DocuSign Envelope ID: 09B7BE0A-B361-4380-99FA-81243B40C7AF

REFERENCE

SEE SHEET 2A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

#### **CONTENTS**

| <u>LINE</u> | <u>STATION</u>      | <b>PLAN</b> | <b>PROFILE</b> |  |
|-------------|---------------------|-------------|----------------|--|
| -L-         | II+00.00 - 47+67.48 | 4-6         | 7-8            |  |
| -Y2-        | 10+00.00 - 16+67.41 | 5           | 9              |  |
| -Y3-        | 10+90.00 - 15+72.87 | 5           | 9              |  |

#### **CROSS SECTIONS**

| <u>LINE</u> | NE STATION          |       |  |  |  |
|-------------|---------------------|-------|--|--|--|
| -L-         | 13+00.00 - 18+50.00 | 10-12 |  |  |  |

#### **APPENDIX**

| <u>APPEND.</u> | <u>IX</u> | <u>TTTLES</u> |         | <u>SHEETS</u> |
|----------------|-----------|---------------|---------|---------------|
| Α              | PAVEMENT  | INVESTIGATION | RESULTS | 13-23         |
| В              | LABO      | DRATORY RESUL | _TS     | 24-25         |

## STATE OF NORTH CAROLINA

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

## **ROADWAY** SUBSURFACE INVESTIGATION

COUNTY WAKE

PROJECT DESCRIPTION PROPOSED GRADE-SEPARATION OF DURANT ROAD (SR 2006) OVER CSX S LINE RAILROAD IN RALEIGH

**INVENTORY** 

STATE PROJECT REFERENCE NO. P-5720

#### **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 1999 707-6805. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

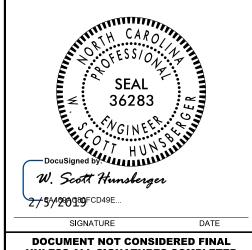
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND 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 INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

- ES:
  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.

| CAROLINA DRILLING            |
|------------------------------|
| CROCKETT, S.C.               |
| LANE, R. W.                  |
|                              |
|                              |
|                              |
|                              |
| INVESTIGATED BYRWL           |
| DRAWN BY <i>HILL, M. J.</i>  |
| CHECKED BY HUNSBERGER, W. S. |
| SUBMITTED BY FALCON          |
| DATE _FEBRUARY 2019          |

**PERSONNEL** 



**UNLESS ALL SIGNATURES COMPLETED** 

P-5720

2

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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 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.  | 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.                                   | ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.                                                                                                                    |  |
| ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.                                                                                            | 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                                             | AQUIFER - A WATER BEARING FORMATION OR STRATA.                                                                                                                                    |  |
| IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ANGULARITY OF GRAINS                                                                                                                                                        | REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:                                                                                                                                | ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.                                                                                              |  |
| AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,<br>VERY STIFF, GRAY. SILTY CLAY. MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:                                                                                                      | ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  WEATHERED  WEATHERED  WON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >                                                                                       | 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.              |  |
| SOIL LEGEND AND AASHTO CLASSIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.                                                                                                                                | ROCK (WR) 100 BLOWS PER FOOT IF TESTED.                                                                                                                                                                                  | ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT                                                                                              |  |
| GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MINERALOGICAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.                                                                                 | CRYSTALLINE CRYSTALLINE WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,                                                                                                                                   | WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.                                                                                      |  |
| CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) CROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.                                                                                                          | ROCK (CR) WOULD TIELD SPI REPUSAL IF TESTED, ROCK TYPE INCLUDES GRANTE, GNEISS, GABRO, SCHIST, ETC.                                                                                                                      | CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.                                                                                                 |  |
| CLASS. A-1-6 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-7-5 A-3-6 A-7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | COMPRESSIBILITY                                                                                                                                                             | NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLO SPT REFUSAL IF TESTED.                                                                                          | COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM                                                                                             |  |
| SYMBOL 000000000000000000000000000000000000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50                                                                                                          | ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD                                                                                         | OF SLOPE.                                                                                                                                                                         |  |
| 7. PASSING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | HIGHLY COMPRESSIBLE LL > 50                                                                                                                                                 | SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.                                                                                                                         | 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.                               |  |
| *10 50 MX GRANULAR SILT MUCK,  *40 30 MX 50 MX 51 MN PEAT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | PERCENTAGE OF MATERIAL                                                                                                                                                      | WEATHERING                                                                                                                                                                                                               | DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT                                                                                                  |  |
| *200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL                                                                                                            | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER                                                                                                                                 | ROCKS OR CUTS MASSIVE ROCK.  DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE                                                                        |  |
| MATERIAL PASSING *40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%                                                                    | HAMMER IF CRYSTALLINE.                                                                                                                                                                                                   | HORIZONTAL.                                                                                                                                                                       |  |
| LL 48 MX 41 MN LITTLE OR PI 6 MX NP 18 MX 18 MN 11 MN 18 MX 18 MN 11 MN 18 MX 11 MN 11 MN MODERATE HIGHLY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MODERATELY ORGANIC         5 - 10%         12 - 20%         SOME         20 - 35%           HIGHLY ORGANIC         > 10%         > 20%         HIGHLY         35% AND ABOVE | VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. | <u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.                                          |  |
| GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | GROUND WATER                                                                                                                                                                | SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO                                                                                                                                    | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.                                        |  |
| USUAL TYPES STONE FRAGS.  OF MAIOR GRAVE! AND FINE SILTY OR CLAYEY SILTY CLAYEY MATTER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING                                                                                                                       | (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.                                                    | FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.                                                                                                           |  |
| MATERIALS SAND SAND CRAVEL AND SAND SOILS SOILS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | STATIC WATER LEVEL AFTER 24 HOURS                                                                                                                                           | MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN                                                                                                                                      | FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM                                                                                                 |  |
| GEN. RATING SCIPPORAGE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                             | (MOD.) 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                                                | PARENT MATERIAL.                                                                                                                                                                  |  |
| AS SUBGRADE P1 OF A-7-5 SUBGROUP IS < LL - 30 ; P1 OF A-7-6 SUBGROUP IS > LL - 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SPRING OR SEEP                                                                                                                                                              | WITH FRESH ROCK.                                                                                                                                                                                                         | 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      |  |
| CONSISTENCY OR DENSENESS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MISCELLANEOUS SYMBOLS                                                                                                                                                       | MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH                              | FIELD.                                                                                                                                                                            |  |
| COMPACTNESS OF RANGE OF STANDARD RANGE OF UNCONFINED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ED SE MOS                                                                                                                                                                   | (MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.                                                                                                                           | JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.                                                                                                        |  |
| PRIMARY SOIL TYPE COMPRESSIVE STRENGTH  CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH  (N-VALUE) (TONS/FT <sup>2</sup> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ROADWAY EMBANKMENT (RE)  ROADWAY EMBANKMENT (RE)  25/025  DIP & DIP DIRECTION  OF ROCK STRUCTURES                                                                           | IF TESTED, WOULD YIELD SPT REFUSAL  SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT                                                                                               | LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.                                                                         |  |
| GENERALLY VERY LOOSE < 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SOIL SYMBOL SOIL SYMBOL SING SLOPE INDICATOR INSTALLATION                                                                                                                   | (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED                                                                                                                               | LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.                                                                                                           |  |
| GRANULAR LUUSE 4 10 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N VSI PMI                                                                                                                                                                   | TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF                                                                                                             | MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS                                                                                             |  |
| MATERIAL DENSE 30 TO 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ARTIFICIAL FILL (AF) OTHER OUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING CONE PENETROMETER                                                            | VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE                                                                                                                                  | USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.                                                                                                                        |  |
| VERY DENSE         > 50           VERY SOFT         < 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | - INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD                                                                                                                         | SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR                                      | PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.                                                        |  |
| GENERALLY SOFT 2 TO 4 0.25 TO 0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | MN C TEST DODING                                                                                                                                                            | VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>                                                                                                                         | RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.                                                                                                            |  |
| SILT-CLAY   MEDIUM STIFF   4 TO 8   0.5 TO 1.0   MATERIAL   STIFF   8 TO 15   1 TO 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | WITH CORE                                                                                                                                                                   | 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                                         | ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF                                                                                           |  |
| (COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | → PIEZOMETER OPT N-VALUE                                                                                                                                                    | ALSO AN EXAMPLE.                                                                                                                                                                                                         | ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.                                                            |  |
| TEXTURE OR GRAIN SIZE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | RECOMMENDATION SYMBOLS                                                                                                                                                      | ROCK HARDNESS                                                                                                                                                                                                            | SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT                                                                                         |  |
| U.S. STD. SIEVE SIZE 4 10 40 60 200 270                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                             | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.                                                                                    | ROCK.  SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND                                                                                            |  |
| OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | UNSUITABLE WASTE                                                                                                                                                            | HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED                                                                                                                                  | RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO                                                                                              |  |
| BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL                                                                                 | TO DETACH HAND SPECIMEN.                                                                                                                                                                                                 | THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. <u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT                                     |  |
| (BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ABBREVIATIONS                                                                                                                                                               | MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED                                             | OR SLIP PLANE.                                                                                                                                                                    |  |
| GRAIN MM 305 75 2.0 0.25 0.05 0.005<br>SIZE IN 12 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED                                                                     | BY MODERATE BLOWS.  MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.                                                                                                            | 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 |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CL CLAY MOD MODERATELY $\gamma$ - UNIT WEIGHT                                                                                                                               | HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE                                                                                                                                  | WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL                                                                                              |  |
| SOIL MOISTURE - CORRELATION OF TERMS  SOIL MOISTURE SCALE FIELD MOISTURE SOURCE FOR THE A MOISTURE SCALE FIELD MOISTURE SCALE FIELD MOISTURE SOURCE FOR THE A MOISTURE SCALE FIELD MOISTURE FIELD F | CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC                                                                       | POINT OF A GEOLOGIST'S PICK.                                                                                                                                                                                             | TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.  STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY                                                       |  |
| (ATTERBERG LIMITS)  DESCRIPTION  GUIDE FOR FIELD MOISTURE DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>                                                                                                 | SOFT CAN BE GROVED 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                                                 | TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.                                                                                                                            |  |
| - SATURATED - USUALLY LIQUID; VERY WET, USUALLY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON                                                                       | PIECES CAN BE BROKEN BY FINGER PRESSURE.                                                                                                                                                                                 | 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       |  |
| (SAT.) FROM BELOW THE GROUND WATER TABLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | F - FINE SL SILT, SILTY ST - SHELBY TUBE                                                                                                                                    | VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY                                        | THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.                                                                                                                         |  |
| PLASTIC SEMISOLIDA PEDILIPES DRYING TO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL                                                                                                   | FINGERNAIL.                                                                                                                                                                                                              | TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.                                                                                                                  |  |
| RANGE < - WET - (W) ATTAIN OPTIMUM MOISTURE  (PI) PL PLASTIC LIMIT - WET - (W) ATTAIN OPTIMUM MOISTURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | FRAGS FRAGMENTS $\omega$ - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO                                                                               | FRACTURE SPACING BEDDING  TERM SPACING TERM THICKNESS                                                                                                                                                                    | BENCH MARK:                                                                                                                                                                       |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | EQUIPMENT USED ON SUBJECT PROJECT                                                                                                                                           | VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET                                                                                                                                                                   | BORING ELEVATIONS TAKEN FROM P5720_Is_tnl_170522.tin DATED I/15/18 ELEVATION: FEET                                                                                                |  |
| OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL _ SHRINKAGE LIMIT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:                                                                                                                                  | WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET                                                                                                                 |                                                                                                                                                                                   |  |
| REQUIRES ADDITIONAL WATER TO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CLAY BITS X AUTOMATIC MANUAL                                                                                                                                                | 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                                                                                              | NOTES: FIAD - FILLED IMMEDIATELY AFTER DRILLING                                                                                                                                   |  |
| - DRY - (D) ATTAIN OPTIMUM MOISTURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CME-55 G' CONTINUOUS FLIGHT AUGER CORE SIZE:                                                                                                                                | THINLY LAMINATED 4.008 FEET                                                                                                                                                                                              | FIAD - FILLED IMMEDIATELT AFTER DKILLING                                                                                                                                          |  |
| PLASTICITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                                                                                                                                                                           | INDURATION                                                                                                                                                                                                               |                                                                                                                                                                                   |  |
| PLASTICITY INDEX (PI) DRY STRENGTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | X CME-550 HARD FACED FINGER BITS                                                                                                                                            | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.                                                                                                                        |                                                                                                                                                                                   |  |
| NON PLASTIC Ø-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | VANE SHEAR TEST UNGCARBIDE INSERTS                                                                                                                                          | FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.                                                                                                                           |                                                                                                                                                                                   |  |
| MODERATELY PLASTIC 16-25 MEDIUM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CASING W/ ADVANCER POST HOLE DIGGER                                                                                                                                         | MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;                                                                                                                                               |                                                                                                                                                                                   |  |
| HIGHLY PLASTIC 26 OR MORE HIGH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | PORTABLE HOIST TRICONESTEEL TEETH  HAND AUGER                                                                                                                               | BREAKS EASILY WHEN HIT WITH HAMMER.                                                                                                                                                                                      |                                                                                                                                                                                   |  |
| COLOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | TRICONE TUNGCARB. SOUNDING ROD                                                                                                                                              | INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE:  DIFFICULT TO BREAK WITH HAMMER.                                                                                                                            |                                                                                                                                                                                   |  |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CORE BIT VANE SHEAR TEST                                                                                                                                                    | CHARP HAMMER BLOWS REQUIRED TO RREAK SAMPLE.                                                                                                                                                                             |                                                                                                                                                                                   |  |
| MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                             | EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.                                                                                                                                                                         | DATE: 1-XX-1                                                                                                                                                                      |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                             |                                                                                                                                                                                                                          |                                                                                                                                                                                   |  |

