TYPE	YEAR	PROJECT NO.	SHEET NO.
CONST.	2014	19180-3212-04	10

GEOTECHNICAL NOTES

SITE CONDITIONS

(1) THE GROUND SURFACE GENERALLY SLOPES DOWNWARD TO THE SOUTH. STATE ROUTE 386 IS AT A LOWER ELEVATION AND GOES BELOW CONFERENCE DRIVE. BELOW THE BRIDGE, FOR CONFERENCE DRIVE, ARE ROCK FACE SPLIT WALLS ON THE NORTH AND SOUTH SIDES WHERE EXCAVATIONS WERE MADE FOR SR 386.

(2) BETWEEN THE ON- AND OFF-RAMPS, GRASS COVERS MOST OF THE GROUND WITH A FEW OUTCROPPINGS OF ROCK ON THE NORTH SIDE OF SR 386. THERE ARE A FEW AREAS LINED BY TREES BETWEEN THE LANES, AND IN THE SOUTHEAST PORTION OF THE SITE, THERE IS A DENSELY WOODED AREA WHERE LIGHT POLE HM-4 (B-04) WILL BE LOCATED.

(3) DRAINAGE DITCHES ARE LOCATED ON THE NORTH AND SOUTH SIDES OF SR 386, AND ALONG THE SIDES OF THE ON- AND OFF-RAMPS, AS WELL AS LIBERTY LANE. BELOW-GROUND UTILITIES WERE OBSERVED THROUGHOUT THE SITE AS MADE EVIDENT BY MANHOLES AND SURFACE PAINT MARKINGS FROM THE LOCAL ONE-CALL SERVICE.

(4) NO GRADE CHANGES ARE PLANNED AT THE POLE LOCATIONS.

GEOLOGIC CONDITIONS

(5) ACCORDING TO THE USGS GEOLOGIC MAP OF THE GOODLETTSVILLE QUADRANGLE (TENNESSEE DIVISION OF GEOLOGY, 1981), THE SITE IS UNDERLAIN BY THE LEIPERS AND CATHEYS FORMATION AND THE SEQUATCHIE FORMATION FOR A PART OF THE NORTHWEST CORNER OF THE SITE. THE LEIPERS AND CATHEYS FORMATION IS TYPICALLY A KNOTTY, FINE TO COARSE GRAINED, THIN TO MEDIUM BEDDED, GRAY ARGILLACEOUS LIMESTONE WITH CALCAREOUS AND PHOSPHATE ZONES. INTERBEDDED LAYERS OF SHALE ARE COMMON. THIS FORMATION WEATHERS TO PRODUCE A THIN RESIDUAL SOIL LAYER (I.E., 5 TO 7 FEET THICK), WHICH IS TYPICALLY A BROWN, SILTY CLAY.

(6) THE SEQUATCHIE FORMATION CONSISTS OF INTERBEDDED LAYERS OF SHALE AND LIMESTONE. THE LIMESTONE IS TYPICALLY MEDIUM TO COARSE GRAINED WITH MEDIUM BEDDING. THE SHALE CONSISTS OF DARK GRAY TO GRAYISH-BROWN, THINLY BEDDED LAYERS. ACCORDING TO THE USGS GEOLOGIC MAP, IT APPEARS THAT THE SEQUATCHIE FORMATION IS LOCATED IN THE VICINITY OF HM-2 (B-06).

(7) BOTH FORMATIONS ARE SUSCEPTIBLE TO SOLUTION WEATHERING AND SINKHOLE DEVELOPMENT. WE DID NOT OBSERVE SINKHOLES ON THE SITE DURING OUR FIELD ACTIVITIES. REVIEW OF THE USGS GOODLETTSVILLE, TENNESSEE 7.5-MINUTE TOPOGRAPHIC QUADRANGLE MAP (1968, PHOTOREVISED 1983) AND THE USDA SOIL SURVEY MAPS DID NOT INDICATE THE PRESENCE OF SINKHOLES AT THE SITE OR IMMEDIATE VICINITY.

SUBSURFACE CONDITIONS

(8) THE SOILS ENCOUNTERED IN THE BORINGS (B-01 THRU B-07) WERE DRIVE SAMPLED IN GENERAL ACCORDANCE WITH ASTM D 1586 - PENETRATION TEST AND SPLIT-BARREL SAMPLING OF SOIL. RELATIVELY UNDISTURBED SAMPLES WERE OBTAINED FROM SELECTED BORINGS IN GENERAL ACCORDANCE WITH ASTM D 1587 – STANDARD PRACTICE FOR THIN-WALLED TUBE SAMPLING OF SOILS FOR GEOTECHNICAL PURPOSES. ROCK CORING WAS PERFORMED IN FIVE OF THE BORINGS IN GENERAL ACCORDANCE WITH ASTM D 2113 - STANDARD PRACTICE FOR ROCK CORE DRILLING AND SAMPLING OF ROCK FOR SITE INVESTIGATION. THE CRITERIA USED TO EVALUATE ROCK QUALITY BASED ON RQD ARE PRESENTED IN THE BORE LOGS. THE BORINGS WERE CHECKED FOR THE PRESENCE OF GROUNDWATER.

