

REFERENCE: R-5930B

PROJECT: 48548

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY CHATHAM  
PROJECT DESCRIPTION CHATHAM PARK WAY NORTH  
OF PROPOSED GRANT DRIVE TO US 15/01  
SITE DESCRIPTION RETAINING WALL 1 -W1- STATION  
10+00 TO 12+66.12 (-L- 161+50 TO 164+10 RT)  
RETAINING WALL 2 -W2- STATION 10+00 TO  
12+79.29 (-L- 161+50 TO 164+28 LT)

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3, 4	RETAINING WALL ENVELOPES
5-8	BORE LOGS
9	SOIL TEST RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5930B	1	

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.

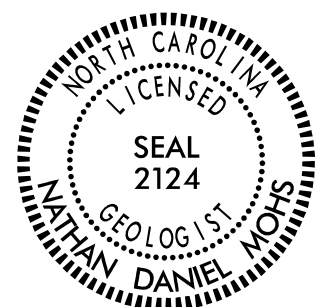
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND 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:
- 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.
  - 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  
M. STANBURY, PG  
SUBTERRA EXP.

INVESTIGATED BY N. MOHS, LG  
DRAWN BY C. STEPHENS, GIT  
CHECKED BY B. SMITH, PG  
SUBMITTED BY N. MOHS, LG  
DATE NOVEMBER 2024



DocuSigned by:  
Nathan Mohs 12/09/2024  
631A27605B4A4C3  
SIGNATURE DATE

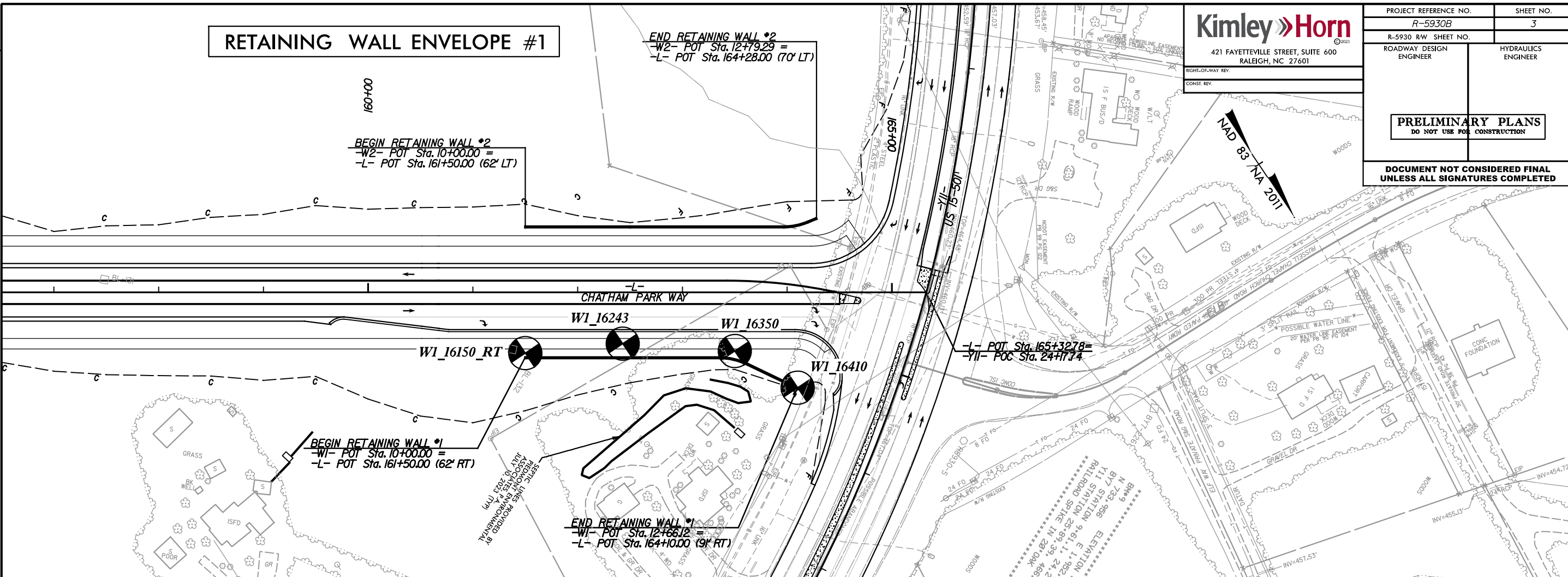
**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
**GEOTECHNICAL ENGINEERING UNIT**  
**SUBSURFACE INVESTIGATION**  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

