

REFERENCE: I-5987A

PROJECT: 47533

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY ROBESON  
 PROJECT DESCRIPTION I-95 IMPROVEMENTS FROM  
SOUTH OF US 301 (EXIT 22) TO NORTH OF  
SR 1758 (McDUFFIE CROSSING ROAD)  
 SITE DESCRIPTION SITE 1 - BRIDGE ON -Y2-  
(SR 1529 - POWERSVILLE ROAD) OVER I-95 (-L-)  
AT STA. 210 + 00

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-9	BORE LOGS
10	SOIL TEST RESULTS
11	SITE PHOTOGRAPHS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	11

**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 (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 THE 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.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
  2. 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.

PERSONNEL

<u>DEGON, A. N.</u>	<u>PAINTER, B. (F&amp;R, Inc.)</u>
<u>TURNAGE, J. R.</u>	<u>PESL, W. (F&amp;R Inc.)</u>
<u>KELLY, N. S.</u>	<u>TIGNOR, D. (F&amp;R Inc.)</u>
	<u>CLARKE, R. (F&amp;R Inc.)</u>

INVESTIGATED BY TERRACON CONSULTANTS  
F&R Inc.

DRAWN BY FIELDS, W. D.

CHECKED BY RIGGS, Jr., A. F.

SUBMITTED BY ALEXANDER, M. J.

DATE SEPTEMBER 2021

Prepared in the Office of:

**Terracon**  
 Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
 RALEIGH, NORTH CAROLINA 27604  
 NC REGISTERED ENGINEERING FIRM: F-0869  
 NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:  
Matt Alexander 10/29/2021

SIGNATURE DATE

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

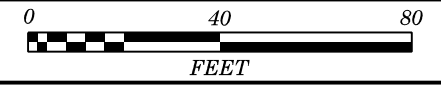
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT**