(9) THE SOIL SAMPLES WERE VISUALLY CLASSIFIED USING THE UNIFIED SOIL CLASSIFICATION SYSTEM (USCS). SAMPLES WERE SELECTED FOR LABORATORY TESTING TO DETERMINE FUNDAMENTAL ENGINEERING CHARACTERISTICS. SPECIFICALLY, TESTS INCLUDED ATTERBERG LIMITS, MOISTURE CONTENT, UNCONFINED COMPRESSIVE STRENGTH OF SOIL, AND UNCONFINED COMPRESSIVE STRENGTH OF ROCK.

(10) A DESCRIPTION OF THE SUBSURFACE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS IS PROVIDED BELOW:

A. FILL: FROM THE GROUND SURFACE, THREE OF THE BORINGS SAMPLED A LAYER OF MATERIAL INTERPRETED TO BE FILL. THE FILL CONSISTED OF FIRM TO HARD, LEAN CLAYS THAT CONTAINED SILT, SAND, AND LIMESTONE FRAGMENTS. THIS LAYER WAS ENCOUNTERED TO A DEPTH RANGING BETWEEN 2-½ AND 16 FEET BELOW THE EXISTING GRADE. THE MOISTURE CONTENT OF NINE TEST SAMPLES OF THE FILL RANGED BETWEEN 7 AND 30 PERCENT. ATTERBERG LIMITS TESTING PERFORMED ON ONE SAMPLE OF THE FILL YIELDED A LIQUID LIMIT (LL) OF 29 AND A PLASTICITY INDEX OF 13.

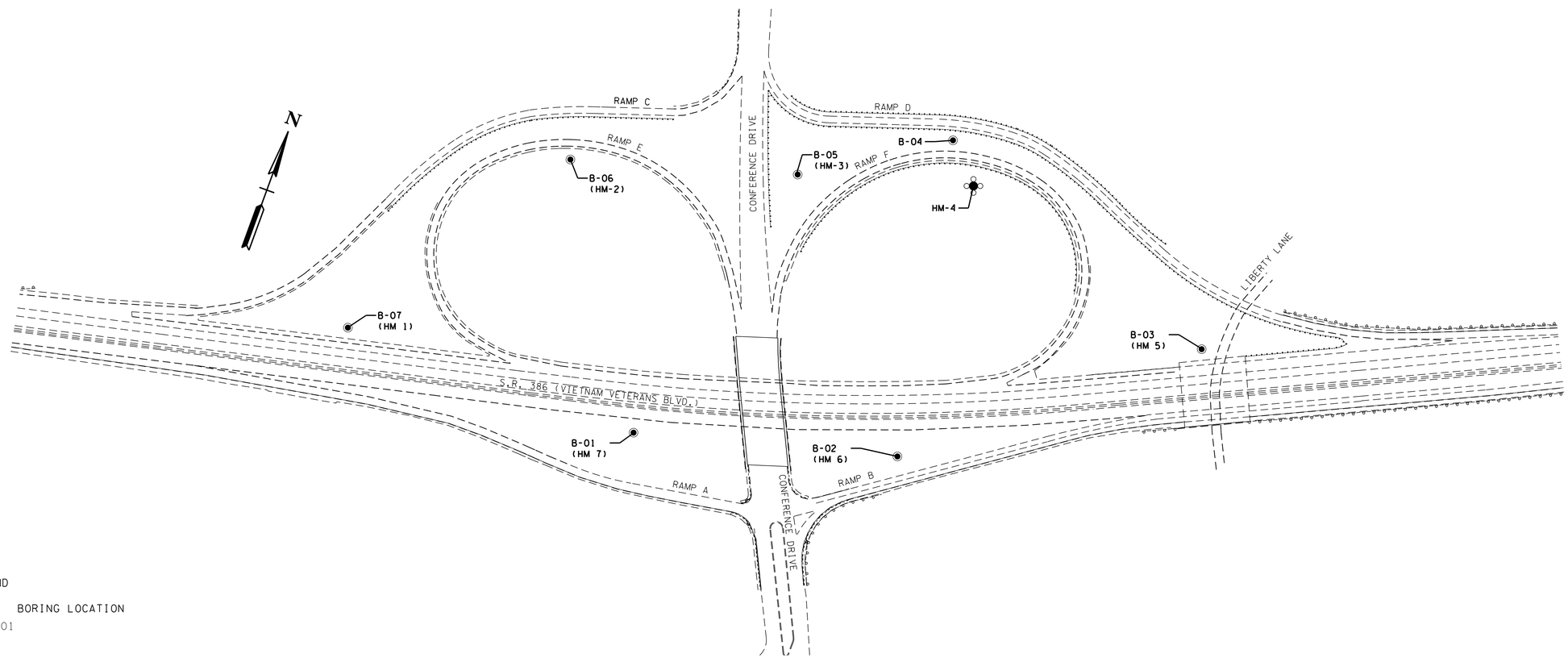
B. RESIDUUM: UNDERLYING THE FILL AND FROM THE SURFACE WHERE FILL WAS ABSENT, RESIDUAL SOILS WERE SAMPLED TO THE BORING REFUSAL OR TERMINATION DEPTH. THE RESIDUUM CONSISTED OF LEAN CLAYS AND FAT CLAYS WITH MINERAL STAINING, SILT, SAND, AND WEATHERED LIMESTONE FRAGMENTS. THESE MATERIALS ARE FIRM TO HARD IN CONSISTENCY. THE MOISTURE CONTENT OF FIVE TEST SAMPLES OF THESE MATERIALS RANGED BETWEEN 8 AND 24 PERCENT. ATTERBERG LIMITS TESTING PERFORMED ON ONE SAMPLE OF THE RESIDUUM YIELDED A LIQUID LIMIT (LL) OF 37 AND A PLASTICITY INDEX OF 18.