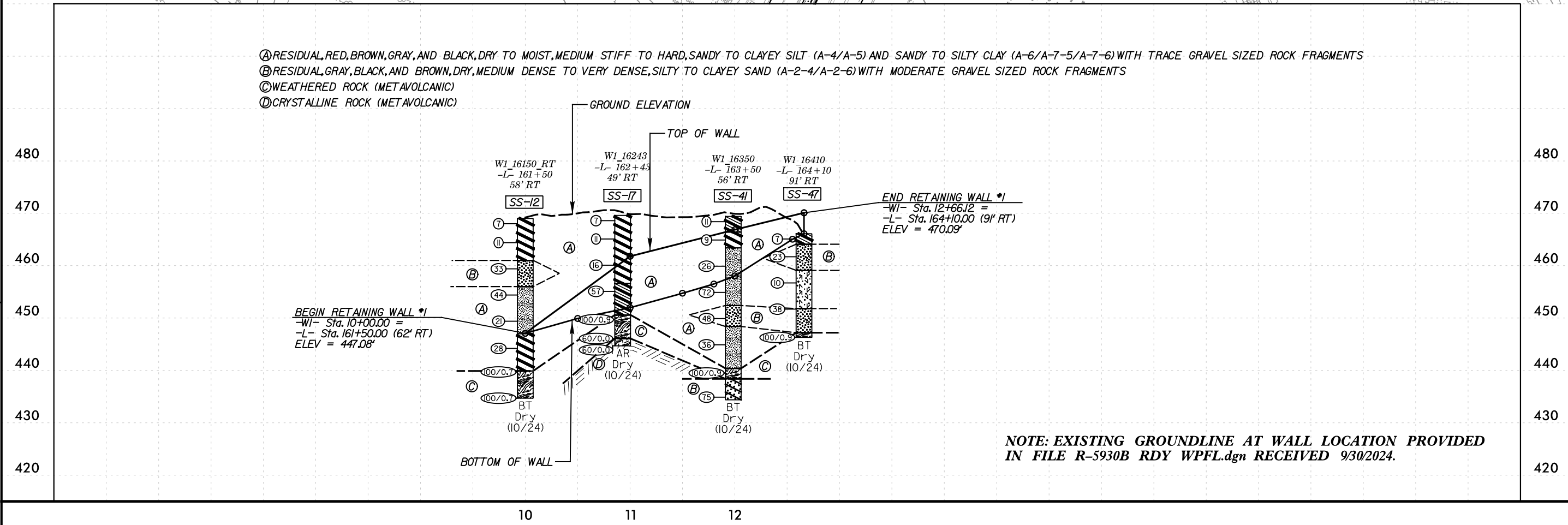
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																															
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, 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 DISLODGED 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>																																																																															
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>										<b>ANGULARITY OF GRAINS</b>										<b>WEATHERED ROCK (WR)</b>										<b>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</b>																																																																															
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<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<b>COMPRESSIBILITY</b>										<b>NON-CRYSTALLINE ROCK (NCR)</b>										<b>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</b>																																																																															
<p>SLIGHTLY COMPRESSIBLE LL &lt; 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL &gt; 50</p>										<b>PERCENTAGE OF MATERIAL</b>										<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>										<b>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</b>																																																																															
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<p>∇ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING          ▽ STATIC WATER LEVEL AFTER 24 HOURS          ∇PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA   SPRING OR SEEP</p>										<b>FRESH</b>										<b>MODERATE (MOD.)</b>										<b>SEVERE (SEV.)</b>																																																																															
<p>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p>										<b>VERY SLIGHT (V SLI.)</b>										<b>SLIGHT (SLI.)</b>										<b>MODERATELY SEVERE (MOD. SEV.)</b>																																																																															
<p>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.</p>										<b>SEVERE (SEV.)</b>										<b>VERY SEVERE (V SEV.)</b>										<b>COMPLETE</b>																																																																															
<p>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.</p>										<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. IF TESTED, WOULD YIELD SPT REFUSAL</b>										<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. IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</b>										<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. IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</b>																																																																															
<p>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>										<b>ROCK HARDNESS</b>										<b>VERY HARD</b>										<b>HARD</b>																																																																															
<p>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p>										<b>MODERATELY HARD</b>										<b>MEDIUM HARD</b>										<b>SOFT</b>																																																																															
<p>CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p>										<b>VERY HARD</b>										<b>HARD</b>										<b>MODERATELY HARD</b>																																																																															
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<p>CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p>										<b>VERY HARD</b>										<b>HARD</b>										<b>MODERATELY HARD</b>																																																																															
