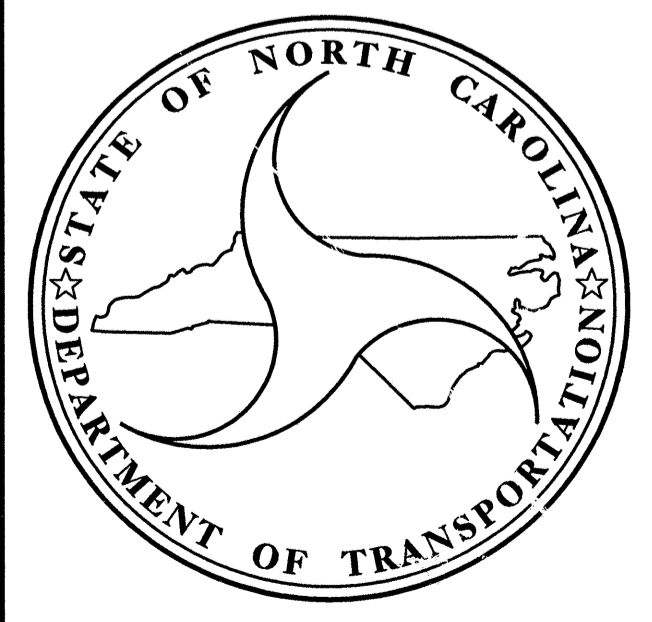


**TIP I-5512**

**CONTRACT: C203601**

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 USER: msells  
 DATE: 7/29/2014  
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DESIGN DATA	
TUNNEL #15	ADT = 9500 IN 2009
TUNNEL #17	ADT = 9500 IN 2009
TUNNEL #104	ADT = 9500 IN 2009

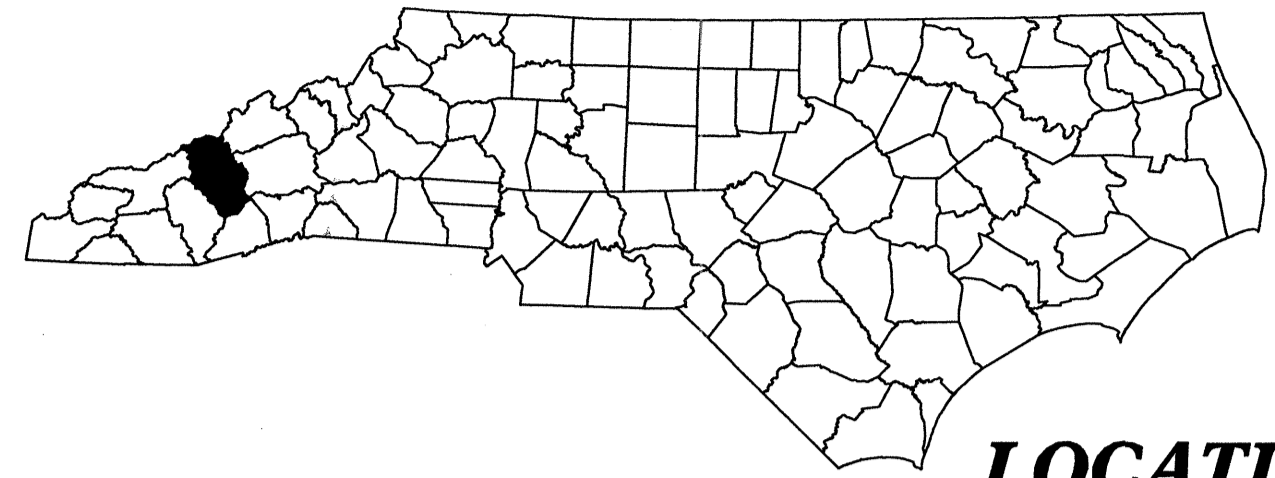
PROJECT LENGTH
LENGTH ROADWAY OF PROJECT = 0.05 MILES
LENGTH STRUCTURE OF PROJECT = 0.624 MILES
TOTAL LENGTH OF STATE PROJECT = 0.674 MILES

STRUCTURES MANAGEMENT UNIT 1000 BIRCH RIDGE DR. RALEIGH, N.C. 27610	
2012 STANDARD SPECIFICATIONS	MATTHEW MOYER, P.E. PROJECT ENGINEER
LETTING DATE :	JOSHUA DEYTON, P.E. PROJECT ENGINEER
OCTOBER 21, 2014	

Prepared In the Office of:  
**HDR**  
 HDR Engineering, Inc. of the Carolinas  
 3733 National Drive, Suite 207 Raleigh, N.C. 27612  
 N.C.B.E.L.S. License Number: F-0116

