REPORT OF GEOTECHNICAL EXPLORATION

I-75 Interchange at I-24
Redevelopment of I-75/I-24 Interchange
PIN 114174.00
Chattanooga, Tennessee

Prepared For:

Neel-Schaffer, Inc.
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KSWA Project Number 300-18-0001

May 18, 2018

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May 18, 2018

Mr. Richard Sullivan
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Subject: **Report of Pavement Exploration**
I-75 Interchange at I-24
Chattanooga, Tennessee
PIN 114174.00
KSWA Project No. 300-18-0001

Dear Mr. Sullivan:
K. S. Ware and Associates, L.L.C. (KSWA) is pleased to submit this report which details the results of our pavement exploration for the referenced project. Our services were provided in accordance with our proposal dated February 20, 2018.

The project described includes the design of the reconstruction of the Interchange of Interstate 75 (I-75) and Interstate 24 (I-24) and approaches. The project is divided into phases therefore, we have divided this report into sections, which include Phase I, Phase II and Pavement Design to assist with separating our sections of the reports if needed.

The attached report reviews the project information provided to us, describes the site and subsurface conditions encountered. This report contains information for use by designers and is not intended for use as a design report conforming to the TDOT Geotechnical Manual. The Appendices contain a description of our field-testing procedures, and our field and laboratory test results.

We appreciate this opportunity to be of service to you on this project. Please contact us if you have any questions regarding this report.

Respectfully submitted,

K. S. Ware and Associates, L.L.C.

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Enclosures: Report of Geotechnical Exploration

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File

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1.0 INTRODUCTION

1.1 PROJECT INFORMATION

Project information was provided by Mr. Michael Agnew, of Neel-Schaffer, in a series of e-mails between Mr. Agnew and Kathy Ware and Julie Oliphant, of KSWA. Additional information was provided after our initial proposal was submitted. KSWA was awarded a notice to proceed from Neel Schaffer on March 16, 2018.

The Tennessee Department of Transportation is considering construction of a new interchange at the junction of Interstate 75 and Interstate 24 in Chattanooga, Tennessee. A Site Location Plan is included as Figure 1 in Appendix A. The new interchange will include construction of new ramps and bridges within the interchange to reconfigure the traffic pattern in the interchange. Additional improvements to add traffic lanes will extend south on I-75 to about Exit 1 (Ringgold Road), north of I-75 to approximately Exit 4 (East Brainerd Road) and west on I-24 to a point between Moore Road and Belvoir Avenue. The project will be divided in to at least two phases, the first phase will start south of Ringgold Road and extend through the Interchange to about Station 443+00, west of the CSX Railroad Bridge Crossing. Phase II will continue to the approximately East Brainerd Road exit. On I-24, Phase I will include interchange ramps and extend to approximately Station 175+00, inclusive of the Spring Creek Road overpass. Phase II will begin from this point back to the start of the project on I-24 at about Station 112+00, including the McBrien Road and Moore Road overpasses.

To facilitate widening of lanes, additional fill soil will be placed to construct embankment fills to support the roadway. Where the embankment fills would otherwise encroach on existing features and adjoining properties, retaining walls will be used to contain the fill with the TDOT Right of Way (ROW).

An additional ramp lane will also be constructed from the Bass Pro Shops parking lot which will connect to the on ramp from Exit 1. This ramp will continue north and collect traffic from the Welcome Center. Overhead signs, ITS Systems, noise barrier walls, and other features will also be included.

These structures will include replacing or widening existing bridges or constructing new bridges. The following list provides the location of the planned structures and the boring prefix label used to identify with each structure.

Phase I

Bridge #2 NB (BN2) and #2 SB (BS2), I-75 North and South over the I-75 NB to I-24 WB ramp
Bridge #3 NB (BN3) and #3 SB (BS3), I-75 North and South over the I-24 EB to I-75 NB ramp
Bridge #9 I-75 NB (B9) ramp to I-24 WB over the I-24 EB to I-75 NB ramp
Bridges over Spring Creek (SCK) for I-75 SB and I-75 NB
Bridge over South Chickamauga Creek (SCC) for I-75 SB and I-75 NB

Bridges to carry Spring Creek Road (SCR) over I-24 EB and WB

Phase II

Bridge of the CSX Railroad (CSX) for I-75 SB and I-75 NB
Bridge to carry McBrien Road (McB) over I-24 EB and WB
Bridge to carry Moore Road (M) over I-24 EB and WB

1.2 PURPOSE AND SCOPE OF EXPLORATION

KSWA was tasked with providing a baseline report of geotechnical conditions present in the project area. This preliminary data will be used for evaluation and cost estimation for the preparation of the 30% Design Package being prepared by Neel-Schaffer. The scope of services performed does not constitute all geotechnical exploration work necessary for design of the complete project. This report is intended as information to assist prospective Design/Build teams in understanding the subsurface conditions present along the alignment. Additional geotechnical work will need to be performed to provide design studies compliant with TDOT's geotechnical manual for each structure and road alignment.

The initial phase of exploration included an evaluation of the existing pavement thickness at 13 locations within the project limits. At each location, a coring machine was used to penetrate the pavement and allow for excavation through the existing basestone layer, where possible. At some locations, a dynamic cone penetrometer (DCP) was used to collect information regarding the consistency of the subgrade and allow for estimation of the pavement support characteristics of the underlying soil. The locations of the pavement core holes is provided on Figure 2 in Appendix A.

Subsequently, exploratory test borings were drilled in areas where bridges and retaining walls are planned. Additional borings were drilled along the alignment of the widened interstate or new ramps. The selection of the boring locations was based on proximity to the layout of the interchange presented to us by Neel-Schaffer and accessibility. Note that some preferred locations required minor lateral adjustments from the staked location to accommodate access. Figure 3 in Appendix A shows the approximate location of each of the exploratory borings. The following table summarizes the exploration performed.

Table 1 Summary of Test Borings

LOCATION	QUANTITY	BORING PREFIX	COMMENTS
Phase I and Phase II			
Alignment Borings	21	A	Terminated at 15 ft or Refusal
Pavement Coring	13	B	Designated as L for travel lane or S for shoulder, two coreholes at each location
Phase I Exploration			
Bridge #2 NB75	4	BN2	BN-21 through BN-24
Bridge #2 SB75	2	BS2	BS-24
Bridge #3 NB75	3	BN3	BN-31, BN-32, BN-34 (BN-33 not drilled)

Bridge #3 SB75	2	BS3	BS-32 and BS-33
Bridge #9	2	B9	B-92 and B-93 (B-91 not drilled)
Spring Creek	6	SCK	SCK 1-3 SB SCK4-6 NB
South Chickamauga Creek	4	SCC	SCC-1 and SCC-4 drilled from golf cart path passing below existing the bridge SCC-2 and SCC-3 drilled from greenway trail passing below existing the bridge
Spring Creek Road	3	SCR	SCR-1 and SCR-3 drilled from Spring Creek Rd, SCR-2 drilled in median of I-24
Phase II			
CSX Railroad	3	CSX	Borings drilled from interstate shoulder
McBrien Road Bridge	2	McB	McB-1 and MCB-2 drilled from McBrien Road
Moore Road Bridge	2	M	M-1 drilled from Moore Road, M-2 drilled from shoulder of I-24 EB
Retaining Walls	6	RW	RW 1-3 drilled on northern side of I-75 near the toe of the existing embankment fill RW 4-6 drilled through the embankment fill from the R shoulder of I-75 NB

Field sampling and test procedures are described in Appendix B. The Test Boring Logs which detail the subsurface conditions encountered at each test boring location are included in Appendix C. The field testing procedures used for drilling and sampling are included in Appendices D. Procedure matrices for classification of subsurface materials encountered are provided in Appendix E for both the USCS Classification and AASHTO classification systems.

2.0 GEOLOGIC CONDITIONS

2.1 SITE GEOLOGY

The site is located in Chattanooga, Tennessee within the Valley and Ridge Physiographic Province. The Valley and Ridge is characterized by folded sedimentary rock composed of limestone, dolomite, sandstone, shale, and siltstone. Folding of the units formed as systems of anticlines and synclines developed. The forces causing the folding also resulted in the formation of a series of faults throughout the Valley and Ridge. In the Chattanooga area, many of the faults are low-angle, shallow, thrust faults. This type of faulting in conjunction with the folding resulted in many nonconformable contacts between geologic units.

The majority of the project area is underlain by Ordovician-aged carbonate rock collectively called the Chickamauga Supergroup. The Supergroup is composed of the equivalent units of the Chickamauga Group (Reedsville Shale, an unnamed limestone unit, Moccasin Formation, Bays Formation, Ottosee Shale, Holston Formation (red limestone), Lenoir Limestone, Athens Shale, and Sevier Shale) and the Nashville Group (Hermitage Formation and Bigby-Cannon Limestone, Leipers-Catheys Limestone). Locally, the Chickamauga Group consists of mostly limestone units with some minor shale.

At the eastern end of the project area, the site is underlain by the Knox Group. The Knox Group is an undifferentiated grouping of siliceous limestone and dolomites (Newala Formation, Mascot Dolomite, Kingsport Formation, Longview Dolomite, Chepultepec Dolomite, and Copper Ridge Dolomite). Zones of sandstone shale and quartzite are also contained in the group.

Geologic maps indicate that a thrust fault zone is present at the contact between the Chickamauga and the Knox in the eastern portion of the site, approximately following the CSX Railroad crossing of the project site. The change can be observed in the area topography, where the ground at lower elevations with minor topographic undulations generally indicate areas underlain by the Chickamauga Super-Group, while the area of the site where the hillier areas are located generally indicate areas underlain by the Knox. A generalized geologic map from the public domain is provided as Figure 4.

2.2 GEOLOGIC HAZARDS

Many of the faults in the area are considered incapable or inactive. However, earthquakes are known to occur within the region. Past events generally point to lower magnitude events located at relatively short distances to the epicenter, or greater magnitudes at greater distances to the epicenter. The higher magnitude events potentially impacting the area include the New Madrid Fault Zone and fault system located near Charleston, South Carolina.

The site is located in an area underlain by carbonate bedrock. Limestone and dolomite, to a lesser extent, are subject to chemical solution weathering, especially along predisposed planes of weakness, such as faults,

joints and bedding planes. Such weathering often results in the formation of irregular rock surfaces, including: pinnacles, slots, sloping surfaces, clay filled seams and open cavities. Water moving through the subsurface system can create erosion channels, which over time may increase in size. These channels can lead to the formation of underground voids and ultimately sinkholes.

During the exploration, we did not observe direct evidence of sinkhole development. However, because of the geologic conditions, the risk of sinkholes is present within the project area.

3.0 SITE CONDITIONS

3.1 I-75 STATION 321+00 TO 370+00

Near the start of the project area to the northern side of the Spring Creek bridge crossing, I-75 south of the interchange with I-24, was constructed on embankment fills crossing flood areas associated with South Chickamauga Creek and Spring Creek, especially north of Exit 1 and around and behind the Welcome Center. These areas typically are inundated during seasonally wet times of the year and during flood events. The ground surface in the lower lying areas generally have soft soil near the surface, especially in the surficial organic zone.

The route for the new ramp connecting from the existing Bass Pro Parking lot to the I-75 NB ramp from Ringgold Road through the Welcome Center area will cross over the existing embankment slope and existing fills used to construct the existing entrance and exit ramps servicing the Welcome Center. The lower-lying land on the eastern side of the fill embankments has a relatively thick organic layer noted to be soft. Hand probes in the area indicate stiffer soil is present within about a foot of the surface in some areas, and deeper in other areas.

3.2 I-75 STATION 370+00 TO STATION 407+00

From the northern side of the Spring Creek crossing, the interchange with I-24 begins. Within the interchange with I-24, the roadways continue to be elevated on embankment fills and bridge structures, with low, poorly-drained areas in the median areas. Some of the median areas have been previously filled, some of the fill materials placed included broken concrete debris materials from previous demolition of Interstate pavements on past projects. Concrete rubble was observed at the surface in the flatter area immediately south of the I-75S to I-24W ramp and in northern part of the area bounded by I-75N, I-75N to I-24W and I-24E to I-75N.

Soft, poorly drained soils were present in the lower-lying areas of the median sections, especially between the I-75 ramps. Thick brush and tall grass was present in and around some of these areas, indicating inability to mow and maintain the areas as well as the majority of the median areas.

3.3 I-75 STATION 407+00 TO 443+00

Interstate 75 near Exit 4 begins in rolling terrain and slopes down to lower-lying areas with less topographic relief. The roadways through this area are primarily constructed on fill embankments to maintain grades and elevate the roadway above adjoining flood areas. The flood prone areas generally begin along the golf course and extend to the interchange along both sides of I-75 except for the northern side of the I-75 corridor west of South Chickamauga Creek.

3.4 I-75 STATION 443+00 TO STATION 476+00

Interstate 75 near Exit 4 begins in rolling terrain and slopes down to lower-lying areas with less topographic relief. The roadways through this area are primarily constructed on fill embankments to maintain grades and elevate the roadway above adjoining flood areas. The flood prone areas generally begin along the golf course and extend to the interchange along both sides of I-75 except for the northern side of the I-75 corridor west of South Chickamauga Creek.

3.5 I-24 STATION 112+00 TO STATION 175+00

Interstate 24 beginning between Belvoir Road and Moore Road is generally constructed on natural ground or relatively thin fill sections as I-24 approaches the Spring Creek Road overpass. Parallel frontage roads located on either side of the interstate are generally at higher elevations than the interstate traffic lanes.

3.6 I-24 STATION 175+00 EAST INTO THE INTERCHANGE WITH I-75

The ramps from I-24 to I-75 are constructed on embankment fills as the interstate enters the lower lying flood prone areas on the southern end of the interchange. On the northern end of the interchange, the surrounding ground conditions are generally higher and better drained than those on the southern portion of the interchange. Fill soil, including a swath of concrete rubble fill is present along the southern side of I-75 SB ramp to I-24 WB.

4.0 SUBSURFACE CONDITIONS

4.1 PAVEMENT CORING

The existing pavement conditions were explored with 26 pavement cores, numbered B-1 through B-13 (BL stands for core hole in lane, BS stands for core hole in shoulder). TDOT crews surveyed the general boring locations. KSWA located the pavement cores at each location. The pavement cores were obtained with mechanical core drilling equipment. In the travel lanes, the thickness of the asphalt averaged about 16 inches of asphalt overlying 16 inches of basestone. Where concrete was present in the travel lane, the concrete averaged about 12 inches thick overlying an average of 15 inches of basestone. The thickness of the basestone below the concrete varied widely, with most of the locations being close to 10 inches of basestone. The pavement thicknesses are listed below in Table 2.

Dynamic Cone Penetrometer (DCP) Tests - To evaluate the consistency and pavement support characteristics in the underlying soil, DCP tests were performed at some locations. The DCP values were used to estimate the California Bearing Ratio (CBR) of the subgrade material.

Table 2: Summary of Pavement Thicknesses

TRAVEL LANE					SHOULDER				
Boring No.	Pavement type	Pavement Thickness (in.)	Base Material Thickness (in.)	Total Thickness (in.)	Boring No.	Pavement type	Pavement Thickness (in.)	Base Material Thickness (in.)	Total Thickness (in.)
BL-1	Asphalt	15	12	27	BS-1	Asphalt	3 3/4	8 1/2	12 1/4
BL-2	Asphalt	18	19	37	BS-2	Asphalt	14	27	41
BL-3	Asphalt	19	17	36	BS-3	Asphalt	14 1/2	18 1/2	33
BL-4	Asphalt	18	16	34	BS-4	Asphalt	15 1/2	32 1/2	48
BL-5	Asphalt	19	n/a		BS-5	Asphalt	19 1/2	19 1/2	39
BL-6	Asphalt	11 1/2	15	26 1/2	BS-6	Asphalt	2 1/2	8 3/4	11 1/4
BL-7	Asphalt	18	21	39	BS-7	Asphalt	13 3/4	19 1/4	33
BL-8	Asphalt	13 1/2	13	26 1/2	BS-8	Asphalt	2 1/2	22	24 1/2
BL-9	Concrete Asphalt	12 1/2 2 1/2	21 1/2	36 1/2	BS-9	Asphalt	2	10 1/2	12 1/2
BL-10	Concrete	11 3/4	8	19 3/4	BS-10	Asphalt	8 3/4	19 1/4	28
BL-11	Concrete	12 1/4	9 1/4	21 1/2	BS-11	Asphalt	5	17 1/4	22 1/4
BL-12	Concrete	12 1/2	25 1/2	38	BG-12	Concrete	10	24	34
BL-13	Concrete	10 1/2	10 1/2	21	BS-13	Asphalt	10	13	23
ASPHALT	**Average**	**16.50**	**16.67**	**33.25**	ASPHALT	**Average**	**9.31**	**18.00**	**27.31**
CONC	**Average**	**10.33**	**14.95**	**27.21**	CONC	**Average**	**10.00**	**24.00**	**34.00**

From the DCP test results, the following CBR Values were estimated. Wet soil conditions were noted in the soil at the subgrade elevation and in the basestone layer at the base of the paving where noted.

Table 3: Estimated CBR Values

Boring Location	Estimated CBR Value	Comments
B-1	2	Wet Soil
B-5	4	Wet Soil
B-6	5	Wet Soil
B-9	12	
B-13	11	

CBR Values estimated from DCP Values

4.2 SOIL AND BEDROCK CONDITIONS

Soil encountered by the borings varied along the alignment, but generally encountered existing fill soil underlain in some cases by alluvial soil, followed by residual soil before encountering auger refusal. Some of the alignment borings, planned for a depth of 15 feet below the ground surface, reached the termination depth without encountering auger refusal or, in some cases, reaching the bottom of the existing fill interval.

The bedrock encountered in most of the borings where rock was cored consisted of hard, gray, argillaceous, limestone with seams of dark gray shale. Based on the elevations auger refusal was encountered, weathering of the limestone appears to have created an undulating surface, with areas of localized weathering where the bedrock surface has near vertical weathering features creating slots of deeper soil cover. In these areas, locally steep sloping rock is present. This was noted in several locations where the steep surface caused drilling tools to wander, following the angle of the rock surface. In some of these cases, the condition was severe enough to cause the boring to be abandoned as noted on the logs. Rock quality was generally good to excellent after penetrating the upper 1 to 5 feet of bedrock. Lower-quality rock was encountered in some locations at greater depth, but appeared to be a more aberrant condition in this formation.

The following sections describe the conditions in more detail, focusing on differences or highlights to the descriptions given above. Additional information can be found on the boring logs, including natural moisture and Atterberg limit data. Laboratory test results not shown on the borings logs are provided in Appendix G of this report.

4.3 I-75 STATION 321+00 TO 370+00

Borings drilled in this area encountered existing fill soil underlain by alluvial soil, in some cases, followed by residual soil. Fill soil was found to consist of reddish-brown, cherty, silty clay within the pavement areas

throughout most of this stretch of interstate, except as the interstate approached the Spring Creek bridges, where the embankment fill was composed of gray and brown silty clay. Similar fill materials were encountered around the entrance and exit ramps for the Welcome Center. Borings drilled except the SPT values indicated the consistency of the soil was generally softer.

Two borings were drilled outside the limits of the existing fill embankments in the lower elevations to the east and west of the intestate corridor. These borings encountered a thin layer of fill, apparently placed when the access roads to billboards were constructed. Below this layer, firm to stiff, silty clay was encountered. These soils were generally wet and of poor quality as they are believed to be moisture sensitive.

Bedrock encountered in the vicinity of the existing bridges over Spring Creek encountered hard, gray, argillaceous limestone. The quality of the rock encountered was mostly good to excellent, except at SCK-3 which encountered about 7 feet of weathered rock and mud seams before encountering rock of good quality.

4.4 I-75 STATION 370+00 TO STATION 407+00

Most of the existing fill soil encountered below the soft wet areas and concrete rubble was composed of brown and gray silty clay and clayey silt of varying consistency, but was generally firm (medium stiff) to stiff. Auger refusal elevations varied within an interval of 643 to 659. The degree of weathering varied from about 3 feet to as much as 15 feet before rock of good to excellent quality was encountered. Rock quality did not appear to have a direct correlation to the elevation at which refusal was encountered because deep weathering was encountered throughout the auger refusal range. Bedrock consisted of hard, gray, argillaceous, limestone.

4.5 I-75 STATION 407+00 TO 443+00

Alluvial soils, consisting of silty clay, clayey silt and intervals of brown sand were encountered along the northern side of the embankment fill in RW-1 through RW-3 and SCC-1 and SCC-4(4A). Similar soils were encountered below the embankment fill in RW-4 through RW-6. Residual soil was encountered below the alluvial soil layer.

At SCC-2, shallow auger refusal was encountered. After coring through about a foot and a half of limestone, an interval of soil about 12 feet thick was encountered. Sloping rock surface conditions were encountered at SCC-4. Because the drilling tools were turning to follow the shape of the rock surface, the boring had to be abandoned after reaching a depth of 30 feet in favor of an offset boring, which encountered rock at about 17 feet. SCC series borings encountered bedrock (except as noted above) between 14 and 18 feet below the ground surface. Rock quality in these borings was generally good to excellent.

In the lower portion of the soil profile above the auger refusal depth, RW-1, RW-2, and RW-4 encountered weathered shale. Auger refusal in these borings was noted as the condition of the shale gradually improved until penetration with soil augers was no longer practical.

4.6 I-75 STATION 443+00 TO STATION 476+00

Borings drilled from the shoulder in this area encountered relatively thick intervals of existing fill, about 20 to 30 feet, before residual soil was encountered. The fill and the underlying residual soil was generally composed of reddish-brown, yellowish-brown and light brown silty clay containing chert fragments and some sand. Sand in this soil was typically seen as remnants of weathered chert. These soils are typical of the type of soil encountered in areas underlain by the Knox Group.

Bedrock encountered by the borings CSX-1 through CSX-3 was composed of hard, gray, siliceous dolomite. Calcite healed fractures were common in the recovered core. Drilling operations reported slow penetration rates and above normal wear on drilling tools. At CSX-1 and the offset boring drilled after CSX-1 was abandoned, floating brecciated rock above the steeply sloping surface was noted. Both attempts as CSX-1 were unsuccessful in recovering measurable rock core. As noted previously, we believe this location is within or near a thrust fault zone.

4.7 I-24 STATION 112+00 TO STATION 175+00

Except where fill soil was encountered, the residual soil profile in this area is relatively thin, less than about 15 feet, and in some cases less than 10 feet. Residual soils were found to be composed of stiff to very stiff, brown and gray, silty clay. A layer of black to brown sand was encountered between about 1 and 3 feet below the surface in boring A-8, located within the median on the western side of Spring Creek Road.

The bedrock encountered at the two bridges in this section, Moore Road and McBrien Road overpasses, was different. At M-1 and M-2 (Moore Road), pink to dark red limestone and gray, brown and green calcareous shale was recovered. The rock quality varied from fair to good, but the recovery percentages were good to excellent. Fractured zones within the rock were common. Most of the fractures appeared to be closed but some weathering was encountered on open fractures. The higher degree of fracturing is believed to be related to a thrust fault zone located west of the project area. Bedrock encountered at McB-1 and McB-2 (McBrien Road) returned to the hard, gray, argillaceous limestone. The upper 5 feet of coring at McB-1 encountered significant weathering and mud seams. The remainder of the rock quality was good to excellent.

4.8 I-24 STATION 175+00 EAST INTO THE INTERCHANGE WITH I-75

Borings drilled around the existing Spring Creek Road bridge abutments (SCR-1 and SCR-3) encountered 12 to 20 feet of existing fill soil underlain by residual soil before encountering auger refusal. One boring was drilled from the median of the interstate between the two overpasses (SCR-2). About 5 feet of fill soil was encountered at SCR-2 followed by residual soil. The fill soil was generally composed of brown and gray silty clay, similar to the underlying residual soil. SPT Values in the fill interval showed the filled to be mostly stiff, but became firm to soft toward the bottom of the fill interval. Residual soils were generally firm to stiff.

Overall, the bedrock encountered by these three borings was good to excellent, except for some areas of weathered shale and a deep mud seam encountered in SCR-1.

Borings drilled for Bridge #9, planned for the I-75 NB ramp to I-24 WB, encountered brown and gray silty clay down to auger refusal. Most of the soil encountered was found to be stiff, except near the surface in B-93 where the soil was soft to medium stiff down to a depth of about 4 feet. Bedrock encountered consisted of hard, gray, limestone of good to excellent quality, except for some weathering encountered in the upper four feet of the core recovered in B-93.

Alignment borings drilled in this area encountered existing fill underlain by residual soil. The existing fill varied between reddish-brown, silty clay and brown and gray silty clay. Most of the fill soil was found to be stiff to very stiff, but some areas of soft to firm fill soil was found, especially toward the lower portion of the fill intervals and in the median gore where I-24 EB ramps split to I-75 NB and SB.

4.9 BORING SUMMARY

The following table provides a summary of all borings drilled, showing the surface elevations, thickness of fill encountered, auger refusal elevation, and estimated elevation of the start of good-to-excellent quality rock. Additional information and comments about the conditions are also provided in the summary table. Conditions can vary from between locations, including significant variations even at close distances due to the nature of the weathering and variability in the surface of the bedrock. Please refer to the boring logs for additional information. Figure 5 in Appendix provides graphical summary diagrams for different sections. Because specific bridge profiles are not developed at this time, the diagrams refer to baselines shown on Figure 3 sheets.

