

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C.  | U-5783                      | 1         | 5            |

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY HENDERSON  
 PROJECT DESCRIPTION US-64 IMPROVEMENTS FROM  
WHITE PINE STREET TO BLYTHE STREET

SITE DESCRIPTION RETAINING WALL #1

**CONTENTS**

| <u>SHEET NO.</u> | <u>DESCRIPTION</u>        |
|------------------|---------------------------|
| 1                | TITLE SHEET               |
| 2                | LEGEND (SOIL & ROCK)      |
| 2A               | SUPPLEMENTAL LEGEND (GSI) |
| 3                | SITE PLAN                 |
| 4                | PROFILE(S)                |
| 5                | SOIL TEST RESULTS         |

**REFERENCE: U-5783**

**PROJECT: N/A**

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. 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.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. 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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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**

A. BLACKMORE

ELITE TECHNIQUES

A. NORTON, E.I.

INVESTIGATED BY ECS SOUTHEAST, LLC

DRAWN BY K. DE MONTBRUN, P.E.

CHECKED BY M. WALKO, P.E.

SUBMITTED BY ECS SOUTHEAST, LLC

DATE NOVEMBER 2023

*Prepared in the Office of:*



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 ENGINEERING  
 FIRM # F-1519



DocuSigned by:

*Kelly de Montbrun*

11/16/2023

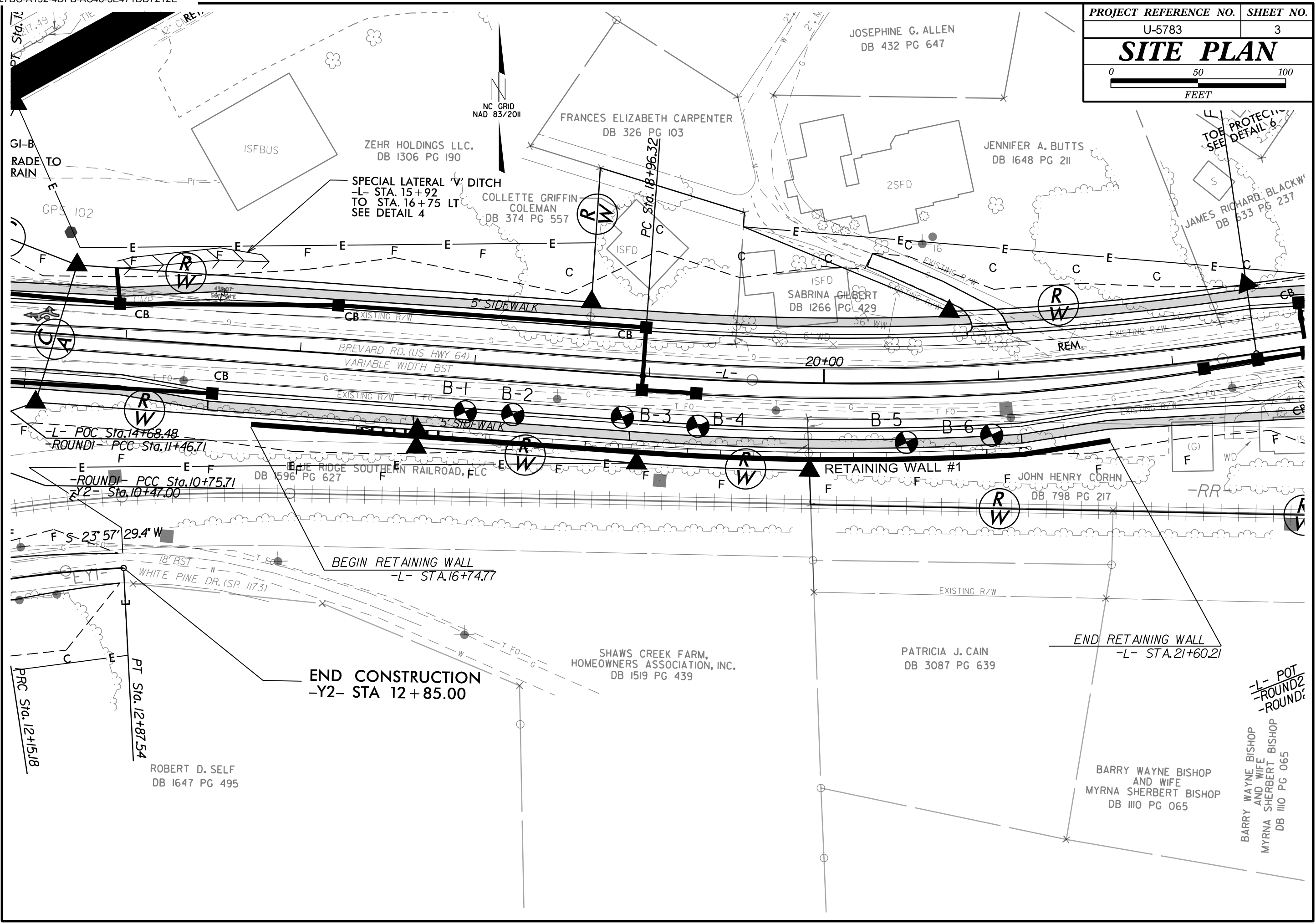
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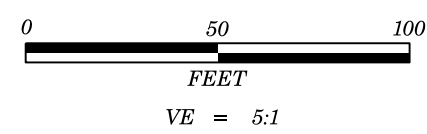
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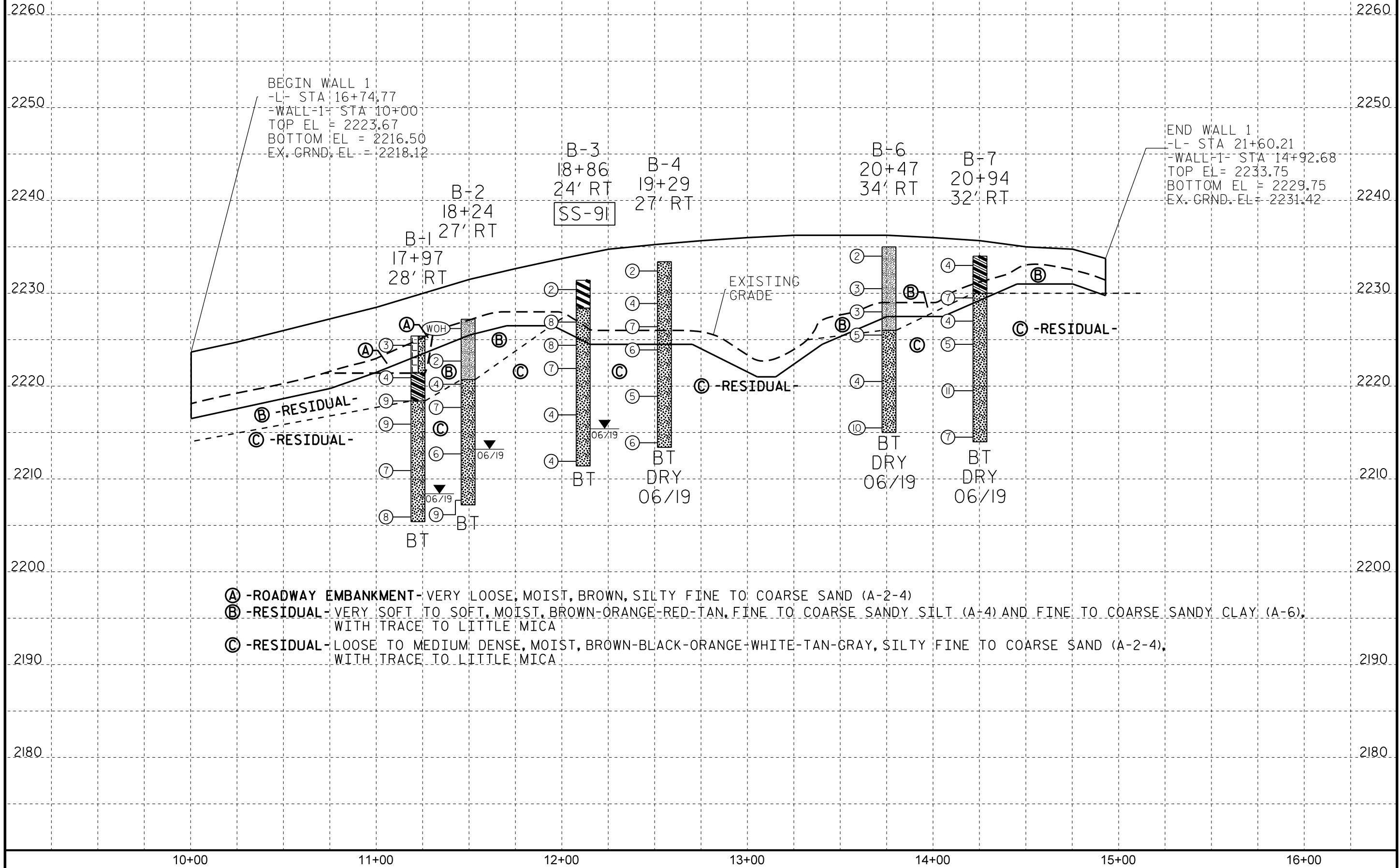
|                       |           |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-5783                | 3         |
| <b>SITE PLAN</b>      |           |
| 0 50 100<br>FEET      |           |





| PROJECT REFERENCE NO.                    | SHEET NO. |
|--|-----------|
| U-5783                                   | 4         |
| BORINGS PROJECT ALONG<br>-WALL1- PROFILE |           |

-WALL1- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY MATTERN & CRAIG IN NOVEMBER 2023. INFERRED STRATIGRAPHY IS DRAWN BORING TO BORING, WITH BOTH PROJECTED ON THE PROFILE.



- (A) -ROADWAY EMBANKMENT- VERY LOOSE, MOIST, BROWN, SILTY FINE TO COARSE SAND (A-2-4)
- (B) -RESIDUAL- VERY SOFT TO SOFT, MOIST, BROWN-ORANGE-RED-TAN, FINE TO COARSE SANDY SILT (A-4) AND FINE TO COARSE SANDY CLAY (A-6), WITH TRACE TO LITTLE MICA
- (C) -RESIDUAL- LOOSE TO MEDIUM DENSE, MOIST, BROWN-BLACK-ORANGE-WHITE-TAN-GRAY, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE TO LITTLE MICA

U-5783

5

## SOIL TEST RESULTS

| BORING<br>ID | SAMPLE<br>NO. | ALIGNMENT | OFFSET | STATION | DEPTH<br>INTERVAL | AASHTO<br>CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |      |      | %<br>MOISTURE | %<br>ORGANIC |
|--------------|---------------|-----------|--------|---------|-------------------|------------------|------|------|-------------|---------|------|------|--------------------|------|------|---------------|--------------|
|              |               |           |        |         |                   |                  |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40   | 200  |               |              |
| B-3          | SS-91         | -L-       | 24' RT | 18+86   | 0.0-1.5'          | A-7-5(8)         | 44   | 14   | 21.1        | 27.9    | 13.6 | 37.3 | 97.9               | 84.1 | 60.9 | 29.0          | -            |

LAB TECHNICIAN: DILLON KESTNER

NCDOT CERTIFICATION NO. 135-01-0816

REFERENCE: U-5783

PROJECT: N/A

**CONTENTS**

| <u>SHEET NO.</u> | <u>DESCRIPTION</u>   |
|------------------|----------------------|
| 1                | TITLE SHEET          |
| 2                | LEGEND (SOIL & ROCK) |
| 3                | SITE PLAN            |
| 4                | PROFILE              |
| 5                | SOIL TEST RESULTS    |

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY HENDERSON  
 PROJECT DESCRIPTION US-64 IMPROVEMENTS FROM  
WHITE PINE STREET TO BLYTHE STREET

SITE DESCRIPTION RETAINING WALL #2

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
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| N.C.  | U-5783                      | 1         | 5            |

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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.

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PERSONNEL

A. BLACKMORE

ELITE

A. NORTON, E.I.

INVESTIGATED BY ECS SOUTHEAST, LLP

DRAWN BY K. DE MONTBRUN, P.E.

CHECKED BY M. WALKO, P.E.

SUBMITTED BY ECS SOUTHEAST, LLP

DATE FEBRUARY 2023

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DocuSigned by:

*Kelly de Montbrun*

2/14/2023

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DATE

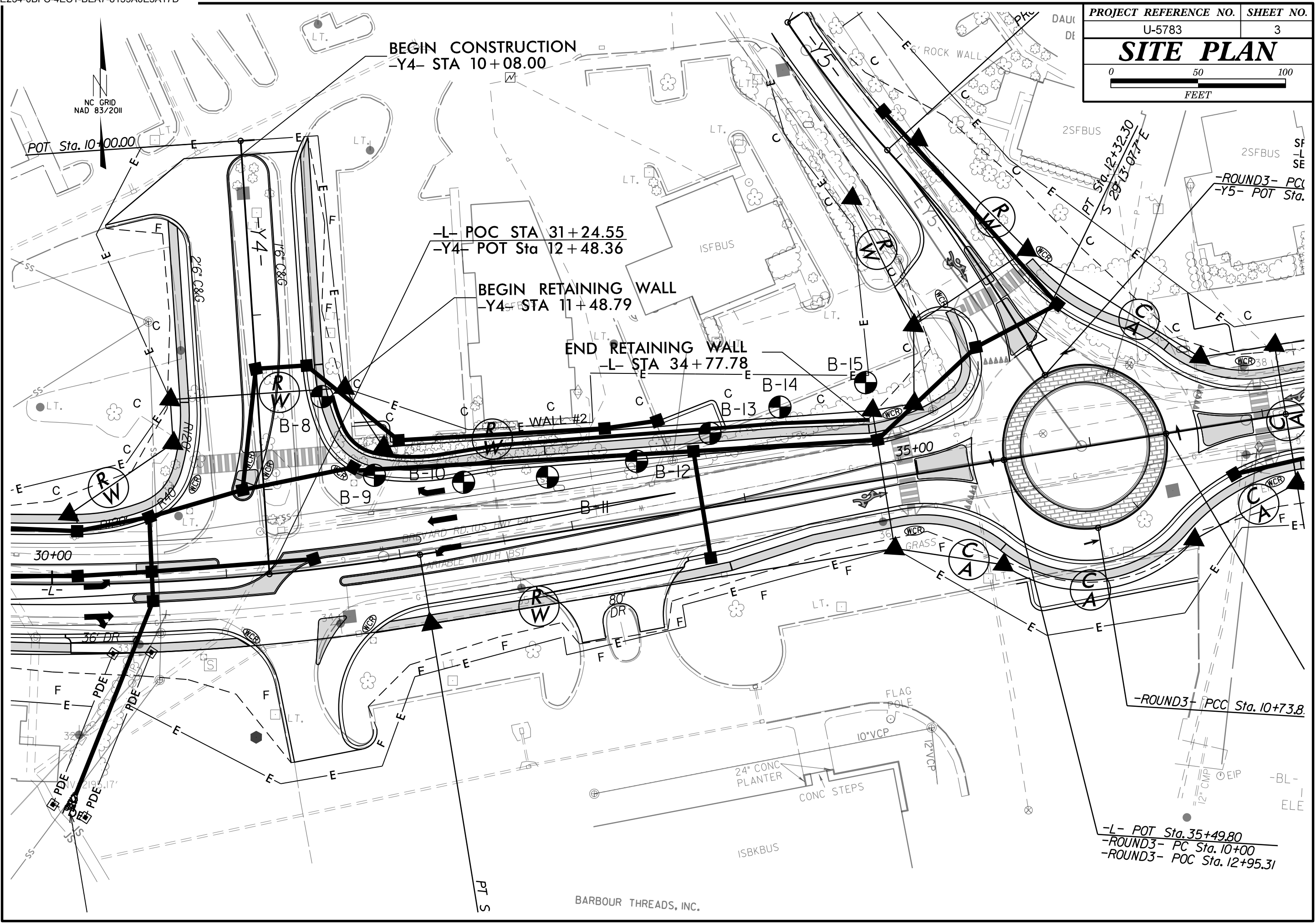
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**  
**SUBSURFACE INVESTIGATION**  
**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