**MATTHEW MOYER, P.E.**  
 PROJECT DESIGN ENGINEER

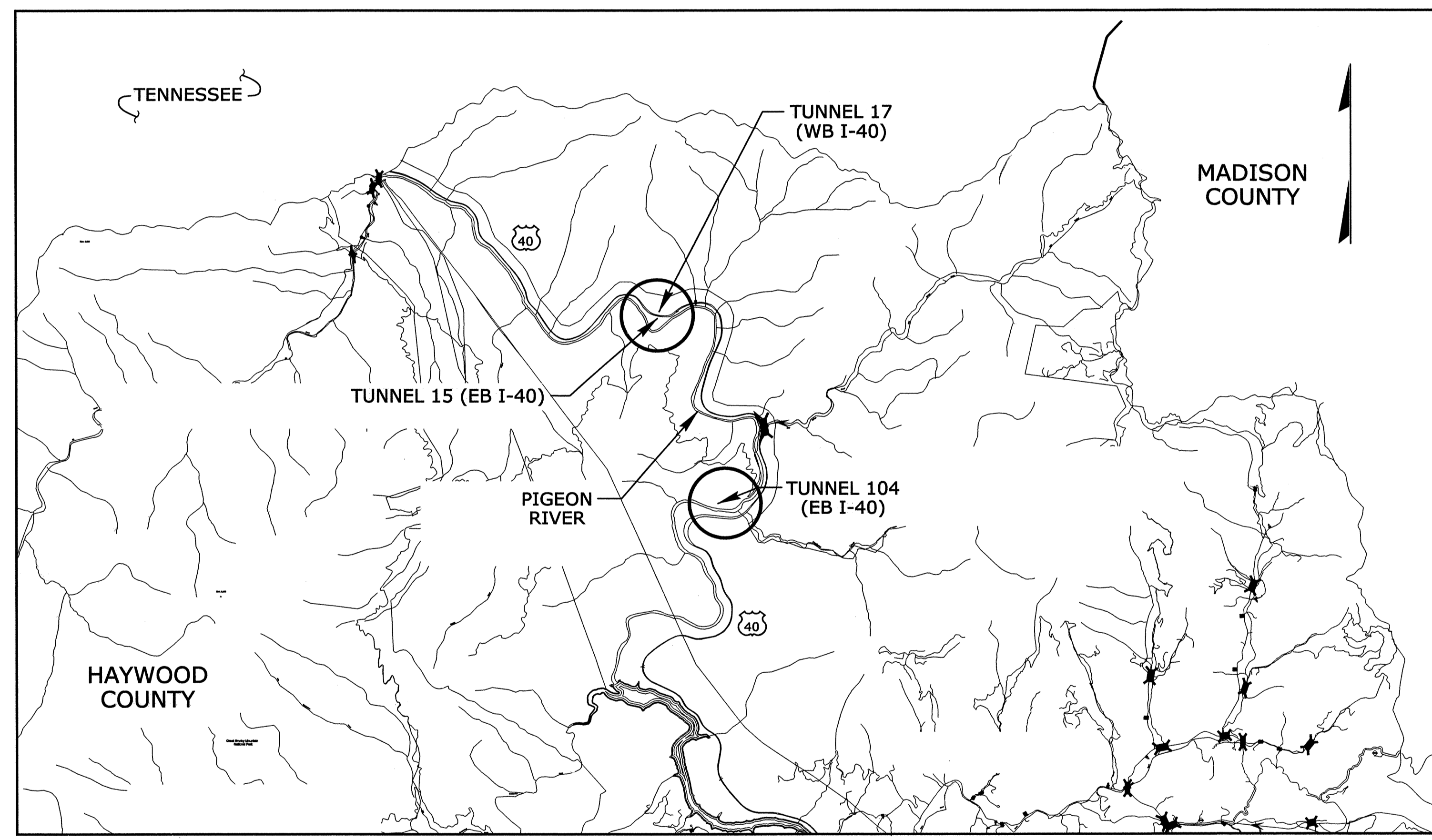
ENGINEER  
 MATTHEW J. MOYER  
 032129  
 7-29-14  
 P.E.  
 BRIDGE DESIGN ENGINEER



STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS  
**HAYWOOD COUNTY**

**LOCATION: TUNNEL 15, TUNNEL 17 AND TUNNEL 104 ON I-40 BETWEEN  
 THE TENNESSEE STATE LINE AND SR 1338  
 (FINES CREEK ROAD - EXIT 15)**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING AND TUNNEL REPAIR**



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	TIP I-5512	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.14.P.10		P.E.	
50136.3.FS1	NHPIM-040-1(260)	CONST.	

TIP I-5512

CONTRACT: C203601

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**HAYWOOD COUNTY**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	TIP I-5512	1A	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.14.P.10		P.E.	
50136.3.FS1	NHPIM-040-1(260)	CONST.	

**LOCATION: TUNNEL 15, TUNNEL 17 AND TUNNEL 104 ON I-40 BETWEEN THE TENNESSEE STATE LINE AND SR 1338 (FINES CREEK ROAD - EXIT 15)**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING AND TUNNEL REPAIR**

INDEX OF SHEETS

DWG. #	DESCRIPTION
1	TITLE SHEET
1A	INDEX OF SHEETS
3A	GUARDRAIL SUMMARY
4 THRU 7	ROADWAY PLANS
TMP-1 THRU TMP-4	TRANSPORTATION MANAGEMENT PLANS
E-001 THRU E-025	ELECTRICAL PLANS
EC-1 THRU EC-2	EROSION CONTROL PLANS
S-001 THRU S-110	STRUCTURE PLANS

EFF. 01-17-2012  
REV. 10-30-2012

GENERAL NOTES:

2012 SPECIFICATIONS  
EFFECTIVE: 01-17-2012  
REVISED: 07-30-2012

2012 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, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

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.

STD.NO. TITLE

DIVISION 3 - PIPE CULVERTS  
310.01 Method of Pipe Installation

DIVISION 8 - INCIDENTALS  
846.01 Concrete Curb, Gutter and Curb & Gutter  
862.01 Guardrail Placement  
862.02 Guardrail Installation  
862.03 Structure Anchor Units

STRUCTURES MANAGEMENT UNIT  
1000 BIRCH RIDGE DR.  
RALEIGH, N.C. 27610

2012 STANDARD SPECIFICATIONS

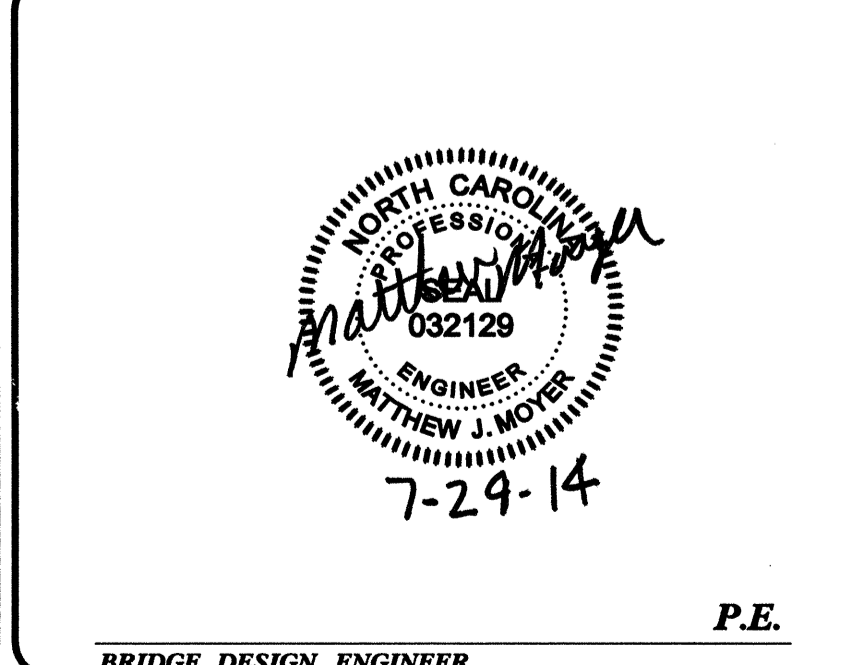
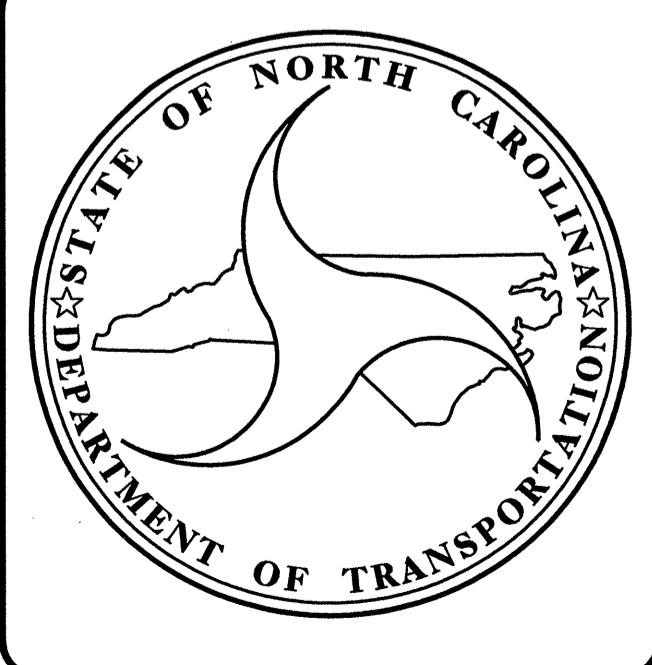
LETTING DATE :  
OCTOBER 21, 2014

