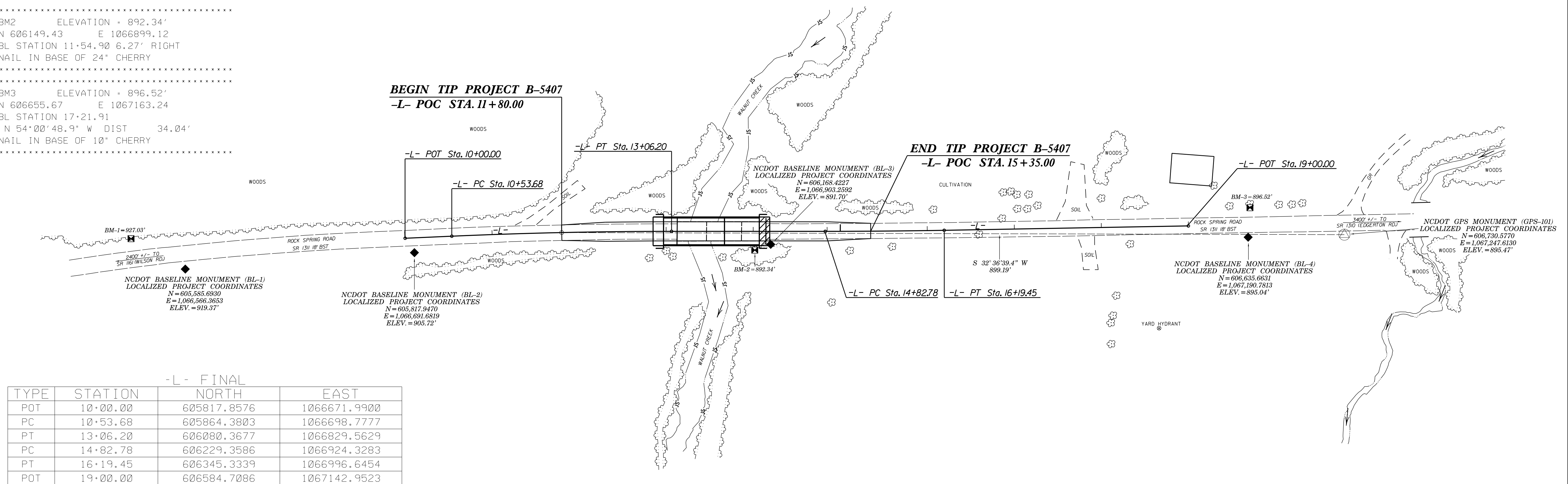
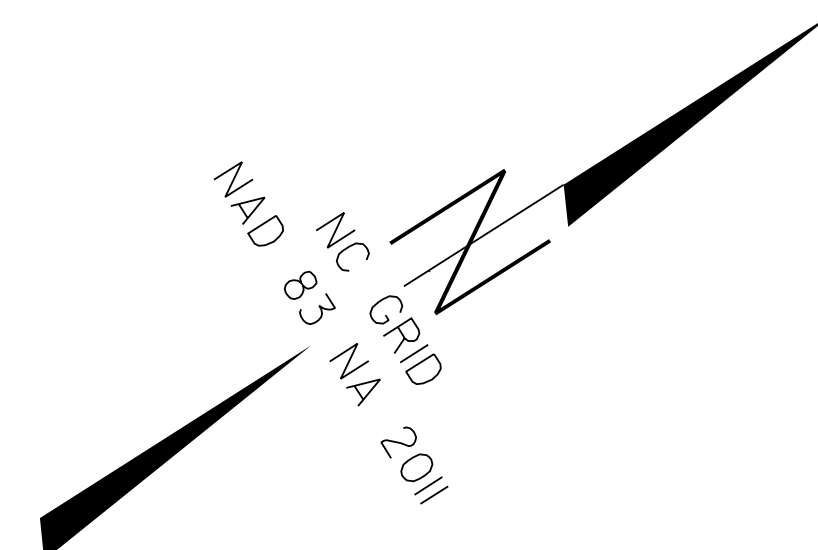
.....
 BM1 ELEVATION = 927.03'
 N 605551.90 E 1066503.39
 BL STATION 5+00.00
 S 61°46'57.2" W DIST 71.46'
 NAIL IN BASE OF 10" POPLAR

.....
 BM2 ELEVATION = 892.34'
 N 606149.43 E 1066899.12
 BL STATION 11+54.90 6.27' RIGHT
 NAIL IN BASE OF 24" CHERRY

.....
 BM3 ELEVATION = 896.52'
 N 606655.67 E 1067163.24
 BL STATION 17+21.91
 N 54°00'48.9" W DIST 34.04'
 NAIL IN BASE OF 10" CHERRY

-FINAL- ROW MARKER IRON PIN AND CAP-E

| ALIGN | STATION | OFFSET | NORTH | EAST |
|-------|----------|--------|--------------|---------------|
| L | 11+80.00 | -20.00 | 605983.50218 | 1066745.90282 |
| L | 12+20.00 | -40.00 | 606028.24191 | 1066749.77793 |
| L | 13+06.20 | -40.00 | 606101.83518 | 1066795.81162 |
| L | 14+82.78 | -40.00 | 606250.82820 | 1066890.57838 |
| L | 15+35.00 | -20.00 | 606284.13588 | 1066935.25715 |
| L | 15+35.00 | 20.00 | 606262.89964 | 1066969.15438 |
| L | 14+82.78 | 40.00 | 606207.89331 | 1066958.08094 |
| L | 13+06.20 | 40.00 | 606258.90029 | 1066863.31417 |
| L | 12+20.00 | 40.00 | 605986.32861 | 1066817.91952 |
| L | 11+80.00 | 20.00 | 605962.78325 | 1066780.11869 |



-L- FINAL

| TYPE | STATION | NORTH | EAST |
|------|----------|-------------|--------------|
| POT | 10+00.00 | 605817.8576 | 1066671.9900 |
| PC | 10+53.68 | 605864.3803 | 1066698.7777 |
| PT | 13+06.20 | 606080.3677 | 1066829.5629 |
| PC | 14+82.78 | 606229.3586 | 1066924.3283 |
| PT | 16+19.45 | 606345.3339 | 1066996.6454 |
| POT | 19+00.00 | 606584.7086 | 1067142.9523 |

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: 606730.5770(±) EASTING: 1067247.6130(±) ELEVATION: 895.47(±)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99983719

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS-101" TO -L- STATION 11+80.00 IS
 S 32°36'39.4" W 899.19'

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

GEOID MODEL: G12NC
 NOTE: DRAWING NOT TO SCALE

NOTES:

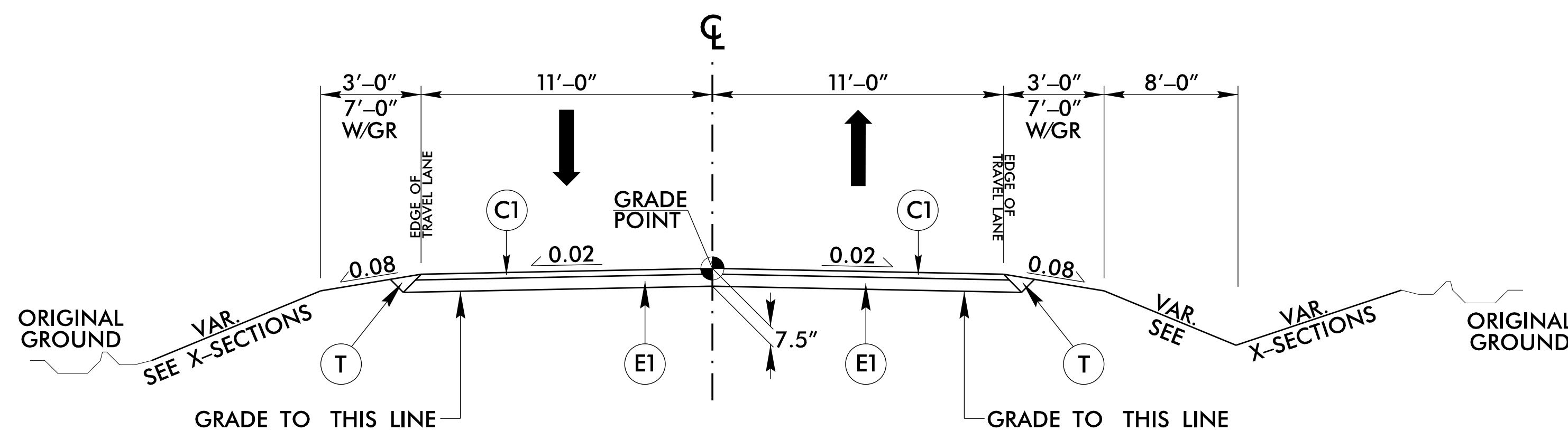
- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/](https://connect.ncdot.gov/resources/location/)
 THE FILES TO BE FOUND ARE AS FOLLOWS:
 B-5407_LS_CONTROL.TXT
- SITE CALIBRATION INFORMATION HAS NOT BEEN 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.

6/2/99

FINAL PAVEMENT SCHEDULE

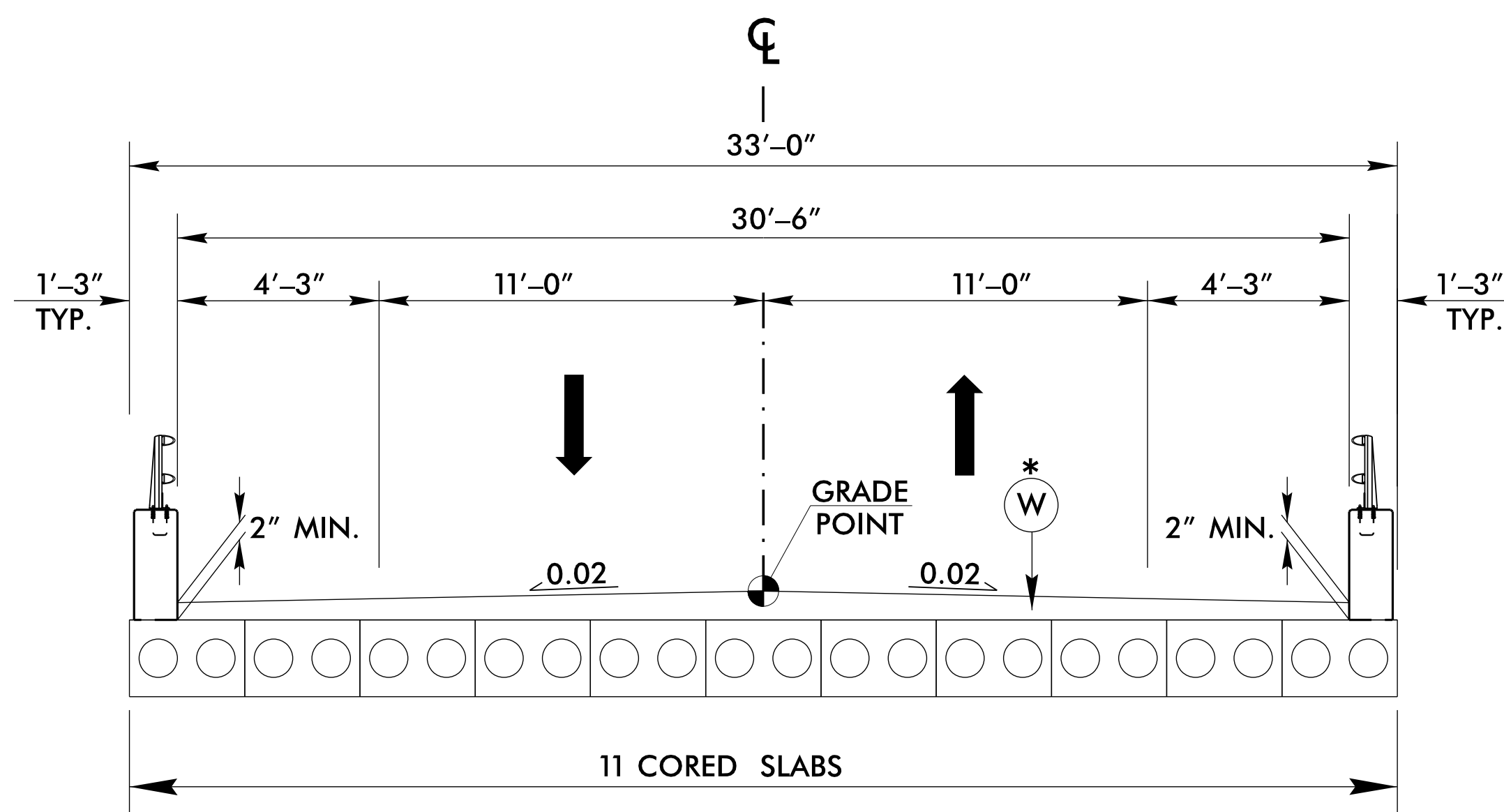
| | | | |
|----|--|----|--|
| C1 | PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS. | R1 | SHOULDER BERM GUTTER. |
| C2 | PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS PER SQ YD PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1 1/2" IN DEPTH | T | EARTH MATERIAL. |
| E1 | PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, 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 B25.0C, 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.



TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
 -L- STA. 11+80.00 TO STA. 12+95.81 (BEGIN BRIDGE)
 -L- STA. 14+08.19 (END BRIDGE) TO STA. 15+35.00



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2
 -L- STA. 12+95.81 (BEGIN BRIDGE) TO STA. 14+08.19 (END BRIDGE)