<b>TEXTURE OR GRAIN SIZE</b>										<b>MISCELLANEOUS SYMBOLS</b>										<b>ROCK HARDNESS</b>										<b>VERY HARD</b>																																																																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <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>4.75</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		4.75	2.00	0.42	0.25	0.075	0.053	<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION          SOIL SYMBOL          ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT          INFERRED SOIL BOUNDARY          INFERRED ROCK LINE          ALLUVIAL SOIL BOUNDARY</p>										<p>25/025 DIP &amp; DIP DIRECTION OF ROCK STRUCTURES          SPT DMT TEST BORE          AUGER BORING          CORE BORING          MONITORING WELL          PIEZOMETER INSTALLATION</p>										<p>SLOPE INDICATOR INSTALLATION          CONE PENETROMETER TEST          SOUNDING ROD          TEST BORING WITH CORE          SPT N-VALUE</p>																																																																	
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<b>CONSISTENCY OR DENSENESS</b>										<b>RECOMMENDATION SYMBOLS</b>										<b>ABBREVIATIONS</b>										<b>SOIL MOISTURE - CORRELATION OF TERMS</b>																																																																															
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GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005																																																																																																						
	IN.	12	3																																																																																																										
<p>LL - LIQUID LIMIT          PL - PLASTIC LIMIT          OM - OPTIMUM MOISTURE          SL - SHRINKAGE LIMIT</p>										<p>DRILL UNITS:  <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"/> D-50</p>										<p>ADVANCING TOOLS:  <input type="checkbox"/> CLAY BITS  <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER  <input checked="" type="checkbox"/> 8" HOLLOW AUGERS  <input type="checkbox"/> HARD FACED FINGER BITS  <input checked="" type="checkbox"/> TUNG-CARBIDE INSERTS  <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER  <input type="checkbox"/> TRICONE * STEEL TEETH  <input type="checkbox"/> TRICONE * TUNG-CARB.  <input type="checkbox"/> CORE BIT</p>										<p>HAMMER TYPE:  <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL          CORE SIZE:  <input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N          HAND TOOLS:  <input type="checkbox"/> POST HOLE DIGGER  <input type="checkbox"/> HAND AUGER  <input type="checkbox"/> SOUNDING ROD  <input type="checkbox"/> VANE SHEAR TEST</p>										<p>TERM SPACING          VERY WIDE MORE THAN 10 FEET          WIDE 3 TO 10 FEET          MODERATELY CLOSE 1 TO 3 FEET          CLOSE 0.16 TO 1 FOOT          VERY CLOSE LESS THAN 0.16 FEET</p>										<p>TERM THICKNESS          VERY THICKLY BEDDED 4 FEET          THICKLY BEDDED 1.5 - 4 FEET          THINLY BEDDED 0.16 - 1.5 FEET          VERY THINLY BEDDED 0.03 - 0.16 FEET          THICKLY LAMINATED 0.008 - 0.03 FEET          THINLY LAMINATED &lt; 0.008 FEET</p>																																																											
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<p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>										<p>FRAGILE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.          MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.          INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.          EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										<p>INDURATION          FRAGILE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.          MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.          INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.          EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>																																																																															
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PROJECT REFERENCE NO. R-5930B	SHEET NO. 3
R-5930 RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	