Table 4: Summary of Boring Data

Boring No.	Surface Elevation	Soil Drill Depth (ft)	Auger Refusal?	Depth Cored (ft)	Total Depth	Existing Fill Thickness (ft)	Elev GW (ft)	Approximate Top of Rock Elevation	Base of Signficant Weathering Elevation	Comments
Alignment Borings										
A-01	717.3	15	NO	X	15	15	X	X	X	Cherty, silty, clay FILL
A-02	718.7	15	NO	X	15	15	X	X	X	Cherty, silty, clay FILL
A-03	675.3	5	YES	X	5	X	X	670.3	X	Shallow Refusal at 5 ft
A-04	670	14	YES	X	14	5.5	X	656.04	X	Hole moved approx 10 feet offset from stake and approx -2 feet in elevation.
A-05	680.2	15	NO	X	15	8	X	X	X	CONCRETE RUBBLE to 5 ft
A-06	680.6	15	NO	X	15	11	X	X	X	CONCRETE RUBBLE TO 4.5 ft
A-07	677.4	15	NO	X	15	12.5	X	X	X	
A-08	673.9	14.7	YES	X	14.7	3.5	X	659.2	X	Possible FOUNDRY SAND, could be RAP
A-09	673	5.5	YES	X	5.5	X	X	667.5	X	Shallow Refusal at 5.5 ft
A-10	684.5	9.4	YES	X	9.4	4.9	X	675.1	X	
A-11	680.5	9.3	YES	X	9.3	3.2	X	671.2	X	Moved hole to 4.9 offset
A-12	674.1	15	NO	X	15	8	X	X	X	
A-13	679.3	14.7	YES	X	14.7	5.5	X	664.6	X	
A-14	679.2	15	NO	X	15	9	X	X	X	Moved hole to 7.4 offset
A-15	680.3	15	NO	X	15	11.5	X	X	X	Hole is 5.1 feet offset
A-16	662.9	10.8	YES	X	10.8	3	X	652.1	X	Hole moved approx 10 feet NE of the stake
A-17	681*	15	NO	X	15	11	X	X	X	
A-18	680.1	15	NO	X	15	10	X	X	X	
A-19	677.4	15	NO	X	15	7	X	X	X	
A-20	678.5	15	NO	X	15	7.5	X	X	X	
A-21	661.8	10.5	YES	X	10.5	X	X	651.3	X	thick topsoil, FAT, wet clay
BRIDGE No. 2										
BN21	667.9	12	YES	10	22	8.5	662.4	655.9	649	Soft Soil to 5 ft, GW at 5.5
BN22	669.7	14	YES	11.5	25.5	6	X	655.7	647	
BN23	668.5	11.4	YES	12	23.4	X	X	657.1	655	
BN24	680.1	15	NO	X	15	8.5	X	X	X	CONCRETE RUBBLE to 4 ft, SOFT to 13.5, Augers leading off - irregular rock surface
BN24A	680.1	18	YES	12.5	30.5	X	657.6	662.1	650	OFFSET Boring to BN24
BS21								0		Not Drilled - not in revised scope
BS22	670.5	16	YES	11	27	X	X	654.5	648	
BS23								0		Not Drilled - not in revised scope
BS24	669.9	13	YES	16.3	29.3	X	X	656.9	645	SOFT soil to 6 ft

Table 4: Summary of Boring Data (continued)

Boring No.	Surface Elevation	Soil Drill Depth (ft)	Auger Refusal?	Depth Cored (ft)	Total Depth	Existing Fill Thickness (ft)	Elev GW (ft)	Approximate Top of Rock Elevation	Base of Signficant Weathering Elevation	Comments
Bridge No. 3										
BN31	676.9	22.8	YES	12.8	35.6	6	X	654.1	650	Used 4 inch OD auger to drill through concrete
BN32	675.6	19.4	YES	11.1	30.5	8.5	X	656.2	653	Used 4 inch OD auger to drill through concrete
BN33								0		Not Accessible
BN34	664.9	21.1	YES	19.5	40.6	X	646.9	643.8	634	
BS31								0		Not Drilled - not in revised scope
BS32	669.3	12.9	YES	10.2	23.1	X	X	656.4	653	CONCRETE RUBBLE to .5 ft
BS33	674.6	27.9	YES	14.3	42.2	4	X	646.7	642	Moved to Ramp
BS34								0		Not Accessible
Bridge No. 9										
B-91										Not Drilled - not in revised scope
B-92	692.13	35	YES	11.7	46.7	8	X	657.13	655	Moved to Ramp
B-93	671.7*	7	YES	14	21	3	X	664.7	660	Marked loaction was too steep to drill. Moved 40 feet North of marked loction and approx -8 feet in elevation. Elevation marked on the stake is 679.49
Bridges over Spring Creek										
SCK-1	680.2	29.8	YES	14.5	44.3	16.5	X	650.4	645	
SCK-2	680.1	24	YES	12.7	36.7	12	X	656.1	651	5 feet from stake
SCK-3	681.1	29.5	YES	FALSE	29.5	17	X	651.6	644	
SCK-4	680.9	28	YES	10	38	14	X	652.9	650	Offset 7.6 feet from stake
SCK-5	679.4	32.8	YES	15.9	48.7	8	X	646.6	644	
SCK-6	679.9	26.8	YES	13	39.8	6.5	X	653.1	650	
Bridge over South Chickamauga Creek										
SCC-1	666.2	17.5	YES	10	27.5	X	652.2	648.7	645	
SCC-2	667.4	4	YES	27	31	4	X	663.4	646	Limestone encountered near ground surface with large clay seam below.
SCC-3	661.0*	14.3	YES	11.3	25.6	X	X	646.7	645	Boring location moved on greenway trail at side of the bridge.
SCC-4	662.3	30	NO		30	4	649.3	632.3	x	Augers leading off at 30' Abandon and offset, lost center plug, sank ahead of augers
SCC-4A	662.3	17.2	YES	10.1	27.3	X	X	645.1	643	IRREGULAR ROCK SURFACE
Bridge over CSX Railroad										
CSX-1	720.9	86.9	YES	7.4	94.3	28.5	X	634	X	Irregular rock surface, hard abrasive rock, no recovery FAULT ZONE
CSX-1A	720.9	72.5	YES	7.8	80.3	1.5	X	648.4	X	Irregular rock surface, hard abrasive rock, no recovery FAULT ZONE
CSX-2	715.5	55	YES	14	69	18.5	X	660.5	656	
CSX-3	716.0*	57.9	YES	14.8	72.7	22	X	658.1	656	Hard rock, siliceous, low grade metamorphism, brecciated dolomite
Moore Road Bridge										
M-1	699.7	30.1	YES	9.8	39.9	12	X	669.6	666	9.6 feet offset from stake
M-2	680.7	8.1	YES	26.2	34.3	1.6	X	672.6	657	
McBrien Road Bridge										
MCB-1	697.2	27.2	YES	15.2	42.4	18.5	X	670	663	Moved hole 12 feet NE. Elevation 0.5 foot lower than stake. Clay Seams in upper 5 ft of rock
MCB-2	696.6	31.1	YES	11	42.1	16	X	665.5	661	
Spring Creek Road Bridge										
SCR-1	695.9	40.7	YES	14.8	55.5	12.5	X	655.2	649	Hole offset 5.5 feet from stake
SCR-2	677.9	17	YES	12	29	6	X	660.9	656	Offset hole 9.6 feet from stake alond a bearing of N 7' W. Ground surface between stake and hole is realtively flat
SCR-3	694.0	33.7	YES	11.4	45.1	19	X	660.3	659	Had to move the boring due to overhead power offset 19.1 feet SW
Retaining Walls - I-75 Lane Widening along Brown Acres Golf Course										
RW-1	669.2	22	YES	X	22	6	X	647.2	x	
RW-2	668.3	24	YES	X	24	X	655.3	644.3	x	
RW-3	665.8	19.5	YES	X	19.5	8.5	657.8	646.3	x	
RW-4	677.7	33.8	YES	X	33.8	13.5	X	643.9	x	2 tubes in offset auger hole
RW-4A	677.7	23	NO	X	23	X	X	654.7	x	
RW-5	677.8	45.4	YES	X	45.4	13.5	652.8	632.4	x	
RW-6	699.3	47.2	YES	X	47.2	35	X	652.1	x	

* Surface Elevation by GIS, should be considered approximate
All other elevaitons by survey supplied by TDOT

4.10 GROUNDWATER CONDITIONS

Groundwater was observed in some of the borings within the soil profile during drilling. Borings encountering water were generally those drilled within the interchange and/or near Spring Creek (SCK, BN2, BN3, BS2, and BS3) and those near South Chickamauga Creek (SCC and RW). In most cases, groundwater was found to occur in sand layers present in the alluvial soil in the lower-lying areas and trapped in loose fill materials in low-lying areas (especially in the interchange medians). Groundwater levels will vary depending on the time of year, climatic conditions and the degree of construction activities.

4.11 LABORATORY TEST RESULTS

KSWA performed the laboratory testing on split spoon and rock core samples in general accordance with ASTM and AASHTO procedures with results presented on the boring logs or in Appendix F where results require additional space for reporting. The laboratory testing included:

- Natural Moisture Content (AASHTO T 265)
- Atterberg Limit Determination (AASHTO T 89 and T 90)
- Unconfined Compressive Strength Testing - Soil (AASHTO T 208)
- Grain Size Analysis (AASHTO T 27)
- Soil Moisture/Density Relationship Determination (AASHTO T 99)
- Unconfined Compressive Test- Rock

Unconfined compressive strength of selected samples of rock were determined by generally using applicable ASTM methods. Samples of weathered to moderately weathered rock and relatively unweathered rock samples were selected for testing to permit comparison. The results of the rock core compressive strength testing are presented in Table 5.

TABLE 5: SUMMARY OF ROCK CORE COMPRESSIVE STRENGTH TESTING

Test Boring Number	Depth of Sample[2] (feet)	Compressive Strength (psi)[1]	(ksf)[1]
BN-21	13.3-13.7	15,422	2,220
BN-21	20.4-20.8	4,996	710
BN-23	12.5-12.9	7,213	1,030
BN-23	19.0-19.4	8,775	1,260
BN-34	29.2-29.8	7,461	1,070
BN-34	37.3-37.7	10,221	1,470
CSX-2	58.4-58.8	14,253	2,050
CSX-2	64.1-64.5	27,594	3,970
CSX-3	64.0-64.4	6,785	970
M-1	32.1-33.2	2,614	370
M-2	27.3-27.7	6,230	890
MCB-2	31.7-32.1	3,801	550
SCC-1	20.9-21.1	3,194	460
SCK-1	33.0-33.4	5,537	800
SCK-6	33.1-34.2	4,797	690
SCR-1	44.8-45.2	5,217	750
SCR-1	45.6-46.1	4,903	710

[1] Pounds per square inch (psi); Kips per square foot (ksf).
[2] All sample depths are approximate.

5.0 PAVEMENT DESIGN RECOMMENDATIONS

A preliminary design was developed for the project using traffic data supplied by TDOT. The data included average daily traffic (ADT) data for different sections of the interstate. Vehicle load distribution data was also included with the information supplied. This data is located in Appendix H of this report. KSWA evaluated the traffic data along with the conditions encountered during the pavement exploration, soil and groundwater conditions encountered during exploration to provide recommendations for rigid and flexible pavement designs.

The designs are based on subgrade support characteristics similar to a CBR of 6 or greater, with good drainage being provided through the use a drainage layers of stone or underdrains in poorly drained areas. Improvements to the subgrade may be needed in some areas of the lane widening to improve the conditions below existing shoulders and grassed areas alongside the interstate. Imported fill used to construct embankments should be of sufficient quality to produce a CBR value of at least 6.

Provided the pavement subgrade is properly prepared, the following pavement sections are recommended.

Table 6: Pavement Thickness Recommendations

RECOMMENDATIONS	Thickness in Inches											
	Flexible Pavement								Rigid Pavement			
	Base Stone	Surface	Binder	Base			ACC Total	TOTAL THICKNESS	Base Stone	PCC	TOTAL	Dowel Condition
Mainline Interstate	14	1 1/4	2 3/4	8 1/4	A Mix	4	12 1/4	26 1/4	12	9.5	21.5	doweled Joints
					AS Mix	4 1/4			12	12.5	24.5	no dowels
Mainline Shoulder	20 3/4	1 1/2	2 3/4	4	A Mix	4	8 1/4	29	12	12	24	no dowels
					AS Mix	0						
24 Ramps	14	1 1/4	2 3/4	7	A Mix	3 1/2	11	25	12	9	21	doweled Joints
					AS Mix	3 1/2			12	12.5	24.5	no dowels
Ramp Shoulder	20 1/4	1 1/2	2 3/4	3 1/2	A Mix	3 1/2	7 3/4	28	12	9	21	no dowels
					AS Mix	0						
McBrien	8	1 1/4	4				5 1/4	13 1/4	X	X	X	
Spring Creek Road	8	1 1/4	4				5 1/4	13 1/4	X	X	X	
Moore Rd	8	1 1/4	4				5 1/4	13 1/4	X	X	X	
On Ramps	12	1 1/4	2 3/4	6	A Mix	3	10	22	12	9	21	doweled Joints
					AS Mix	3			12	12	24	no dowels
Mill and Overlay	X	1 1/4	2 3/4	X			4	varies	X	X	X	

NOTES:
Rigid Pavement Concrete Strength Modulus of Rupture = 750 psi
Based on Pavement Support Characteristics similar to CBR value of 6, with good drainage
Asphalt Base Mix or Binder may be used below concrete pavement in place of Base Stone.
Shoulder thickness may be thicker if used for mainline traffic during construction.
Base course on shoulders thickened to match total section thickness of adjacent section

6.0 QUALIFICATIONS OF RECOMMENDATIONS

The conditions described in this report were interpreted from our observations at the site and using the information obtained from the test borings that were advanced at the site. Test borings only depict the soil and rock conditions at the specific location and time at which they were made. The soil and rock conditions at other locations on the sites may differ from those occurring at the boring locations.

The conclusions and recommendations for the design of pavements in this report were based on the available subsurface information, the project information provided, and the assumptions previously stated. Additional evaluation of the pavement section is recommended to coincide with particular project limits, traffic routing during construction and other factors.

The scope of our geotechnical services did not include assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater or surface water within or beyond the site studied. Any statements in this report or indicated on the test boring logs regarding odors, staining of soils or other unusual conditions observed are strictly for the information of our client.

Our professional services were limited to developing a geotechnical conditions baseline report and was not intended to act as a design geotechnical study for this project. Additional exploration and evaluation will be need to conform to the requirements of the TDOT Geotechnical Manual for each of the structures. KSWA is not responsible for the conclusions, opinions, or recommendations made by others based upon the data included herein.

Our services include retaining the soil and rock samples obtained during this study for 60 days after report submittal. Further storage or transfer of the samples can be made at the Client's expense upon a written request.

APPENDIX A
FIGURES

Approximate Phase Limits

Approximate Project Limits

Image from Google Earth Pro, 10/2016

N	JOB NO.: 300-18-0001	Site Location Plan		LEGEND	Figure 1
	CLIENT: Neel-Schafferl	**PIN 114174.00**			
	I-75 interchange at I-24 Chattanooga, TN	**I-75 INTERCHANGE AT I-24** **CHATTANOOGA, TENNESSEE**			
NOT TO SCALE	3/29/2018	DRAWN BY: AZ	REVIEWED BY: DH		

KSWA
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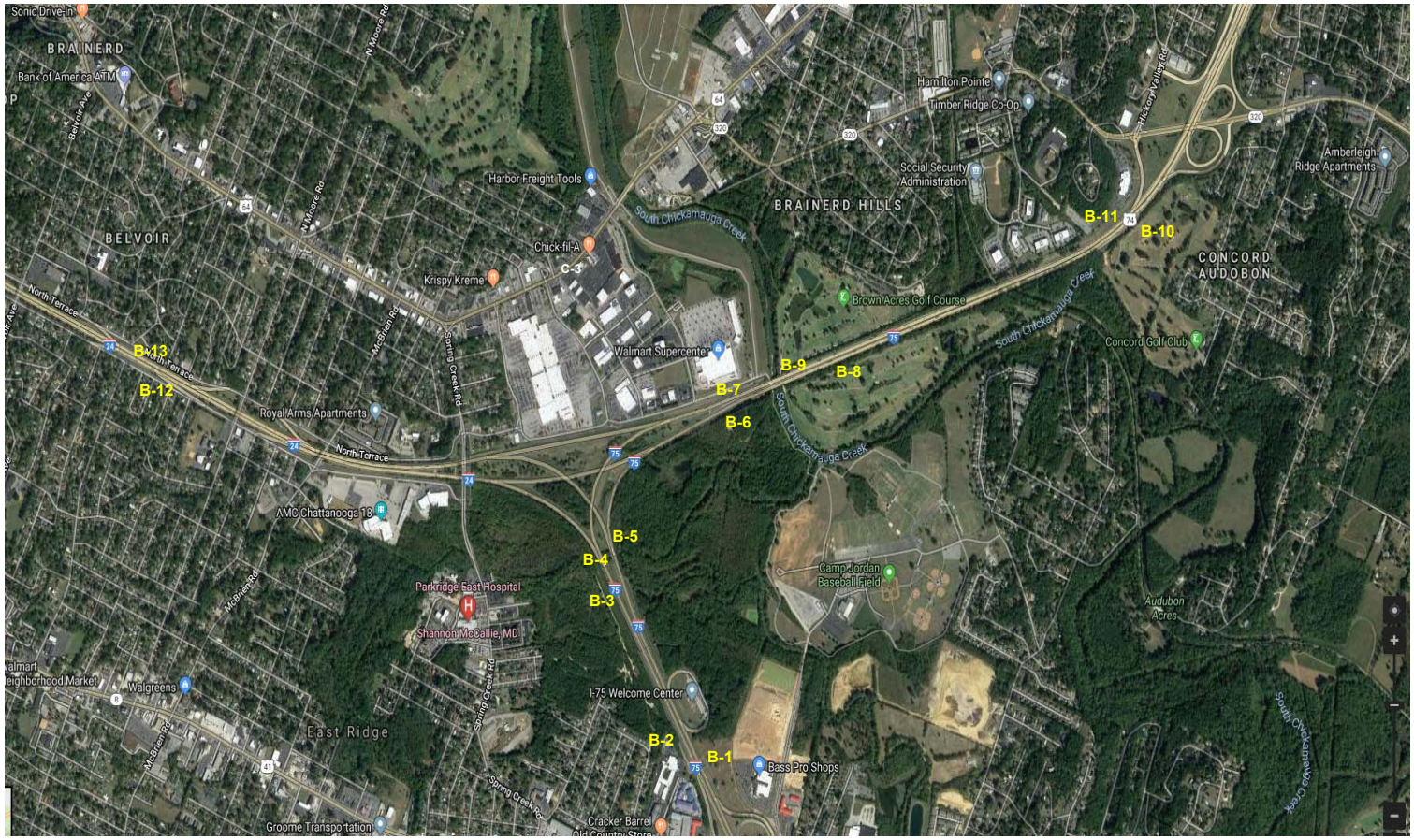

N	JOB NO.: 300-18-0001	Coring Location Plan		LEGEND	Figure 2
	CLIENT: Neel-Schafferl	PIN 114174.00 I-75 INTERCHANGE AT I-24 CHATTANOOGA, TENNESSEE		B-1 Approximate Location of Core Holes on Shoulder and Travel Lane and reference number	
NOT TO SCALE	I-75 interchange at I-24 Chattanooga, TN				
	3/29/2018	DRAWN BY: AZ	REVIEWED BY: DH		

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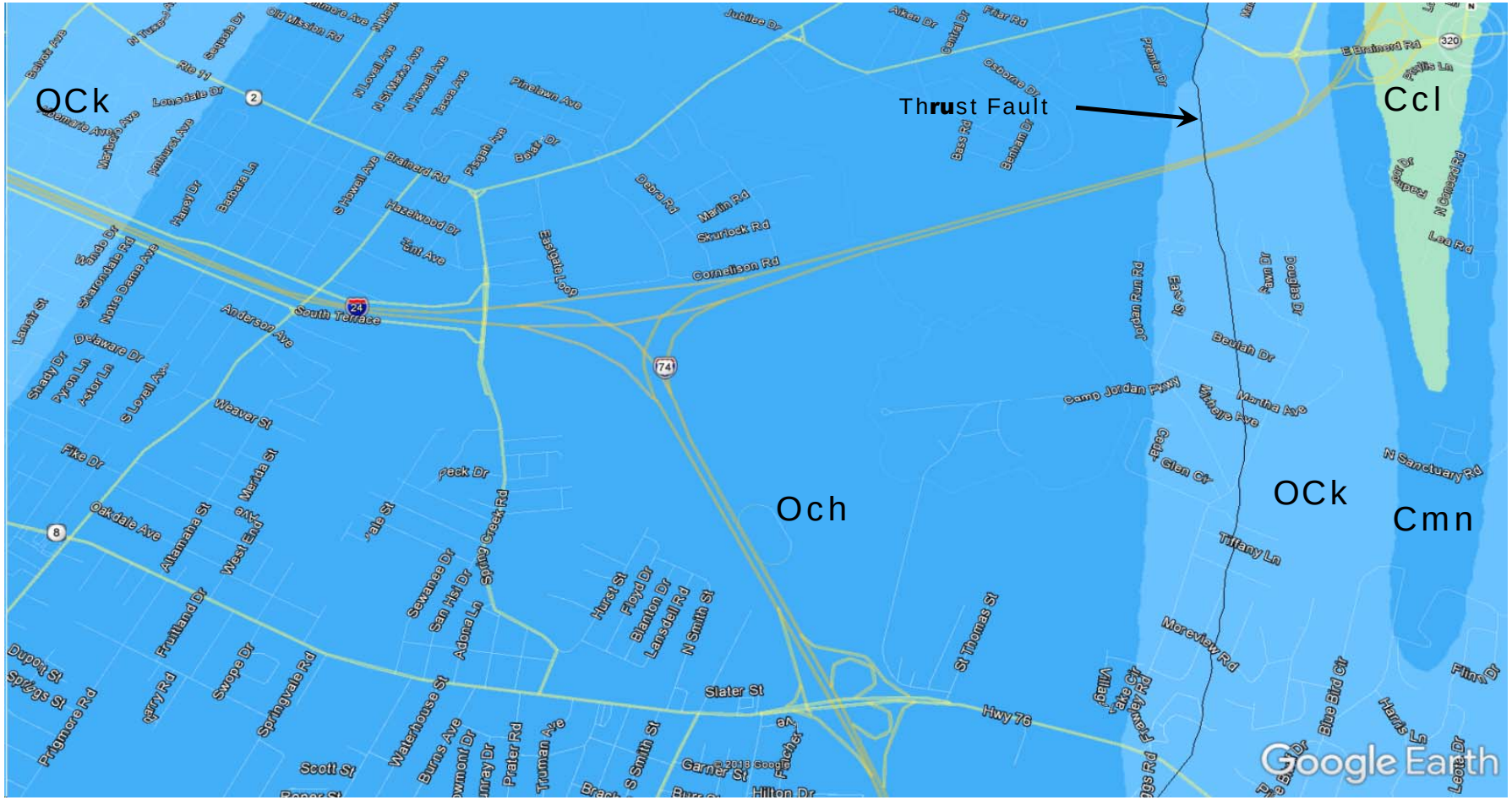

Ccl	Nolichucky Shale, and Maryville, Rogersville, and Rutledge Formations, and Pumpkin Valley Shale	Och	Chickamauga Group
Cmn	Maynardville Limestone	OCk	Knox Group

Map from Google Earth Pro, Geology from Tennessee Department of Geology Metadata

N	JOB NO.: 300-18-0001	Area Geology Map		LEGEND	Figure 4
	CLIENT: Neel-Schafferl				
	I-75 interchange at I-24 Chattanooga, TN	**PIN 114174.00** **I-75 INTERCHANGE AT I-24** **CHATTANOOGA, TENNESSEE**			
NOT TO SCALE	3/29/2018	DRAWN BY: AZ	REVIEWED BY: DH		

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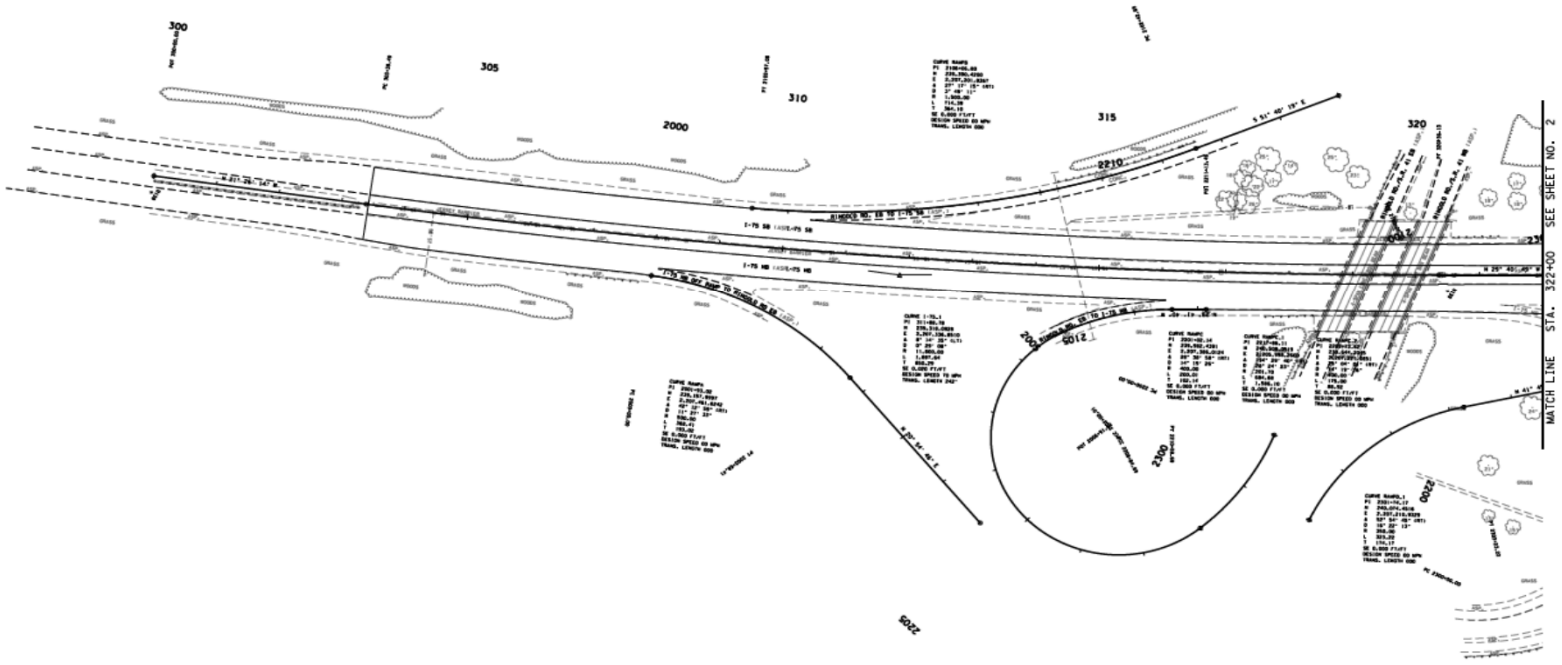
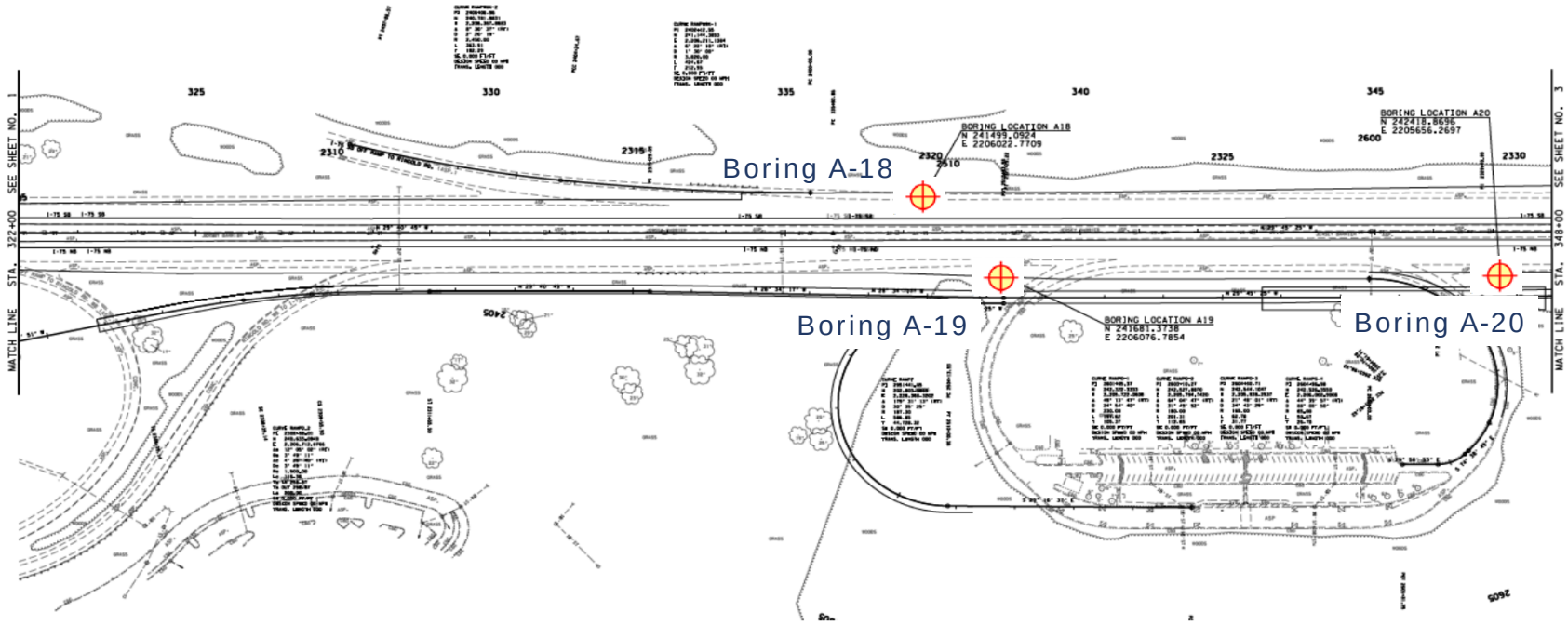
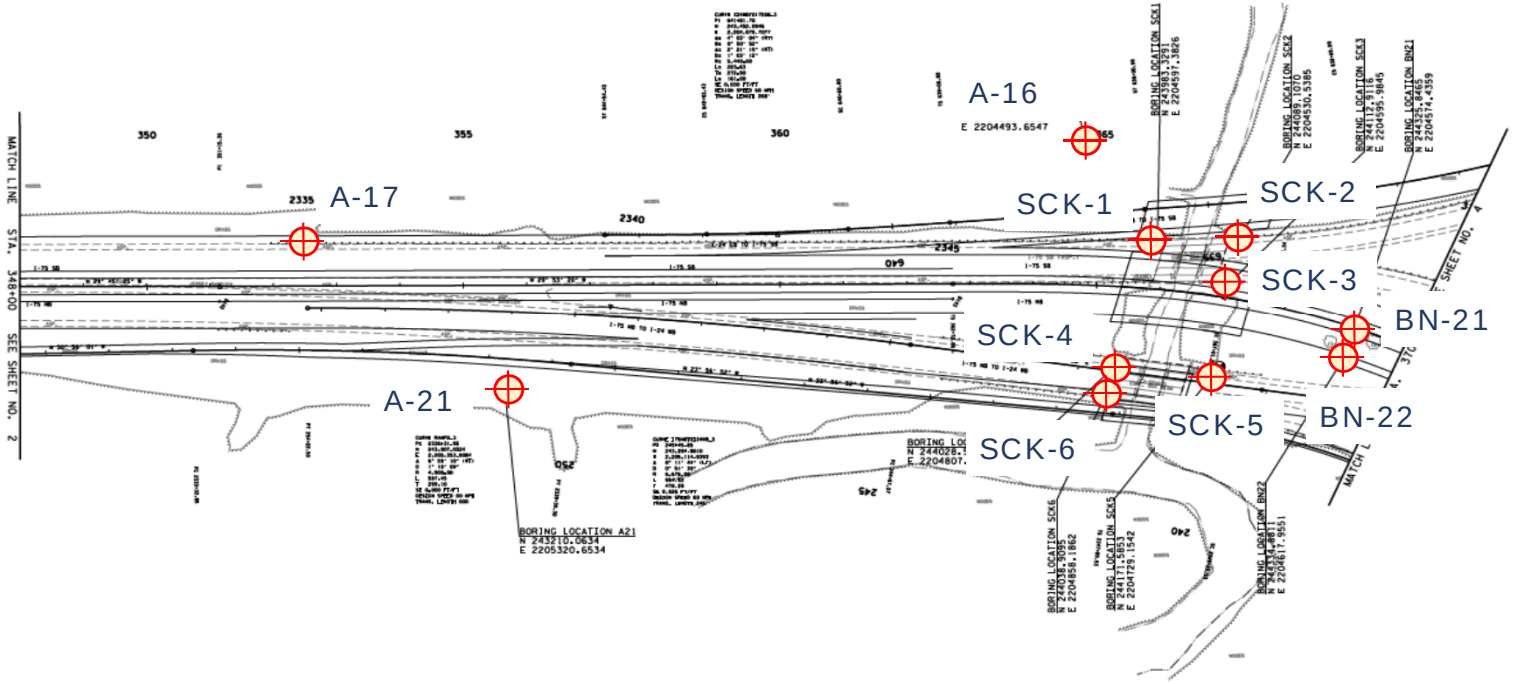


