

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

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

| | | | |
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| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
| N.C. | U-3304 | 1 | 27 |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| 34912.1.1 | STP-0701(8) | P.E. | |
| 34912.2.2 | STP-0701(8) | RW, UTIL. | |
| 34912.3.3 | STP-0701(16) | CONST. | |

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| -YI- | 10+00-25+79 | 9-10 | 15 | 25-27 |
| -YIDET- | 10+00-20+62 | 11 | 16 | - |

ROADWAY
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34912.1.1 (U-3304) F.A. PROJ. STP-0701(8)
COUNTY ALAMANCE
PROJECT DESCRIPTION BURLINGTON - GRAND OAKS BLVD. EXT.
FROM SR 1146 (KIRKPATRICK RD.) TO NC 62 (ALAMANCE RD.)

CAUTION NOTICE

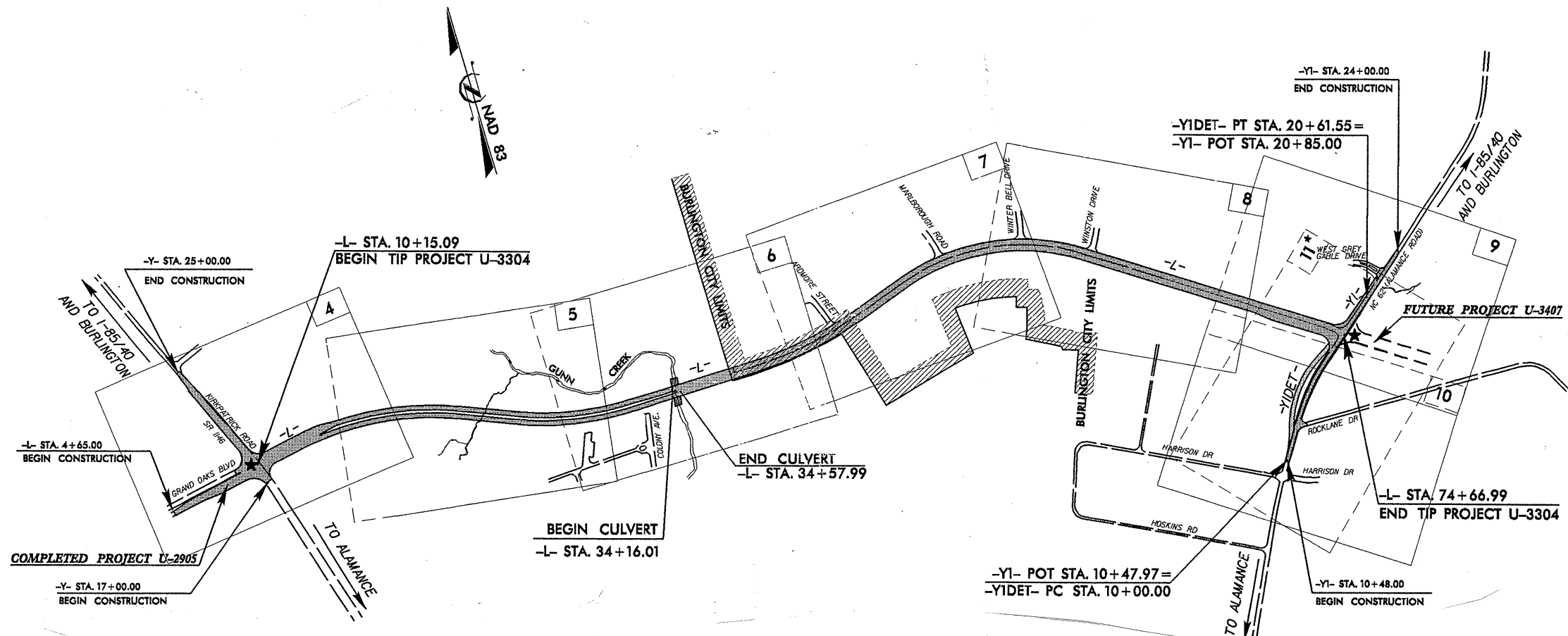
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

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

INVENTORY

CONTRACT: C201857 ID: U-3304



PERSONNEL

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INVESTIGATED BY K. B. MILLER
CHECKED BY K. B. MILLER
SUBMITTED BY N. T. ROBERSON
DATE JANUARY, 2007



DRAWN BY: K. B. MILLER, W. D. FIELDS

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

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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| PROJECT REFERENCE NO. 34912.11 (U-3304) | SHEET NO. 2 |
|--|----------------|

| SOIL DESCRIPTION | | GRADATION | | ROCK DESCRIPTION | | TERMS AND DEFINITIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE ASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, DARK CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HARD PLASTIC, A-7-6</i> | | WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. | | HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE SPOON BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: | | <p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p>ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FMJ) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.</p> <p>STRATA CORE RECOVERY (SCREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p>TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th>GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-1-b</th> <th>A-3</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th></th> <th></th> <th></th> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>% PASSING</th> <td colspan="7">50 MX</td> <td colspan="7">40 MX</td> <td colspan="3">GRANULAR SOILS</td> <td colspan="3">SILT-CLAY SOILS</td> <td colspan="3">MUCK, PEAT</td> </tr> <tr> <th>LIQUID LIMIT</th> <td colspan="7">30 MX</td> <td colspan="7">25 MX</td> <td colspan="3">15 MX</td> <td colspan="3">40 MN</td> <td colspan="3">35 MN</td> <td colspan="3">30 MN</td> </tr> <tr> <th>PLASTIC INDEX</th> <td colspan="7">6 MX</td> <td colspan="7">NP</td> <td colspan="3">4 MX</td> <td colspan="3">8 MX</td> <td colspan="3">12 MX</td> <td colspan="3">16 MX</td> <td colspan="3">No MX</td> </tr> <tr> <th>GROUP INDEX</th> <td colspan="7">0</td> <td colspan="7">0</td> <td colspan="3">0</td> <td colspan="3">4 MX</td> <td colspan="3">8 MX</td> <td colspan="3">12 MX</td> <td colspan="3">16 MX</td> <td colspan="3">No MX</td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td colspan="2">STONE FRAGS, GRAVEL, AND SAND</td> <td colspan="2">FINE SAND</td> <td colspan="3">SILTY OR CLAYEY GRAVEL AND SAND</td> <td colspan="3">SILTY SOILS</td> <td colspan="3">CLAYEY SOILS</td> <td colspan="3">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td colspan="3">HIGHLY ORGANIC SOILS</td> <td colspan="3"></td> </tr> <tr> <th>GEN. RATING AS A SUBGRADE</th> <td colspan="7">EXCELLENT TO GOOD</td> <td colspan="7">FAIR TO POOR</td> <td colspan="3">FAIR TO POOR</td> <td colspan="3">POOR</td> <td colspan="3">UNSATURABLE</td> </tr> </table> <p>PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p> | | GENERAL CLASS. | GRANULAR MATERIALS (≤ 35% PASSING #200) | | | | | | | SILT-CLAY MATERIALS (> 35% PASSING #200) | | | | | | | ORGANIC MATERIALS | | | GROUP CLASS. | A-1 | A-1-b | A-3 | A-2 | A-2-4 | A-2-5 | A-2-6 | A-2-7 | A-4 | A-5 | A-6 | A-7 | A-1, A-2 | A-3 | A-4, A-5 | A-6, A-7 | | | | SYMBOL | | | | | | | | | | | | | | | | | | | | % PASSING | 50 MX | | | | | | | 40 MX | | | | | | | GRANULAR SOILS | | | SILT-CLAY SOILS | | | MUCK, PEAT | | | LIQUID LIMIT | 30 MX | | | | | | | 25 MX | | | | | | | 15 MX | | | 40 MN | | | 35 MN | | | 30 MN | | | PLASTIC INDEX | 6 MX | | | | | | | NP | | | | | | | 4 MX | | | 8 MX | | | 12 MX | | | 16 MX | | | No MX | | | GROUP INDEX | 0 | | | | | | | 0 | | | | | | | 0 | | | 4 MX | | | 8 MX | | | 12 MX | | | 16 MX | | | No MX | | | USUAL TYPES OF MAJOR MATERIALS | STONE FRAGS, GRAVEL, AND SAND | | FINE SAND | | SILTY OR CLAYEY GRAVEL AND SAND | | | SILTY SOILS | | | CLAYEY SOILS | | | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER | | | HIGHLY ORGANIC SOILS | | | | | | GEN. RATING AS A SUBGRADE | EXCELLENT TO GOOD | | | | | | | FAIR TO POOR | | | | | | | FAIR TO POOR | | | POOR | | | UNSATURABLE | | | <p>MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p>COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p> <p>PERCENTAGE OF MATERIAL</p> <table border="1"> <tr> <th></th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>ORGANIC MATERIAL</td> <td></td> <td></td> <td></td> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> <tr> <td></td> <td></td> <td></td> <td>35% AND ABOVE</td> </tr> </table> <p>GROUND WATER</p> <p>▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ▽ STATIC WATER LEVEL AFTER 24 HOURS ▽ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA ○ SPRING OR SEEP</p> | | | GRANULAR SOILS | SILT - CLAY SOILS | OTHER MATERIAL | ORGANIC MATERIAL | | | | TRACE OF ORGANIC MATTER | 2 - 3% | 3 - 5% | TRACE | LITTLE ORGANIC MATTER | 3 - 5% | 5 - 12% | LITTLE | MODERATELY ORGANIC | 5 - 10% | 12 - 20% | SOME | HIGHLY ORGANIC | >10% | >20% | HIGHLY | | | | 35% AND ABOVE | <p>WEATHERED ROCK (WR)</p> <p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>CRYSTALLINE ROCK (CR)</p> <p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p>NON-CRYSTALLINE ROCK (NCR)</p> <p>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP)</p> <p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p> <p>WEATHERING</p> <p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p>SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH, OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i></p> <p>VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE.</p> <p>ROCK HARDNESS</p> <p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p> <p>MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT, CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p> <p>VERY SOFT CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNAIL.</p> | |
| GENERAL CLASS. | GRANULAR MATERIALS (≤ 35% PASSING #200) | | | | | | | SILT-CLAY MATERIALS (> 35% PASSING #200) | | | | | | | ORGANIC MATERIALS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP CLASS. | A-1 | A-1-b | A-3 | A-2 | A-2-4 | A-2-5 | A-2-6 | A-2-7 | A-4 | A-5 | A-6 | A-7 | A-1, A-2 | A-3 | A-4, A-5 | A-6, A-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SYMBOL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| % PASSING | 50 MX | | | | | | | 40 MX | | | | | | | GRANULAR SOILS | | | SILT-CLAY SOILS | | | MUCK, PEAT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LIQUID LIMIT | 30 MX | | | | | | | 25 MX | | | | | | | 15 MX | | | 40 MN | | | 35 MN | | | 30 MN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLASTIC INDEX | 6 MX | | | | | | | NP | | | | | | | 4 MX | | | 8 MX | | | 12 MX | | | 16 MX | | | No MX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP INDEX | 0 | | | | | | | 0 | | | | | | | 0 | | | 4 MX | | | 8 MX | | | 12 MX | | | 16 MX | | | No MX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| USUAL TYPES OF MAJOR MATERIALS | STONE FRAGS, GRAVEL, AND SAND | | FINE SAND | | SILTY OR CLAYEY GRAVEL AND SAND | | | SILTY SOILS | | | CLAYEY SOILS | | | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER | | | HIGHLY ORGANIC SOILS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GEN. RATING AS A SUBGRADE | EXCELLENT TO GOOD | | | | | | | FAIR TO POOR | | | | | | | FAIR TO POOR | | | POOR | | | UNSATURABLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| ORGANIC MATERIAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TRACE OF ORGANIC MATTER | 2 - 3% | 3 - 5% | TRACE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MODERATELY ORGANIC | 5 - 10% | 12 - 20% | SOME | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | 35% AND ABOVE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>CONSISTENCY OR DENSENESS</p> <table border="1"> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td><4 4 TO 10 10 TO 30 30 TO 50 >50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td><2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30</td> <td><0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4</td> </tr> </table> | | PRIMARY SOIL TYPE | COMPACTNESS OR CONSISTENCY | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²) | GENERALLY GRANULAR MATERIAL (NON-COHESIVE) | VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE | <4 4 TO 10 10 TO 30 30 TO 50 >50 | N/A | GENERALLY SILT-CLAY MATERIAL (COHESIVE) | VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD | <2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30 | <0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4 | <p>MISCELLANEOUS SYMBOLS</p> <p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p>SOIL SYMBOL</p> <p>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p>INFERRED SOIL BOUNDARY</p> <p>INFERRED ROCK LINE</p> <p>ALLUVIAL SOIL BOUNDARY</p> <p>DIP & DIP DIRECTION OF ROCK STRUCTURES</p> <p>SOUNDING ROD</p> <p>SPT TEST BORING</p> <p>AUGER BORING</p> <p>CORE BORING</p> <p>MONITORING WELL</p> <p>PIEZOMETER INSTALLATION</p> <p>SLOPE INDICATOR INSTALLATION</p> <p>SPT N-VALUE</p> <p>SPT REFUSAL</p> | | <p>ABBREVIATIONS</p> <p>AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST ○ - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS</p> <p>HL - HIGHLY MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY F - FINE SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL</p> <p># - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED γ_w - UNIT WEIGHT γ_d - DRY UNIT WEIGHT</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PRIMARY SOIL TYPE | COMPACTNESS OR CONSISTENCY | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GENERALLY GRANULAR MATERIAL (NON-COHESIVE) | VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE | <4 4 TO 10 10 TO 30 30 TO 50 >50 | N/A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GENERALLY SILT-CLAY MATERIAL (COHESIVE) | VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD | <2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30 | <0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>TEXTURE OR GRAIN SIZE</p> <table border="1"> <tr> <th>U.S. STD. SIEVE SIZE</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <th>OPENING (MM)</th> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> </table> <table border="1"> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE, SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <td>GRAIN MM 305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> <td></td> </tr> <tr> <td>SIZE IN. 12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> | | U.S. STD. SIEVE SIZE | 4 | 10 | 40 | 60 | 200 | 270 | OPENING (MM) | 4.75 | 2.00 | 0.42 | 0.25 | 0.075 | 0.053 | BOULDER (BLDR.) | COBBLE (COB.) | GRAVEL (GR.) | COARSE SAND (CSE, SD.) | FINE SAND (F SD.) | SILT (SL.) | CLAY (CL.) | GRAIN MM 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005 | | SIZE IN. 12 | 3 | | | | | | <p>EQUIPMENT USED ON SUBJECT PROJECT</p> <p>DRILL UNITS:</p> <p>MOBILE B- _____</p> <p>BK-51 _____</p> <p>CME-45C _____</p> <p>CME-550 _____</p> <p>PORTABLE HOIST _____</p> <p>CME-55 _____</p> <p>ADVANCING TOOLS:</p> <p>CLAY BITS _____</p> <p>6" CONTINUOUS FLIGHT AUGER _____</p> <p>8" HOLLOW AUGERS _____</p> <p>HARD FACED FINGER BITS _____</p> <p>TUNG.-CARBIDE INSERTS _____</p> <p>CASING w/ ADVANCER _____</p> <p>TRICONE STEEL TEETH _____</p> <p>TRICONE TUNG.-CARB. _____</p> <p>CORE BIT _____</p> <p>HAMMER TYPE:</p> <p>AUTOMATIC _____</p> <p>MANUAL <input checked="" type="checkbox"/></p> <p>CORE SIZE:</p> <p>B _____</p> <p>N _____</p> <p>H _____</p> <p>HAND TOOLS:</p> <p>POST HOLE DIGGER _____</p> <p>HAND AUGER <input checked="" type="checkbox"/></p> <p>SOUNDING ROD _____</p> <p>VANE SHEAR TEST _____</p> | | <p>FRACTURE SPACING</p> <table border="1"> <tr> <th>TERM</th> <th>SPACING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </table> <p>BEDDING</p> <table border="1"> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table> <p>INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p> | | TERM | SPACING | VERY WIDE | MORE THAN 10 FEET | WIDE | 3 TO 10 FEET | MODERATELY CLOSE | 1 TO 3 FEET | CLOSE | 0.16 TO 1 FEET | VERY CLOSE | LESS THAN 0.16 FEET | TERM | THICKNESS | VERY THICKLY BEDDED | > 4 FEET | THICKLY BEDDED | 1.5 - 4 FEET | THINLY BEDDED | 0.16 - 1.5 FEET | VERY THINLY BEDDED | 0.03 - 0.16 FEET | THICKLY LAMINATED | 0.008 - 0.03 FEET | THINLY LAMINATED | < 0.008 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U.S. STD. SIEVE SIZE | 4 | 10 | 40 | 60 | 200 | 270 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OPENING (MM) | 4.75 | 2.00 | 0.42 | 0.25 | 0.075 | 0.053 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BOULDER (BLDR.) | COBBLE (COB.) | GRAVEL (GR.) | COARSE SAND (CSE, SD.) | FINE SAND (F SD.) | SILT (SL.) | CLAY (CL.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRAIN MM 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SIZE IN. 12 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TERM | SPACING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VERY WIDE | MORE THAN 10 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| WIDE | 3 TO 10 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MODERATELY CLOSE | 1 TO 3 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CLOSE | 0.16 TO 1 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VERY CLOSE | LESS THAN 0.16 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TERM | THICKNESS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VERY THICKLY BEDDED | > 4 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| THICKLY BEDDED | 1.5 - 4 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| THINLY BEDDED | 0.16 - 1.5 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VERY THINLY BEDDED | 0.03 - 0.16 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| THICKLY LAMINATED | 0.008 - 0.03 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| THINLY LAMINATED | < 0.008 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>SOIL MOISTURE - CORRELATION OF TERMS</p> <table border="1"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL</td> <td>Liquid Limit (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL</td> <td>Plastic Limit (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM</td> <td>Optimum Moisture (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL</td> <td>Shrinkage Limit (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table> | | SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION | LL | Liquid Limit (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | PL | Plastic Limit (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | OM | Optimum Moisture (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | SL | Shrinkage Limit (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | <p>PLASTICITY</p> <table border="1"> <tr> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td>NONPLASTIC 0-5</td> <td>VERY LOW</td> </tr> <tr> <td>LOW PLASTICITY 6-15</td> <td>SLIGHT</td> </tr> <tr> <td>MED. PLASTICITY 16-25</td> <td>MEDIUM</td> </tr> <tr> <td>HIGH PLASTICITY 26 OR MORE</td> <td>HIGH</td> </tr> </table> | | PLASTICITY INDEX (PI) | DRY STRENGTH | NONPLASTIC 0-5 | VERY LOW | LOW PLASTICITY 6-15 | SLIGHT | MED. PLASTICITY 16-25 | MEDIUM | HIGH PLASTICITY 26 OR MORE | HIGH | <p>COLOR</p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LL | Liquid Limit (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PL | Plastic Limit (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OM | Optimum Moisture (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SL | Shrinkage Limit (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLASTICITY INDEX (PI) | DRY STRENGTH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NONPLASTIC 0-5 | VERY LOW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOW PLASTICITY 6-15 | SLIGHT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MED. PLASTICITY 16-25 | MEDIUM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HIGH PLASTICITY 26 OR MORE | HIGH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>BENCH MARK:</p> <p>ELEVATION: _____ FT.</p> | | <p>NOTES:</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