**RETAINING WALL ENVELOPE #1**



- Ⓐ RESIDUAL, RED, BROWN, GRAY, AND BLACK, DRY TO MOIST, MEDIUM STIFF TO HARD, SANDY TO CLAYEY SILT (A-4/A-5) AND SANDY TO SILTY CLAY (A-6/A-7-5/A-7-6) WITH TRACE GRAVEL SIZED ROCK FRAGMENTS
- Ⓑ RESIDUAL, GRAY, BLACK, AND BROWN, DRY, MEDIUM DENSE TO VERY DENSE, SILTY TO CLAYEY SAND (A-2-4/A-2-6) WITH MODERATE GRAVEL SIZED ROCK FRAGMENTS
- Ⓒ WEATHERED ROCK (METAVOLCANIC)
- Ⓓ CRYSTALLINE ROCK (METAVOLCANIC)



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REVISIONS

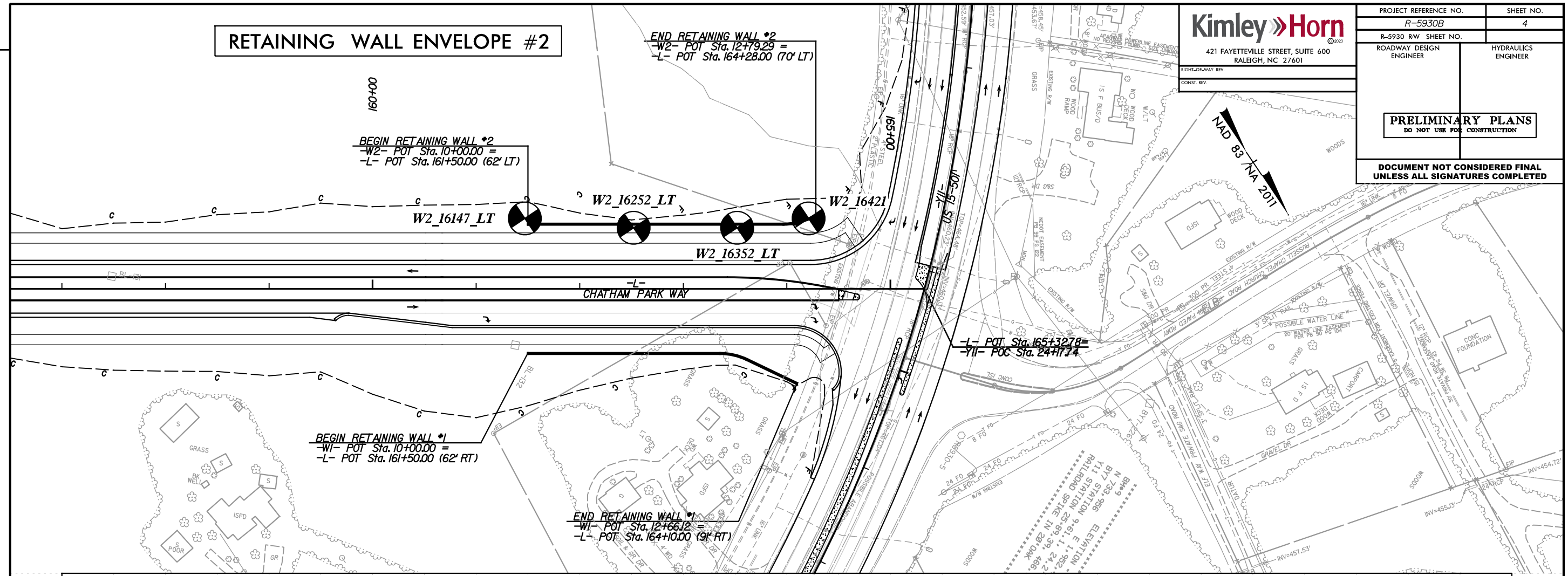
11/7/2024