# SUBSURFACE INVESTIGATION

**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																											
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (ASTM T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.  <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>										<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.  <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  <b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.  <b>ARTESIAN</b> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.  <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.  <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  <b>ROCK QUALITY DESIGNATION (RQD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.  <b>SILL</b> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.  <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.  <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  <b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																											
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING										MISCELLANEOUS SYMBOLS																																																																											
<p><b>GENERAL CLASS.</b></p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="5">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-1-b</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th></th> </tr> <tr> <th>SYMBOL</th> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> <td>○○○○○○○○</td> </tr> <tr> <th>% PASSING #10 #40 #200</th> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 10 MX</td> <td>35 MX 35 MX</td> <td>35 MX 35 MX</td> <td>35 MX 35 MX</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td>MUCK, PEAT</td> <td></td> <td></td> </tr> </table>										GRANULAR MATERIALS (≤ 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)					ORGANIC MATERIALS					GROUP CLASS.	A-1	A-1-b	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7		SYMBOL	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT			<p><b>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</b></p>										<p><b>FRESH</b> - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.  <b>VERY SLIGHT (V SLI.)</b> - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.  <b>SLIGHT (SLI.)</b> - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.  <b>MODERATE (MOD.)</b> - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.  <b>MODERATELY SEVERE (MOD. SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>  <b>SEVERE (SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</i>  <b>VERY SEVERE (V SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i>  <b>COMPLETE</b> - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>										<p><b>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</b>  <b>SOIL SYMBOL</b>  <b>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</b>  <b>INFERRED SOIL BOUNDARY</b>  <b>INFERRED ROCK LINE</b>  <b>ALLUVIAL SOIL BOUNDARY</b></p>									
GRANULAR MATERIALS (≤ 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)					ORGANIC MATERIALS																																																																																															
GROUP CLASS.	A-1	A-1-b	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7																																																																																										
SYMBOL	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○	○○○○○○○○																																																																																									
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT																																																																																											
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS										ABBREVIATIONS																																																																																					
<table border="1" style="width: 100%; text-align: center;"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <td></td> <td>4.76</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> </table>										U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270		4.76	2.00	0.42	0.25	0.075	0.053	<p><b>UNDERCUT</b> (diagonal lines)  <b>SHALLOW UNDERCUT</b> (dotted lines)  <b>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</b> (cross-hatch)  <b>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</b> (horizontal lines)  <b>UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</b> (vertical lines)</p>										<p><b>AR</b> - AUGER REFUSAL  <b>BT</b> - BORING TERMINATED  <b>CL</b> - CLAY  <b>CPT</b> - CONE PENETRATION TEST  <b>CSE</b> - COARSE  <b>DMT</b> - DILATOMETER TEST  <b>DPT</b> - DYNAMIC PENETRATION TEST  <b>e</b> - VOID RATIO  <b>F</b> - FINE  <b>FOSS.</b> - FOSSILIFEROUS  <b>FRAC.</b> - FRACTURED, FRACTURES  <b>FRAGS.</b> - FRAGMENTS  <b>HI.</b> - HIGHLY  <b>MED.</b> - MEDIUM  <b>MICA.</b> - MICACEOUS  <b>MOD.</b> - MODERATELY  <b>NP</b> - NON PLASTIC  <b>ORG.</b> - ORGANIC  <b>PMT</b> - PRESSUREMETER TEST  <b>SAP.</b> - SAPROLITIC  <b>SD.</b> - SAND, SANDY  <b>SL.</b> - SILT, SILTY  <b>SLI.</b> - SLIGHTLY  <b>TCR</b> - TRICONE REFUSAL  <b>w</b> - MOISTURE CONTENT  <b>V</b> - VERY  <b>VST</b> - VANE SHEAR TEST  <b>WEA.</b> - WEATHERED  <b>W</b> - UNIT WEIGHT  <b>W<sub>d</sub></b> - DRY UNIT WEIGHT  <b>SAMPLE ABBREVIATIONS</b>  <b>S</b> - BULK  <b>SS</b> - SPLIT SPOON  <b>ST</b> - SHELBY TUBE  <b>RS</b> - ROCK  <b>RT</b> - RECOMPACTED TRIAXIAL  <b>CBR</b> - CALIFORNIA BEARING RATIO</p>																																																																							
U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270																																																																																																			
