

**CONTRACT: ID: U-4716**

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

**CONTENTS**

<u>LINE</u>	<u>STATION</u>	<u>PLAN</u>	<u>PROFILE</u>	<u>XSECT</u>
-L-	3298+92.00 - 3343+15.82	5-7	8-9	10

APPENDIX A - SPECIAL PROVISION FOR GEOGRID FOR EMBANKMENT SUBGRADE STABILIZATION

**RAILWAY**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. \_\_\_\_\_ F.A. PROJ. \_\_\_\_\_  
 COUNTY DURHAM  
 PROJECT DESCRIPTION PROPOSED RAIL ALIGNMENT AT  
HOPSON ROAD GRADE SEPARATION

**RECOMMENDATIONS**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.		1	10
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 250-4089. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

**PERSONNEL**

M. BAHIRADHAN

J. HAMM

T. EVANS

C. NORVILLE

INVESTIGATED BY T. EVANS

CHECKED BY M. BAHIRADHAN

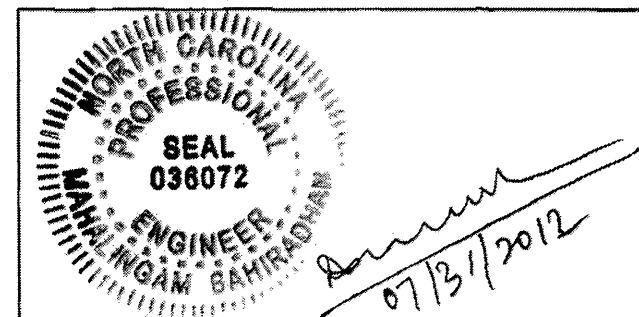
SUBMITTED BY FALCON ENG.

DATE JULY 31, 2012

DRAWN BY: J. HAMM

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, COMPRESSION, PERCENTAGE OF MATERIAL, WEATHERING, CONSISTENCY OR DENSENESS, MISCELLANEOUS SYMBOLS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, INDURATION, BENCH MARK, NOTES.

## EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

PROJECT TIP # U-4716A/C

COUNTY Wake

DATE 8/10/2012

SHEET 1 OF 2 SHEETS

LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	EARTH EMB.	EMBANK. 20%	BORROW	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
MAIN	3242+89.00	3260+32.00	238				238	1,140		1,140	1,368	1,130	0		0
		SUBTOTAL	238				238	1,140		1,140	1,368	1,130	0		0
MAIN	3263+04.00	3291+18.00	7,169				7,169	2,576		2,576	3,091	0	4,078		4,078
		SUBTOTAL	7,169				7,169	2,576		2,576	3,091	0	4,078		4,078
MAIN	3292+92.00	3314+93.68	975				975	32,398		32,398	38,878	37,903	0		0
		SUBTOTAL	975				975	32,398		32,398	38,878	37,903	0		0
MAIN	3316+58.68	3346+00.00	5,341		1,333		5,341	126,123		126,123	151,348	146,007	0	1,333	1,333
		SUBTOTAL	5,341	0	1,333	0	5,341	126,123		126,123	151,348	146,007	0	1,333	1,333
MAIN	3346+00.00	3376+00.00	8,506				8,506	1,874		1,874	2,249	0	6,257		6,257
		SUBTOTAL	8,506				8,506	1,874		1,874	2,249	0	6,257		6,257
MAIN	3376+00.00	3406+00.00	6,817				6,817	10,067		10,067	12,080	5,263	0		0
		SUBTOTAL	6,817				6,817	10,067		10,067	12,080	5,263	0		0
MAIN	3406+00.00	3436+00.00	9,688				9,688	14,459		14,459	17,351	7,663	0		0
		SUBTOTAL	9,688				9,688	14,459		14,459	17,351	7,663	0		0
MAIN	3436+00.00	3442+21.00	1,415				1,415	1,809		1,809	2,171	756	0		0
		SUBTOTAL	1,415				1,415	1,809		1,809	2,171	756	0		0
<b>PROJECT SUBTOTAL</b>			40,149	0	1,333	0	40,149	190,446	0	190,446	228,535	198,721	10,335	1,333	11,668
ADDITIONAL UNDERCUT					1,800			1,800		1,800	2,160	2,160		1,800	1,800
WASTE TO REPLACE BORROW												-10,335	-10,335		-10,335
<b>PROJECT TOTAL</b>			40,149	0	3,133	0	40,149	192,246	0	192,246	230,695	190,546	0	3,133	3,133
ESTIMATE 5% TO REPLACE TOPSOIL ON BORROW PIT												9,527			