DocuSign Envelope ID: 09B7BE0A-B361-4380-99FA-81243B40C7AF STATE OF NORTH CAROLINA STATE N.C. **3** 25P-5720 RAIL DIVISION 46932.1.1 PE WAKE COUNTY **DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED** 25% APPROVED PLANS LOCATION: PROPOSED GRADE-SEPARATION OF DURANT ROAD (SR 2006) OVER CSX S LINE RAILROAD IN RALEIGH TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE IE **END CONSTRUCTION** -Y2- POT Sta. 16+67.41 **BEGIN BRIDGE END CONSTRUCTION** *-L- POT STA. 31+80.00* -DRW2- POC Sta. 12+10.86 END BRIDGE **END TIP PROJECT P-5720 END CONSTRUCTION** -L- POT STA. 32+80.00 -L- STA 46+75.00 -DRW1- POT Sta. 11+55.00 **BEGIN TIP PROJECT P-5720** -L- STA 11+00.00 6 -Y2-ACCESS ROA -L-SR 3006 (DURANT ROAD) TO CAPITAL BLVD TO FALLS OF NEUSE ROAD **BEGIN CONSTRUCTION** -Y4- POT Sta. 11+70.00 **BEGIN CONSTRUCTION** -Y1- POT Sta. 11+43.00 INCOMPLETE PLANS 4693 **BEGIN CONSTRUCTION** PRELIMINARY PLANS -Y3- POT Sta. 10+90.00 SUBMITTAL: **DATE:** September 26, 2017 CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ? HYDRAULICS ENGINEER **Kimley \*\*Horn** GRAPHIC SCALES DESIGN DATA PROJECT LENGTH Prepared in the Office of: ADT 2019 = 21,000ADT 2040 = 31,100LENGTH ROADWAY TIP PROJECT P-5720 = 0.658 MILES 2018 STANDARD SPECIFICATIONS 8% GREGORY BREW, P.E. = 55% LENGTH STRUCTURE TIP PROJECT P-5720 = 0.019 MILES SIGNATURE: = 3%\* RIGHT OF WAY DATE: ROADWAY DESIGN = 50 MPH TOTAL LENGTH TIP PROJECT P-5720 = 0.677 MILES RAIL DIVISION MARCH 15, 2018 RACHEL ABROMAITIS, P.E. **ENGINEER** PROFILE (HORIZONTAL) **CLASSIFICATION:** PROJECT DESIGN ENGINEER ENGINEERING COORDINATION URBAN COLLECTOR AND SAFETY LETTING DATE: KUMAR TRIVEDI, P.E.

PROJECT MANAGER
NCDOT RAIL DIVISION MARCH 19, 2019 \* 1% TTST 2% DUAL PROFILE (VERTICAL) SUBREGIONAL TIER

DocuSign Envelope ID: 09B7BE0A-B361-4380-99FA-81243B40C7AF

SHEET 3A 46932.1.1 (P-5720)



#### Roadway Subsurface Investigation Report - Inventory

Proposed Grade – Separation of Durant Road (SR 2006)

Over CSX S Line Railroad in Raleigh

Wake County, North Carolina

WBS: 46932.1.1 TIP: P-5720

Falcon Project No.: G17058.00

#### Prepared for:

Kimley-Horn and Associates 421 Fayetteville Street, Suite 600 Raleigh, NC 27601

Submitted by:
Falcon Engineering, Inc.
1210 Trinity Road, Suite 110
Cary, North Carolina 27513
(919) 871-0800
www.falconengineers.com

February 5, 2019

 WBS:
 46932.1.1

 TIP:
 P-5720

 COUNTY:
 Wake

**DESCRIPTION:** Proposed Grade Separation of Durant Road (SR 2006)

Over CSX S Line Railroad in Raleigh

**SUBJECT:** Roadway Subsurface Investigation – Inventory

#### PROJECT DESCRIPTION

This project consists of constructing a new grade separation on Durant Road over the CSX S line railroad in Wake County. The current at grade crossing will be replaced with a bridge just north of the current crossing. Durant Road will be shifted north to allow the current crossing to remain in place during construction. In addition to the roadway realignment, a bridge structure and multiple retaining walls will be constructed. Investigations for structures will be provided under separate cover.

The investigation was conducted between November 27<sup>th</sup>, 2017 and December 14<sup>th</sup>, 2017 in general accordance with our Proposal to Provide Geotechnical Engineering Services, dated August 24<sup>th</sup>, 2017.

A total of thirteen (13) Standard Penetration Test (SPT) borings and six (6) hand auger borings were performed for the proposed roadway alignments. All mechanical borings were drilled using a CME 550 ATV mounted drill rig equipped with 2 ½-inch inside diameter hollow-stem augers, and SPT testing was performed with an automatic hammer. Representative soil samples, collected with a split-barrel sampler or hand auger, were selected for laboratory testing to verify visual field classifications. In addition, one (1) bulk sample was collected for standard Proctor compaction and California Bearing Ratio (CBR) testing. Twelve (12) locations along the existing roadway were cored, measured and Dual Mass Dynamic Cone Penetrometer (DCP) testing completed to correlate in-situ CBR values for the existing subgrade to depths of up to three feet below subgrade. The dual mass DCP used is manufactured by Kessler Soils Engineering Products, Inc. CBR values were estimated using software provided by the manufacturer which utilizes correlations established by the Army Corps of Engineers Waterways Experiment Station.

DocuSign Envelope ID: 09B7BE0A-B361-4380-99FA-81243B40C7AF



The following alignments, totaling approximately 0.91 miles were investigated.

| Alignment                | Station (ft)      |
|--------------------------|-------------------|
| -L- (Durant Road)        | 11+00 to 46+75    |
| -Y2- (Access Road)       | 10+00 to 16+67.41 |
| -Y3- (Leslieshire Drive) | 10+00 to 15+72.87 |

#### AREAS OF SPECIAL GEOTECHNICAL INTEREST

A. The following locations contain highly plastic soils with plasticity indices (PI) greater than 25 within 3 feet of proposed subgrade elevations:

| <u>Alignment</u> | <u>Station (ft)</u> |
|------------------|---------------------|
| -L-              | 13+50 to 18+00      |
| -L-              | 42+00 to 44+00      |

B. The following locations contain very soft to soft/very loose soils with an N-value less than 4 near the ground surface:

| <u>Alignment</u> | Station (ft)   |
|------------------|----------------|
| -L-              | 20+00 to 23+00 |
| -L-              | 28+00 to 30+00 |

- C. Alluvial soils were not encountered at the locations explored. Isolated alluvial soils may exist elsewhere on the site between borings in proximity to natural waterways and/or constructed drainage features.
- D. Two retaining walls are proposed to be constructed along the roadway alignments at the following locations:

|         | <u>Alignment</u> | Station (ft)                        |
|---------|------------------|-------------------------------------|
| Wall #1 | -L-              | 22+00.04 to 25+29.95, 42.5' LT      |
| Wall #2 | -Y3-             | 12+75, 42.0' RT to 15+00, 43.54' RT |

www.FalconEngineers.com

Engineering | Inspection | Testing

1210 Trinity Road, Suite 110 | Cary, North Carolina 27513 | T 919.871.0800

SHEET 3B 46932.1.1 (P-5720)

#### PHYSIOGRAPHY AND GEOLOGY

According to the *Geologic Map of North Carolina* (1985), the site is in the Raleigh Belt Physiographic Province of North Carolina. Specifically, rocks at the site are noted as Injected Gneiss (**CZig**), consisting of biotite gneiss and schist intruded by numerous sills and dikes of granite, pegmatite, and aplite; minor hornblende gneiss.

Existing site topography is relatively flat, sloping gently from west to east. The site lies in northeast Raleigh and is currently an at-grade crossing for the CSX S line. The existing corridor is populated with residential (multi-family as well as single family) to the south and commercial and municipal properties to the north. A small stream approaches the alignment from the north and crosses the proposed -Y2- alignment. The proposed alignment shift to the north will cross over landscaped and wooded areas.

#### **SOIL PROPERTIES**

A variety of soils were encountered along the project, including existing roadway embankments, residual soils and weathered rock.

Topsoil and rootmat was encountered in grassy, brushy, and wooded areas ranging in thickness from 0.2 to 0.5 feet, typically on the order of 0.3 feet, and consisting of sandy clay.

Roadway Embankment soils were encountered beneath and adjacent to existing roadways. These soils consist of up to 8.5 feet of dry to moist, very loose to medium dense, silty and clayey sand (A-2-4, A-2-6) and soft to very stiff, silty and sandy clay (A-6, A-7).