	4.76	2.00	0.42	0.25	0.075	0.053																																																																																																			
SOIL MOISTURE - CORRELATION OF TERMS										EQUIPMENT USED ON SUBJECT PROJECT										FRACTURE SPACING																																																																																					
<table border="1" style="width: 100%;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT PL - PLASTIC LIMIT</td> <td>- SATURATED - (SAT.) - WET - (W)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td></td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>										SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL - LIQUID LIMIT PL - PLASTIC LIMIT	- SATURATED - (SAT.) - WET - (W)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE		- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<p><b>DRILL UNITS:</b>  <input type="checkbox"/> CME-45C  <input type="checkbox"/> CME-55  <input type="checkbox"/> CME-550  <input type="checkbox"/> VANE SHEAR TEST  <input type="checkbox"/> PORTABLE HOIST  <input checked="" type="checkbox"/> CME-55 (F&amp;R3495)  <input checked="" type="checkbox"/> DIERICH D-50 (F&amp;R249)</p> <p><b>ADVANCING TOOLS:</b>  <input type="checkbox"/> CLAY BITS  <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER  <input type="checkbox"/> 8" HOLLOW AUGERS  <input type="checkbox"/> HARD FACED FINGER BITS  <input type="checkbox"/> TUNG-CARBIDE INSERTS  <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER  <input checked="" type="checkbox"/> TRICONE 2% * STEEL TEETH  <input type="checkbox"/> TRICONE * TUNG-CARB.  <input checked="" type="checkbox"/> 2 1/4" HOLLOW STEM AUGERS  <input checked="" type="checkbox"/> 3/4" HOLLOW STEM AUGERS</p> <p><b>HAMMER TYPE:</b>  <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL  <b>CORE SIZE:</b>  <input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N  <b>HAND TOOLS:</b>  <input type="checkbox"/> POST HOLE DIGGER  <input type="checkbox"/> HAND AUGER  <input type="checkbox"/> SOUNDING ROD  <input type="checkbox"/> VANE SHEAR TEST</p>										<table border="1" style="width: 100%;"> <tr> <th>TERM</th> <th>SPACING</th> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>&lt; 0.008 FEET</td> </tr> </table>										TERM	SPACING	TERM	THICKNESS	VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET																																				
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																																																																																																							
LL - LIQUID LIMIT PL - PLASTIC LIMIT	- SATURATED - (SAT.) - WET - (W)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																																																							
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																																																							
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																																																							
TERM	SPACING	TERM	THICKNESS																																																																																																						
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET																																																																																																						
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																																																						
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																																																						
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																						
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																						
		THINLY LAMINATED	< 0.008 FEET																																																																																																						
PLASTICITY										INDURATION										NOTES																																																																																					
<table border="1" style="width: 100%;"> <tr> <th>NON PLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td></td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td>SLIGHTLY PLASTIC</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table>										NON PLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH		0-5	VERY LOW	SLIGHTLY PLASTIC	6-15	SLIGHT	MODERATELY PLASTIC	16-25	MEDIUM	HIGHLY PLASTIC	26 OR MORE	HIGH	<p><b>FRIABLE</b> - RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.  <b>MODERATELY INDURATED</b> - GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.  <b>INDURATED</b> - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.  <b>EXTREMELY INDURATED</b> - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										<p><b>BENCH MARK:</b> I5987A-5-BY8; STA. 21+44.83 -L- 84.46' RIGHT  <b>N:</b> 346,053; <b>E:</b> 2,000,619 <b>ELEVATION:</b> N/A <b>FEET</b></p> <p><b>NOTES:</b>  FIAD - FILLED IMMEDIATELY AFTER DRILLING</p> <p><b>NOTE:</b> ELEVATIONS OF BORINGS EB1-A, BI-C AND EB2-A PERFORMED BY F&amp;R Inc. OBTAINED FROM PROVIDED TIN FILE: I5987_Is_tin.tin DATED: 11-14-2019</p>																																																																						
NON PLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH																																																																																																							
	0-5	VERY LOW																																																																																																							
SLIGHTLY PLASTIC	6-15	SLIGHT																																																																																																							
MODERATELY PLASTIC	16-25	MEDIUM																																																																																																							
HIGHLY PLASTIC	26 OR MORE	HIGH																																																																																																							