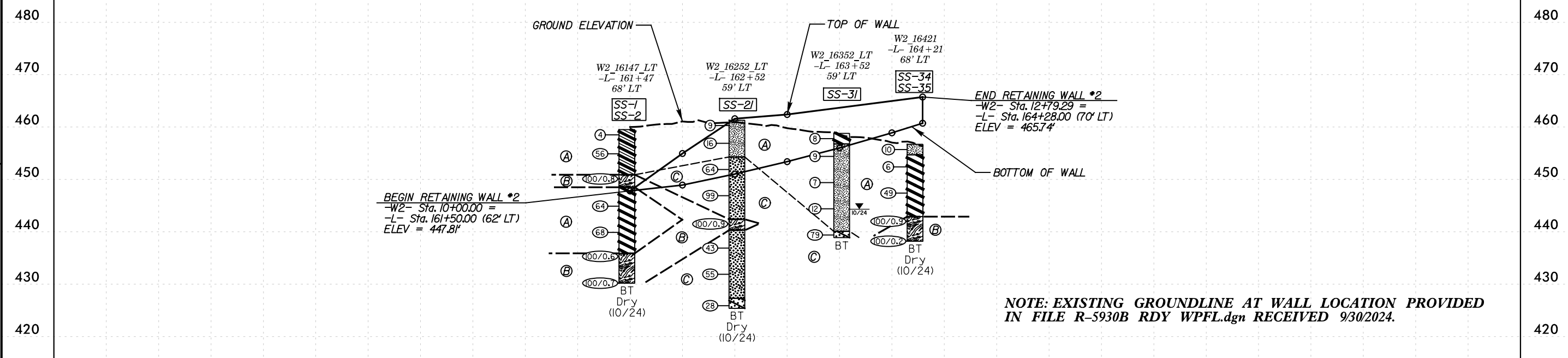
# RETAINING WALL ENVELOPE #2

**Kimley & Horn**  
 421 FAYETTEVILLE STREET, SUITE 600  
 RALEIGH, NC 27601

PROJECT REFERENCE NO. R-5930B	SHEET NO. 4
R-5930 RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	



- Ⓐ RESIDUAL, BROWN, RED, ORANGE, AND BLACK, DRY TO MOIST, MEDIUM STIFF TO HARD, SAPROLITIC, SANDY SILT (A-4) AND SANDY TO SILTY CLAY (A-6/A-7-5/A-7-6) WITH TRACE GRAVEL SIZED ROCK FRAGMENTS
- Ⓑ WEATHERED ROCK (METAVOLCANIC)
- Ⓒ RESIDUAL, BROWN, GRAY, AND ORANGE, DRY, DENSE TO VERY DENSE, SAPROLITIC, SILTY TO CLAYEY SAND (A-2-4/A-2-6)