Residual soils were encountered consisting of dry to saturated, loose to medium dense, clayey and silty sand (A-2-4, A-2-6) and medium stiff to hard, sandy silt, and silty and sandy clays (A-4, A-6, A-7).

#### **GROUNDWATER PROPERTIES**

Groundwater levels were measured at the time of boring completion, and in many cases after a waiting period of at least 24 hours. Borings drilled within and in close proximity to existing roadways were backfilled immediately after completion due to safety considerations. Groundwater was encountered in borings at depths of 22.8 ft to 24.7 ft, corresponding to elevations ranging from 252.7 ft to 273.3 ft.



Detailed groundwater measurements are included in the attached subsurface profiles and cross sections.

#### ADDITIONAL LABORATORY TESTING

The following bulk sample was obtained:

<u>Sample Location Location Test</u>

BS-1 39+00, 20' LT, -L- 1.0 – 7.0 California Bearing Ratio, Standard Proctor

Classification test results for these samples are included in the subsurface profiles. Standard Proctor and California Bearing Ratio (CBR) data is attached in Appendix A.

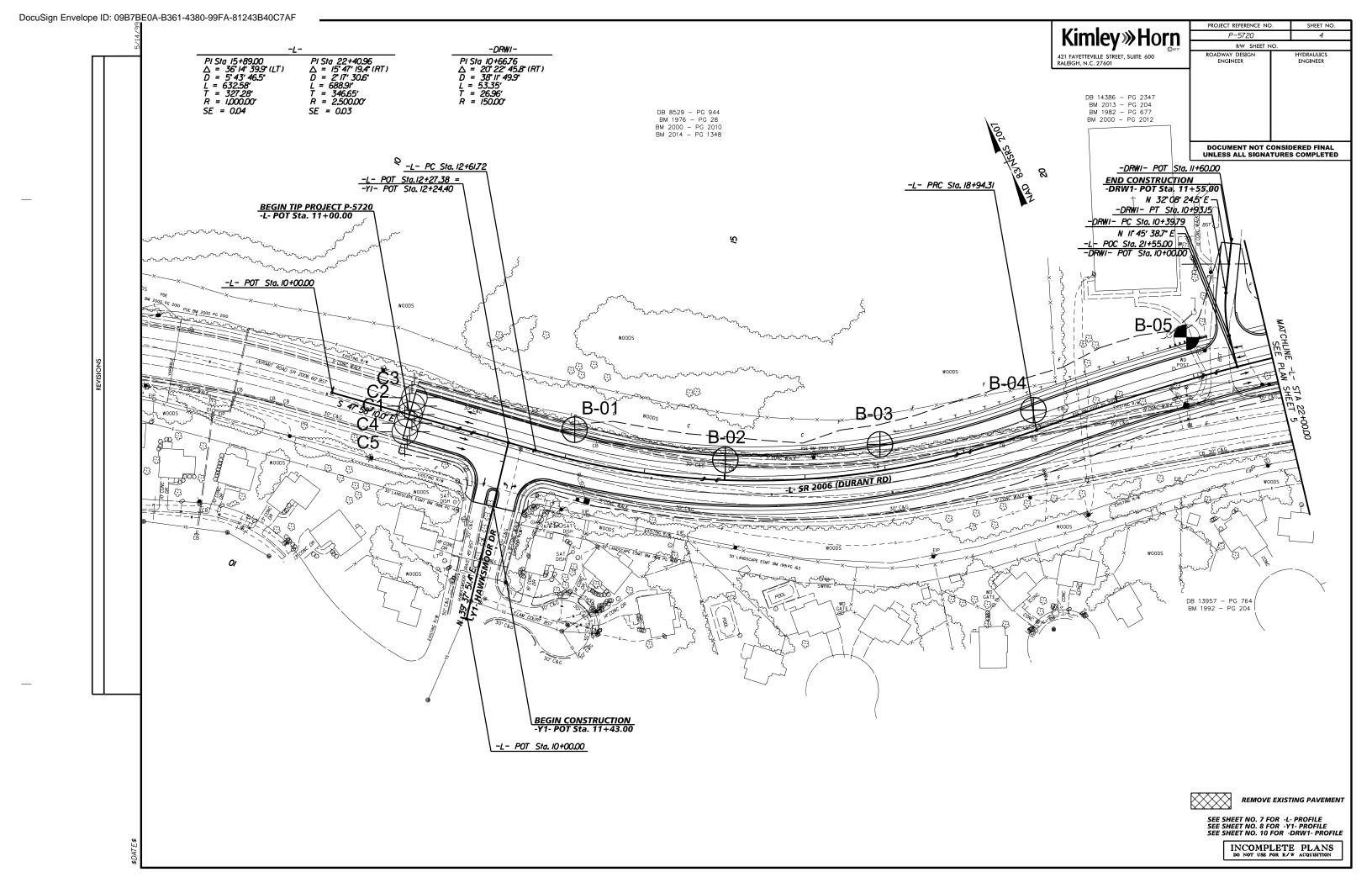
### FALCON ENGINEERING, INC.

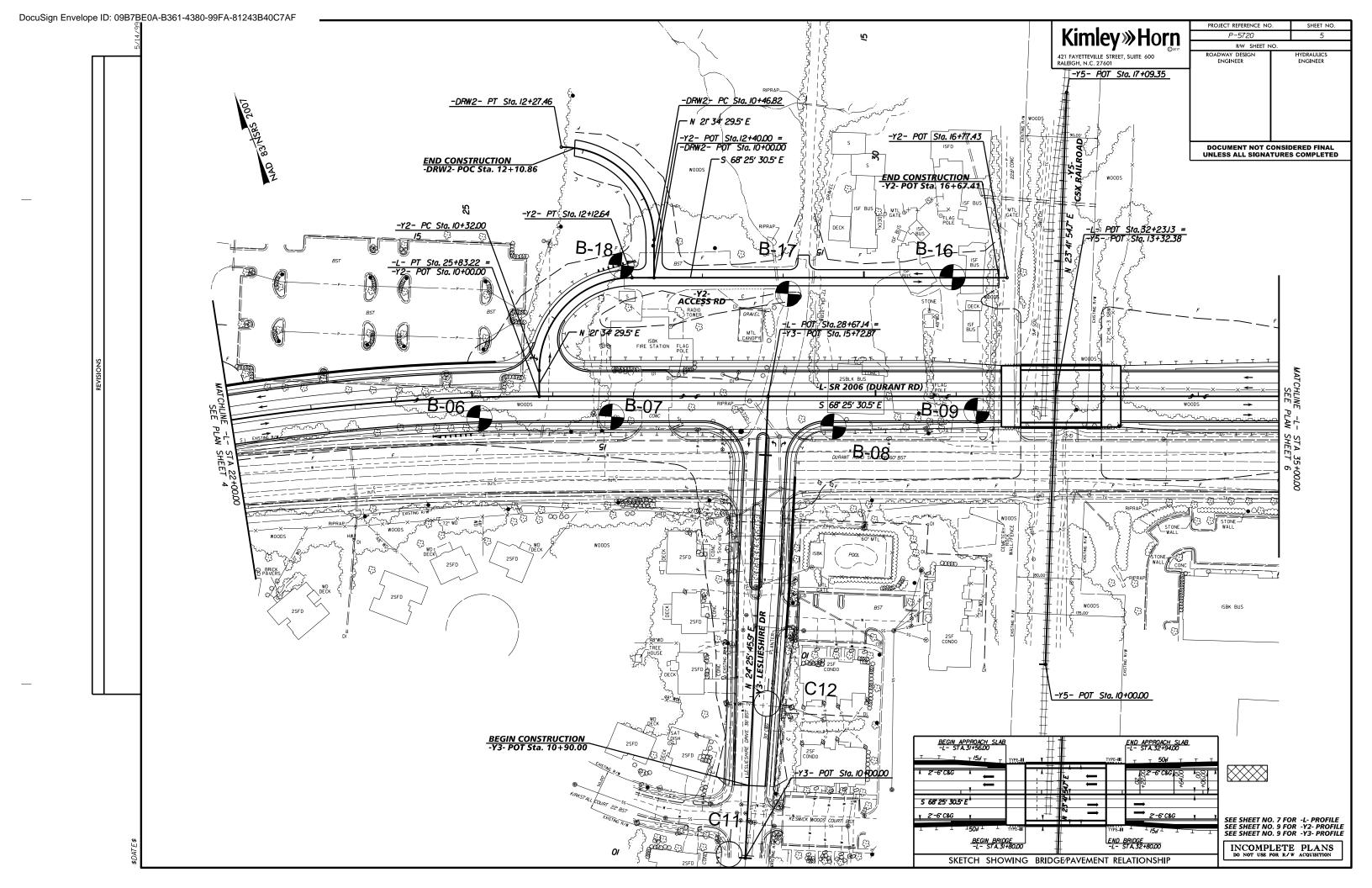
Report Prepared By:

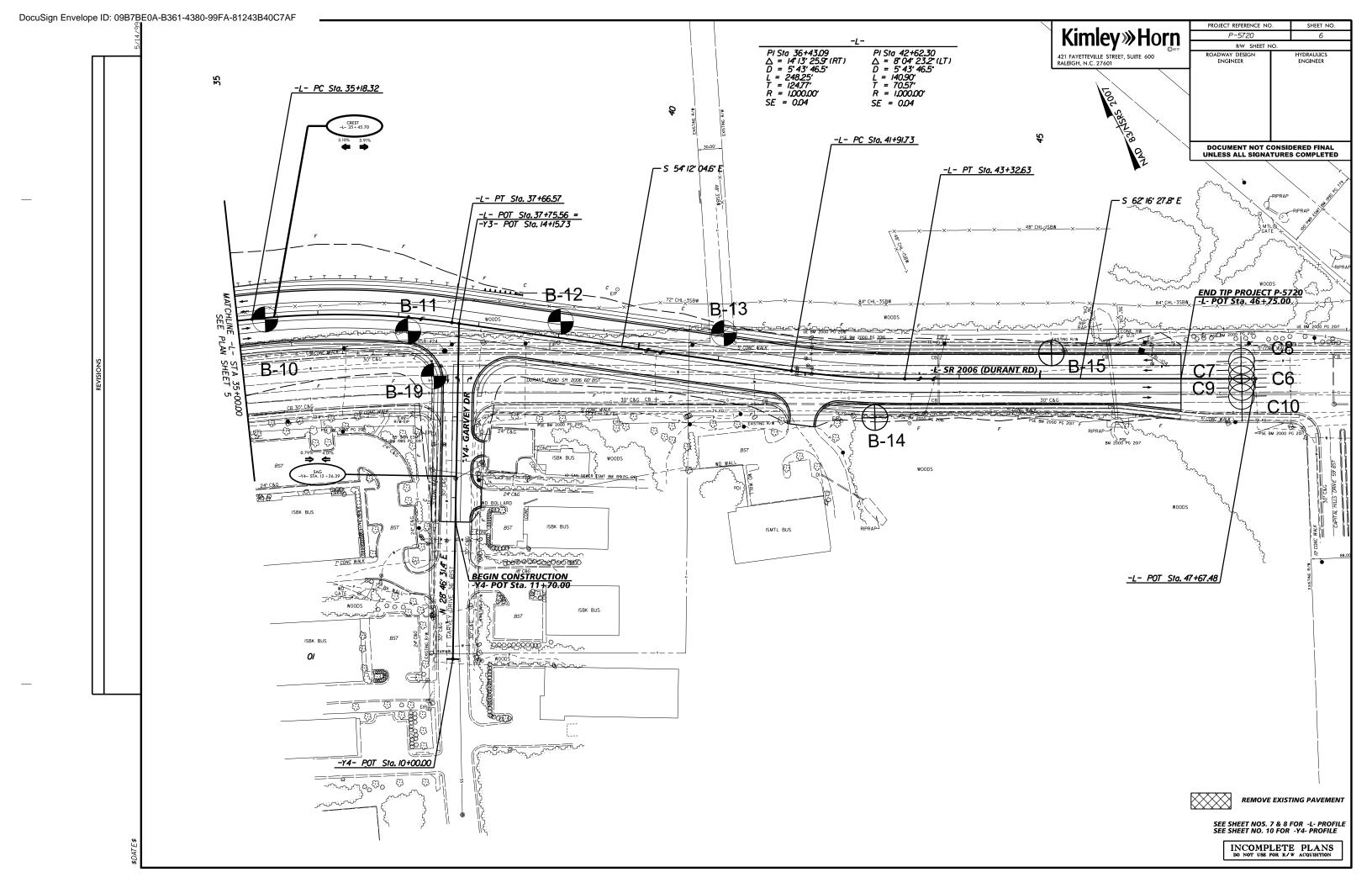
W. Scott Hunsberger, PE Geotechnical Engineer Jeremy R. Hamm, PE