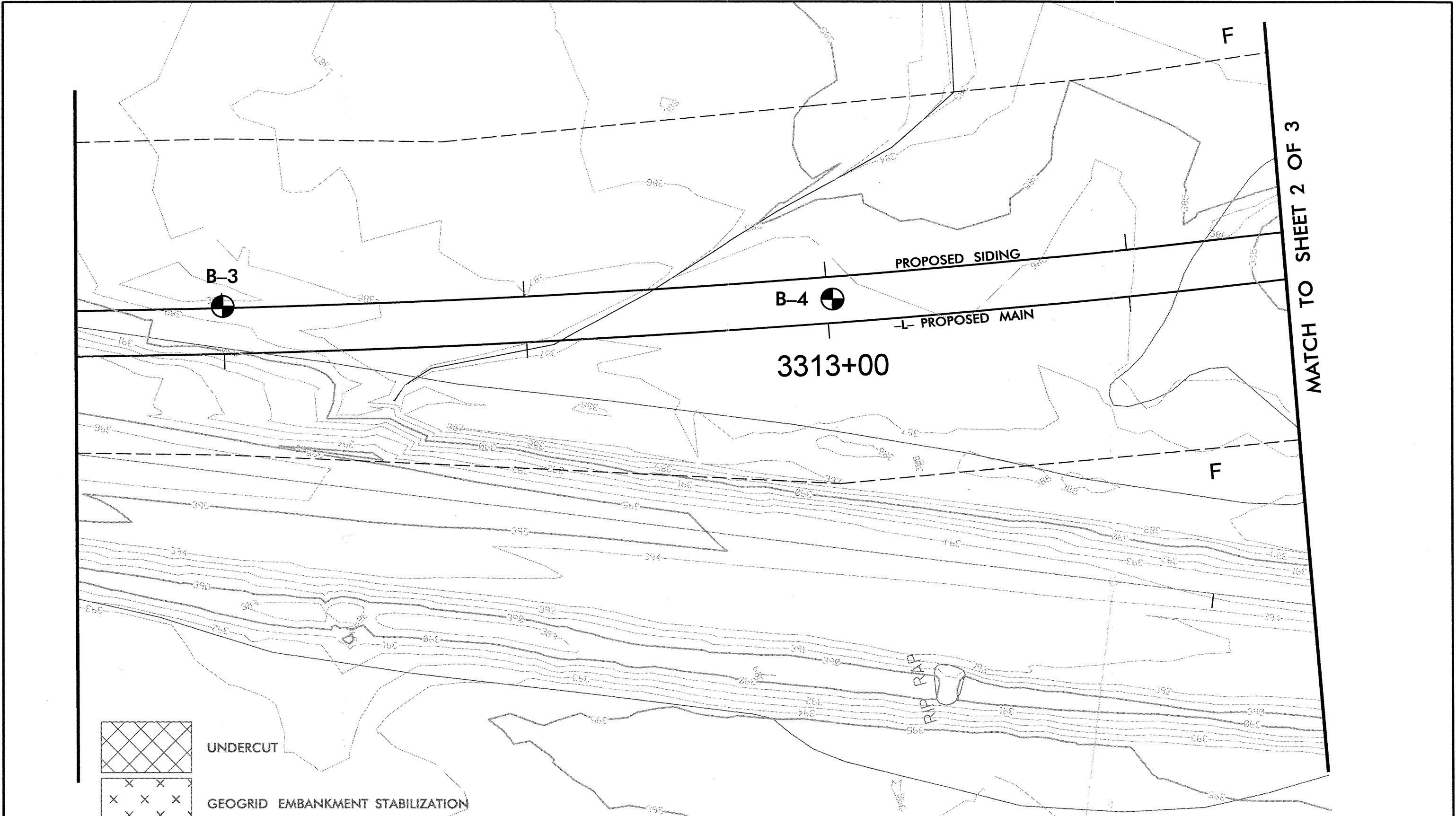
LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	EARTH EMB.	EMBANK. 20%	BORROW	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
<b>GRAND TOTAL</b>			40,149		3,133							200,074			
<b>SAY</b>			40,200		3,140							200,100			

EST. DDE = 13,870 CY

EST. SHALLOW UNDERCUT = 2,450 CY PER GEOTECHNICAL RECOMMENDATION

EST. 2,000 CY OF SELECT GRANULAR MATERIAL PER GEOTECHNICAL RECOMMENDATION

\* THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEER.