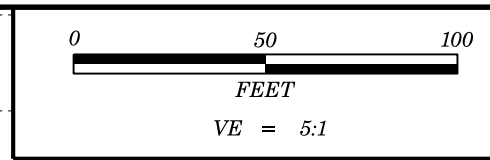
| <p style="text-align: center;"><b>SOIL DESCRIPTION</b></p> <p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, 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 style="text-align: center;"><b>SOIL LEGEND AND AASHTO CLASSIFICATION</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="2">GENERAL CLASS.</td> <td colspan="6">GRANULAR MATERIALS (≤ 35% PASSING #200)</td> <td colspan="6">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</td> <td colspan="3">ORGANIC MATERIALS</td> </tr> <tr> <td>A-1</td><td>A-1-b</td><td>A-2</td><td>A-2-4</td><td>A-2-5</td><td>A-2-6</td><td>A-2-7</td><td>A-4</td><td>A-5</td><td>A-6</td><td>A-7</td><td>A-1, A-2</td><td>A-3</td><td>A-4, A-5</td><td>A-6, A-7</td><td></td><td></td><td></td> </tr> <tr> <td>GROUP CLASS.</td> <td colspan="6"></td> <td colspan="6"></td> <td colspan="3"></td> </tr> <tr> <td>SYMBOL</td> <td colspan="6">[Pattern]</td> <td colspan="6">[Pattern]</td> <td colspan="3">[Pattern]</td> </tr> <tr> <td>% PASSING #10 #40 #200</td> <td>50 MX<br/>30 MX<br/>15 MX</td> <td>50 MX<br/>25 MX</td> <td>51 MN</td> <td>35 MX</td> <td>35 MX</td> <td>35 MX</td> <td>35 MX</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>MATERIAL PASSING #40</td> <td colspan="6"></td> <td colspan="6"></td> <td colspan="3"></td> </tr> <tr> <td>LL<br/>PI</td> <td colspan="6"></td> <td colspan="6"></td> <td colspan="3"></td> </tr> <tr> <td>GROUP INDEX</td> <td colspan="6"></td> <td colspan="6"></td> <td colspan="3"></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td colspan="2">STONE FRAGS. GRAVEL, AND SAND</td> <td colspan="2">FINE SAND</td> <td colspan="2">SILTY OR CLAYEY GRAVEL AND SAND</td> <td colspan="2">SILTY SOILS</td> <td colspan="2">CLAYEY SOILS</td> <td colspan="3">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td colspan="3">HIGHLY ORGANIC SOILS</td> </tr> <tr> <td>GEN. RATING AS SUBGRADE</td> <td colspan="6">EXCELLENT TO GOOD</td> <td colspan="6">FAIR TO POOR</td> <td colspan="3">FAIR TO POOR</td> <td colspan="3">POOR</td> <td colspan="3">UNSATURABLE</td> </tr> <tr> <td></td> <td colspan="6">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS &gt; LL - 30</td> <td colspan="6"></td> <td colspan="3"></td> <td colspan="3"></td> <td colspan="3"></td> </tr> </table> | GENERAL CLASS.  | GRANULAR MATERIALS (≤ 35% PASSING #200)  |   |                              |                                 |                   |              | SILT-CLAY MATERIALS (> 35% PASSING #200) |                              |                    |   |               |                  | ORGANIC MATERIALS    |                  |                | 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 |     |      |      | GROUP CLASS. |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          | SYMBOL                | [Pattern]                    |                    |              |               |                  |                   | [Pattern]        |                |                          |                   |                   |                    | [Pattern]       |                       |                      | % PASSING #10 #40 #200 | 50 MX<br>30 MX<br>15 MX | 50 MX<br>25 MX   | 51 MN           | 35 MX                            | 35 MX | 35 MX | 35 MX | 36 MN | 36 MN | 36 MN | 36 MN | 36 MN | 36 MN |  |  |  |  |  | MATERIAL PASSING #40 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | LL<br>PI |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | GROUP INDEX |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    | USUAL TYPES OF MAJOR MATERIALS                | STONE FRAGS. GRAVEL, AND SAND   |                                 | FINE SAND   |            | SILTY OR CLAYEY GRAVEL AND SAND |                                  | SILTY SOILS  |                                   | CLAYEY SOILS                      |  | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER |             |  | HIGHLY ORGANIC SOILS                    |   |   | GEN. RATING AS SUBGRADE             | EXCELLENT TO GOOD                        |   |                                       |  |  |   | FAIR TO POOR |  |  |  |  |  | FAIR TO POOR |                                   |  | POOR |  |  | UNSATURABLE |  |   |  | PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30 |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    | <p style="text-align: center;"><b>GRADATION</b></p> <p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.<br/> <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.<br/> <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p> <p style="text-align: center;"><b>ANGULARITY OF GRAINS</b></p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <b>ANGULAR</b>, <b>SUBANGULAR</b>, <b>SUBROUNDED</b>, OR <b>ROUNDED</b>.</p> <p style="text-align: center;"><b>MINERALOGICAL COMPOSITION</b></p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;"><b>COMPRESSIBILITY</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>SLIGHTLY COMPRESSIBLE</td> <td>LL &lt; 31</td> </tr> <tr> <td>MODERATELY COMPRESSIBLE</td> <td>LL = 31 - 50</td> </tr> <tr> <td>HIGHLY COMPRESSIBLE</td> <td>LL &gt; 50</td> </tr> </table> <p style="text-align: center;"><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><b>ORGANIC MATERIAL</b></td> <td><b>GRANULAR SOILS</b></td> <td><b>SILT - CLAY SOILS</b></td> <td><b>OTHER MATERIAL</b></td> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY</td> </tr> <tr> <td></td> <td></td> <td></td> <td>35% AND ABOVE</td> </tr> </table> <p style="text-align: center;"><b>GROUND WATER</b></p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING<br/>  STATIC WATER LEVEL AFTER 24 HOURS<br/>  PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA<br/>  SPRING OR SEEP</p> <p style="text-align: center;"><b>MISCELLANEOUS SYMBOLS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td> DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</td> <td> SOIL SYMBOL</td> <td> SPT TEST BORING</td> <td> SLOPE INDICATOR INSTALLATION</td> </tr> <tr> <td> ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td> AUGER BORING</td> <td> INFERRERD SOIL BOUNDARY</td> <td> CORE BORING</td> <td> CONE PENETROMETER TEST</td> </tr> <tr> <td> INFERRERD ROCK LINE</td> <td> MONITORING WELL</td> <td> SOUNDING ROD</td> <td> TEST BORING WITH CORE</td> <td> SPT N-VALUE</td> </tr> <tr> <td> ALLUVIAL SOIL BOUNDARY</td> <td> PIEZOMETER INSTALLATION</td> <td></td> <td></td> <td></td> </tr> </table> | SLIGHTLY COMPRESSIBLE | LL < 31 | MODERATELY COMPRESSIBLE | LL = 31 - 50 | HIGHLY COMPRESSIBLE | LL > 50 | <b>ORGANIC MATERIAL</b> | <b>GRANULAR SOILS</b> | <b>SILT - CLAY SOILS</b> | <b>OTHER MATERIAL</b> | TRACE OF ORGANIC MATTER | 2 - 3% | 3 - 5% | TRACE | LITTLE ORGANIC MATTER | 3 - 5% | 5 - 12% | LITTLE | MODERATELY ORGANIC | 5 - 10% | 12 - 20% | SOME | HIGHLY ORGANIC | > 10% | > 20% | HIGHLY |  |  |  | 35% AND ABOVE | ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION | DIP & DIP DIRECTION OF ROCK STRUCTURES | SOIL SYMBOL | SPT TEST BORING | SLOPE INDICATOR INSTALLATION | ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT | AUGER BORING | INFERRERD SOIL BOUNDARY | CORE BORING | CONE PENETROMETER TEST | INFERRERD ROCK LINE | MONITORING WELL | SOUNDING ROD | TEST BORING WITH CORE | SPT N-VALUE | ALLUVIAL SOIL BOUNDARY | PIEZOMETER INSTALLATION |  |  |  | <p style="text-align: center;"><b>ROCK DESCRIPTION</b></p> <p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRERD 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> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td> WEATHERED ROCK (WR)</td> <td>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</td> </tr> <tr> <td> CRYSTALLINE ROCK (CR)</td> <td>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</td> </tr> <tr> <td> NON-CRYSTALLINE ROCK (NCR)</td> <td>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. 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MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.<br/> <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.<br/> <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.<br/> <b>ROCK QUALITY DESIGNATION (ROD)</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.<br/> <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.<br/> <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.<br/> <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.<br/> <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.<br/> <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.<br/> <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.<br/> <b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p> <p><b>BENCH MARK:</b> N/A</p> <p style="text-align: right;">ELEVATION: _____ FEET</p> <p><b>NOTES:</b><br/>     ROADWAY DESIGN FILES, .TIN FILE, AND GPK FILE PROVIDED BY VAUGHN &amp; MELTON AND MATTERN &amp; CRAIG<br/>     NORTHING AND EASTINGS OBTAINED USING A TRIMBLE GEO7X. ELEVATIONS WERE OBTAINED USING THE PROVIDED .TIN FILE.<br/>     FIAD = FILLED IN AFTER DRILLING</p> |
|--|---|--|---|------------------------------|---------------------------------|-------------------|--------------|--|------------------------------|--------------------|---|---------------|------------------|----------------------|------------------|----------------|--------------------------|-------------------|-------------------|--------------------|-----------------|------------------------|----------------------|---------------------|-------------------------------|--------------------------|-------------------|----------------------------------|------------|------------------|----------|-----|------|------|--------------|--|----------|--|--|------------------|--|--|--------------------|-----------|-----------------------------|--------------|------------------------|--------------------------------|----------------|----------|-----------------------|------------------------------|--------------------|--------------|---------------|------------------|-------------------|------------------|----------------|--------------------------|-------------------|-------------------|--------------------|-----------------|-----------------------|----------------------|------------------------|-------------------------|------------------|-----------------|----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|--|--|--|--|----------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-------------|--|--|--|--|--|--|--|--|--|--|--|--|--|----------------------------------|------------------------------------|---|---------------------------------|---------------------------------|---|------------|---------------------------------|----------------------------------|--|-----------------------------------|-----------------------------------|--|---|-------------|--|---|---|---|-------------------------------------|--|---|---------------------------------------|--|--|---|--------------|--|--|--|--|--|--------------|-----------------------------------|--|------|--|--|-------------|--|---|--|---|--------------------------------------|----|----------------------|---|--------------------|-------------|---|----|---------------|------------------------------------|----|-------------|--|----|--|--|---|-----------------------|--------------|------------------------------------|--|-----------------------|---------|-------------------------|--------------|---------------------|---------|-------------------------|-----------------------|--------------------------|-----------------------|-------------------------|--------|--------|-------|-----------------------|--------|---------|--------|--------------------|---------|----------|------|----------------|-------|-------|--------|--|--|--|---------------|---|--|-------------|-----------------|------------------------------|--|--------------|-------------------------|-------------|------------------------|---------------------|-----------------|--------------|-----------------------|-------------|------------------------|-------------------------|--|--|--|--|---------------------|--|-----------------------|--|----------------------------|---|-------------------------------------|---|-------|---|---------------------|---|--------------|---|-----------------|--|-------------------------------|---|---------------|---|----------------------|---|----------|--|-----------|---|------|---|-----------------|---|-------------|--|------|---|-----------|--|------------------|--|---------|--|------|---------|------|-----------|-----------|-------------------|---------------------|--------|------|--------------|----------------|--------------|------------------|-------------|---------------|-----------------|-------|----------------|--------------------|------------------|------------|---------------------|------------------|-------------------|--|--|-----------------------|--------------|--|
| GENERAL CLASS.   |   | GRANULAR MATERIALS (≤ 35% PASSING #200)  |   |                              |                                 |                   |              | SILT-CLAY MATERIALS (> 35% PASSING #200) |                              |                    |   |               |                  | ORGANIC MATERIALS    |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  | 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         |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| GROUP CLASS.   |   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| SYMBOL   | [Pattern]   |  |   |                              |                                 |                   | [Pattern]    |  |                              |                    |   |               | [Pattern]        |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| % PASSING #10 #40 #200   | 50 MX<br>30 MX<br>15 MX   | 50 MX<br>25 MX   | 51 MN   | 35 MX                        | 35 MX                           | 35 MX             | 35 MX        | 36 MN                                    | 36 MN                        | 36 MN              | 36 MN   | 36 MN         | 36 MN            |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| MATERIAL PASSING #40   |   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| LL<br>PI   |   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| GROUP INDEX  |   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| USUAL TYPES OF MAJOR MATERIALS   | STONE FRAGS. GRAVEL, AND SAND   |  | FINE SAND   |                              | SILTY OR CLAYEY GRAVEL AND SAND |                   | SILTY SOILS  |  | CLAYEY SOILS                 |                    | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER |               |                  | HIGHLY ORGANIC SOILS |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| GEN. RATING AS SUBGRADE  | EXCELLENT TO GOOD   |  |   |                              |                                 |                   | FAIR TO POOR |  |                              |                    |   |               | FAIR TO POOR     |                      |                  | POOR           |                          |                   | UNSATURABLE       |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  | PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| SLIGHTLY COMPRESSIBLE  | LL < 31   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| MODERATELY COMPRESSIBLE  | LL = 31 - 50  |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| HIGHLY COMPRESSIBLE  | LL > 50   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| <b>ORGANIC MATERIAL</b>  | <b>GRANULAR SOILS</b>   | <b>SILT - CLAY SOILS</b>   | <b>OTHER MATERIAL</b>                                 |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| TRACE OF ORGANIC MATTER  | 2 - 3%  | 3 - 5%   | TRACE   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| LITTLE ORGANIC MATTER  | 3 - 5%  | 5 - 12%  | LITTLE  |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| MODERATELY ORGANIC   | 5 - 10%   | 12 - 20%   | SOME  |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| HIGHLY ORGANIC   | > 10%   | > 20%  | HIGHLY  |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  |   |  | 35% AND ABOVE   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION  | DIP & DIP DIRECTION OF ROCK STRUCTURES  | SOIL SYMBOL  | SPT TEST BORING                                       | SLOPE INDICATOR INSTALLATION |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT   | AUGER BORING  | INFERRERD SOIL BOUNDARY  | CORE BORING   | CONE PENETROMETER TEST       |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| INFERRERD ROCK LINE  | MONITORING WELL   | SOUNDING ROD   | TEST BORING WITH CORE                                 | SPT N-VALUE                  |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| ALLUVIAL SOIL BOUNDARY   | PIEZOMETER INSTALLATION   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| WEATHERED ROCK (WR)  | NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| CRYSTALLINE ROCK (CR)  | FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.  |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| NON-CRYSTALLINE ROCK (NCR)   | 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.   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| COASTAL PLAIN SEDIMENTARY ROCK (CP)  | COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| FRESH  | ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| VERY SLIGHT (V SL.)  | 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.   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| SLIGHT (SL.)   | 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.   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| MODERATE (MOD.)  | 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.  |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| MODERATELY SEVERE (MOD. SEV.)  | 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>   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| SEVERE (SEV.)  | 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>   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| VERY SEVERE (V SEV.)   | 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> |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| COMPLETE   | ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.  |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| VERY HARD  | CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| HARD   | CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| MODERATELY HARD  | 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.   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| MEDIUM HARD  | CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.  |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| SOFT   | CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| VERY SOFT  | 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.  |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| FRACTURE SPACING   |   | BEDDING  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| 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   | THINLY LAMINATED   | 0.008 - 0.03 FEET                                     |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  |   | VERY THINLY LAMINATED  | < 0.008 FEET  |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| <p style="text-align: center;"><b>TEXTURE OR GRAIN SIZE</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>U.S. STD. SIEVE SIZE</td> <td>4</td> <td>10</td> <td>40</td> <td>60</td> <td>200</td> <td>270</td> </tr> <tr> <td>OPENING (MM)</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> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>BOULDER (BLDR.)</b></td> <td><b>COBBLE (COB.)</b></td> <td><b>GRAVEL (GR.)</b></td> <td><b>COARSE SAND (CSE. SD.)</b></td> <td><b>FINE SAND (F SD.)</b></td> <td><b>SILT (SL.)</b></td> <td><b>CLAY (CL.)</b></td> </tr> <tr> <td>GRAIN SIZE</td> <td>MM 305<br/>IN. 12</td> <td>75<br/>3</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> </table>   | U.S. STD. SIEVE SIZE  | 4  | 10  | 40                           | 60                              | 200               | 270          | OPENING (MM)                             | 4.76                         | 2.00               | 0.42  | 0.25          | 0.075            | 0.053                |                  |                |                          |                   |                   |                    |                 | <b>BOULDER (BLDR.)</b> | <b>COBBLE (COB.)</b> | <b>GRAVEL (GR.)</b> | <b>COARSE SAND (CSE. SD.)</b> | <b>FINE SAND (F SD.)</b> | <b>SILT (SL.)</b> | <b>CLAY (CL.)</b>                | GRAIN SIZE | MM 305<br>IN. 12 | 75<br>3  | 2.0 | 0.25 | 0.05 | 0.005        | <p style="text-align: center;"><b>RECOMMENDATION SYMBOLS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td> UNDERCUT</td> <td> UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</td> <td> UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</td> </tr> <tr> <td> SHALLOW UNDERCUT</td> <td> UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</td> <td></td> </tr> </table> <p style="text-align: center;"><b>ABBREVIATIONS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>CL - CLAY</td> <td>CPT - CONE PENETRATION TEST</td> <td>CSE - COARSE</td> <td>DMT - DILATOMETER TEST</td> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>e - VOID RATIO</td> <td>F - FINE</td> <td>FOSS. - FOSSILIFEROUS</td> <td>FRAC. - FRACTURED, FRACTURES</td> <td>FRAGS. - FRAGMENTS</td> <td>HI. - HIGHLY</td> <td>MED. - MEDIUM</td> <td>MICA - MICACEOUS</td> <td>MOD. - MODERATELY</td> <td>NP - NON PLASTIC</td> <td>ORG. - ORGANIC</td> <td>PMT - PRESSUREMETER TEST</td> <td>SAP. - SAPROLITIC</td> <td>SD. - SAND, SANDY</td> <td>SL. - SILTY, SILTY</td> <td>SLI. - SLIGHTLY</td> <td>TCR - TRICONE REFUSAL</td> <td>w - MOISTURE CONTENT</td> <td>V - VERY</td> <td>VST - VANE SHEAR TEST</td> <td>WEA. - WEATHERED</td> <td>Z - UNIT WEIGHT</td> <td>γ<sub>d</sub> - DRY UNIT WEIGHT</td> </tr> <tr> <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> <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> <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> <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> </table> <p style="text-align: center;"><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <table border="1" style="width: 100%; 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MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p> | SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION  | GUIDE FOR FIELD MOISTURE DESCRIPTION | LL | - SATURATED - (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | PLASTIC RANGE (PI) | - WET - (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | PL | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | OM | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | SL |  |  | NON PLASTIC<br>SLIGHTLY PLASTIC<br>MODERATELY PLASTIC<br>HIGHLY PLASTIC | PLASTICITY INDEX (PI) | DRY STRENGTH | 0-5<br>6-15<br>16-25<br>26 OR MORE | VERY LOW<br>SLIGHT<br>MEDIUM<br>HIGH   |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| U.S. STD. SIEVE SIZE   | 4   | 10   | 40  | 60                           | 200                             | 270               |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| OPENING (MM)   | 4.76  | 2.00   | 0.42  | 0.25                         | 0.075                           | 0.053             |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  |   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| <b>BOULDER (BLDR.)</b>   | <b>COBBLE (COB.)</b>  | <b>GRAVEL (GR.)</b>  | <b>COARSE SAND (CSE. SD.)</b>                         | <b>FINE SAND (F SD.)</b>     | <b>SILT (SL.)</b>               | <b>CLAY (CL.)</b> |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| GRAIN SIZE   | MM 305<br>IN. 12  | 75<br>3  | 2.0   | 0.25                         | 0.05                            | 0.005             |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| UNDERCUT   | UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE  | UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| SHALLOW UNDERCUT   | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK  |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| AR - AUGER REFUSAL   | CL - CLAY   | CPT - CONE PENETRATION TEST  | CSE - COARSE  | DMT - DILATOMETER TEST       | DPT - DYNAMIC PENETRATION TEST  | e - VOID RATIO    | F - FINE     | FOSS. - FOSSILIFEROUS                    | FRAC. - FRACTURED, FRACTURES | FRAGS. - FRAGMENTS | HI. - HIGHLY  | MED. - MEDIUM | MICA - MICACEOUS | MOD. - MODERATELY    | NP - NON PLASTIC | ORG. - ORGANIC | PMT - PRESSUREMETER TEST | SAP. - SAPROLITIC | SD. - SAND, SANDY | SL. - SILTY, SILTY | SLI. - SLIGHTLY | TCR - TRICONE REFUSAL  | w - MOISTURE CONTENT | V - VERY            | VST - VANE SHEAR TEST         | WEA. - WEATHERED         | Z - UNIT WEIGHT   | γ <sub>d</sub> - DRY UNIT WEIGHT |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  |   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  |   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| <input type="checkbox"/> CME-45C   | <input type="checkbox"/> CLAY BITS  | <input checked="" type="checkbox"/> AUTOMATIC  | <input type="checkbox"/> MANUAL                       |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| <input type="checkbox"/> CME-55  | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER   | CORE SIZE:   |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| <input type="checkbox"/> CME-550   | <input checked="" type="checkbox"/> 8" HOLLOW AUGERS  | <input type="checkbox"/> -B _____  | <input type="checkbox"/> -H _____                     |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| <input type="checkbox"/> VANE SHEAR TEST   | <input type="checkbox"/> HARD FACED FINGER BITS   | HAND TOOLS:  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| <input type="checkbox"/> PORTABLE HOIST  | <input type="checkbox"/> TUNG-CARBIDE INSERTS   | <input type="checkbox"/> POST HOLE DIGGER  | <input type="checkbox"/> HAND AUGER                   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| <input type="checkbox"/> GEOPROBE 78220T   | <input type="checkbox"/> CASING _____ W/ ADVANCER   | <input type="checkbox"/> SOUNDING ROD  | <input type="checkbox"/> VANE SHEAR TEST              |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  | <input type="checkbox"/> TRICONE _____ *STEEL TEETH   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  | <input type="checkbox"/> TRICONE _____ *TUNG-CARB.  |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  | <input type="checkbox"/> CORE BIT   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  |   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS)   | FIELD MOISTURE DESCRIPTION  | GUIDE FOR FIELD MOISTURE DESCRIPTION   |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| LL   | - SATURATED - (SAT.)  | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE                                  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| PLASTIC RANGE (PI)   |   | - WET - (W)  | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| PL   | - MOIST - (M)   | SOLID; AT OR NEAR OPTIMUM MOISTURE   |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| OM   |   | - DRY - (D)  | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| SL   |   |  |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
| NON PLASTIC<br>SLIGHTLY PLASTIC<br>MODERATELY PLASTIC<br>HIGHLY PLASTIC  | PLASTICITY INDEX (PI)   | DRY STRENGTH   |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |
|  | 0-5<br>6-15<br>16-25<br>26 OR MORE  | VERY LOW<br>SLIGHT<br>MEDIUM<br>HIGH   |   |                              |                                 |                   |              |  |                              |                    |   |               |                  |                      |                  |                |                          |                   |                   |                    |                 |                        |                      |                     |                               |                          |                   |                                  |            |                  |          |     |      |      |              |  |          |  |  |                  |  |  |                    |           |                             |              |                        |                                |                |          |                       |                              |                    |              |               |                  |                   |                  |                |                          |                   |                   |                    |                 |                       |                      |                        |                         |                  |                 |                                  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |                                 |                                  |  |                                   |                                   |  |   |             |  |   |   |   |                                     |  |   |                                       |  |  |   |              |  |  |  |  |  |              |                                   |  |      |  |  |             |  |   |  |   |                                      |    |                      |   |                    |             |   |    |               |                                    |    |             |  |    |  |  |   |                       |              |                                    |  |                       |         |                         |              |                     |         |                         |                       |                          |                       |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |  |  |  |               |   |  |             |                 |                              |  |              |                         |             |                        |                     |                 |              |                       |             |                        |                         |  |  |  |  |                     |  |                       |  |                            |   |                                     |   |       |   |                     |   |              |   |                 |  |                               |   |               |   |                      |   |          |  |           |   |      |   |                 |   |             |  |      |   |           |  |                  |  |         |  |      |         |      |           |           |                   |                     |        |      |              |                |              |                  |             |               |                 |       |                |                    |                  |            |                     |                  |                   |  |  |                       |              |  |