**NOTE: EXISTING GROUNDLINE AT WALL LOCATION PROVIDED IN FILE R-5930B RDY WPFL.dgn RECEIVED 9/30/2024.**

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REVISIONS

11/7/2024

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 48548.1.2		TIP R-5930B		COUNTY CHATHAM		GEOLOGIST M. Stanbury											
SITE DESCRIPTION Chatham Park Way North of Proposed Grant Drive to US 15 / 501 (Retaining Wall Nos. 1 & 2)							GROUND WTR (ft)										
BORING NO. W1_16150_RT		STATION 161+50		OFFSET 58 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 469.0 ft		TOTAL DEPTH 34.3 ft		NORTHING 733,301		EASTING 1,952,930											
DRILL RIG/HAMMER EFF./DATE SEL0435 DIEDRICH D-50 83% 08/27/2024			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER M. Morgan		START DATE 10/08/24		COMP. DATE 10/08/24		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
470	469.0	0.0	2	3	4										469.0	GROUND SURFACE	0.0
465	465.4	3.6	4	4	7										461.0	<b>RESIDUAL</b> Red and Black, Medium Stiff to Stiff, Silty Clay (A-7-6) with Trace Gravel Sized Rock Fragments	
460	460.4	8.6	12	13	20										456.0	Brown, Dense, Silty Sand (A-2-4) with Moderate Gravel Sized Rock Fragments	8.0
455	455.4	13.6	8	16	28										456.0	Brown and Black, Very Stiff to Hard, Saprolitic, Sandy Silt (A-4) with Trace Gravel Sized Rock Fragments	13.0
450	450.4	18.6	7	10	11										447.0	Brown and Black, Very Stiff, Saprolitic, Silty Clay (A-7-6)	22.0
445	445.4	23.6	11	11	17							SS-12	21%		439.9	<b>WEATHERED ROCK</b> (Metavolcanic)	29.1
440	440.4	28.6	22	54	46/0.2										434.7	Boring Terminated at Elevation 434.7 ft in Weathered Rock (Metavolcanic)	34.3
435	435.4	33.6	63	37/0.2												-Station and Offset Relative to Alignment -W1- (10+00, 4' LT)	

WBS 48548.1.2		TIP R-5930B		COUNTY CHATHAM		GEOLOGIST M. Stanbury											
SITE DESCRIPTION Chatham Park Way North of Proposed Grant Drive to US 15 / 501 (Retaining Wall Nos. 1 & 2)							GROUND WTR (ft)										
BORING NO. W1_16243		STATION 162+43		OFFSET 49 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 469.6 ft		TOTAL DEPTH 24.9 ft		NORTHING 733,345		EASTING 1,952,848											
DRILL RIG/HAMMER EFF./DATE SEL0435 DIEDRICH D-50 83% 08/27/2024			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER M. Morgan		START DATE 10/08/24		COMP. DATE 10/08/24		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
470	469.6	0.0	3	3	4										469.6	GROUND SURFACE	0.0
465	466.1	3.5	5	5	6										456.6	<b>RESIDUAL</b> Red and Brown, Medium Stiff to Very Stiff, Saprolitic, Silty Clay (A-7-5) with Trace Gravel Sized Rock Fragments	
460	461.1	8.5	5	8	8										456.6	Brown, Hard, Sandy Clay (A-6) with Trace Gravel Sized Rock Fragments	13.0
455	456.1	13.5	14	33	24										450.6	<b>WEATHERED ROCK</b> (Metavolcanic)	19.0
450	451.1	18.5	10	30	70/0.4										444.7	<b>CRYSTALLINE ROCK</b> (Metavolcanic)	24.9
445	446.1	23.5	60/0.0													Boring Terminated with Standard Penetration Test Refusal at Elevation 444.7 ft Crystalline Rock (Metavolcanic)	
	444.7	24.9	60/0.0													-Station and Offset Relative to Alignment -W1- (10+93, 13' LT)	

NCDOT BORE DOUBLE R5930B\_GEO\_RWAL\_BH.GPJ\_NC\_DOT.GDT 11/7/24



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 48548.1.2		TIP R-5930B		COUNTY CHATHAM		GEOLOGIST M. Stanbury										
SITE DESCRIPTION Chatham Park Way North of Proposed Grant Drive to US 15 / 501 (Retaining Wall Nos. 1 & 2)							GROUND WTR (ft)									
BORING NO. W2_16147_LT		STATION 161+47		OFFSET 68 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 459.5 ft		TOTAL DEPTH 29.3 ft		NORTHING 733,195		EASTING 1,952,863										
DRILL RIG/HAMMER EFF./DATE SEL0435 DIEDRICH D-50 83% 08/27/2024			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER M. Morgan		START DATE 10/08/24		COMP. DATE 10/08/24		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
460	459.5	0.0	2	1	3							SS-1	23%	D	459.5	0.0
455	455.9	3.6	7	26	30							SS-2	18%		450.9	8.6
450	450.9	8.6	37	63/0.3										D	448.5	11.0
445	445.9	13.6	17	12	52									D	435.9	23.6
440	440.9	18.6	21	31	37									D	430.2	29.3
435	435.9	23.6	53	47/0.1												
	430.9	28.6	60	40/0.2												
Boring Terminated at Elevation 430.2 ft in Weathered Rock (Metavolcanic) -Boring Located 3 Feet Downstation of Alignment -W2- (10+00, 6' LT)																