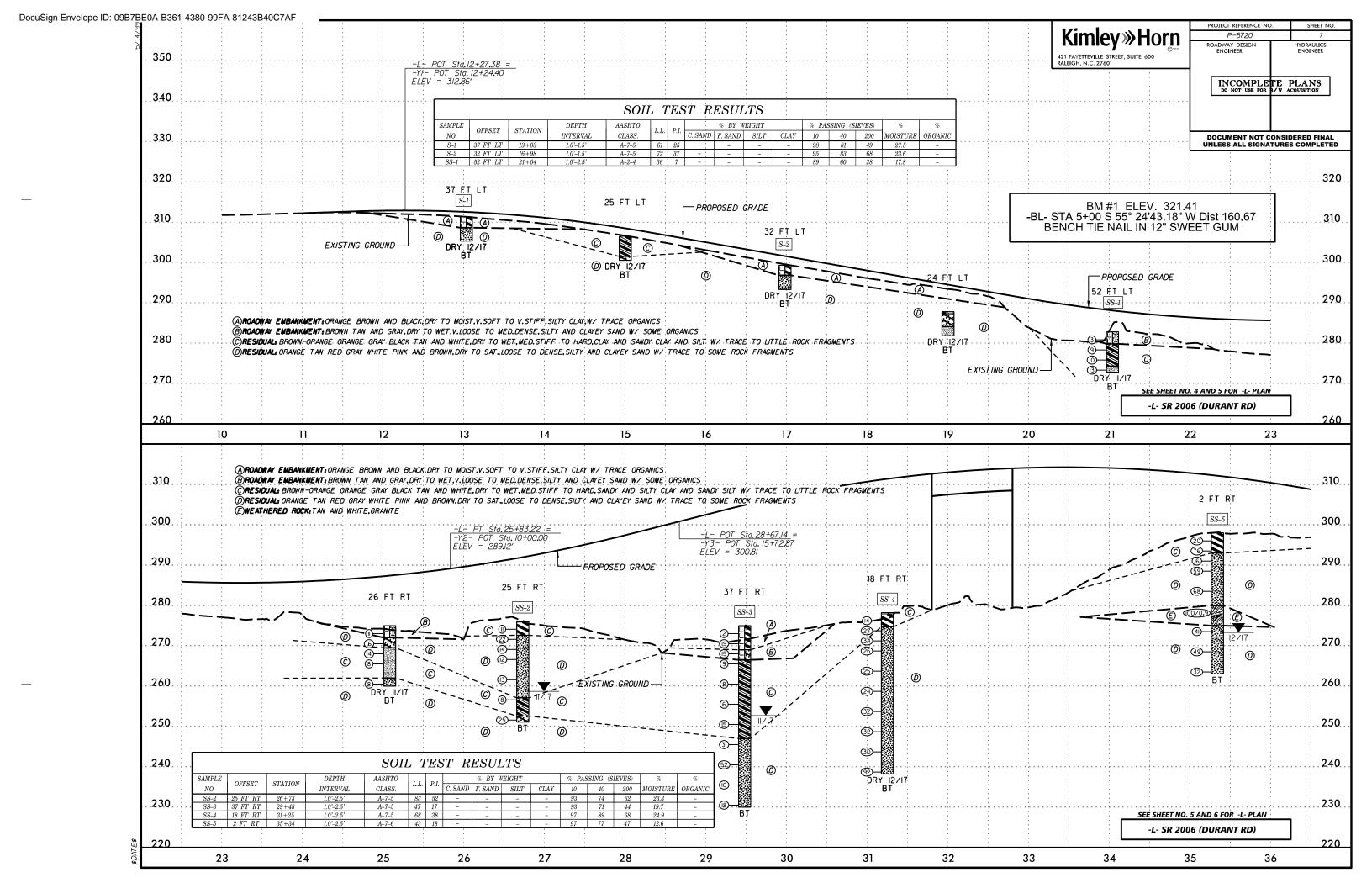
Report Reviewed By:

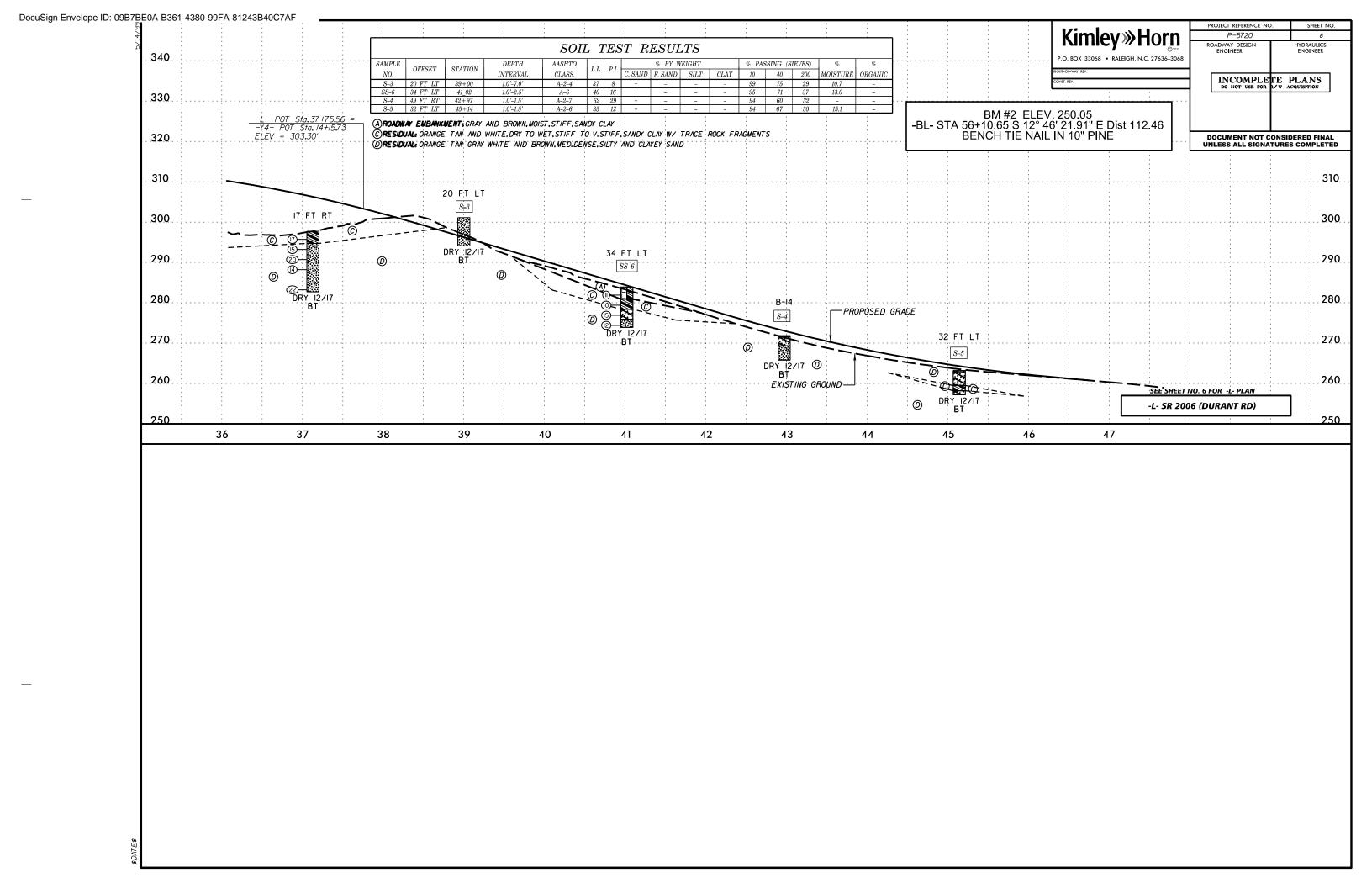
ngineer Geotechnical Engineering Manager