|                       |           |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-5783                | 3         |
| <b>SITE PLAN</b>      |           |
|                       |           |



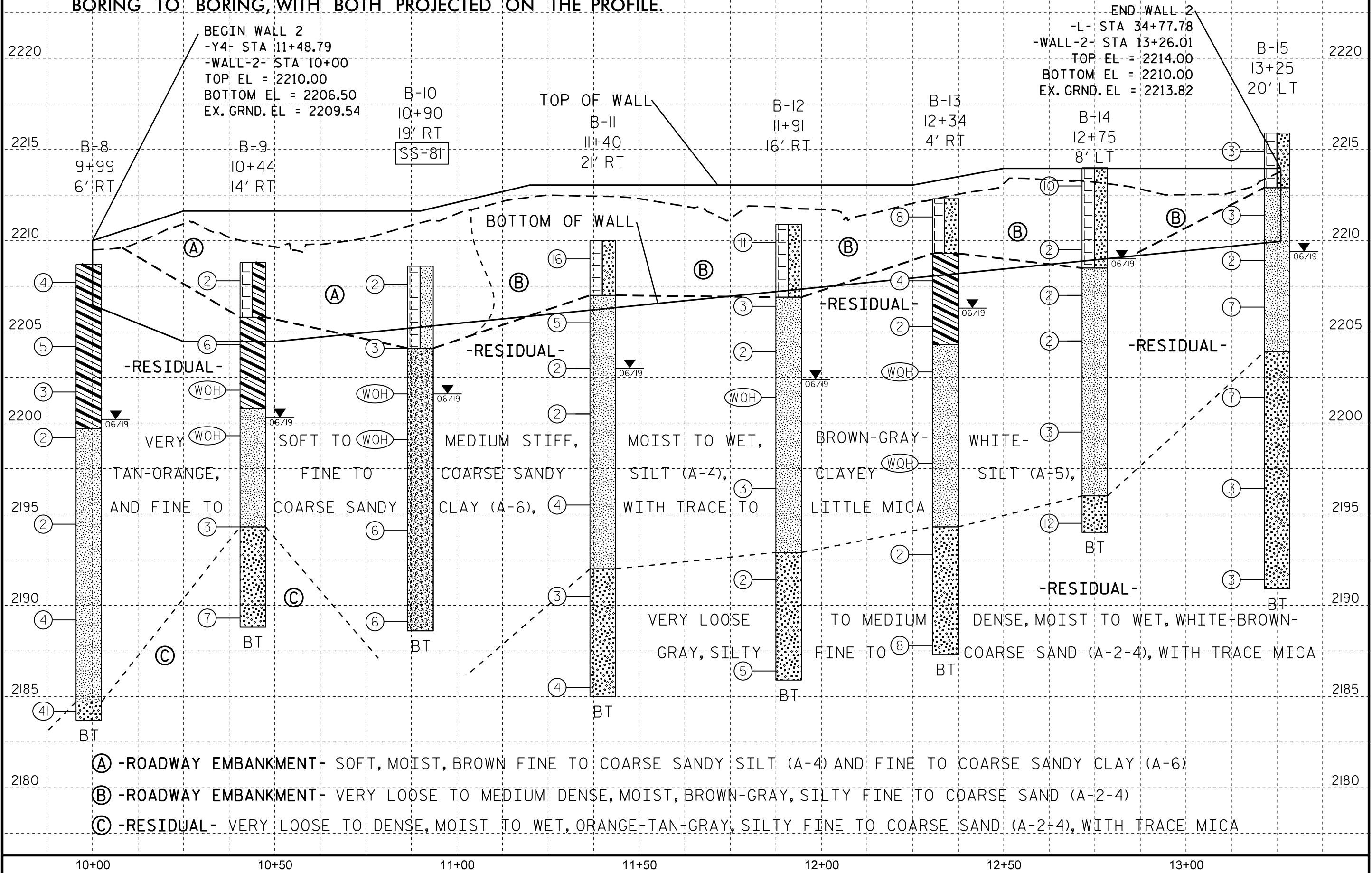
BARBOUR THREADS, INC.





|  |                  |
|--|------------------|
| <b>PROJECT REFERENCE NO.</b>                     | <b>SHEET NO.</b> |
| U-5783   | 4                |
| <b>BORINGS PROJECT ALONG<br/>-WALL2- PROFILE</b> |                  |

**-WALL2- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY VAUGHN & MELTON IN JUNE 2021. INFERRED STRATIGRAPHY IS DRAWN BORING TO BORING, WITH BOTH PROJECTED ON THE PROFILE.**



U-5783

5

## SOIL TEST RESULTS

| BORING<br>ID | SAMPLE<br>NO. | ALIGNMENT | OFFSET | STATION | DEPTH<br>INTERVAL | AASHTO<br>CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |      |      | %<br>MOISTURE | %<br>ORGANIC |
|--------------|---------------|-----------|--------|---------|-------------------|------------------|------|------|-------------|---------|------|------|--------------------|------|------|---------------|--------------|
|              |               |           |        |         |                   |                  |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40   | 200  |               |              |
| B-10         | SS-81         | -WALL2-   | 19' RT | 10+90   | 6.0-7.5'          | A-5(0)           | 46   | NP   | 24.6        | 42.5    | 13.8 | 19.0 | 99.0               | 82.7 | 43.1 | 36.2          | -            |

LAB TECHNICIAN: DILLON KESTNER

NCDOT CERTIFICATION NO. 135-01-0816

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C.  | U-5783                      | 1         | 5            |

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY HENDERSON  
 PROJECT DESCRIPTION US-64 IMPROVEMENTS FROM  
WHITE PINE STREET TO BLYTHE STREET

SITE DESCRIPTION RETAINING WALL #3

**CONTENTS**

| <u>SHEET NO.</u> | <u>DESCRIPTION</u>   |
|------------------|----------------------|
| 1                | TITLE SHEET          |
| 2                | LEGEND (SOIL & ROCK) |
| 3                | SITE PLAN            |
| 4                | PROFILE              |
| 5                | SOIL TEST RESULTS    |

**REFERENCE: U-5783**

**PROJECT: N/A**

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  - 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**

A. BLACKMORE

ELITE TECHNIQUES

A. NORTON, E.I.

INVESTIGATED BY ECS SOUTHEAST, LLP

DRAWN BY K. DE MONTBRUN, P.E.

CHECKED BY M. WALKO, P.E.

SUBMITTED BY ECS SOUTHEAST, LLP

DATE FEBRUARY 2023

*Prepared in the Office of:*



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DocuSigned by:

Kelly de Montbrun 2/14/2023

7BDD9975E22C480 SIGNATURE DATE

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 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**

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 209, 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, *VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6*

**SOIL LEGEND AND AASHTO CLASSIFICATION**

| GENERAL CLASS.  | GRANULAR MATERIALS (≤ 35% PASSING #200) |             |       |                                 |              |              |             | SILT-CLAY MATERIALS (> 35% PASSING #200) |              |             |             |             |          |     | ORGANIC MATERIALS |          |  |  |  |  |
|---|---|-------------|-------|---------------------------------|--------------|--------------|-------------|--|--------------|-------------|-------------|-------------|----------|-----|-------------------|----------|--|--|--|--|
|   | A-1                                     | A-1-b       | A-1-c | 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 |  |  |  |  |
| GROUP CLASS.  | A-1-a                                   | A-1-b       |       | 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 |       | 40 MX 10 MX                     | 41 MN 10 MX  | 40 MX 11 MN  | 41 MN 11 MN |  | 40 MX 10 MX  | 41 MN 10 MX | 40 MX 11 MN | 41 MN 11 MN |          |     |                   |          |  |  |  |  |
| MATERIAL PASSING #40 LL PI  |   |             |       | 40 MX 10 MX                     | 41 MN 10 MX  | 40 MX 11 MN  | 41 MN 11 MN |  | 40 MX 10 MX  | 41 MN 10 MX | 40 MX 11 MN | 41 MN 11 MN |          |     |                   |          |  |  |  |  |
| GROUP INDEX   | 0                                       | 0           |       | 0                               | 4 MX         | 8 MX         | 12 MX       |  | 16 MX        | NO MX       |             |             |          |     |                   |          |  |  |  |  |
| USUAL TYPES OF MAJOR MATERIALS  | STONE GRAVEL, SAND                      | FINE SAND   |       | SILTY OR CLAYEY GRAVEL AND SAND | SILTY SOILS  | CLAYEY SOILS |             |  |              |             |             |             |          |     |                   |          |  |  |  |  |
| GEN. RATING AS SUBGRADE   | EXCELLENT TO GOOD                       |             |       |                                 | FAIR TO POOR |              |             |  | FAIR TO POOR | POOR        | UNSATURABLE |             |          |     |                   |          |  |  |  |  |
| PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30 |   |             |       |                                 |              |              |             |  |              |             |             |             |          |     |                   |          |  |  |  |  |