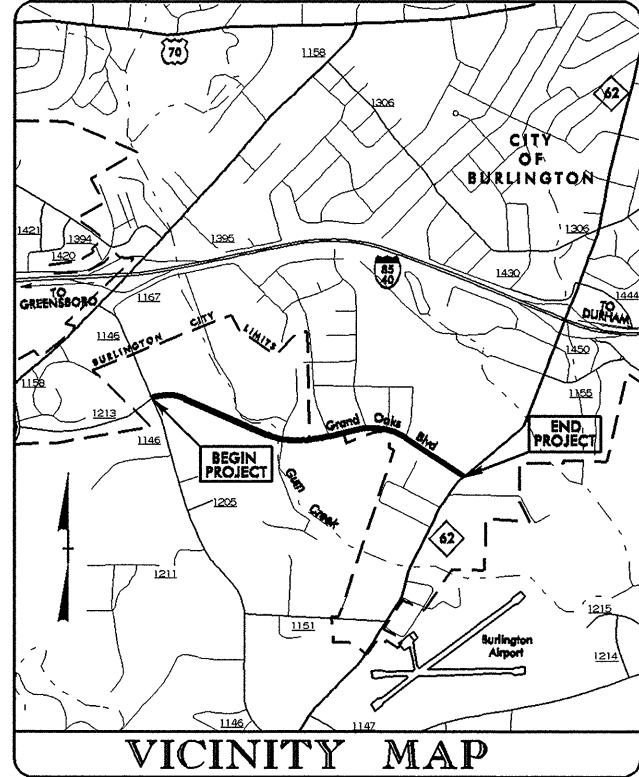
9/09/99

02-JAN-2007 10:03
 L:\LEAD\Projects\Information\TIP_U3304_GEO_RDMY_widening & new_location\CADD_GEO\TECH\Plan\Pr of U3304_r.dwg_inv_title sheet.dgn
 ksmiller At 06/22/08

TIP PROJECT: U-3304

CONTRACT:

See Sheet 1-A For Index of Sheets
 See Sheet 1-B For Conventional Symbols



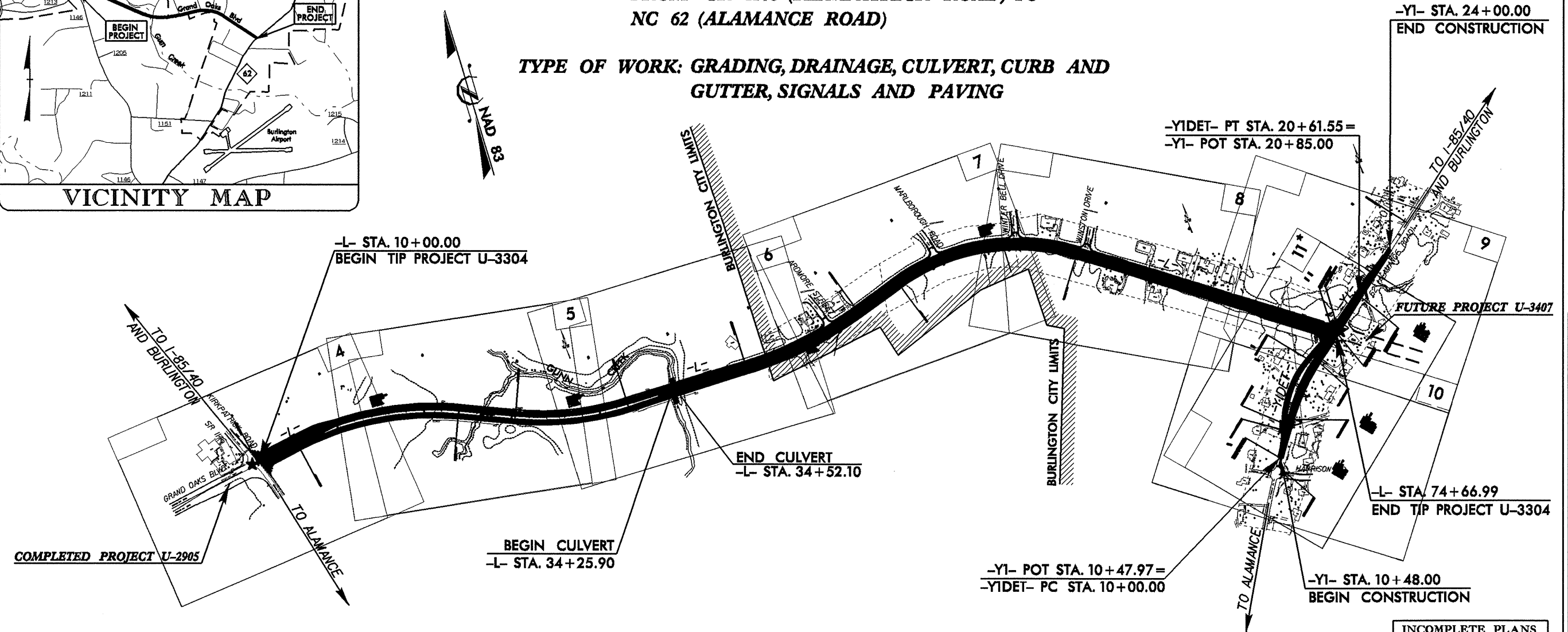
STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS
ALAMANCE COUNTY

**LOCATION: BURLINGTON - GRAND OAKS BLVD EXTENSION
 FROM SR 1146 (KIRKPATRICK ROAD) TO
 NC 62 (ALAMANCE ROAD)**

**TYPE OF WORK: GRADING, DRAINAGE, CULVERT, CURB AND
 GUTTER, SIGNALS AND PAVING**



| | | | |
|-----------------|-----------------------------|-------------|--------------|
| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
| N.C. | U-3304 | 2A | 27 |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| 34912.1.1 | STP-0701(8) | P.E. | |
| | | | |
| | | | |
| | | | |



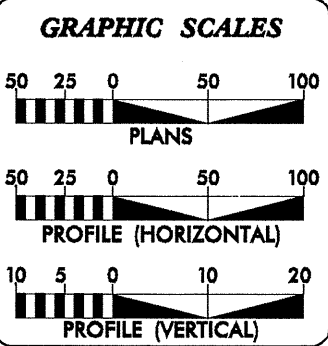
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

THIS PROJECT IS PARTIALLY WITHIN THE CITY OF BURLINGTON

★ PROPOSED SIGNAL

***NOTE: -YI- DETOUR SHOWN ON SHEET 11**

**INCOMPLETE PLANS
 DO NOT USE FOR R/W ACQUISITION
 PRELIMINARY PLANS
 DO NOT USE FOR CONSTRUCTION**



DESIGN DATA

| | |
|------------|----------|
| ADT 2001 = | 8,700 |
| ADT 2025 = | 21,800 |
| DHV = | 10 % |
| D = | 60 % |
| T = | 5 % * |
| V = | 50 MPH |
| * TTST 2 % | DUAL 3 % |

PROJECT LENGTH

| | |
|---------------------------------------|----------|
| LENGTH ROADWAY TIP PROJECT U-3304 = | 1.220 mi |
| LENGTH STRUCTURE TIP PROJECT U-3304 = | 0.005 mi |
| TOTAL LENGTH TIP PROJECT U-3304 = | 1.225 mi |

Prepared in the Office of:
DIVISION OF HIGHWAYS
 1000 Birch Ridge Dr., Raleigh, NC 27610

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
 APRIL 21, 2006

LETTING DATE:
 APRIL 15, 2008

JASON MOORE, PE
 PROJECT ENGINEER

KEVIN E. MOORE, PE
 PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

**DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA**

STATE DESIGN ENGINEER _____ P.E.

**DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION**

APPROVED DIVISION ADMINISTRATOR _____ DATE _____



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

January 2, 2007

STATE PROJECT: 34912.1.1 (U-3304)
FEDERAL PROJECT: STP-0701(8)
COUNTY: Alamance
DESCRIPTION: Burlington – Grand Oaks Blvd. Ext. from SR 1146 (Kirkpatrick Rd.) to NC 62 (Alamance Rd.)
SUBJECT: Geotechnical Report – Inventory

Project Description

This project consists of the widening of existing Grand Oaks Blvd. from two lanes to four lanes and extending Grand Oaks Blvd. on new location to Kirkpatrick Rd. The widening is asymmetrical along the right side of the existing roadway. Improvements to the intersection with NC 62 (-Y1-) are also included in this project. Traffic on NC 62 will be shifted to a detour alignment (-Y1DET-) during construction of the intersection.

The geotechnical field investigation was conducted during May 2006 utilizing a consultant drill crew. Borings were logged by NCDOT Geotechnical Engineering personnel. An ATV-mounted CME-55 drill machine with a manual hammer was used to perform most borings. Standard Penetration Tests were advanced using hollow stem augers at select locations. Additional borings along the alignment were advanced with continuous flight augers or a hand auger where access was limited. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

The following alignments, totaling 1.7 miles, were investigated:

| <u>Line</u> | <u>Station (±)</u> |
|-------------|--------------------|
| -L- | 10+00 to 74+67 |
| -Y1- | 10+48 to 24+00 |
| -Y1DET- | 10+00 to 20+62 |

Plan sheets and cross-sections of these alignments accompany this report.

Areas of Special Geotechnical Interest

- 1) Highly Plastic Clay Soils: Intervals containing highly plastic clay soils (plasticity indices of greater than 25) are noted below:

| <u>Line</u> | <u>Station (±)</u> |
|-------------|--------------------|
| -L- | 10+00 to 20+00 |
| -L- | 24+00 to 33+50 |
| -L- | 38+00 to 42+00 |
| -L- | 60+75 to 70+25 |
| -Y1- | 16+25 to 18+25 |
| -Y1DET- | 11+50 to 18+00 |

- 2) Crystalline Rock: Crystalline rock was encountered at the following stations:

| <u>Line</u> | <u>Station (±)</u> |
|-------------|--------------------|
| -L- | 24+00 to 32+00 |
| -L- | 33+50 to 40+00 |
| -L- | 44+50 to 45+75 |
| -L- | 60+75 to 61+25 |
| -L- | 70+00 to 72+00 |
| -Y1- | 18+50 to 19+50 |

(for further details see the discussion of Rock Properties below)

Physiography and Geology

The project is located in the Piedmont Physiographic Province of North Carolina. The project corridor is primarily composed of single family homes and wooded lots. The topography of the area is gently rolling with a maximum relief of nearly twenty feet at Gum Creek. Geologically, the project is located within the Carolina Slate Belt. Soils are derived from the in-place weathering of the underlying bedrock of metamorphosed granite/diorite and mafic volcanic rocks. Locally, these rock units tend to form alternating zones of weathered and crystalline rock across the project.

Soil Properties

Existing roadway embankments on the project are generally five feet or less in height. Existing embankment soils were not investigated.

Residual soils along the project corridor generally exhibit poor engineering qualities. These soils are typically red-orange to tan-brown, moist, medium stiff to hard, highly plastic, sandy and silty clay (A-6, A-7-6). Plasticity indices for these soils range from 26 to 43. Minor amounts of moist, medium stiff to hard, sandy silt (A-4) and moist, very dense, silty sand (A-2-4) are also present.

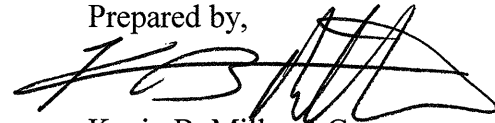
Rock Properties

Weathered rock and/or crystalline rock were encountered along the project as noted above. The weathered rock occurs at depths ranging from 12 to 15 feet, and consists of weathered metagranite, metadiorite and/or mafic volcanic rocks. Crystalline rock was encountered at depths ranging from 2.5 to 14 feet. The shallowest occurrences were near -L- stations 45+00 and 61+00.

Groundwater

Due to seasonally dry conditions at the time of the investigation, groundwater was only encountered in two borings along the project. The groundwater levels ranged between elevations 595 and 600 feet along -Y1- between stations 13+00 and 17+00. Groundwater levels are subject to seasonal changes and may be higher due to prevailing climatic conditions such as precipitation, temperature, and wind.

Prepared by,



Kevin B. Miller, LG
Project Geological Engineer

EARTHWORK BALANCE SHEET IN CUBIC YARDS

| LOCATION | UNCLASSIFIED EXCAVATION | ROCK EXCAVATION | UNDERCUT EXCAVATION | UNSUITABLE EARTH EXCAVATION | SUITABLE EARTH EXCAVATION | TOTAL EMB'T | EARTH EMBANKMENT | ROCK EMB'T | EMB'T + % 20 | BORROW | SELECT BORROW | ROCK WASTE | SUITABLE WASTE | UNSUITABLE WASTE | TOTAL WASTE |
|--|-------------------------|-----------------|---------------------|-----------------------------|---------------------------|-------------|------------------|------------|--------------|--------|---------------|------------|----------------|------------------|-------------|
| -L - 10+00.00 TO 23+50.00 | 10 | 0 | 200 | 15 | -5 | 45156 | 45156 | 0 | 54187 | 54192 | 0 | 0 | 0 | 215 | 215 |
| -L - 23+50.00 TO 34+50.00 | 165 | 0 | 1879 | 167 | -2 | 32458 | 32458 | 0 | 38950 | 38952 | 0 | 0 | 0 | 2046 | 2046 |
| -L - 34+50.00 TO 38+00.00 | 812 | 0 | 0 | 0 | 812 | 8524 | 8524 | 0 | 10229 | 9417 | 0 | 0 | 0 | 0 | 0 |
| -Y- 17+00.00 to 25+00.00 | 224 | 0 | 404 | 44 | 180 | 1033 | 1033 | 0 | 1240 | 1060 | 0 | 0 | 0 | 448 | 448 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SUBTOTALS NO 1 | 1211 | 0 | 2483 | 226 | 985 | 87171 | 87171 | 0 | 104606 | 103621 | 0 | 0 | 0 | 2709 | 2709 |
| -L- 38+00.00 TO 68+00.00 (LT.) | 3250 | 0 | 0 | 24 | 3226 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3226 | 24 | 3250 |
| -L- 38+00.00 TO 68+00.00 (RT.) | 7927 | 24 | 1070 | 1375 | 6528 | 1303 | 1279 | 24 | 1559 | 0 | 0 | 0 | 4993 | 2445 | 7438 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SUBTOTALS NO 2 | 11177 | 24 | 1070 | 1399 | 9754 | 1303 | 1279 | 24 | 1559 | 0 | 0 | 0 | 8219 | 2469 | 10688 |
| -L- 68+00.00 TO 74+00.00 (LT.) | 1098 | 0 | 0 | 0 | 1098 | 15 | 15 | 0 | 18 | 0 | 0 | 0 | 1080 | 0 | 1080 |
| -L- 68+00.00 TO 74+00.00 (RT.) | 3074 | 0 | 321 | 521 | 2553 | 336 | 336 | 0 | 403 | 0 | 0 | 0 | 2150 | 842 | 2992 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SUBTOTAL NO 3 | 4172 | 0 | 321 | 521 | 3651 | 351 | 351 | 0 | 421 | 0 | 0 | 0 | 3230 | 842 | 4072 |
| -Y1 DET- 10+50.00 TO 21+00.00 | 2013 | 0 | 0 | 300 | 1713 | 25 | 25 | 0 | 30 | 0 | 0 | 0 | 1683 | 300 | 1983 |
| -Y1- 10+00.00 TO 18+50.00 | 3205 | 0 | 227 | 672 | 2533 | 277 | 277 | 0 | 332 | 0 | 0 | 0 | 2201 | 899 | 3100 |
| -Y1- 18+50.00 TO 24+50.00 LT | 372 | 0 | 0 | 0 | 372 | 107 | 107 | 0 | 128 | 0 | 0 | 0 | 244 | 0 | 244 |
| -Y1- 18+50.00 TO 24+50.00 RT | 46 | 0 | 0 | 0 | 46 | 694 | 694 | 0 | 833 | 787 | 0 | 0 | 0 | 0 | 0 |
| -Y1DET- REMOVAL- 10+00 TO 18+50 | 982 | 0 | 184 | 198 | 784 | 853 | 853 | 0 | 1024 | 240 | 0 | 0 | 0 | 382 | 382 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SUBTOTAL NO 4 | 6618 | 0 | 411 | 1170 | 5448 | 1956 | 1956 | 0 | 2347 | 1027 | 0 | 0 | 4128 | 1581 | 5709 |
| PROJECT SUBTOTALS | 23178 | 24 | 4285 | 3316 | 19838 | 90781 | 90757 | 24 | 108933 | 104648 | 0 | 0 | 15577 | 7601 | 23178 |
| LOSS DUE TO CLEAR. & GRUB | -400 | | | | -400 | | | | | 400 | | | 0 | | 0 |
| ADDITIONAL UNDERCUT EXCAV. EST. FOR DRIVEWAYS | 0 | | 3250 | 0 | 0 | 3250 | 3250 | 0 | 3900 | 3900 | 0 | | 0 | 3250 | 3250 |
| EST. FOR PAV'T REMOVAL | | | | | | 0 | 0 | 0 | 0 | 0 | | | | | 0 |
| ROCK TO REPLACE BORROW | | | | | | | 0 | 0 | 0 | 0 | | 0 | | | 0 |
| ADJUST FOR ROCK WASTE | | | | | | | | | 0 | 0 | | | | | |
| WASTE IN LIEU OF BORROW | | | | | | | | | | -15577 | | | -15577 | | -15577 |
| SHOULDER CONSTRUCTION | | | | | | | 1000 | | 1000 | | | | | | |
| LESS SELECT GRANURAL MAT'L | | | | | | | | | | -7000 | | | | | |
| LESS CLASS IV SUBGRADE STAB. MAT'L | 0 | | | | | -2517 | -2517 | | -3021 | -3021 | | | | | |
| PROJECT TOTALS | 22778 | 24 | 7535 | 3316 | 19438 | 91514 | 92490 | 24 | 110812 | 84350 | 0 | 0 | 0 | 10851 | 10851 |
| REPLACE TOP SOIL BOR. PITS | | | | | | | | | | 4218 | | | | | |
| GRAND TOTALS | 22778 | | 7535 | | | | | | | 88568 | 0 | | | | |
| SAY | 22800 | | 7600 | | | | | | | 88600 | 0 | | | | |