WBS 48548.1.2		TIP R-5930B		COUNTY CHATHAM		GEOLOGIST M. Stanbury										
SITE DESCRIPTION Chatham Park Way North of Proposed Grant Drive to US 15 / 501 (Retaining Wall Nos. 1 & 2)							GROUND WTR (ft)									
BORING NO. W2_16252_LT		STATION 162+52		OFFSET 59 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 461.3 ft		TOTAL DEPTH 35.9 ft		NORTHING 733,260		EASTING 1,952,780										
DRILL RIG/HAMMER EFF./DATE SEL0435 DIEDRICH D-50 83% 08/27/2024			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER M. Morgan		START DATE 10/09/24		COMP. DATE 10/09/24		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
465	461.3	0.0	4	5	4							SS-21	15%	D	461.3	0.0
460	457.9	3.4	4	5	11										D	454.3
455	452.9	8.4	14	20	44									D	440.3	21.0
450	447.9	13.4	34	55	44									D	427.3	34.0
445	442.9	18.4	22	46	54/0.4									D	425.4	35.9
440	437.9	23.4	12	15	28									D		
435	432.9	28.4	14	17	38									D		
430	426.9	34.4	11	14	14									M		
Boring Terminated at Elevation 425.4 ft in Clayey Sand -Station and Offset Relative to Alignment -W2- (11+02, 3' RT)																

NCDOT BORE DOUBLE R5930B\_GEO\_RWAL\_BH.GPJ NC\_DOT.GDT 11/7/24

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 48548.1.2		TIP R-5930B		COUNTY CHATHAM		GEOLOGIST M. Stanbury	
SITE DESCRIPTION Chatham Park Way North of Proposed Grant Drive to US 15 / 501 (Retaining Wall Nos. 1 & 2)							GROUND WTR (ft)
BORING NO. W2_16352_LT		STATION 163+52		OFFSET 59 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 458.8 ft		TOTAL DEPTH 19.9 ft		NORTHING 733,316		EASTING 1,952,697	
DRILL RIG/HAMMER EFF./DATE SEL0435 DIEDRICH D-50 83% 08/27/2024			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic		
DRILLER M. Morgan		START DATE 10/09/24		COMP. DATE 10/09/24		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
460	458.8	0.0												458.8	GROUND SURFACE	0.0
455	455.4	3.4	4	4	4	...	...	...	...	...		M		456.8	<b>RESIDUAL</b> Red and Black, Stiff, Silty Clay (A-7-6)	2.0
			3	4	5	...	...	...	...	...		M			Red, Brown, Black, and Orange, Medium Stiff to Stiff, Saprolitic, Sandy Silt (A-4)	
450	450.4	8.4	2	3	4	...	...	...	...	...		SS-31	51%			
445	445.4	13.4	3	4	8	...	...	...	...	...						
440	440.4	18.4	24	36	43	...	...	...	...	...				440.1	Gray and Orange, Very Dense, Saprolitic, Clayey Sand (A-2-6)	18.7
												D		438.9	Boring Terminated at Elevation 438.9 ft in Clayey Sand	19.9

-Station and Offset Relative to Alignment  
-W2- (12+02, 3' RT)