MATTHEW MOYER, P.E.  
PROJECT ENGINEER

JOSHUA DEYTON, P.E.  
PROJECT ENGINEER

Prepared In the Office of:  
HDR Engineering, Inc. of the Carolinas  
3733 National Drive, Suite 207 Raleigh, N.C. 27612  
N.C.B.E.L.S. License Number: F-0116

MATTHEW MOYER, P.E.  
PROJECT DESIGN ENGINEER



PLOT DRIVER: NCDOT\_pdf\_mono\_enc\_50.plt  
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PENTABLE: I-40 Tunnel.tbl  
TIME: 2:55:31 PM

DATE: 7/29/2014

P.E.

BRIDGE DESIGN ENGINEER

COMPUTED BY: E. BROOKS DATE: 11-11-2013  
 CHECKED BY: E. BROOKS DATE: 11-11-2013

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

"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

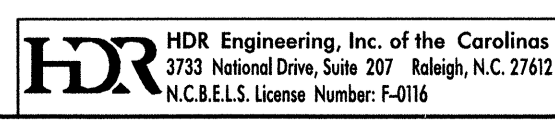
# GUARDRAIL SUMMARY

TUNNEL NO.	ROAD / ALIGNMENT	DIRECTION	LOCATION (LEFT / RIGHT)	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS							IMPACT ATTENUATOR TYPE 350			REMARKS																	
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU 350	CAT-1	TYPE III										NO.	G	NG													
15	I-40	EASTBOUND	RT	162.5			TUNNEL FACE		VAR	VAR	143.75	NA	8.6	NA	1		1																									
15	SERVICE RD	EASTBOUND	LT	100			ELECTRICAL STRUC.		4	NA	50	NA	1	NA	1	1																										
104	I-40	EASTBOUND	RT	106.25			TUNNEL FACE		VAR	VAR	TIE TO EXIST W 50:1 TAPER	NA	VAR	NA			1																							TIE TO EXISTING WITH 50:1 TAPER; ACTUAL LENGTH MAY VARY. ADD ADDITIONAL SPACER BLOCKS AS NECESSARY.		
SUBTOTAL				368.75											2	1	2																									
LESS																																										
ANCHOR UNITS																																										
GRAU-350 (2) @ 50'																																										
CAT-1 (1) @ 6.25'																																										
TYPE III (2) @ 18.75'																																										
SUBTOTAL																																										
TOTAL				225												2	1	2																								

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PROJECT NO. I-5512, 50136.3.FS1  
 HAYWOOD COUNTY  
 STATION: \_\_\_\_\_