| | | |
|---------------------------------|--------|-------------|
| PAVEMENT STRUCTURE VOLUME : | 11,159 | CUBIC YARDS |
| DRAINAGE DITCH EXCAVATION : | 80 | CUBIC YARDS |
| SHOULDER BORROW: | 0 | CUBIC YARDS |
| UNDERCUT EXCAVATION | 0 | CUBIC YARDS |
| CLASS IV SUBGRADE STABILIZATION | 5750 | TONS |

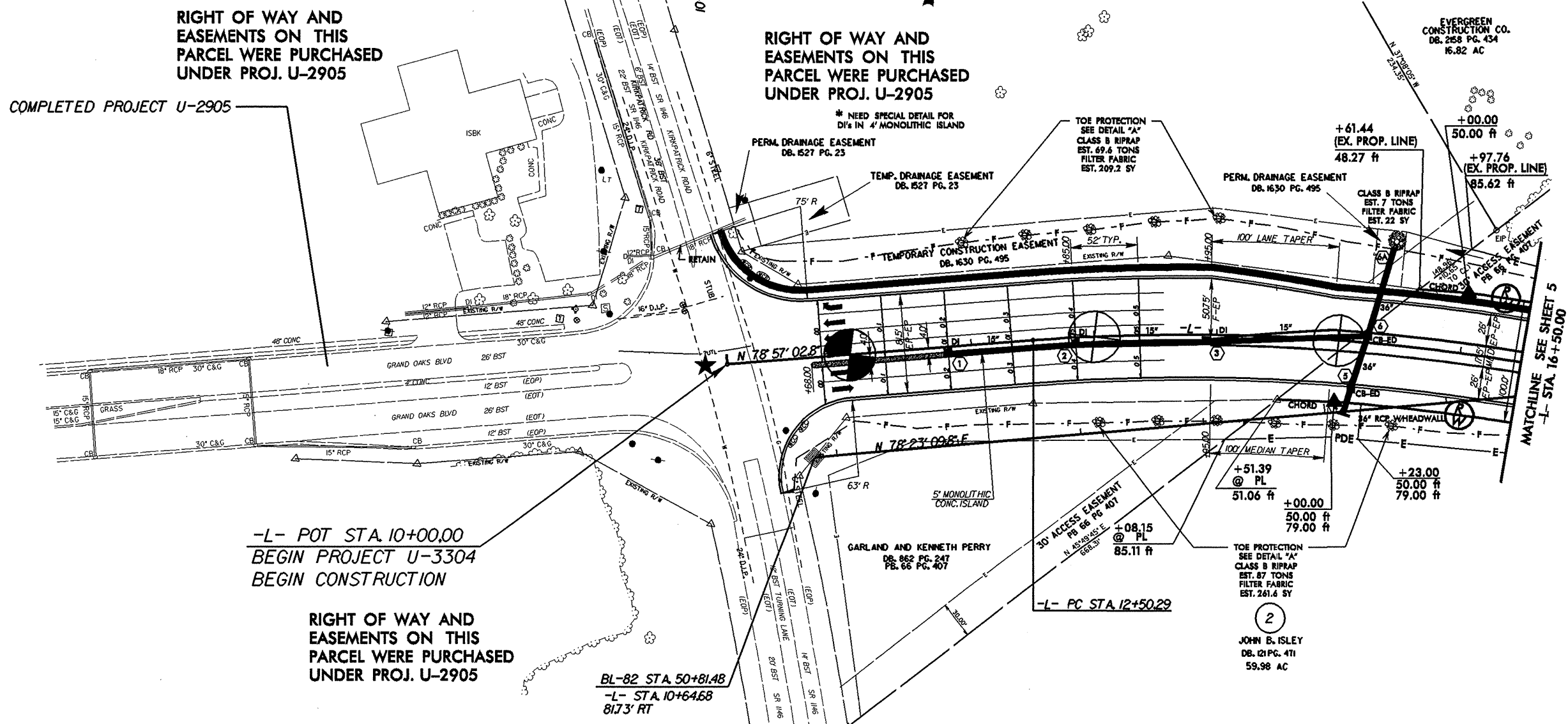
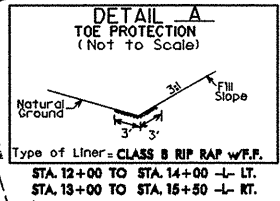
(Contingency Item)
(Backfill Material To Replace Shallow Undercut Excavation)

EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

7/2/99

REVISIONS

| | |
|---|-----------------------|
| PROJECT REFERENCE NO. U-3304 | SHEET NO. 4 |
| R/W SHEET NO. 4 | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION | |
| PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |



RIGHT OF WAY AND EASEMENTS ON THIS PARCEL WERE PURCHASED UNDER PROJ. U-2905

RIGHT OF WAY AND EASEMENTS ON THIS PARCEL WERE PURCHASED UNDER PROJ. U-2905

-L- POT STA. 10+00.00
BEGIN PROJECT U-3304
BEGIN CONSTRUCTION

RIGHT OF WAY AND EASEMENTS ON THIS PARCEL WERE PURCHASED UNDER PROJ. U-2905

BL-82 STA. 50+81.48
-L- STA. 10+64.68
81.73' RT

-L- PC STA. 12+50.29

| AVERAGE DAILY TRAFFIC | | 2001 | | 2025 | |
|-----------------------|-------|-----------------|--------|------|--|
| | | 8,300 | 14,800 | | |
| 11,300 | 100 | 800 | 8700 | | |
| 28,400 | 200 | 2,000 | 21,800 | | |
| PROJECT U-2905 | 3,400 | 100 | | | |
| | 8,500 | 100 | | | |
| | | 10,900 | 21,200 | | |
| | | KIRKPATRICK RD. | | | |

-L-
PI Sta 17+35.58
 $\Delta = 33' 01'' 29.4'' (RT)$
 $D = 3' 30'' 00.2''$
 $L = 943.55'$
 $T = 485.29'$
 $R = 1637.00'$
 $V = 50 \text{ mph}$
 $RO = 260'$

08-NOV-2006 09:56 L:\EROV\roaleigh_investigation\TIP\U3304_GEO_RDWY_widening & new location\CADD_GEO\TECH\Plan\Prof\U3304_geo_inv_psh_4.dgn kmiller AT 06/22/1488

BARBARA S. THOMPSON
(FORMERLY BARBARA S. ISLEY)
DB. 409 PG. 34

★ PROPOSED SIGNAL

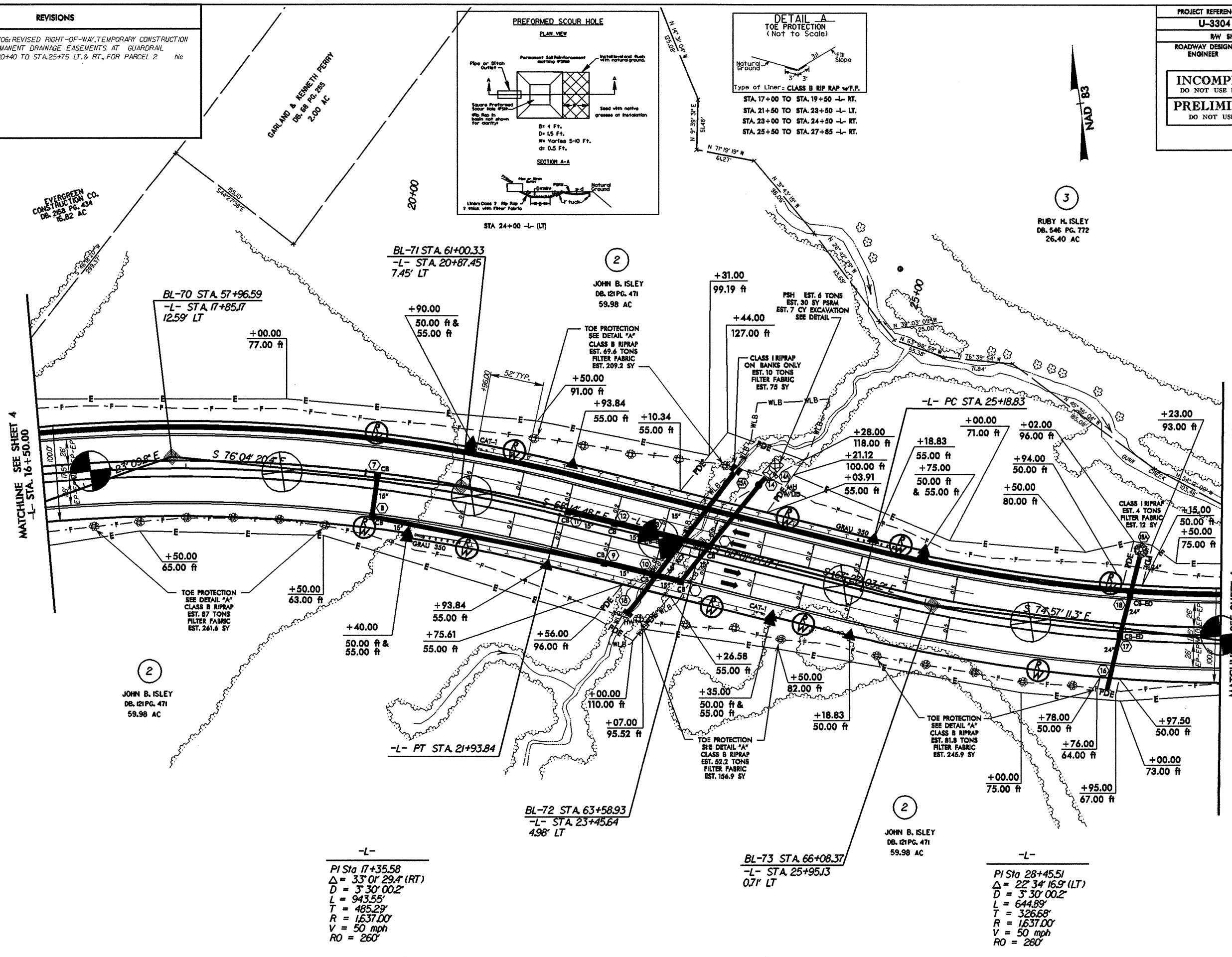
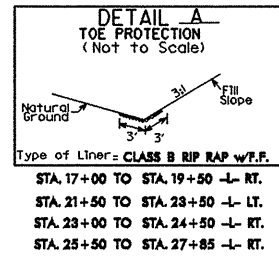
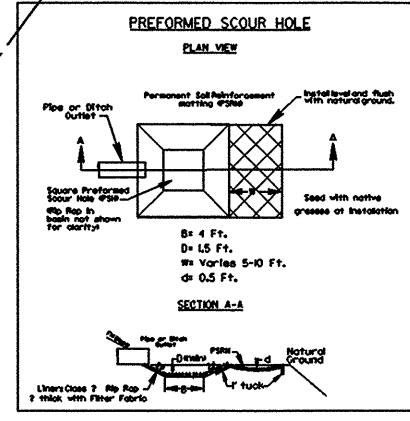
FOR -L- PROFILE SEE SHEET 12

7/2/99
 08-NOV-2006 09:56
 L:\ERON\Rail\proj\11\03304_GED_RDWY_widening & new location\CADD_GEO\TECH\Plan\Prof\03304_geo_inv_psh_5.dgn
 Remiller - AT 05/22/1408

REVISIONS

R/W REVISION 6/6/06; REVISED RIGHT-OF-WAY, TEMPORARY CONSTRUCTION EASEMENTS & PERMANENT DRAINAGE EASEMENTS AT GUARDRAIL LOCATION, -L- STA. 20+40 TO STA. 25+75 LT. & RT., FOR PARCEL 2

| | |
|---|---------------------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-3304 | 5 |
| R/W SHEET NO. | 5 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION | |
| PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |



-L-
 PI Sta 17+35.58
 $\Delta = 33^{\circ} 01' 29.4$ (RT)
 $D = 3^{\circ} 30' 00.2$
 $L = 943.55'$
 $T = 485.29'$
 $R = 1637.00'$
 $V = 50$ mph
 $RO = 260'$

-L-
 PI Sta 28+45.51
 $\Delta = 22^{\circ} 34' 16.9$ (LT)
 $D = 3^{\circ} 30' 00.2$
 $L = 644.89'$
 $T = 326.68'$
 $R = 1637.00'$
 $V = 50$ mph
 $RO = 260'$

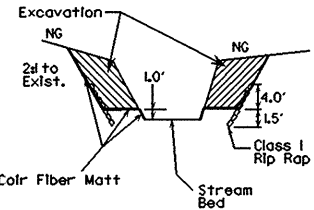
FOR -L- PROFILE SEE SHEET 12

7/2/99
 21-MAR-2007 08:39
 I:\Vero\raleigh\proj\3304\location\cadd\geotech\planprof\3304_geo_rnv_psh_6.dgn
 KMiller At 05/22/1408

REVISIONS

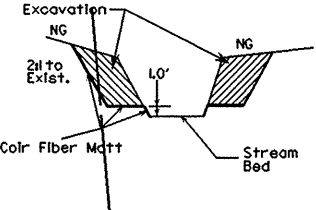
R/W REVISION 6/6/06; REVISED RIGHT-OF-WAY & TEMPORARY CONSTRUCTION EASEMENTS AT GUARDRAIL LOCATION, -L- STA. 32+05 TO STA. 37+6493 LT. & RT. FOR PARCEL 2 & 4 No

Outlet Channel Bench Detail B (Not to Scale)



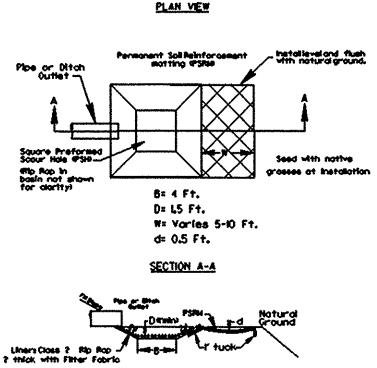
STA 34+40 -L- (RT)

Inlet Channel Bench Detail C (Not to Scale)



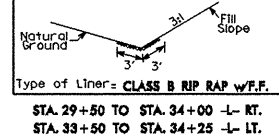
STA 34+55 -L- (LT)