No Borings This Section

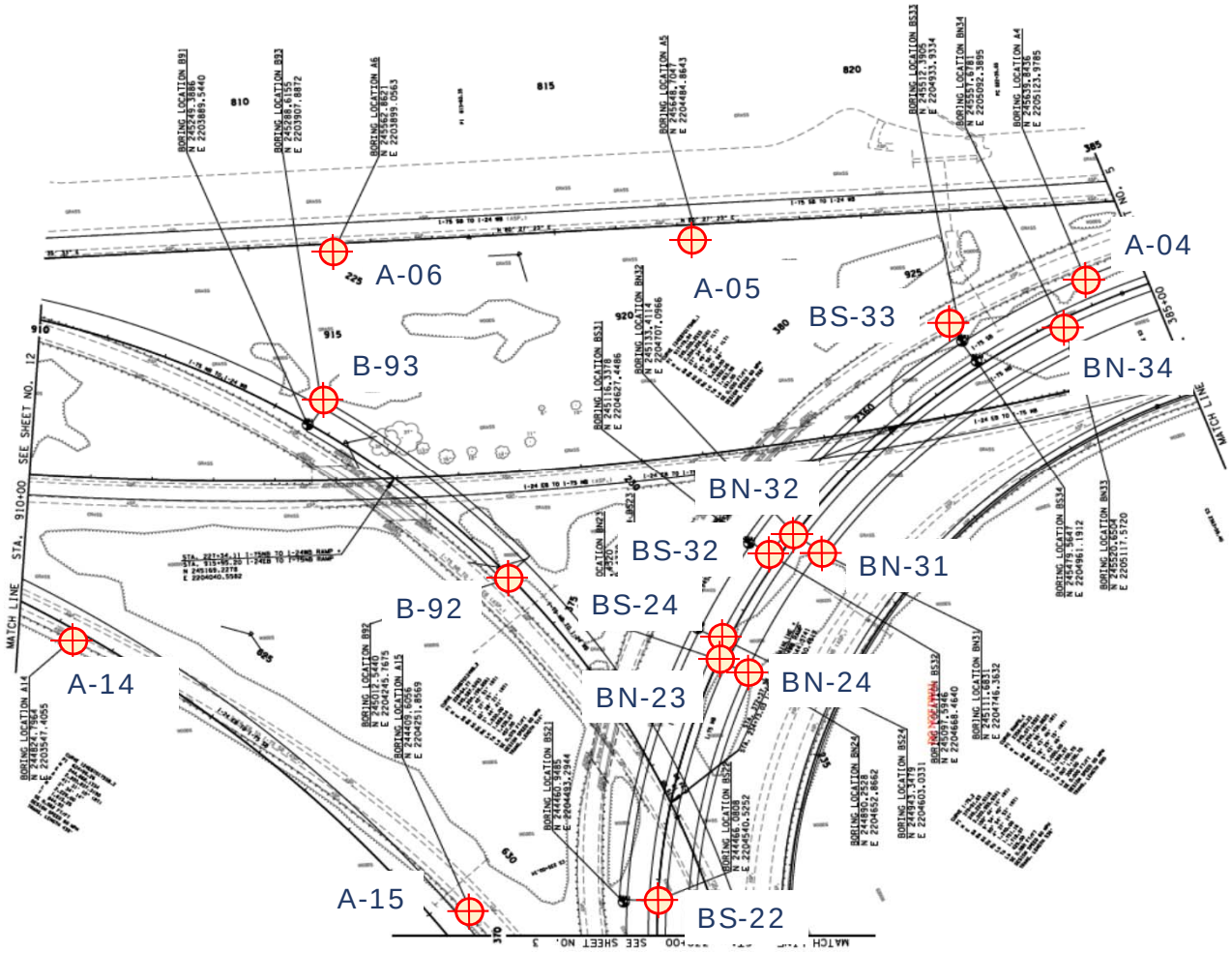
N NOT TO SCALE	JOB NO.: 300-18-0001 CLIENT: Neel-Schaffer I-75 interchange at I-24 Chattanooga, TN 3/29/2018	Boring Location Plan **PIN 114174.00** **I-75 INTERCHANGE AT I-24** **CHATTANOOGA, TENNESSEE** DRAWN BY: AZ / REVIEWED BY: DH	LEGEND Approximate Boring Location A-03 Boring Label	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 3 A



N NOT TO SCALE	JOB NO.: 300-18-0001 CLIENT: Neel-Schaffer I-75 interchange at I-24 Chattanooga, TN 3/29/2018	Boring Location Plan **PIN 114174.00** **I-75 INTERCHANGE AT I-24** **CHATTANOOGA, TENNESSEE** DRAWN BY: AZ REVIEWED BY: DH	LEGEND Approximate Boring Location A-03 Boring Label	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 3 B



N	JOB NO.: 300-18-0001	Boring Location Plan	LEGEND	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 3 C
	CLIENT: Neel-Schaffer				
	I-75 interchange at I-24 Chattanooga, TN	**PIN 114174.00** **I-75 INTERCHANGE AT I-24** **CHATTANOOGA, TENNESSEE**	Approximate Boring Location A-03 Boring Label		
NOT TO SCALE	3/29/2018	DRAWN BY: AZ	REVIEWED BY: DH		



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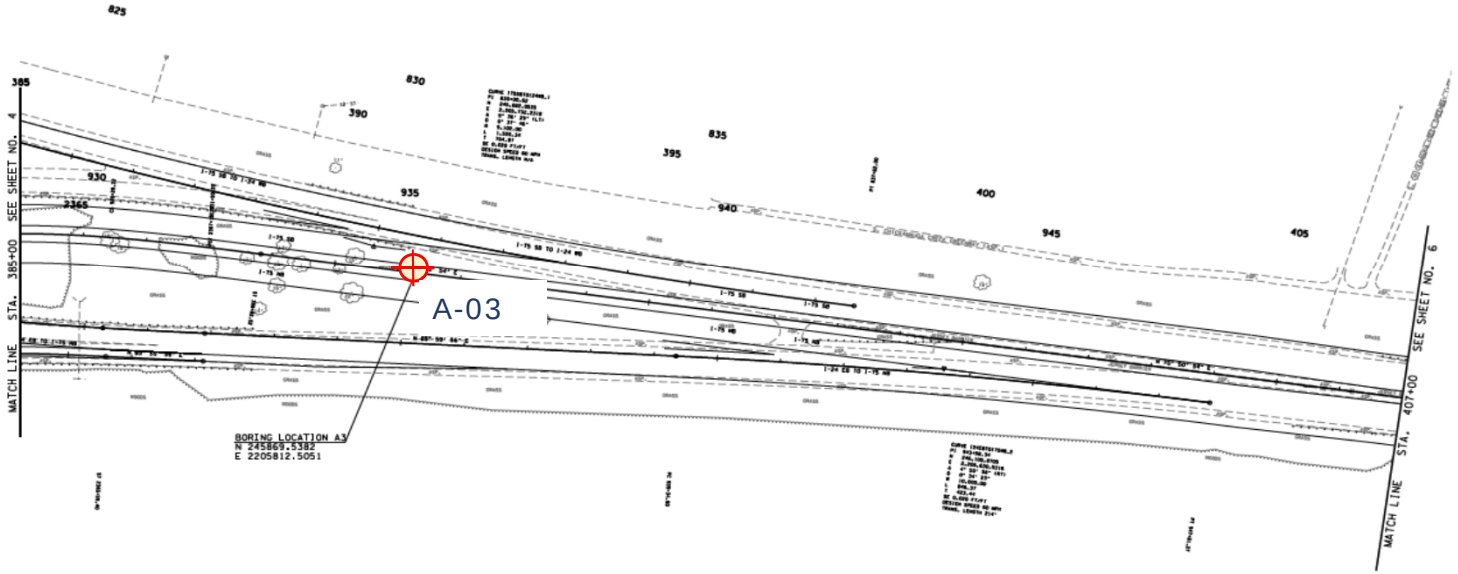
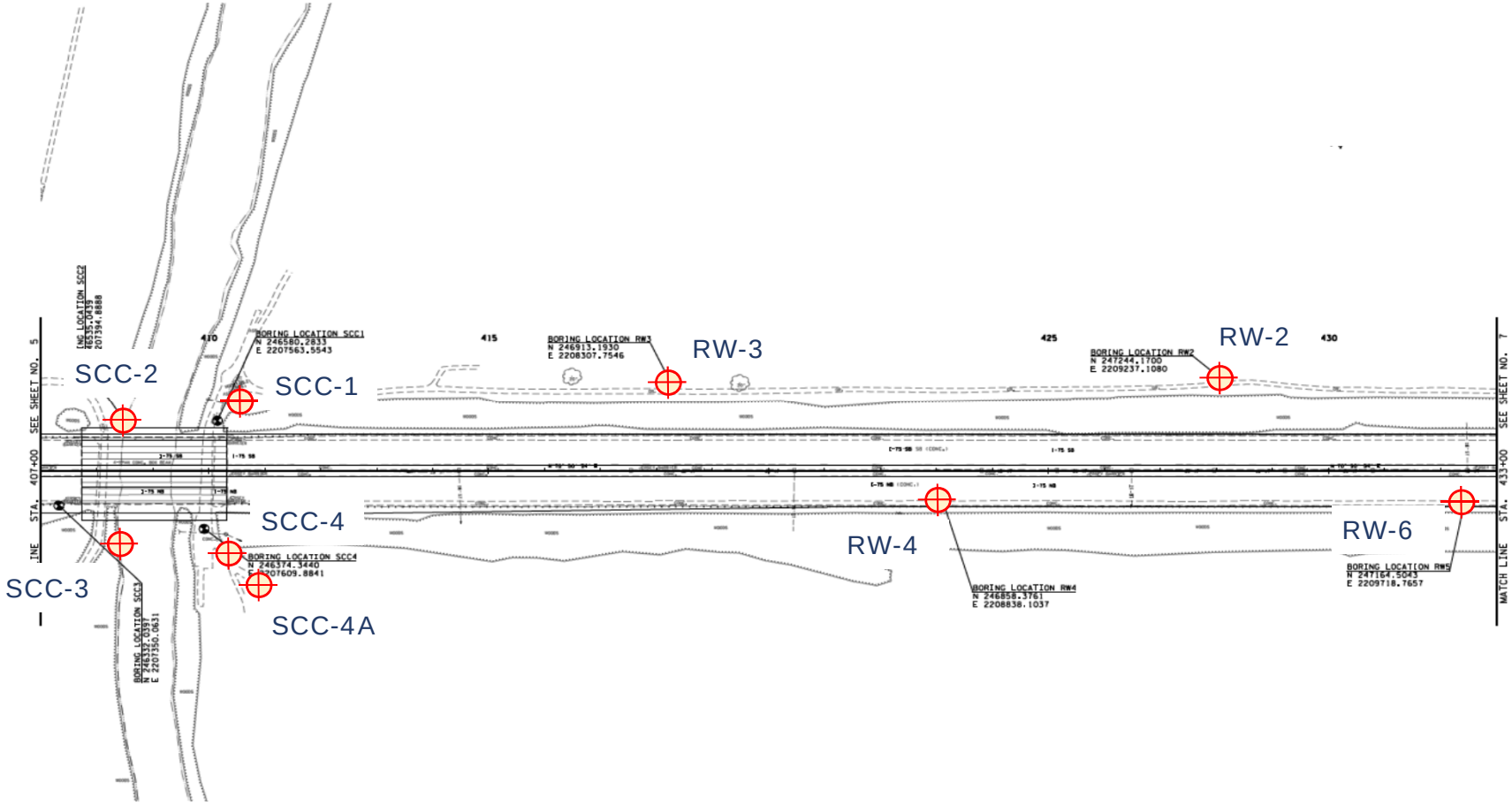
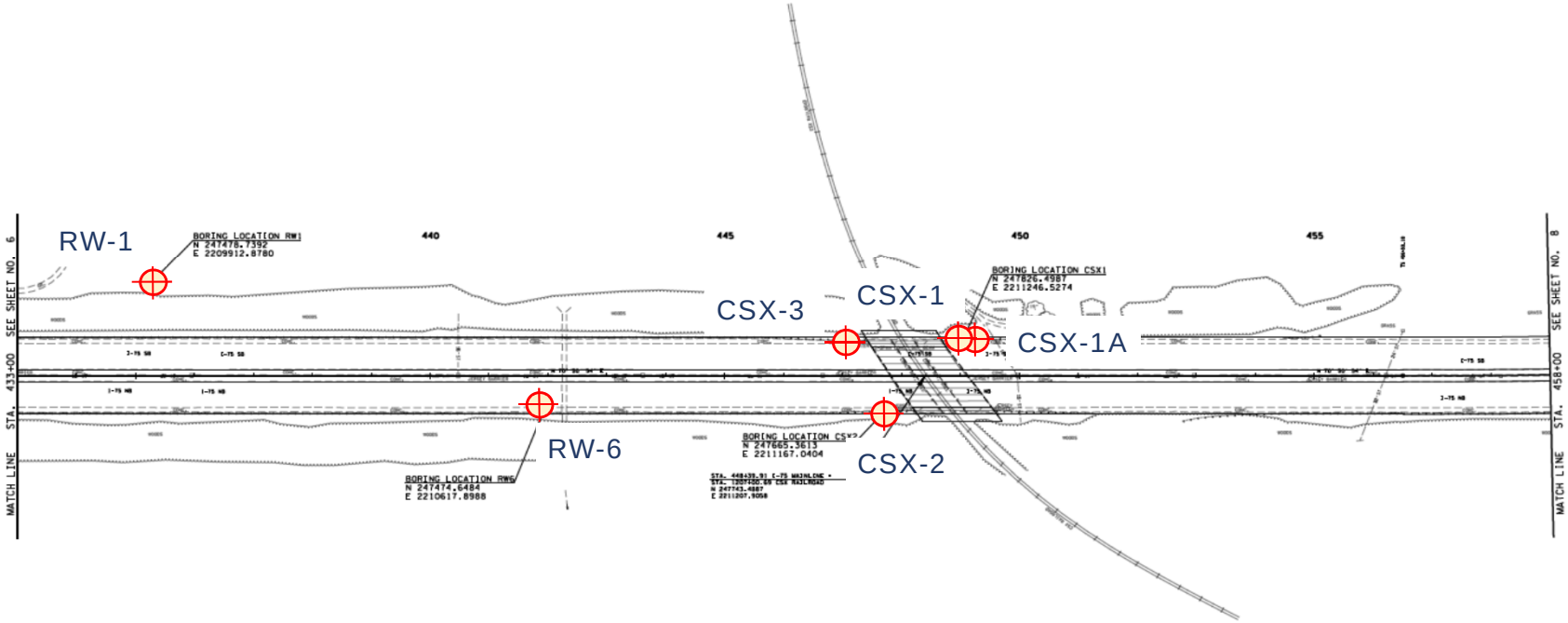


N NOT TO SCALE	JOB NO.: 300-18-0001 CLIENT: Neel-Schaffer	Boring Location Plan	LEGEND	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 3 E
	I-75 interchange at I-24 Chattanooga, TN	**PIN 114174.00** **I-75 INTERCHANGE AT I-24** **CHATTANOOGA, TENNESSEE**	Approximate Boring Location A-03 Boring Label		
	3/29/2018	DRAWN BY: AZ / REVIEWED BY: DH			



N NOT TO SCALE	JOB NO.: 300-18-0001 CLIENT: Neel-Schaffer I-75 interchange at I-24 Chattanooga, TN 3/29/2018	Boring Location Plan **PIN 114174.00** **I-75 INTERCHANGE AT I-24** **CHATTANOOGA, TENNESSEE** DRAWN BY: AZ / REVIEWED BY: DH	LEGEND Approximate Boring Location A-03 Boring Label	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 3 F



N

NOT TO SCALE

JOB NO.: 300-18-0001

CLIENT: Neel-Schaffer

I-75 interchange at I-24
Chattanooga, TN

3/29/2018

Boring Location Plan

PIN 114174.00
I-75 INTERCHANGE AT I-24
CHATTANOOGA, TENNESSEE

DRAWN BY: AZ

REVIEWED BY: DH

LEGEND

Approximate Boring Location

A-03 Boring Label

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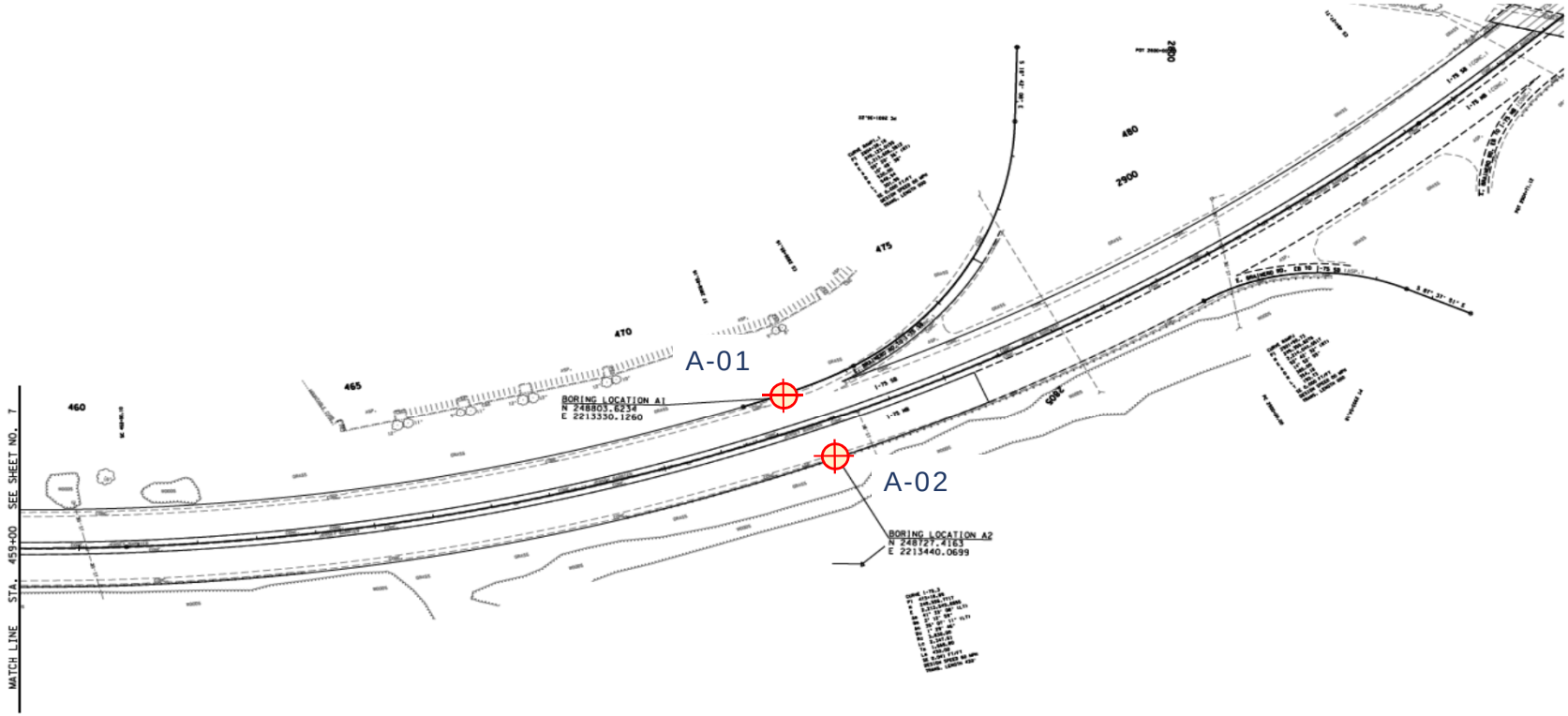
Figure 3 G



N

NOT TO SCALE

JOB NO.: 300-18-0001

CLIENT: Neel-Schaffer

I-75 interchange at I-24
Chattanooga, TN

3/29/2018

Boring Location Plan

PIN 114174.00
I-75 INTERCHANGE AT I-24
CHATTANOOGA, TENNESSEE

DRAWN BY: AZ

REVIEWED BY: DH

LEGEND

Approximate Boring Location

A-03 Boring Label

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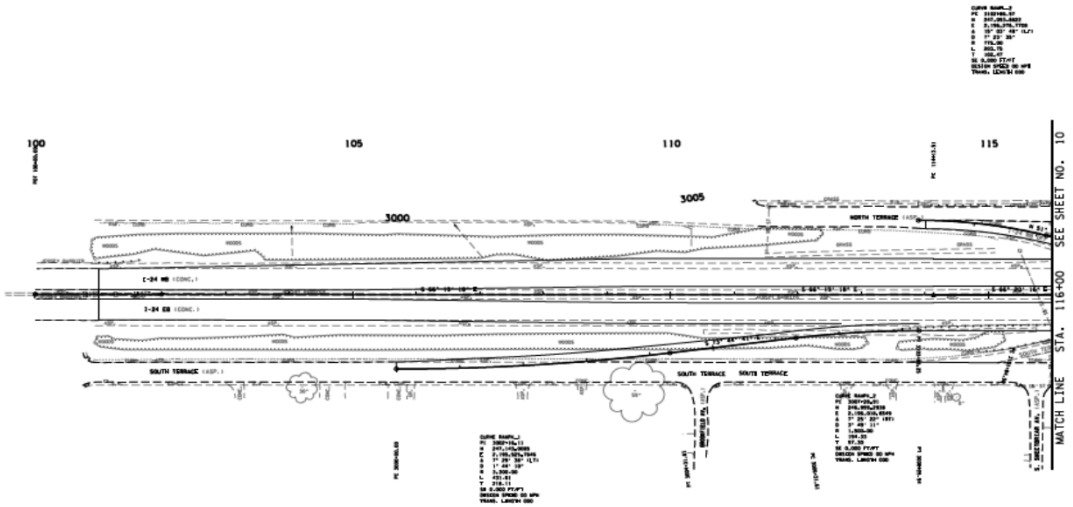
Figure 3 H