* VARIABLE PAVEMENT DEPTH
 SEE STRUCTURE PLANS

LOCHNER

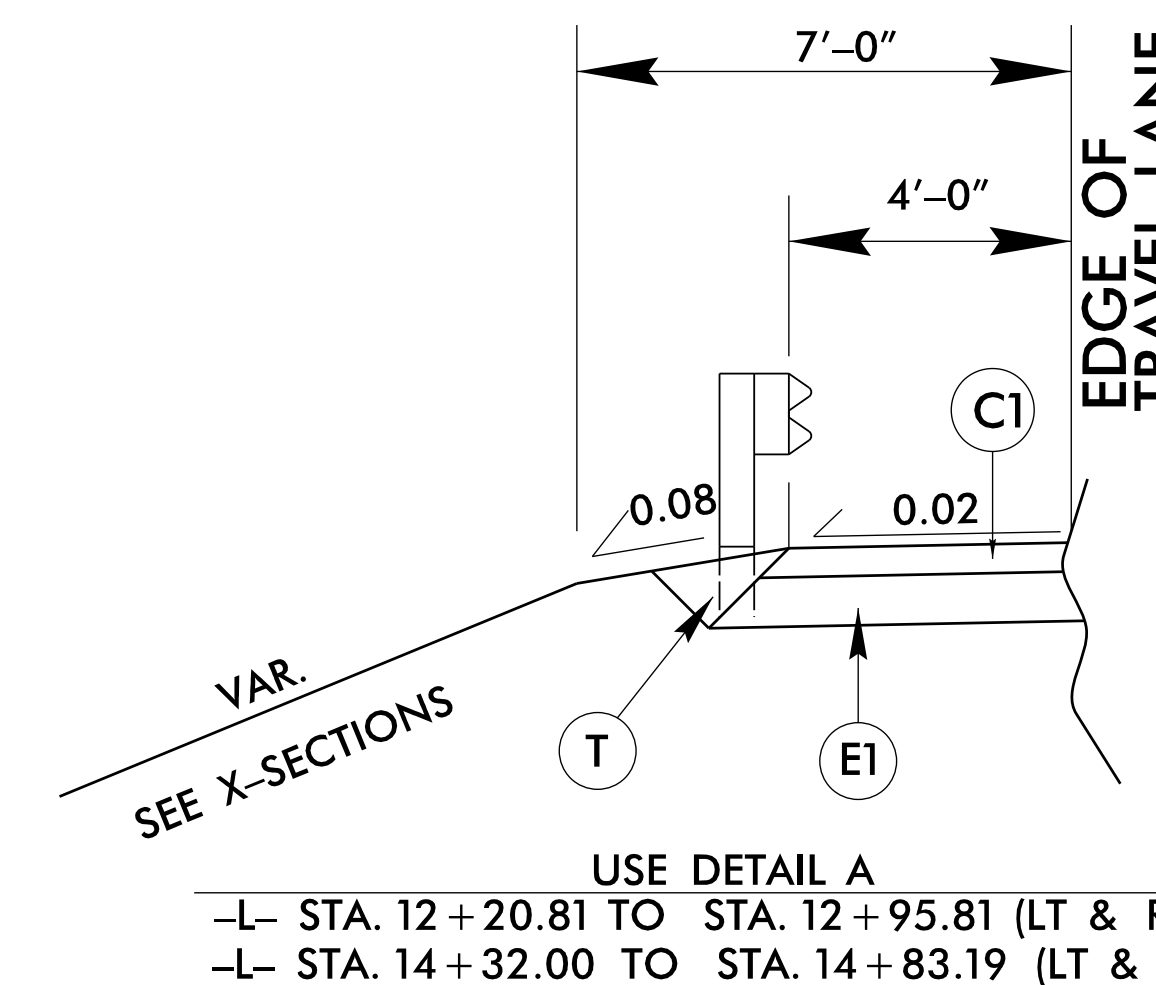
H. W. LOCHNER, INC.
 2840 PLAZA PLACE, SUITE 202
 RALEIGH, NC 27612
 (919)571-7111

NC License
 Number F-0159

| | |
|---------------------------------|------------------------------|
| PROJECT REFERENCE NO. B-5407 | SHEET NO. 2A-1 |
| ROADWAY DESIGN ENGINEER | PAVEMENT DESIGN ENGINEER |

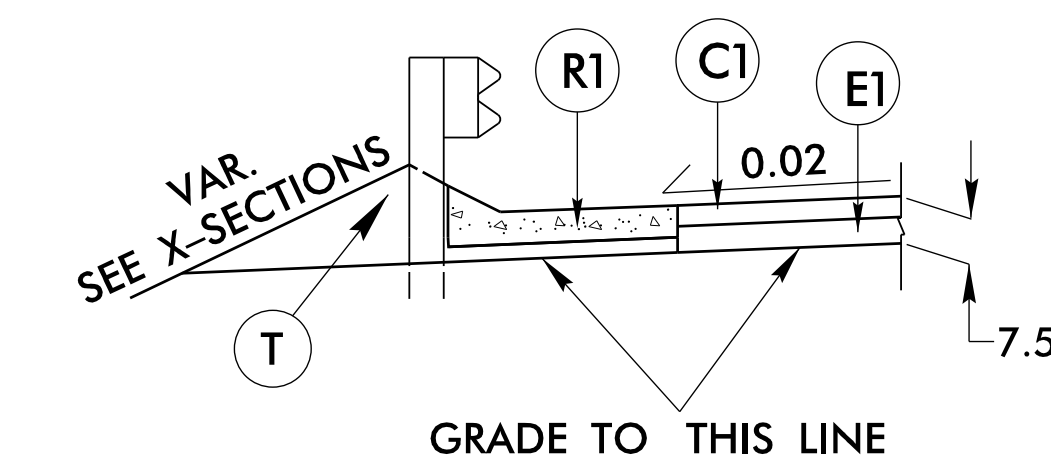
**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

**DETAIL A
 PAVED SHOULDER
 WITH GUARDRAIL**

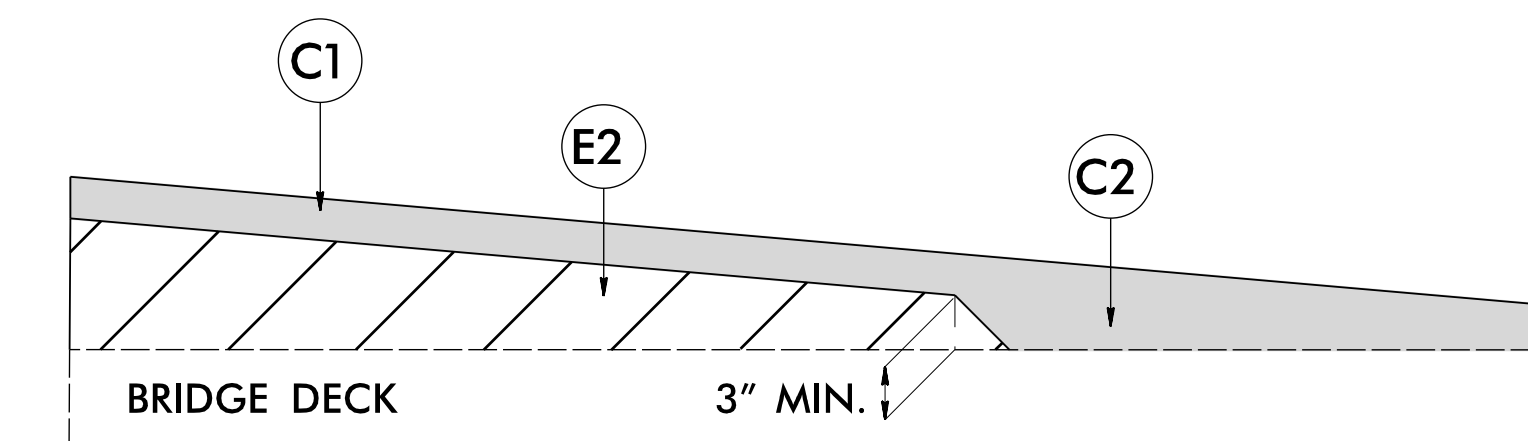


USE DETAIL A
 -L- STA. 12+20.81 TO STA. 12+95.81 (LT & RT)
 -L- STA. 14+32.00 TO STA. 14+83.19 (LT & RT)

**DETAIL B
 SHOULDER BERM GUTTER
 ON SUBGRADE**



USE DETAIL B
 -L- STA. 14+19.06 (END APPROACH SLAB) TO -L- STA. 14+32.00 (LT & RT)



**WEDGING DETAIL FOR WEARING
 SURFACE ON STRUCTURE**

12-MAR-2018 11:04 AM
 H:\Projects\2018\B-5407\RDY_psh_02_TYP.dgn

I4-DEC-2017 10:36
 S:\Contracts\Special Details\Standard Drawings\Division 8\08662d0301.dgn
 Jhowerton AT_CSD-292595

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03

SHEET 1 OF 7
862D03

NOTE:

- **POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- *THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
- SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
- MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
- LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
- SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862D03

SHEET 2 OF 7
862D03

NOTE:

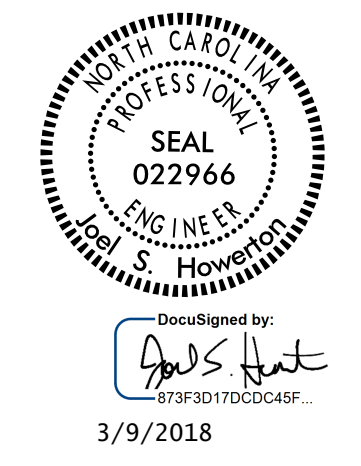
- **POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- *THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
- SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
- MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
- LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
- SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

DOCUMENT NOT CONSIDERED FINAL
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**CONTRACT STANDARDS
AND DEVELOPMENT UNIT**
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

| | |
|-------------------------|----------------|
| ORIGINAL BY: J HOWERTON | DATE: 06-22-12 |
| MODIFIED BY: | DATE: |
| CHECKED BY: | DATE: |
| FILE SPEC.: | |



STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

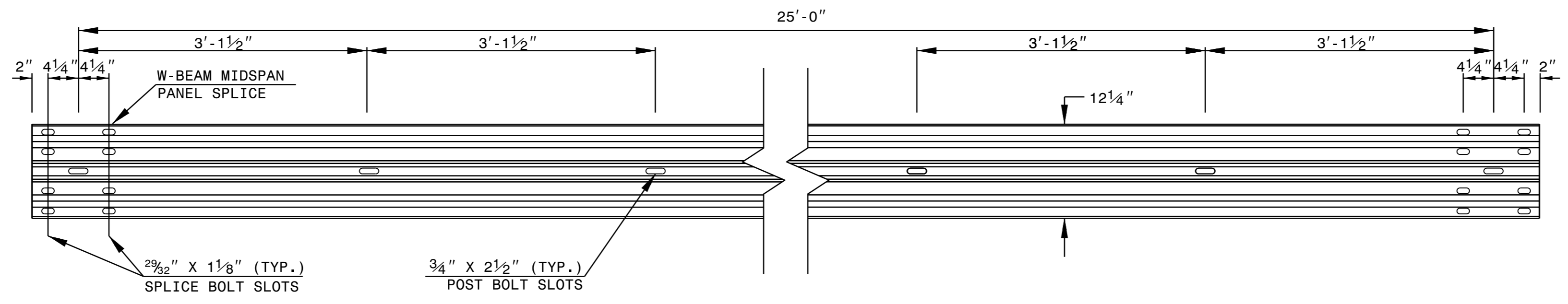
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

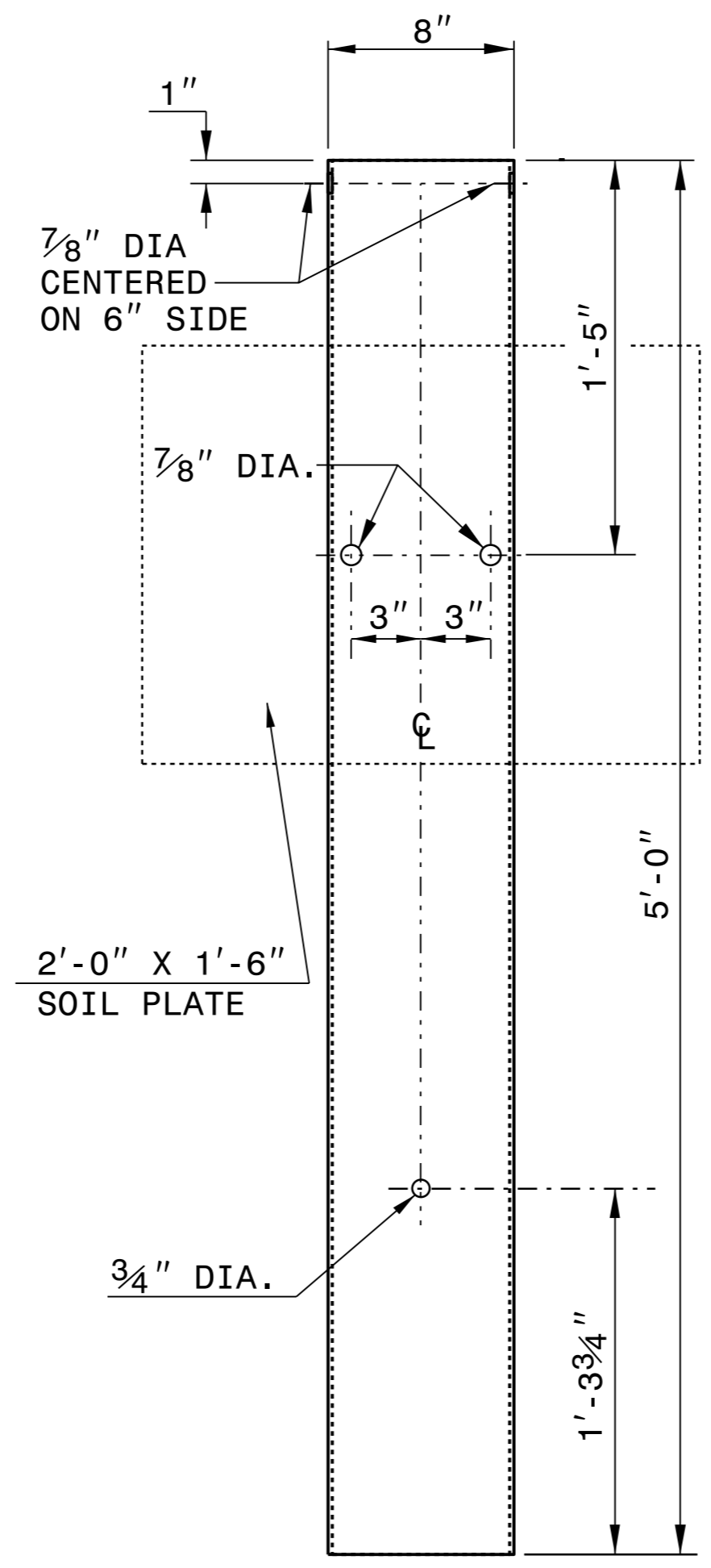
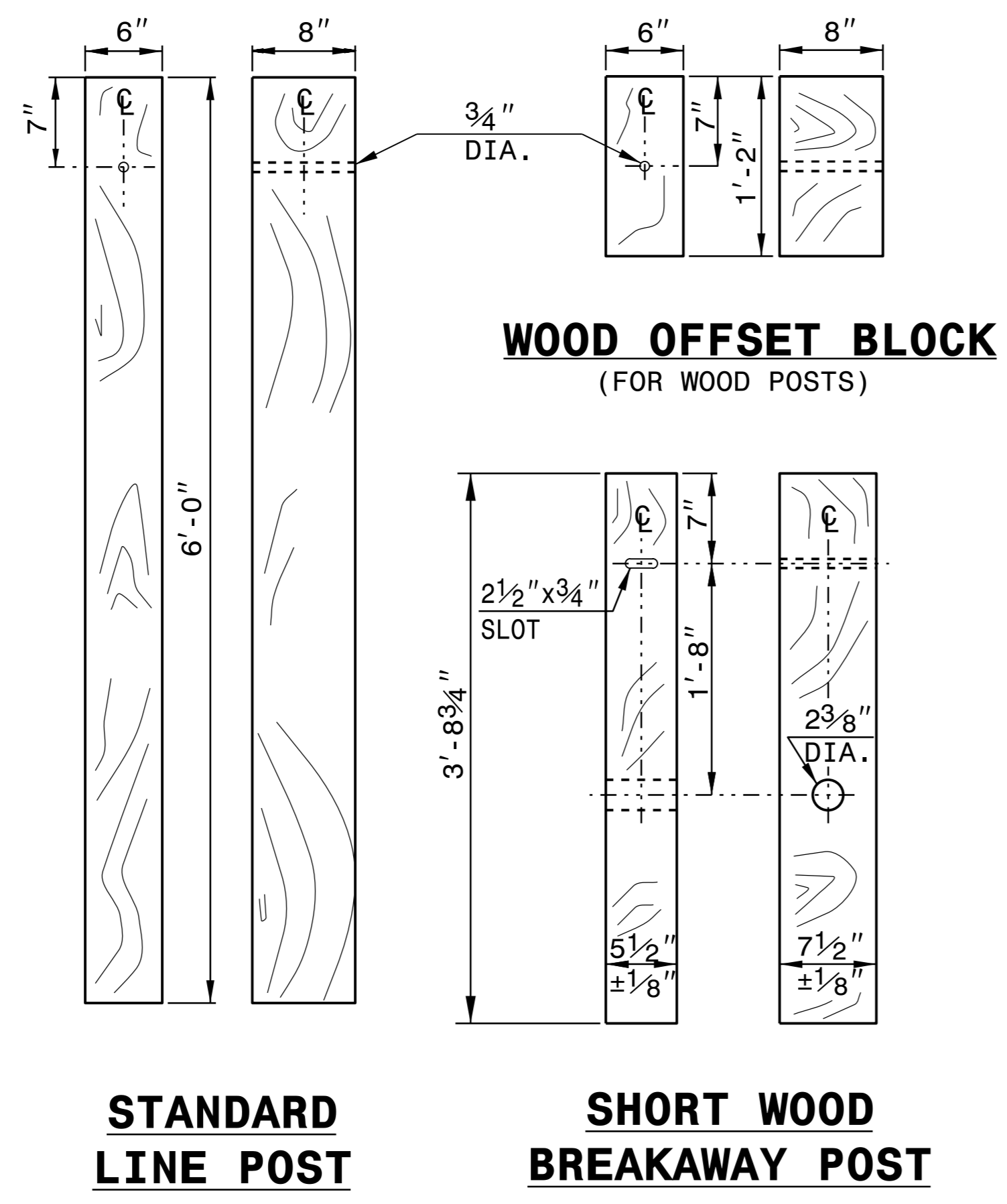
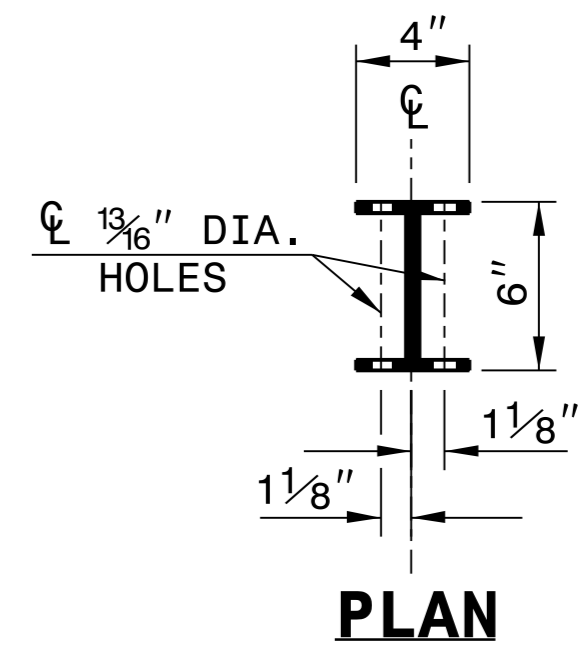
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