PREFORMED SCOUR HOLE



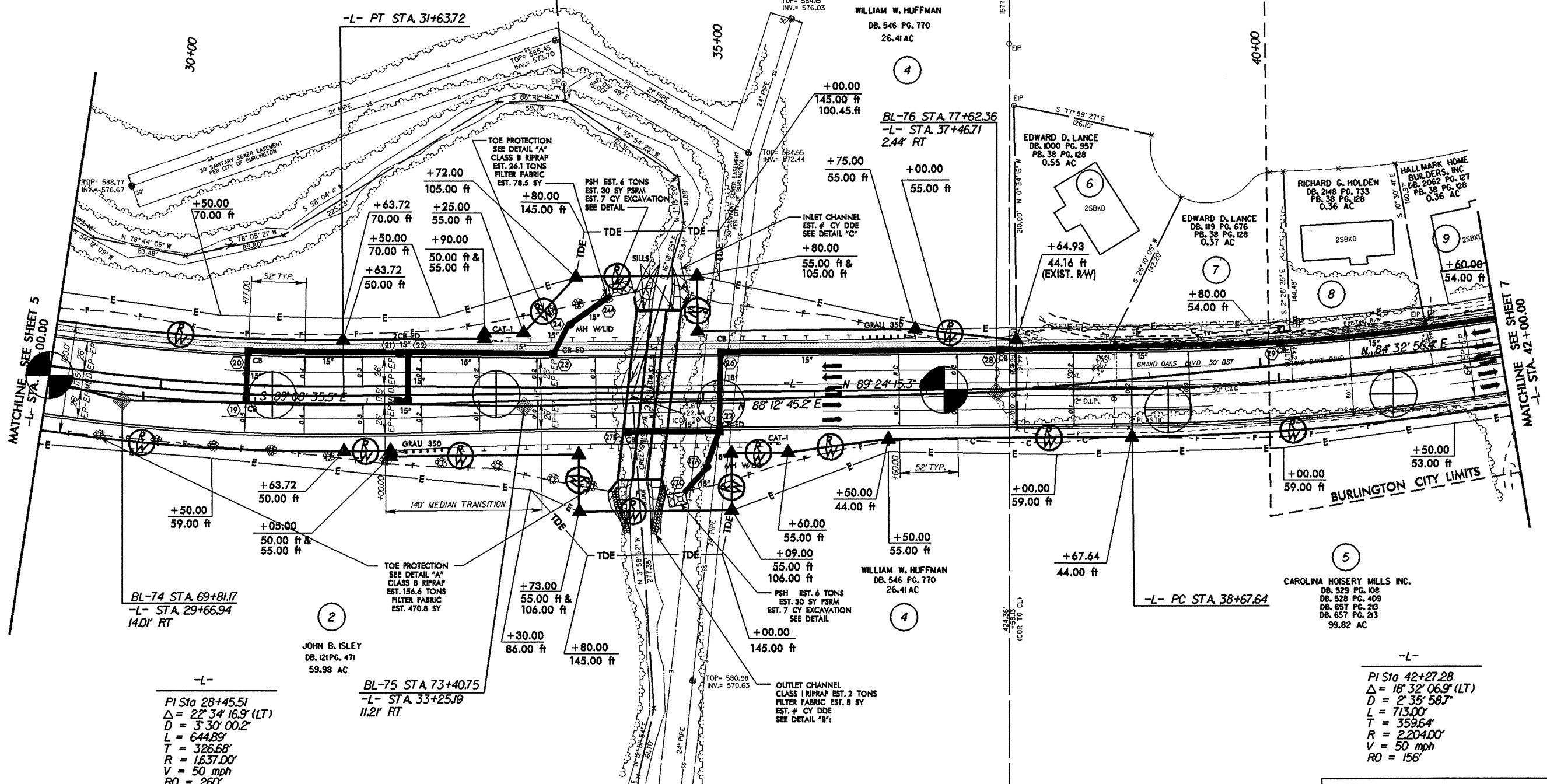
STA 34+07 -L- (LT)
 STA 34+63 -L- (RT)

DETAIL A TOE PROTECTION (Not to Scale)



STA. 29+50 TO STA. 34+00 -L- RT.
 STA. 33+50 TO STA. 34+25 -L- LT.

| | |
|---|-----------------------|
| PROJECT REFERENCE NO. U-3304 | SHEET NO. 6 |
| R/W SHEET NO. 6 | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION | |
| PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |



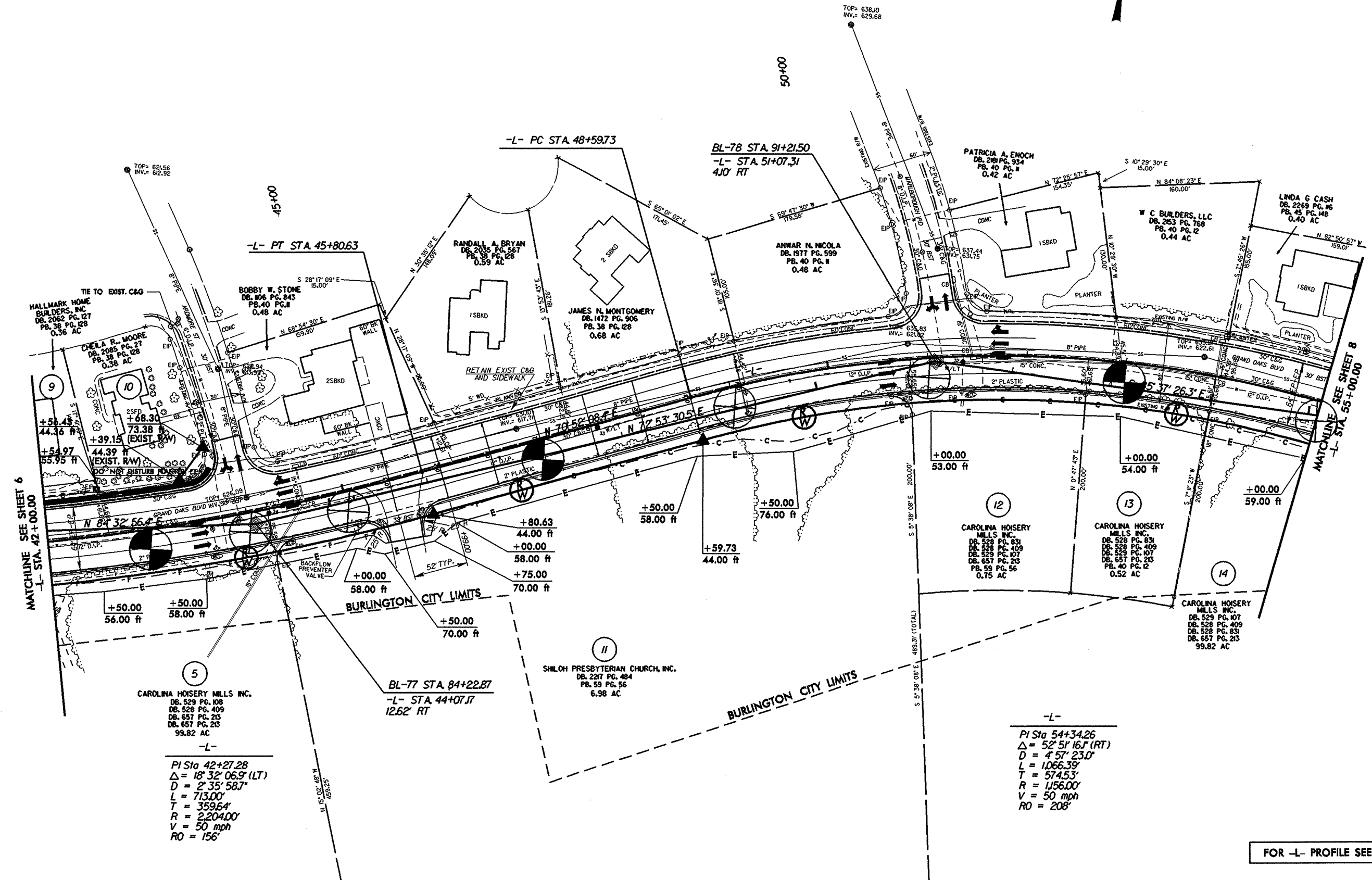
-L-
 PI Sta 42+27.28
 $\Delta = 18' 32" 06.9" (LT)$
 $D = 2' 35" 58.7"$
 $L = 713.00'$
 $T = 359.64'$
 $R = 2,204.00'$
 $V = 50 \text{ mph}$
 $RO = 156'$

FOR -L- PROFILE SEE SHEETS 12 & 13

7/2/99
 08-NOV-2006 09:57
 L:\NEO\RA\raigh\investigation\TIP-U3304-CEO-RDMY_widening & new location\CADD_GEO\TECH\Plan\Prof\U3304_GEO_INV_psh_7.dgn
 KMiller At 06:32:21408

REVISIONS

| | |
|--------------------------------|---------------------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-3304 | 7 |
| R/W SHEET NO. | 7 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS | |
| DO NOT USE FOR R/W ACQUISITION | |
| PRELIMINARY PLANS | |
| DO NOT USE FOR CONSTRUCTION | |



MATCHLINE SEE SHEET 6
 -L- STA. 42+00.00

MATCHLINE SEE SHEET 8
 -L- STA. 55+00.00

-L-
 PI Sta 42+27.28
 $\Delta = 18^{\circ} 32' 06.9" (LT)$
 $D = 2^{\circ} 35' 58.7"$
 $L = 713.00'$
 $T = 359.64'$
 $R = 2,204.00'$
 $V = 50 \text{ mph}$
 $RO = 156'$

-L-
 PI Sta 54+34.26
 $\Delta = 52^{\circ} 51' 16.1" (RT)$
 $D = 4^{\circ} 57' 23.0"$
 $L = 1,066.39'$
 $T = 574.53'$
 $R = 1,156.00'$
 $V = 50 \text{ mph}$
 $RO = 208'$

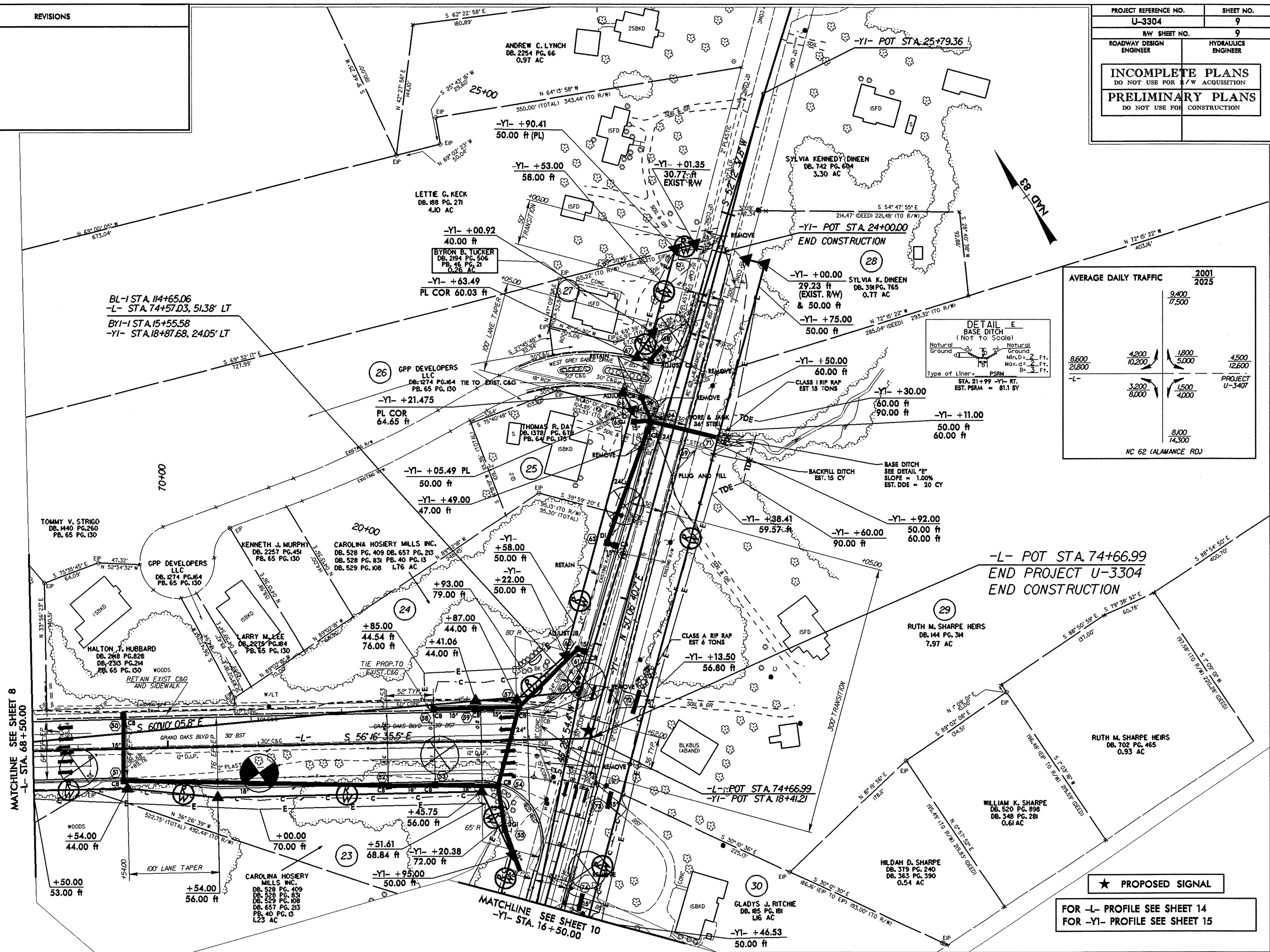
FOR -L- PROFILE SEE SHEET 13

7/2/99

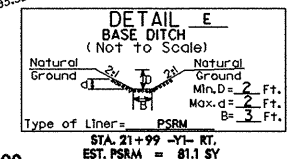
| REVISIONS | |
|-----------|--|
| | |
| | |
| | |

| | |
|---|---------------------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-3304 | 9 |
| R/W SHEET NO. | 9 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION | |
| PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |

21-MAR-2007 08:37 I:\projects\gis\project\p\3304\geo_rdwj-widening & new location\cadd\geotech\planprof\3304-geo-inv-psh-9.dgn kbml11e



| AVERAGE DAILY TRAFFIC | | 2001 | 2025 |
|-----------------------|--------|-------|----------------|
| | | 9,400 | 17,500 |
| 8,600 | 4,200 | 1,800 | 4,500 |
| 21,800 | 10,200 | 5,000 | 12,600 |
| -L- | 3,200 | 1,500 | PROJECT U-3407 |
| | 8,000 | 4,000 | |
| | | 8,100 | 14,300 |
| NC 62 (ALAMANCE RD) | | | |



MATCHLINE SEE SHEET 8
-L- STA. 68+50.00

MATCHLINE SEE SHEET 10
-YI- STA. 16+50.00

★ PROPOSED SIGNAL

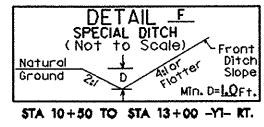
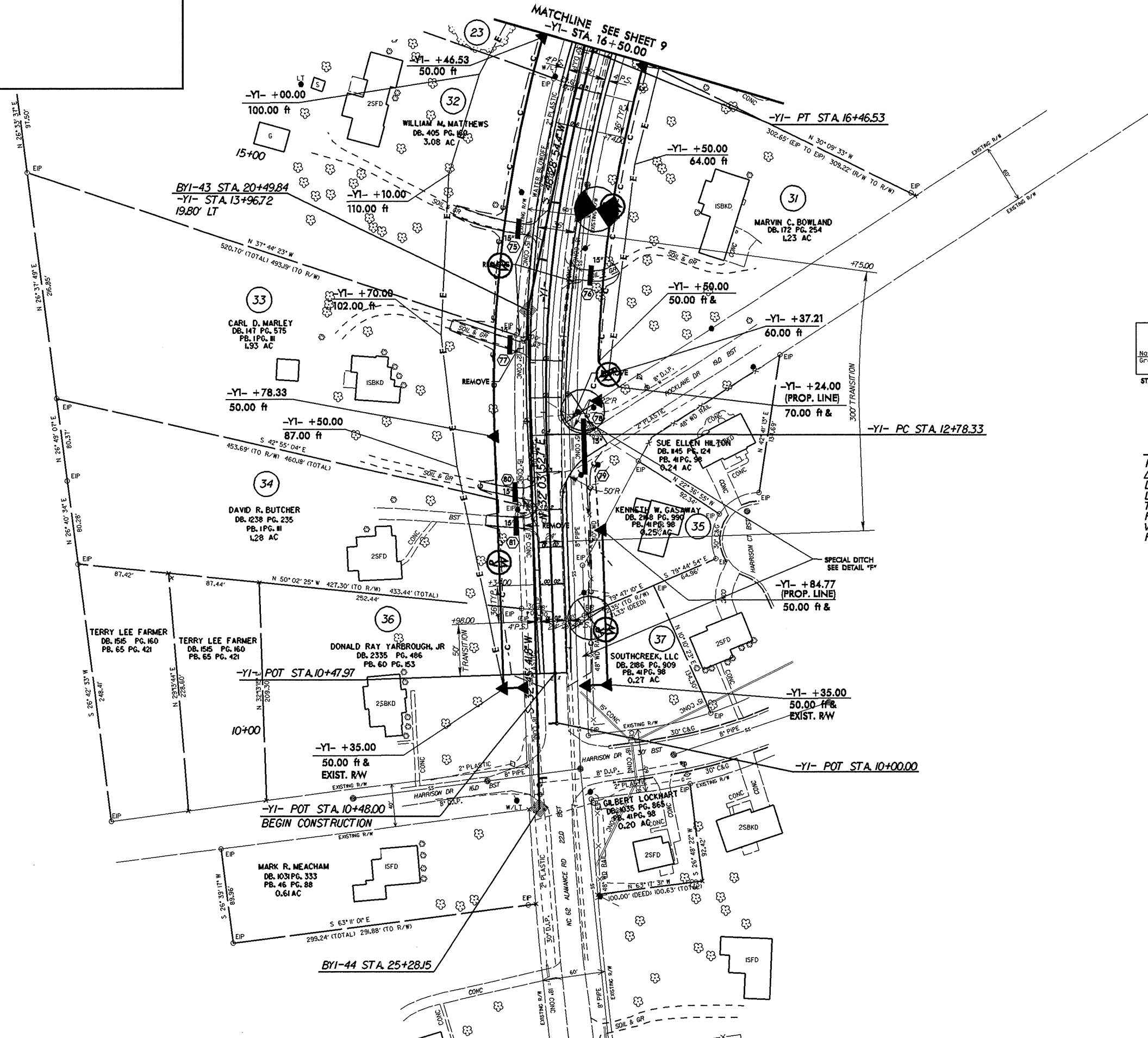
FOR -L- PROFILE SEE SHEET 14
FOR -YI- PROFILE SEE SHEET 15