**NOTES:**

PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM HNTB NORTH CAROLINA, DATED SEPTEMBER 2011.



FALCON ENGINEERING, INC.  
 1210 TRINITY ROAD, SUITE 110  
 RALEIGH, NC 27607  
 PHONE: 919.871.0800  
 FAX: 919.871.0803

**BORING LOCATION PLAN**

PROPOSED RAIL ALIGNMENT  
 AT HOPSON ROAD GRADE CROSSING  
 DURHAM COUNTY, NORTH CAROLINA

FEBRUARY, 2012	PROJECT NO.: G10018.00	SHEET 1 OF 3
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MATCH TO SHEET 1 OF 3

MATCH TO SHEET 3 OF 3

EB1-A

EB1-B

3315+00

EB2-A

EB2-B

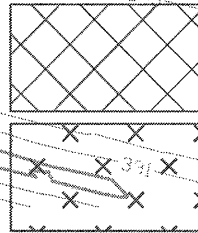
B-5

18" RCP

15" RCP

F

F



UNDERCUT

GEOGRID EMBANKMENT STABILIZATION

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 DURHAM COUNTY, NORTH CAROLINA

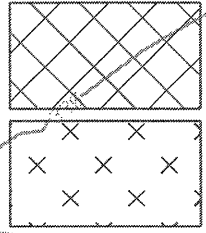
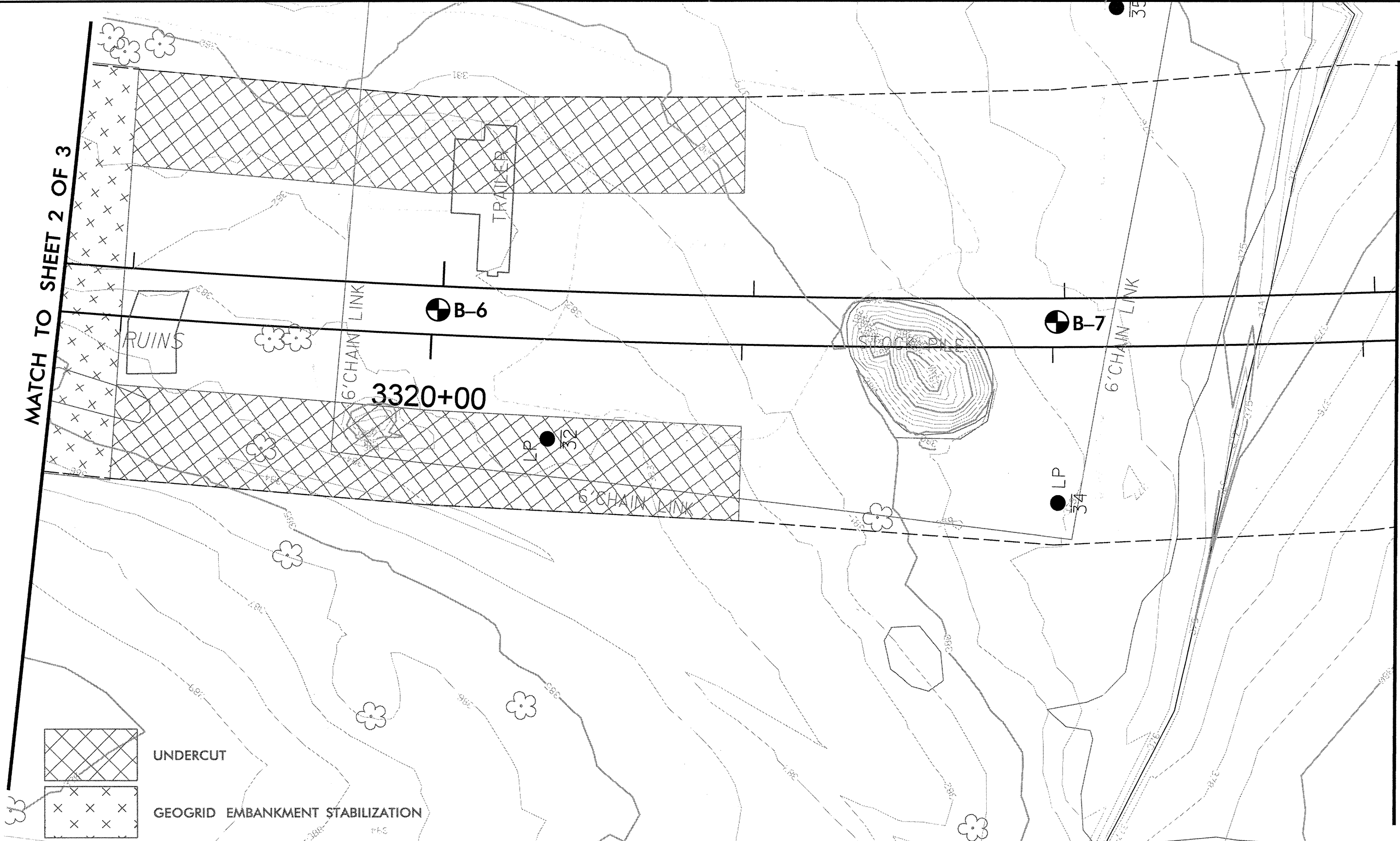
JULY, 2012