**CONSISTENCY OR DENSENESS**

| PRIMARY SOIL TYPE                          | COMPACTNESS OR CONSISTENCY                                       | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)     | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) |
|--|--|--|--|
| GENERALLY GRANULAR MATERIAL (NON-COHESIVE) | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE       | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50         | N/A  |
| GENERALLY SILT-CLAY MATERIAL (COHESIVE)    | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30 | < 0.25<br>0.25 TO 0.5<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4   |

**TEXTURE OR GRAIN SIZE**

| 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 |
| Boulder (BLDR.)                   |      |      |      |      |       |       |
| Cobble (COB.)                     |      |      |      |      |       |       |
| Gravel (GR.)                      |      |      |      |      |       |       |
| Coarse Sand (CS, SD.)             |      |      |      |      |       |       |
| Fine Sand (F SD.)                 |      |      |      |      |       |       |
| Silt (SL.)                        |      |      |      |      |       |       |
| Clay (CL.)                        |      |      |      |      |       |       |

**SOIL MOISTURE - CORRELATION OF TERMS**

| SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION                                |
|--|----------------------------|---|
| LL - LIQUID LIMIT                      | - SATURATED - (SAT.)       | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE |
| PL - PLASTIC LIMIT                     | - WET - (W)                | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE               |
| OM - OPTIMUM MOISTURE SHRINKAGE LIMIT  | - MOIST - (M)              | SOLID; AT OR NEAR OPTIMUM MOISTURE                                  |
| SL - SHRINKAGE LIMIT                   | - DRY - (D)                | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE                |

**PLASTICITY**

| NON PLASTIC        | PLASTICITY INDEX (PI) | DRY STRENGTH |
|--------------------|-----------------------|--------------|
| SLIGHTLY PLASTIC   | 0-5                   | VERY LOW     |
| MODERATELY PLASTIC | 6-15                  | SLIGHT       |
| HIGHLY PLASTIC     | 16-25                 | MEDIUM       |
|                    | 26 OR MORE            | HIGH         |

**COLOR**

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

**GRADATION**

**WELL GRADED** - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  
**UNIFORMLY GRADED** - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.  
**GAP-GRADED** - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

**ANGULARITY OF GRAINS**

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: **ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.**

**MINERALOGICAL COMPOSITION**

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

**COMPRESSIBILITY**

SLIGHTLY COMPRESSIBLE LL < 31  
 MODERATELY COMPRESSIBLE LL = 31 - 50  
 HIGHLY COMPRESSIBLE LL > 50

**PERCENTAGE OF MATERIAL**

| ORGANIC MATERIAL        | GRANULAR SOILS | SILT - CLAY SOILS | OTHER MATERIAL       |
|-------------------------|----------------|-------------------|----------------------|
| TRACE OF ORGANIC MATTER | 2 - 3%         | 3 - 5%            | TRACE 1 - 10%        |
| LITTLE ORGANIC MATTER   | 3 - 5%         | 5 - 12%           | LITTLE 10 - 20%      |
| MODERATELY ORGANIC      | 5 - 10%        | 12 - 20%          | SOME 20 - 35%        |
| HIGHLY ORGANIC          | > 10%          | > 20%             | HIGHLY 35% AND ABOVE |

**GROUND WATER**

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

**MISCELLANEOUS SYMBOLS**

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRERD SOIL BOUNDARY
- INFERRERD ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT TEST BORING
- AUGER BORING
- CORE BORING
- MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

**RECOMMENDATION SYMBOLS**

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

**ABBREVIATIONS**

- AR - AUGER REFUSAL
- BT - BORING TERMINATED
- CL - CLAY
- CPT - CONE PENETRATION TEST
- CSE - COARSE
- DMT - DILATOMETER TEST
- DPT - DYNAMIC PENETRATION TEST
- e - VOID RATIO
- F - FINE
- FOSS. - FOSSILIFEROUS
- FRAC. - FRACTURED, FRACTURES
- FRAGS. - FRAGMENTS
- HI. - HIGHLY
- MED. - MEDIUM
- MICA. - MICACEOUS
- MOD. - MODERATELY
- NP - NON PLASTIC
- ORG. - ORGANIC
- PMT - PRESSUREMETER TEST
- SAP. - SAPROLITIC
- SD. - SAND, SANDY
- SL. - SILTY, SILTY
- SLI. - SLIGHTLY
- TCR - TRICONE REFUSAL
- w - MOISTURE CONTENT
- V - VERY
- VST - VANE SHEAR TEST
- WEA. - WEATHERED
- W - UNIT WEIGHT
- W - DRY UNIT WEIGHT
- S - BULK
- SS - SPLIT SPOON
- ST - SHELBY TUBE
- RS - ROCK
- RT - RECOMPACTED TRIAXIAL
- CBR - CALIFORNIA BEARING RATIO

**EQUIPMENT USED ON SUBJECT PROJECT**

- DRILL UNITS:
  - CME-45C
  - CME-55
  - CME-550
  - VANE SHEAR TEST
  - PORTABLE HOIST
  - GEOPROBE 78220T
- ADVANCING TOOLS:
  - CLAY BITS
  - 6" CONTINUOUS FLIGHT AUGER
  - 8" HOLLOW AUGERS
  - HARD FACED FINGER BITS
  - TUNG-CARBIDE INSERTS
  - CASING  W/ ADVANCER
  - TRICONE \* STEEL TEETH
  - TRICONE \* TUNG-CARB.
  - CORE BIT
- HAMMER TYPE:
  - AUTOMATIC
  - MANUAL
- CORE SIZE:
  - B
  - H
  - N
- HAND TOOLS:
  - POST HOLE DIGGER
  - HAND AUGER
  - SOUNDING ROD
  - VANE SHEAR TEST

**ROCK DESCRIPTION**

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:

- WEATHERED ROCK (WR) - NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
- CRYSTALLINE ROCK (CR) - FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
- NON-CRYSTALLINE ROCK (NCR) - 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.
- COASTAL PLAIN SEDIMENTARY ROCK (CP) - COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

**WEATHERING**

- FRESH** - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
- VERY SLIGHT (V SL.)** - 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.
- SLIGHT (SL.)** - 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.
- MODERATE (MOD.)** - 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.
- MODERATELY SEVERE (MOD. SEV.)** - 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*
- SEVERE (SEV.)** - 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 > 100 BPF*
- VERY SEVERE (V SEV.)** - 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 < 100 BPF*
- COMPLETE** - 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.

**ROCK HARDNESS**

- VERY HARD** - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
- HARD** - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
- MODERATELY HARD** - 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.
- MEDIUM HARD** - CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
- SOFT** - CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
- VERY SOFT** - 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.

**FRACTURE SPACING**

| 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 |

**BEDDING**

| 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    | < 0.008 FEET      |

**INDURATION**

- FRIABLE** - 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.

**TERMS AND DEFINITIONS**

- ALLUVIUM (ALLUV.)** - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
- AQUIFER** - A WATER BEARING FORMATION OR STRATA.
- ARENACEOUS** - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
- ARGILLACEOUS** - 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.
- ARTESIAN** - 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.
- CALCAREOUS (CALC.)** - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
- COLLUVIUM** - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
- CORE RECOVERY (REC.)** - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
- DIKE** - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
- DIP** - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
- DIP DIRECTION (DIP AZIMUTH)** - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
- FAULT** - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
- FISSILE** - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
- FLOAT** - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.
- FLOOD PLAIN (FP)** - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
- FORMATION (FM.)** - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
- JOINT** - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
- LEDGE** - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
- LENS** - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
- MOTTLED (MOT.)** - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
- PERCHED WATER** - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
- RESIDUAL (RES.) SOIL** - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
- ROCK QUALITY DESIGNATION (ROQ)** - 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.
- SAPROLITE (SAP.)** - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
- SILL** - 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.
- SLICKENSIDE** - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
- STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)** - 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.
- STRATA CORE RECOVERY (SREC.)** - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- STRATA ROCK QUALITY DESIGNATION (SROQ)** - 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.
- TOPSOIL (TS.)** - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

**BENCH MARK: N/A**

ELEVATION: \_\_\_\_\_ FEET

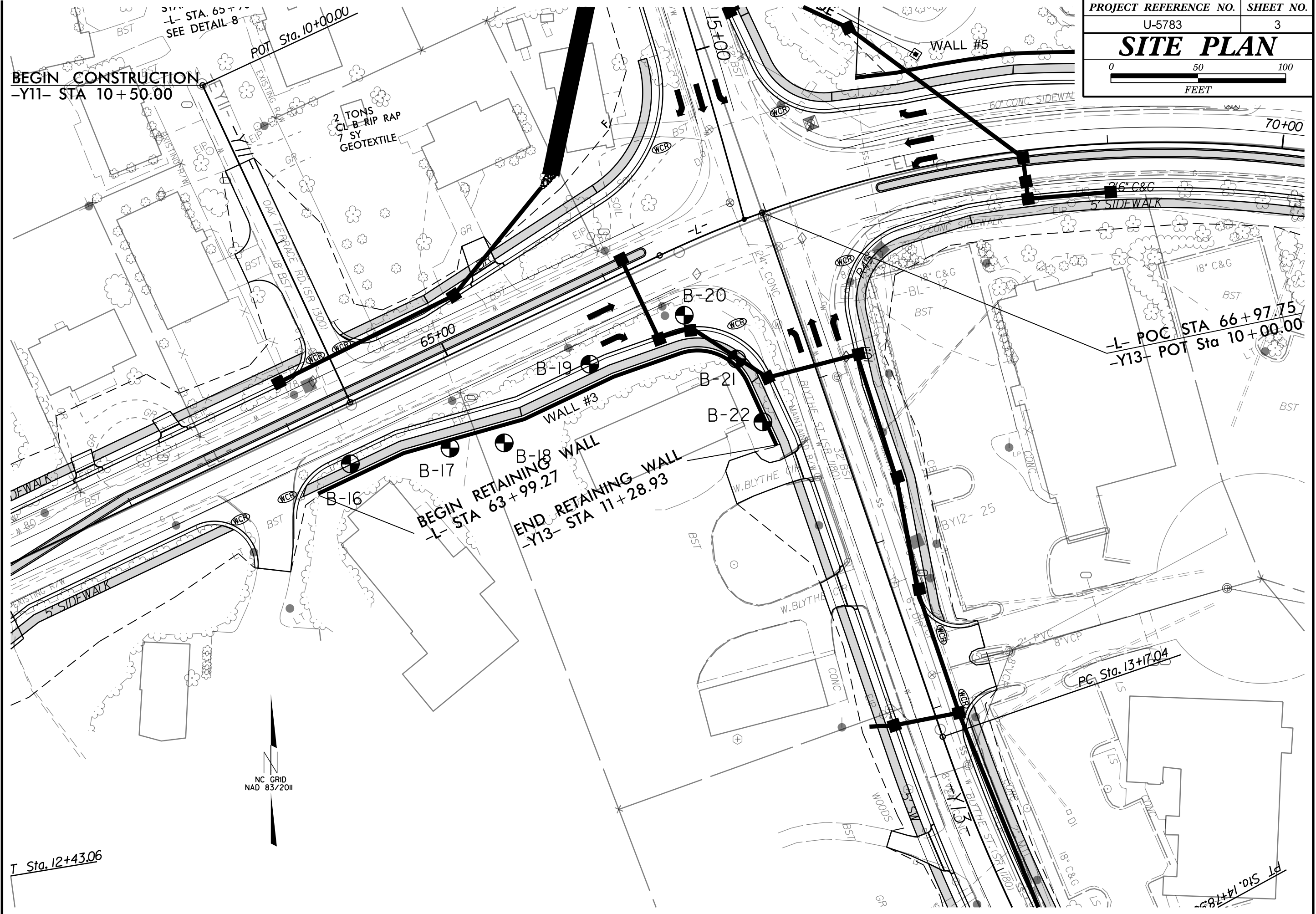
**NOTES:**

ROADWAY DESIGN FILES, .TIN FILE, AND GPK FILE PROVIDED BY VAUGHN & MELTON AND MATTERN & CRAIG

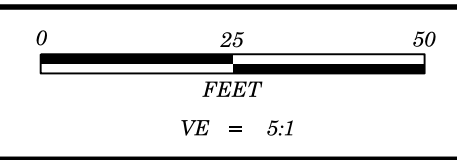
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FIAD = FILLED IN AFTER DRILLING

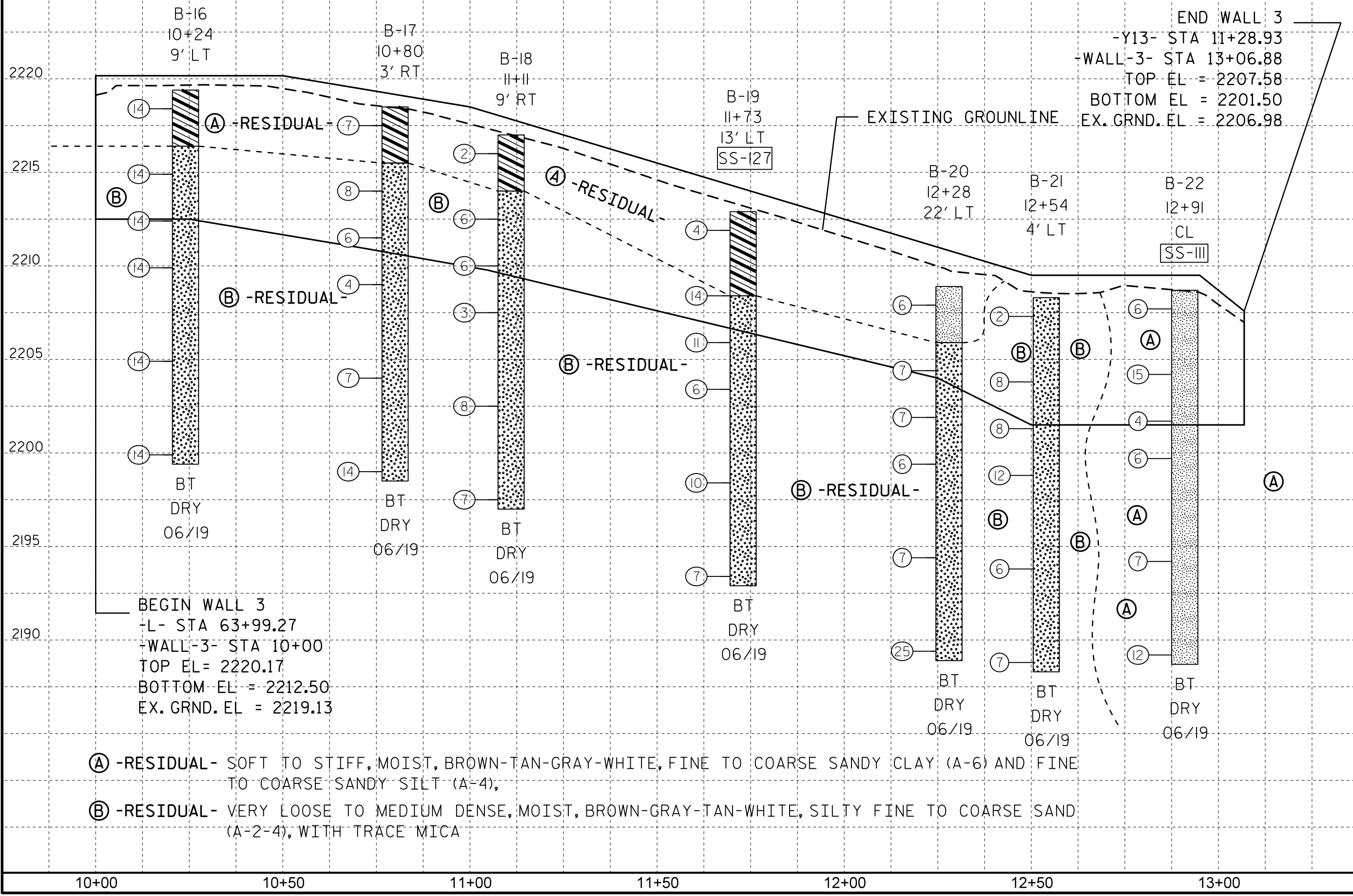
|                       |           |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-5783                | 3         |
| <b>SITE PLAN</b>      |           |
|                       |           |



**-WALL3- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY VAUGHN & MELTON IN JUNE 2021. INFERRED STRATIGRAPHY IS DRAWN BORING TO BORING, WITH BOTH PROJECTED ON THE PROFILE.**



|  |                  |
|--|------------------|
| <b>PROJECT REFERENCE NO.</b>                     | <b>SHEET NO.</b> |
| U-5783   | 4                |
| <b>BORINGS PROJECT ALONG<br/>-WALL3- PROFILE</b> |                  |



- (A) -RESIDUAL-** SOFT TO STIFF, MOIST, BROWN-TAN-GRAY-WHITE, FINE TO COARSE SANDY CLAY (A-6) AND FINE TO COARSE SANDY SILT (A-4),
- (B) -RESIDUAL-** VERY LOOSE TO MEDIUM DENSE, MOIST, BROWN-GRAY-TAN-WHITE, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE MICA



## SOIL TEST RESULTS

| BORING<br>ID | SAMPLE<br>NO. | ALIGNMENT | OFFSET | STATION | DEPTH<br>INTERVAL | AASHTO<br>CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |      |      | %<br>MOISTURE | %<br>ORGANIC |
|--------------|---------------|-----------|--------|---------|-------------------|------------------|------|------|-------------|---------|------|------|--------------------|------|------|---------------|--------------|
|              |               |           |        |         |                   |                  |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40   | 200  |               |              |
| B-19         | SS-127        | -WALL3-   | 13' LT | 11+73   | 0.0-1.5'          | A-6(6)           | 34   | 15   | 19.7        | 28.8    | 19.3 | 32.1 | 99.7               | 90.5 | 56.0 | 17.4          | -            |
| B-22         | SS-111        | -WALL3-   | CL     | 12+91   | 6.0-7.5'          | A-4(2)           | 36   | 8    | 15.8        | 37.9    | 18.2 | 28.1 | 96.9               | 89.5 | 52.5 | 16.5          | -            |

LAB TECHNICIAN: DILLON KESTNER

NCDOT CERTIFICATION NO. 135-01-0816

REFERENCE: U-5783

PROJECT: N/A

**CONTENTS**

| <u>SHEET NO.</u> | <u>DESCRIPTION</u>   |
|------------------|----------------------|
| 1                | TITLE SHEET          |
| 2                | LEGEND (SOIL & ROCK) |
| 3                | SITE PLAN            |
| 4                | PROFILE              |
| 5                | SOIL TEST RESULTS    |

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY HENDERSON  
 PROJECT DESCRIPTION US-64 IMPROVEMENTS FROM  
WHITE PINE STREET TO BLYTHE STREET

SITE DESCRIPTION RETAINING WALL #4

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C.  | U-5783                      | 1         | 5            |

**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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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

A. BLACKMORE

ELITE TECHNIQUES

A. NORTON, E.I.

INVESTIGATED BY ECS SOUTHEAST, LLP

DRAWN BY K. DE MONTBRUN, P.E.