7/2/99

21-MAR-2007 08:41
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 Miller

| REVISIONS | |
|-----------|--|
| | |
| | |

| | |
|---|---------------------|
| PROJECT REFERENCE NO. U-3304 | SHEET NO. 10 |
| R/W SHEET NO. 10 | HYDRAULICS ENGINEER |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION | |
| PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |



STA 10+50 TO STA 13+00 -YI- RT.
 -YI-
 PI Sta 14+63.97
 Δ = 18° 02' 48.0" (RT)
 D = 4' 5.4" 0.46"
 L = 368.20'
 T = 185.64'
 R = 1,169.00'
 V = 50 mph
 RO = 216'

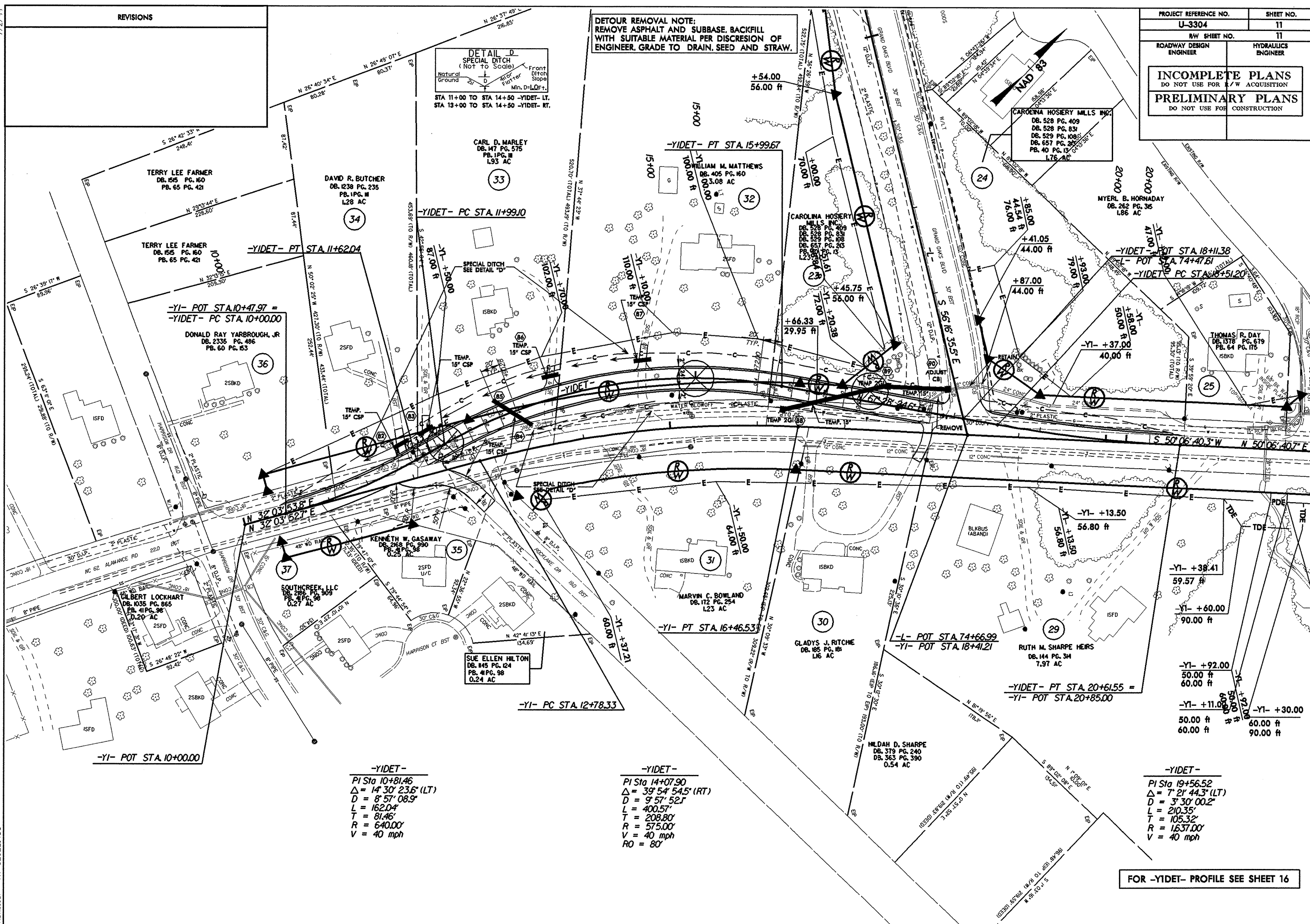
FOR -YI- PROFILE SEE SHEET 15

7/2/99

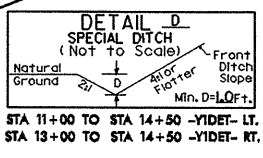
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kbm\lter

REVISIONS

| | |
|--------------------------------|---------------------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-3304 | 11 |
| R/W SHEET NO. | |
| 11 | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| | |
| INCOMPLETE PLANS | |
| DO NOT USE FOR A/W ACQUISITION | |
| PRELIMINARY PLANS | |
| DO NOT USE FOR CONSTRUCTION | |



DETOUR REMOVAL NOTE:
REMOVE ASPHALT AND SUBBASE. BACKFILL WITH SUITABLE MATERIAL PER DISCRETION OF ENGINEER. GRADE TO DRAIN, SEED AND STRAW.



CARL D. MARLEY
DB. 147 PG. 575
PB. 1 PG. 11
L93 AC

DAVID R. BUTCHER
DB. 1238 PG. 235
PB. 1 PG. 11
L28 AC

TERRY LEE FARMER
DB. 1545 PG. 421
PB. 65 PG. 421

TERRY LEE FARMER
DB. 1545 PG. 421
PB. 65 PG. 421

DONALD RAY YARBROUGH, JR.
DB. 2335 PG. 486
PB. 60 PG. 153

KENNETH W. GASAWAY
DB. 268 PG. 990
PB. 4 PG. 98
0.25 AC

MARVIN C. BOWLAND
DB. 172 PG. 254
L23 AC

SUE ELLEN HILTON
DB. 145 PG. 124
PB. 4 PG. 98
0.24 AC

GLADYS J. RITCHE
DB. 185 PG. 181
L16 AC

RUTH M. SHARPE HEIRS
DB. 144 PG. 314
7.97 AC

HILDAH D. SHARPE
DB. 379 PG. 240
DB. 363 PG. 390
0.54 AC

CAROLINA HOSEY MILLS INC.
DB. 528 PG. 409
DB. 528 PG. 831
DB. 529 PG. 108
DB. 657 PG. 24
PB. 40 PG. 13
L76 AC

MYREL B. HORNADAY
DB. 262 PG. 38
L86 AC

THOMAS R. DAY
DB. 1378 PG. 679
PB. 64 PG. 175

-YIDET-
PI Sta 10+81.46
Δ = 14° 30' 23.6" (LT)
D = 8' 57" 08.9"
L = 162.04'
T = 81.46'
R = 640.00'
V = 40 mph

-YIDET-
PI Sta 14+07.90
Δ = 39° 54' 54.3" (RT)
D = 9' 57" 52.1"
L = 400.57'
T = 208.80'
R = 575.00'
V = 40 mph
RO = 80'

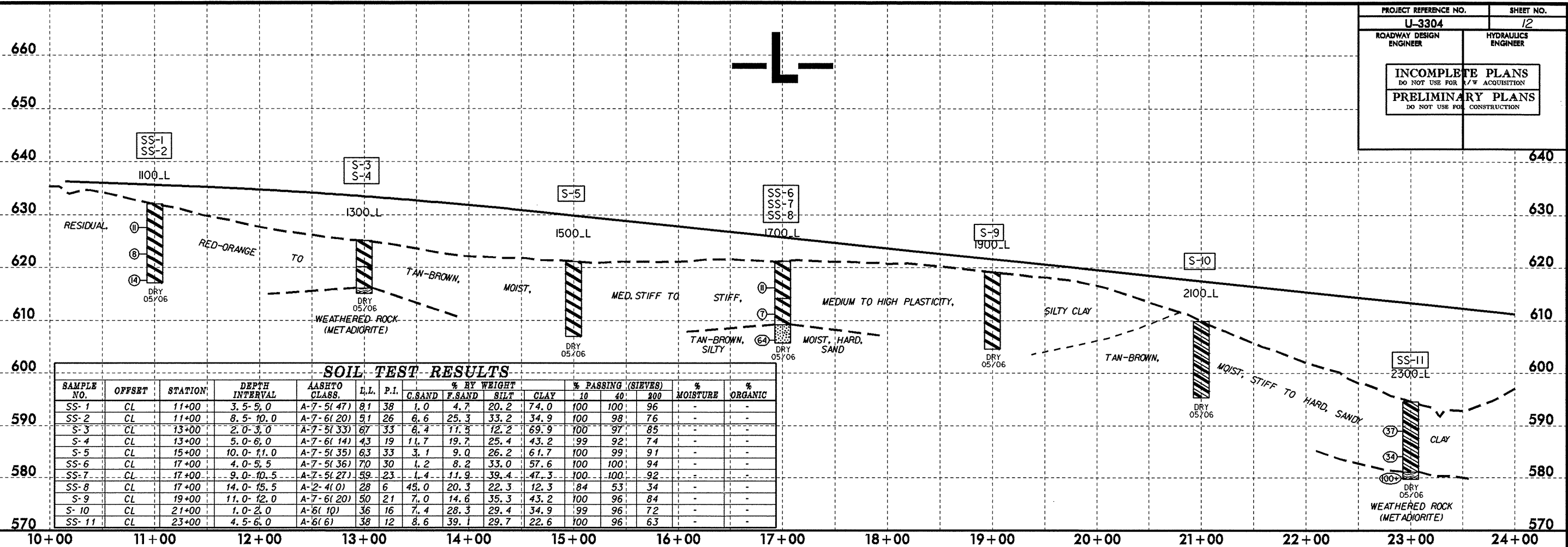
-YIDET-
PI Sta 19+56.52
Δ = 7° 21' 44.3" (LT)
D = 3' 30" 00.2"
L = 210.35'
T = 105.32'
R = 1637.00'
V = 40 mph

FOR -YIDET- PROFILE SEE SHEET 16

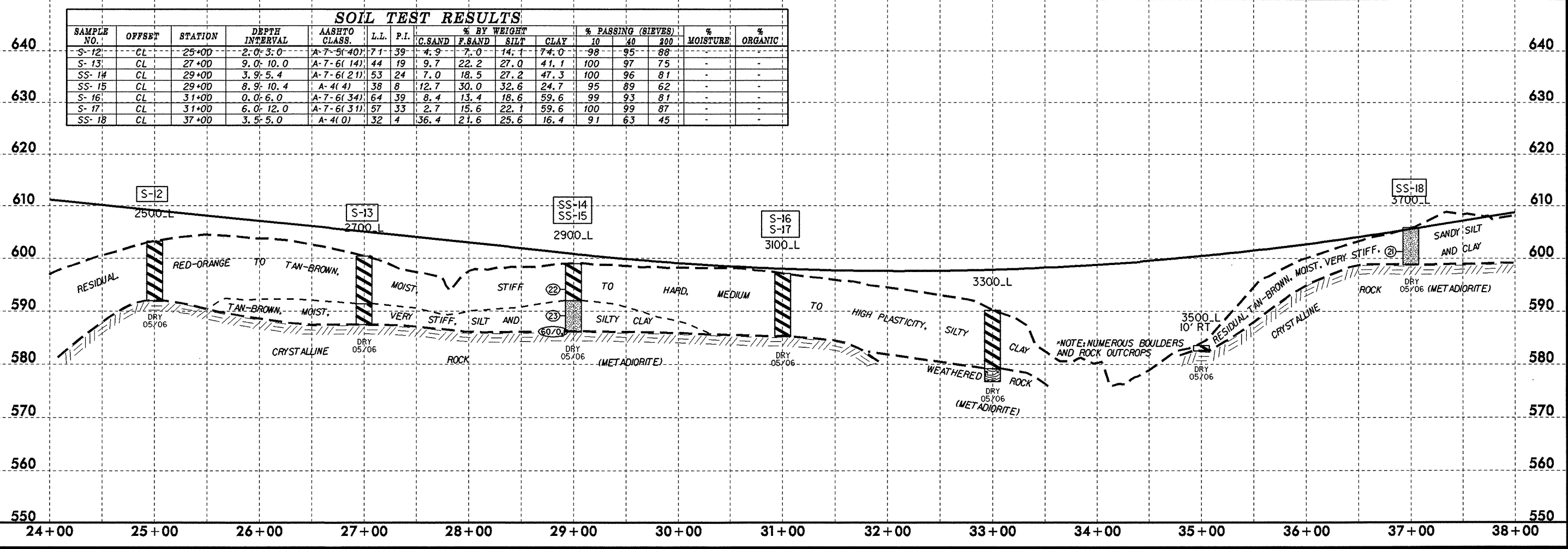
5/28/99

29-MAR-2007 14:15 Investigation\p\3304_geo_rdwj_wdmgm & new_location\cadd_geotech\planproj\3304_geo_pf1.dgn

| | |
|--|------------------------|
| PROJECT REFERENCE NO. U-3304 | SHEET NO. 12 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |



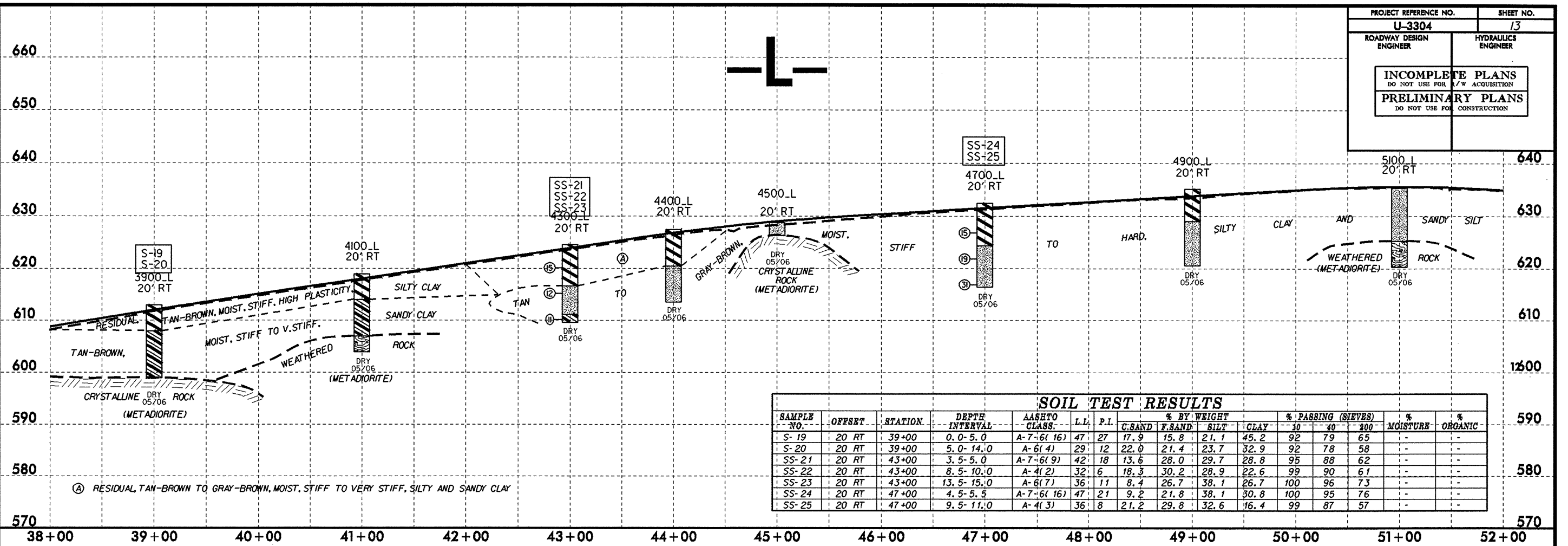
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|-----|-----|------------|-----------|
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | 10 | 40 | 200 | | |
| SS-1 | CL | 11+00 | 3.5-5.0 | A-7-5(47) | 81 | 38 | 1.0 | 4.7 | 20.2 | 74.0 | 100 | 100 | 96 | - | - |
| SS-2 | CL | 11+00 | 8.5-10.0 | A-7-6(20) | 51 | 26 | 6.6 | 25.3 | 33.2 | 34.9 | 100 | 98 | 76 | - | - |
| S-3 | CL | 13+00 | 2.0-3.0 | A-7-5(33) | 67 | 33 | 6.4 | 11.5 | 12.2 | 69.9 | 100 | 97 | 85 | - | - |
| S-4 | CL | 13+00 | 5.0-8.0 | A-7-6(14) | 43 | 19 | 11.7 | 19.7 | 25.4 | 43.2 | 99 | 92 | 74 | - | - |
| S-5 | CL | 15+00 | 10.0-11.0 | A-7-5(35) | 63 | 33 | 3.1 | 9.0 | 26.2 | 61.7 | 100 | 99 | 91 | - | - |
| SS-6 | CL | 17+00 | 4.0-5.5 | A-7-5(36) | 70 | 30 | 1.2 | 8.2 | 33.0 | 57.6 | 100 | 100 | 94 | - | - |
| SS-7 | CL | 17+00 | 9.0-10.5 | A-7-5(27) | 59 | 23 | 1.4 | 11.9 | 39.4 | 47.3 | 100 | 100 | 92 | - | - |
| SS-8 | CL | 17+00 | 14.0-15.5 | A-2-4(0) | 28 | 6 | 45.0 | 20.3 | 22.3 | 12.3 | 84 | 53 | 34 | - | - |
| S-9 | CL | 19+00 | 11.0-12.0 | A-7-6(20) | 50 | 21 | 7.0 | 14.6 | 35.3 | 43.2 | 100 | 96 | 84 | - | - |
| S-10 | CL | 21+00 | 1.0-2.0 | A-6(10) | 36 | 16 | 7.4 | 28.3 | 29.4 | 34.9 | 99 | 96 | 72 | - | - |
| SS-11 | CL | 23+00 | 4.5-6.0 | A-6(6) | 38 | 12 | 8.6 | 39.1 | 29.7 | 22.6 | 100 | 96 | 63 | - | - |