PROJECT NO.: G10018.00

SHEET 2 OF 3



MATCH TO SHEET 2 OF 3



UNDERCUT

GEOGRID EMBANKMENT STABILIZATION

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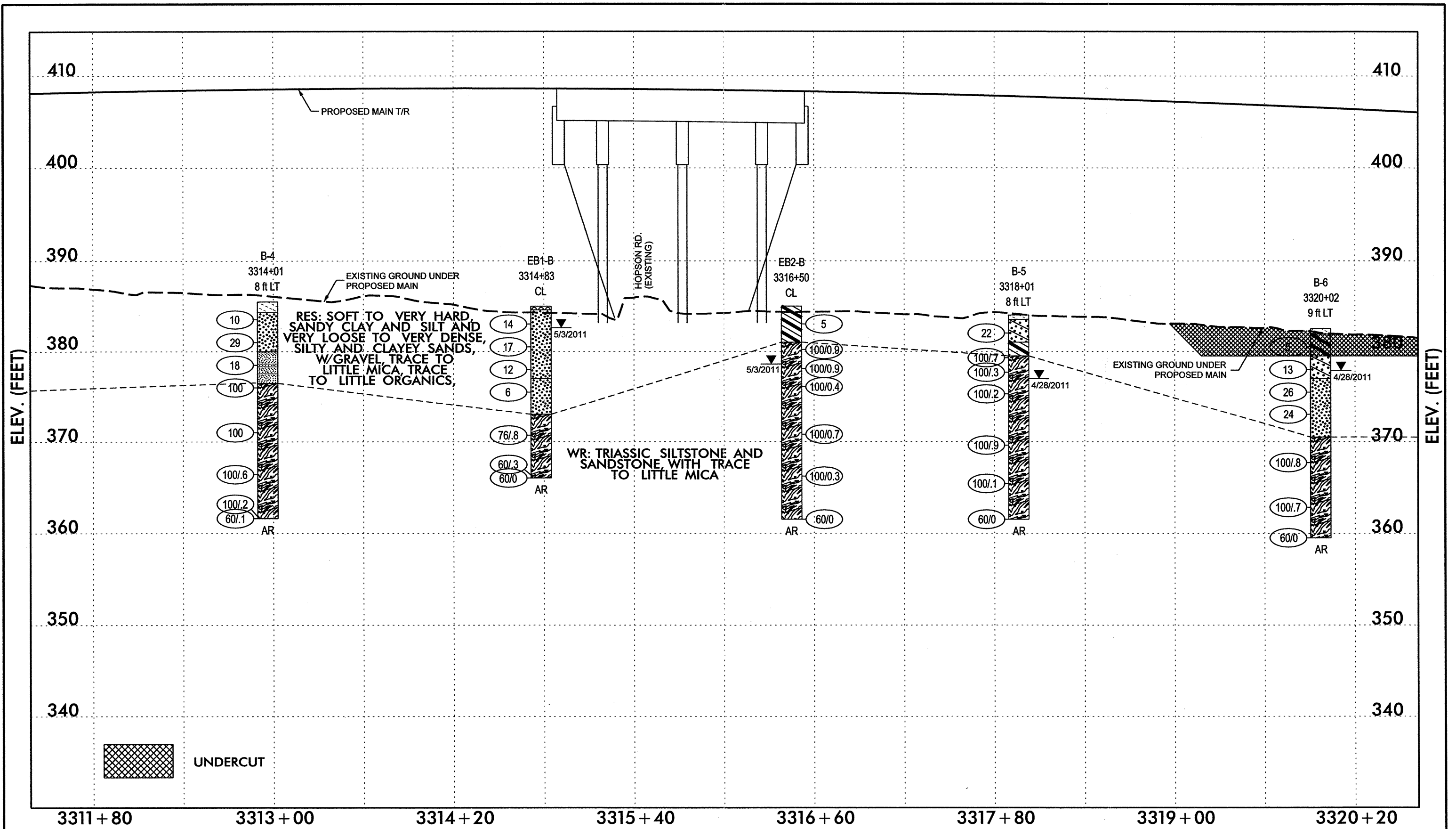
**BORING LOCATION PLAN**