CHECKED BY M. WALKO, P.E.

SUBMITTED BY ECS SOUTHEAST, LLP

DATE OCTOBER 2021

*Prepared in the Office of:*



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 ENGINEERING  
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DocuSigned by:  
*Kelly de Montbrun* 3/24/2023

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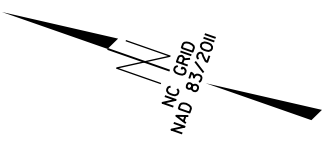
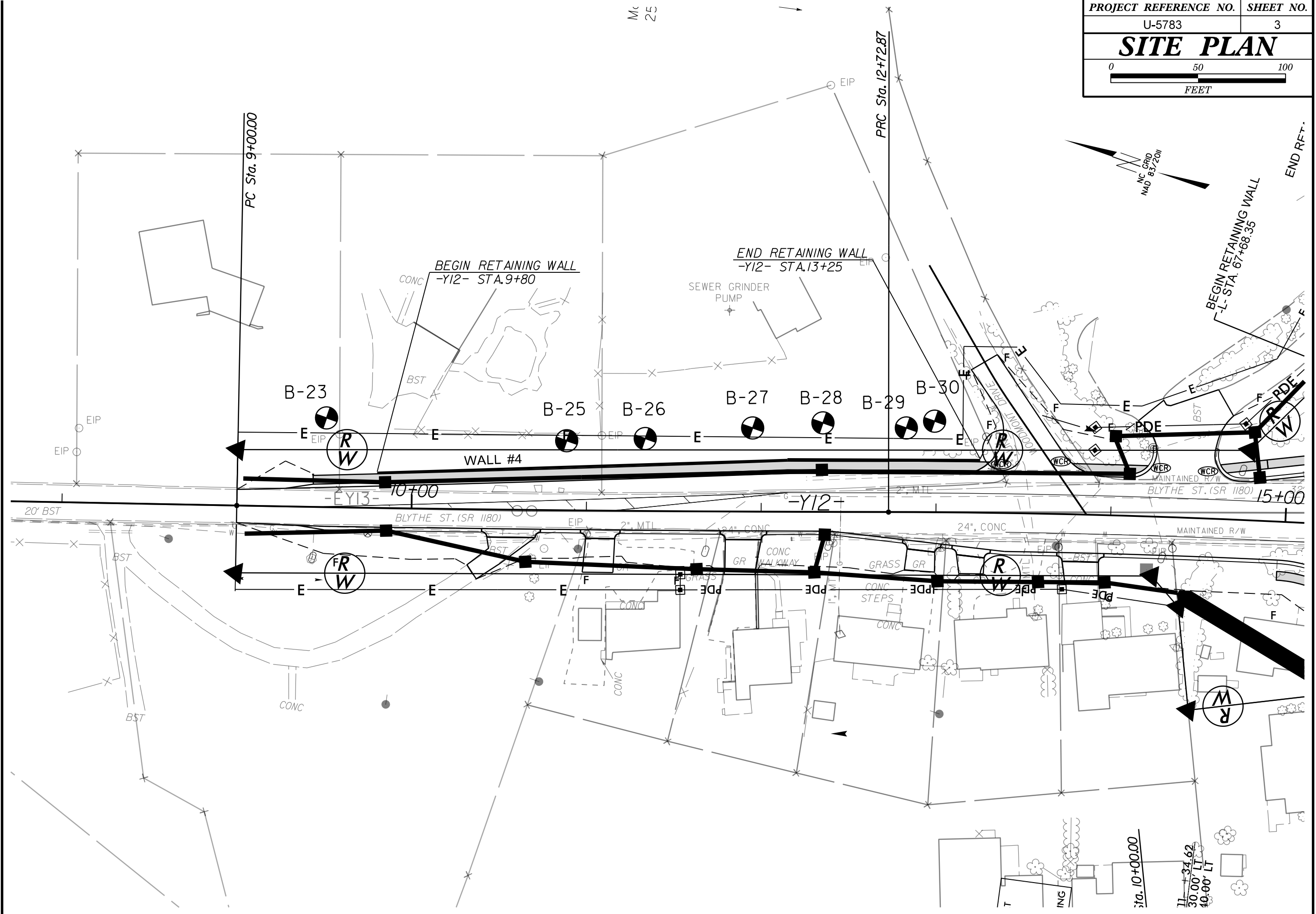
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. Includes sub-sections like SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, COMPRESSION, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, and INDURATION.

Mic  
25

|                       |           |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-5783                | 3         |
| <b>SITE PLAN</b>      |           |
|                       |           |
| FEET                  |           |



BEGIN RETAINING WALL  
-L- STA. 67+68.35

END RETAINING WALL  
-Y12- STA. 13+25

END RFT.

PC Sta. 9+00.00

PRC Sta. 12+72.87

BEGIN RETAINING WALL  
-Y12- STA. 9+80

END RETAINING WALL  
-Y12- STA. 13+25

B-23

B-25

B-26

B-27

B-28

B-29

B-30

-EY13- 10+00

-Y12-

BLYTHE ST. (SR 1180) 15+00

20' BST

BLYTHE ST. (SR 1180)

2" MTL

24" CONC

24" CONC

MAINTAINED R/W

FR  
W

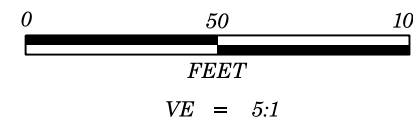
R  
W

R  
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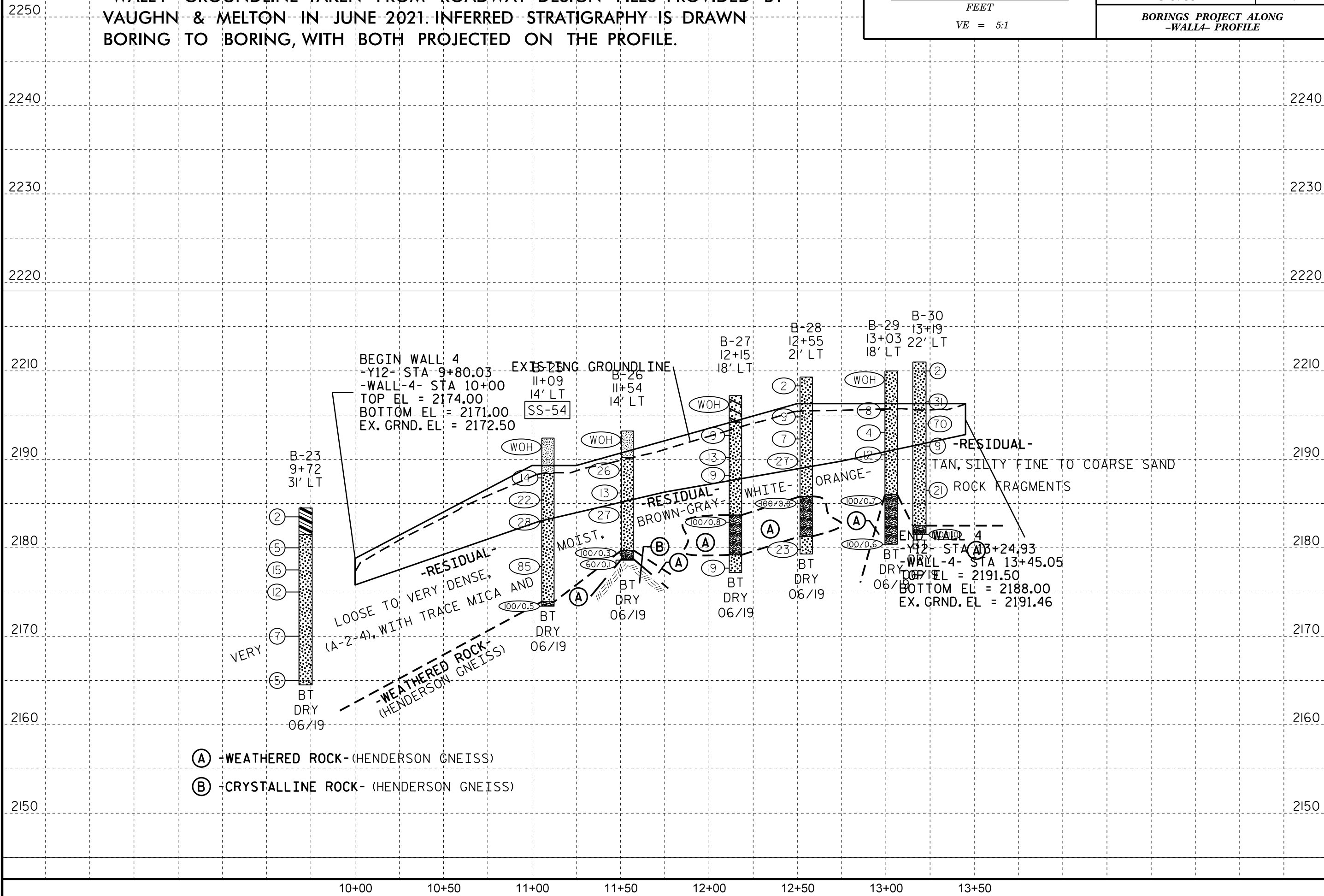
Sta. 10+00.00

34.62  
30.00' LT  
40.00' LT

-WALL4- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY VAUGHN & MELTON IN JUNE 2021. INFERRED STRATIGRAPHY IS DRAWN BORING TO BORING, WITH BOTH PROJECTED ON THE PROFILE.



| PROJECT REFERENCE NO.                    | SHEET NO. |
|--|-----------|
| U-5783                                   | 4         |
| BORINGS PROJECT ALONG<br>-WALL4- PROFILE |           |



- (A) -WEATHERED ROCK- (HENDERSON GNEISS)
- (B) -CRYSTALLINE ROCK- (HENDERSON GNEISS)

U-5783

5

## SOIL TEST RESULTS

| BORING<br>ID | SAMPLE<br>NO. | ALIGNMENT | OFFSET | STATION | DEPTH<br>INTERVAL | AASHTO<br>CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |      |      | %<br>MOISTURE | %<br>ORGANIC |
|--------------|---------------|-----------|--------|---------|-------------------|------------------|------|------|-------------|---------|------|------|--------------------|------|------|---------------|--------------|
|              |               |           |        |         |                   |                  |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40   | 200  |               |              |
| B-25         | SS-54         | -WALL4-   | 14' LT | 11+09   | 0.0-1.5'          | A-4(0)           | 25   | 5    | 30.3        | 29.3    | 14.6 | 25.8 | 96.1               | 77.6 | 43.7 | 19.1          | -            |

LAB TECHNICIAN: DILLON KESTNER

NCDOT CERTIFICATION NO. 135-01-0816



REFERENCE: U-5783

PROJECT: N/A

**CONTENTS**

| <u>SHEET NO.</u> | <u>DESCRIPTION</u>   |
|------------------|----------------------|
| 1                | TITLE SHEET          |
| 2                | LEGEND (SOIL & ROCK) |
| 3                | SITE PLAN            |
| 4                | PROFILE              |
| 5                | SOIL TEST RESULTS    |

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY HENDERSON  
 PROJECT DESCRIPTION US-64 IMPROVEMENTS FROM  
WHITE PINE STREET TO BLYTHE STREET

SITE DESCRIPTION RETAINING WALL #5

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C.  | U-5783                      | 1         | 5            |

**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.

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- 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

A. BLACKMORE

ELITE TECHNIQUES

A. NORTON, E.I.

INVESTIGATED BY ECS SOUTHEAST, LLP

DRAWN BY K. DE MONTBRUN, P.E.

CHECKED BY M. WALKO, P.E.

SUBMITTED BY ECS SOUTHEAST, LLP

DATE FEBRUARY 2023

*Prepared in the Office of:*



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DocuSigned by:  
  
 7BDD9975E22C480...  
 DATE 2/13/2023

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

**SOIL DESCRIPTION**

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 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, *VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6*

**SOIL LEGEND AND AASHTO CLASSIFICATION**

| GENERAL CLASS.                 | GRANULAR MATERIALS (≤ 35% PASSING #200) |             |                                 |             |              |             |             | SILT-CLAY MATERIALS (> 35% PASSING #200) |             |             |             |              |             |             | ORGANIC MATERIALS |   |                      |            |
|--------------------------------|---|-------------|---------------------------------|-------------|--------------|-------------|-------------|--|-------------|-------------|-------------|--------------|-------------|-------------|-------------------|---|----------------------|------------|
|                                | 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          |   |                      |            |
| GROUP CLASS.                   | A-1-a                                   | 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 35 MX                     | 35 MX 35 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  | 36 MN 36 MN | 36 MN 36 MN | 36 MN 36 MN       | GRANULAR SOILS  | SILT-CLAY SOILS      | MUCK, PEAT |
| MATERIAL PASSING #40 LL PI     | -                                       | -           | 40 MX 10 MX                     | 41 MN 10 MX | 40 MX 11 MN  | 41 MN 11 MN | 40 MX 11 MN | 41 MN 11 MN                              | 40 MX 11 MN | 41 MN 11 MN | 40 MX 11 MN | 41 MN 11 MN  | 40 MX 11 MN | 41 MN 11 MN | 40 MX 11 MN       | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER | HIGHLY ORGANIC SOILS |            |
| GROUP INDEX                    | 0                                       | 0           | 0                               | 4 MX        | 8 MX         | 12 MX       | 16 MX       | NO MX                                    |             |             |             |              |             |             |                   |   |                      |            |
| USUAL TYPES OF MAJOR MATERIALS | STONE FRAGS. GRAVEL, AND SAND           | FINE SAND   | SILTY OR CLAYEY GRAVEL AND SAND | SILTY SOILS | CLAYEY SOILS |             |             |  |             |             |             |              |             |             |                   |   |                      |            |
| GEN. RATING AS SUBGRADE        | EXCELLENT TO GOOD                       |             |                                 |             |              |             |             | FAIR TO POOR                             |             |             |             | FAIR TO POOR | POOR        | UNSATURABLE |                   |   |                      |            |

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

**CONSISTENCY OR DENSENESS**

| PRIMARY SOIL TYPE                          | COMPACTNESS OR CONSISTENCY                                       | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)     | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) |
|--|--|--|--|
| GENERALLY GRANULAR MATERIAL (NON-COHESIVE) | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE       | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50         | N/A  |
| GENERALLY SILT-CLAY MATERIAL (COHESIVE)    | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30 | < 0.25<br>0.25 TO 0.5<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4   |

**TEXTURE OR GRAIN SIZE**

| 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 |
| BOULDER (BLDR.)                   |         |      |      |      |       |       |
| COBBLE (COB.)                     |         |      |      |      |       |       |
| GRAVEL (GR.)                      |         |      |      |      |       |       |
| COARSE SAND (CS.E. SD.)           |         |      |      |      |       |       |
| FINE SAND (F SD.)                 |         |      |      |      |       |       |
| SILT (SL.)                        |         |      |      |      |       |       |
| CLAY (CL.)                        |         |      |      |      |       |       |
| GRAIN SIZE                        | 305 IN. | 75   | 2.0  | 0.25 | 0.05  | 0.005 |

**SOIL MOISTURE - CORRELATION OF TERMS**

| SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION                                |
|--|----------------------------|---|
| LL - LIQUID LIMIT                      | - SATURATED - (SAT.)       | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE |
| PLASTIC RANGE (PI)                     | - WET - (W)                | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE               |
| OM - OPTIMUM MOISTURE SHRINKAGE LIMIT  | - MOIST - (M)              | SOLID; AT OR NEAR OPTIMUM MOISTURE                                  |
| SL - SHRINKAGE LIMIT                   | - DRY - (D)                | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE                |

**PLASTICITY**

| NON PLASTIC        | PLASTICITY INDEX (PI) | DRY STRENGTH |
|--------------------|-----------------------|--------------|
| SLIGHTLY PLASTIC   | 0-5                   | VERY LOW     |
| MODERATELY PLASTIC | 6-15                  | SLIGHT       |
| HIGHLY PLASTIC     | 16-25                 | MEDIUM       |
|                    | 26 OR MORE            | HIGH         |

**COLOR**

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.