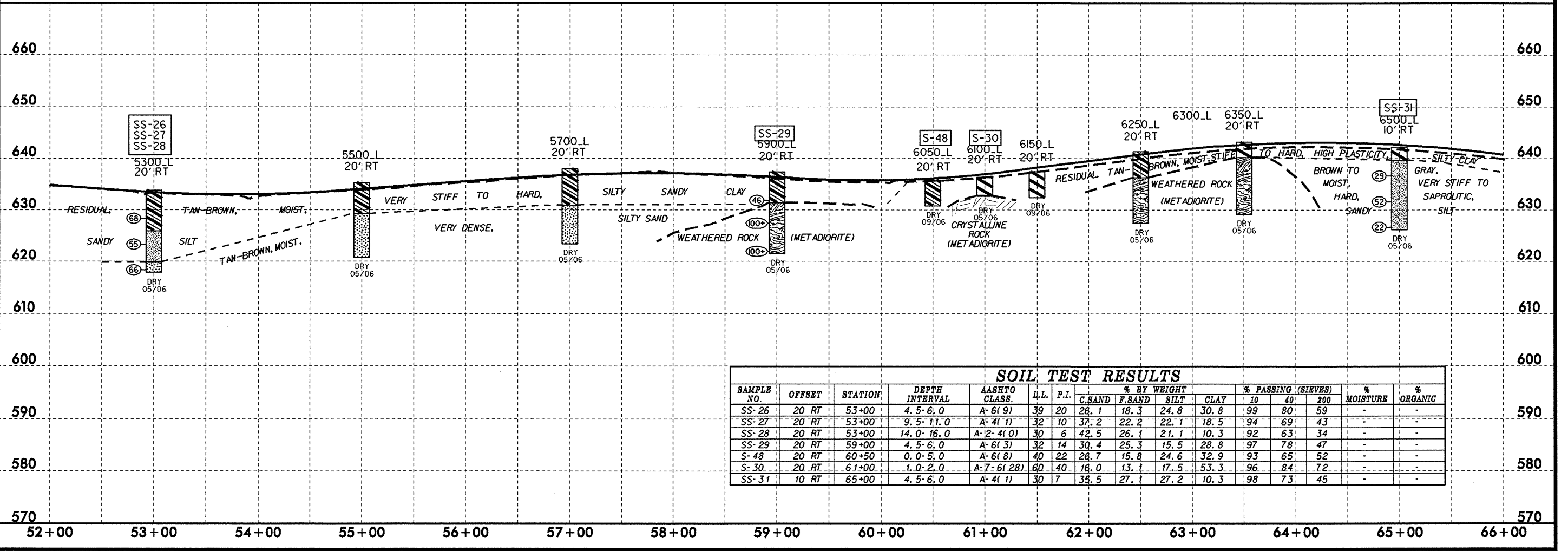
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | 10 | 40 | 200 | | |
| S-12 | CL | 25+00 | 2.0-3.0 | A-7-5(40) | 71 | 39 | 4.9 | 7.0 | 14.1 | 74.0 | 98 | 95 | 88 | - | - |
| S-13 | CL | 27+00 | 9.0-10.0 | A-7-6(14) | 44 | 19 | 9.7 | 22.2 | 27.0 | 41.1 | 100 | 97 | 75 | - | - |
| SS-14 | CL | 29+00 | 3.9-5.4 | A-7-6(21) | 53 | 24 | 7.0 | 18.5 | 27.2 | 47.3 | 100 | 96 | 81 | - | - |
| SS-15 | CL | 29+00 | 8.9-10.4 | A-4(4) | 38 | 8 | 12.7 | 30.0 | 32.6 | 24.7 | 95 | 89 | 62 | - | - |
| S-16 | CL | 31+00 | 0.0-6.0 | A-7-6(34) | 64 | 39 | 8.4 | 13.4 | 18.6 | 59.6 | 99 | 93 | 81 | - | - |
| S-17 | CL | 31+00 | 6.0-12.0 | A-7-6(31) | 57 | 33 | 2.7 | 15.6 | 22.1 | 59.6 | 100 | 99 | 87 | - | - |
| SS-18 | CL | 37+00 | 3.5-5.0 | A-4(0) | 32 | 4 | 36.4 | 21.6 | 25.6 | 16.4 | 91 | 63 | 45 | - | - |

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 11/13/08

| | |
|--|------------------------|
| PROJECT REFERENCE NO. U-3304 | SHEET NO. 13 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |



| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | 10 | 40 | 200 | | |
| S-19 | 20 RT | 39+00 | 0.0-5.0 | A-7-6(16) | 47 | 27 | 17.9 | 15.8 | 21.1 | 45.2 | 92 | 79 | 65 | - | - |
| S-20 | 20 RT | 39+00 | 5.0-14.0 | A-6(4) | 29 | 12 | 22.0 | 21.4 | 23.7 | 32.9 | 92 | 78 | 58 | - | - |
| SS-21 | 20 RT | 43+00 | 3.5-5.0 | A-7-6(9) | 42 | 18 | 13.6 | 28.0 | 29.7 | 28.8 | 95 | 88 | 62 | - | - |
| SS-22 | 20 RT | 43+00 | 8.5-10.0 | A-4(2) | 32 | 6 | 18.3 | 30.2 | 28.9 | 22.6 | 99 | 90 | 61 | - | - |
| SS-23 | 20 RT | 43+00 | 13.5-15.0 | A-6(7) | 36 | 11 | 8.4 | 26.7 | 38.1 | 26.7 | 100 | 96 | 73 | - | - |
| SS-24 | 20 RT | 47+00 | 4.5-5.5 | A-7-6(16) | 47 | 21 | 9.2 | 21.8 | 38.1 | 30.8 | 100 | 95 | 76 | - | - |
| SS-25 | 20 RT | 47+00 | 9.5-11.0 | A-4(3) | 36 | 8 | 21.2 | 29.8 | 32.6 | 16.4 | 99 | 87 | 57 | - | - |

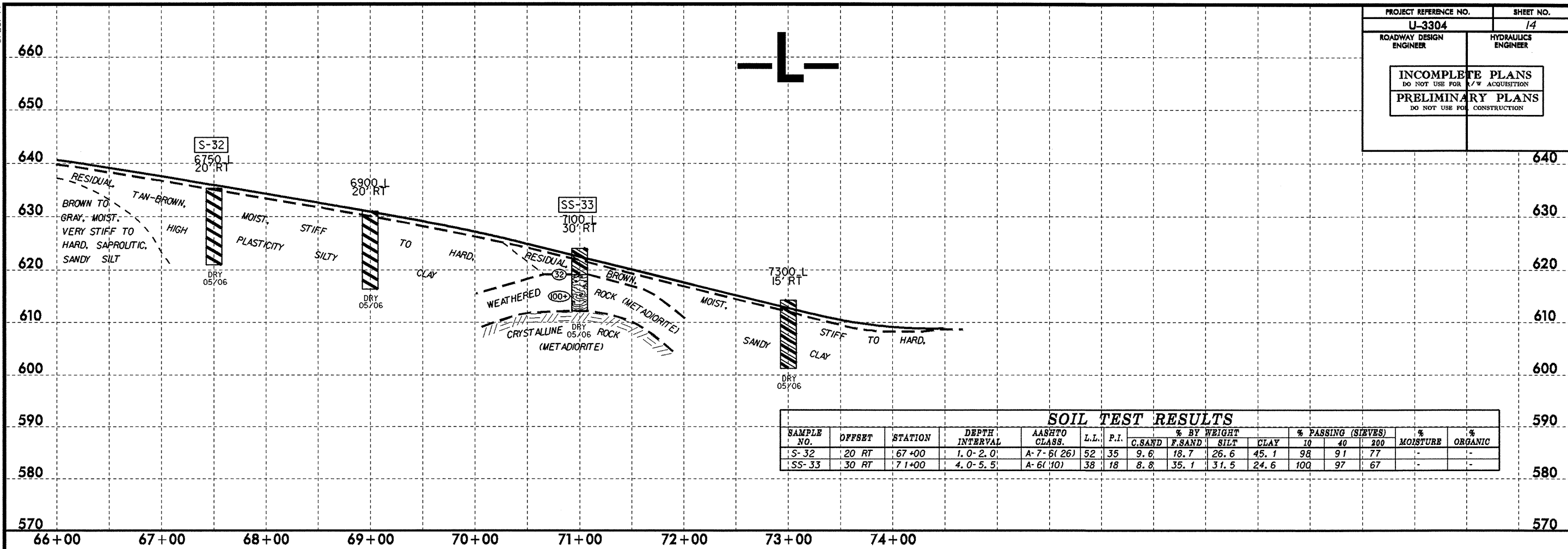


| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | 10 | 40 | 200 | | |
| SS-26 | 20 RT | 53+00 | 4.5-6.0 | A-6(9) | 39 | 20 | 26.1 | 18.3 | 24.8 | 30.8 | 99 | 80 | 59 | - | - |
| SS-27 | 20 RT | 53+00 | 9.5-11.0 | A-4(1) | 32 | 10 | 37.2 | 22.2 | 22.1 | 18.5 | 94 | 69 | 43 | - | - |
| SS-28 | 20 RT | 53+00 | 14.0-16.0 | A-2-4(1) | 30 | 6 | 42.5 | 26.1 | 21.1 | 10.3 | 92 | 63 | 34 | - | - |
| SS-29 | 20 RT | 59+00 | 4.5-6.0 | A-6(3) | 32 | 14 | 30.4 | 25.3 | 15.5 | 28.8 | 97 | 78 | 47 | - | - |
| S-48 | 20 RT | 60+50 | 0.0-5.0 | A-6(8) | 40 | 22 | 26.7 | 15.8 | 24.6 | 32.9 | 93 | 65 | 52 | - | - |
| S-30 | 20 RT | 61+00 | 1.0-2.0 | A-7-6(28) | 60 | 40 | 16.0 | 13.1 | 17.5 | 53.3 | 96 | 84 | 72 | - | - |
| SS-31 | 10 RT | 65+00 | 4.5-6.0 | A-4(1) | 30 | 7 | 35.5 | 27.1 | 27.2 | 10.3 | 98 | 73 | 45 | - | - |

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| | |
|---|------------------------|
| PROJECT REFERENCE NO. U-3304 | SHEET NO. 14 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR ACQUISITION | |
| PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |

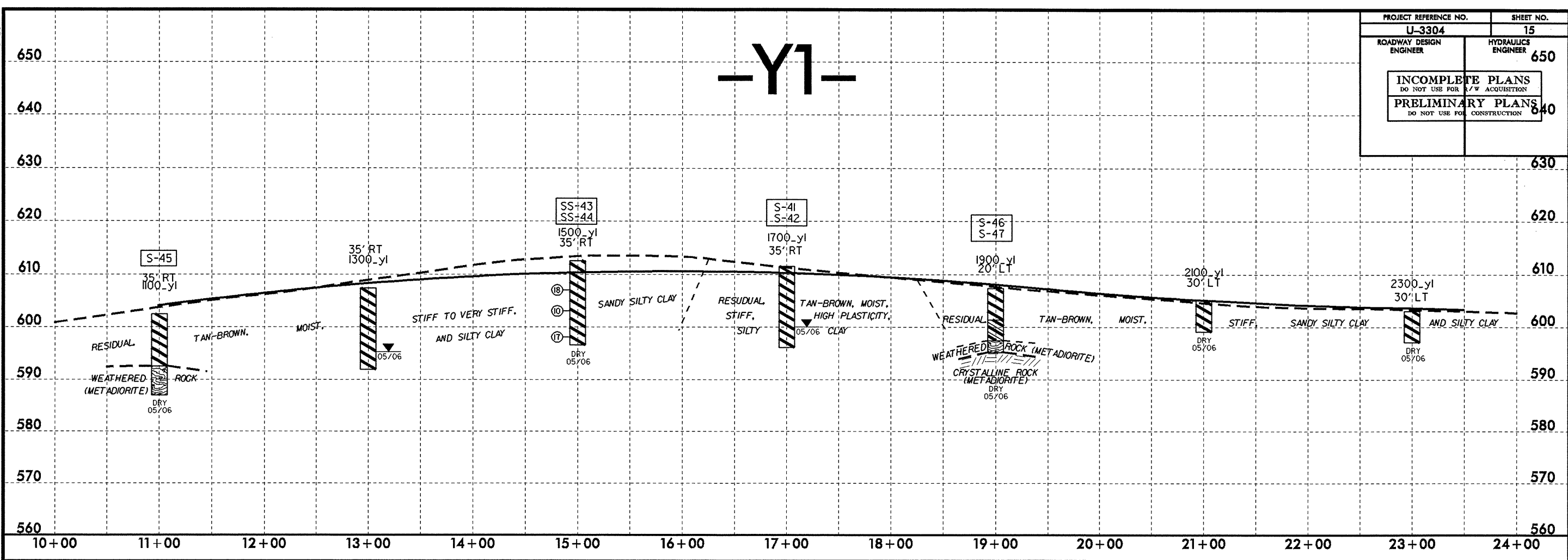


| SOIL TEST RESULTS | | | | | | | | | | | | | | | |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | 10 | 40 | 200 | | |
| S-32 | 20 RT | 67+00 | 1.0-2.0' | A-7-6(26) | 52 | 35 | 9.6 | 18.7 | 26.6 | 45.1 | 98 | 91 | 77 | - | - |
| SS-33 | 30 RT | 71+00 | 4.0-5.5' | A-6(10) | 38 | 18 | 8.8 | 35.1 | 31.5 | 24.6 | 100 | 97 | 67 | - | - |

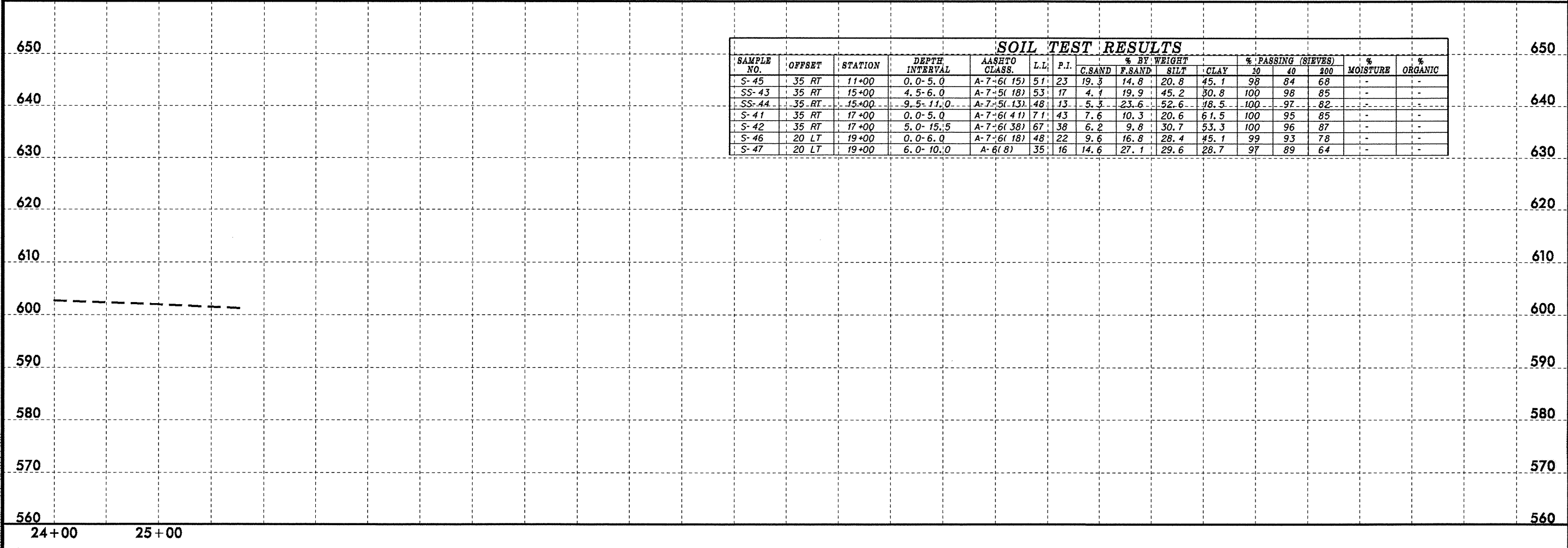
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| | |
|---|-----------------------------------|
| PROJECT REFERENCE NO. U-3304 | SHEET NO. 15 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER 650 |
| INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION | |
| PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |



| SOIL TEST RESULTS | | | | | | | | | | | | | | | |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | 20 | 40 | 200 | | |
| S-45 | 35 RT | 11+00 | 0.0-5.0 | A-7-6(15) | 51 | 23 | 19.3 | 14.8 | 20.8 | 45.1 | 98 | 84 | 68 | - | - |
| SS-43 | 35 RT | 15+00 | 4.5-6.0 | A-7-5(18) | 53 | 17 | 4.1 | 19.9 | 45.2 | 30.8 | 100 | 98 | 85 | - | - |
| SS-44 | 35 RT | 15+00 | 9.5-11.0 | A-7-5(13) | 48 | 13 | 5.3 | 23.6 | 52.6 | 48.5 | 100 | 97 | 82 | - | - |
| S-41 | 35 RT | 17+00 | 0.0-5.0 | A-7-6(41) | 71 | 43 | 7.6 | 10.3 | 20.6 | 61.5 | 100 | 95 | 85 | - | - |
| S-42 | 35 RT | 17+00 | 5.0-15.5 | A-7-6(38) | 67 | 38 | 6.2 | 9.8 | 30.7 | 53.3 | 100 | 96 | 87 | - | - |
| S-46 | 20 LT | 19+00 | 0.0-6.0 | A-7-6(18) | 48 | 22 | 9.6 | 16.8 | 28.4 | 45.1 | 99 | 93 | 78 | - | - |
| S-47 | 20 LT | 19+00 | 6.0-10.0 | A-6(8) | 35 | 16 | 14.6 | 27.1 | 29.6 | 28.7 | 97 | 89 | 64 | - | - |