No Borings This Section

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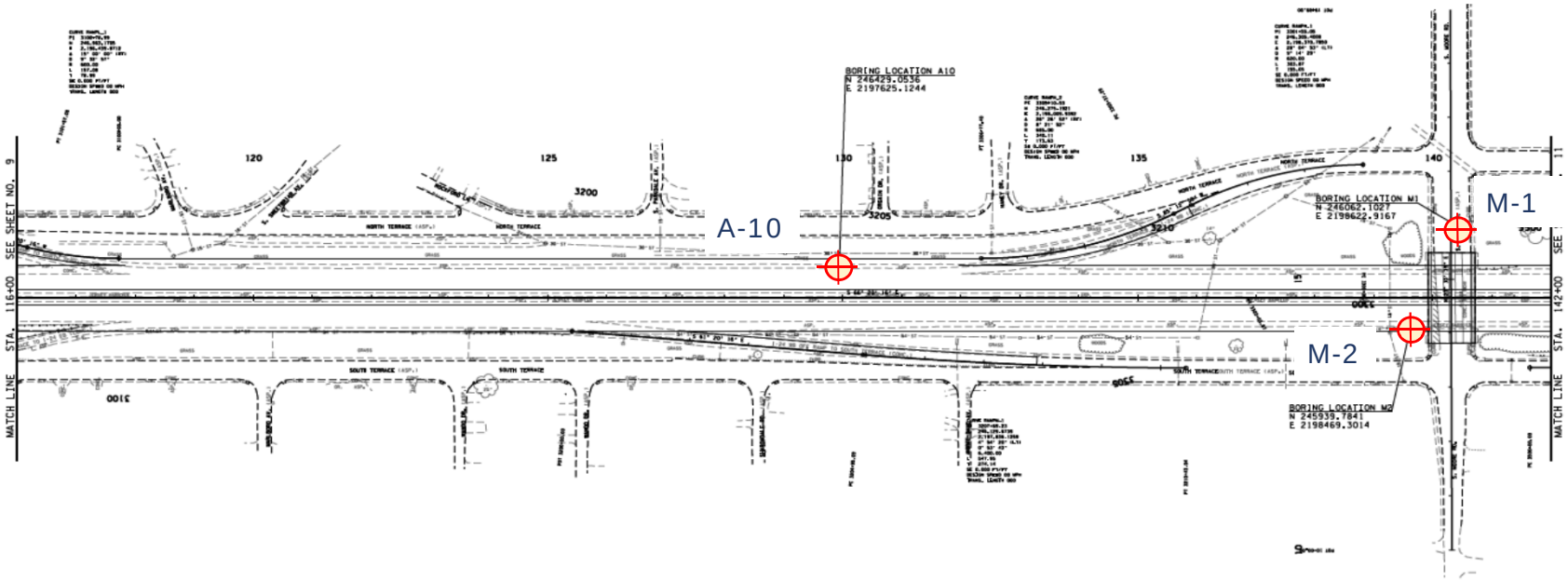
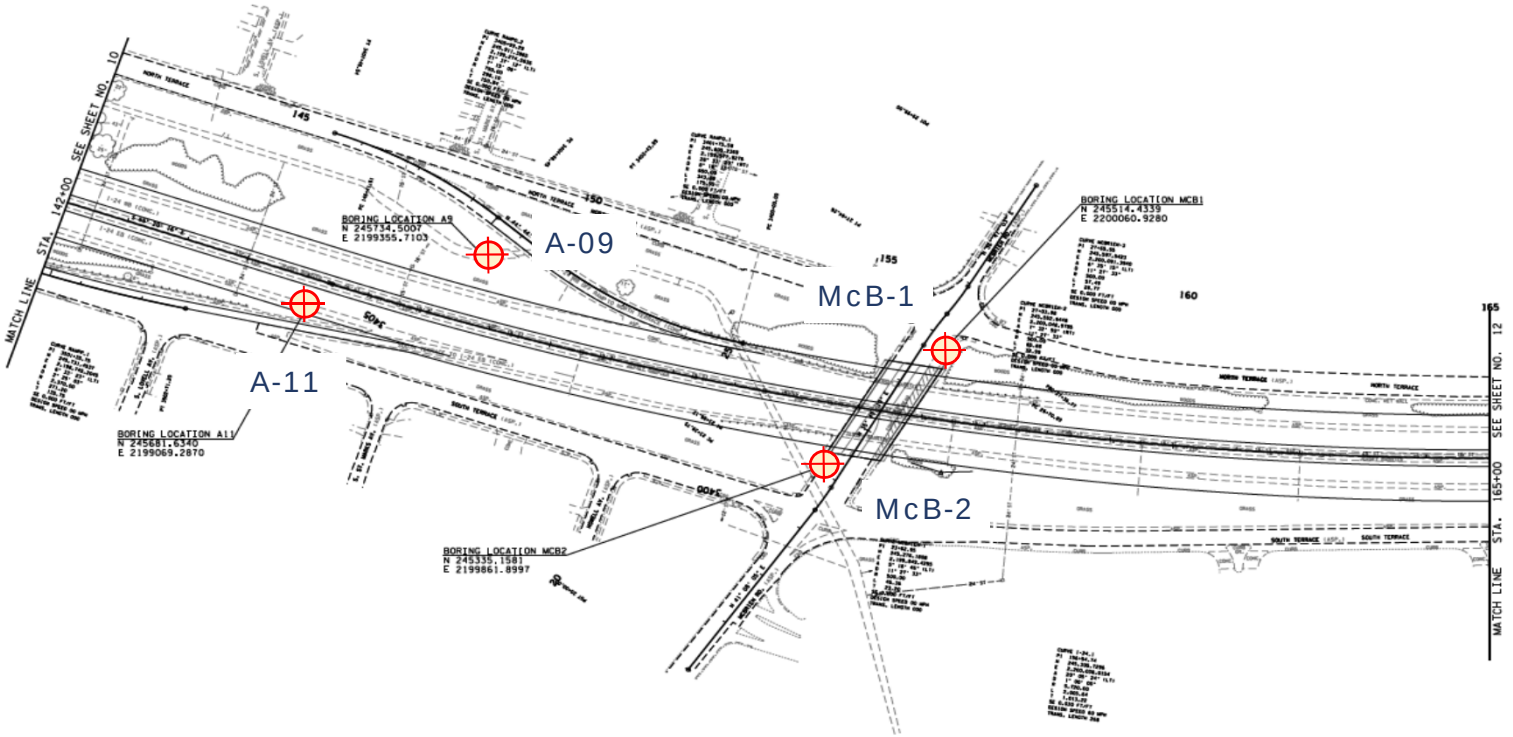


N NOT TO SCALE	JOB NO.: 300-18-0001 CLIENT: Neel-Schaffer I-75 interchange at I-24 Chattanooga, TN 3/29/2018	Boring Location Plan **PIN 114174.00** **I-75 INTERCHANGE AT I-24** **CHATTANOOGA, TENNESSEE** DRAWN BY: AZ REVIEWED BY: DH	LEGEND Approximate Boring Location A-03 Boring Label	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 3 J



N

NOT TO SCALE

JOB NO.: 300-18-0001

CLIENT: Neel-Schaffer

I-75 interchange at I-24
Chattanooga, TN

3/29/2018

Boring Location Plan

PIN 114174.00
I-75 INTERCHANGE AT I-24
CHATTANOOGA, TENNESSEE

DRAWN BY: AZ

REVIEWED BY: DH

LEGEND

Approximate Boring Location

A-03 Boring Label

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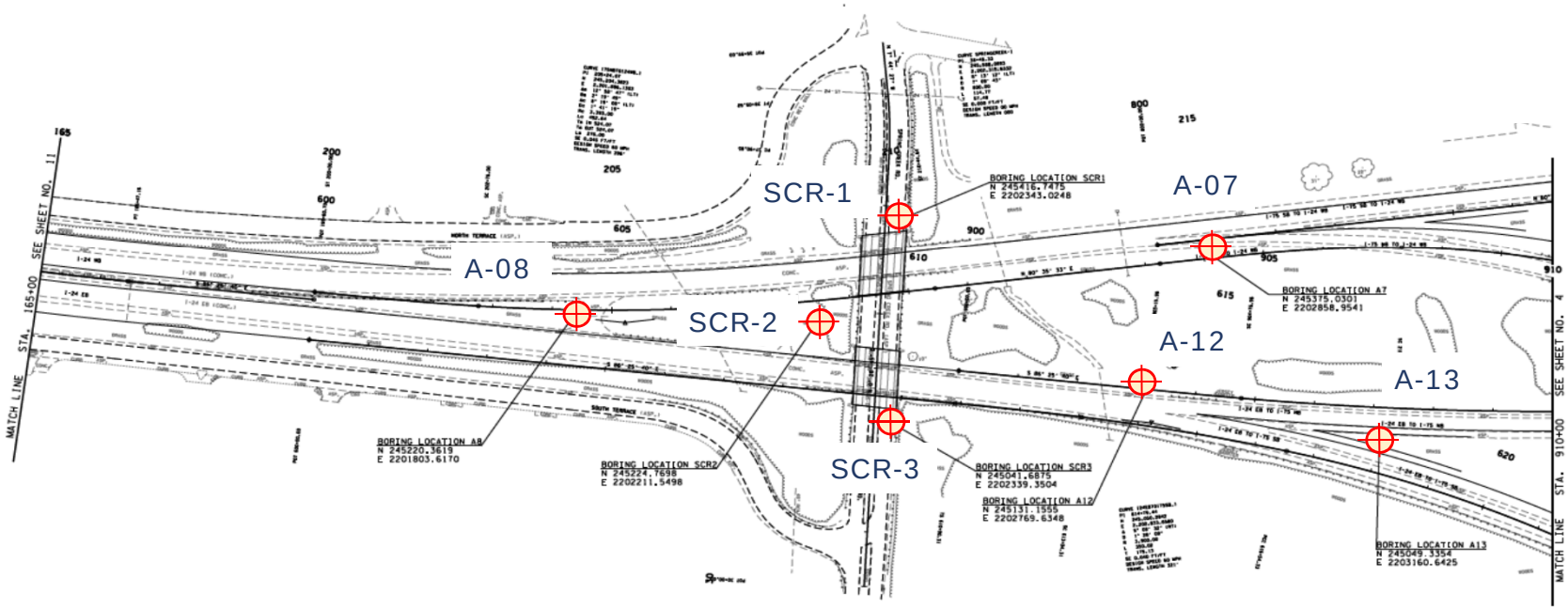
Figure 3 K



N NOT TO SCALE	JOB NO.: 300-18-0001 CLIENT: Neel-Schaffer I-75 interchange at I-24 Chattanooga, TN 3/29/2018	Boring Location Plan **PIN 114174.00** **I-75 INTERCHANGE AT I-24** **CHATTANOOGA, TENNESSEE** DRAWN BY: AZ	REVIEWED BY: DH	LEGEND Approximate Boring Location A-03 Boring Label	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental

Figure 3 L

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SUBSURFACE DIAGRAM
SPRING CREEK BRIDGE
FIGURE # 5A

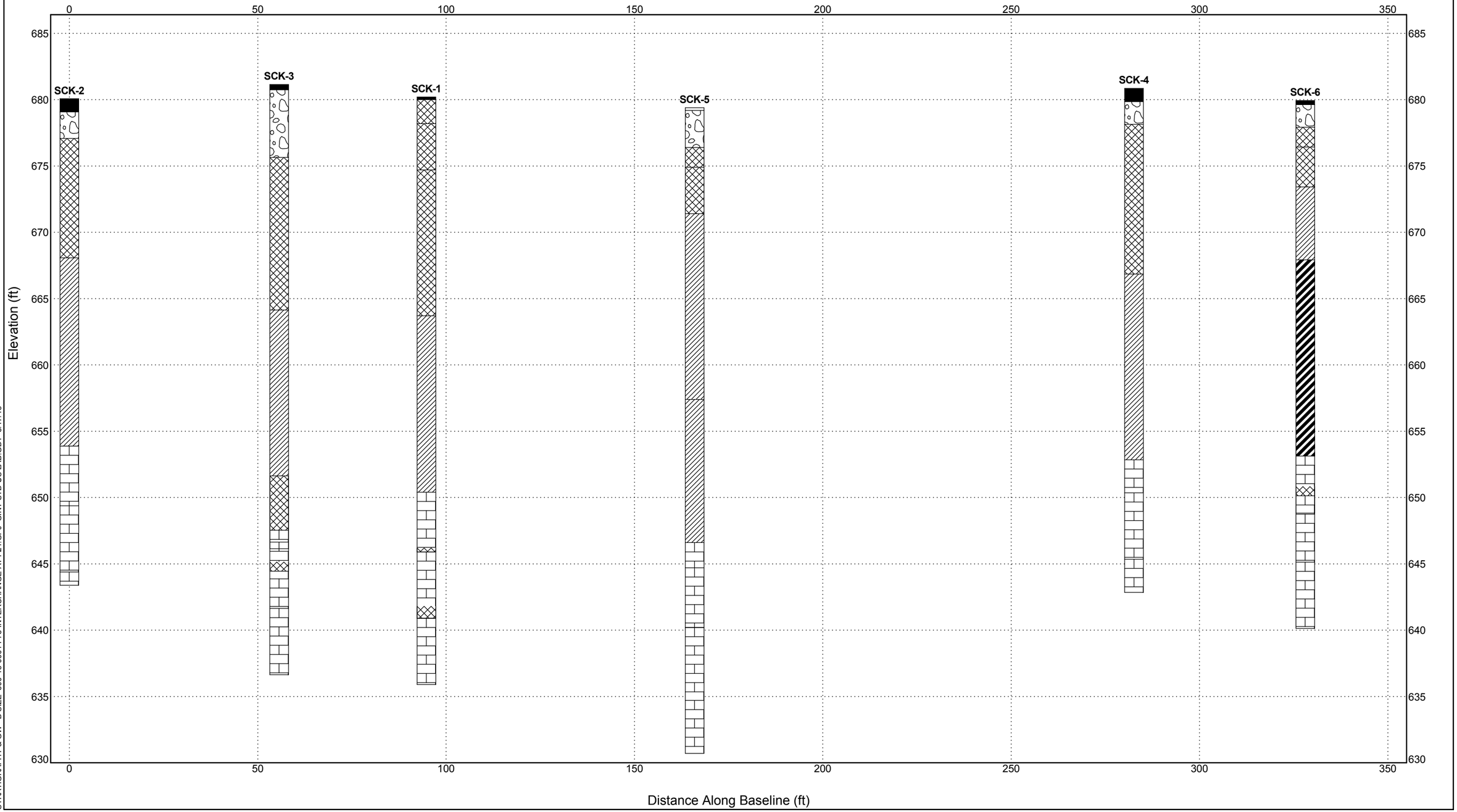
CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001

PROJECT NAME TDOT I-75 Interchange

PROJECT LOCATION Chattanooga, Tennessee

- Asphalt
- Limestone
- USCS High Plasticity Clay
- Fill (made ground)
- USCS Poorly-graded Gravel
- USCS Low Plasticity Clay



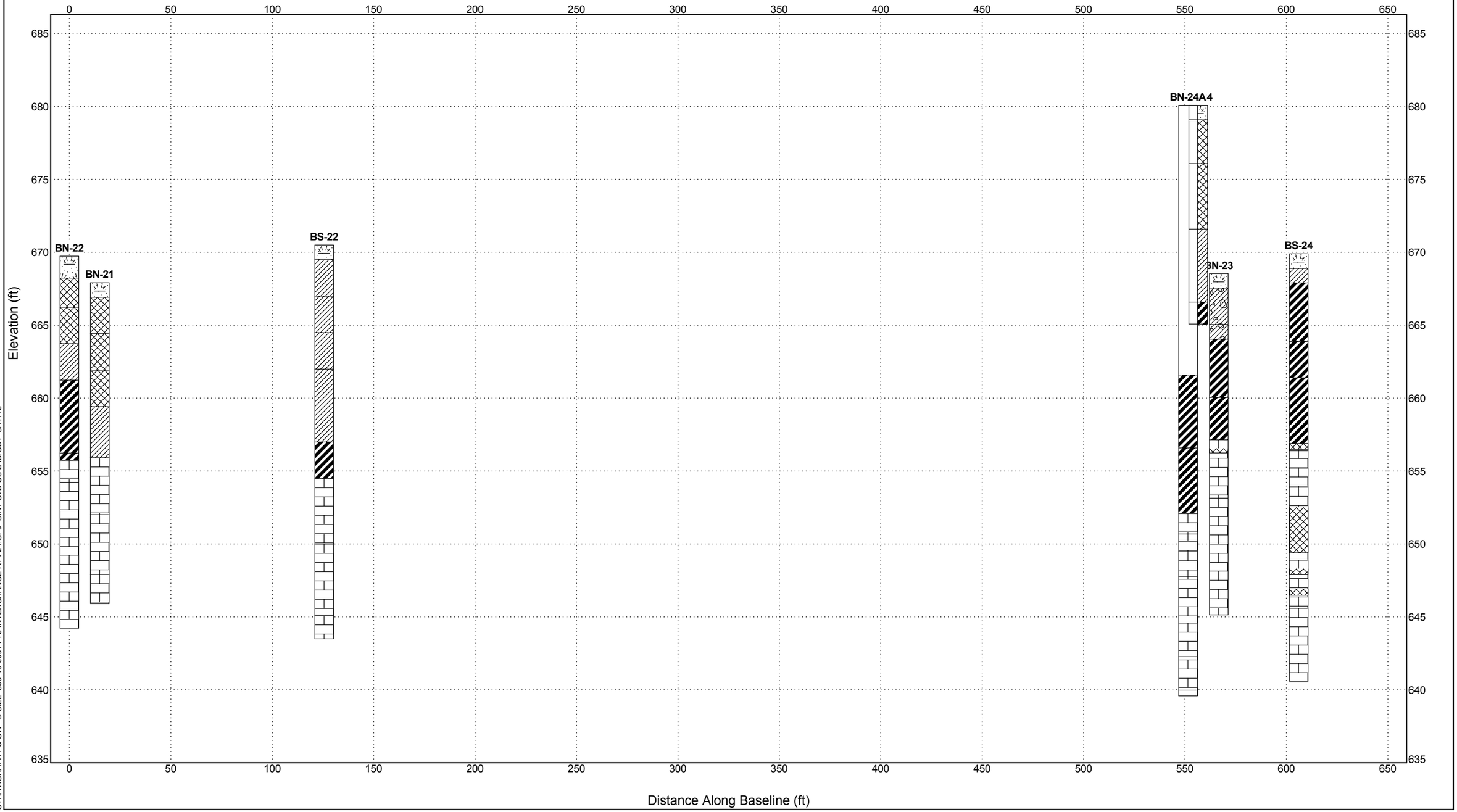
STRATIGRAPHY & GW - B SIZE 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ GINT STD US LAB.GDT 5/17/18

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

SUBSURFACE DIAGRAM
BRIDGE # 2 (NB, SB)
FIGURE # 5B

Topsoil
Limestone
Fill (made ground)
USCS High Plasticity Clay
USCS Low Plasticity Clay
USCS Low Plasticity Gravelly Clay

CLIENT Neel-Schaffer
PROJECT NUMBER 300-18-0001
PROJECT NAME TDOT I-75 Interchange
PROJECT LOCATION Chattanooga, Tennessee



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SUBSURFACE DIAGRAM
BRIDGE # 3 (NB, SB)
FIGURE # 5C

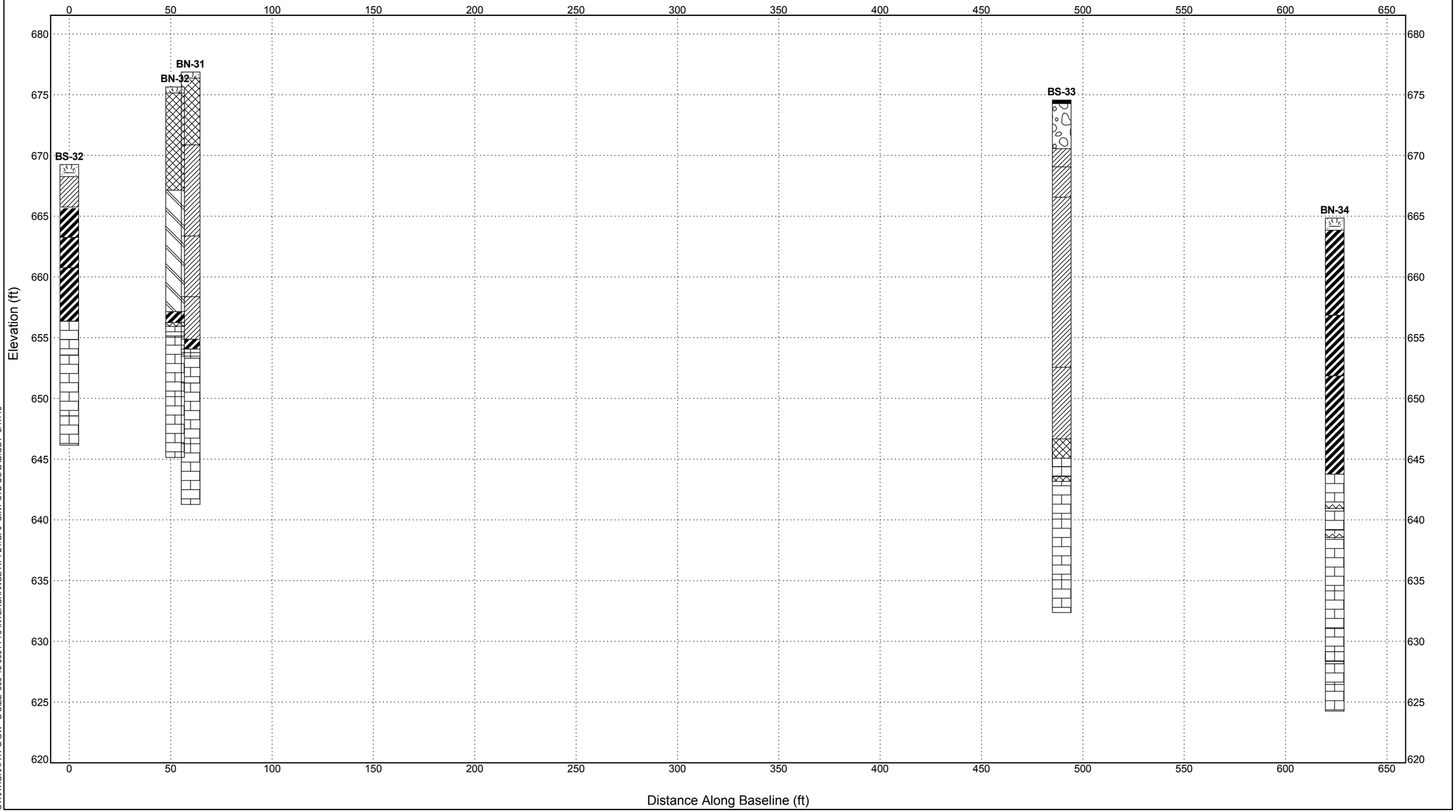
CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001

PROJECT NAME TDOT I-75 Interchange

PROJECT LOCATION Chattanooga, Tennessee

- Topsoil
- USCS High Plasticity Clay
- Asphalt
- Fill (made ground)
- Limestone
- USCS Poorly-graded Gravel
- USCS Low Plasticity Clay
- USCS Low to High Plasticity Clay



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SUBSURFACE DIAGRAM
SOUTH CHICKAMAUGA CREEK BRIDGE
FIGURE # 5D

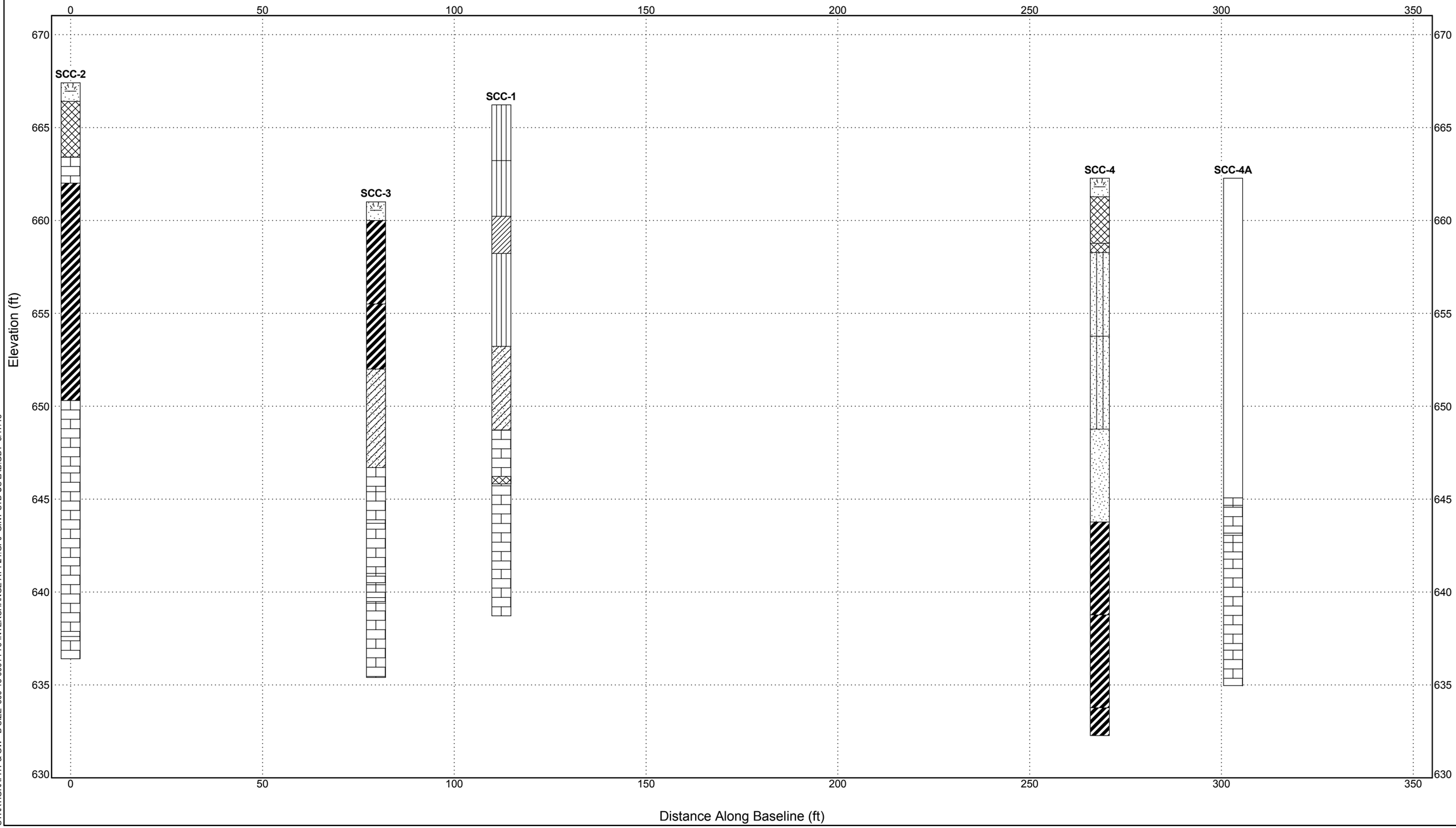
CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001

PROJECT NAME TDOT I-75 Interchange

PROJECT LOCATION Chattanooga, Tennessee

- USCS Silt
- Limestone
- USCS High Plasticity Clay
- USCS Low Plasticity Clay
- Fill (made ground)
- USCS Silty Sand
- USCS Clayey Sand
- Topsoil
- USCS Poorly-graded Sand



STRATIGRAPHY & GW - B SIZE 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ GINT STD US LAB.GDT 5/17/18