DRAWN BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

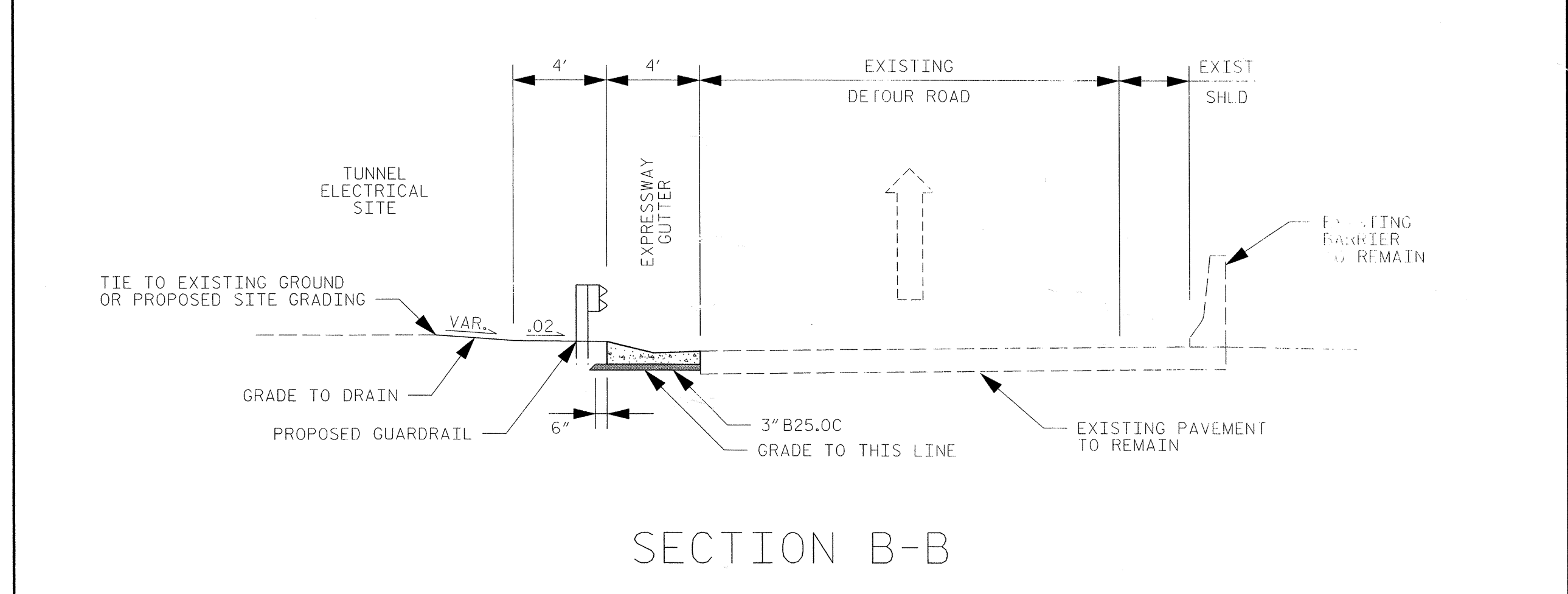
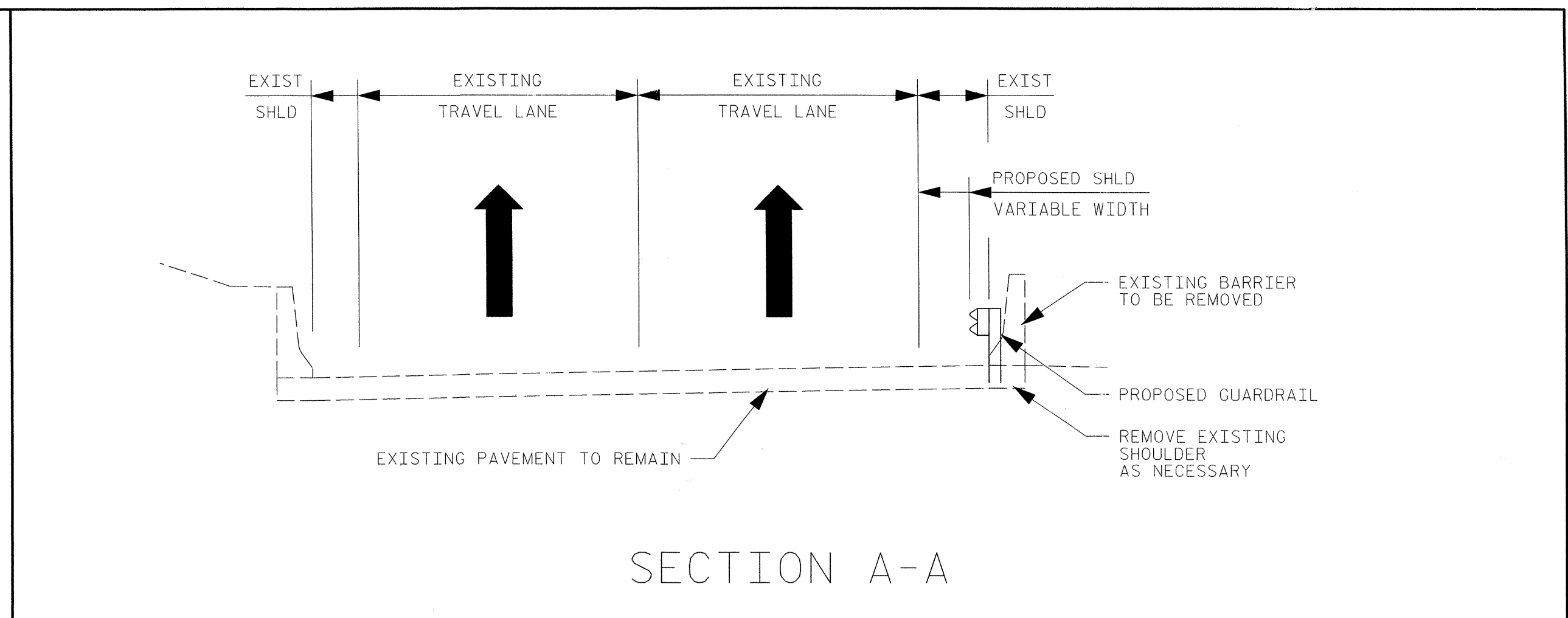
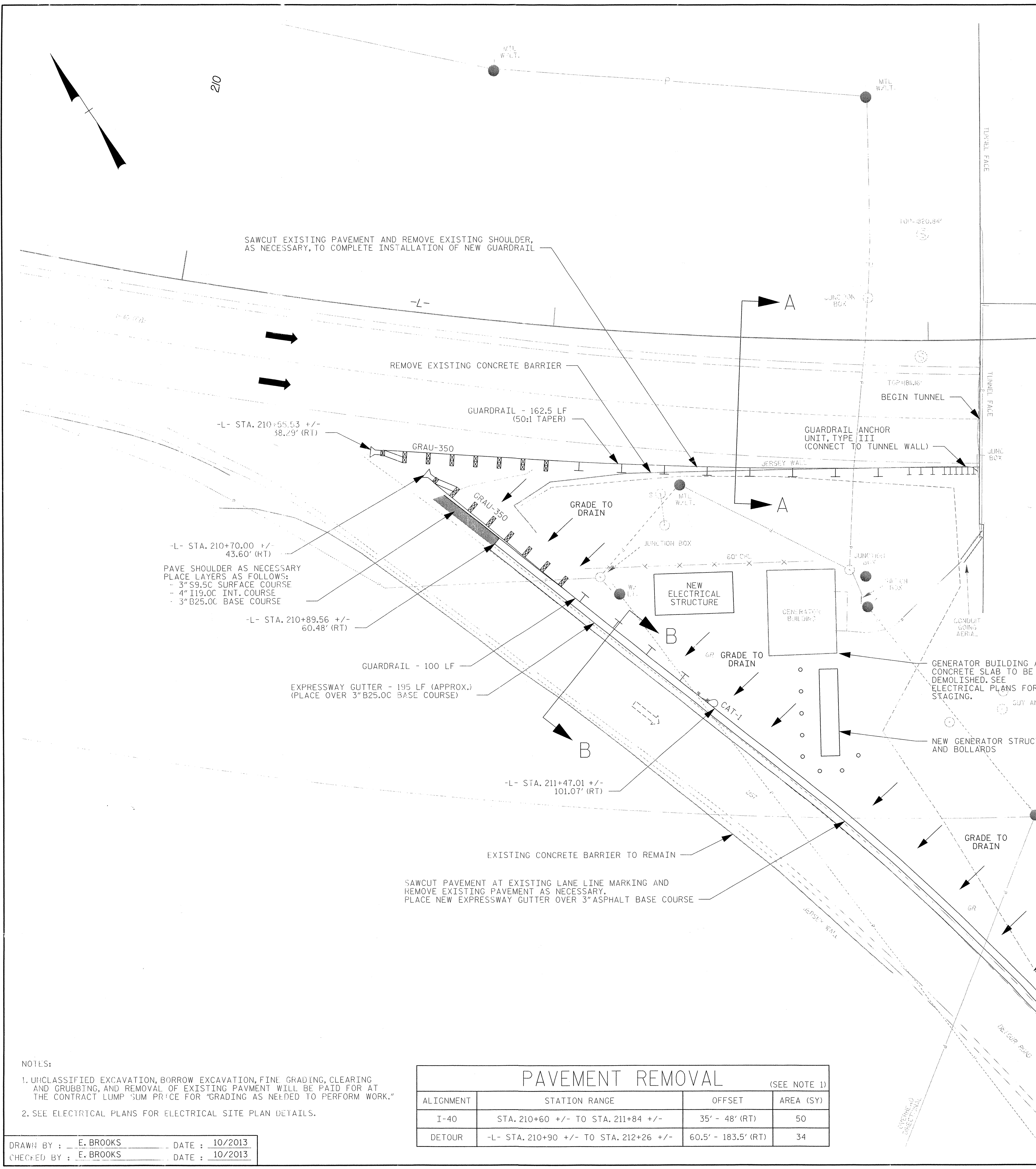