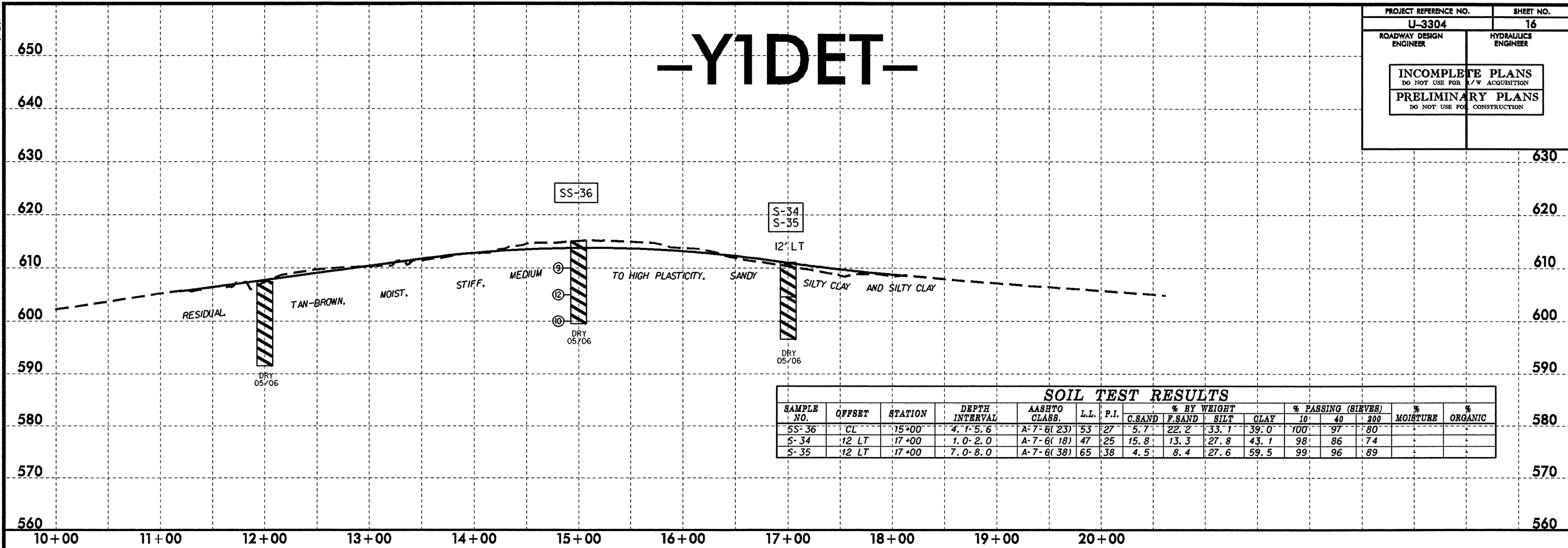


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28-DEC-2006 16:40
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-YIDET-

| | |
|---|------------------------|
| PROJECT REFERENCE NO. U-3304 | SHEET NO. 16 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION | |
| PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |

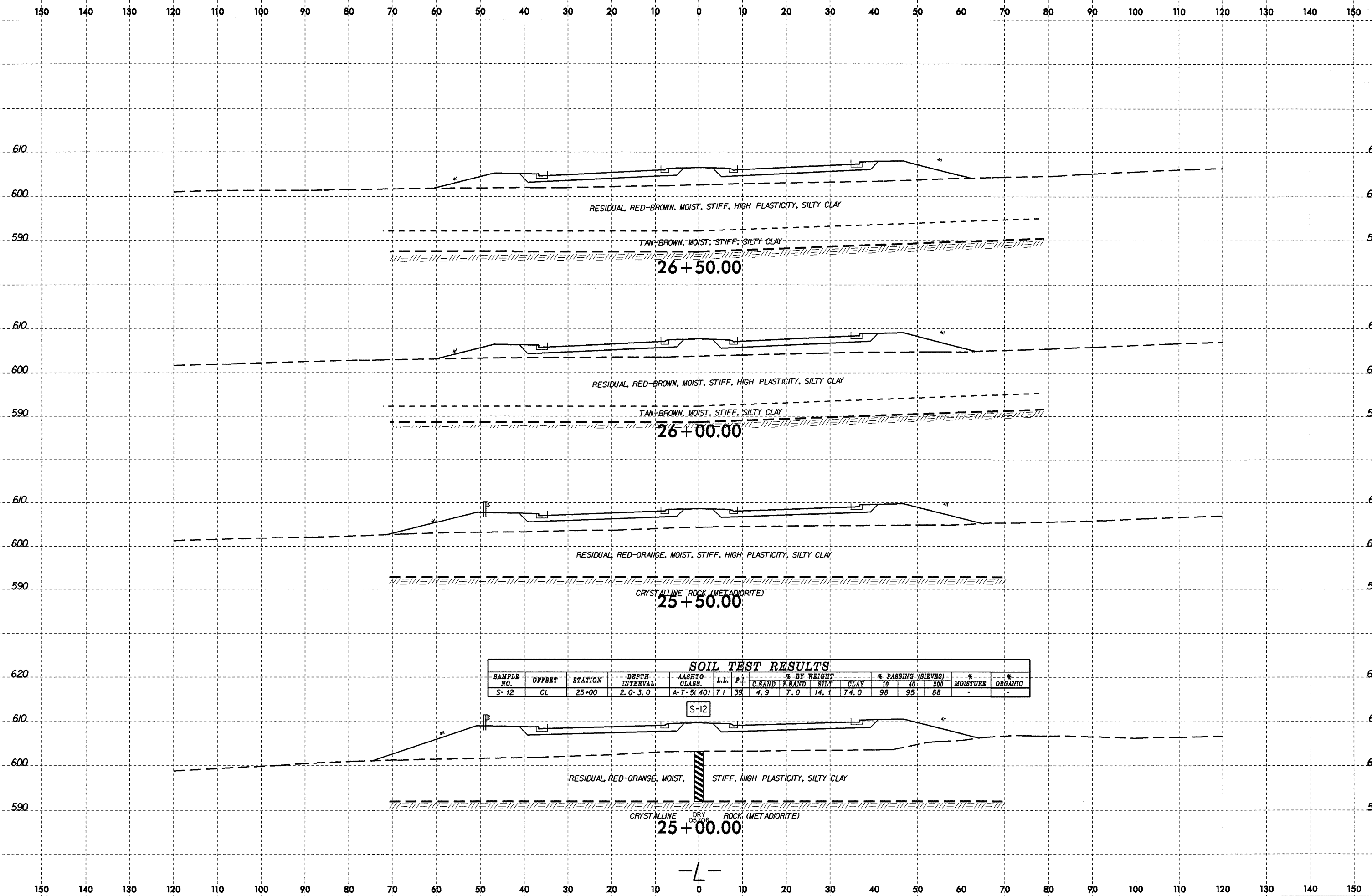


| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|-----|------|------------|-----------|
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | 10' | 40' | 200' | | |
| | | | | | | | | | | | | | | | |
| SS-36 | CL | 15+00 | 4'-5.6' | A-7-6(23) | 53 | 27 | 5.7 | 22.2 | 33.1 | 39.0 | 100 | 97 | 80 | | |
| S-34 | 12 LT | 17+00 | 1'-0.2' | A-7-6(18) | 47 | 25 | 15.8 | 13.3 | 27.8 | 43.1 | 98 | 86 | 74 | | |
| S-35 | 12 LT | 17+00 | 7'-0.8' | A-7-6(38) | 65 | 38 | 4.5 | 8.4 | 27.6 | 59.5 | 99 | 96 | 89 | | |

630
620
610
600
590
580
570
560

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00

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 khamilton



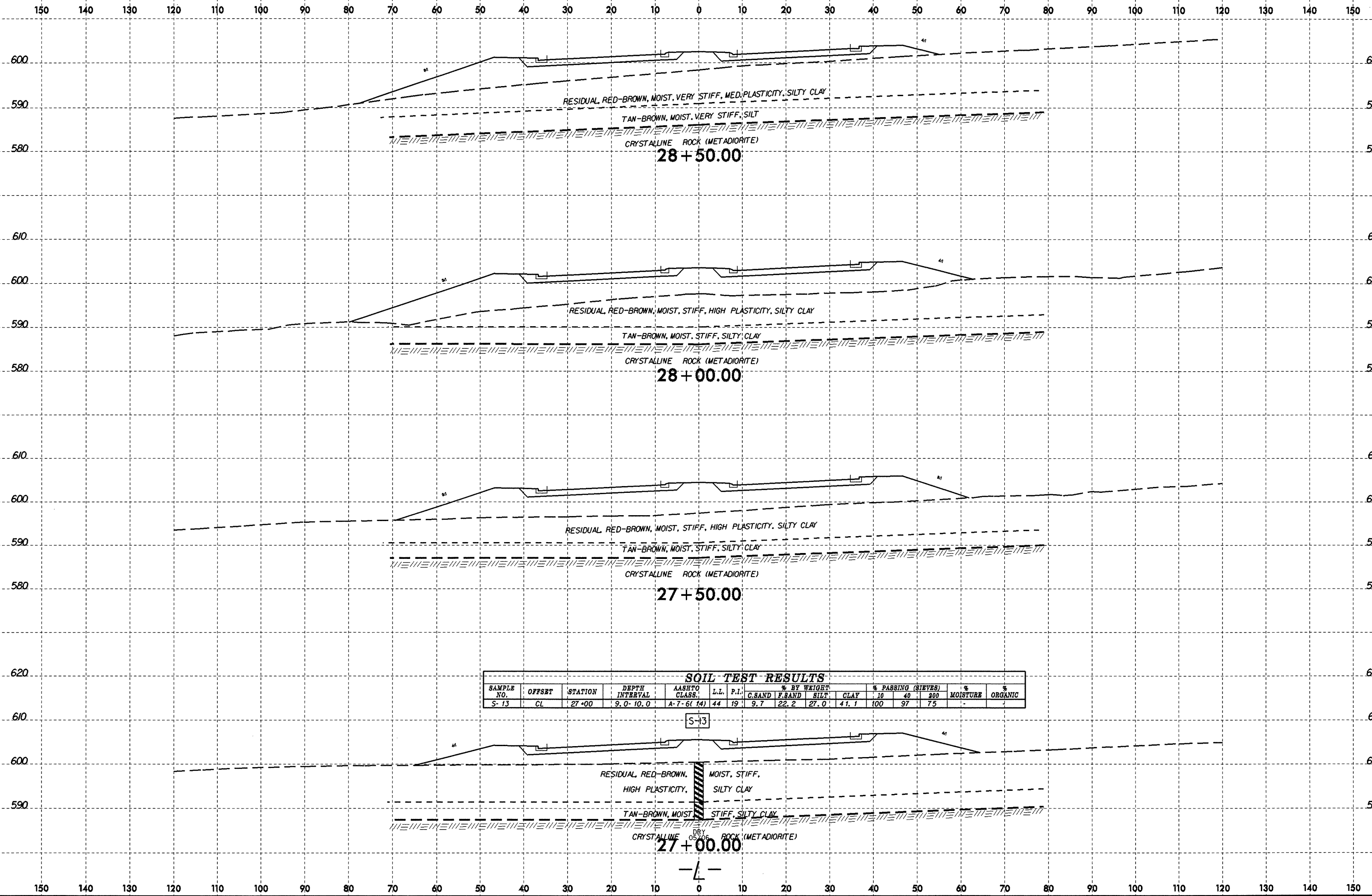
| SOIL TEST RESULTS | | | | | | | | | | | | | | | |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.L. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | 10 | 40 | 200 | | |
| S-12 | CL | 25+00 | 2.0-3.0 | A-7-5(40) | 71 | 39 | 4.9 | 7.0 | 14.1 | 74.0 | 98 | 95 | 88 | - | - |

S-12

25+00.00

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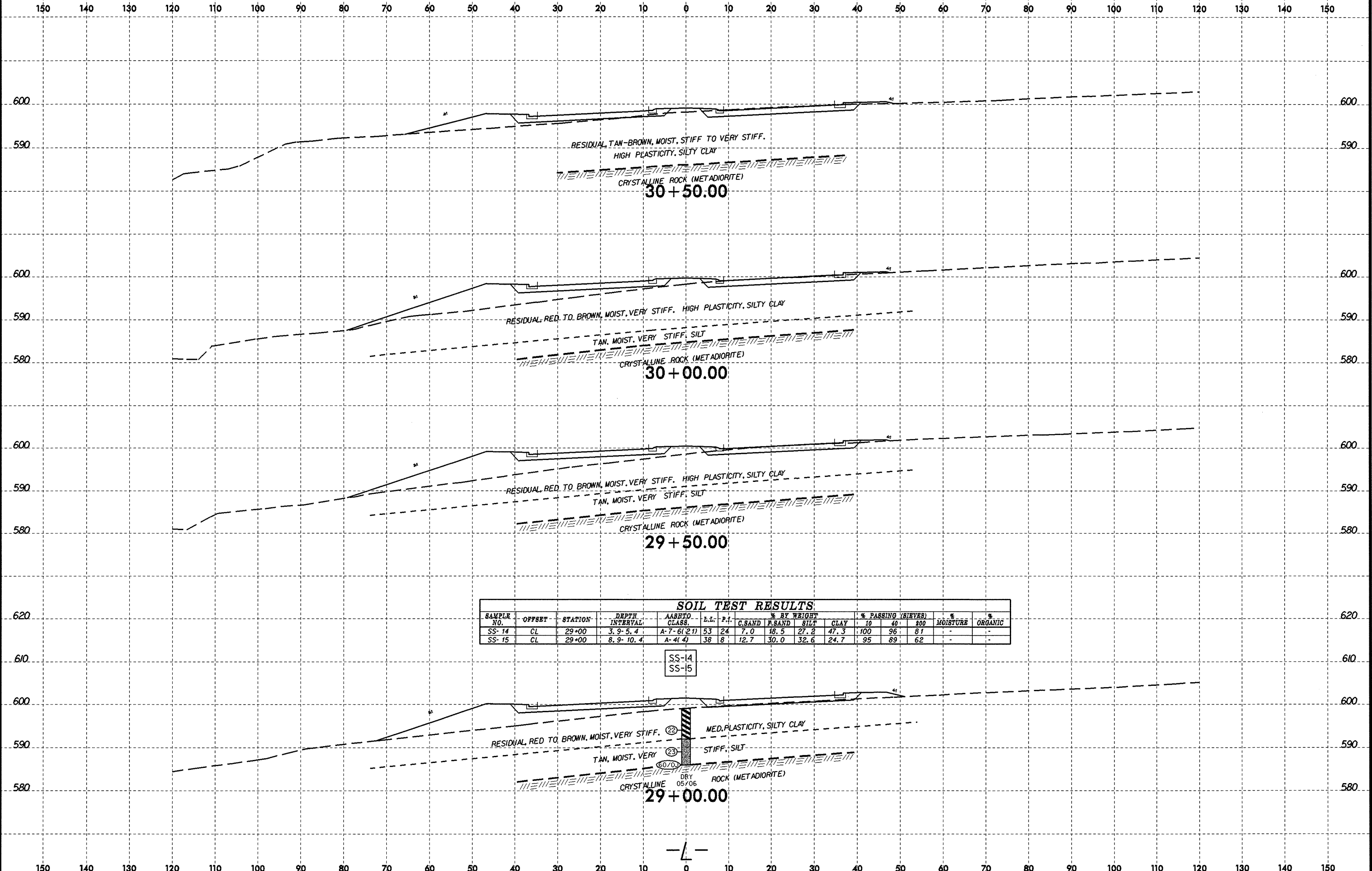
| SOIL TEST RESULTS | | | | | | | | | | | | | | | |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.L. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | 10 | 40 | 200 | | |
| S-13 | CL | 27+00 | 9.0-10.0 | A-7-6(14) | 44 | 19 | 9.7 | 22.2 | 27.0 | 41.1 | 100 | 97 | 75 | - | - |