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SUBSURFACE DIAGRAM
SPRING CREEK ROAD BRIDGE
FIGURE # 5E

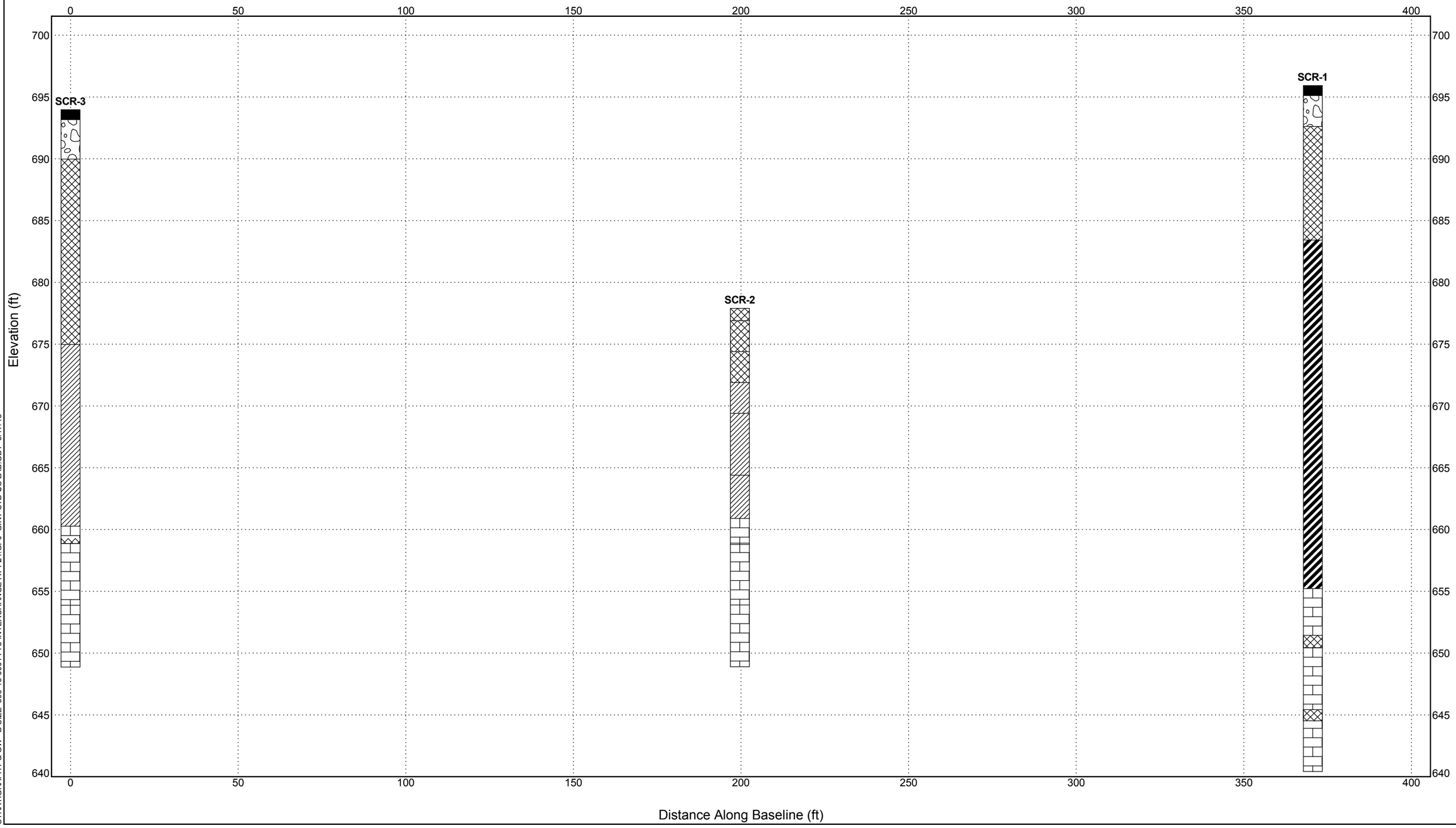
CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001

PROJECT NAME TDOT I-75 Interchange

PROJECT LOCATION Chattanooga, Tennessee

- Asphalt
- USCS High Plasticity Clay
- USCS Poorly-graded Gravel
- Limestone
- Fill (made ground)
- USCS Low Plasticity Clay



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SUBSURFACE DIAGRAM
BRIDGE # 9 (I-75 NB - I-24 WB)
FIGURE # 5F

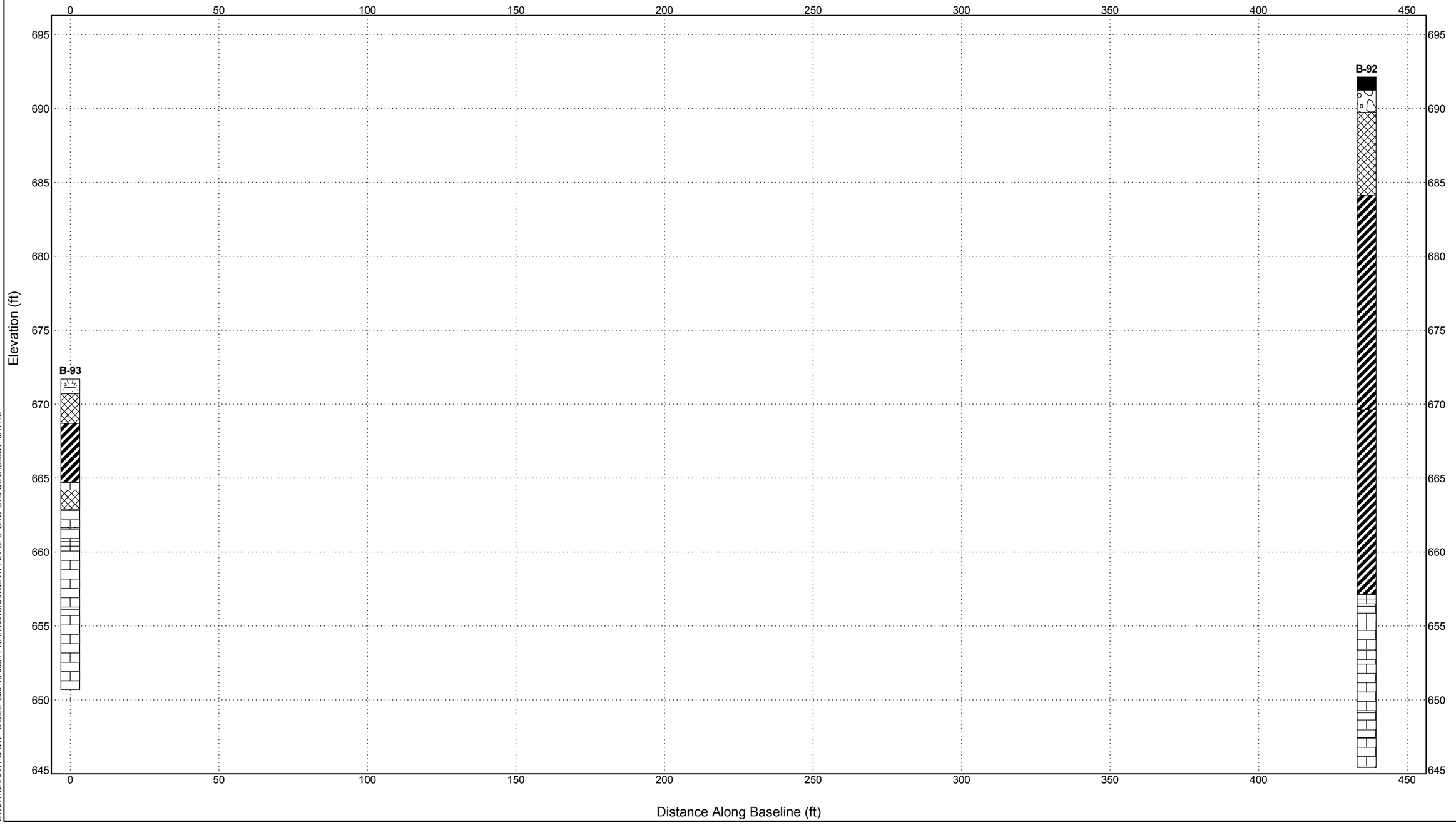
CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001

PROJECT NAME TDOT I-75 Interchange

PROJECT LOCATION Chattanooga, Tennessee

Asphalt
USCS High Plasticity Clay
USCS Poorly-graded Gravel
Limestone
Fill (made ground)
Topsoil



STRATIGRAPHY & GW - B SIZE 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ GINT STD US LAB.GDT 5/17/18

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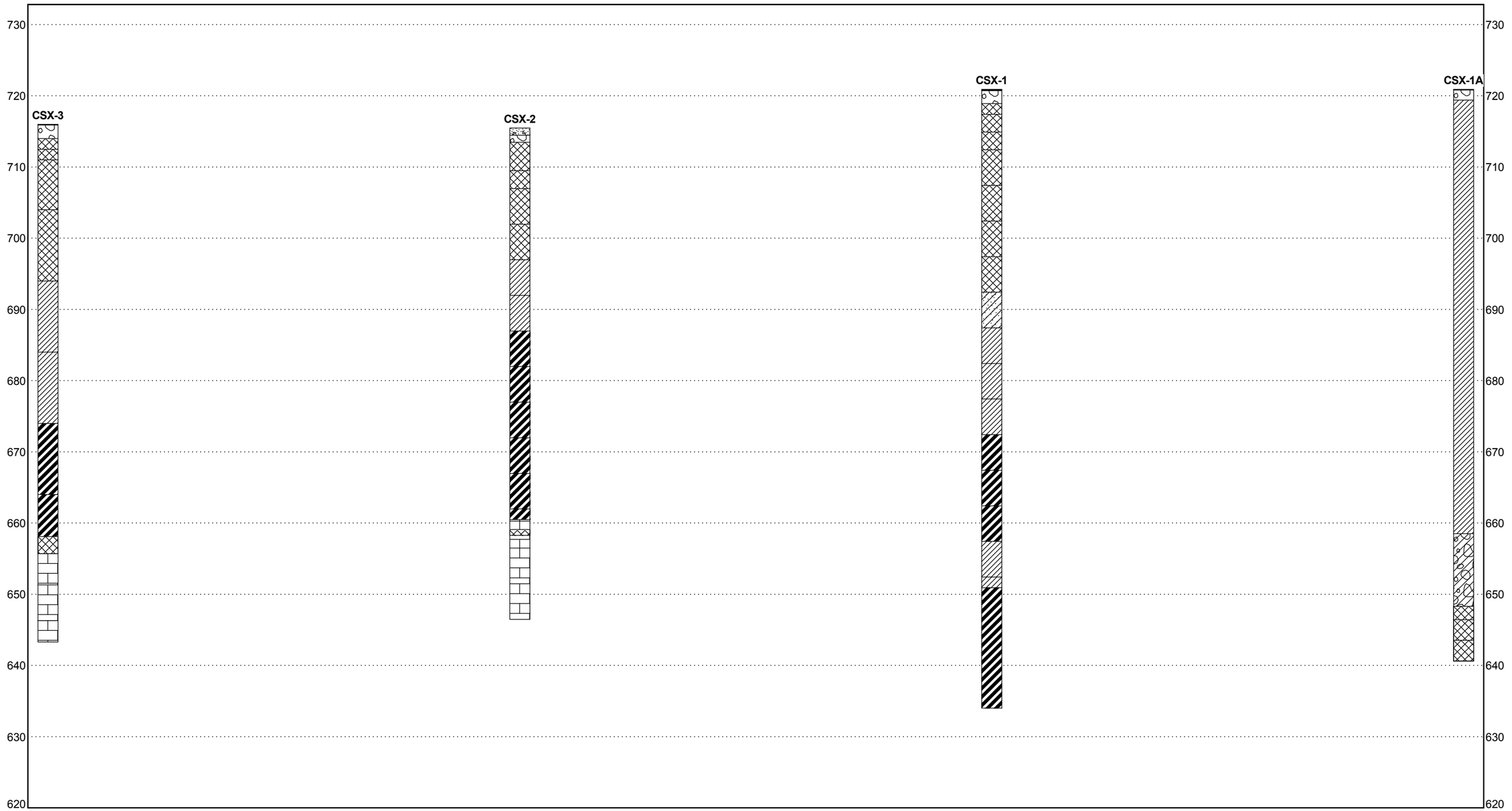
CLIENT Neel-Schaffer
PROJECT NUMBER 300-18-0001

SUBSURFACE DIAGRAM
CSX RAILROAD BRIDGE
FIGURE # 5G

PROJECT NAME TDOT I-75 Interchange
PROJECT LOCATION Chattanooga, Tennessee

- Asphalt
- USCS Clayey Sand
- USCS Clayey Gravel
- USCS Poorly-graded Gravel
- USCS Low Plasticity Clay
- Limestone
- Fill (made ground)
- USCS High Plasticity Clay
- Concrete



STRATIGRAPHY & GW - B SIZE 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ GINT STD US LAB.GDT 5/17/18

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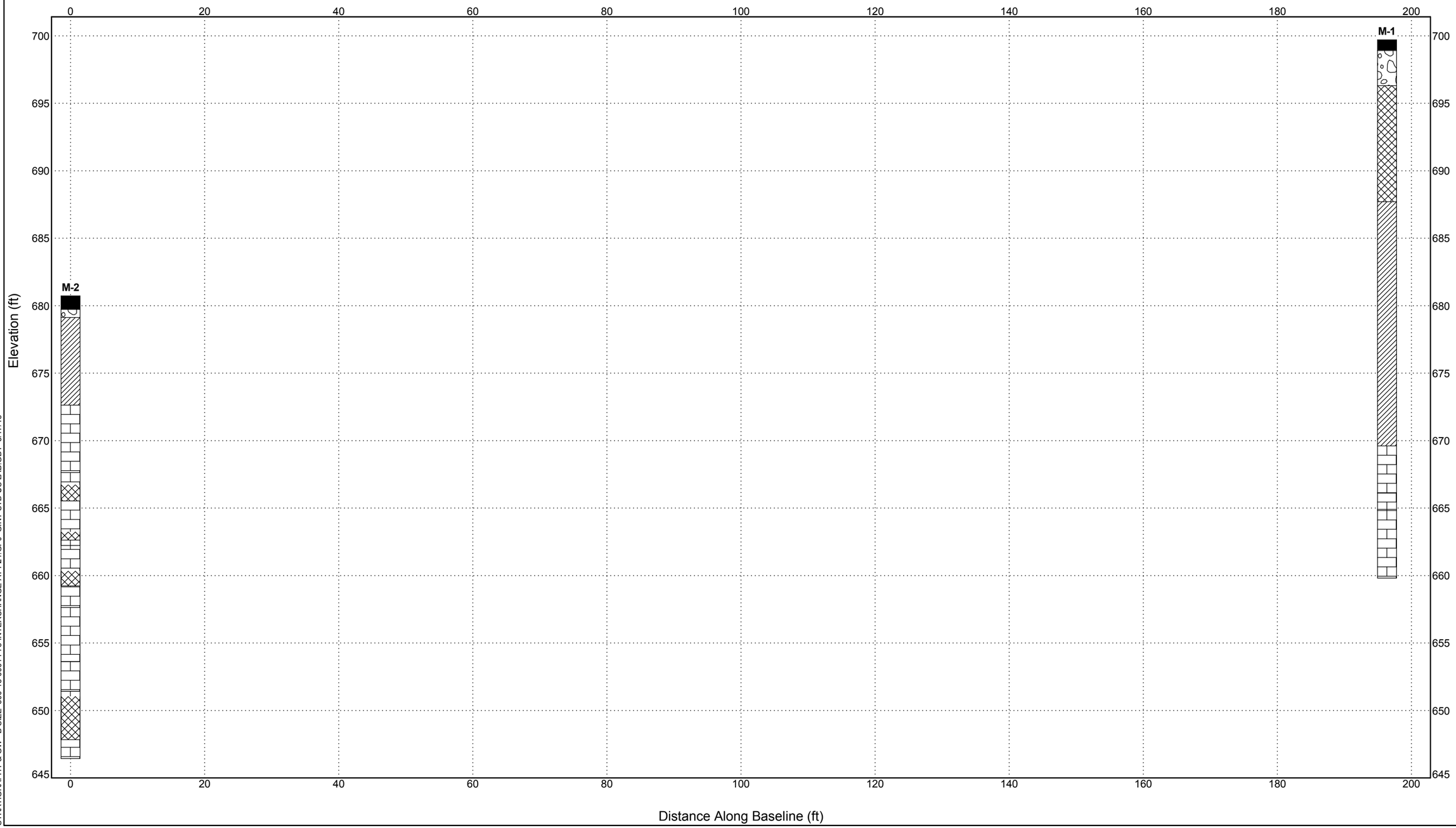
SUBSURFACE DIAGRAM
MOORE ROAD BRIDGE
FIGURE # 5H

Asphalt
USCS Low Plasticity Clay
USCS Poorly-graded Gravel
Limestone
Fill (made ground)

CLIENT Neel-Schaffer
PROJECT NUMBER 300-18-0001
PROJECT NAME TDOT I-75 Interchange
PROJECT LOCATION Chattanooga, Tennessee



STRATIGRAPHY & GW - B SIZE 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ GINT STD US LAB.GDT 5/17/18

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SUBSURFACE DIAGRAM
MCBRIEN ROAD BRIDGE
FIGURE # 5I

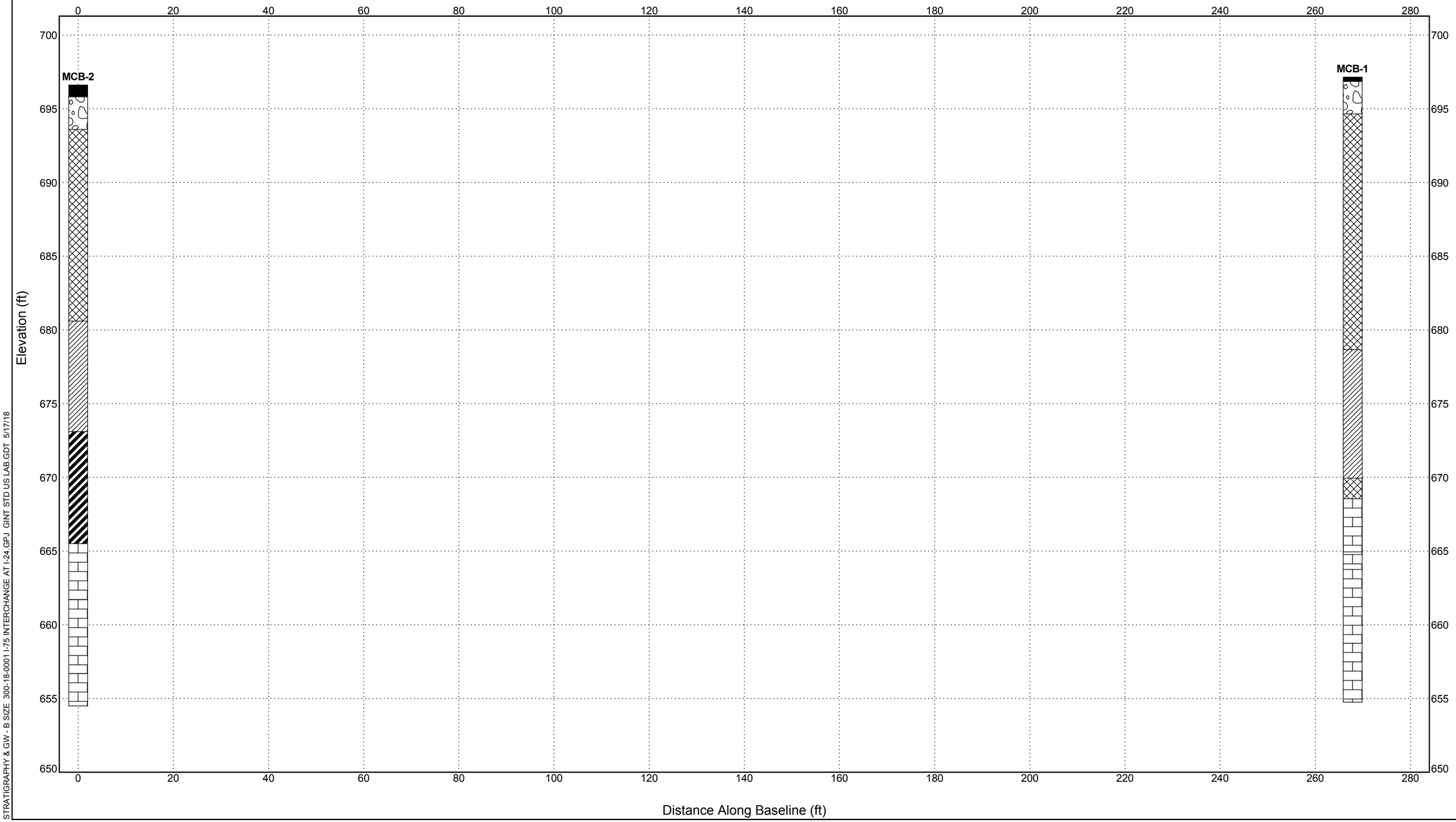
CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001

PROJECT NAME TDOT I-75 Interchange

PROJECT LOCATION Chattanooga, Tennessee

Asphalt
USCS Low Plasticity Clay
USCS Poorly-graded Gravel
Limestone
Fill (made ground)
USCS High Plasticity Clay



APPENDIX B
FIELD TESTING PROCEDURES

FIELD PROCEDURES

Drilling, sampling, and testing were conducted in general accordance with methods of the American Society for Testing and Materials (ASTM) or other widely-accepted geotechnical engineering standards. Descriptions of the procedures used during this exploration are provided below.

BORING LOCATIONS AND ELEVATIONS

The boring locations were selected by KSWA based on our review of the site layout plan and any physical access constraints, including underground and overhead utilities. Most of the actual boring locations were marked at the site by TDOT personnel using survey methods. KSWA personnel marked borings CSX-3, A-17, BS-33 (relocated from original position) and offset borings by estimating distances and angles relative to on-site features. GPS coordinates and elevations from GIS methods were used to determine the location and elevation of these borings and should be considered approximate. Surveying of boring coordinates was beyond the scope of our exploration.

TEST BORINGS
ASTM D 1586

Test borings were advanced using auger drilling techniques. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2.0-inch O.D., split-barrel sampler. The sampler was initially seated 6 inches to penetrate any loose cuttings and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is the *standard penetration resistance*, or N-value. Standard penetration resistance, when properly evaluated, is an index to the soil's strength and density. The criteria used during this exploration are presented on the Field Classification System sheet in this appendix. Representative portions of the soil samples obtained were placed in sealed containers and transported to our laboratory, where our engineer selected samples for laboratory testing.

The standard penetration tests were performed using an automatic hammer. The automatic hammer has a higher efficiency than the traditional rope and cathead hammer, thus yielding comparatively lower N-values. This reduction in N-value was accounted for during our engineering analysis. However, the consistencies presented on the boring logs were based on the customary relationships with N-value.

INTACT SAMPLES
ASTM D 1587

Relatively undisturbed (intact) samples were obtained for laboratory testing by slowly and uniformly pushing a 3-inch O.D., 16-guage, steel tube into the soil at the desired sampling level, in accordance with ASTM D 1587. The tube was then removed from the ground and the encased soil was sealed at the ends to prevent loss of moisture. The depth at which undisturbed samples were taken is indicated on the respective Test Boring Logs.

REFUSAL MATERIALS

Soil drilling and sampling equipment may not be capable of penetrating hard cemented soils, thin rock seams, large boulders, waste materials, weathered rock, or sound continuous rock. Refusal is the term applied to materials that cannot be penetrated with soil drilling equipment or where the standard penetration resistance exceeds 100 blows per foot. Core drilling is needed to determine the character and continuity of the refusal materials.

FIELD PROCEDURES (CONTINUED)

WATER LEVEL READINGS

The boreholes were checked for groundwater upon completion. The groundwater conditions encountered are indicated on the boring logs. Groundwater levels may depend upon recent rainfall or seasonal conditions, construction activity, and other site-specific factors. Since these conditions may change with time, the water level information presented on the boring logs represents the conditions only at the time each measurement was taken.

BORING LOGS

The soil samples obtained during the drilling were visually classified using the Unified Soil Classification System (USCS) as a guide (reference Soil Classification Chart in Appendix B). The Test Boring Logs in Appendix B provide the soil descriptions and penetration resistances, and represent our interpretation of the conditions encountered at each boring location. The stratification lines indicated on the boring records represent the approximate boundaries between material types, but these transitions may be gradual. The boring logs were prepared based on the field logs and review of the laboratory classification test results. The USCS designations indicated on the boring logs are based on visual-manual evaluation of the samples unless otherwise defined by laboratory testing.

The boring logs indicate estimated interfaces between soil strata. The interfaces indicated represent the approximate interface location, but the actual transition between strata may be gradual. Water levels indicated on the boring logs represent the conditions only at the time each measurement was taken.