PROPOSED RAIL ALIGNMENT  
 AT HOPSON ROAD GRADE CROSSING  
 DURHAM COUNTY, NORTH CAROLINA

JULY, 2012

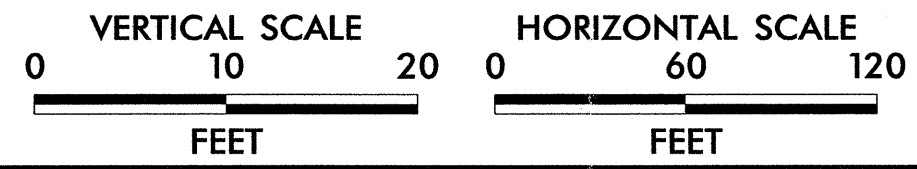
PROJECT NO.:  
G10018.00

SHEET 3 OF 3



**NOTES:**

- GROUNDLINE PROFILE OF -L- TAKEN FROM PLANS PROVIDED BY HNTB NORTH CAROLINA, DATED SEPTEMBER 2011.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.



**FALCON ENGINEERING**

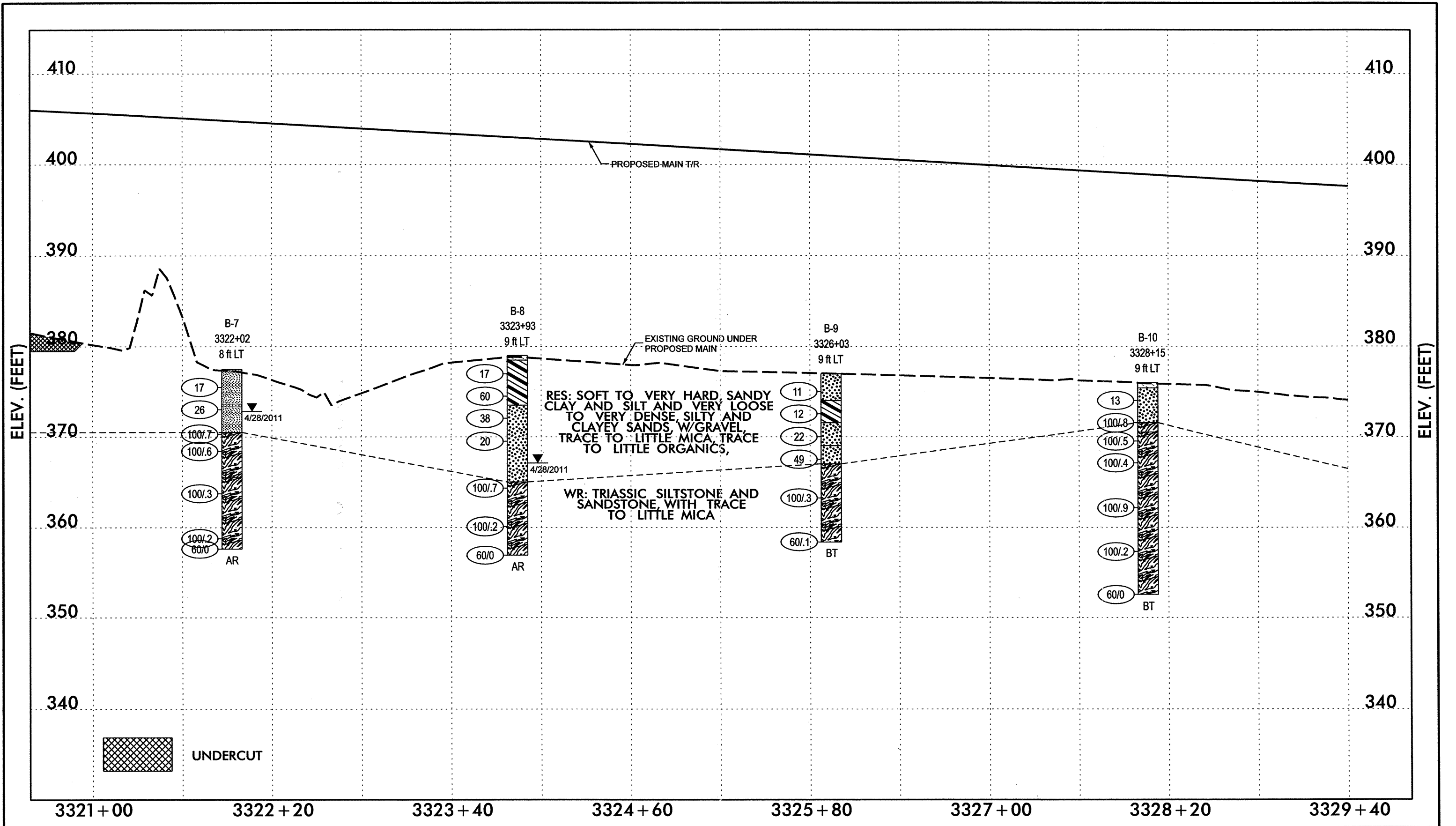
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RALEIGH, NC 27607  
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**SUBSURFACE PROFILE ALONG -L-**