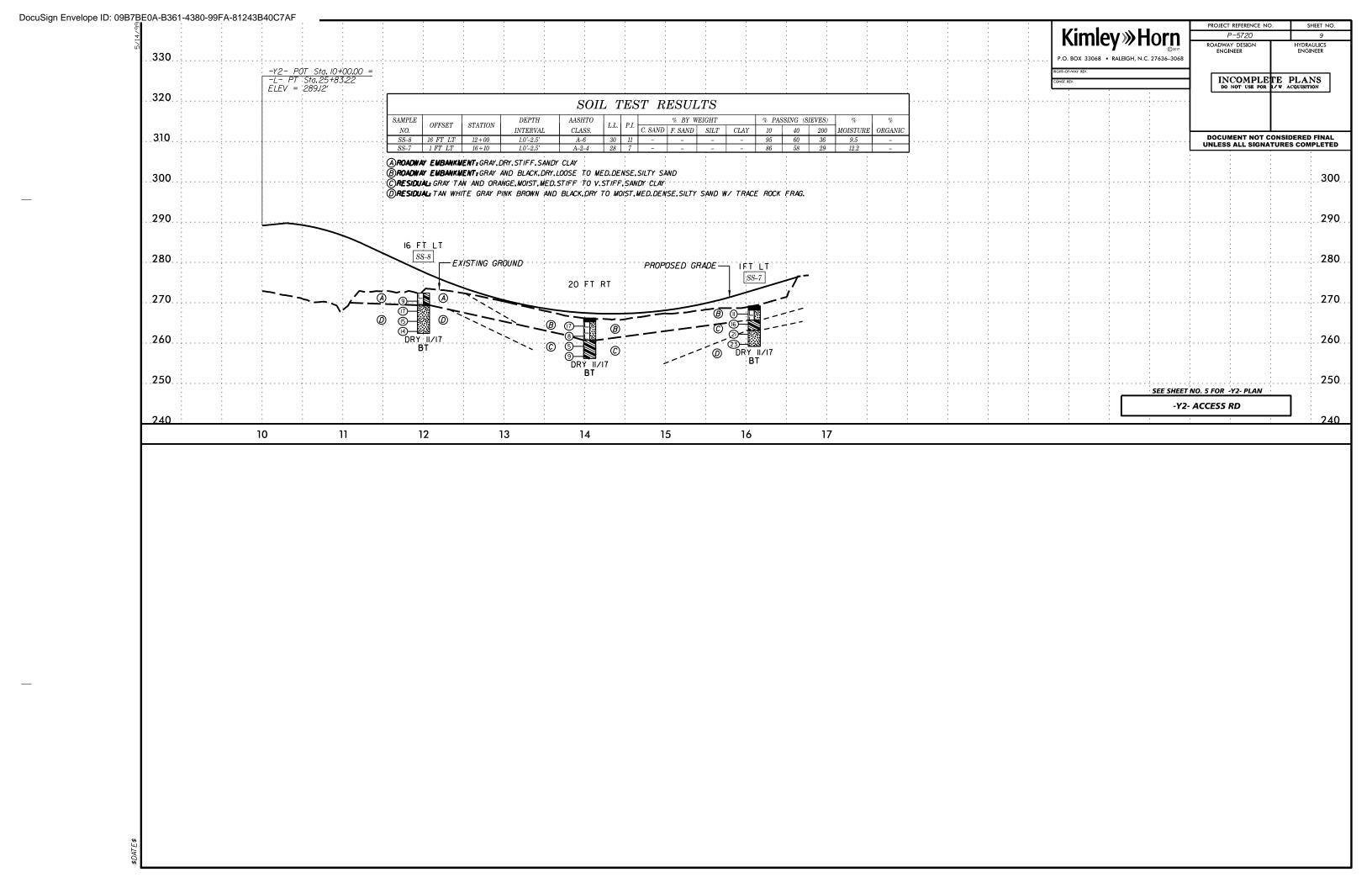


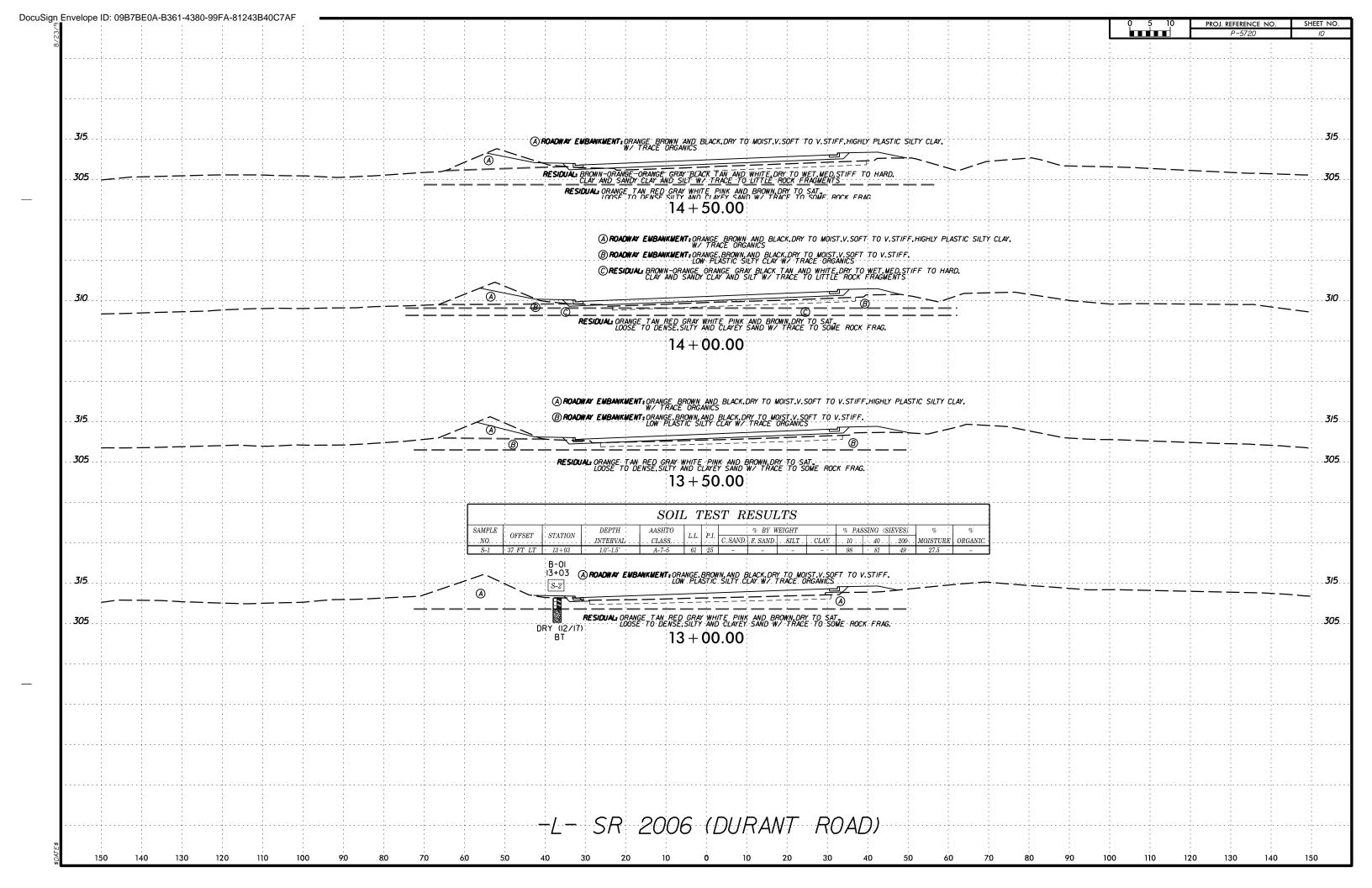


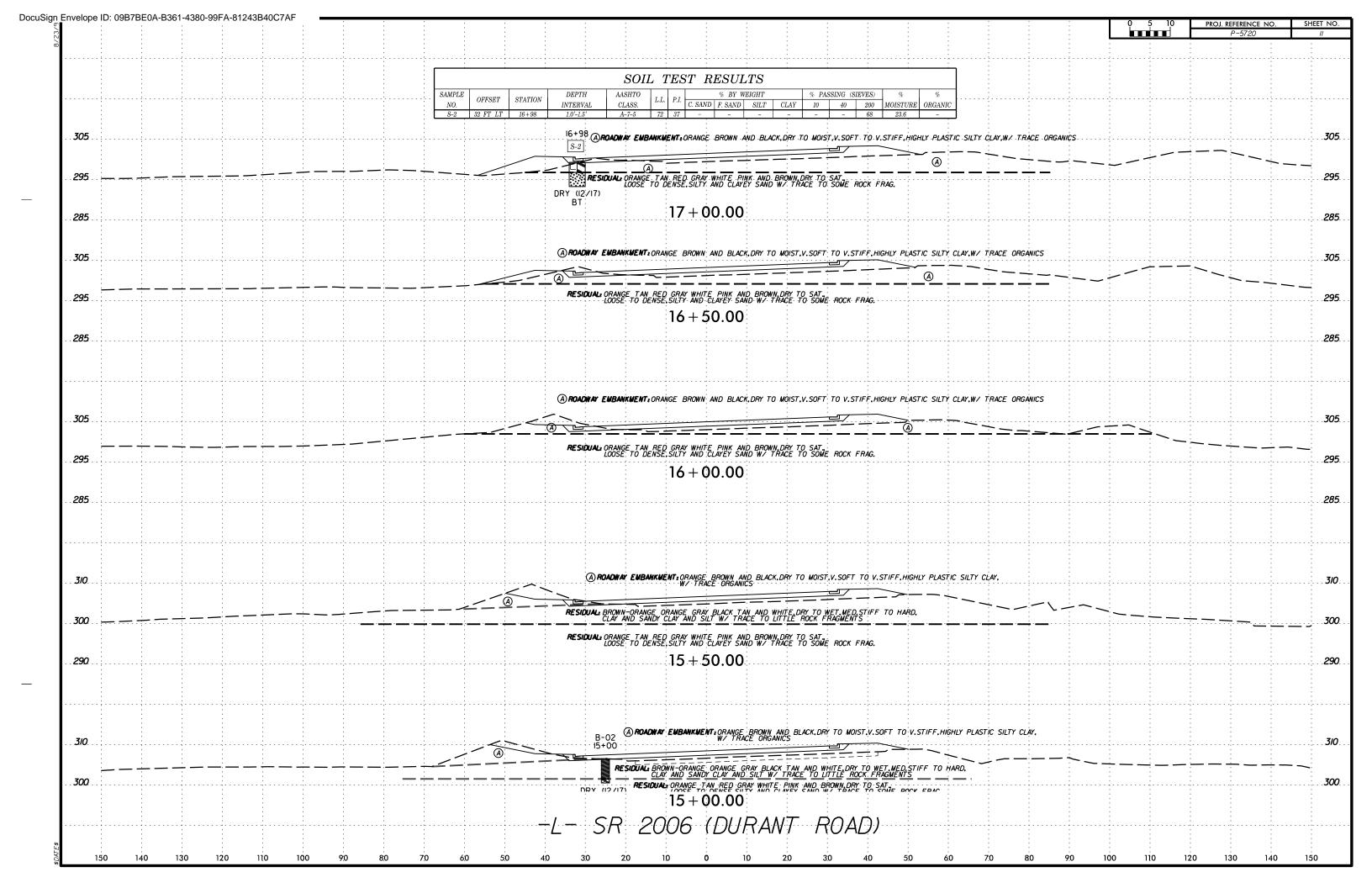












DocuSign Envelope ID: 09B7BE0A-B361-4380-99FA-81243B40C7AF PROJECT REFERENCE NO. 13 P-5720 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION APPENDIX A PAVEMENT INVESTIGATION RESULTS REFERENCE: 46932 WSH DATE DocuSign Envelope ID: 09B7BE0A-B361-4380-99FA-81243B40C7AF
SHEET 14