FIELD CLASSIFICATION SYSTEM

Sands and Gravels

No. of Blows	Relative Density
0-5	Very Loose
6-10	Loose
11-30	Medium dense
31-50	Dense
51+	Very Dense

Silts and Clays

No. of Blows	Relative Consistency
0-2	Very Soft
3-4	Soft
5-9	Firm
10-15	Stiff
16-30	Very Stiff
31+	Hard

Particle Size Identification

Boulders: 8-inch diameter or more
Cobbles: 3- to 8-inch diameter
Gravel:
- Coarse: 1- to 3-inch
- Medium: 0.50- to 1-inch
- Fine: 0.25- to 0.50-inch

Sand:
- Coarse: 2.00-mm to 0.25-inch (diameter of pencil lead)
- Medium: 0.074-mm to 2.00-mm (diameter of broom straw)
- Fine: 0.042-mm to 0.074-mm (diameter of human hair)

Silt: 0.002-mm to 0.042-mm (Cannot see particles)
Clay: <0.002-mm

Relative Proportions

Descriptive Term	Percent
Trace	1-10
Little	11-20
Some	21-35
And	36-50

Relative Quality of Rock Cores

Quality	RQD
Very Poor	0-25%
Poor	25-50%
Fair	50-75%
Good	75-90%
Excellent	90-100%

$$\text{RQD} = \frac{\text{Total length of core recovered in pieces 4 inches long or longer}}{\text{Total length of core run}} \times 100\%$$

Rock Hardness

Very Soft	Rock disintegrates or easily compresses to touch; can be hard to very hard soil
Soft	Rock is coherent but breaks easily to thumb pressure at sharp edges and crumbles with firm hand pressure
Moderately Hard	Small pieces can be broken off along sharp edges by considerable hard thumb pressure; can be broken by light hammer blows
Hard	Rock cannot be broken by thumb pressure, but can be broken by moderate hammer blows
Very Hard	Rock can be broken by heavy hammer blows

APPENDIX C
TEST BORING LOGS

TEST BORING LOG

TEST BORING NO. A-01

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 717.3
Location: N 248803.6234 E 2213330.1260

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (4 inches) 0.3										
		BASESTONE (15.6 inches) A-1 1.6										
		LEAN CLAY (CL), with chert, reddish brown, stiff, (FILL) A-7-5				5-5-6			18.1			
		3.5										
4		LEAN CLAY (CL), with chert, very silty, reddish brown, stiff, (FILL) A-7-5				3-4-5			20.8	41	21	20
		6.0										
		LEAN CLAY (CL), very silty, dark reddish brown, (FILL) A-7-5				3-4-5			22.0			
8		8.5										
		LEAN CLAY (CL), silty, dark reddish brown, (FILL) A-7-5				3-3-4			20.7			
12		13.5										
		FAT CLAY (CH), very silty, dark reddish brown, (FILL) A-7-6				3-3-5			27.0			
		15.0 BORING TERMINATED AT 15.0 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/11/18**
Date Completed: **4/11/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. A-02

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 718.7
Location: N 248727.4136 E 2213440.0699

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (4 inches) 0.3										
		BASESTONE (19.2 inches) A-1 1.9										
		LEAN CLAY (CL), silty, some chert, reddish brown, stiff, (FILL) A-7-5				3-4-6			18.7			
4		4.0										
		LEAN CLAY (CL), silty, occaisional sandy, medium reddish brown, with gravel, (FILL) A-7-5				4-5-6			18.0			
		6.0										
		LEAN CLAY (CL), silty, sandy, with lots of sandy chert zones, (FILL) A-7-5				4-5-6			13.8			
8		8.5										
		LEAN CLAY (CL), very silty, reddish brown, (FILL) A-7-5				3-2-3			18.4			
12		13.5										
		LEAN CLAY (CL), silty, reddish brown, (FILL) A-7-5				4-6-8			15.3			
		15.0										
16		BORING TERMINATED AT 15.0 FBGS										
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/10/18**
Date Completed: **4/10/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. A-03

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 675.3
Location: N 245869.5382 E 2205812.5051

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		LEAN CLAY (CL), dark brown with organic material A-8		56		1-2-4			34.6	66	30	36
		2.0										
		FAT CLAY (CH, reddish brown to brown and gray, rock fragments, stiff, Black mineral staining A-7-6										
4				39		2-50/6-			31.1			
		5.0										
		AUGER REFUSAL AT 5 FBGS BORING TERMINATED AT 5 FBGS										
8												
12												
16												
20												
24												
28												

Completion Depth (ft.): **5.0**
Date Started: **4/18/18**
Date Completed: **4/18/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550,HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. A-04

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 670.0
Location: N 245639.8436 E 2205123.9785

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		LEAN CLAY (CL), with traces of topsoil, dark brown, traces of roots, (FILL) A-8		56		1-2-3			34.3			
		3.0										
4		FAT CLAY (CH), reddish brown, stiff, black mineral staining, (FILL) A-7-6		78		2-5-5			22.6	49	22	27
		5.5										
		FAT CLAY (CH), yellowish brown mottled reddish brown, stiff, black mineral staining, aggregates A-7-6		89		3-6-7			21.9			
8				78		2-3-4			26.1			
		12.0										
12		FAT CLAY (CH), brown and gray, very stiff, limestone fragments A-7-6		83		50/6--			31.6			
		15.0										
		AUGER REFUSAL AT 14 FBGS BORING TERMINATED AT 14 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **14.0**
Date Started: **4/18/18**
Date Completed: **4/18/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Moved hole 10' offset. Boring was backfilled with cuttings. Elevation was about 2' lower than the marked location. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. A-05

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.2
Location: N 245648.7047 E 2204484.8643

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (7 inches) 0.6										
		CONCRETE RUBBLE (4.4 feet), (FILL)										
4		5.0										
		LOW TO HIGH PLASTICITY CLAY (CL-CH), reddish brown to brown, aggregates, soft, (FILL) A-7-5		33		3-2-2			15.3			
8		8.0										
		LEAN CLAY (CL), black to dark gray, moist, black mineral staining, aggregates A-7-5		100		2-2-3			17.7	35	19	16
		11.0										
12		LEAN CLAY (CL), brown and gray, stiff, aggregates A-7-5										
				67		2-3-4			19.5			
		15.0										
16		BORING TERMINATED AT 15 FBGS										
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/18/18**
Date Completed: **4/18/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. A-06

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.6
Location: N 245562.8621 E 2203899.0563

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (7 inches) 0.6										
		CONCRETE RUBBLE (3.9 feet), (FILL)										
4		4.5										
		LEAN CLAY (CL), light brown and gray, (FILL) A-7-5		67		3-3-5			19.9	34	18	16
8		8.0										
		LEAN CLAY (CL), brown, (FILL) A-7-5		44		2-2-3			17.7			
		11.0										
12		FAT CLAY (CH), gray and moist A-7-6										
		13.0										
		FAT CLAY (CH), mostly gray with some brown, stiff A-7-6		89		2-3-7			19.5			
		15.0										
16		BORING TERMINATED AT 15 FBGS										
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/18/18**
Date Completed: **4/18/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. A-07

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 677.4
Location: N 245375.0301 E 2202858.9541

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	ASPHALT (8.4 inches) 0.7										
	BASESTONE (12 inches) A-1 1.7										
	FAT CLAY (CH), reddish brown to brown mottled gray, firm, (FILL) A-7-6		67		4-2-3						
4			78		3-3-4						
	5.5										
	FAT CLAY (CH), brown mottled gray and dark gray, soft to firm, dense, aggregates, with occasional organic material (roots), (FILL) A-7-6		83		1-2-2						
8			100		1-2-4						
12	12.5										
	FAT CLAY (CH), brown, stiff, dense, highly plastic, some black mineral staining A-7-6		100		4-4-6						
	15.0										
16	BORING TERMINATED AT 15 FBGS										
20											
24											
28											

Completion Depth (ft.): **15.0**
Date Started: **5/1/18**
Date Completed: **5/1/18**
Drilled By: **TSD / Richardson**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. A-08

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 673.9
Location: N 245220.3619 E 2201803.6170

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		POORLY-GRADED SAND (SP) A-3a 1.0										
		POORLY-GRADED SAND (SP), black, dense, dry, (FILL) Possible Foundry Sand A-30a		93		16-22-25			3.7			
		3.5										
4		LEAN CLAY (CL), brown, stiff, moist A-7-5		67		7-4-6			18.2			
		6.0										
		LEAN CLAY (CL), brown, stiff, moist A-7-5		13		7-6-4			15.2			
8		8.5										
		LEAN CLAY (CL) with traces of sand, brown, stiff, moist A-7-5		87		4-5-6			17.9	48	20	28
12												
		13.5										
		FAT CLAY (CH), brown, stiff, moist A-7-6 14.1 14.7		100		11-15-50/2			13.5			
		Severely weathered Limestone										
		AUGER REFUSAL AT 14.7 FBGS BORING TERMINATED AT 14.7 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **14.7**
Date Started: **4/12/18**
Date Completed: **4/12/18**
Drilled By: **MW / Mike**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Offset hole 15' from stake along a bearing of N93E. Ground surface at hole is about 2.7' higher than stake. Boring was backfilled with cuttings. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. A-09

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 673.0
Location: N 245727.9300 E 2199356.2500

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		LEAN CLAY (CL), reddish brown mottled gray, stiff, gravels, black mineral staing A-7-5		67		3-5-8			19.0			
		3.5										
4		LEAN CLAY (CL), brown mottled gray, stiff, rock fragments, black mineral staining A-7-5		89		4-7-6			13.3			
		5.5										
		AUGER REFUSAL AT 5.5 FBGS BORING TERMINATED AT 5.5 FBGS										
8												
12												
16												
20												
24												
28												

Completion Depth (ft.): **5.5**
Date Started: **4/16/18**
Date Completed: **4/16/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. A-10

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 684.5
Location: N 246429.0536 E 2197625.1244

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (4.8 inches) 0.4										
		BASESTONE (54 inches) A-1										
4				50		3-10-7						
		4.9										
		FAT CLAY (CH), brown mottled gray, firm, dense, chert fragments A-7-6		100		3-4-4						
8		9.4		93		6-50/5-						
		AUGER REFUSAL AT 9.4 FBGS BORING TERMINATED AT 9.4 FBGS										
12												
16												
20												
24												
28												

Completion Depth (ft.): **9.4**
Date Started: **4/30/18**
Date Completed: **4/30/18**
Drilled By: **TSD / Richardson**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. A-11

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.5
Location: N 245681.6340 E 2199069.2870

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (9.8 inches) 0.8										
		POORLY GRADED SAND (SP), gray, dry, medium dense, (FILL) A-2		67		22-8-6			4.4			
		3.2										
4		FAT CLAY (CH), Residual soil, brown and gray, moist, firm to very stiff, mottled A-7-5		100		8-3-6			25.3	61	27	34
				100		6-9-15			22.1			
8		9.3		100		50/4--						
		AUGER REFUSAL AT 9.3 FBGS BORING TERMINATED AT 9.3 FBGS							24.5			
12												
16												
20												
24												
28												

Completion Depth (ft.): **9.3**
Date Started: **4/15/18**
Date Completed: **4/15/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved 4.9' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. A-12

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 674.1
Location: N 245131.1555 E 2202769.6348

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (6 inches) 0.5										
		BASESTONE (24 inches) A-1										
		2.5										
		LEAN CLAY (CL), brown mottled gray, soft to firm, dense, aggregates, (FILL) A-7-5		83		3-4-5						
4				89		2-1-2						
		8.0										
8		FAT CLAY (CH), brown mottled gray and dark gray, soft, dense to very dense A-7-6		100		1-2-3						
12												
		15.0		100		3-2-3						
		BORING TERMINATED AT 15 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/30/18**
Date Completed: **4/30/18**
Drilled By: **TSD / Richardson**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. A-13

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 679.3
Location: N 245049.3354 E 2203160.6425

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (4.8 inches) 0.7										
		BASESTONE (21.6 inches) A-1										
		2.5										
		LEAN CLAY (CL), gray to dark gray and some brown, mostly soft, (FILL) 3.5		50		4-2-2						
4		A-7-5										
		LEAN CLAY (CL), brown to reddish brown, stiff, dense, (FILL)		83		4-8-8						
		A-7-5 5.5										
		FAT CLAY (CH), brown mottled gray and dark gray, soft to stiff, dense										
		A-7-6		72		4-4-6						
8												
				100		4-4-3						
12												
		14.7		97		3-4-50/1						
		AUGER REFUSAL AT 14.7 FBGS BORING TERMINATED AT 14.7 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **14.7**
Date Started: **5/1/18**
Date Completed: **5/1/18**
Drilled By: **TSD / Richardson**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. A-14

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 679.2
Location: N 244824.7964 E 2203547.4055

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (15.6 inches)										
		1.3										
		BASESTONE (20.4 inches) A-1		100		50/3.6--			2.7			
		3.0										
4		LEAN CLAY (CL), brown and gray, moist, stiff to very stiff, mottled, (FILL) A-6a		67		8-7-9			17.5			
				93		5-5-6			18.9	33	19	14
8												
		9.0										
		LEAN CLAY (CL), Residual soil, brown and gray, wet, stiff to very stiff, mottled A-6a Becoming wet from 9.7'		100		4-6-8			17.9			
12												
				100		4-4-3			18.7			
		15.0										
		BORING TERMINATED AT 15 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/15/18**
Date Completed: **4/16/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved 7.4' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. A-15

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.3
Location: N 244409.6056 E 2204251.8569

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (24 inches)										
		2.0										
		POORLY GRADED SAND (SP), gray, dry, dense, (FILL) A-7-5		100		45-50/5-			1.1			
		3.9										
4		LEAN CLAY (CL), brown and gray, moist and very stiff, mottled, (FILL) A-7-5		80		5-10-13			18.6	44	23	21
				100		5-6-7			24.1			
8				100		5-8-10			17.8			
		11.5										
12		FAT CLAY (CH), brown and gray, moist and firm, mottled A-7-6										
				27		2-3-5			22.1			
		15.0										
		BORING TERMINATED AT 15 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/16/18**
Date Completed: **4/16/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved 5.1' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. A-16

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 662.9
Location: N 243793.7153 E 2204493.6547

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		FAT CLAY (CH), reddish brown, (FILL) A-7-5		67		3-5-7			22.6	50	26	24
		3.0										
4		FAT CLAY (CH), yellowish brown mottled gray, black mineral staining A-7-5		72		3-5-6			21.1			
				72		2-4-5			19.6			
8												
		9.5		78		2-5-7			20.8			
		FAT CLAY (CH), dark gray, moist, rock fragments A-7-6										
		10.8										
12		AUGER REFUSAL AT AT 10.8 FBGS BORING TERMINATED AT 10.8 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **10.8**
Date Started: **4/19/18**
Date Completed: **4/19/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Hole was moved 10' NE of marked location. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. A-17

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 681.0
Location: N 241263.51 E 2206226.57

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (2.4 inches) 0.2										
		BASESTONE (26.4 inches) A-1										
		2.4										
		LEAN CLAY (CL), with traces of basestone, silty, reddish brown, (FILL) 3.5				14-3-3			23.7			
		A-7-5										
4		FAT CLAY (CH), basestone (fall in), slighlty silty, reddish brown and yellow mottled, (FILL)				5-6-8			30.0	50	23	27
		A-7-5 5.5										
		LEAN CLAY (CL), slightly silty, reddish brown, chert fragments, (FILL)										
		A-7-5				6-5-5			28.3			
8		8.0										
		FAT CLAY (CH), slightly silty, light reddish brown, yellow mootled, chert fragments, (FILL)										
		A-7-5				5-5-6			32.7			
		11.0										
12		FAT CLAY (CH), silty and sandy, light yellowish brown to gray										
		A-7-5										
						2-2-3			31.6			
		15.0										
		BORING TERMINATED AT 15 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/19/18**
Date Completed: **4/19/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Elevation and UTM coordinates were taken from GIS.**

TEST BORING LOG

TEST BORING NO. A-18

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.1
Location: N 241499.0924 E 2206022.7709

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (2.4) 0.2										
		BASESTONE (27.6 inches) A-1										
		2.5										
		LEAN CLAY (CL), slightly silty, reddish brown mottled yellowish brown, (FILL) A-7-5				4-17-15			16.8			
4		4.0										
		FAT CLAY (CH), reddish brown mottled yellowish brown to gray, (FILL) A-7-5				3-3-4			36.9	61	27	34
						2-3-4			30.9			
8												
						2-3-4			21.3			
		10.0										
		FAT CLAY (CH), Residual soil, alluvium, light yellowish brown motttled gray, moist zones A-7-6										
12												
				100		2-3-4			33.0			
		15.0										
		BORING TERMINATED AT 15 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/20/18**
Date Completed: **4/20/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. A-19

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 677.4
Location: N 241681.3738 E 2206076.7854

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (9.6 inches) 0.8		80		4-4-4			15.4			
		LEAN CLAY (CL), reddish brown, gravels, (FILL) 1.3 A-7-5		100		3-3-3			23.1			
		LEAN CLAY (CL), silty, brown to yellowish brown, chert gravels, (FILL) A-7-5										
4				9		2-3-3			24.5			
		5.5										
		LEAN CLAY (CL), silty to very silty, light yellowish brown, moist, (FILL) A-7-5 7.0		100		3-4-4			25.3	35	18	17
		LEAN CLAY (CL), Residual soil, silty to very silty, sandy, light brown, moist and soft A-7-5										
8				100		2-3-3			14.8			
		11.0										
		LEAN CLAY (CL), Residual soil, very silty and sandy, light yellowish brown to reddish brown, stiff A-7-5										
12												
		15.0		100		7-11-12			21.1			
		BORING TERMINATED AT 15 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/17/18**
Date Completed: **4/17/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. A-20

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 678.5
Location: N 242418.8696 E 2205656.2697

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		CRUSHED STONE (12 inches), (at edge of pavement) A-1 1.0		100		8-8-9			19.6			
		LEAN CLAY (CL) with traces of crushed stone, silty, brown to reddish brown, some gravel and grass, (FILL) A-7-5 2.5		100		3-6-6			24.0			
4		FAT CLAY (CH), silty, slightly sandy in lower part, reddish brown to brown, chert fragments, (FILL) A-7-5		100		2-3-3			26.8			
		7.5		100		3-4-5			27.8	65	25	40
8		FAT CLAY (CH), Residual soil, slightly silty, yellowish to reddish brown, minor chert fragments in upper part and large chert fragments in lower part A-7-5		50		3-4-5			20.3			
12												
		15.0		100		6-8-6			29.6			
		BORING TERMINATED AT 15 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/17/18**
Date Completed: **4/17/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. A-21

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 661.8
Location: N 243210.0634 E 2205320.6534

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		LEAN CLAY (CL), silty, brown to dark brown, stiff, black mineral staining		78		3-4-6			22.7			
		3.0										
4		LEAN CLAY (CL), silty, brown and some gray, stiff, aggregates, black mineral staining		61		3-4-6			23.9	45	23	22
				89		3-3-6			20.6			
8				72		2-4-5						
		10.5										
		AUGER REFUSAL AT AT 10.5 FBGS BORING TERMINATED AT 10.5 FBGS										
12												
16												
20												
24												
28												

Completion Depth (ft.): **10.5**
Date Started: **4/19/18**
Date Completed: **4/19/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Hole was moved 10' E of marked location. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. B-92

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 692.1
Location: N 245013.0589 E 2204240.5625

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (10.8 inches)										
		0.9										
		BASESTONE (18 inches) A-1										
		2.4										
		LEAN CLAY (CL), light brown to brown mottled gray, (FILL) A-7-5		67		4-6-7						
4				72		4-4-4						
		8.0										
8		FAT CLAY (CH), brown mottled gray and dark gray, firm, dense A-7-5		94		4-5-5						
12				89		3-4-5						
16												
20				100		4-6-8						
		22.5										
24		FAT CLAY (CH), brown mottled gray, stiff to very stiff, moist and soft at some spots, dense to very dense, chert fragments, black minearl staining A-7-5		100		5-6-7						
28				100		5-7-10						

Completion Depth (ft.): **46.7**
Date Started: **4/30/18**
Date Completed: **5/1/18**
Drilled By: **TSD / Richardson**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. B-92

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 692.1
Location: N 245013.0589 E 2204240.5625

Depth, feet	Graphic Log	MATERIAL DESCRIPTION		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32													
					83		3-4-50/2						
			35.0										
		AUGER REFUSAL AT 35 FBGS	35.3										
		BEGAN CORING AT 35 FBGS	35.8										
36		RUN 1											
		LIMESTONE, gray, hard, argillaceous with shale partings			100	100	--						
		Healed Vertcal fracture (35.3')											
		Closed bedding plane (35.8')	38.7										
		Closed bedding plane (36.8')	38.8										
		Closed bedding plane (38.7')	39.7										
40		RUN 2											
					100	100	--						
			43.0										
		Closed bedding plane (43')											
44			44.2										
		Closed bedding plane (44.2')	44.7										
		Closed bedding plane (44.7')	44.7										
		RUN 3			100	100	--						
			46.7										
		CORING TERMINATED AT 46.7 FBGS											
48													
52													
56													
60													

Completion Depth (ft.): **46.7**
Date Started: **4/30/18**
Date Completed: **5/1/18**
Drilled By: **TSD / Richardson**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. B-93

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 671.7
Location: N 245288.6155 E 2203907.8872

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	TOPSOIL (12 inches)										
	1.0										
	LEAN CLAY (CL), top part is black and has contains traces of roots, bottom part is gray mottled brown, (FILL) A-7-5		72		2-2-3			24.2			
	3.0										
4	FAT CLAY (CH), brown, rock fragments A-7-6		67		2-3-9			24.2			
	7.0		100		50/6--			23.5			
	AUGER REFUSAL AT 7 FBGS BEGAN CORING AT 7 FBGS										
8	RUN 1 Mud seam, weathered limestone		80	45	--						
	8.8										
	10.1										
	1/2" mud seam (10')										
	11.0										
	11.3										
12	RUN 2 LIMESTONE, gray, hard, argillaceous with shale partings Closed bedding plane (11.3')		98	90	--						
	15.6										
16	Closed bedding plane (15.6')										
	16.0										
	RUN 3		98	96	--						
	20.4										
20	Closed bedding plane (20.4')										
	21.0										
	CORING TERMINATED AT 21 FBGS										
24											
28											

Completion Depth (ft.): **21.0**
Date Started: **4/19/18**
Date Completed: **4/19/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Marked location was too steep to drill. Moved 40 ft N of marked location. Boring was backfilled with cuttings. Elevation used in log was taken from GIS during drilling.**

TEST BORING LOG

TEST BORING NO. BN-21

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 667.9
Location: N 244319.7316 E 2204574.5198

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	TOPSOIL (12 inches)										
	1.0										
	LEAN CLAY (CL), TOPSOIL, roots, brown, mottled, soft, (FILL) A-7-5		67		1-2-3			39.6			
	3.5										
4	LEAN CLAY (CL), dark brown and dark gray, mottled, soft, (FILL) A-7-5		67		1-2-2			36.0			
	▽ GROUNDWATER ENCOUNTERED DURING DRILLING AT 5.5 FBGS										
	6.0										
	LEAN CLAY (CL), aggregates, brown and gray, wet, black mineral staining, stiff, (FILL) A-7-5		100		4-6-12			14.5			
8	8.5										
	LEAN CLAY (CL), moist, brown and gray, iron staining, stiff A-7-5		100		3-7-7			17.7			
	12.0		100		50/1--						
12	AUGER REFUSAL AT 12.0 FBGS BEGAN CORING AT 12.0 FBGS							24.6			
	RUN 1 LIMESTONE, gray, hard, argillaceous with shale partings		100	100	--						
	15.9										
16	RUN 2		100	85	--						
	20.0										
20	RUN 3		100	100	--						
	22.0										
	BORING TERMINATED AT 22.0 FBGS										
24											
28											

Completion Depth (ft.): **22.0**
Date Started: **4/17/18**
Date Completed: **4/17/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was encountered during drilling activities at 5.5 fbgs. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. BN-22

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 669.7
Location: N 244334.8811 E 2204617.9551

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	TOPSOIL (18 inches)										
	1.5										
	LEAN CLAY (CL), aggregate, light brown to brown, stiff, (FILL) A-7-5		61		3-8-4			14.3			
	3.5										
4	LEAN CLAY (CL), aggregates, roots, brown, stiff, (FILL) A-7-5		50		3-3-3			14.6			
	6.0										
	LEAN CLAY (CL), brown and gray, soft, wet A-7-5		67		2-1-3			23.9			
8	8.5										
	FAT CLAY (CH), dark brown and gray, moist with rock fragments A-7-5		78		1-3-3			19.7			
12	13.5										
	FAT CLAY (CH), light brown and gray, moist with rock fragments at the bottom A-7-5 14.0		83		2-50/3-						
	AUGER REFUSAL AT 14.0 FBGS 15.5		100	100	--						
	BEGAN CORING AT 14.0 FBGS										
16	RUN 1 LIMESTONE, gray, hard, argillaceous with shale partings										
	RUN 2		100	100	--						
20	20.5										
	RUN 3		100	100	--						
24	25.5										
	CORING TERMINATED AT 25.5 FBGS										
28											

Completion Depth (ft.): **25.5**
Date Started: **4/17/18**
Date Completed: **4/17/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. BN-23

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 668.5
Location: N 244906.8539 E 2204599.6742

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	TOPSOIL (12 inches)										
	1.0										
	LEAN CLAY WITH GRAVEL (CLG), light brown, rock fragments at bottom, soft A-7-5		61		2-2-2			20.0			
	3.5										
4	LEAN CLAY WITH GRAVEL (CLG), light brown, black mineral staining, firm A-7-5		39		2-4-4			20.9	38	19	19
	4.5										
	FAT CLAY (CH) with rock fragments, light brown, very stiff A-7-5				2-4-6			23.7			
8	8.5										
	FAT CLAY (CH) with rock fragments, brown, very stiff A-7-5		83		3-5-8			15.5			
	11.4										
12	AUGER REFUSAL AT 11.4 FBGS BEGAN CORING AT 11.4 FBGS										
	12.3										
	RUN 1 LIMESTONE, gray, hard, argillaceous with shale partings Open stained bedding planes, weathered from 12' - 12.3'		100	78	--						
	15.4										
16	RUN 2		100	100	--						
	20.4										
20	RUN 3		100	100	--						
	23.4										
24	CORING TERMINATED AT 23.4 FBGS										
28											

Completion Depth (ft.): **23.4**
Date Started: **4/12/18**
Date Completed: **4/12/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. BN-24

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.1
Location: N 244890.3028 E 2204668.7253

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		CONCRETE RUBBLE (3 feet), (FILL)		0		3-2-3						
4		4.0										
		LEAN CLAY (OL), brown to dark brown, gravel, firm, with organic material, (FILL) A-8		61		2-3-3						
				22		2-3-3			13.9			
8		8.5										
		LEAN CLAY (CL), brown to dark brown, gravel, soft, with organic material A-8		44		1-1-2			27.3			
12		13.5										
		FAT CLAY (CH) with some gravel, drak gray, firm, moist A-7-5		61		2-3-4			19.9			
		15.0										
16		BORING TERMINATED AT 15 FBGS Drilling tools were being forced on an angle. Hole abandoned - moved offset boring										
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/12/18**
Date Completed: **4/12/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. BN-24A

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.1
Location: Moved offset 5 ft South of BN-24

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
0		AUGER ONLY Offset boring for BN-24 moved over 5 ft South				--						
18.5		FAT CLAY (CH), some gravel, brown and gray, soft, iron staining, mottled A-7-5		61		2-2-2			21.9			
		GROUNDWATER ENCOUNTERED DURING DRILLING AT 22.5 FBGS										
23.5		FAT CLAY (CH) with gravel, brown and gray, stiff, wet to very moist, mottled A-7-5		78		3-4-6			25.2			
28.0		AUGER REFUSAL AT 28.0 FBGS BEGAN CORING AT 28.0 FBGS		100		50/2--						
29.4		RUN 1 LIMESTONE, gray, hard, argillaceous with shale		100	85	--			27.2			

Completion Depth (ft.): **40.5**
Date Started: **4/13/18**
Date Completed: **4/13/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was encountered during drilling activities at 22.5 fbgs. Boring was backfilled with cuttings. UTM coordinates were taken from GIS.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. BN-24A

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.1

Location: Moved offset 5 ft South of BN-24

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		partings 30.6										
		Weathered zone (29.4')										
		RUN 2										
32		32.3										
		Closed bedding plane (32.3')		100	94	--						
		35.5										
36		RUN 3										
		37.8										
		Closed bedding plane (37.8')		98	94	--						
40		40.1										
		Closed bedding plane (40.1') 40.5										
		CORING TERMINATED AT 40.5 FBGS										
44												
48												
52												
56												
60												

Completion Depth (ft.): **40.5**
Date Started: **4/13/18**
Date Completed: **4/13/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was encountered during drilling activities at 22.5 fbgs. Boring was backfilled with cuttings. UTM coordinates were taken from GIS.**

TEST BORING LOG

TEST BORING NO. BN-31

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 676.9
Location: N 245111.6831 E 2204746.3632

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (6 inches) 0.5										
		CONCRETE RUBBLE (5.5 feet), (FILL)										
4												
		6.0										
		LEAN CLAY (CL) with gravel alluvium, hard, (Possible FILL) A-7-5										
8				39		1-2-50			11.4			
12		13.5										
		LEAN CLAY (CL), light brown to brown, stiff, heavy black mineral staining, encountered plug A-7-5		89		2-4-5			18.0			
16												
		18.5										
		LEAN CLAY (CL) with rock fragments, gray and brown, black mineral staining, stiff, plug A-7-5		83		3-5-6			17.8			
20		22.0										
		FAT CLAY (CH) , brown and gray, some black mineral staining, plug A-7-5 22.8		73		3-50/3-			29.1			
		AUGER REFUSAL AT 22.8 FBGS 23.1										
		BEGAN CORING AT 22.8 FBGS 23.4										
24		RUN 1		100	79	--						
		LIMESTONE, gray, hard, argillaceous with shale partings 25.6										
		Open bedding plane (23.1')										
		Open bedding plane (23.4')										
28		RUN 2		100	98	--						

Completion Depth (ft.): **35.6**
Date Started: **4/12/18**
Date Completed: **4/12/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. 4" OD auger used to auger through concrete. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. BN-31

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 676.9
Location: N 245111.6831 E 2204746.3632

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		30.6 RUN 3		100	96	--						
36		35.6 CORING TERMINATED AT 35.6 FBGS										
40												
44												
48												
52												
56												
60												