**GRADATION**

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  
 UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.  
 GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

**ANGULARITY OF GRAINS**

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

**MINERALOGICAL COMPOSITION**

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

**COMPRESSIBILITY**

SLIGHTLY COMPRESSIBLE LL < 31  
 MODERATELY COMPRESSIBLE LL = 31 - 50  
 HIGHLY COMPRESSIBLE LL > 50

**PERCENTAGE OF MATERIAL**

| ORGANIC MATERIAL        | GRANULAR SOILS | SILT - CLAY SOILS | OTHER MATERIAL       |
|-------------------------|----------------|-------------------|----------------------|
| TRACE OF ORGANIC MATTER | 2 - 3%         | 3 - 5%            | TRACE 1 - 10%        |
| LITTLE ORGANIC MATTER   | 3 - 5%         | 5 - 12%           | LITTLE 10 - 20%      |
| MODERATELY ORGANIC      | 5 - 10%        | 12 - 20%          | SOME 20 - 35%        |
| HIGHLY ORGANIC          | > 10%          | > 20%             | HIGHLY 35% AND ABOVE |

**GROUND WATER**

WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING  
 STATIC WATER LEVEL AFTER 24 HOURS  
 PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA  
 SPRING OR SEEP

**MISCELLANEOUS SYMBOLS**

|  |  |  |  |
|--|--|--|--|
|  | ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION      |  | DIP & DIP DIRECTION OF ROCK STRUCTURES |
|  | SOIL SYMBOL  |  | SPT TEST BORING                        |
|  | ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT |  | AUGER BORING                           |
|  | INFERRED SOIL BOUNDARY                             |  | CORE BORING                            |
|  | INFERRED ROCK LINE                                 |  | MONITORING WELL                        |
|  | ALLUVIAL SOIL BOUNDARY                             |  | PIEZOMETER INSTALLATION                |
|  | SLOPE INDICATOR INSTALLATION                       |  | CONE PENETROMETER TEST                 |
|  | SOUNDING ROD                                       |  | TEST BORING WITH CORE                  |
|  | SPT N-VALUE  |  | SPT N-VALUE                            |

**RECOMMENDATION SYMBOLS**

|  |                  |  |  |  |  |
|--|------------------|--|--|--|--|
|  | UNDERCUT         |  | UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE           |  | UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL |
|  | SHALLOW UNDERCUT |  | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK |  |  |

**ABBREVIATIONS**

|                    |           |                               |              |                        |                                |                |          |                       |                              |                    |              |   |                  |                   |                  |                |                          |                   |                   |                   |                 |                       |                      |          |                       |                  |                 |                                  |
|--------------------|-----------|-------------------------------|--------------|------------------------|--------------------------------|----------------|----------|-----------------------|------------------------------|--------------------|--------------|---|------------------|-------------------|------------------|----------------|--------------------------|-------------------|-------------------|-------------------|-----------------|-----------------------|----------------------|----------|-----------------------|------------------|-----------------|----------------------------------|
| AR - AUGER REFUSAL | CL - CLAY | CPT - COARSE PENETRATION TEST | CSE - COARSE | DMT - DILATOMETER TEST | DPT - DYNAMIC PENETRATION TEST | e - VOID RATIO | F - FINE | FOSS. - FOSSILIFEROUS | FRAC. - FRACTURED, FRACTURES | FRAGS. - FRAGMENTS | HI. - HIGHLY | MED. - MEDIUM   | MICA - MICACEOUS | MOD. - MODERATELY | NP - NON PLASTIC | ORG. - ORGANIC | PMT - PRESSUREMETER TEST | SAP. - SAPROLITIC | SD. - SAND, SANDY | SL. - SILT, SILTY | SLI. - SLIGHTLY | TCR - TRICONE REFUSAL | w - MOISTURE CONTENT | V - VERY | VST - VANE SHEAR TEST | WEA. - WEATHERED | W - UNIT WEIGHT | W <sub>d</sub> - DRY UNIT WEIGHT |
|                    |           |                               |              |                        |                                |                |          |                       |                              |                    |              | <b>SAMPLE ABBREVIATIONS</b><br>S - BULK<br>SS - SPLIT SPOON<br>ST - SHELBY TUBE<br>RS - ROCK<br>RT - RECOMPACTED TRIAXIAL<br>CBR - CALIFORNIA BEARING RATIO |                  |                   |                  |                |                          |                   |                   |                   |                 |                       |                      |          |                       |                  |                 |                                  |

**EQUIPMENT USED ON SUBJECT PROJECT**

|   |   |   |
|---|---|---|
| DRILL UNITS:<br><input type="checkbox"/> CME-45C<br><input type="checkbox"/> CME-55<br><input type="checkbox"/> CME-550<br><input type="checkbox"/> VANE SHEAR TEST<br><input type="checkbox"/> PORTABLE HOIST<br><input checked="" type="checkbox"/> GEOPROBE 78220T | ADVANCING TOOLS:<br><input type="checkbox"/> CLAY BITS<br><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER<br><input checked="" type="checkbox"/> 8" HOLLOW AUGERS<br><input type="checkbox"/> HARD FACED FINGER BITS<br><input type="checkbox"/> TUNG-CARBIDE INSERTS<br><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER<br><input type="checkbox"/> TRICONE _____ * STEEL TEETH<br><input type="checkbox"/> TRICONE _____ * TUNG-CARB.<br><input type="checkbox"/> CORE BIT | HAMMER TYPE:<br><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL<br>CORE SIZE:<br><input type="checkbox"/> -B _____ <input type="checkbox"/> -H _____<br><input type="checkbox"/> -N _____<br>HAND TOOLS:<br><input type="checkbox"/> POST HOLE DIGGER<br><input type="checkbox"/> HAND AUGER<br><input type="checkbox"/> SOUNDING ROD<br><input type="checkbox"/> VANE SHEAR TEST |
|---|---|---|

**ROCK DESCRIPTION**

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:

|  |                                     |  |   |
|--|-------------------------------------|--|---|
|  | WEATHERED ROCK (WR)                 |  | NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  |
|  | CRYSTALLINE ROCK (CR)               |  | FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.                  |
|  | NON-CRYSTALLINE ROCK (NCR)          |  | 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. |
|  | COASTAL PLAIN SEDIMENTARY ROCK (CP) |  | COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.                       |

**WEATHERING**

|                               |   |
|-------------------------------|---|
| FRESH                         | ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.   |
| VERY SLIGHT (V SL.)           | 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.   |
| SLIGHT (SL.)                  | 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.   |
| MODERATE (MOD.)               | 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.  |
| MODERATELY SEVERE (MOD. SEV.) | 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>   |
| SEVERE (SEV.)                 | 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>   |
| VERY SEVERE (V SEV.)          | 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> |
| COMPLETE                      | 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.  |

**ROCK HARDNESS**

|                 |   |
|-----------------|---|
| VERY HARD       | CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.   |
| HARD            | CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.   |
| MODERATELY HARD | 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.                               |
| MEDIUM HARD     | CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.            |
| SOFT            | CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. |
| VERY SOFT       | 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.                          |

| FRACTURE SPACING |                     | BEDDING             |                   |
|------------------|---------------------|---------------------|-------------------|
| 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 | THINLY LAMINATED    | 0.008 - 0.03 FEET |
|                  |                     | THICKLY LAMINATED   | < 0.008 FEET      |

**INDURATION**

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

|                      |   |
|----------------------|---|
| FRIABLE              | 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.                 |

**TERMS AND DEFINITIONS**

**ALLUVIUM (ALLUV.)** - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  
**AQUIFER** - A WATER BEARING FORMATION OR STRATA.  
**ARENACEOUS** - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  
**ARGILLACEOUS** - 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.  
**ARTESIAN** - 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.  
**CALCAREOUS (CALC.)** - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  
**COLLUVIUM** - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  
**CORE RECOVERY (REC.)** - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  
**DIKE** - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  
**DIP** - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  
**DIP DIRECTION (DIP AZIMUTH)** - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  
**FAULT** - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  
**FISSILE** - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  
**FLOAT** - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED FROM PARENT MATERIAL.  
**FLOOD PLAIN (FP)** - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  
**FORMATION (FM.)** - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  
**JOINT** - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  
**LEDGE** - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  
**LENS** - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  
**MOTTLED (MOT.)** - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  
**PERCHED WATER** - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  
**RESIDUAL (RES.) SOIL** - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  
**ROCK QUALITY DESIGNATION (ROD)** - 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.  
**SAPROLITE (SAP.)** - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.  
**SILL** - 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.  
**SLICKENSIDE** - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  
**STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)** - 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.  
**STRATA CORE RECOVERY (SREC.)** - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  
**STRATA ROCK QUALITY DESIGNATION (SROD)** - 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.  
**TOPSOIL (TS.)** - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

**BENCH MARK: N/A**

ELEVATION: \_\_\_\_\_ FEET

**NOTES:**

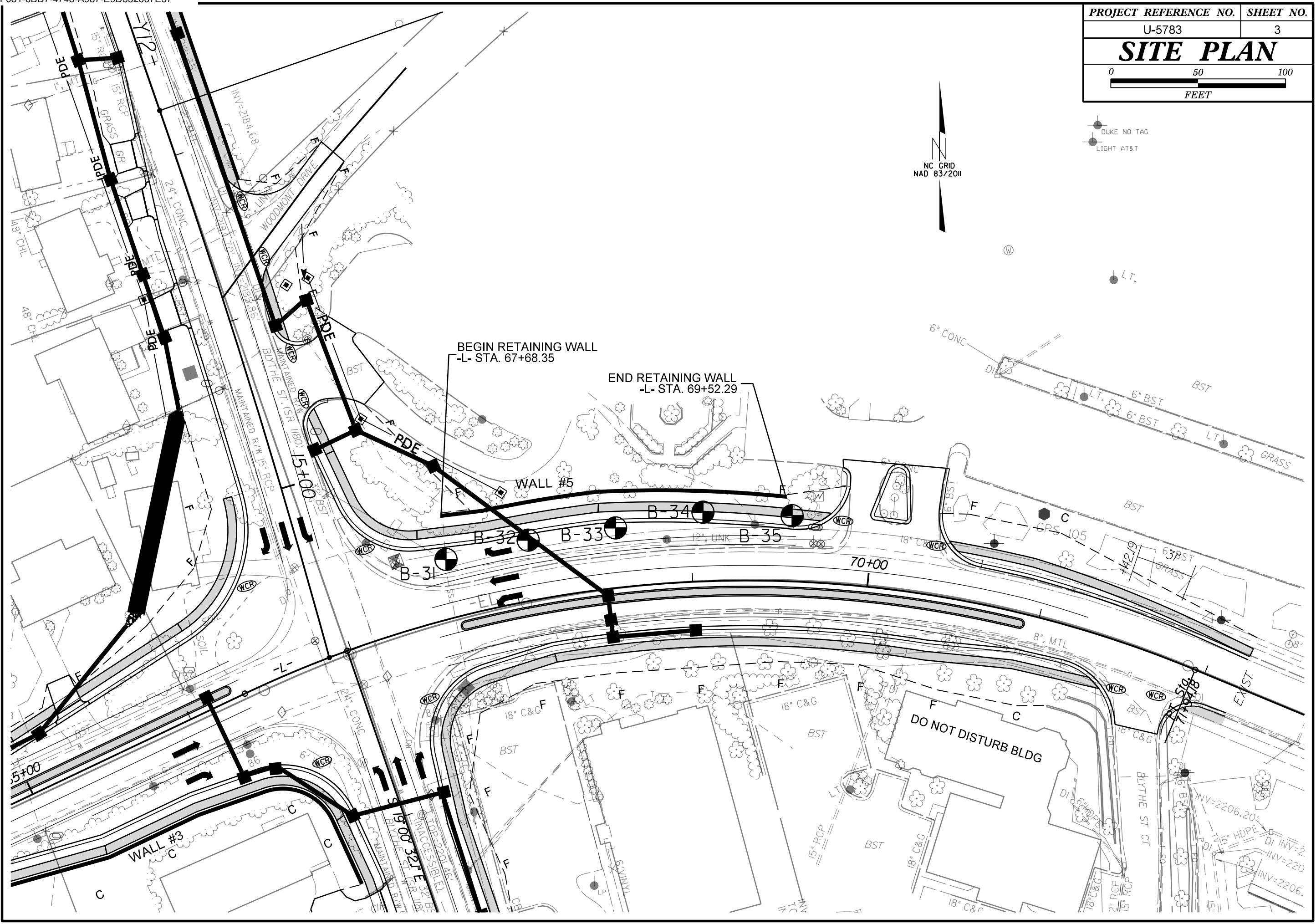
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NORTHING AND EASTINGS OBTAINED USING A TRIMBLE GEOTX. ELEVATIONS WERE OBTAINED USING THE PROVIDED .TIN FILE.