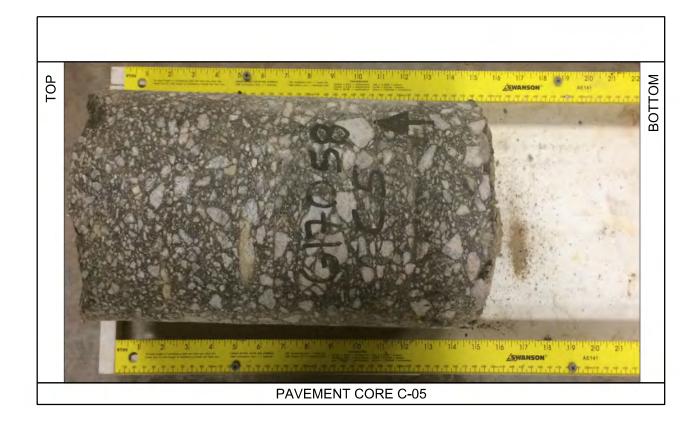




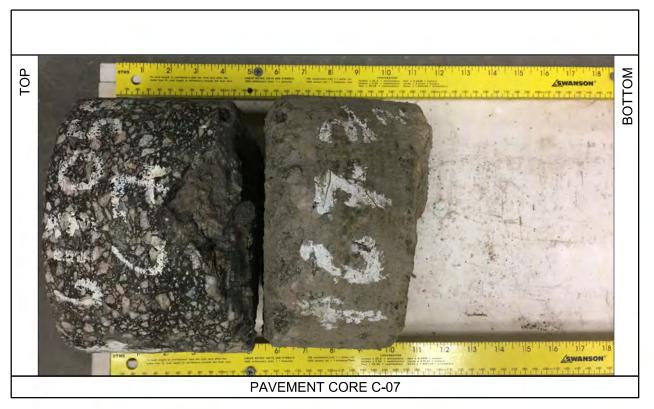


#### PAVEMENT CORE PHOTOGRAPHS

PROPOSED GRADE-SEPARATION OF DURANT ROAD (SR 2006) OVER CSX S LINE RAILROAD IN RALEIGH WAKE COUNTY, NORTH CAROLINA WBS NO.: 46932.1.1 | TIP NO.: P-5720 FALCON PROJECT NO.: G17058.00 DocuSign Envelope ID: 09B7BE0A-B361-4380-99FA-81243B40C7AF
SHEET 15









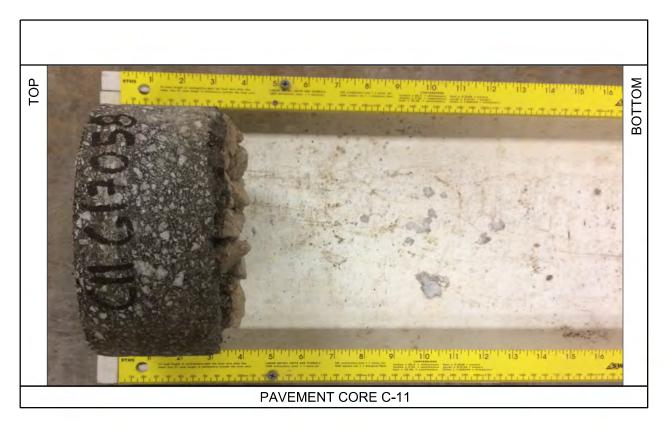


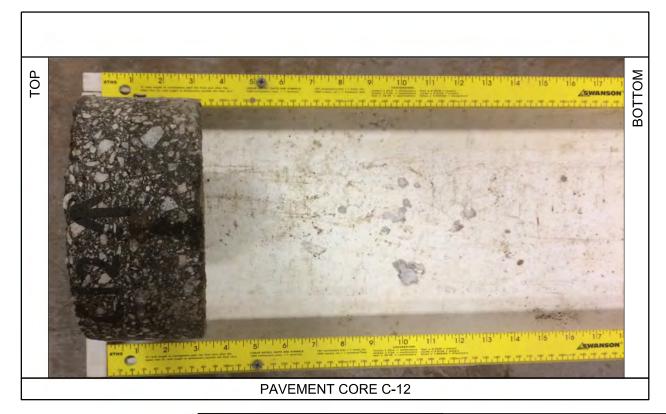
#### PAVEMENT CORE PHOTOGRAPHS

PROPOSED GRADE-SEPARATION OF DURANT ROAD (SR 2006) OVER CSX S LINE RAILROAD IN RALEIGH WAKE COUNTY, NORTH CAROLINA WBS NO.: 46932.1.1 | TIP NO.: P-5720 FALCON PROJECT NO.: G17058.00 DocuSign Envelope ID: 09B7BE0A-B361-4380-99FA-81243B40C7AF
SHEET 16





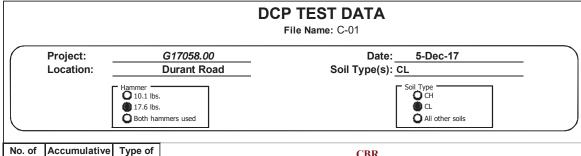


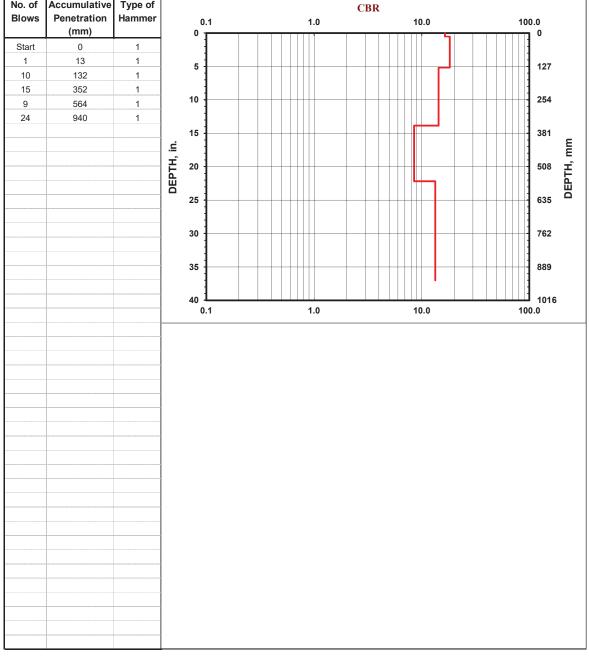


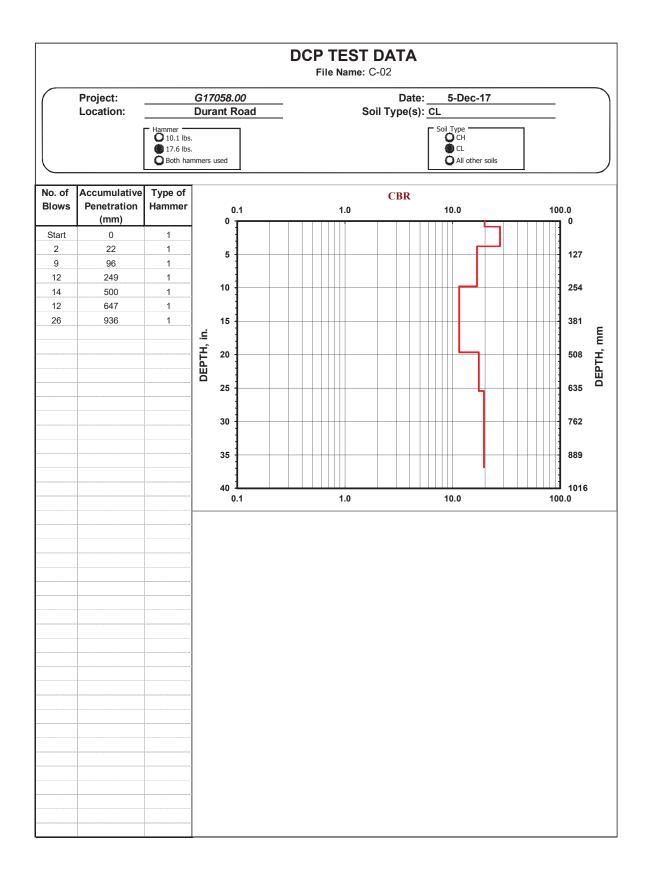


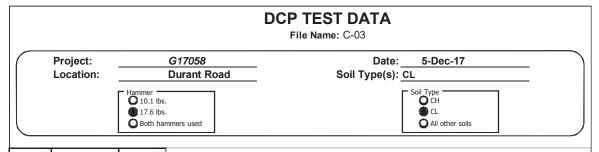
#### PAVEMENT CORE PHOTOGRAPHS

PROPOSED GRADE-SEPARATION OF DURANT ROAD (SR 2006) OVER CSX S LINE RAILROAD IN RALEIGH WAKE COUNTY, NORTH CAROLINA WBS NO.: 46932.1.1 | TIP NO.: P-5720 FALCON PROJECT NO.: G17058.00