PROPOSED RAIL ALIGNMENT AT  
HOPSON ROAD GRADE CROSSING  
DURHAM COUNTY, NORTH CAROLINA

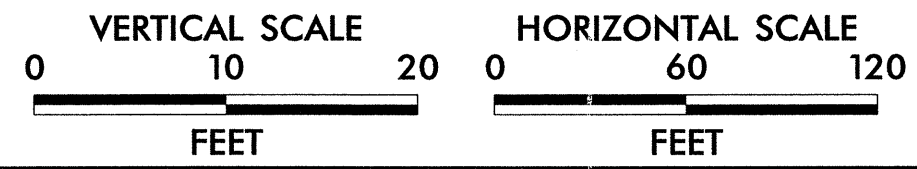
FEBRUARY, 2012   PROJECT NO.: G10018.00   SHEET 1 OF 2





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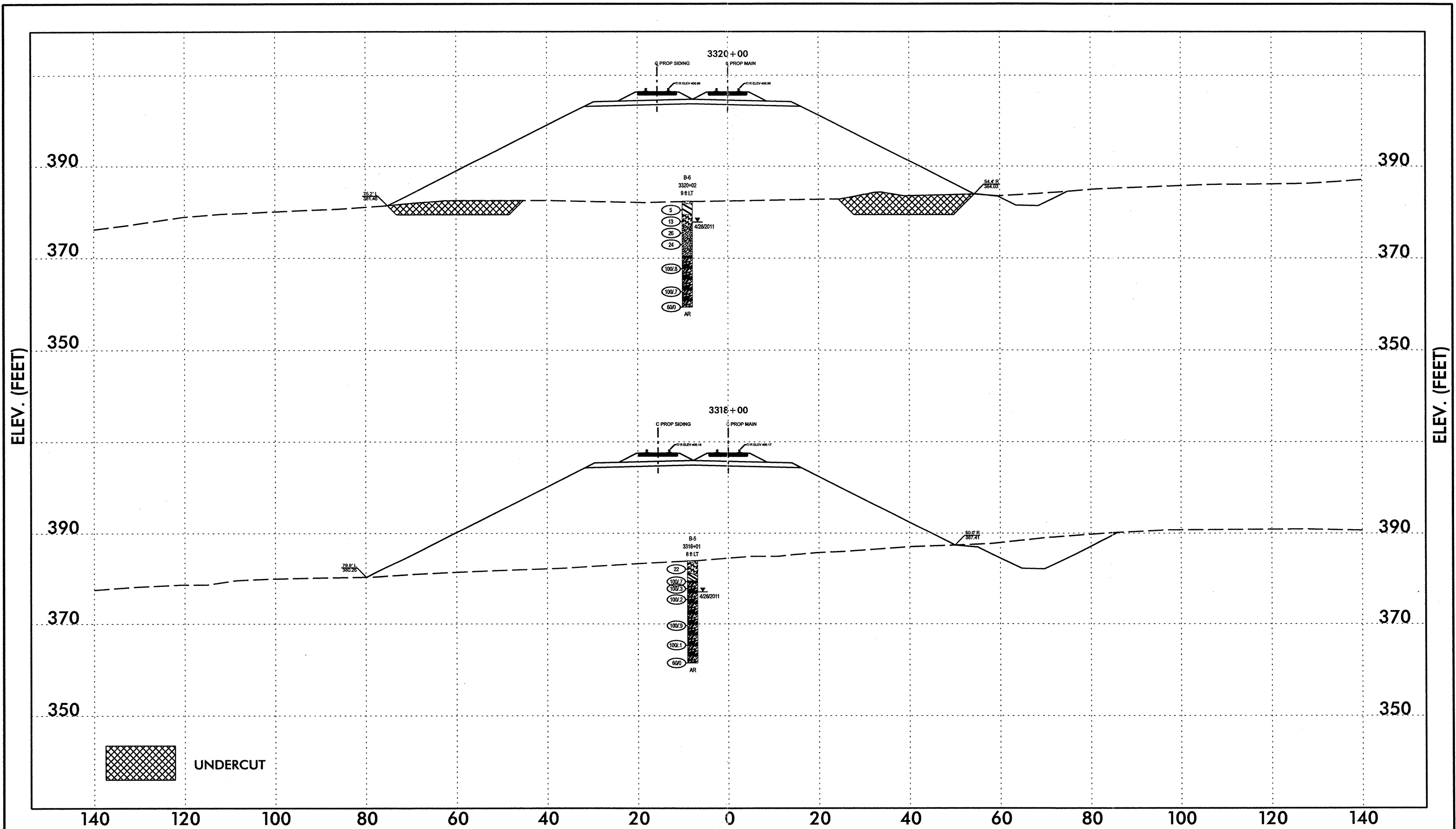
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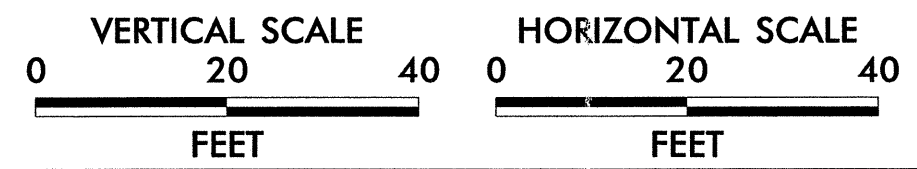
**SUBSURFACE PROFILE ALONG -L-**