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

## GUARDRAIL SUMMARY

REVISIONS						SHEET NO. 3-A TOTAL SHEETS
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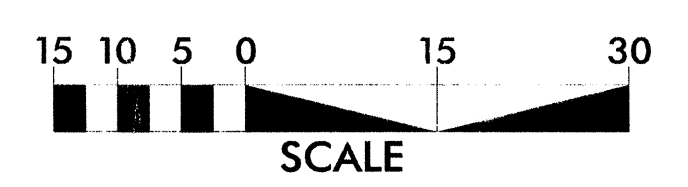


**ASPHALT PAVEMENT SCHEDULE & NOTES:**

PLACE 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS PER SY YD IN EACH OF TWO LAYERS

PLACE 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF **456 LBS PER SY YD**

PLACE 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 342 LBS PER SY YD.



PROJECT NO. I-5512, 50136.3.FS1  
HAYWOOD COUNTY  
 STATION: 211+50 -L- (EB I-40)

NOTES:  
 1. 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 AS NEEDED TO PERFORM WORK.  
 2. SEE ELECTRICAL PLANS FOR ELECTRICAL SITE PLAN DETAILS.

PAVEMENT REMOVAL (SEE NOTE 1)			
ALIGNMENT	STATION RANGE	OFFSET	AREA (SY)
I-40	STA. 210+60 +/- TO STA. 211+84 +/-	35' - 48' (RT)	50
DETOUR	-L- STA. 210+90 +/- TO STA. 212+26 +/-	60.5' - 183.5' (RT)	34

DRAWN BY: E. BROOKS DATE: 10/2013  
 CHECKED BY: E. BROOKS DATE: 10/2013

PAVEMENT DESIGN ENGINEER  
 NORTH CAROLINA PROFESSIONAL SEAL 024964  
 JOSEPH T. HOFFMAN  
 8/15/14

ROADWAY DESIGN ENGINEER  
 NORTH CAROLINA PROFESSIONAL SEAL 032584  
 E. BROOKS  
 8/11/14

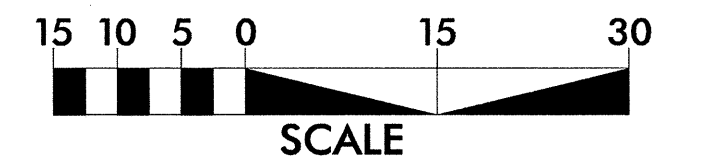
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

TUNNEL 15  
 ROADWAY PLAN

REVISIONS						SHEET NO. 4	TOTAL SHEETS
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2	--	--	4	--	--		

HDR HDR Engineering, Inc. of the Carolinas  
 3783 National Drive, Suite 207 Raleigh, NC 27612  
 N.C.B.E.L.S. License Number: F-0116

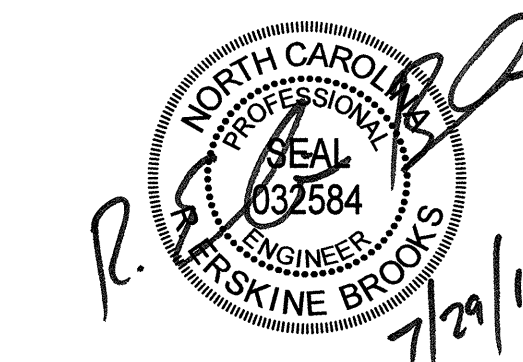
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PROJECT NO. I-5512, 50136.3.FS1  
 HAYWOOD COUNTY  
 STATION: 23+40 -L- (EB I-40)