WBS 48548.1.2		TIP R-5930B		COUNTY CHATHAM		GEOLOGIST M. Stanbury	
SITE DESCRIPTION Chatham Park Way North of Proposed Grant Drive to US 15 / 501 (Retaining Wall Nos. 1 & 2)							GROUND WTR (ft)
BORING NO. W2_16421		STATION 164+21		OFFSET 68 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 456.7 ft		TOTAL DEPTH 18.5 ft		NORTHING 733,347		EASTING 1,952,635	
DRILL RIG/HAMMER EFF./DATE SEL0435 DIEDRICH D-50 83% 08/27/2024			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic		
DRILLER M. Morgan		START DATE 10/09/24		COMP. DATE 10/09/24		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
460	456.7	0.0												456.7	GROUND SURFACE	0.0
455	453.4	3.3	4	4	6	...	...	...	...	...		SS-34	14%	454.7	<b>RESIDUAL</b> Brown and Orange, Stiff, Sandy Silt (A-4)	2.0
			2	2	4	...	...	...	...	...		SS-35	28%		Brown and Black, Medium Stiff to Hard, Saprolitic, Highly Plastic, Silty Clay (A-7-5)	
450	448.4	8.3	10	23	26	...	...	...	...	...						
445	443.4	13.3	22	42	58/0.4	...	...	...	...	...				442.9	<b>WEATHERED ROCK</b> (Metavolcanic)	13.8
440	438.4	18.3	100/0.2			...	...	...	...	...				438.2	Boring Terminated at Elevation 438.2 ft in Weathered Rock (Metavolcanic)	18.5

-Station and Offset Relative to Alignment  
-W2- (12-72, 1' LT)



Laboratory Testing Summary

Project Number: 48548.1.2  
 TIP Number: R-5930B  
 County: Chatham  
 Description: Chatham Park Way North of Proposed Grant Drive to US 15/501 (Retaining Wall Nos. 1 and 2)

Boring No.	Sample No.	Station	Offset (feet)	Northing	Easting	Depth Interval (feet)	Lab ID	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
											Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
W1_16150_RT	SS-12	161+50	58' RT	733301	1952930	18.6-20.1	24-1963	A-4 (0)	NP	NP	9.3	19.3	43.4	28.0	0.0	100	95.9	76.7	21.1%	
W1_16243	SS-17	162+43	49' RT	733345	1952848	3.5-5.0	24-1964	A-7-5 (24)	60	19	4.4	6.3	20.2	69.1	0.0	100	97.1	91.1	34.1%	
W1_16350	SS-41	163+50	56' RT	733410	1952763	8.5-10.0	24-1965	A-4 (9)	37	9	1.8	19.2	48.6	30.4	0.0	100	99.6	85.5	20.9%	
W1_16410	SS-47	164+10	91' RT	733473	1952732	0.0-1.5	24-1966	A-6 (5)	36	12	21.0	12.3	33.9	32.8	11.8	82.2	68.3	58	20.5%	
W2_16147_LT	SS-1	161+47	68' LT	733195	1952863	0.0-1.5	24-1967	A-6 (7)	37	11	13.0	12.5	41.6	32.9	4.6	90.1	81.5	70.8	22.9%	
W2_16147_LT	SS-2	161+47	68' LT	733195	1952863	3.6-5.1	24-1968	A-6 (5)	37	12	22.2	22.8	38.9	16.1	6.8	91.5	79.4	55.3	17.7%	
W2_16252_LT	SS-21	162+52	59' LT	733260	1952780	0.0-1.5	24-1969	A-4 (1)	27	7	17.1	10.3	42.2	30.4	26.3	65.8	56.2	49.9	15.4%	
W2_16352_LT	SS-31	163+52	59' LT	733260	1952780	8.4-9.9	24-1970	A-4 (0)	NP	NP	3.0	5.8	48.0	43.2	0.0	100	98.2	93.2	51.4%	
W2_16421	SS-34	164+21	68' LT	733316	1952697	0.0-1.5	24-1971	A-4 (0)	23	4	21.0	9.8	38.9	30.3	19.1	64.8	52.7	47	14.4%	
W2_16421	SS-35	164+21	68' LT	733347	1952635	3.3-4.8	24-1972	A-7-6 (54)	75	49	1.4	5.1	22.7	70.8	0.0	100	98.9	96	28.2%	

*Chad Hawkins*

Certified Lab Technician Signature

147-02-0821

Certification Number