PROPOSED RAIL ALIGNMENT AT  
 HOPSON ROAD GRADE CROSSING  
 DURHAM COUNTY, NORTH CAROLINA

FEBRUARY, 2012    PROJECT NO.: G10018.00    SHEET 2 OF 2

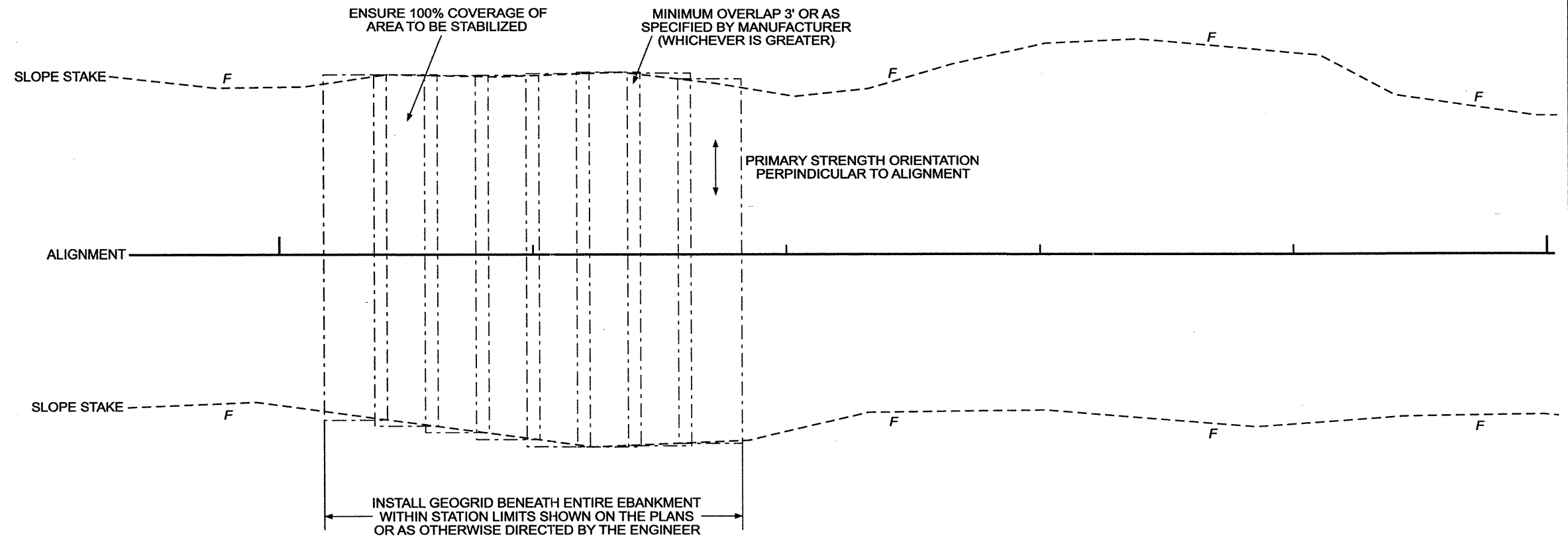
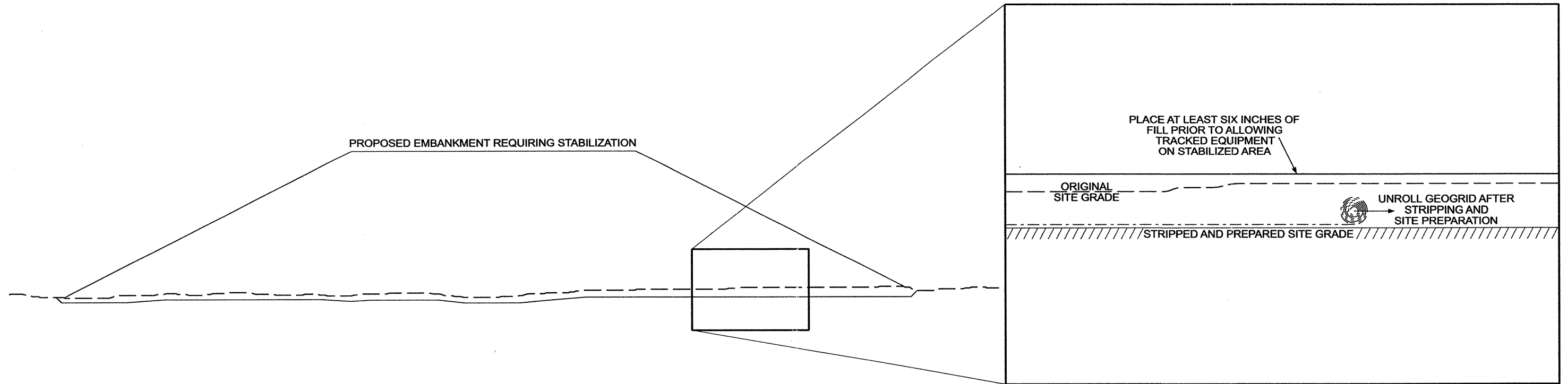


**NOTES:**  
 • GROUNDLINE PROFILE OF -L- TAKEN FROM PLANS PROVIDED BY HNTB NORTH CAROLINA, DATED SEPTEMBER 2011.

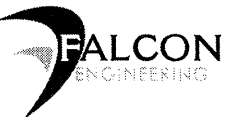


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SUBSURFACE CROSS SECTIONS		
PROPOSED RAIL ALIGNMENT AT HOPSON ROAD GRADE CROSSING DURHAM COUNTY, NORTH CAROLINA		
FEBRUARY, 2012	PROJECT NO.: G10018.00	SHEET 1 OF 1



**NOTES:**  
 SEE PROJECT SPECIAL PROVISIONS FOR GEOGRID SPECIFICATIONS. FOLLOW ALL MANUFACTURER INSTRUCTIONS FOR OVERLAP, PINNING/SEWING, STORAGE, INSTALLATION, TRAFFICKING, AND ANY OTHER CONSIDERATION PROVIDED, UNLESS SPECIFIED OTHERWISE IN THE PROJECT SPECIAL PROVISION.

 <p>FALCON ENGINEERING, INC.          1210 TRINITY ROAD, SUITE 110          RALEIGH, NC 27607          PHONE: 919.871.0800          FAX: 919.871.0803</p>	<b>GOEGRID STABILIZATION DETAIL</b>	
	PROPOSED RAIL ALIGNMENT AT HOPSON ROAD GRADE CROSSING DURHAM COUNTY, NORTH CAROLINA	
	JULY, 2012	PROJECT NO.: G10018.00