FIAD = FILLED IN AFTER DRILLING

|                       |           |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-5783                | 3         |
| <b>SITE PLAN</b>      |           |
|                       |           |
| FEET                  |           |

- DUKE NO TAG
- LIGHT AT&T



BEGIN RETAINING WALL  
-L- STA. 67+68.35

END RETAINING WALL  
-L- STA. 69+52.29

WALL #5

WALL #3

DO NOT DISTURB BLDG

B-31 B-32 B-33 B-34 B-35

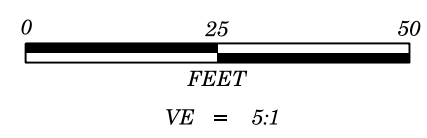
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65+00

69+00

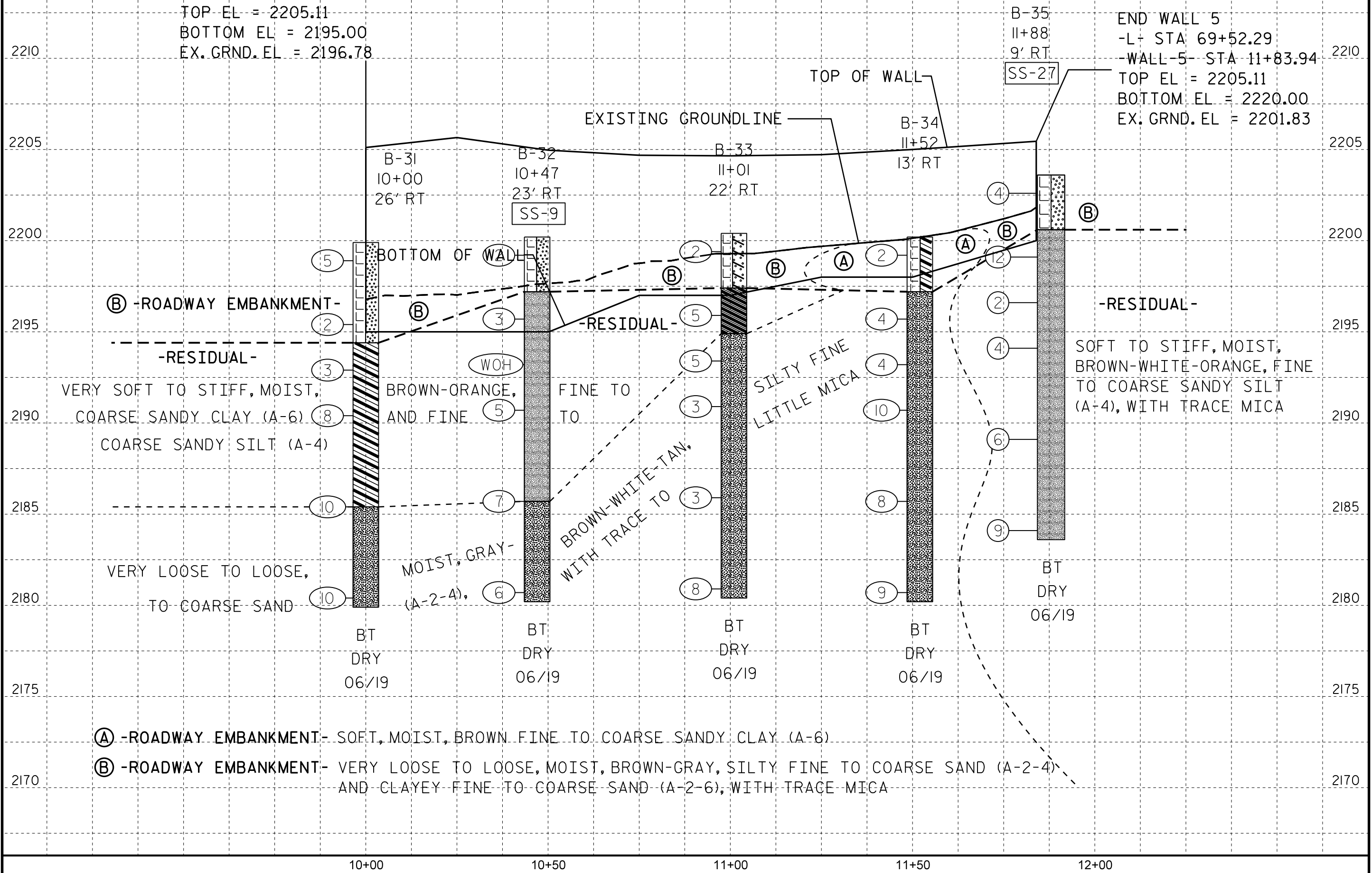
77+28

INV=2206.20  
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INV=220  
INV=2206.



|  |                  |
|--|------------------|
| <b>PROJECT REFERENCE NO.</b>                     | <b>SHEET NO.</b> |
| U-5783   | 4                |
| <b>BORINGS PROJECT ALONG<br/>-WALL5- PROFILE</b> |                  |

**-WALL5- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY VAUGHN & MELTON IN JUNE 2021. INFERRED STRATIGRAPHY IS DRAWN BORING TO BORING, WITH BOTH PROJECTED ON THE PROFILE.**



## SOIL TEST RESULTS

| BORING<br>ID | SAMPLE<br>NO. | ALIGNMENT | OFFSET | STATION | DEPTH<br>INTERVAL | AASHTO<br>CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |      |      | %<br>MOISTURE | %<br>ORGANIC |
|--------------|---------------|-----------|--------|---------|-------------------|------------------|------|------|-------------|---------|------|------|--------------------|------|------|---------------|--------------|
|              |               |           |        |         |                   |                  |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40   | 200  |               |              |
| B-32         | SS-9          | -WALL5-   | 23' RT | 10+47   | 6.0-7.5'          | A-4(4)           | 30   | 10   | 16.1        | 27.9    | 18.4 | 37.6 | 99.7               | 90.4 | 61.8 | 25.2          | -            |
| B-35         | SS-27         | -WALL5-   | 9' RT  | 11+88   | 6.0-7.5'          | A-4(0)           | 33   | NP   | 20.0        | 42.2    | 17.8 | 20.0 | 96.7               | 88.8 | 45.2 | 22.9          | -            |

LAB TECHNICIAN: DILLON KESTNER

NCDOT CERTIFICATION NO. 135-01-0816

REFERENCE: U-5783

PROJECT: N/A

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY HENDERSON  
 PROJECT DESCRIPTION US-64 IMPROVEMENTS FROM  
WHITE PINE STREET TO BLYTHE STREET

SITE DESCRIPTION RETAINING WALL #6

**CONTENTS**

| <u>SHEET NO.</u> | <u>DESCRIPTION</u>        |
|------------------|---------------------------|
| 1                | TITLE SHEET               |
| 2                | LEGEND (SOIL & ROCK)      |
| 2A               | SUPPLEMENTAL LEGEND (GSI) |
| 3                | SITE PLAN                 |
| 4                | PROFILE                   |
| 5                | SOIL TEST RESULTS         |

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C.  | U-5783                      | 1         | 5            |

**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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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**

A. BLACKMORE

**GEOLOGIC EXPLORATION**

INVESTIGATED BY ECS SOUTHEAST, LLP

DRAWN BY K. DE MONTBRUN, P.E.

CHECKED BY M. WALKO, P.E.

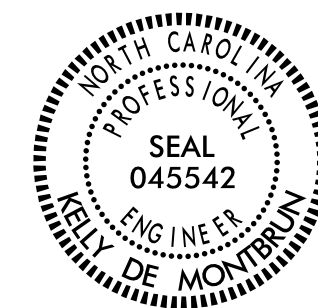
SUBMITTED BY ECS SOUTHEAST, LLP

DATE OCTOBER 2023

Prepared in the Office of:



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 NC REGISTERED  
 ENGINEERING  
 FIRM # F-1078



DocuSigned by:

*Kelly de Montbrun*

10/4/2023

SIGNATURE






























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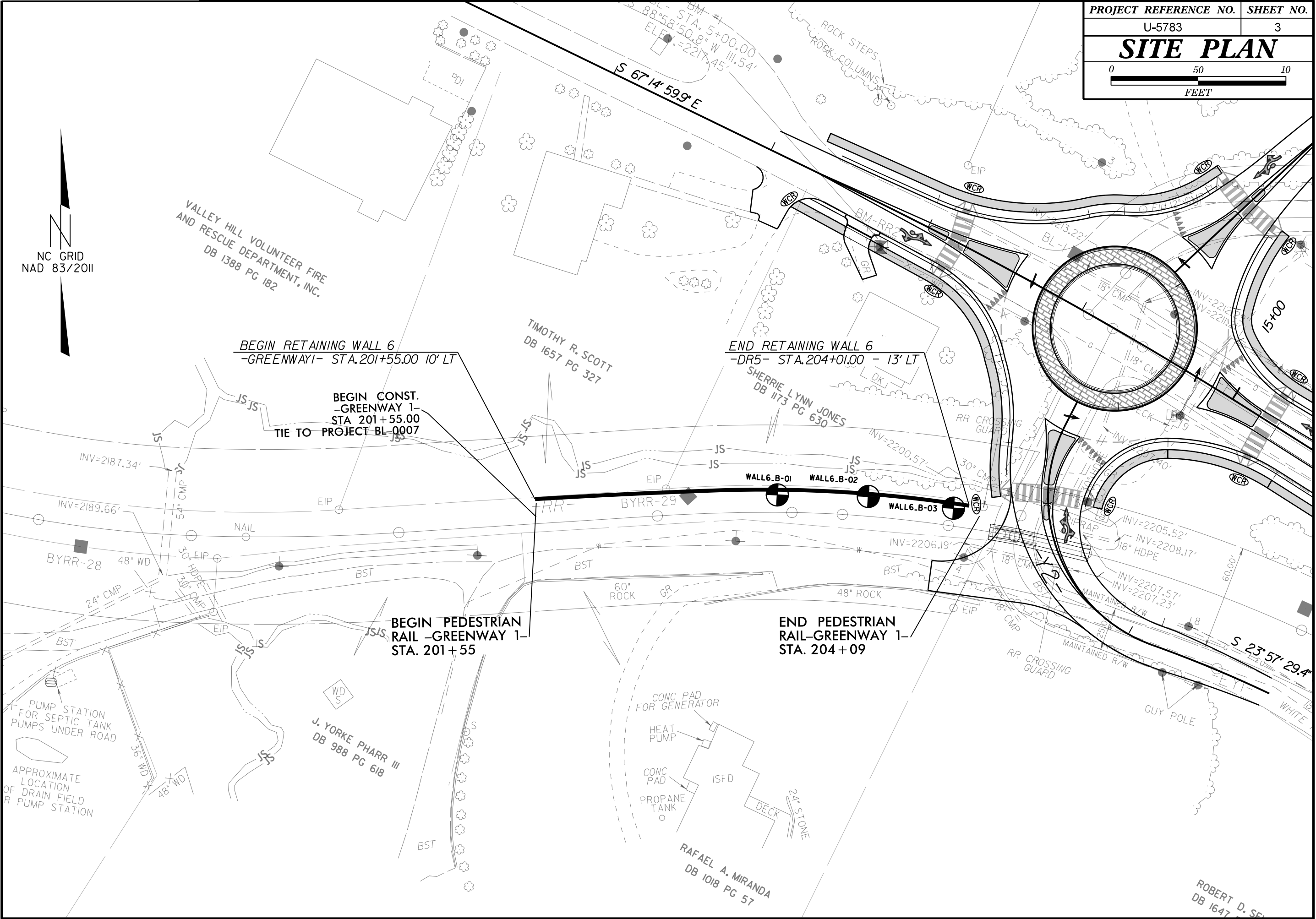
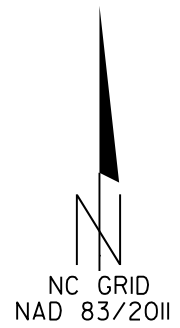
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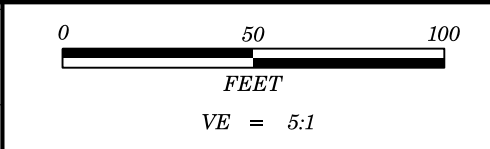
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**  
**SUBSURFACE INVESTIGATION**  
**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