S-13

27+00.00

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29-MAR-2007 4:22
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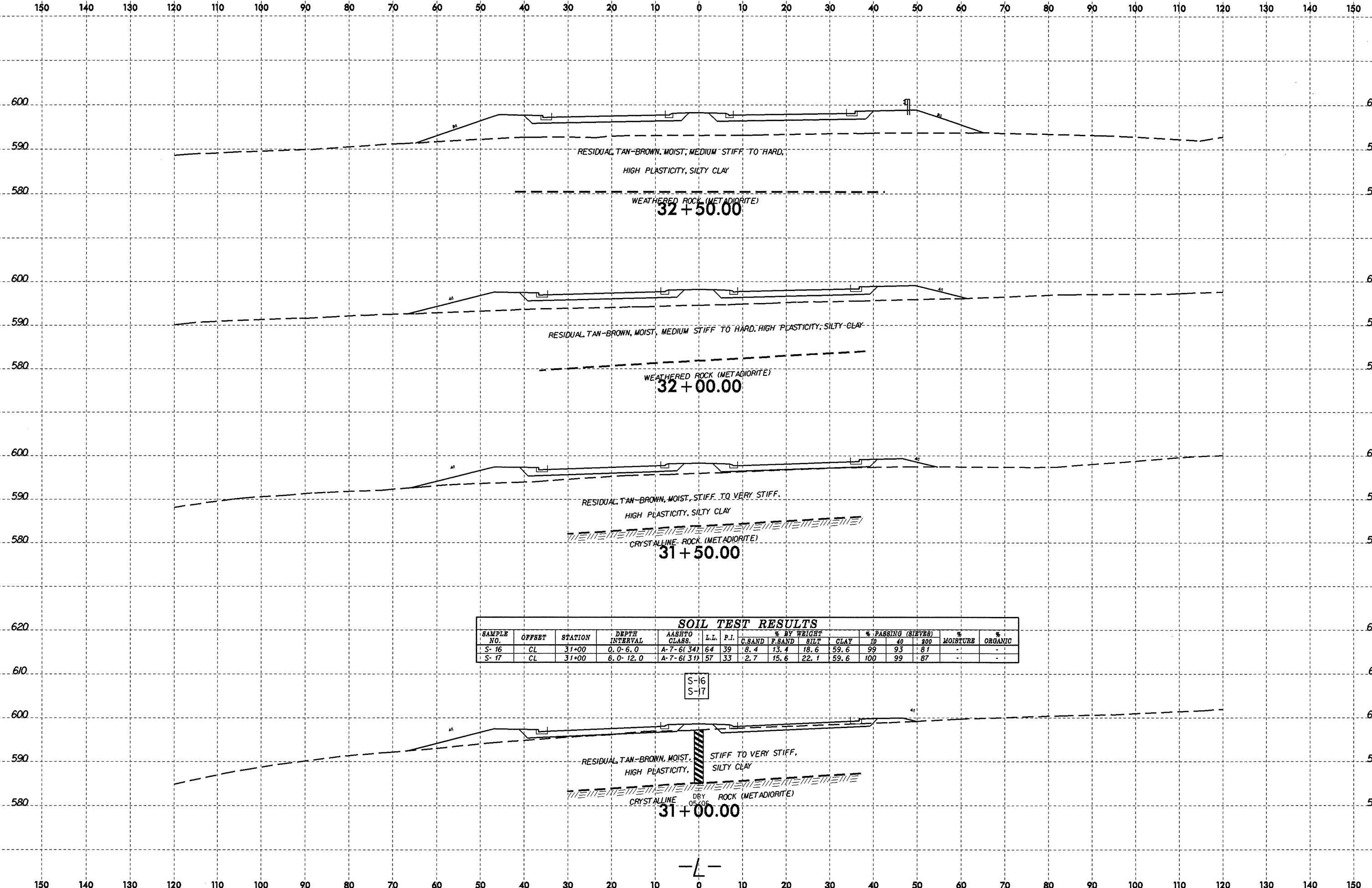
SOIL TEST RESULTS

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.L. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|----|-----|------------|-----------|
| | | | | | | | C. SAND | F. SAND | SILT | CLAY | 10 | 40 | 200 | | |
| SS-14 | CL | 29+00 | 3.9-5.4 | A-7-6(2) | 53 | 24 | 7.0 | 18.5 | 27.2 | 47.3 | 100 | 96 | 81 | - | - |
| SS-15 | CL | 29+00 | 8.9-10.4 | A-4(4) | 38 | 8 | 12.7 | 30.0 | 32.6 | 24.7 | 95 | 89 | 62 | - | - |

SS-14
SS-15

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 23-MAR-2007 14:22
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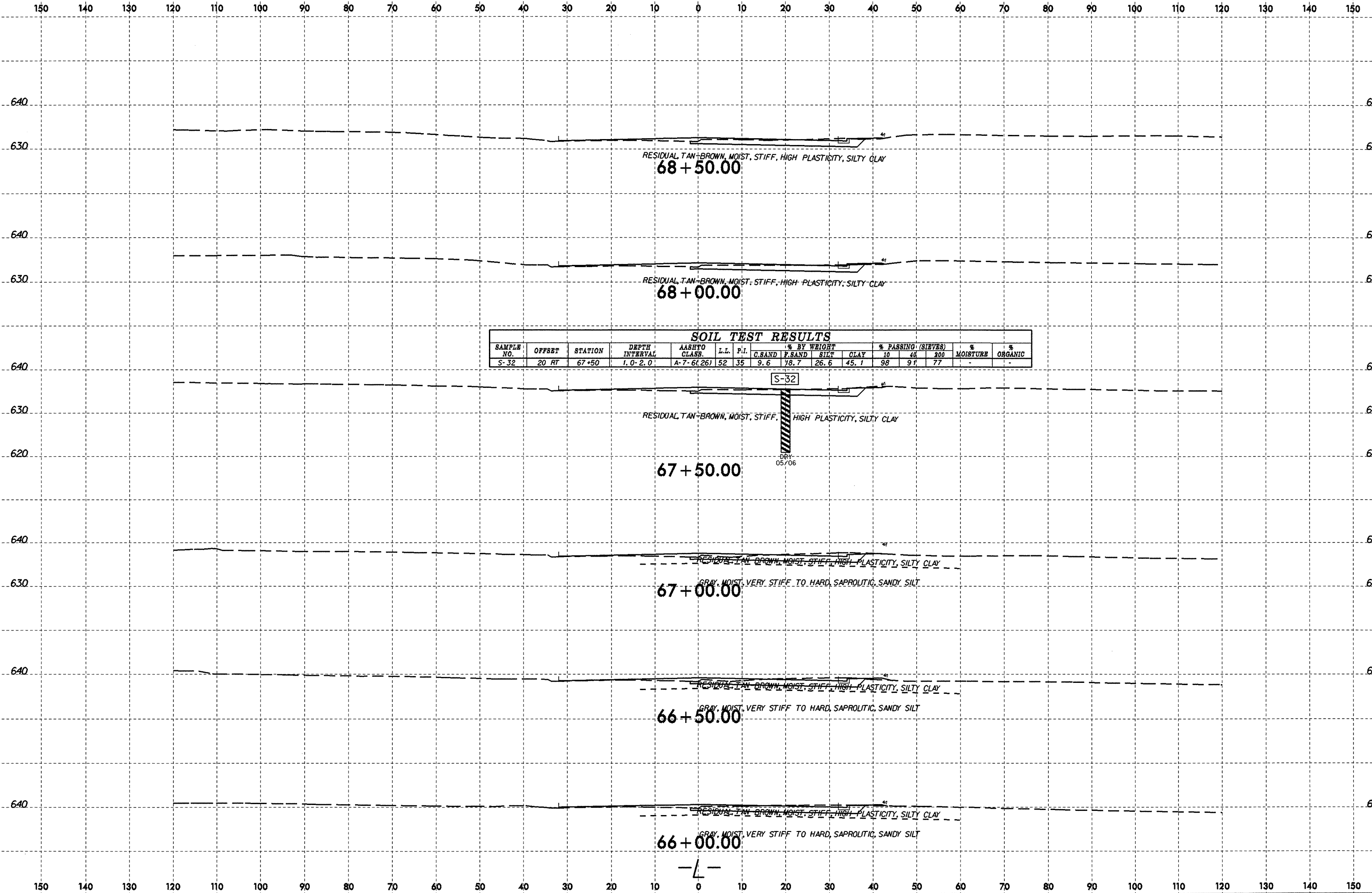


| SOIL TEST RESULTS | | | | | | | | | | | | | | | |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|--------------------|-----|----|------------|-----------|-----|
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC | |
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | 10 | 40 | | | 200 |
| S-16 | CL | 31+00 | 0.0-6.0 | A-7-6(34) | 64 | 39 | 8.4 | 13.4 | 18.6 | 59.6 | 99 | 93 | 81 | - | - |
| S-17 | CL | 31+00 | 6.0-12.0 | A-7-6(31) | 57 | 33 | 2.7 | 15.6 | 22.1 | 59.6 | 100 | 99 | 87 | - | - |

S-16
S-17

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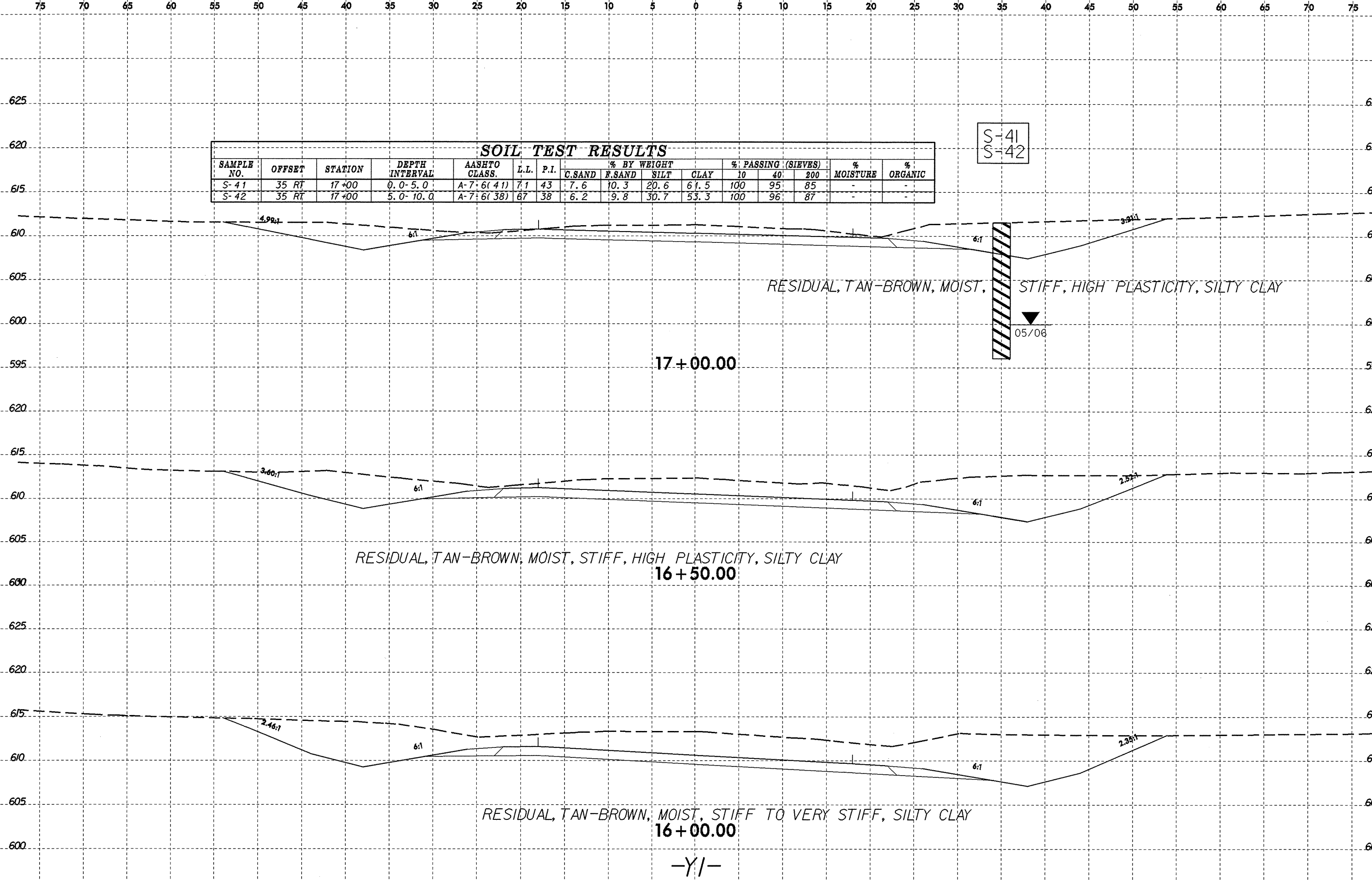
8/23/99
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| SOIL TEST RESULTS | | | | | | | | | | | | | | | |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | 10 | 40 | 200 | | |
| S-41 | 35 RT | 17+00 | 0.0-5.0 | A-7.6(41) | 71 | 43 | 7.6 | 10.3 | 20.6 | 61.5 | 100 | 95 | 85 | - | - |
| S-42 | 35 RT | 17+00 | 5.0-10.0 | A-7.6(38) | 67 | 38 | 6.2 | 9.8 | 30.7 | 53.3 | 100 | 96 | 87 | - | - |

S-41
S-42



17+00.00

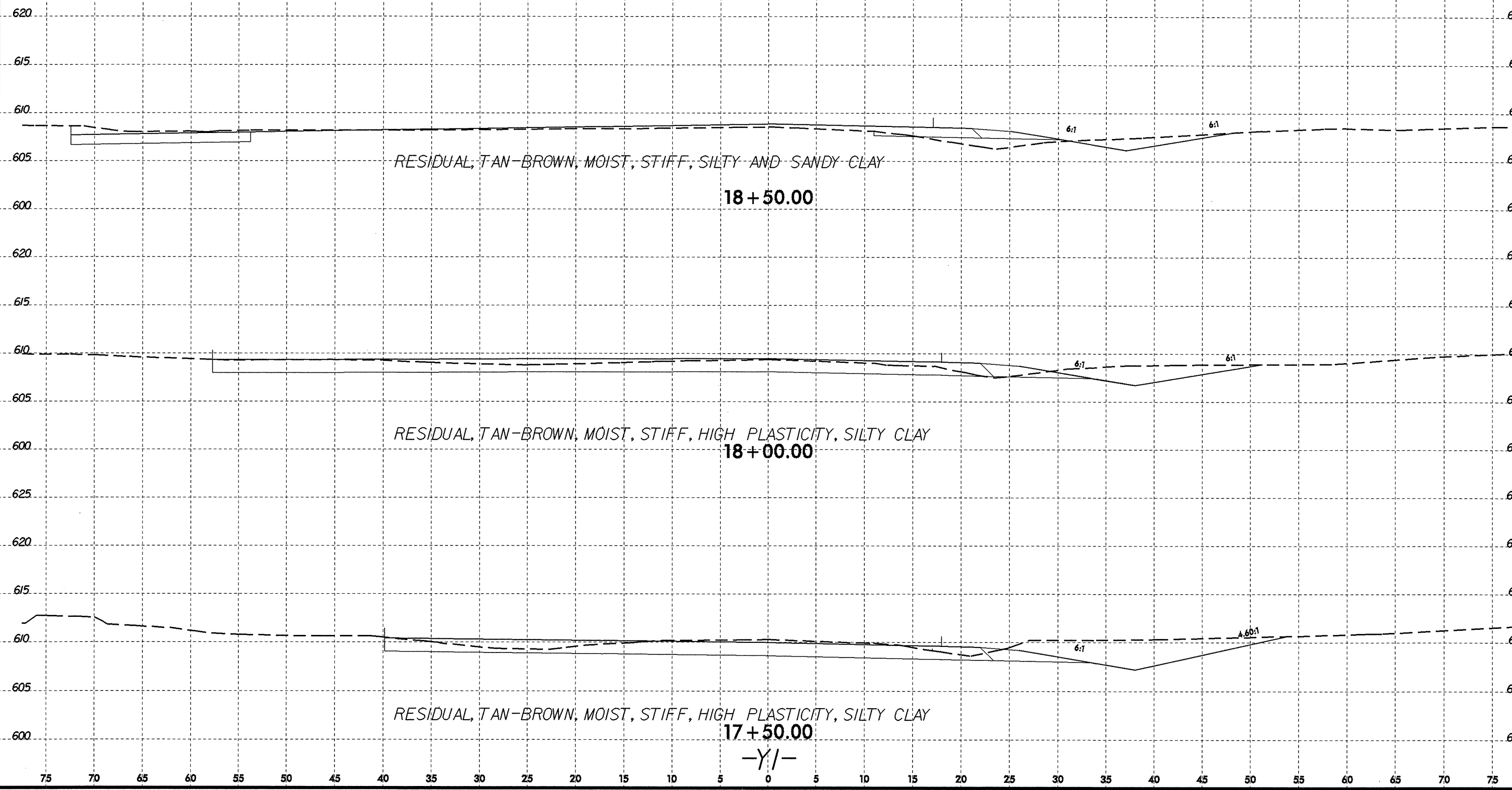
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