# SITE PLAN



SKREW ANGLE 95°

KAF

KAREN PAUL OBERSCHEA

I5987A-5=  
BY8  
STA. 21+44.83  
84.46' RT -L-  
N-346053  
E-2000619

BEGIN BRIDGE  
-Y2- STA. 28+80.29

211+00 -L-

SINGLE FACE  
BARRIER

-L-  
TO US 301(EXIT 25)

END BRIDGE  
-Y2- STA. 30+71.29

32+00 -Y2-

Y2\_EB1-A  
28+53 -Y2-  
34' LT

Y2\_B1-C  
29+81 -Y2-  
CL

Y2\_EB2-A  
31+07 -Y2-  
33' LT

← TO US 301

EXISTING R/W  
TO SR 1005 →

Y2\_EB1-B  
28+91 -Y2-  
19' RT

BST BRIDGE DECK

Y2\_EB2-B  
30+59 -Y2-  
14' RT

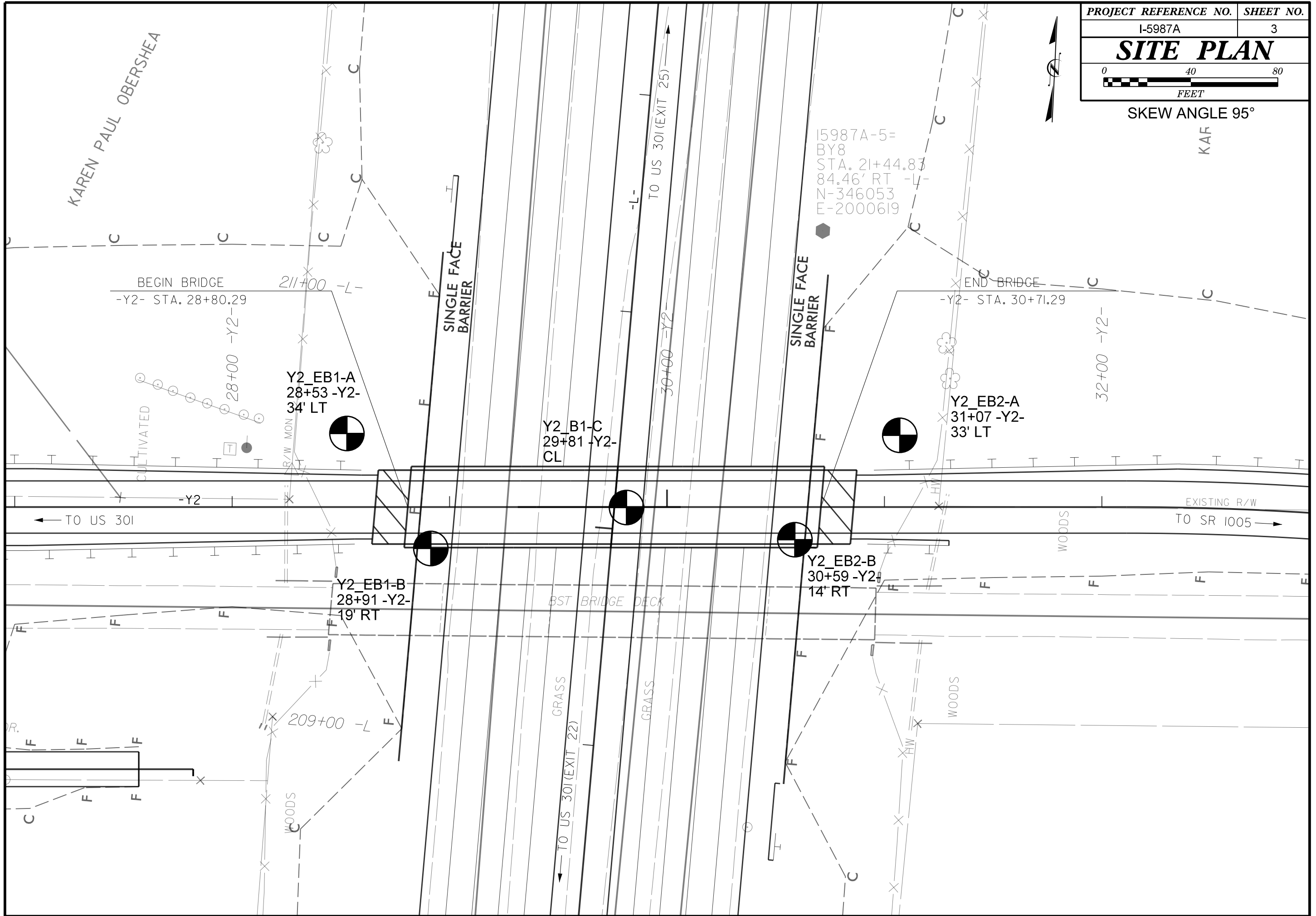
209+00 -L-

GRASS

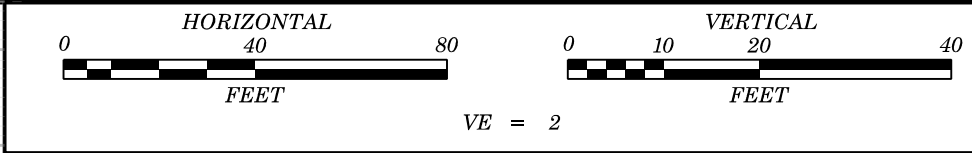
GRASS

WOODS

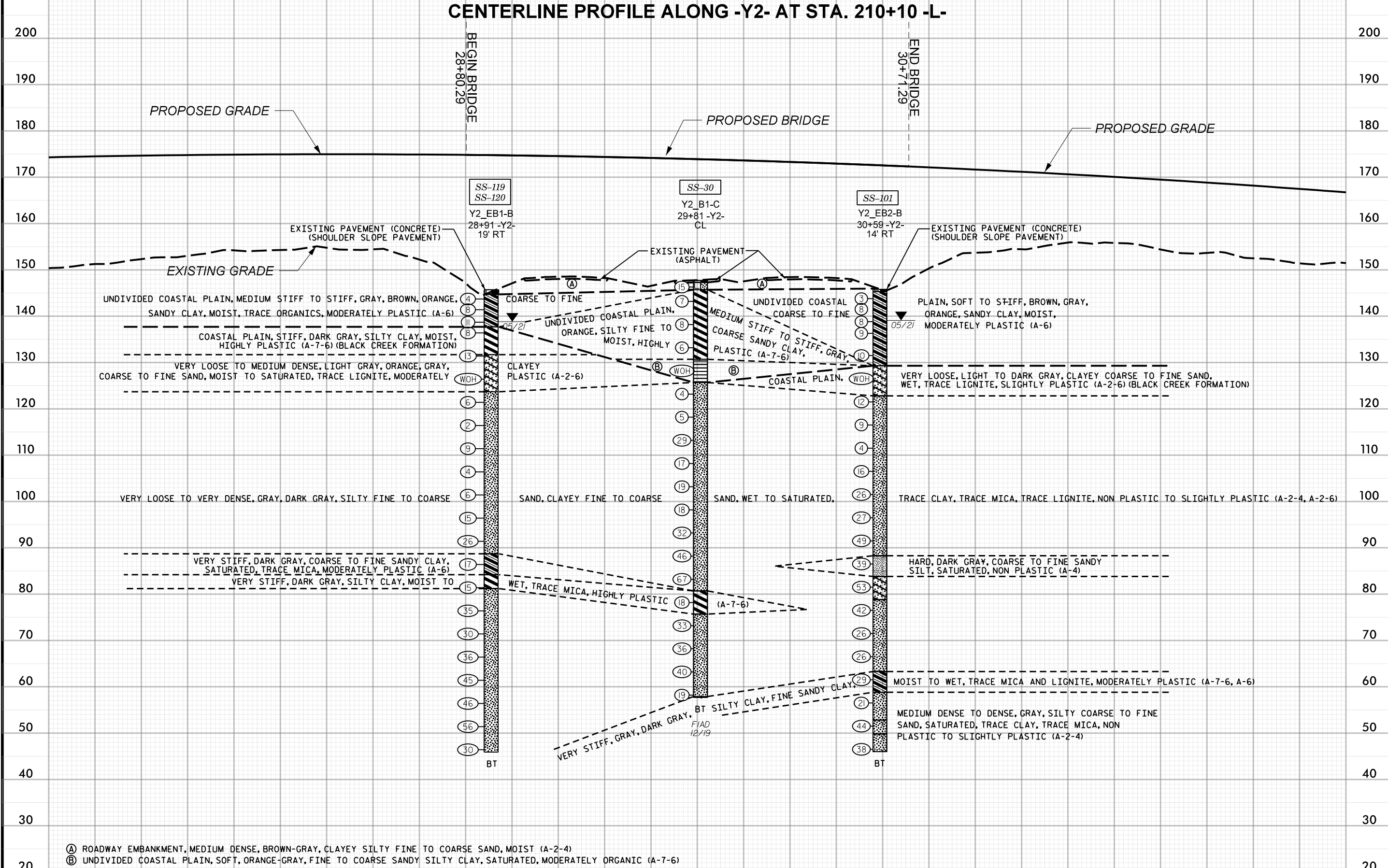
← TO US 301(EXIT 22)



NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -L- TAKEN FROM THE PROVIDED PROJECT TIN FILE (I5987\_ls\_tin1.tin).  
 SKEW ANGLE - 95°



PROJECT REFERENCE NO.	SHEET NO.
I-5987A	4
CENTERLINE PROFILE ALONG -Y2-	



27+00      28+00      29+00      30+00      31+00      32+00      -Y2-





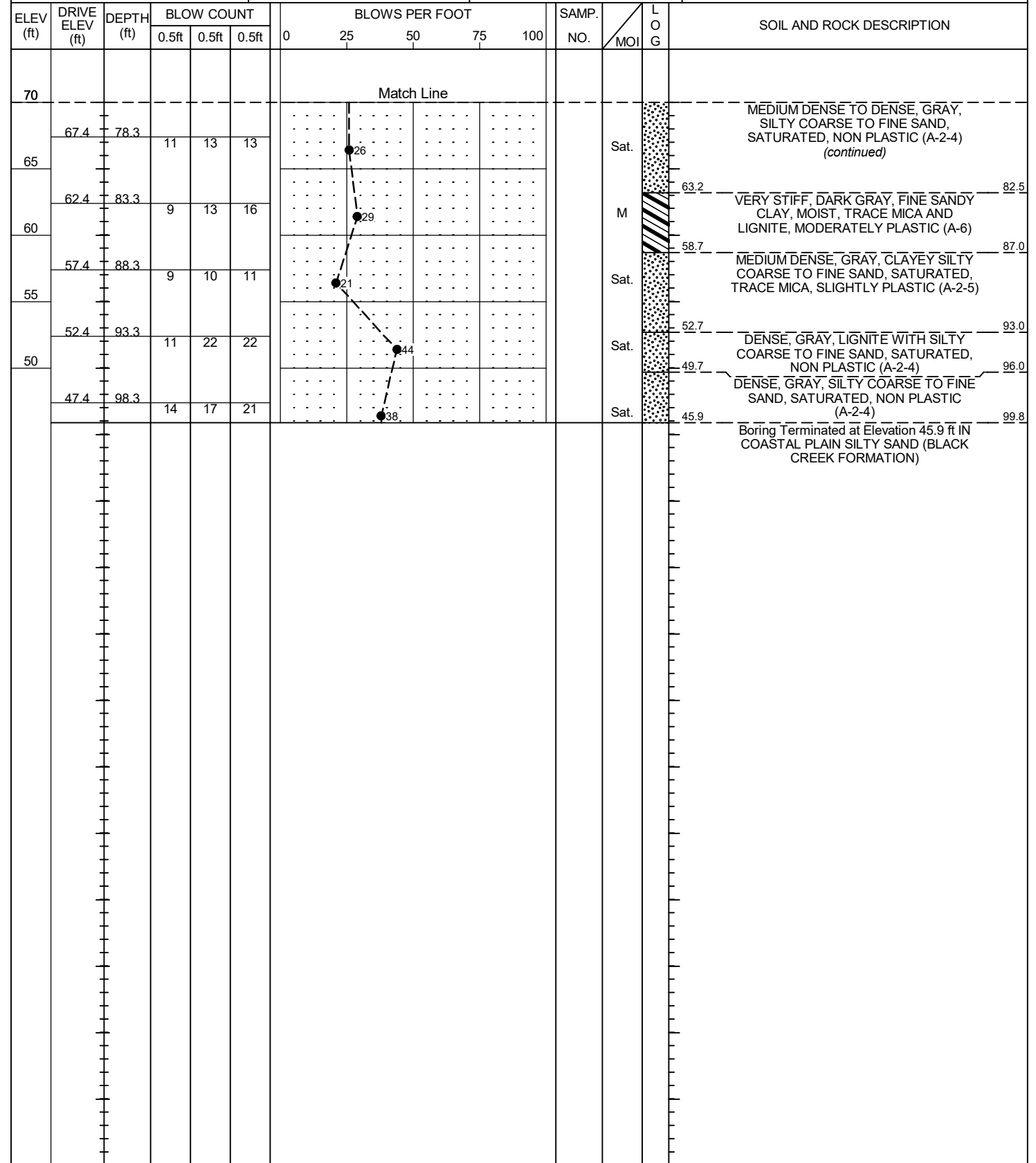
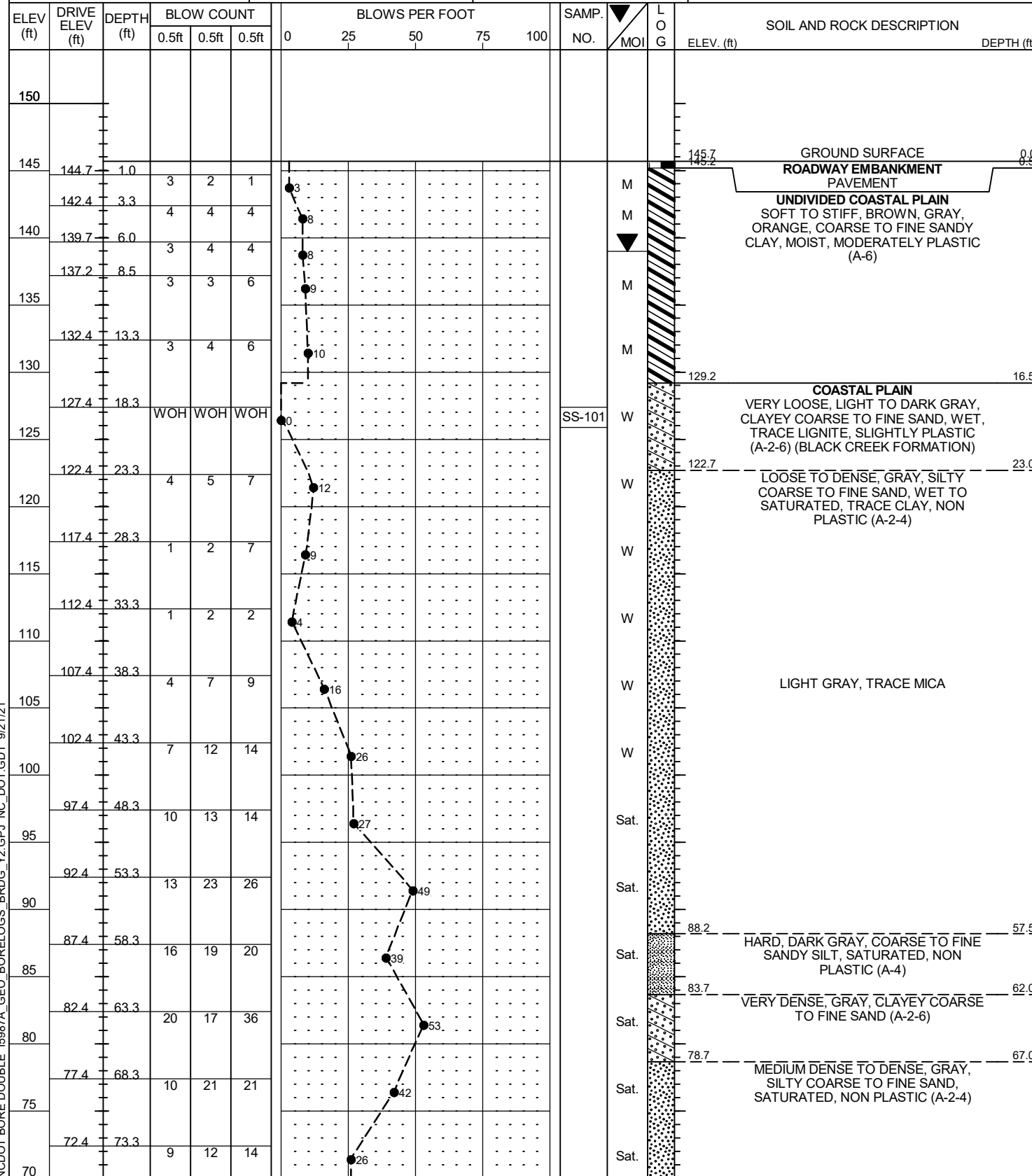