| SOIL DESCRIPTION   |  | GRADATION  |  | ROCK DESCRIPTION   |  | TERMS AND DEFINITIONS  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
|--|--|--|--|--|--|--|---|--|---------------|---|--|--|--|---|-------------|--|---|--|------------------------|--------------------|-----------------------|--|----------------------------------|--|---|---------------------------------|---|-----------------------------|----------------------------------|---|------------------|--|---|------------------------|---|---|---|-------------------|--|----------------|-------------------|--|----------|-------------------|---|-----------------------|---|-----------------------------------|------------------------------|-----------------------|---------------------------|--------------------|----------------------|--------------------------------|--------------|----------|--|
| SOIL 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 (ASHTO 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>   |  | <b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.<br><b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.<br><b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES. |  | <b>HARD ROCK</b> 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: |  | <b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.<br><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.<br><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.<br><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.<br><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.<br><b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.<br><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.<br><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.<br><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.<br><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.<br><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.<br><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.<br><b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.<br><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.<br><b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.<br><b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.<br><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.<br><b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.<br><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.<br><b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.<br><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.<br><b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.<br><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.<br><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.<br><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.<br><b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.<br><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS (IN 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.<br><b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.<br><b>STRATA ROCK QUALITY DESIGNATION (SRQD)</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.<br><b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>   |  | <b>ANGULARITY OF GRAINS</b><br>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:<br><b>ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</b>   |  | <b>MINERALOGICAL COMPOSITION</b><br>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.  |  | <b>WEATHERED ROCK (WR)</b><br> NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.   |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <b>MINERALOGICAL COMPOSITION</b><br>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.  |  | <b>COMPRESSIBILITY</b><br>SLIGHTLY COMPRESSIBLE LL < 31<br>MODERATELY COMPRESSIBLE LL = 31 - 50<br>HIGHLY COMPRESSIBLE LL > 50   |  | <b>CRYSTALLINE ROCK (CR)</b><br> FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.   |  | <b>NON-CRYSTALLINE ROCK (NCR)</b><br> 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>PERCENTAGE OF MATERIAL</b><br><table border="1" style="width: 100%; font-size: 8pt;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table>   |  | ORGANIC MATERIAL   | GRANULAR SOILS   | SILT - CLAY SOILS  | OTHER MATERIAL   | TRACE OF ORGANIC MATTER  | 2 - 3%  | 3 - 5%   | TRACE 1 - 10% | LITTLE ORGANIC MATTER                                 | 3 - 5%   | 5 - 12%  | LITTLE 10 - 20%  | MODERATELY ORGANIC  | 5 - 10%     | 12 - 20%   | SOME 20 - 35%   | HIGHLY ORGANIC   | > 10%                  | > 20%              | HIGHLY 35% AND ABOVE  | <b>GROUND WATER</b><br> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING<br> STATIC WATER LEVEL AFTER 24 HOURS<br> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA<br> SPRING OR SEEP |                                  | <b>WEATHERING</b><br><b>FRESH</b> - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.<br><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.<br><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.<br><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.<br><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><br><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><br><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><br><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. |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| ORGANIC MATERIAL   | GRANULAR SOILS   | SILT - CLAY SOILS  | OTHER MATERIAL   |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| TRACE OF ORGANIC MATTER  | 2 - 3%   | 3 - 5%   | TRACE 1 - 10%  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| LITTLE ORGANIC MATTER  | 3 - 5%   | 5 - 12%  | LITTLE 10 - 20%  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| MODERATELY ORGANIC   | 5 - 10%  | 12 - 20%   | SOME 20 - 35%  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| HIGHLY ORGANIC   | > 10%  | > 20%  | HIGHLY 35% AND ABOVE   |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <b>CONSISTENCY OR DENSENESS</b><br><table border="1" style="width: 100%; font-size: 8pt;"> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE<br/>LOOSE<br/>MEDIUM DENSE<br/>DENSE<br/>VERY DENSE</td> <td>&lt; 4<br/>4 TO 10<br/>10 TO 30<br/>30 TO 50<br/>&gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESSIVE)</td> <td>VERY SOFT<br/>SOFT<br/>MEDIUM STIFF<br/>STIFF<br/>VERY STIFF<br/>HARD</td> <td>&lt; 2<br/>2 TO 4<br/>4 TO 8<br/>8 TO 15<br/>15 TO 30<br/>&gt; 30</td> <td>&lt; 0.25<br/>0.25 TO 0.5<br/>0.5 TO 1.0<br/>1 TO 2<br/>2 TO 4<br/>&gt; 4</td> </tr> </table> |  | PRIMARY SOIL TYPE  | COMPACTNESS OR CONSISTENCY                                       | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)   | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) | GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)  | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE          | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50 | N/A           | GENERALLY SILT-CLAY MATERIAL (COHESSIVE)              | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30 | < 0.25<br>0.25 TO 0.5<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4 | <b>MISCELLANEOUS SYMBOLS</b><br> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION<br> SOIL SYMBOL<br> ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT<br> INFERRED SOIL BOUNDARY<br> INFERRED ROCK LINE<br> ALLUVIAL SOIL BOUNDARY<br> DIP & DIP DIRECTION OF ROCK STRUCTURES<br> SPT, DMT, OR VST TEST BORING<br> AUGER BORING<br> CORE BORING<br> MONITORING WELL<br> PIEZOMETER INSTALLATION<br> SLOPE INDICATOR INSTALLATION<br> CONE PENETROMETER TEST<br> SOUNDING ROD<br> TEST BORING WITH CORE<br> SPT N-VALUE |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| PRIMARY SOIL TYPE  | COMPACTNESS OR CONSISTENCY   | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)   | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)  | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE           | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50   | N/A  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| GENERALLY SILT-CLAY MATERIAL (COHESSIVE)   | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD     | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30   | < 0.25<br>0.25 TO 0.5<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4   |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <b>TEXTURE OR GRAIN SIZE</b><br><table border="1" style="width: 100%; font-size: 8pt;"> <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> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE, SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GRAIN SIZE</td> <td>MM 305<br/>IN. 12</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</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       | BOULDER (BLDR.)                                      | COBBLE (COB.)   | GRAVEL (GR.)   | COARSE SAND (CSE, SD.) | FINE SAND (F SD.)  | SILT (SL.)            | CLAY (CL.)   |                                  |  |   |                                 |   |                             |                                  | GRAIN SIZE  | MM 305<br>IN. 12 | 75                                       | 2.0   | 0.25                   | 0.05                                    | 0.005   | <b>RECOMMENDATION SYMBOLS</b><br> UNDERCUT<br> SHALLOW UNDERCUT<br> UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE<br> UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK<br> UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| 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  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| BOULDER (BLDR.)  | COBBLE (COB.)  | GRAVEL (GR.)   | COARSE SAND (CSE, SD.)   | FINE SAND (F SD.)  | SILT (SL.)   | CLAY (CL.)   |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
|  |  |  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| GRAIN SIZE   | MM 305<br>IN. 12   | 75   | 2.0  | 0.25   | 0.05   | 0.005  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <b>SOIL MOISTURE - CORRELATION OF TERMS</b><br><table border="1" style="width: 100%; font-size: 8pt;"> <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</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</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  | - SATURATED - (SAT.)   | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | PL - PLASTIC LIMIT                             | - WET - (W)   | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | OM - OPTIMUM MOISTURE  | - MOIST - (M)  | SOLID; AT OR NEAR OPTIMUM MOISTURE                             | SL - SHRINKAGE LIMIT  | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | <b>ABBREVIATIONS</b><br><table border="1" style="width: 100%; font-size: 8pt;"> <tr> <td>AR - AUGER REFUSAL</td> <td>MED. - MEDIUM</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MICA - MICACEOUS</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL - CLAY</td> <td>MOD. - MODERATELY</td> <td>W - UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>NP - NON PLASTIC</td> <td>W<sub>d</sub> - DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE - COARSE</td> <td>ORG. - ORGANIC</td> <td></td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td><b>SAMPLE ABBREVIATIONS</b></td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SAP. - SAPROLITIC</td> <td>S - BULK</td> </tr> <tr> <td>e - VOID RATIO</td> <td>SD. - SAND, SANDY</td> <td>SS - SPLIT SPOON</td> </tr> <tr> <td>F - FINE</td> <td>SL. - SILT, SILTY</td> <td>ST - SHELBY TUBE</td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>SLI. - SLIGHTLY</td> <td>RS - ROCK</td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>TCR - TRICONE REFUSAL</td> <td>RT - RECOMPACTED TRIAXIAL</td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>w - MOISTURE CONTENT</td> <td>CBR - CALIFORNIA BEARING RATIO</td> </tr> <tr> <td>HL. - HIGHLY</td> <td>V - VERY</td> <td></td> </tr> </table> |  | AR - AUGER REFUSAL     | MED. - MEDIUM      | VST - VANE SHEAR TEST | BT - BORING TERMINATED   | MICA - MICACEOUS                 | WEA. - WEATHERED   | CL - CLAY   | MOD. - MODERATELY               | W - UNIT WEIGHT                                     | CPT - CONE PENETRATION TEST | NP - NON PLASTIC                 | W <sub>d</sub> - DRY UNIT WEIGHT  | CSE - COARSE     | ORG. - ORGANIC                           |   | DMT - DILATOMETER TEST | PMT - PRESSUREMETER TEST                | <b>SAMPLE ABBREVIATIONS</b>                   | DPT - DYNAMIC PENETRATION TEST  | SAP. - SAPROLITIC | S - BULK   | e - VOID RATIO | SD. - SAND, SANDY | SS - SPLIT SPOON                                     | F - FINE | SL. - SILT, SILTY | ST - SHELBY TUBE                                    | FOSS. - FOSSILIFEROUS | SLI. - SLIGHTLY                                   | RS - ROCK                         | FRAC. - FRACTURED, FRACTURES | TCR - TRICONE REFUSAL | RT - RECOMPACTED TRIAXIAL | FRAGS. - FRAGMENTS | w - MOISTURE CONTENT | CBR - CALIFORNIA BEARING RATIO | HL. - HIGHLY | V - VERY |  |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS)   | FIELD MOISTURE DESCRIPTION   | GUIDE FOR FIELD MOISTURE DESCRIPTION   |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| LL - LIQUID LIMIT  | - SATURATED - (SAT.)   | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| PL - PLASTIC LIMIT   | - WET - (W)  | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| OM - OPTIMUM MOISTURE  | - MOIST - (M)  | SOLID; AT OR NEAR OPTIMUM MOISTURE   |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| SL - SHRINKAGE LIMIT   | - DRY - (D)  | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE   |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| AR - AUGER REFUSAL   | MED. - MEDIUM  | VST - VANE SHEAR TEST  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| BT - BORING TERMINATED   | MICA - MICACEOUS   | WEA. - WEATHERED   |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| CL - CLAY  | MOD. - MODERATELY  | W - UNIT WEIGHT  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| CPT - CONE PENETRATION TEST  | NP - NON PLASTIC   | W <sub>d</sub> - DRY UNIT WEIGHT   |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| CSE - COARSE   | ORG. - ORGANIC   |  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| DMT - DILATOMETER TEST   | PMT - PRESSUREMETER TEST   | <b>SAMPLE ABBREVIATIONS</b>  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| DPT - DYNAMIC PENETRATION TEST   | SAP. - SAPROLITIC  | S - BULK   |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| e - VOID RATIO   | SD. - SAND, SANDY  | SS - SPLIT SPOON   |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| F - FINE   | SL. - SILT, SILTY  | ST - SHELBY TUBE   |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| FOSS. - FOSSILIFEROUS  | SLI. - SLIGHTLY  | RS - ROCK  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| FRAC. - FRACTURED, FRACTURES   | TCR - TRICONE REFUSAL  | RT - RECOMPACTED TRIAXIAL  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| FRAGS. - FRAGMENTS   | w - MOISTURE CONTENT   | CBR - CALIFORNIA BEARING RATIO   |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| HL. - HIGHLY   | V - VERY   |  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <b>PLASTICITY</b><br><table border="1" style="width: 100%; font-size: 8pt;"> <tr> <th>NON PLASTIC</th> <th>SLIGHTLY PLASTIC</th> <th>MODERATELY PLASTIC</th> <th>HIGHLY PLASTIC</th> </tr> <tr> <td>0-5</td> <td>6-15</td> <td>16-25</td> <td>26 OR MORE</td> </tr> <tr> <th>PLASTICITY INDEX (PI)</th> <th colspan="3">DRY STRENGTH</th> </tr> <tr> <td></td> <td>VERY LOW</td> <td>MEDIUM</td> <td>HIGH</td> </tr> </table>  |  | NON PLASTIC  | SLIGHTLY PLASTIC   | MODERATELY PLASTIC   | HIGHLY PLASTIC   | 0-5  | 6-15  | 16-25  | 26 OR MORE    | PLASTICITY INDEX (PI)                                 | DRY STRENGTH   |  |  |   | VERY LOW    | MEDIUM   | HIGH  | <b>EQUIPMENT USED ON SUBJECT PROJECT</b><br><table border="1" style="width: 100%; font-size: 8pt;"> <tr> <th>DRILL UNITS:</th> <th>ADVANCING TOOLS:</th> <th>HAMMER TYPE:</th> </tr> <tr> <td><input type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td></td> </tr> <tr> <td><input type="checkbox"/> CME-550</td> <td><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE _____ * STEEL TEETH</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE _____ * TUNG-CARB.</td> <td></td> </tr> <tr> <td><input checked="" type="checkbox"/> DIEDRICH D-50</td> <td><input type="checkbox"/> CORE BIT</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table> |                        | DRILL UNITS:       | ADVANCING TOOLS:      | HAMMER TYPE:   | <input type="checkbox"/> CME-45C | <input type="checkbox"/> CLAY BITS   | <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL | <input type="checkbox"/> CME-55 | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER |                             | <input type="checkbox"/> CME-550 | <input checked="" type="checkbox"/> 8" HOLLOW AUGERS  |                  | <input type="checkbox"/> VANE SHEAR TEST | <input type="checkbox"/> HARD FACED FINGER BITS |                        | <input type="checkbox"/> PORTABLE HOIST | <input 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 checked="" type="checkbox"/> DIEDRICH D-50 | <input type="checkbox"/> CORE BIT |                              |                       |                           |                    |                      |                                |              |          |  |
| NON PLASTIC  | SLIGHTLY PLASTIC   | MODERATELY PLASTIC   | HIGHLY PLASTIC   |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| 0-5  | 6-15   | 16-25  | 26 OR MORE   |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| PLASTICITY INDEX (PI)  | DRY STRENGTH   |  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
|  | VERY LOW   | MEDIUM   | HIGH   |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| DRILL UNITS:   | ADVANCING TOOLS:   | HAMMER TYPE:   |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <input type="checkbox"/> CME-45C   | <input type="checkbox"/> CLAY BITS                                   | <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <input type="checkbox"/> CME-55  | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER                  |  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <input type="checkbox"/> CME-550   | <input checked="" type="checkbox"/> 8" HOLLOW AUGERS                 |  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <input type="checkbox"/> VANE SHEAR TEST   | <input type="checkbox"/> HARD FACED FINGER BITS                      |  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <input type="checkbox"/> PORTABLE HOIST  | <input 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 checked="" type="checkbox"/> DIEDRICH D-50  | <input type="checkbox"/> CORE BIT                                    |  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
|  |  |  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <b>COLOR</b><br>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.   |  | <b>INDURATION</b><br>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.   |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <table border="1" style="width: 100%; font-size: 8pt;"> <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                     | <b>BENCH MARK: N/A</b><br><br><table border="1" style="width: 100%; font-size: 8pt;"> <tr> <td style="text-align: center;">ELEVATION:</td> <td style="text-align: center;">FEET</td> </tr> </table> |                  | ELEVATION:                               | FEET  |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| 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   |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| ELEVATION:   | FEET   |  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |
| <b>NOTES:</b><br>ROADWAY DESIGN FILES PROVIDED BY MATTERN & CRAIG.<br>NORTHING AND EASTINGS OBTAINED USING A TRIMBLE GEOTX. ELEVATIONS WERE OBTAINED USING THE PROVIDED .TIN FILE.<br>FIAD = FILLED IN AFTER DRILLING  |  | DATE: 8-15-14  |  |  |  |  |   |  |               |   |  |  |  |   |             |  |   |  |                        |                    |                       |  |                                  |  |   |                                 |   |                             |                                  |   |                  |  |   |                        |   |   |   |                   |  |                |                   |  |          |                   |   |                       |   |                                   |                              |                       |                           |                    |                      |                                |              |          |  |

|                       |           |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-5783                | 3         |
| <b>SITE PLAN</b>      |           |
|                       |           |
| FEET                  |           |

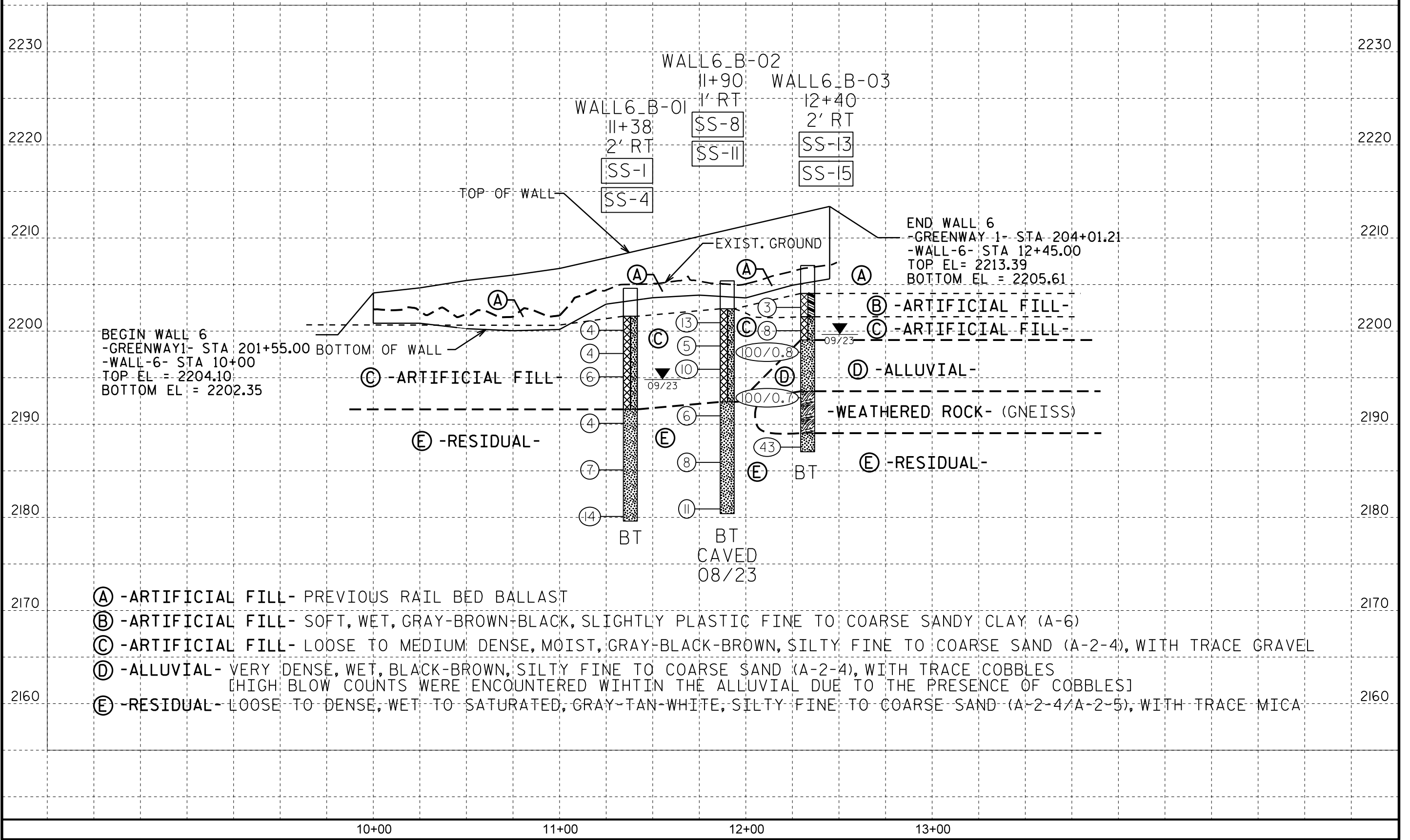


ROBERT D. SE  
DB 1647



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|--|------------------|
| <b>PROJECT REFERENCE NO.</b>                     | <b>SHEET NO.</b> |
| U-5783   | 4                |
| <b>BORINGS PROJECT ALONG<br/>-WALL6- PROFILE</b> |                  |

-WALL6- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY MATTERN & CRAIG IN SEPTEMBER 2023. INFERRED STRATIGRAPHY IS DRAWN BORING TO BORING, WITH BOTH PROJECTED ON THE PROFILE.



## SOIL TEST RESULTS

| BORING ID  | SAMPLE NO. | ALIGNMENT | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |      |      | % MOISTURE | % ORGANIC |
|------------|------------|-----------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|------|------|------------|-----------|
|            |            |           |        |         |                |               |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40   | 200  |            |           |
| WALL6 B-01 | SS-1       | -WALL6-   | 2' RT  | 11+38   | 3.5-5.0'       | A-2-4(0)      | 29   | 9    | 33.4        | 27.5    | 13.4 | 25.7 | 76.3               | 59.2 | 33.7 | 19.4       | -         |
| WALL6 B-01 | SS-4       | -WALL6-   | 2' RT  | 11+38   | 13.5-15.0'     | A-2-5(0)      | 44   | NP   | 34.4        | 43.7    | 12.5 | 9.5  | 90.5               | 69.7 | 27.5 | 35.5       | -         |
| WALL6 B-02 | SS-8       | -WALL6-   | 1' RT  | 11+90   | 6.0-7.5'       | A-2-4(0)      | 34   | NP   | 47.9        | 34.2    | 8.5  | 9.5  | 81.6               | 56.0 | 18.6 | 22.8       | -         |
| WALL6 B-02 | 22-11      | -WALL6-   | 1' RT  | 11+90   | 18.5-20.0'     | A-2-4(0)      | 39   | NP   | 33.0        | 43.6    | 15.9 | 7.4  | 95.1               | 74.6 | 30.3 | 28.0       | -         |
| WALL6 B-03 | SS-13      | -WALL6-   | 2' RT  | 12+40   | 3.5-5.0'       | A-6(2)        | 34   | 11   | 27.4        | 26.1    | 20.7 | 25.7 | 86.8               | 71.5 | 45.1 | 32.6       | -         |
| WALL6 B-03 | SS-15      | -WALL6-   | 2' RT  | AS+40   | 8.5-10.0'      | A-2-4(0)      | 30   | 2    | 40.7        | 28.5    | 15.1 | 15.7 | 84.3               | 62.0 | 29.4 | 26.9       | -         |

LAB TECHNICIAN: DILLON KESTNER

NCDOT CERTIFICATION NO. 135-01-0816