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

TUNNEL 104  
 ROADWAY PLAN

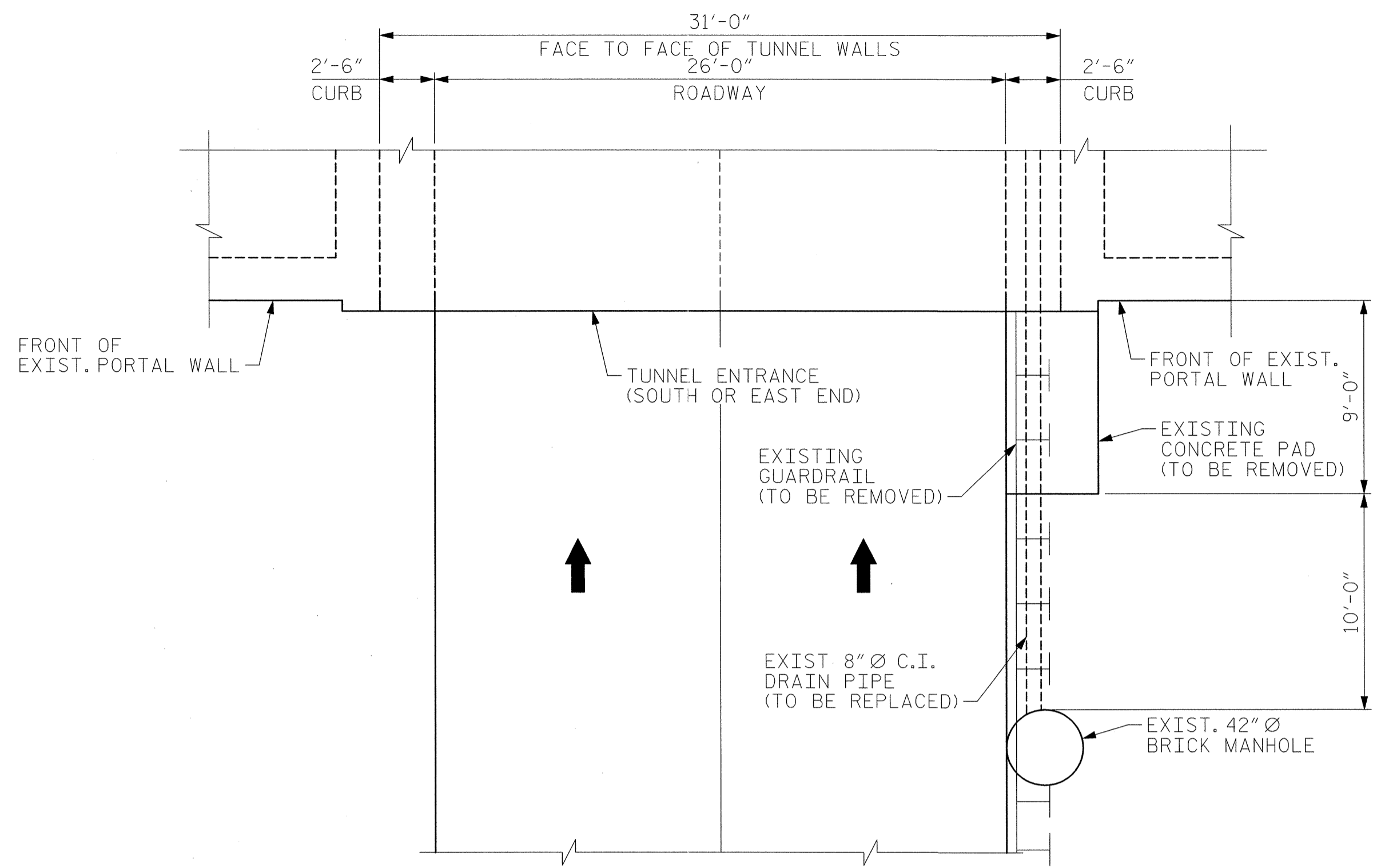


NOTE: SEE ELECTRICAL PLANS FOR ELECTRICAL SITE PLAN DETAILS.

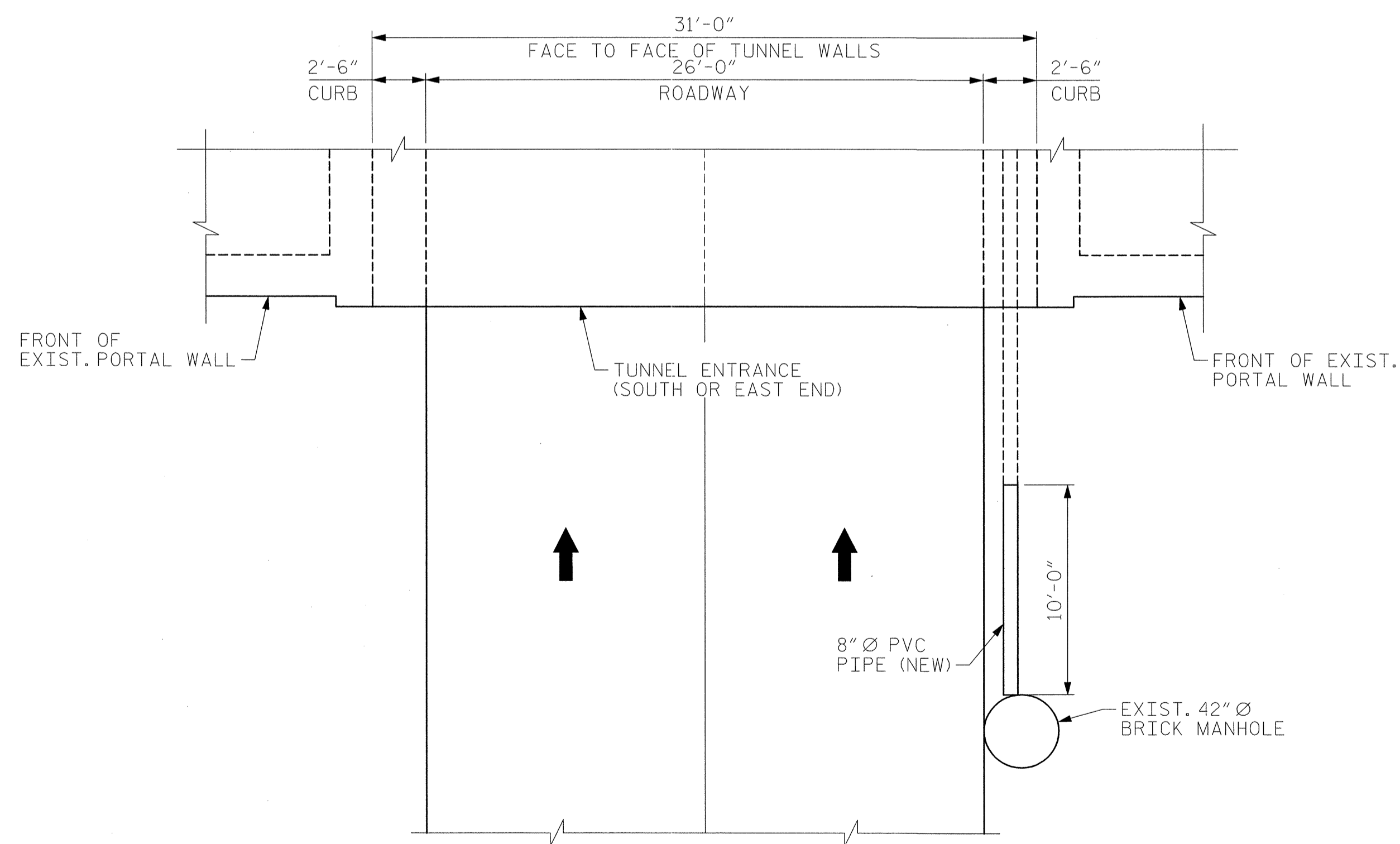
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 CHECKED BY : E. BROOKS DATE : 10/2013