<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> DEGON, A. N.
<b>SITE DESCRIPTION</b> BRIDGE ON -Y2- (SR 1529-POWERSVILLE ROAD) OVER -L- (I-95) AT -L- STA. 210+00			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y2_EB2-B	<b>STATION</b> 30+59	<b>OFFSET</b> 14 ft RT	<b>ALIGNMENT</b> -Y2-
<b>COLLAR ELEV.</b> 145.7 ft	<b>TOTAL DEPTH</b> 99.8 ft	<b>NORTHING</b> 345,912	<b>EASTING</b> 2,000,613
<b>DRILL RIG/HAMMER EFF./DATE</b> TER299 DIEDRICH D-50 79% 12/31/2020		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> TURNAGE, J. R.	<b>START DATE</b> 05/04/21	<b>COMP. DATE</b> 05/04/21	<b>SURFACE WATER DEPTH</b> N/A

<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> DEGON, A. N.
<b>SITE DESCRIPTION</b> BRIDGE ON -Y2- (SR 1529-POWERSVILLE ROAD) OVER -L- (I-95) AT -L- STA. 210+00			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y2_EB2-B	<b>STATION</b> 30+59	<b>OFFSET</b> 14 ft RT	<b>ALIGNMENT</b> -Y2-
<b>COLLAR ELEV.</b> 145.7 ft	<b>TOTAL DEPTH</b> 99.8 ft	<b>NORTHING</b> 345,912	<b>EASTING</b> 2,000,613
<b>DRILL RIG/HAMMER EFF./DATE</b> TER299 DIEDRICH D-50 79% 12/31/2020		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> TURNAGE, J. R.	<b>START DATE</b> 05/04/21	<b>COMP. DATE</b> 05/04/21	<b>SURFACE WATER DEPTH</b> N/A



NCDOT BORE DOUBLE I5987A\_GEO\_BORELOGS\_BRDG\_Y2.GPJ\_NC\_DOT.GDT 9/21/21

**LABORATORY TESTING SUMMARY**

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: BRIDGE ON -Y2- (SR 1529 - POWERSVILLE ROAD) OVER -L- STA. 210+00

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-119	28+91	-Y2-	19 RT	8.3-9.8	A-7-6(13)	45	32	11.9	36.5	15.8	35.8	0	100	97	55	19.2	--
SS-120	28+91	-Y2-	19 RT	18.3-19.8	A-2-6(0)	32	16	8.4	64.5	6.0	21.1	0	100	98	29	--	--
SS-101	30+59	-Y2-	14 RT	18.3-19.8	A-2-6(0)	31	11	10.2	64.9	6.1	18.8	0	100	95	27	--	--

NP - NON-PLASTIC

*Stephanie H. Huffman*

Certified Lab Technician Signature  
Terracon

114-01-1203  
Certification Number

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-24	28+53	-Y2-	34 LT	18.5-20.0	A-2-4(0)	NP	NP	16.3	62.7	8.5	12.5	0	100	95	23	--	--
SS-501	31+07	-Y2-	33 LT	3.5-5.0	A-7-6(14)	50	30	20.0	27.4	10.7	41.9	0	100	91	56	18.3	--
ST-100	31+03	-Y2-	33 LT	12.0-14.0	A-6 (11)	36	16	4.6	25.0	38.5	31.9	0	100	99	76	40.2	--
SS-502	31+07	-Y2-	33 LT	14.0-15.0	A-7-5(17)	54	21	9.4	21.4	36.8	32.4	0	100	96	74	40.0	13.9
SS-30	29+81	-Y2-	CL	3.5-5.0	A-7-6(14)	49	28	19.4	23.8	16.1	40.7	0	100	90	60	24.9	--