(11) BORING B-04 WAS TERMINATED AT THE PREDETERMINED DEPTH OF 25 FEET WITHOUT REACHING REFUSAL. BORING B-05 WAS TERMINATED AT 23 FEET BELOW THE GROUND SURFACE UPON REACHING REFUSAL. BASED ON OUR EXPERIENCE AND THE RESULTS FOUND IN THE OTHER BORINGS, REFUSAL IS INTERPRETED TO BE THE BEDROCK SURFACE. IN THE REMAINING FIVE BORINGS (B-01, B-02, B-03, B-06, AND B-07), REFUSAL WAS ENCOUNTERED AT DEPTHS RANGING BETWEEN 2 AND 8 FEET BELOW GROUND LEVEL. THE REFUSAL MATERIALS IN THESE FIVE BORINGS WERE EXPLORED TO A TOTAL DEPTH OF 25 FEET BELOW THE GROUND SURFACE. A SUMMARY OF THE DATA COLLECTED FROM THE ROCK CORE SAMPLES IS PROVIDED IN THE TABLE BELOW.

SUMMARY OF ROCK CORE DATA

BORING LOG	POLE NO.	CORE DEPTH (FT)	CORE RECOVERY (PERCENT)	RQD (PERCENTE)	ROCK QUALITY
B-01	HM-7	4-13	96	77	GOOD
		13-23	100	98	EXCELLENT
		23-25	100	100	EXCELLENT
B-02	HM-6	8-18	99	68	FAIR
		18-25	98	62	FAIR
B-03	HM-5	3-12	100	60	FAIR
		12-22	99	95	EXCELLENT
		22-25	100	75	GOOD
B-06	HM-2	2-12	83	54	FAIR
		12-22	100	86	GOOD
		22-25	100	90	EXCELLENT
B-07	HM-1	8-16	96	40	POOR
		16-25	97	79	GOOD

(12) THE BORINGS WERE DRY UPON REACHING REFUSAL OR THE BORING TERMINATION DEPTH. AFTER CORING (WHERE PERFORMED), WATER LEVELS WERE MEASURED AT DEPTHS RANGING BETWEEN 2.5 AND 8.7 FEET BELOW THE GROUND SURFACE. THE WATER LEVELS WERE ELEVATED BY WATER INTRODUCED INTO THE BOREHOLES DURING THE CORE DRILLING PROCESS. THE BORINGS WERE THEN BACKFILLED WITH AUGER CUTTINGS. GROUNDWATER LEVELS MAY FLUCTUATE DUE TO RECENT RAINFALL, CONSTRUCTION ACTIVITY, OR OTHER SITE-SPECIFIC FACTORS.



* * * GEOTECHNICAL INFORMATION PROVIDED BY: TTL, INC., ON FILE WITH TDOT TRAFFIC DESIGN * * *

SEALED BY

Brenda K. Booker

COORDINATES ARE NAD/83(1995), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

BORING LOCATIONS AND GEOTECHNICAL NOTES

SR 386 AT CONFERENCE DRIVE

SCALE: 1"=150'

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