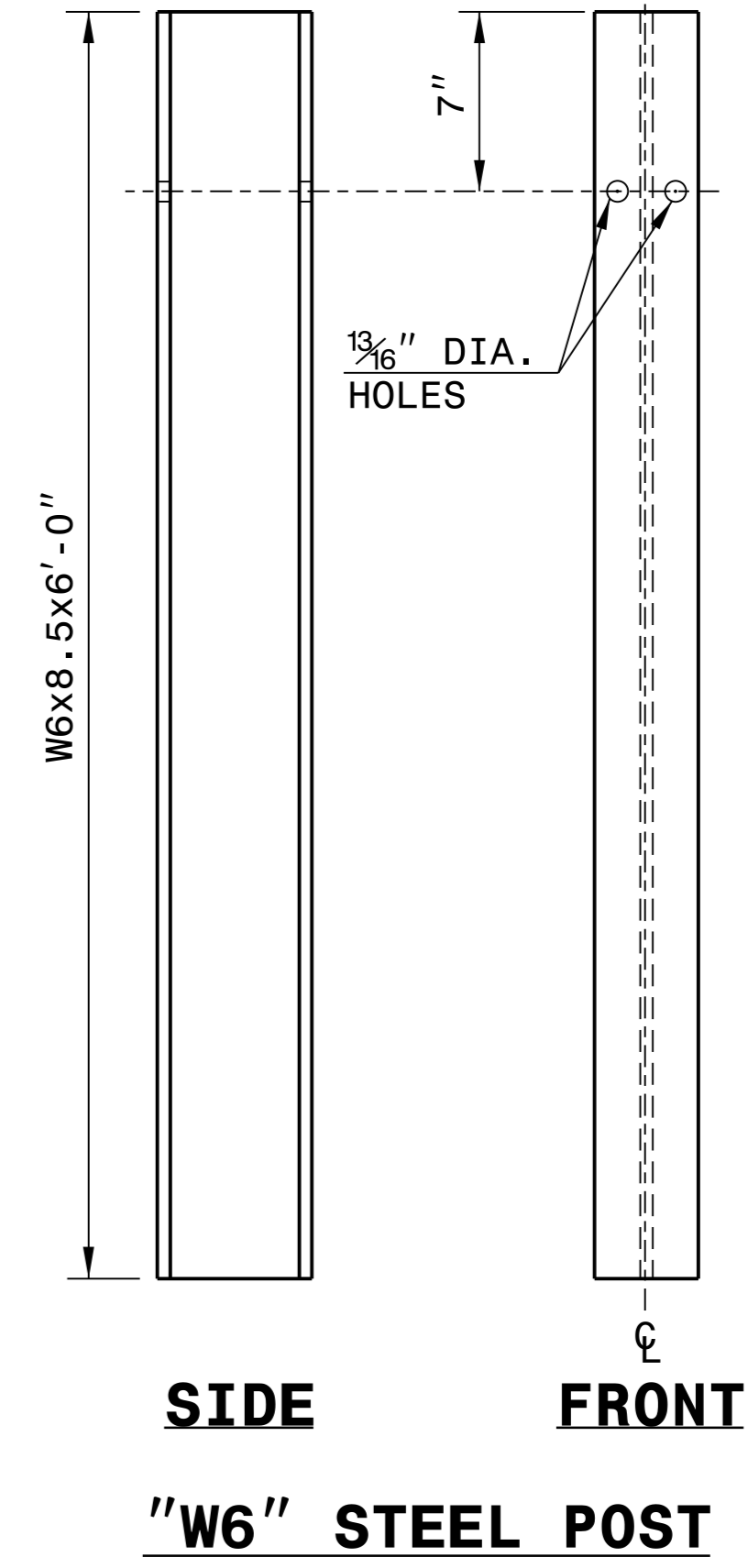
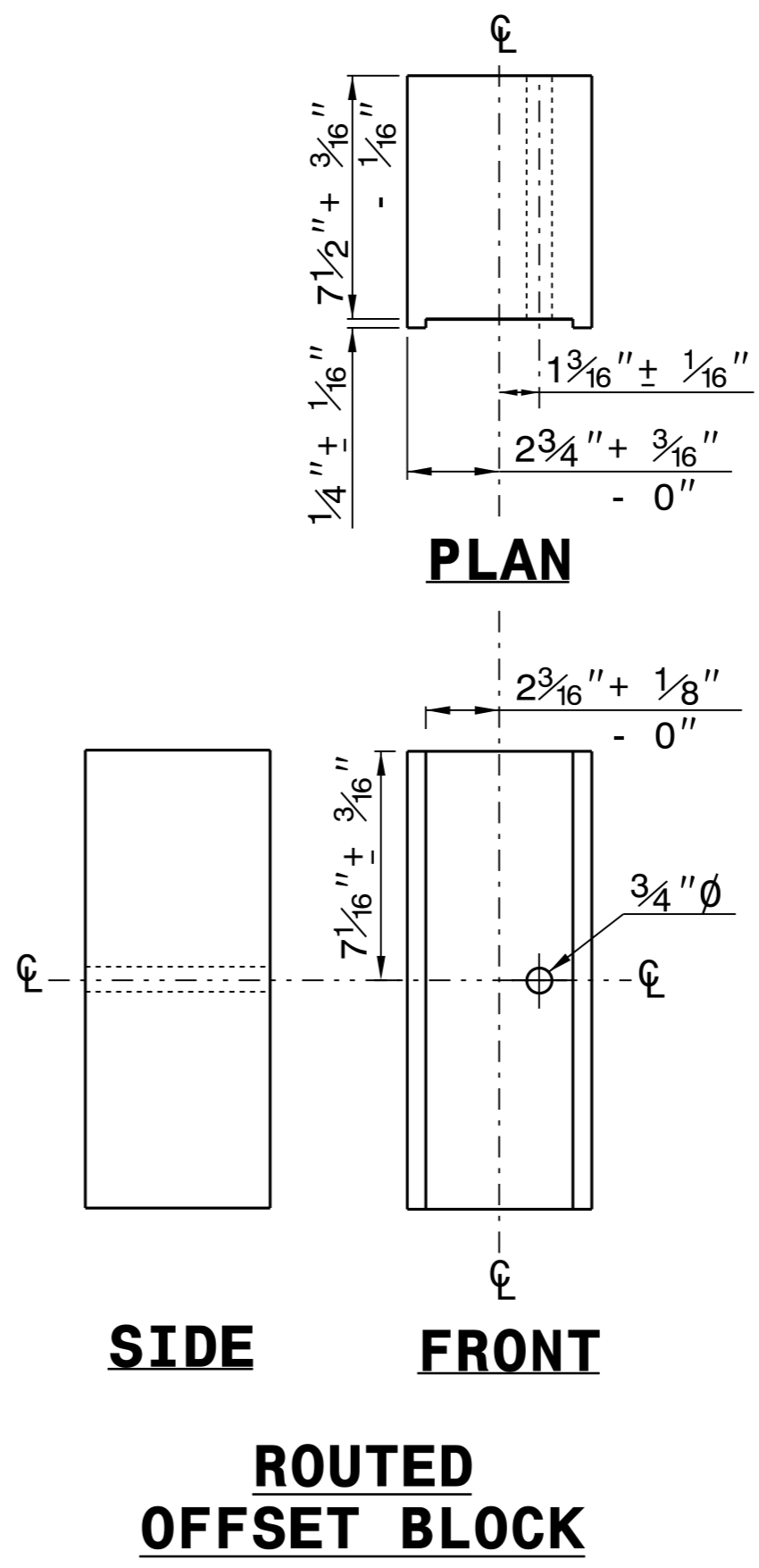
SHEET 6 OF 8
862D02