Completion Depth (ft.): **35.6**
Date Started: **4/12/18**
Date Completed: **4/12/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. 4" OD auger used to auger through concrete. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. BN-32

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 675.6
Location: N 245133.4114 E 2204707.0966

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
0		TOPSPOL (6 inches) 0.5 CONCRETE RUBBLE (8 feet), (FILL)										
8		8.5 LEAN CLAY (CL) at top, FAT CLAY (CH) with gravel and rock fragments, black mineral staining A-7-5										
12				61		3-5-6			23.3			
16		18.5 FAT CLAY (CH), light brown and gray, stiff A-7-5		83		2-50/4-			25.0			
20		19.4 AUGER REFUSAL AT 19.4 FBGS BEGAN CORING AT 19.4 FBGS 19.7 20.5 RUN 1 20.6 LIMESTONE, gray, hard, argillaceous with shale partings Stained core from 19.4' - 19.7'		100	100	--						
24		RUN 2 Open, stained, leached bedding plane (20.6')		100	96	--						
28		25.5 RUN 3		100	100	--						

Completion Depth (ft.): **30.5**
Date Started: **4/12/18**
Date Completed: **4/12/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. 4" OD auger used to auger through concrete. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. BN-32

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 675.6
Location: N 245133.4114 E 2204707.0966

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		30.5										
		CORING TERMINATED AT 30.5 FBGS										
32												
36												
40												
44												
48												
52												
56												
60												

Completion Depth (ft.): **30.5**
Date Started: **4/12/18**
Date Completed: **4/12/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. 4" OD auger used to auger through concrete. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. BN-34

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 664.9
Location: N 245584.3935 E 2205087.5137

Depth, feet	Material Description	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	TOPSOIL (12 inches)										
1.0	FAT CLAY (CH), pale yellow, brown and gray, traces of roots and organic material in top part, black mineral staining in bottom part A-7-5		67		3-3-4			22.1			
4			94		2-2-2			24.6			
			100		2-4-7			23.5			
8.0	FAT CLAY (CH), light brown to brown, rock fragments A-7-6		89		3-4-5			21.8			
12											
13.0	FAT CLAY (CH), color changes with the depth from brown to gray, wet, weathered rock at the bottom A-7-6		83		1-2-2			34.5			
16											
	▽ GROUNDWATER ENCOUNTERED DURING DRILLING AT 18 FBGS										
			67		0-6-7						
20											
21.1	AUGER REFUSAL AT 21.1 FBGS BEGAN CORING AT 21.1 FBGS		100		50/5--			13.4			
	RUN 1 LIMESTONE, gray, hard, argillaceous with shale partings										
23.9	Weathered wash parting from 23.6' - 23.9'		100	83	--						
24											
25.7											
26.3	RUN 2 Weathered wash parting form 26' - 26.3'										
28			94	72	--						

Completion Depth (ft.): **40.6**
Date Started: **4/18/18**
Date Completed: **4/18/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was encountered during drilling activities at 18 fbgs. Auger was slanting off at 15 fbgs. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. BN-34

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 664.9
Location: N 245584.3935 E 2205087.5137

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		30.7 RUN 3										
32				100	98	--						
		33.8 Closed bedding plane (33.8')										
		35.7 Weathered high angle fracture from 35.7' - 36.5'										
36		36.5 RUN 4		100	40	--						
		36.7 RUN 5										
		38.4 Closed bedding plane (38.4')		100	100	--						
40		40.6 CORING TERMINATED AT 40.6 FBGS										
44												
48												
52												
56												
60												

Completion Depth (ft.): **40.6**
Date Started: **4/18/18**
Date Completed: **4/18/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was encountered during drilling activities at 18 fbgs. Auger was slanting off at 15 fbgs. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. BS-22

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 670.5
Location: N 244466.0808 E 2204540.5252

Depth, feet	Material Description	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	TOPSOIL (12 inches)										
1.0	LEAN CLAY (CL), aggregates, brown, stiff A-7-5		33		4-6-4			14.0			
3.5	LEAN CLAY (CL), aggregates, brown, stiff with black organic material A-7-5		72		2-3-4			22.6			
6.0	LEAN CLAY (CL), aggregates, brownish gray to dark grey, stiff, black mineral staining A-7-5		67		2-3-4			19.1			
8.5	LEAN CLAY (CL), rock fragments, brown, gray to dark gray, firm, moist, mottled A-7-5		100		1-2-3			23.6			
13.5	FAT CLAY (CH), brown and gray, very stiff, black mineral staining A-7-6		100		3-7-9			37.0			
16.0	AUGER REFUSAL AT 16.0 FBGS BEGIN CORING AT 16.0 FBGS							20.1			
	RUN 1 LIMESTONE, gray, hard, argillaceous with shale partings		100	98	--						
20.5	RUN 2		100	100	--						
25.4	RUN 3		100	88	--						
27.0	CORING TERMINATED AT 27.0 FBGS										

Completion Depth (ft.): **27.0**
Date Started: **4/17/18**
Date Completed: **4/17/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550,HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. BS-24

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 669.9
Location: N 244943.3479 E 2204603.0331

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		LEAN CLAY (CL), some gravel, light brown and gray, firm A-7-5		61		2-2-3			27.6			
		2.0										
		FAT CLAY (CH), brown and gray, moist, rock fragments at bottom, firm A-7-5		78		1-2-3			29.2			
4		6.0										
		FAT CLAY (CH) with some gravel, brown, iron staining, stiff A-7-5		78		2-4-6			22.9			
8		8.5										
		FAT CLAY (CH) with some gravel, brown, stiff A-7-5		72		2-3-7			24.8			
12		13.0										
		AUGER REFUSAL AT 13 FBGS		31	0	--						
		13.4 BEGAN CORING AT 13 FBGS										
		13.5 RUN 1 Weathered Shale parting from 13' - 13.5'		100	84	--						
		14.7 RUN 2 LIMESTONE, gray, hard, argillaceous with shale partings										
16		16.0 Weathered Limestone (14.7')										
		RUN 3 Zone of open bedding planes from 17.4' - 20.5'		100	98	--						
20		20.5										
		21.0 RUN 4										
		Open, stained, leached, rear vertical fracture from 21.6' - 22'		100	42	--						
		22.0										
		Open, stained, leached, rear vertical fracture from 23' - 23.4'										
24		23.4 24.3 RUN 5										
				98	96	--						
28		29.3										
		BORING TERMINATED AT 29.3 FBGS										

Completion Depth (ft.): **29.3**
Date Started: **4/11/18**
Date Completed: **4/11/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. BS-32

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 669.3
Location: N 245097.5946 E 2204668.4640

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		LEAN CLAY (CL), with gravel, light brown, firm A-7-5		100		2-2-3			17.6			
		3.5										
4		FAT CLAY (CH), with gravel, light brown and gray, iron staining, firm A-7-5		56		2-3-2			27.3			
		6.0										
		FAT CLAY (CH), with rock fragments at the top, light brown to brown and gray, firm A-7-5		67		1-3-5			25.0			
8		8.5										
		FAT CLAY (CH), with gravel, light brown and gray, iron staining, firm A-7-6		72		2-4-5			29.7			
12		12.9										
		AUGER REFUSAL AT 12.9 FBGS BEGAN CORING AT 12.9 FBGS										
		RUN 1		100	82	--						
		14.4 Vertical fracture (12.9') Mud seam (14.4')										
		15.7										
16		RUN 2 LIMESTONE, gray, hard, argillaceous with shale partings		100	100	--						
20		20.7										
		RUN 3		100	100	--						
		23.1										
		CORING TERMINATED AT 23.1 FBGS										
24												
28												

Completion Depth (ft.): **23.1**
Date Started: **4/11/18**
Date Completed: **4/11/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. BS-33

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 674.6
Location: N 245512.3905 E 2204933.9334

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (3.6 inches) 0.3										
		BASESTONE (44.4 inches) A-1				8-8-3						
4		4.0		20		2-3-3						
		LEAN CLAY (CL), very silty, light yellowish brown mottled gray A-7-5 5.5										
		LEAN CLAY (CL), very silty, brown A-7-5		20		2-2-3						
8		8.0										
		LEAN CLAY (CL), yellowish brown to slightly grayish brown, moist, soft to firm A-7-5		100		2-4-4						
12												
				100		2-2-2						
16												
				100		2-2-4						
20												
		22.0										
		LEAN CLAY (CL), silty, yellowish to grayish brown, stiff A-7-5										
24				100		5-5-7						
		27.9										
28		AUGER REFUSAL AT 27.9 FBGS BEGAN CORING AT 27.9 FBGS										
		RUN 1		69	0	--						
		29.5 LIMESTONE, gray, hard, argillaceous with shale										

Completion Depth (ft.): **42.2**
Date Started: **4/25/18**
Date Completed: **4/26/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. BS-33

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 674.6
Location: N 245512.3905 E 2204933.9334

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		partings 30.2'		14	0	--						
		Zone of weathered rock and mud seams from 27.9' - 30.2' 30.2'		100	100	--						
32		RUN 2 31.0'										
		RUN 3 31.4'		100	63	--						
		RUN 4										
		Weathered rock from 31' - 31.4'										
		RUN 5 34.5'										
36				100	92	--						
		RUN 6 39.5'										
40				100	93	--						
		CORING TERMINATED AT 42.2 FBGS 42.2'										
44												
48												
52												
56												
60												

Completion Depth (ft.): **42.2**
Date Started: **4/25/18**
Date Completed: **4/26/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. CSX-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9
Location: N 247841.8209 E 2211283.5481

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (3 inches) 0.2										
		BASESTONE (21.6 inches) A-1 2.0										
		LEAN CLAY (CL), very silty, sandy, gravel, light brown, (FILL) A-2-7 3.5				10-8-5			11.3			
4		LEAN CLAY (CL), silty, sandy, reddish brown, (FILL) A-2-7 6.0				3-3-4			23.7			
		LEAN CLAY (CL), very silty, brown to reddish brown,(FILL) A-7-5 8.5				5-6-7			14.9			
8		LEAN CLAY (CL), silty, reddish brown, (FILL) A-7-5 13.5				10-12-13			19.4			
12		LEAN CLAY (CL), silty, yellowish to reddish brown, (FILL) A-7-5 18.5				9-10-13			25.7			
16		LEAN CLAY, sandy with chert fragments, silty, light reddish brown, (FILL) A-2-7 23.5				4-6-7			14.8			
20		LEAN CLAY (CL), sandy, silty, light reddish brown to light brown, (FILL) A-2-7 28.5				14-16-50/4			23.0			
24		SAND (SC), very clayey, light reddish brown to brown A-2-7				15-19-14			14.5			
28												

Completion Depth (ft.): **94.3**
Date Started: **4/11/18**
Date Completed: **4/12/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. CSX-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9
Location: N 247841.8209 E 2211283.5481

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32												
		33.5										
		LEAN CLAY (CL), with chert, gravel and sand streaks, medium reddish brown A-2-7				8-8-50/5			23.3			
36												
		38.5										
		LEAN CLAY (CL), with chert, gravel and sand streaks, medium reddish brown A-2-7				5-5-7			29.3			
40												
		43.5										
44		LEAN CLAY (CL), silty, sandy, reddish brown, chert gravel and sand, gray A-2-7				4-6-6			29.7			
48												
		48.5										
		FAT CLAY (CH), with silt, reddish brown A-7-5				2-3-3			36.9			
52												
		53.5										
		FAT CLAY (CH), reddish brown, wet A-7-5				2-2-4			36.4			
56												
		58.5										
		FAT CLAY (CH), high palsticity, reddish brown, wet A-7-5				4-4-6			30.7			
60												

Completion Depth (ft.): **94.3**
Date Started: **4/11/18**
Date Completed: **4/12/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. CSX-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9
Location: N 247841.8209 E 2211283.5481

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
63.5											
64	LEAN CLAY (CL) with chert and gravel, sandy and silty A-2-7				13-9-13			29.7			
68											
68.5											
	LEAN CLAY (CL), some gravel, silty, sandy, very soft A-2-7				1-1-1			48.4			
70.0											
	FAT CLAY (CH), wet, very soft with seams of chert (Drilling tods advanced under their own weight to 78.5 ft) A-7-6										
72											
76											
	NO RECOVERY				50/0.2"--			28.6			
80											
	NO RECOVERY				7-8-50/1			18.0			
84											
86.9											
	AUGER REFUSAL AT 86.9 FBGS BEGAN CORING AT 86.9 FBGS NO RECOVERY, CORE BARREL LEADING OFF CORING TERMINATED AT 94.3 FBGS										
88											

Completion Depth (ft.): **94.3**
Date Started: **4/11/18**
Date Completed: **4/12/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. CSX-1A

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9

Location: Offset 20 feet E of CSX-1

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (1 inch) 0.1/										
		BASESTONE (16.8 inches)										
		A-1 1.5										
		AUGER ONLY										
		LEAN CLAY (CL), some chert, silty, reddish brown										
		A-4a										
4												
8												
12												
16												
20												
24												
28												

Completion Depth (ft.): **80.3**
Date Started: **4/12/18**
Date Completed: **4/13/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. UTM coordinates were taken from GIS.**

TEST BORING LOG

TEST BORING NO. CSX-1A

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9
Location: Offset 20 feet E of CSX-1

MATERIAL DESCRIPTION

Depth, feet	Graphic Log	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32											
36											
40											
44											
48											
52											
56											
60											

Completion Depth (ft.): **80.3**
Date Started: **4/12/18**
Date Completed: **4/13/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. UTM coordinates were taken from GIS.**

TEST BORING LOG

TEST BORING NO. CSX-1A

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9
Location: Offset 20 feet E of CSX-1

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		62.4										
		CLAYEY GRAVEL (GC) Casing advanced with tri-cone roller bit through dense chert zone A-2-7										
64												
68												
72		72.6										
		RUN 1 Weathered rock from 72.6' - 74.5'		34	0	--						
		74.5										
		RUN 2 LIMESTONE, brecciated and quartzitic		21	0	--						
76		77.4										
		RUN 3 NO RECOVERY				--						
80		80.3										
		CORING TERMINATED AT 80.3 FBGS CORE BARREL RUPTURED, LOST IN THE HOLE BORING ABONDONED										
84												
88												

Completion Depth (ft.): **80.3**
Date Started: **4/12/18**
Date Completed: **4/13/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. UTM coordinates were taken from GIS.**

TEST BORING LOG

TEST BORING NO. CSX-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 715.5
Location: N 247665.3613 E 2211167.0404

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		CONCRETE (1 foot)										
		1.0										
		BASESTONE (12 inches)										
		A-1		87		22-17-16			7.6			
		2.0										
		LEAN CLAY (CL), sandy, brown, stiff, moist, (FILL) A-2-7										
4				73		11-5-6			7.4			
		6.0										
		LEAN CLAY (CL), sandy with gravel, brown, hard, moist, (FILL) A-2-7		100		12-22-24			18.8			
8		8.5										
		CLAYEY SAND (SC), gravel, brown, very stiff, moist, (FILL) A-2-7		100		5-11-15			17.9			
12		13.5										
		LEAN CLAY (CL), sandy, brown, very stiff, moist, (FILL) A-2-7		100		7-10-15			27.0			
16		18.5										
		LEAN CLAY (CL), with traces of fine sand, brown, firm, very moist A-7-5		100		4-3-3						
20		23.5										
		LEAN CLAY (CL), very stiff, moist, mottled A-7-5		100		8-9-12			27.1			
24												
28		28.5										
		FAT CLAY (CH), stiff, moist, mottled A-7-5		87		6-6-8			29.0			

Completion Depth (ft.): **69.0**
Date Started: **4/9/18**
Date Completed: **4/10/18**
Drilled By: **MW / Mike**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 10.8' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. CSX-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 715.5
Location: N 247665.3613 E 2211167.0404

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32											
	33.5 FAT CLAY (CH), with traces of gravel and chert, brown, very stiff, moist A-7-6		100		7-7-9			36.8			
36											
	38.5 FAT CLAY (CH), with traces of gravel and chert, brown, very stiff, moist A-7-6		100		6-10-7			41.8			
40											
	43.5 FAT CLAY (CH), with traces of gravel and chert, brown, very stiff, moist A-7-6		60		5-6-9			33.9			
44											
48	48.5 FAT CLAY (CH), with traces of gravel and chert, brown, very stiff, moist A-7-6				6-11-7			30.7			
52											
	53.5 FAT CLAY (CH), with traces of gravel and chert, brown, very stiff, moist A-7-6		100		9-50/5-			15.9			
	55.0 AUGER REFUSAL AT 55 FBGS 55.2 BEGAN CORING AT 55 FBGS										
56	RUN 1 Stained core (55.2') 57.2 Zone of angled fractures from 56.5' - 57.2'		95	95	--						
	59.0 RUN 2 LIMESTONE, very hard, quartzitic, gray with calcite										
60											

Completion Depth (ft.): **69.0**
Date Started: **4/9/18**
Date Completed: **4/10/18**
Drilled By: **MW / Mike**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 10.8' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. CSX-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 715.5
Location: N 247665.3613 E 2211167.0404

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		healed fractures		100	100	--						
64		64.0 RUN 3 Non-jointed below 64 FBGS		90	90	--						
68		Core loss left in hole 69.0 CORING TERMINATED AT 69.0 FBGS										
72												
76												
80												
84												
88												

Completion Depth (ft.): **69.0**
Date Started: **4/9/18**
Date Completed: **4/10/18**
Drilled By: **MW / Mike**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 10.8' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. CSX-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 716.0

Location: 25 paces of W-SW of W corner of CSX bridge

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (1.2 inches) 0.1/										
		BASESTONE (22.8 inches) A-1										
		2.0										
		LEAN CLAY (CL), with traces of gravel / basestone, silty, brown to reddish brown, (FILL) A-7-5 3.5		50		5-3-4			15.9			
4		LEAN CLAY (CL), with traces of basestone, slightly silty, reddish brown, (FILL) A-7-5 5.0		33		2-2-2			16.0			
		LEAN CLAY (CL), silty to very silty, sandy, abundant chert gravels, yellowish to reddish brown, very soft, (FILL) A-2-7		80		1-2-2			21.5			
8				100		2-2-2			22.5			
		12.0										
12		LEAN CLAY (CL), silty to very silty, sandy to very sandy, yellowish to reddish brown, firm to stiff, (FILL) A-2-7		100		2-3-3			19.9			
16												
				100		5-7-6			22.8			
20		22.0										
		LEAN CLAY (CL), silty to very silty, sandy, reddish brown, some chert A-2-7										
24				100		6-9-10			16.8			
28				100		9-9-12			26.9			

Completion Depth (ft.): **72.7**
Date Started: **4/18/18**
Date Completed: **4/25/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Elevation and UTM coordinates were taken from GIS.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. CSX-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 716.0

Location: 25 paces of W-SW of W corner of CSX bridge

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		32.0 LEAN CLAY (CL), silty to very silty, reddish to yellowish brown, mottled A-7-5										
				100		7-11-13			25.3			
36												
				100		4-6-9			27.8			
40												
		42.0 FAT CAY (CH), slightly silty, reddish to yellowish brown, with black and white mottling A-7-6										
44				100		6-7-9			36.5			
48				100		9-8-11			28.7			
52		52.0 FAT CLAY (CH), slightly silty, light brown to brown, mottled A-7-6										
				100		5-5-6			28.7			
56												
		57.9 AUGER REFUSAL AT 57.9 FBGS BEGAN CORING AT 57.9 FBGS										
60		RUN 1, Run 2 Weatherd Dolomite, stained core, mud seams from 57.9'		50	0	--						

Completion Depth (ft.): **72.7**
Date Started: **4/18/18**
Date Completed: **4/25/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Elevation and UTM coordinates were taken from GIS.**

TEST BORING LOG

TEST BORING NO. CSX-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 716.0

Location: 25 paces of W-SW of W corner of CSX bridge

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		- 60.3' 60.3										
		RUN 3 60.3 BRECCIA, Dolomite, stained with high angle fractures		100	100	--						
64		64.7										
		RUN 4 BRECCIA, Dolomite, silicious, quartzitic with calcite healed fractures		100	100	--						
68		69.7										
		Open, stained bedding plane (69.7') 69.7/ RUN 5 BRECCIA, Dolomite		100	100	--						
72		72.7										
		CORING TERMINATED AT 72.7 FBGS										
76												
80												
84												
88												

Completion Depth (ft.): **72.7**
Date Started: **4/18/18**
Date Completed: **4/25/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Elevation and UTM coordinates were taken from GIS.**

TEST BORING LOG

TEST BORING NO. M-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 699.7
Location: N 246062.1027 E 2198622.9167

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (9.6 inches)										
		0.8										
		BASESTONE (31.2 inches) A-1										
		3.4										
4		LEAN CLAY (CL), brown, dry, moist and firm, (FILL) A-7-5		72		2-3-6			20.4			
				72		3-3-3				50	23	27
8				100		3-4-6			22.3			
12		12.0										
		LEAN CLAY (CL), Residual Soil, brown, stiff to very stiff A-7-5		100		6-7-9			28.1			
16												
				100		3-5-7			16.8			
20												
24				94		7-10-11						
28				100		7-8-50/4						

Completion Depth (ft.): **39.9**
Date Started: **4/20/18**
Date Completed: **4/20/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 9.6' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. M-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 699.7
Location: N 246062.1027 E 2198622.9167

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		AUGER REFUSAL AT 30.1 FBGS 30.1 BEGAN CORING AT 30.1 FBGS RUN 1 LIMESTONE, argillaceous, pink and dark red to gray and brown, hard (Holstan Formation)		100	88	--						
		33.6 Open bedding plane (33.6')										
		34.8 High angle vertical fracture (34.8') 34.9/										
36		RUN 2		100	92	--						
		39.9										
40		CORING TERMINATED AT 39.9 FBGS										
44												
48												
52												
56												
60												

Completion Depth (ft.): **39.9**
Date Started: **4/20/18**
Date Completed: **4/20/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 9.6' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. M-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.7
Location: N 245939.7841 E 2198469.3014

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (12 inches)										
		1.0										
		BASESTONE (7.2 inches)										
		A-1		89		9-4-7			16.1			
		1.6										
		LEAN CLAY (CL), with traces of sand, brown and gray, stiff and moist										
		A-7-5										
4				89		3-3-5			24.3	56	24	32
						4-2-4			37.5			
8		8.1										
		AUGER REFUSAL AT 8.1 FBGS										
		BEGAN CORING AT 8.1 FBGS										
		RUN 1										
		LIMESTONE, dark red and gray with seam of green calcareous shale		100	96	--						
12		13.1										
		RUN 2										
		Zone of weatherd, fractured Limestone 14' - 15.2'										
		15.2		100	52	--						
16		Zone of high angled fractures 17.5' - 18.5'										
		18.1										
		RUN 3										
		18.5										
20		Zone of weatherd, fractured Limestone 20.4' - 21.5'		100	56	--						
		21.5										
		23.1										
		RUN 4										
24				100	100	--						
		27.1										
		RUN 5										
28				100	100	--						
		29.3										
		RUN 6										

Completion Depth (ft.): **34.3**
Date Started: **4/12/18**
Date Completed: **4/16/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 7.6' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. M-2

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.7
Location: N 245939.7841 E 2198469.3014

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		Zone of fractured Limestone 29.7' - 32.9'		48	48	--						
		32.9										
		34.3										
		CORING TERMINATED AT 34.3 FBGS CASING ADVANCER USED TO SET CASING TO 18.1 FEET DUE LOOSE ROCK COLLAPSING IN HOLE										
36												
40												
44												
48												
52												
56												
60												

Completion Depth (ft.): **34.3**
Date Started: **4/12/18**
Date Completed: **4/16/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 7.6' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. MCB-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 697.2
Location: N 245514.4339 E 2200060.9280

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (3.6 inches) 0.3										
		BASESTONE (26.4 inches) A-1										
		2.5										
		LEAN CLAY (CL), gray, moist, firm to stiff, (FILL) A-7-5										
4				67		4-5-6			22.4	56	23	33
				78		4-6-4			23.0			
8				67		2-2-5			31.1			
12				100		2-3-5			28.7			
16												
		18.5										
		LEAN CLAY (CL), gray, moist, very stiff, chert fragments A-7-5		100		2-11-10			15.2			
20												
24				100		6-6-10			25.7			
		27.2										
		AUGER REFUSAL AT 27.2 FBGS BEGAN CORING AT 27.2 FBGS		100	43	--						
28		RUN 1 28.6 LIMESTONE, weathered with mud seams from 27.2' - 32.2'										

Completion Depth (ft.): **42.4**
Date Started: **4/18/18**
Date Completed: **4/19/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring moved to 12' offset NE. Driller reported 2 small rod drops. Elevation was about 0.5' lower than the marked location. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. MCB-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 697.2
Location: N 245514.4339 E 2200060.9280

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		RUN 2		88	50	--						
		32.2										
		33.4										
		RUN 3 LIMESTONE, gray, hard, argillaceous with shale partings										
36				100	100	--						
		38.4										
		RUN 4										
40				100	100	--						
		42.4										
		CORING TERMINATED AT 42.4 FBGS										
44												
48												
52												
56												
60												

Completion Depth (ft.): **42.4**
Date Started: **4/18/18**
Date Completed: **4/19/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring moved to 12' offset NE. Driller reported 2 small rod drops. Elevation was about 0.5' lower than the marked location. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. MCB-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 696.6
Location: N 245335.1581 E 2199861.8997

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (9.6 inches)										
		0.8										
		BASESTONE (26.4 inches) A-1		56		13-12-10			3.6			
		3.0										
4		LEAN CLAY (CL), brown and gray, moist and firm, (FILL) A-7-5		0		3-4-4						
				100		2-2-5			29.3			
8												
				40		3-4-8			25.6			
12												
				100		8-5-6			18.8			
16		16.0										
		LEAN CLAY (CL), Residual soil, moist, stiff A-7-5										
20				100		5-6-9			19.8			
		23.5										
24		FAT CLAY (CH), brown to gary with chert fragments up to 1" A-7-6 Becoming wet from 24.3'		100		5-5-9			26.3			
28												

Completion Depth (ft.): **42.1**
Date Started: **4/19/18**
Date Completed: **4/19/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 10' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. MCB-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 696.6
Location: N 245335.1581 E 2199861.8997

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			100		5-7-11			16.5			
31.1	AUGER RFUSAL AT 31.1 FBGS BEGAN CORING AT 31.1 FBGS										
32	RUN 1 LIMESTONE, gray, hard, argillaceous with occasional shale partings		95	87	--						
34.9	RUN 2										
36			98	84	--						
39.9	RUN 3										
40			100	100	--						
42.1	CORING TERMINATED AT 42.1										
44											
48											
52											
56											
60											

Completion Depth (ft.): **42.1**
Date Started: **4/19/18**
Date Completed: **4/19/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 10' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. RW-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 669.2
Location: N 247478.7392 E 2209912.8780

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	TOPSOIL (12 inches)										
	1.0										
	LEAN CLAY (CL), roots, rock fragments, gray and light brown, firm, (FILL) A-7-5		72		4-4-5			17.9			
	3.5										
4	FAT CLAY (CH), rock fragments, gray and light brown, soft, moist, (FILL) A-7-6		100		1-2-1			22.8			
	6.0										
	SILTY LEAN CLAY (CL-ML), gray and light brown, stiff A-7-5		100		4-7-8			18.8			
8	8.5										
	SILTY LEAN CLAY (CL-ML), gray and light brown, black mineral staining, moist, stiff A-7-5		100		4-6-9			19.9			
12	13.5										
	LEAN CLAY (CL), gray and light brown, moist, firm A-7-5		100		3-4-4			19.7			
16	17.5										
	LEAN CLAY (CL), silty, rock fragments A-7-5		100		17-15-8						
20	22.0										
	AUGER REFUSAL AT 22.0 FBGS BORING TERMINATED AT 22.0 FBGS										
24											
28											