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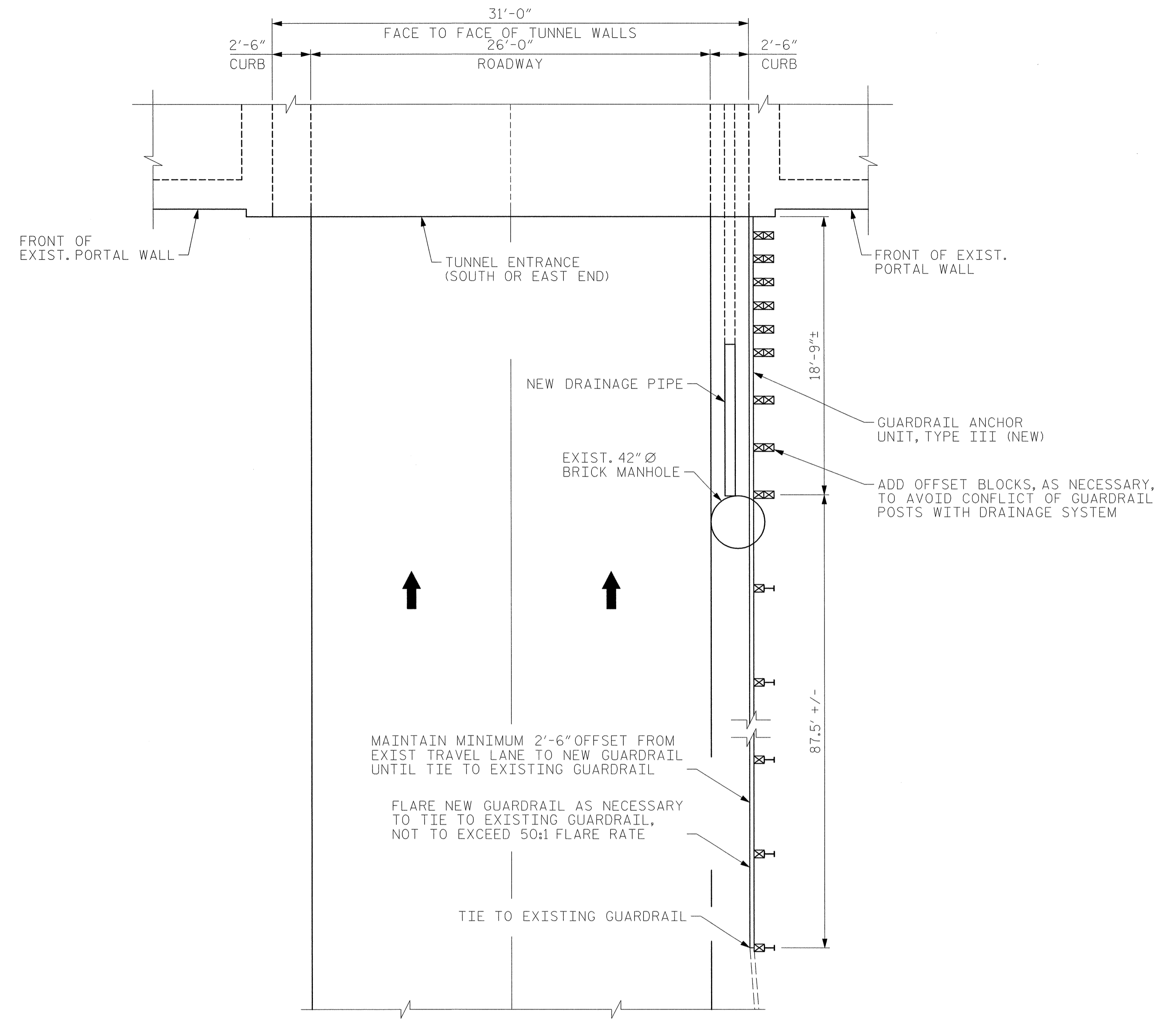
HDR HDR Engineering, Inc. of the Carolinas  
 3733 National Drive, Suite 207 Raleigh, N.C. 27612  
 N.C.E.L.S. License Number: F-0116



EXISTING PLAN OF TUNNEL ENTRANCE



DRAINAGE PIPE REPLACEMENT AT TUNNEL ENTRANCE

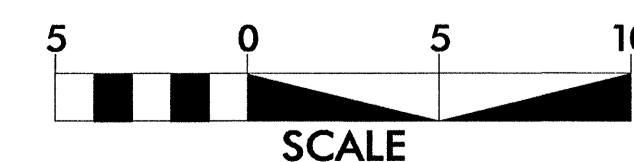
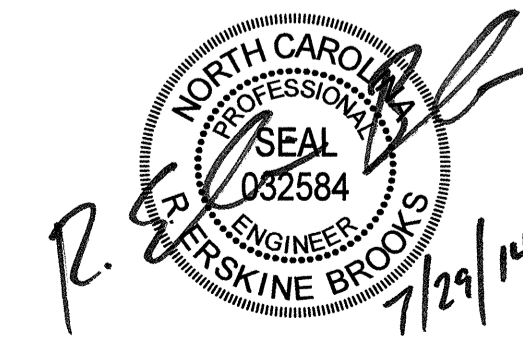


GUARDRAIL REPLACEMENT AND ANCHORAGE AT TUNNEL ENTRANCE

PROJECT NO. I-5512, 50136.3.FS1  
 HAYWOOD COUNTY  
 STATION: \_\_\_\_\_

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

TUNNEL 104  
 DRAINAGE PIPE  
 REPAIR



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

HDR Engineering, Inc. of the Carolinas  
 3723 National Drive, Suite 207 Raleigh, NC 27612  
 N.C.B.E.L.S. License Number: F-016