STANDARD W-BEAM GUARDRAIL



STEEL TUBE
TS 6"x8"x0.1875"



SYSTEM PARTS



DocuSigned by:
J. Howerton
3/9/2018

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

SEE TITLE BLOCK

| | |
|--------------------------|----------------|
| ORIGINAL BY: J. HOWERTON | DATE: 3-7-2018 |
| MODIFIED BY: | DATE: |
| CHECKED BY: | DATE: |
| FILE SPEC.: | |

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

SUMMARY OF EARTHWORK

IN CUBIC YARDS

| STATION | STATION | UNCLASSIFIED EXCAVATION CY | EMBANK +% CY | BORROW CY | WASTE CY |
|--|-------------------------|----------------------------|--------------|-----------|----------|
| SUMMARY 1 | | | | | |
| -L- 11+80.00 | 12+95.81 BEG. BRIDGE | 42 | 122 | 80 | 0 |
| SUMMARY 1 TOTAL | | | | | |
| | | 42 | 122 | 80 | 0 |
| SUMMARY 2 | | | | | |
| -L- 14+08.19 END BRIDGE | 15+35.00 | 33 | 279 | 246 | 0 |
| SUMMARY 2 TOTAL | | | | | |
| | | 33 | 279 | 246 | 0 |
| PROJECT SUB-TOTALS | | 75 | 401 | 326 | 0 |
| LOSS DUE TO CLEARING & GRUBBING | | -10 | | 10 | |
| EST. 5% TO REPLACE TOP SOIL ON BORROW PIT | | | | 17 | |
| GRAND TOTAL | | 65 | | 353 | |
| SAY | | 70 | | 400 | |

UNDERCUT EXCAVATION (CONTINGENCY) = 100 CY
 SELECT GRANULAR MATERIAL, CLASS III (CONTINGENCY) = 100 CY

NOTE: These 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".

FENCE SUMMARY

| LINE | STATION | STATION | SIDE | 3 STRAND BARBED WIRE LENGTH (FT) | 4 STRAND BARBED WIRE LENGTH (FT) |
|--------------|----------|----------|------|----------------------------------|----------------------------------|
| -L- | 11+97.42 | 13+35.00 | LT. | | 147.78' |
| -L- | 11+96.57 | 13+16.32 | RT. | | 121.57' |
| -L- | 14+46.11 | 15+31.86 | RT. | 89.42' | |
| TOTAL | | | | 89.42' | 269.35' |
| SAY | | | | 100' | 280' |

**SHOULDER BERM
 GUTTER SUMMARY**

| SURVEY LINE | STATION | STATION | LENGTH (FT) |
|--------------|---------|---------|-------------|
| L (RT) | 14+19 | 14+32 | 13.00 |
| L (LT) | 14+19 | 14+32 | 13.00 |
| TOTAL | | | 26.00' |
| SAY | | | 30.00' |

REMOVAL OF EXISTING ASPHALT PAVEMENT

| SURVEY LINE | STATION | STATION | AREA (SY) |
|--------------|---------|---------|-----------|
| L | 11+80 | 12+96 | 231.62 |
| L | 14+08 | 15+35 | 253.62 |
| TOTAL | | | 485.24 |
| SAY | | | 500.00 |