NP - NON-PLASTIC

D. COUNCIL - F&R  
Certified Lab Technician Signature

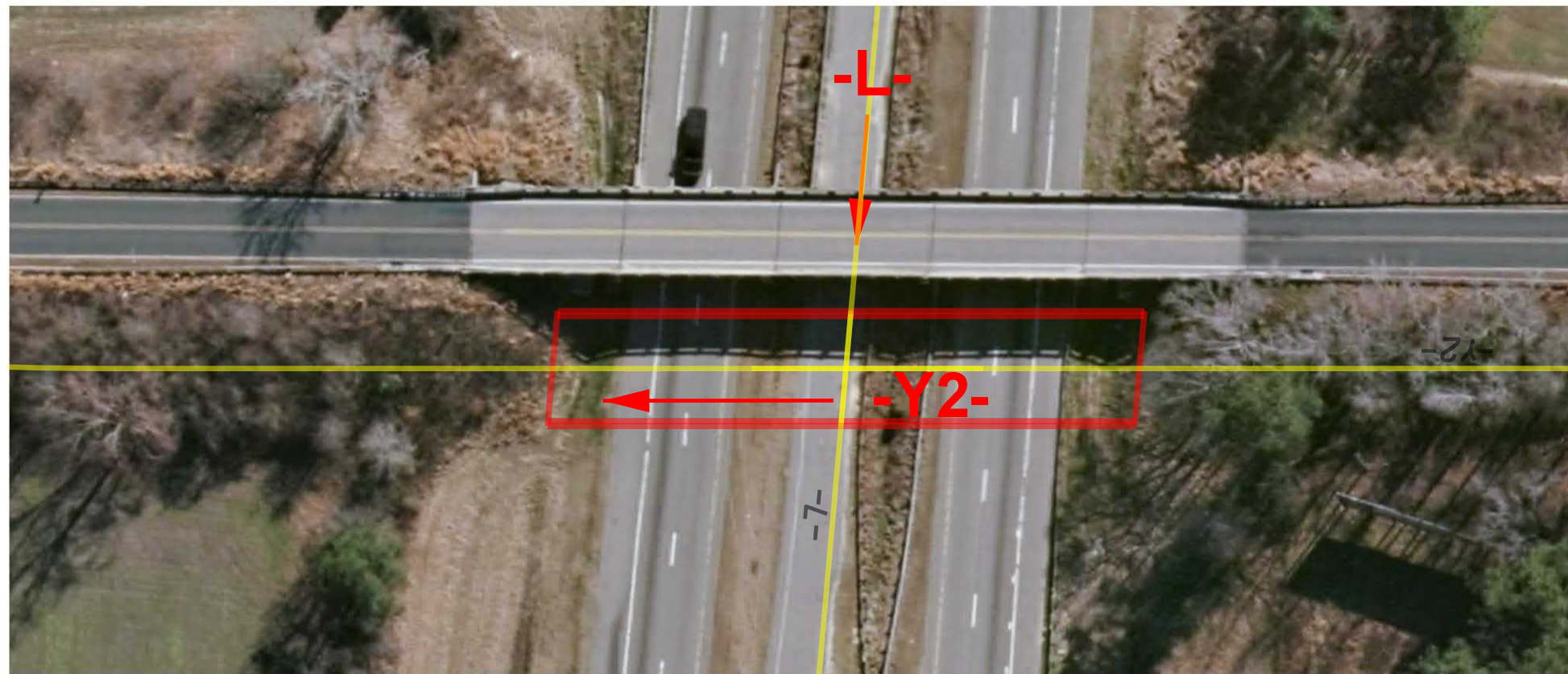
101-02-0603  
Certification Number

# SITE PHOTOGRAPHS

SITE 1 - BRIDGE ON -Y2- (SR 1529 - POWERSVILLE ROAD)  
OVER -L- (I-95) AT STA. 210+00



NORTH OF BRIDGE ON -L- LOOKING SOUTH  
FROM EB2 (LEFT) TOWARD EB1 (RIGHT)



LOOKING SOUTH ON -L- AT BRIDGE  
(EB2 ON LEFT EB1 ON RIGHT)