PLOT DRIVER: NCDOT\_pdf\_color\_eng\_100.plt  
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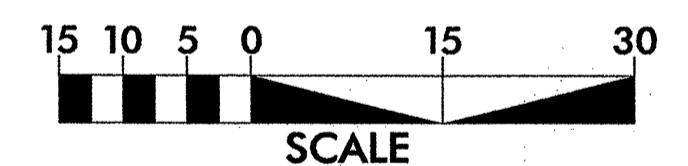
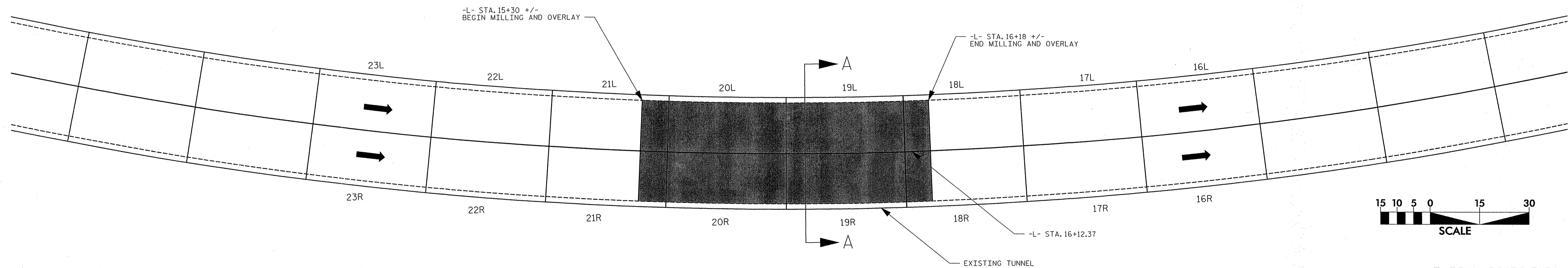
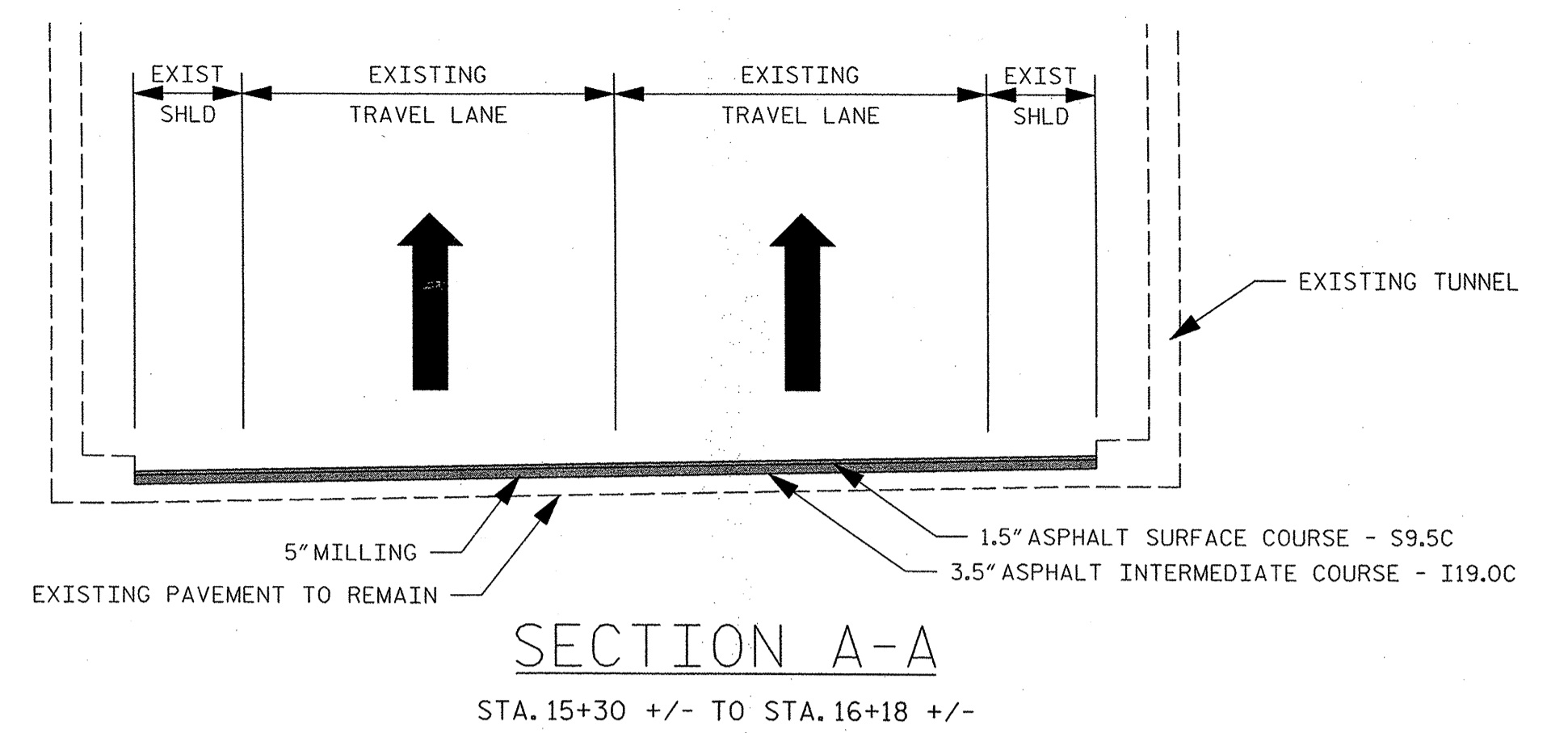
DRAWN BY: E. BROOKS DATE: 10/20/13  
 CHECKED BY: E. BROOKS DATE: 10/20/13

### ASPHALT PAVEMENT SCHEDULE & NOTES:

PLACE 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS PER SY YD

PLACE 3.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 399 LBS PER SY YD.

AS NECESSARY AND AS DIRECTED BY THE ENGINEER, REPAIR EXISTING ASPHALT BASE COURSE AND SUBGRADE BY PLACING ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS PER SY YD PER 1" IN DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.



PROJECT NO. I-5512, 50136.3.FS1  
HAYWOOD COUNTY  
 STATION: 15+80 -L- (EB I-40)

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

### TUNNEL 104 ASPHALT OVERLAY

PAVEMENT DESIGN ENGINEER

*Joseph T. Holland* 8/15/14

SEAL 024964

ENGINEER

JOSEPH T. HOLLAND

ROADWAY DESIGN ENGINEER

*E. Brooks* 7/29/14

SEAL 032584

ENGINEER

ERSKINE BROOKS

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

**HDR** HDR Engineering, Inc. of the Carolinas  
 3733 National Drive, Suite 207 Raleigh, N.C. 27612  
 N.C.B.E.L.S. License Number: F-016

DRAWN BY : E. BROOKS DATE : 10/2013  
 CHECKED BY : E. BROOKS DATE : 10/2013

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