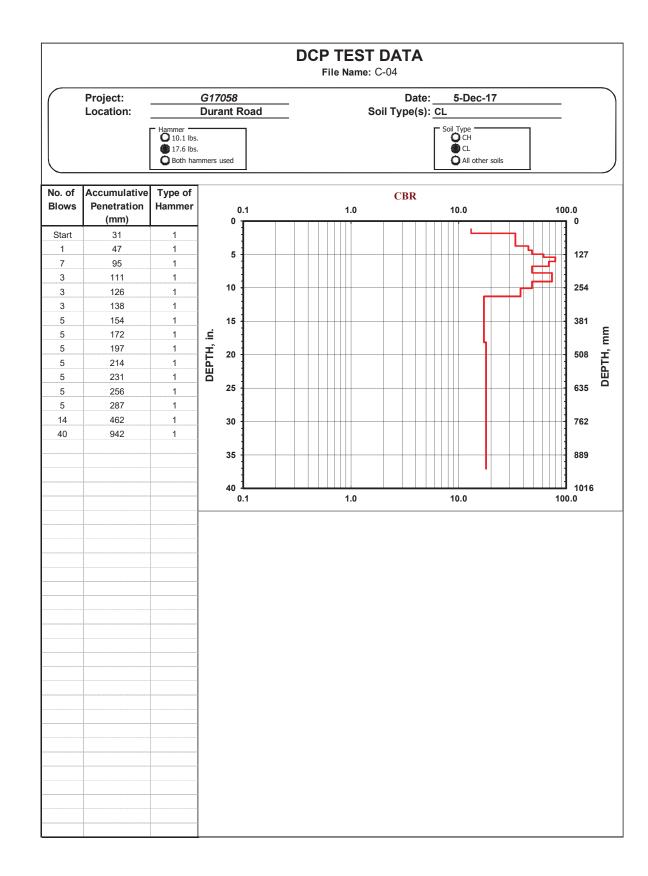


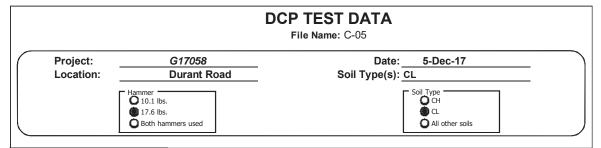


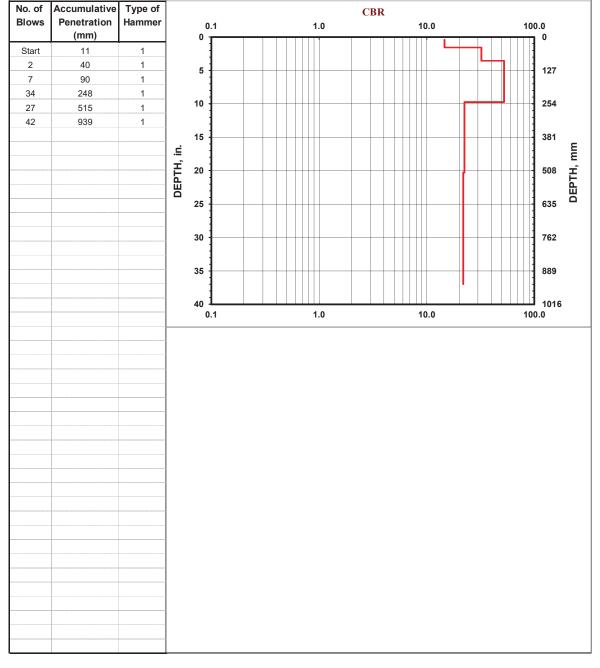


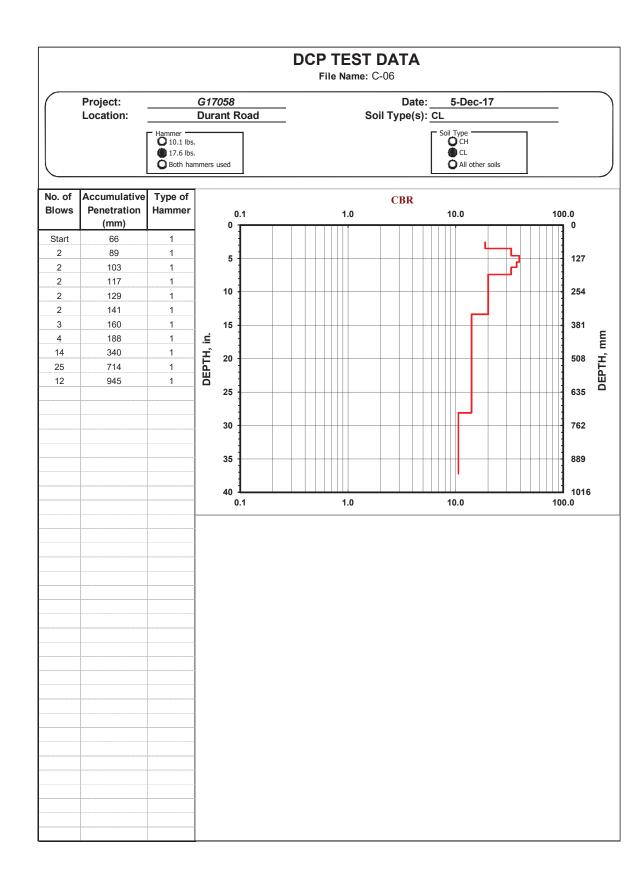


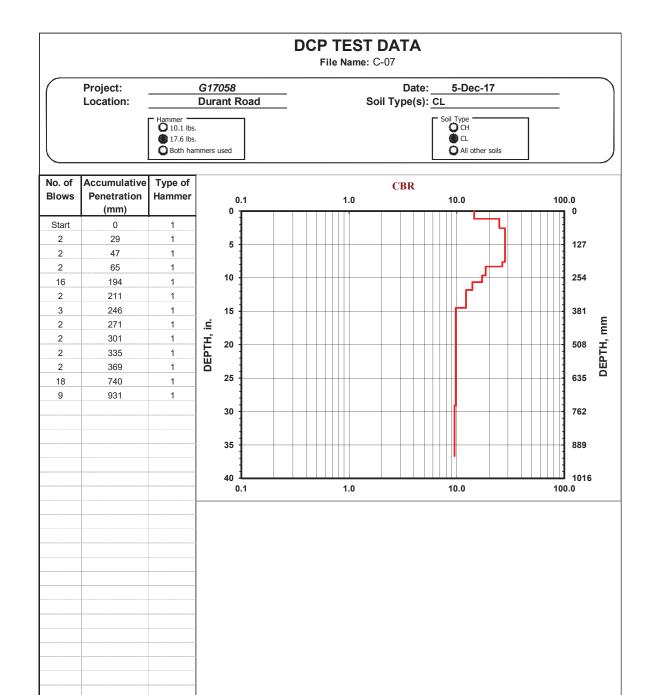
| No. of       | Accumulative | Type of                                 |            |          |     | CBR |          |       |           |
|--------------|--------------|-----------------------------------------|------------|----------|-----|-----|----------|-------|-----------|
| Blows        | Penetration  | Hammer                                  |            | 0.1      | 1.0 |     | 10.0     | 100.0 |           |
|              | (mm)         |                                         |            | 0        |     |     |          | O     |           |
| Start        | 32           | 1                                       |            | 1        |     |     |          |       |           |
| 1            | 50           | 1                                       |            | 5 🖠      |     |     |          | 127   |           |
| 4            | 103          | 1                                       |            | 1        |     |     |          | ]     |           |
| 12           | 220          | 1                                       |            | 10       |     |     |          | 254   |           |
| 10           | 364          | 1                                       |            | ·        |     |     |          |       |           |
| 7            | 534          | 1                                       |            |          |     |     |          |       |           |
| 3<br>8       | 595          | 1<br>1                                  | نے ا       | 15       |     |     |          | 381   | Ε         |
| 12           | 765          | 1                                       | DEPTH, in. | 1        |     |     |          |       | DEPTH, mm |
| 12           | 939          | I                                       | Ӗ          | 20 ]     |     |     | <u> </u> | 508   | ΞÉ        |
|              |              |                                         | ם          | 1        |     |     |          |       | ᇤ         |
| ~~~~~~~~~~~~ |              | <u> </u>                                |            | 25       |     |     |          | 635   | 2         |
|              |              | *************************************** |            |          |     |     |          |       |           |
|              |              |                                         |            |          |     |     |          |       |           |
|              | 3            |                                         |            | 30       |     |     |          | 762   |           |
|              |              |                                         |            | 1        |     |     |          |       |           |
|              |              |                                         |            | 35       |     |     |          | 889   |           |
|              |              |                                         |            | <b>.</b> |     |     |          |       |           |
|              |              |                                         |            | 40       |     |     |          | 1016  | i         |
|              |              | ***                                     |            | 0.1      | 1.0 |     | 10.0     | 100.0 |           |
|              |              |                                         |            |          |     |     |          |       |           |
|              |              |                                         |            |          |     |     |          |       |           |
| ~~~~~~       |              |                                         |            |          |     |     |          |       |           |
|              |              |                                         |            |          |     |     |          |       |           |