"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

GUARDRAIL SUMMARY

| SURVEY LINE | BEG. STA. | END STA. | LOCATION | LENGTH | | | WARRANT POINT | | "N" DIST. FROM E.O.L. | TOTAL SHOUL. WIDTH | FLARE LENGTH | | W | | ANCHORS | | | | | | | | | | REMARKS | | | | | | |
|----------------------|-----------|----------|----------|-----------|-------------|--------------|---------------|----------------|-----------------------|--------------------|--------------|--------------|--------------|--------------|---------|----|-----------|-------|----------|-------|--------|-----|------|--|---------|--|--|--|--|--|--|
| | | | | STRAIGHT | SHOP CURVED | DOUBLE FACED | APPROACH END | TRAILING END | | | APPROACH END | TRAILING END | APPROACH END | TRAILING END | XI MOD | XI | GREU TL-3 | M-350 | TYPE III | CAT-1 | VI MOD | BIC | AT-1 | | | | | | | | |
| -L- | 12+20.81 | 12+95.81 | LT | 75.00' | | | | 12+96 (Bridge) | 4'-3" | 7'-3" | 50.00' | | 1 | | | 1 | | 1 | | | | | | | | | | | | | |
| -L- | 12+20.81 | 12+95.81 | RT | 75.00' | | | | 12+96 (Bridge) | 4'-3" | 7'-3" | 50.00' | | 1 | | | 1 | | 1 | | | | | | | | | | | | | |
| -L- | 14+08.19 | 14+83.19 | LT | 75.00' | | | | 14+08 (Bridge) | 4'-3" | 7'-3" | 50.00' | | 1 | | | 1 | | 1 | | | | | | | | | | | | | |
| -L- | 14+08.19 | 14+83.19 | RT | 75.00' | | | | 14+08 (Bridge) | 4'-3" | 7'-3" | 50.00' | | 1 | | | 1 | | 1 | | | | | | | | | | | | | |
| SUB-TOTAL | | | | 300.00' | | | | | | | | | | | | 4 | | 4 | | | | | | | | | | | | | |
| LESS ANCHORS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | GREU TL-3 | 4@50.00 | -200.00' | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | TYPE-III | 4@18.75 | -75.00' | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL | | | | 25.00' | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SAY | | | | 25.00' | | | | | | | | | | | | | | | | | | | | | | | | | | | |

ADDITIONAL GUARDRAIL POSTS = 5 EA.

6/21/08

COMPUTED BY: CLY DATE: 08-29-2017
 CHECKED BY: BKE DATE: 08-30-2017

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

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. SHEET NO.
 B-5407 36-1

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

**SUMMARY OF AGGREGATE
 SUBGRADE /STABILIZATION**

| LOCATION | 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 |
|--------------|---------|---------|-------------------------------|----------------------------------|---------------------------|---|---|---------------------------------|--|
| CONT INGENCY | | | | | 50 | 80 | 100 | | |
| | | ASU | TOTAL CY/TONS/SY | | 50 | 80 | 100 ** | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

*ASU = Aggregate Subgrade
 *ATU = 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.

SUMMARY OF SUBSURFACE DRAINAGE

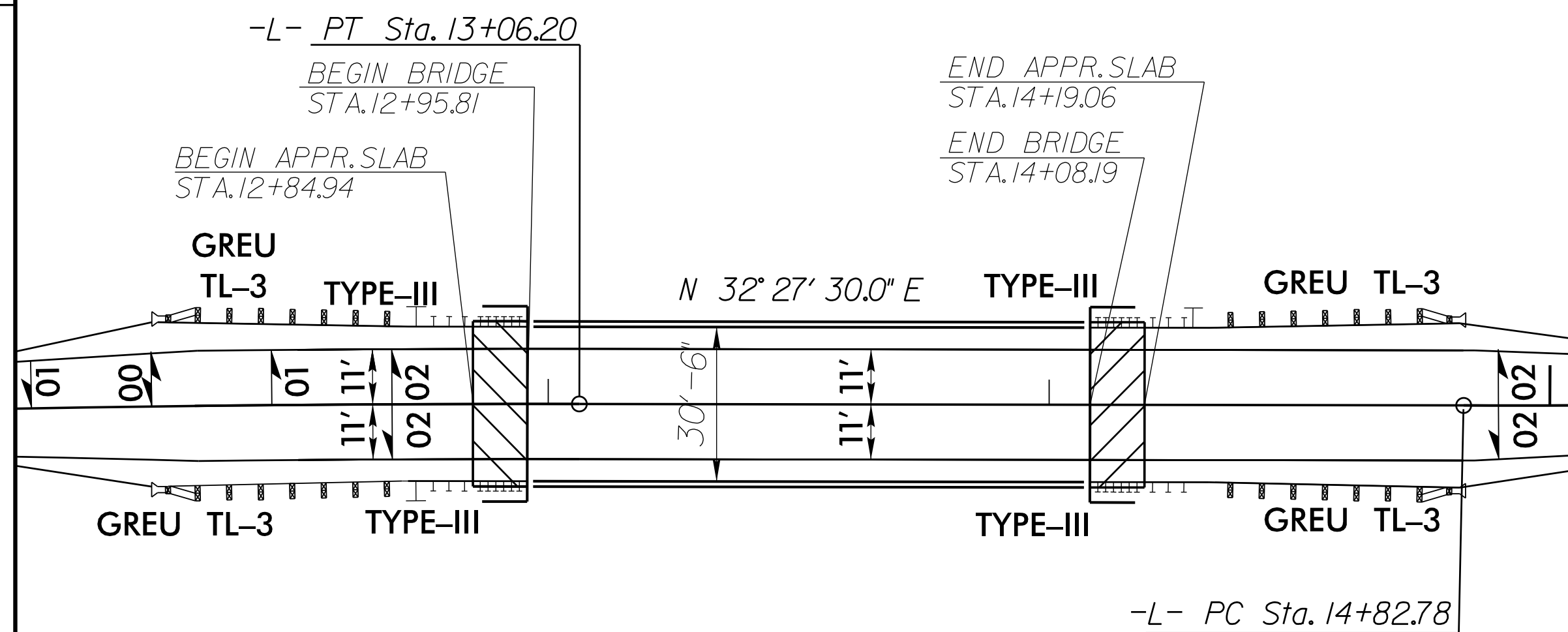
| SURVEY LINE | STATION | STATION | LOCATION (LT/CL/RT) | DRAIN TYPE* UD/BD/SD | 6" PERFORATED SUBDRAIN PIPE LF |
|----------------|---------|---------|------------------------|-------------------------|--------------------------------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | CONT INGENCY | SD | 100 |
| | | | | TOTAL LF | 100 |
| | | | | | |

* UD - UNDERDRAIN
 * BD - BLIND DRAIN
 * SD - SUBSURFACE DRAIN

2/18/2018
 B5407_rdu_psh_036-1_sum.dgn
 chakel

8/17/99

BRIDGE/ PAVEMENT RELATIONSHIP SKETCH



LOCHNER

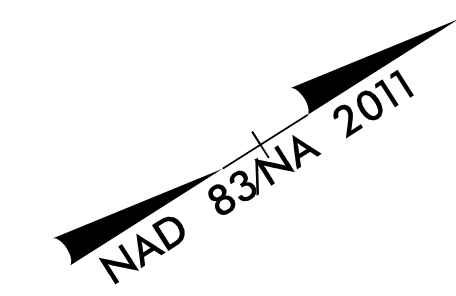
H. W. LOCHNER, INC.
 2840 PLAZA PLACE, SUITE 202
 RALEIGH, NC 27612
 (919) 571-7111

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-5407 | SHEET NO. 4 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| SEAL 25523 BRIAN K. EASON 3/14/2018 | SEAL 039102 BRANDON D. PARHAM 3/14/2018 |

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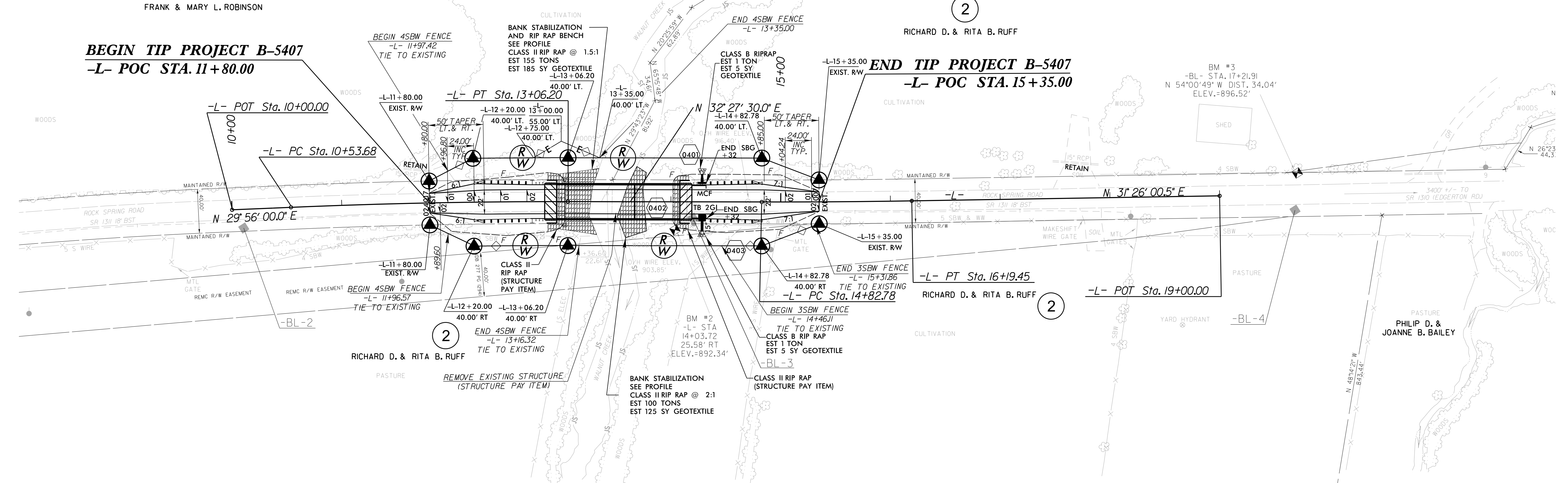
-L-
 PI Sta 11+79.96 Δ = 2° 31' 30.0" (RT)
 D = 0° 59' 59.7"
 L = 252.52'
 T = 126.28'
 R = 5,730.00'
 SE = 2%
 Ro = 48'
 VD = 50 mph

PI Sta 15+51.12 Δ = 1° 01' 30.0" (LT)
 D = 0° 44' 59.8"
 L = 136.68'
 T = 68.34'
 R = 7,640.00'
 SE = NC
 VD = 50 mph

1
 FRANK & MARY L. ROBINSON

BEGIN TIP PROJECT B-5407
 -L- POC STA. 11+80.00

END TIP PROJECT B-5407
 -L- POC STA. 15+35.00



REVISIONS

8/14/2018 B-5407_Roy_PSH04.dgn

PAVED SHOULDER
 SEE SHEET 5 FOR -L- PROFILE
 SEE SHEET S-1 TO S-24 FOR STRUCTURE PLANS

5/14/19

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

NC License
 Number F-0159

ECOLOGICAL
 ENGINEERING

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 Suite 101
 Cary, NC 27518
 (919) 557-0929

| | |
|---------------------------------|------------------------|
| PROJECT REFERENCE NO. B-5407 | SHEET NO. 5 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| | |

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE = 2400 CFS
 DESIGN FREQUENCY = 25 YRS
 DESIGN HW ELEVATION = 890.6 FT
 BASE DISCHARGE = 4060 CFS
 BASE FREQUENCY = 100 YRS
 BASE HW ELEVATION = 892.38 FT
 OVERTOPPING DISCHARGE = 3108 CFS
 OVERTOPPING FREQUENCY = 50+ YRS
 OVERTOPPING ELEVATION = 891.5 FT

DATE OF SURVEY = 2/2/2016
 W.S. ELEVATION AT DATE OF SURVEY = 881.4 FT

-L-

CL STA. 13+52.00 -L-
 @ 70' 24" CORED SLAB
 @ 40' 21" CORED SLAB
 W/ 4'-0" CAPS
 GP = 894.47'
 SKEW = 90'

BM #2
 -L- STA 14+03.72
 25.58' RT
 ELEV. = 892.34'

BEGIN GRADE
 -L- STA. 11+80.00
 ELEV. = 898.07'

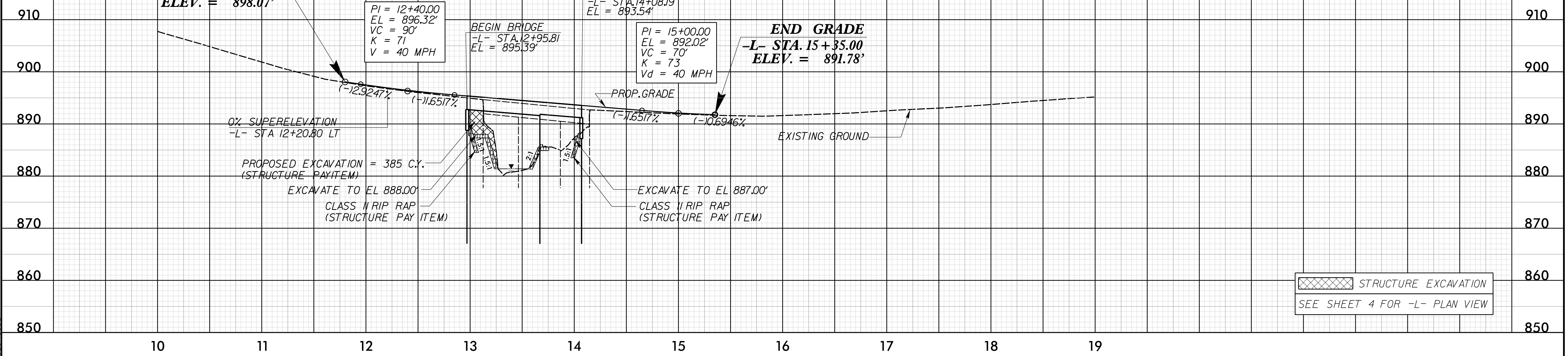
PI = 12+40.00
 EL = 896.32'
 VC = 90'
 K = 71
 V = 40 MPH

BEGIN BRIDGE
 -L- STA. 12+95.81
 EL = 895.39'

END BRIDGE
 -L- STA. 14+08.19
 EL = 893.54'

PI = 15+00.00
 EL = 892.02'
 VC = 70'
 K = 73
 Vd = 40 MPH

END GRADE
 -L- STA. 15+35.00
 ELEV. = 891.78'



0% SUPERELEVATION
 -L- STA 12+20.80 LT

PROPOSED EXCAVATION = 385 C.Y.
 (STRUCTURE PAY ITEM)
 EXCAVATE TO EL 888.00'
 CLASS 11 RIP RAP
 (STRUCTURE PAY ITEM)

EXCAVATE TO EL 887.00'
 CLASS 11 RIP RAP
 (STRUCTURE PAY ITEM)

STRUCTURE EXCAVATION
 SEE SHEET 4 FOR -L- PLAN VIEW

3/14/2018
B-5407_Roy_P-05.dgn