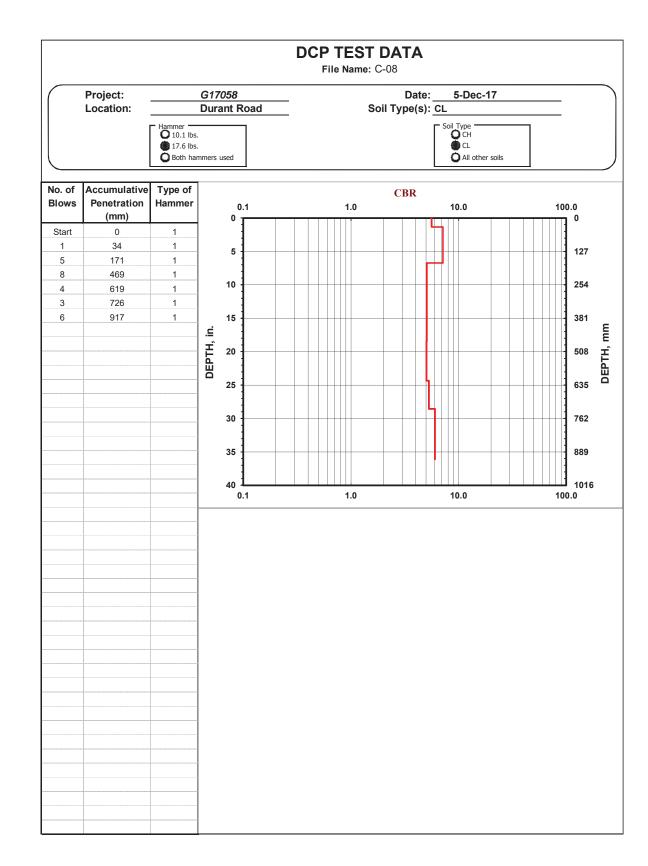


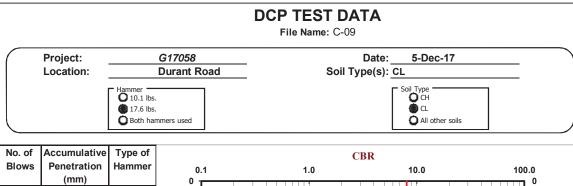


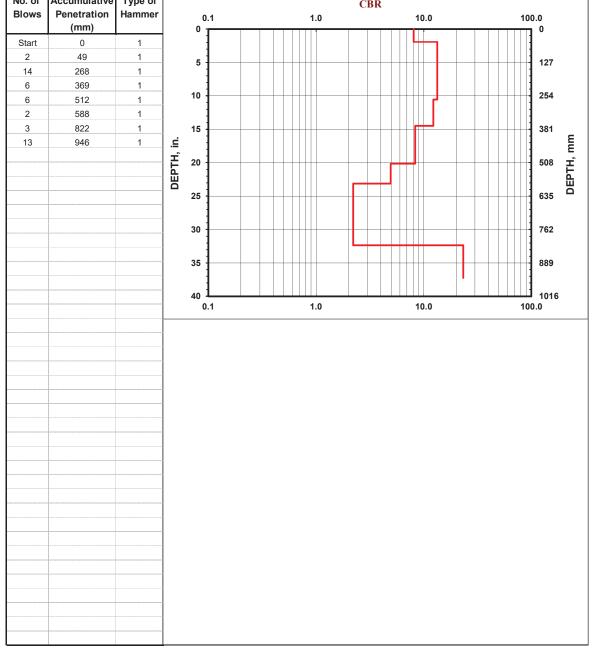


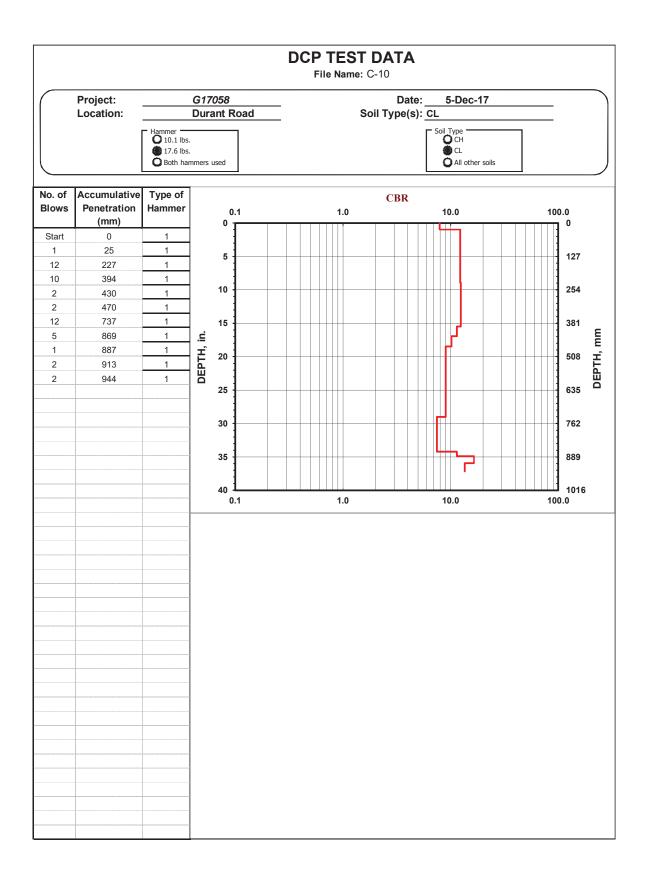


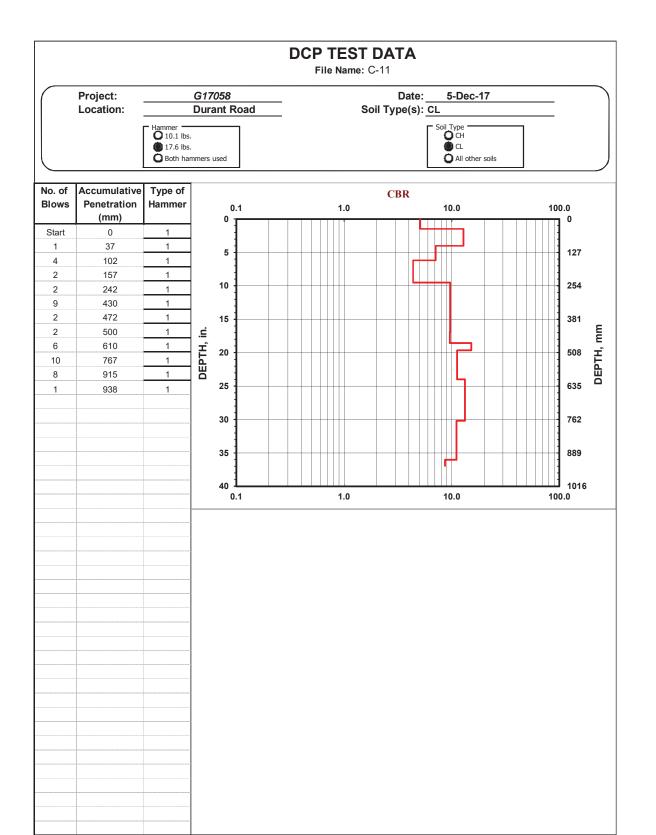


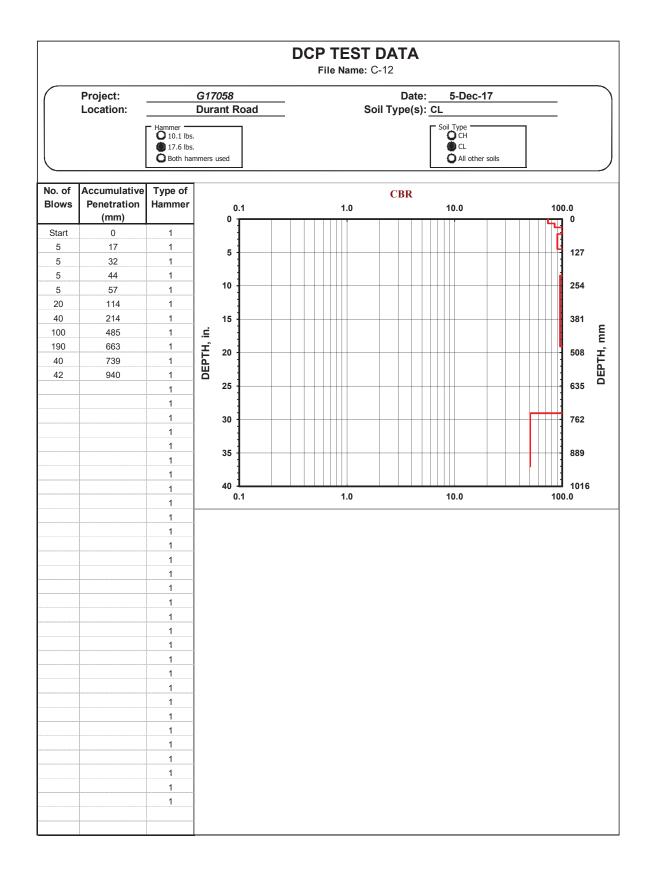












Falcon Engineering, Inc. 1210 Trinity Road, Suite 110 Raleigh, NC 27607

#### PAVEMENT SECTION AND SUBGRADE CONDITION SUMMARY

#### PROPOSED GRADE SEPARATION OF DURANT ROAD (SR 2006) OVER CSX S-LINE RAILROAD

#### WAKE COUNTY, NORTH CAROLINA

TIP No.: P-7520 WBS No. 46932.1.1 Falcon Project No.: G17063.00

|          |           | TEST LOCATION |             |        | PAVEMENT S | SECTION THICKN    | IESS (INCHES) | SUBGRADE       |       |
|----------|-----------|---------------|-------------|--------|------------|-------------------|---------------|----------------|-------|
| LOCATION | ALIGNMENT | LANE          | STATION     | OFFSET | НМА        | AGGREGATE<br>BASE | TOTAL         | IN-SITU<br>CBR | NOTES |
| C-01     | -L-       | CTL           | 11+00, -L-  | CL     | 14.00      | 0.00              | 14.00         | 10             | -     |
| C-02     | -L-       | WB, ISL       | 11+00, -L-  | 11' LT | 14.00      | 0.00              | 14.00         | 11             | -     |
| C-03     | -L-       | WB, OSL       | 11+00, -L-  | 22' LT | 15.00      | 0.00              | 15.00         | 10             | -     |
| C-04     | -L-       | EB, ISL       | 11+00, -L-  | 11' RT | 15.00      | 0.00              | 15.00         | 11             | -     |
| C-05     | -L-       | EB, OSL       | 11+00, -L-  | 22' RT | 14.00      | 0.00              | 14.00         | 11             | -     |
| C-06     | -L-       | CTL           | 46+50, -L-  | CL     | 14.00      | 0.00              | 14.00         | 11             | -     |
| C-07     | -L-       | WB, ISL       | 46+50, -L-  | 11' LT | 11.00      | 0.00              | 11.00         | 10             | -     |
| C-08     | -L-       | WB, OSL       | 46+50, -L-  | 22' LT | 13.00      | 0.00              | 13.00         | 6              | -     |
| C-09     | -L-       | EB, ISL       | 46+50, -L-  | 11' RT | 15.00      | 0.00              | 15.00         | 5              |       |
| C-10     | -L-       | EB, OSL       | 46+50, -L-  | 22' RT | 14.00      | 0.00              | 14.00         | 10             |       |
| C-11     | -L-       | SB            | 10+04, -Y3- | 20' LT | 3.00       | 9.00              | 12.00         | 8              | -     |
| C-12     | -L-       | NB            | 11+93, -Y3- | 17' RT | 2.00       | 7.00              | 9.00          | 25             |       |
|          | REPRE     | SENTATIVE AVE | RAGE        |        | 12.00      | 1.33              | 13            | 11             | -     |

LEGEND: EB - EASTBOUND, WB - WESTBOUND, SB- SOUTHBOUND, NORTHBOUND, OSL - OUTSIDE LANE, ISL - INSIDE LANE, CTL - CENTRAL TURN LANE

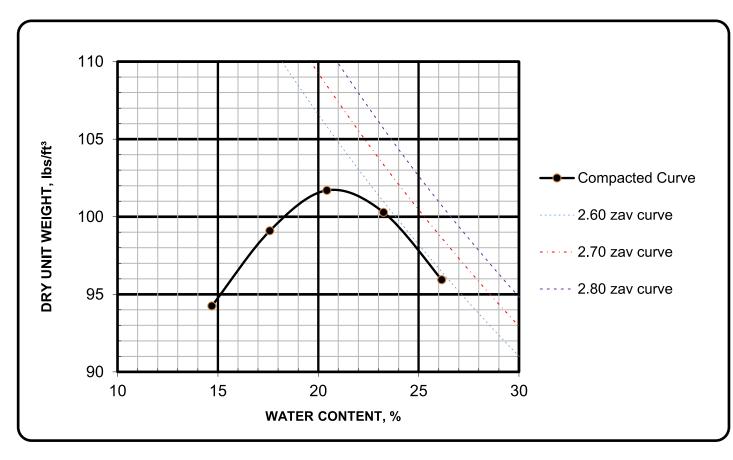
DocuSign Envelope ID: 09B7BE0A-B361-4380-99FA-81243B40C7AF PROJECT REFERENCE NO. 24 P-5720 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION APPENDIX B LABORATORY RESULTS REFERENCE: 46932 WSH <del>2/5/201</del>9 INITIALS DATE

## REPORT OF LABORATORY COMPACTION CHARACTERISTICS OF SOILS USING STANDARD EFFORT

Performed in general accordance with ASTM D 698, Method A January 10, 2018



PROJECT NAME: P-5720 Durant Road Grade Separation PROJECT NUMBER: G17058.00 SAMPLE IDENTIFICATION: B-12, BS-01, 1.0-7.0' SAMPLE DESCRIPTION: Brown silty sand



STANDARD MAXIMUM DRY UNIT WEIGHT, Ibs/ft<sup>3</sup>: 101.8 STANDARD OPTIMUM WATER CONTENT, %: 20.8 AS-RECEIVED WATER CONTENT: 10.7

LIQUID LIMIT: 37

PLASTIC LIMIT: 29

PLASTICITY INDEX: 8
PERCENT FINER NO. 200: 29

USCS CLASSIFICATION: SM

**REMARKS:** 

REVIEWED BY: John Railly

Falcon Engineering 1210 Trinity Road Suite 110 Cary, NC 27513 Telephone: 919-871-0800 www.falconengineers.com

# REPORT OF CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS Performed in General Accordance with ASTM D 1883

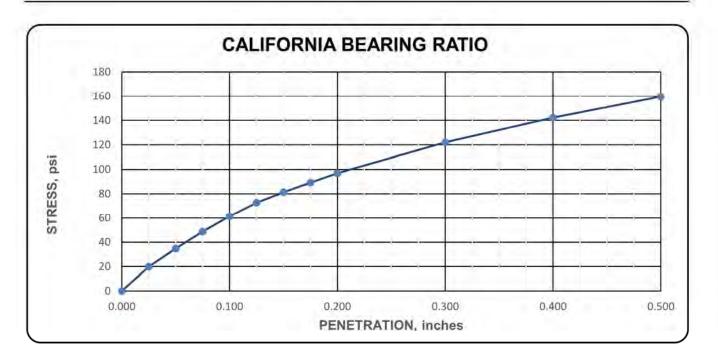
FALCO

Performed in General Accordance with ASTM D 1883
January 10, 2018

PROJECT NAME: P-5720 Durant Road Grade Separation

PROJECT NUMBER: G17058.00

SAMPLE IDENTIFICATION: B-12, BS-01, 1.0-7.0



|                       |                               | <u>uncorrected</u> | <u>corrected</u> |
|-----------------------|-------------------------------|--------------------|------------------|
| <b>BEARING RATIO:</b> | at 0.1 inches of penetration: | 6.1                | 6.1              |
|                       | at 0.2 inches of penetration: | 6.5                | 6.5              |

Compaction Method: ASTM D698

Maximum Dry Unit Weight, lbs/ft<sup>3</sup>: 101.8

Optimum Water Content, %: 20.8 Compacted Dry Unit Weight, lbs/ft<sup>3</sup>: 100.8

Compacted Water Content, %: 20.7
Compaction Percentage: 99.0

Surcharge amount, lbs: 10 Immersion period, hours: 97

Water Content, Top one-inch after test, %: 28.2

Swell, %: 1.4

Reviewed by: John Railly

Falcon Engineering 1210 Trinity Rd. Suite 110 Cary, NC 27513 Telephone: 919-871-0800 www.falconengineers.com