Completion Depth (ft.): **22.0**
Date Started: **4/11/18**
Date Completed: **4/11/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. RW-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 668.3
Location: N 247244.1700 E 2209237.1080

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	TOPSOIL (12 inches)										
	1.0										
	LEAN CLAY (CL), brown, moist, firm A-7-5		100		1-2-3			21.7			
	3.5										
4	LEAN CLAY (CL), light brown, stiff A-7-5		94		3-5-5			22.9			
	6.0										
	LEAN CLAY (CL), with silt, gray and light brown, stiff A-7-5		100		4-6-6			17.4			
8	8.5										
	LEAN CLAY (CL), gray and brown, silt, gravel, stiff A-7-5		100		11-5-7			19.7			
12	▽ GROUNDWATER ENCOUNTERED DURING DRILLING AT 13.0 FBGS	13.5									
	SILTY SAND (SM), with gravel, gray to medium brown, dense, wet A-2-7		94		10-19-30			10.9			
16	17.5										
	FAT CLAY (CH), brown and gray, moist to wet, rock fragements A-7-6		83		31-32-27						
20											
24	24.0		50		50/6--			14.5			
	AUGER REFUSAL AT 24.0 FBGS BORING TERMINATED AT 24.0 FBGS										
28											

Completion Depth (ft.): **24.0**
Date Started: **4/11/18**
Date Completed: **4/11/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was encountered during drilling activities at 13 fbgs. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. RW-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 665.8
Location: N 246913.1930 E 2208307.7546

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	TOPSOIL (12 inches)										
	1.0										
	LEAN CLAY (CL), brown, firm, moist, with organic material, (FILL) A-7-5		100		2-3-4			22.3			
	3.5										
4	LEAN CLAY (CL), silty, brown, firm, moist, (FILL) A-7-5		94		2-3-3			21.5			
	6.0										
	LEAN CLAY (CL), silty, brown and gray, moist, (FILL) A-7-5		97		--			23.5	27	20	7
8	▽ GROUNDWATER ENCOUNTERED DURING DRILLING AT 8.0 FBGS										
	8.5										
	FAT CLAY (CH), sandy, silty, brown, moist A-7-5		94		1-2-3			24.2			
	9.5										
	POORLY GRADED GRAVEL (GP), sandy, silty, brown, moist A-2-6										
12			67		3-7-7			17.4			
16											
	18.5										
	FAT CLAY (CH), some sand at top, gray, wet, rock fragments at bottom A-7-6		125		0-50/3-			33.4			
20	19.5										
	AUGER REFUSAL AT 19.5 FBGS BORING TERMINATED AT 19.5 FBGS										
24											
28											

Completion Depth (ft.): **19.5**
Date Started: **4/11/18**
Date Completed: **4/11/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was encountered during drilling activities at 8 fbgs. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. RW-4

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 677.7
Location: N 246858.3761 E 2208838.1037

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (4 inches) 0.3										
		BASESTONE (14.4 inches) A-1 1.5										
		Compacted LEAN CLAY (CL), with chert and gravel, brown to reddish brown, (FILL) A-2-7				4-9-15						
		3.5										
4		Compacted LEAN CLAY (CL), with chert and gravel, brown to reddish brown, (FILL) A-2-7				6-10-12			12.8	50	25	25
		6.5										
		Compacted LEAN CLAY (CL), with chert and gravel, brown to reddish brown, (FILL) A-2-7				6-6-7			16.2			
8		8.5										
		Compacted LEAN CLAY (CL), with chert and gravel, brown to reddish brown, (FILL) A-2-7				4-5-5			17.4			
12		13.5										
		LEAN CLAY (CL), silty, gray, soft A-7-5				1-2-2			19.8	28	17	11
16		18.5										
		FAT CLAY (CH), silty, light brown A-7-5				3-4-6			24.2			
20		23.5										
		FAT CLAY (CH), silty, brown with darker brown, mottled A-7-5				2-3-4			27.3			
24		28.5										
28		FAT CLAY (CH), with highly weathered rock fragments A-7-5				16-19-22						

Completion Depth (ft.): **33.8**
Date Started: **4/9/18**
Date Completed: **4/10/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. RW-4

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 677.7
Location: N 246858.3761 E 2208838.1037

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		33.8										
		AUGER REFUSAL AT 33.8 FBGS BORING TERMINATED AT 33.8 FBGS										
36												
40												
44												
48												
52												
56												
60												

Completion Depth (ft.): **33.8**
Date Started: **4/9/18**
Date Completed: **4/10/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. RW-4A

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 677.7
Location: 5 ft offset of RW-4

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
0		AUGER ONLY See RW-4										
4												
8						--						
12												
16												
19.0												
20		LEAN CLAY (CL) A-7-5		100		--			22.3			
				100		--			21.5	30	19	11
23.0		BORING TERMINATED AT 23 FBGS										
24												
28												

Completion Depth (ft.): **23.0**
Date Started: **4/9/18**
Date Completed: **4/10/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Only shelby tube samples were taken from this hole. Boring was backfilled with cuttings. UTM coordinates were taken from GIS.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. RW-5

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 677.8
Location: N 247164.5043 E 2209718.7657

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (5 inches) 0.4										
		BASESTONE (31.2 inches) A-1										
		3.0										
4		LEAN CLAY (CL), silty, sandy, with gravel, light to reddish brown, (FILL) A-7-5 4.5		39		4-4-5			16.2			
		LEAN CLAY (CL), with gravel, light brown, (FILL) A-7-5 6.0		50		2-3-3			14.9			
		LEAN CLAY (CL), silty, sandy, reddish brown, (FILL) A-7-5		50		5-4-5			17.6			
8		8.5										
		LEAN CLAY (CL), silty, sandy, reddish brown, (FILL) A-7-5		50		3-6-7			18.4			
12		13.5										
		LEAN CLAY (CL), brown with black mineral staining, firm A-7-5		100		2-3-4			20.8			
16												
				6		3-4-6			20.9			
20												
		23.5										
24		LEAN CLAY (CL), silty, brown mottled gray, stiff A-7-5		100		4-5-5			22.0			
		▽ GROUNDWATER ENCOUNTERED DURING DRILLING AT 25.0 FBGS										
28		28.5										
		LEAN CLAY (CL), with gravel, gray, very wet, firm A-7-5		100		5-4-4			50.8			

Completion Depth (ft.): **45.4**
Date Started: **4/10/18**
Date Completed: **4/10/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was encountered during drilling at 25 fbgs activities. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. RW-5

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 677.8
Location: N 247164.5043 E 2209718.7657

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32												
		33.5										
		FAT CLAY (CH), with gravel, wet, very soft, A-7-6		22		1-1-1			57.4			
36												
40												
						3-50/1-			37.2			
44		45.4				50/5--			61.0			
		AUGER REFUSAL AT 45.4 FBGS BORING TERMINATED AT 45.4 FBGS										
48												
52												
56												
60												

Completion Depth (ft.): **45.4**
Date Started: **4/10/18**
Date Completed: **4/10/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was encountered during drilling at 25 fbgs activities. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. RW-6

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 699.3
Location: N 247474.6484 E 2210617.8988

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (3 inches) 0.3										
		BASESTONE (21 inches) A-1										
		2.0										
		LEAN CLAY (CL), light to medium reddish brown, (FILL) A-7-5	X			5-4-5			15.9			
		3.5										
4		LEAN CLAY (CL), some chert and gravel, light reddish brown, (FILL) A-7-5	X			2-4-4			21.4			
		6.0										
		LEAN CLAY (CL), light reddish brown, (FILL) A-7-5	X			5-5-4			14.8			
8		8.5										
		LEAN CLAY (CL), with chert and gravel fragments, light reddish brown, (FILL) A-2-7	X			9-10-10			21.3	49	25	24
12		13.5										
		LEAN CLAY (CL), with chert and gravel fragments, light reddish brown, (FILL) A-2-7	X			4-5-7			18.3			
16		18.5										
		LEAN CLAY (CL), with chert and gravel fragments, light reddish brown, (FILL) A-2-7	X			4-5-8			21.4	54	24	30
20		23.5										
24		LEAN CLAY (CL), with chert and gravel, light reddish brown, (FILL) A-2-7	X			4-4-5			20.8			
28			X			6-6-9			8.8			

Completion Depth (ft.): **47.2**
Date Started: **4/10/18**
Date Completed: **4/10/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. RW-6

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 699.3
Location: N 247474.6484 E 2210617.8988

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32												
						6-5-4			20.4			
		35.0										
36		FAT CLAY (CH), with chert, brown, wet, stiff A-2-6										
						4-7-7			22.9			
40												
						4-7-8						
44												
		47.2										
		AUGER REFUSAL AT 47.2 FBGS BORING TERMINATED AT 47.2 FBGS										
48												
52												
56												
60												

Completion Depth (ft.): **47.2**
Date Started: **4/10/18**
Date Completed: **4/10/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCC-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 666.2
Location: N 246624.0273 E 2207582.7919

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		LEAN SILT (ML) with clayey gravel, firm A-7-5										
				44		2-3-3			9.6			
		3.0										
4		LEAN SILT (ML) with clayey gravel, limestone fragments, firm A-7-5		39		2-4-2			14.4			
		6.0										
		LEAN CLAY (CL), soft A-7-5		50		4-2-2			18.5			
8		8.0										
		LEAN SILT (ML), clayey with rounded gravel, alluvium A-7-5		100		1-3-3			21.0			
12		13.0										
		CLAYEY SAND (SC), with silt, brown A-2-5 GROUNDWATER ENCOUNTERED DURING DRILLING AT 14 FBGS		78		2-5-5			34.3			
16		17.5										
		AUGER REFUSAL AT 17.5 FBGS BEGAN CORING AT 17.5 FBGS										
		RUN 1 LIMESTONE, gray, hard, argillaceous with shale partings		96	84	--						
20		20.0 RUN 2 20.4 Open stained bedding planes from 20' - 20.4'		98	94	--						
24		25.0 RUN 3		100	100	--						
		27.5										
28		CORING TERMINATED AT 27.5 FBGS										

Completion Depth (ft.): **27.5**
Date Started: **4/10/18**
Date Completed: **4/10/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was encountered during drilling activities at 14 fbgs. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. SCC-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 667.4
Location: N 246528.7736 E 2207374.3501

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		FAT CLAY (CH), reddish brown to brown, traces of roots in top part, rock fragments, black mineral staining, (FILL) A-7-6		33		2-2-7			21.8			
		4.0		83		2-50/2-						
4		AUGER REFUSAL AT 4 FBGS BEGAN CORING AT 4 FBGS							23.8			
		RUN 1		70	70	--						
		5.4										
		RUN 1 , RUN 2, RUN 3 - All CLAY with Limestone fragments A-7-6										
8				0	0	--						
12				0	0	--						
16												
		17.1										
		RUN 4 LIMESTONE, gray, hard, argillaceous with shale partings		78	34	--						
20		21.0										
		RUN 5		100	100	--						
24												
		26.0										
		RUN 6										
28				98	90	--						
		29.8										

Completion Depth (ft.): **31.0**
Date Started: **4/16/18**
Date Completed: **4/16/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with grout. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. SCC-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 667.4
Location: N 246528.7736 E 2207374.3501

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		Stained fracture (29.8')										
		31.0										
		CORING TERMINATED AT 31 FBGS										
32												
36												
40												
44												
48												
52												
56												
60												

Completion Depth (ft.): **31.0**
Date Started: **4/16/18**
Date Completed: **4/16/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with grout. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCC-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 661.0
Location: N 246332.0397 E 2207350.0631

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		FAT CLAY (CH), mottled brown, rock fragments, black mineral staining A-7-6		44		6-4-4			16.4			
4				50		2-3-2			28.2			
		5.5										
		FAT CLAY (CH), brown to dark gray, moist to very moist A-7-6		78		2-2-2			22.2			
8												
		9.0										
		CLAYEY SAND (SC), brown, rock fragments A-2-7		100		2-1-2			22.8			
12												
		14.3		94		0-20-50/1			35.7			
		AUGER REFUSAL AT 14.3 FBGS BEGAN CORING AT 14.3 FBGS		100	100	--						
		15.6										
16		RUN 1 LIMESTONE, gray, hard, argillaceous with shale partings										
		RUN 2 17.3										
		Closed bedding plane (17.3')		100	92	--						
		20.0										
20		Closed bedding plane (20') 20.5										
		RUN 3 20.6										
		Closed bedding plane (20.6') 21.3										
		Closed bedding plane (21.3') 21.6										
		Closed bedding plane (21.6')		100	88	--						
24												
		25.6										
		CORING TERMINATED AT 25.6 FBGS										
28												

Completion Depth (ft.): **25.6**
Date Started: **4/16/18**
Date Completed: **4/16/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with grout. Boring location was moved on greenway trail at side of the bridge. Elevation was taken from GIS.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/18/18

TEST BORING LOG

TEST BORING NO. SCC-4

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 662.3
Location: N 246361.2597 E 2207643.7214

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		LEAN CLAY (CL), (FILL) Hand auger to 3.0 FBGS A-7-5										
		3.5										
4		LEAN CLAY (CL), firm, (FILL) 4.0 A-7-5		61		3-2-4			10.5			
		SILTY SAND (SM), with limestone fragements, loose A-2-7		61		2-4-6			12.4			
8		8.5										
		SILTY SAND (SM), with gravel fragments, brown, coarse grains, wood fragments, very loose A-2-7		61		2-2-2			14.2			
12		▽ GROUNDWATER ENCOUNTERED DURING DRILLING AT 13.0 FBGS 13.5		33		2-4-5						
		POORLY-GRADED SAND (SP), with coarse rock fragments, loose A-2-5										
16		18.5										
		FAT CLAY (CH), with gravel, brown, soft, wet A-7-5		100		0-0-3			74.2			
20		23.5										
		FAT CLAY (CH), with shale gravel, brown, very soft, wet A-7-5		78		1-0-0			68.5			
24												
28		28.5										
		FAT CLAY (CH), with weathered limestone and shale fragements, brown, soft, moist A-7-6 30.0		100		2-1-2			66.9			

Completion Depth (ft.): **30.0**
Date Started: **4/10/18**
Date Completed: **4/10/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was encountered during drilling activities at 13 fbgs. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. SCC-4

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 662.3
Location: N 246361.2597 E 2207643.7214

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		BORING TERMINATED AT 30 FBGS AUGER STARTED SLANTING OFF MOVED 40 FEET SE OFFSET										
36												
40												
44												
48												
52												
56												
60												

Completion Depth (ft.): **30.0**
Date Started: **4/10/18**
Date Completed: **4/10/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was encountered during drilling activities at 13 fbgs. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCC-4A

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 662.3
Location: Moved offset 40 ft SE of SSC-4

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
0		AUGER ONLY See SCC-4										
4												
8						--						
12												
16												
17.2												
17.6		RUN 1 Open bedding plane (17.6')		96	75	--						
19.1												
19.6		Mud seam (19.1')										
20		RUN 2 LIMESTONE, gray, hard, argillaceous with calcite healed fracture		100	100	--						
20.5		RUN 3		98	94	--						
24												
25.4		RUN 4		100	100	--						
27.3		CORING TERMINATED AT 27.3 FBGS										
28												

Completion Depth (ft.): **27.3**
Date Started: **4/10/18**
Date Completed: **4/10/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. UTM coordinates were taken from GIS.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. SCK-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.2
Location: N 243983.3291 E 2204597.3826

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (2.4 inches) 0.2										
		BASESTONE (21.6 inches) A-1 2.0										
		LEAN CLAY (CL), very silty, brown, (FILL) A-7-5 NO RECOVERY				3-3-3			19.3			
4						2-3-3						
		5.5										
		LEAN CLAY (CL), silty, brown to reddish brown and yellowish brown, (FILL) A-7-5				2-3-3						
8						2-2-3						
12						2-2-2						
16		16.5										
		LEAN CLAY (CL), silty, brown to grayish brown A-7-5				3-4-6						
20												
24						4-6-7						
28		NO RECOVERY										
		29.8				8-13-50/3						

Completion Depth (ft.): **44.3**
Date Started: **4/15/18**
Date Completed: **4/16/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCK-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.2
Location: N 243983.3291 E 2204597.3826

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		AUGER REFUSAL AT 29.8 FBGS BEGAN CORING AT 29.8										
32		RUN 1 LIMESTONE, gray, hard, argillaceous with shale partings		93	91	--						
		Weathered shale parting (34' - 34.3') 34.3										
		RUN 2										
36				100	92	--						
		Zone of high angle fractures (38.4' - 39.3')										
		39.3 RUN 3										
40				100	100	--						
44		44.3 CORING TERMINATED AT 44.3 FBGS										
48												
52												
56												
60												

Completion Depth (ft.): **44.3**
Date Started: **4/15/18**
Date Completed: **4/16/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCK-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.1
Location: N 244089.1070 E 2204530.5385

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	ASPHALT (12 inches)										
	1.0										
	BASESTONE (24 inches) A-1		67		10-11-4			3.3			
	3.0										
4	LEAN CLAY (CL), brown and gray, firm to stiff, (FILL) A-7-5		67		4-4-6			22.4			
			100		3-4-4			22.8	44	21	23
8			100		2-3-5			25.5			
	12.0										
12	LEAN CLAY (CL), Residual soil, brown, moist, stiff to very stiff, mottled A-7-5		100		3-5-9			23.9			
16											
			61		3-6-7			25.1			
20	Moist to wet										
24			100		5-7-50/2			19.5			
	26.2										
	AUGER REFUSAL AT 26.2 BEGAN CORING AT 26.2										
	RUN 1										
28	LIMESTONE, gray, hard, argillaceous with shale partings		96	96	--						

Completion Depth (ft.): **36.7**
Date Started: **4/16/18**
Date Completed: **4/16/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 5' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCK-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.1
Location: N 244089.1070 E 2204530.5385

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		30.7										
		RUN 2		100	100	--						
32												
		35.7										
36		RUN 3		100	100	--						
		36.7										
		CORING TERMINATED AT 36.7 FBGS										
40												
44												
48												
52												
56												
60												

Completion Depth (ft.): **36.7**
Date Started: **4/16/18**
Date Completed: **4/16/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 5' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCK-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 681.1
Location: N 244112.9116 E 2204595.9845

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (4.8 inches) 0.4										
		BASESTONE (61.2 inches) A-1										
4				70		9-13-10						
		5.5										
		LEAN CLAY (CL), slightly silty, light yellowish brown, (FILL) A-7-5										
8				100		2-2-3						
12				100		3-3-4						
16		17.0										
		LEAN CLAY (CL), silty, yellowish brown to grayish brown A-7-5										
20				100		2-3-4						
24				100		2-3-6						
28		29.5				50/1--						
		AUGER REFUSAL AT 29.5 FBGS										

Completion Depth (ft.): **44.5**
Date Started: **4/26/18**
Date Completed: **4/30/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson / A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCK-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 681.1
Location: N 244112.9116 E 2204595.9845

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32	BEGAN CORING AT 29.5 FBGS RUN 1 Weathered Limestone, vertical fractures, stained from 29.5' - 35'		90	15	--						
	33.6										
	RUN 2		78	0	--						
	34.5										
	RUN 3										
	35.0										
36	Weathered shale partings from 36' - 36.7'										
	36.7										
	LIMESTONE, gray, hard, argillaceous with shale partings		100	84	--						
	39.5										
40	RUN 4										
			100	100	--						
44	44.5										
	CORING TERMINATED AT 44.5 FBGS										
48											
52											
56											
60											

Completion Depth (ft.): **44.5**
Date Started: **4/26/18**
Date Completed: **4/30/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson / A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCK-4

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.9
Location: N 244028.5120 E 2204807.5259

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (12inches)										
		1.0										
		BASESTONE (20.4 inches) A-1		100		20-23-21			2.1			
		2.7										
		LEAN CLAY(CL), brown and gray, moist, firm, gravel size chert fragments, (FILL) A-7-5		61		12-10-8			13.7			
4				87		4-3-5			22.7			
8				100		3-3-5			24.8			
12												
		14.0										
		LEAN CLAY (CL), Residual soil, brown and gray, firm, chert fragments, mottled A-7-5		100		2-3-6			23.4			
16												
20				20		2-2-6			24.3			
24				87		2-2-5			27.9			
		28.0										
28		AUGER REFUSAL AT 28 FBGS BEGAN CORING AT 28 FBGS										
		RUN 1 LIMESTONE, gray, hard, argillaceous with shale		80	90	--						

Completion Depth (ft.): **38.0**
Date Started: **4/16/18**
Date Completed: **4/16/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 7.6' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCK-4

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.9
Location: N 244028.5120 E 2204807.5259

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		partings 30.5 RUN 2		100	100	--						
		35.5 RUN 3										
36				100	100	--						
		38.0 CORING TERMINATED AT 38 FBGS										
40												
44												
48												
52												
56												
60												

Completion Depth (ft.): **38.0**
Date Started: **4/16/18**
Date Completed: **4/16/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 7.6' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCK-5

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 679.4
Location: N 244171.5853 E 2204729.1542

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	ASPHALT (2.4 inches) 0.2										
	BASESTONE (33.6 inches) A-1										
	3.0										
	CLAYEY SAND (SC), with traces of silt, yellowish brown to olive brown, (FILL) A-2-7				3-4-4			10.7			
4	4.5										
	LEAN CLAY (CL), silty to very silty, yellowish brown to light brown, (FILL) A-7-5				2-3-4			18.6			
					3-6-3			15.8			
	8.0										
8	LEAN CLAY (CL), silty, light brown to brown, soft to firm A-7-5				4-4-4			21.5			
12					5-7-7			15.1			
16											
					3-3-5			25.1			
20											
	22.0										
	LEAN CLAY (CL), silty and sandy, wet, very soft sticky, angular chert and gravel fragments A-7-5				4-4-4			24.4			
24											
28					1-0-0			25.7			

Completion Depth (ft.): **48.7**
Date Started: **4/16/18**
Date Completed: **4/17/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCK-5

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 679.4
Location: N 244171.5853 E 2204729.1542

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		32.8 AUGER REFUSAL AT 32.8 FBGS BEGAN CORING AT 32.8 FBGS										
		RUN 1		37	12	--						
		34.7 RUN 2		100	100	--						
36												
		39.2 RUN 3		100	100	--						
40												
		44.7 RUN 4		100	100	--						
44												
48		48.7 CORING TERMINATED AT 48.7 FBGS DRILLED CORE - 48.6 FBGS 0.1' IN HOLE										
52												
56												
60												

Completion Depth (ft.): **48.7**
Date Started: **4/16/18**
Date Completed: **4/17/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCK-6

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 679.9
Location: N 244038.9095 E 2204858.1862

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (3.6) 0.3										
		BASESTONE (20.4 inches) A-1										
		2.0										
		BASESTONE, very sandy, gravel, clay, reddish brown, (FILL) A-2-7		100		10-8-3			18.6			
		3.5										
4		LEAN CLAY (CL), very silty with sand, reddish brown to yellowish brown, gravel, (FILL) A-2-7		100		3-4-5			20.6			
				100		3-3-3			24.8			
		6.5										
		LEAN CLAY (CL), with traces of silt and sand, yellowish brown to light brown mottled gray, moist and soft A-7-5		100		2-2-2			18.4			
8				33		1-2-3			22.8			
		12.0										
12		FAT CLAY (CH), light brown mottled green, some reddish brown, light to medium olive green, very moist, soft A-7-5		100		3-3-3			18.8			
16												
				100		6-5-4			32.1			
20												
24				100		2-3-4			25.5			
		26.8 AUGER REFUSAL AT 26.8 FBGS BEGAN CORING AT 26.8										
28		RUN 1 LIMESTONE, gray, hard, argillaceous with shale partings Zone of high angle fractures from 29.8' - 34.8'		100	87	--						
		29.8										

Completion Depth (ft.): **39.8**
Date Started: **4/17/18**
Date Completed: **4/18/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. SCK-6

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 679.9
Location: N 244038.9095 E 2204858.1862

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		RQD discounted due to high angle fractures RUN 2 — 31.1		100	76	--						
		34.8 RUN 3										
36				100	100	--						
		39.8 CORING TERMINATED AT 39.8 FBGS										
40												
44												
48												
52												
56												
60												

Completion Depth (ft.): **39.8**
Date Started: **4/17/18**
Date Completed: **4/18/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCR-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 695.9
Location: N 245416.7475 E 2202343.0248

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (9.6 inches)										
		0.8										
		BASESTONE (30 inches) A-1		87		19-21-8			3.4			
		3.3										
4		LEAN CLAY (CL), brown and gray, firm to stiff, (FILL) A-7-5		87		9-7-6			17.5			
				93		4-4-4			26.1			
8				100		1-2-4			24.6			
12		12.5										
		FAT CLAY (CH), Residual soil, brown and gray, moist to wet, chert nodules A-7-5		100		1-2-5			23.9			
16												
				100		3-3-4			25.8			
20												
24				100		3-5-8			23.5			
28				100		4-4-5			23.3			

Completion Depth (ft.): **55.5**
Date Started: **4/18/18**
Date Completed: **4/18/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 5.5' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCR-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 695.9
Location: N 245416.7475 E 2202343.0248

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32												
				100		5-6-9			20.5			
36												
				0		1-1-1						
40		40.7 AUGER REFUSAL AT 40.7 FBGS BEGAN CORING ART 40.7 FBGS										
		RUN 1 LIMESTONE, gray, hard, argillaceous with shale partings		94	60	--						
44		Zone of high angle fractures, stained from 44.5' - 45.5'										
		45.5 RUN 2										
48				98	84	--						
		50.5 RUN 3 Stained weathered rock from 50.5' - 51.4'										
52		51.4		96	82	--						
		55.5 CORING TERMINATED AT 55.5 FBGS										
56												
60												

Completion Depth (ft.): **55.5**
Date Started: **4/18/18**
Date Completed: **4/18/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 5.5' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. SCR-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 677.9
Location: N 245224.7698 E 2202211.5498

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		LEAN CLAY (CL), sandy A-5-7										
		1.0 SAND (SW), fine, brown to black, medium dense, moist, (FILL) A-2-5		87		6-5-7			11.9			
		3.5 LEAN CLAY (CL), sandy, brown, stiff, moist, (FILL)		87		3-5-8			13.9			
4		6.0 LEAN CLAY (CL), brown, firm, moist A-7-5		20		5-3-2			12.4			
8		8.5 LEAN CLAY (CL), brown to black, soft, moist, mottled A-7-5		80		2-2-2			26.1			
12		13.5 LEAN CLAY (CL), with chert nodules, firm, moist A-7-5		100		4-3-5			18.6			
16		17.0 AUGER REFUSAL AT 17.0 FBGS BEGAN CORING AT 17.0 FBGS RUN 1		100	100	--						
		LIMESTONE, bluish gray, hard, argillaceous 19.0 RUN 2 19.1 Shale parting (19')		90	90	--						
20												
24		24.0 RUN 3		96	96	--						
28		29.0 CORING TERMINATED AT 29.0 FBGS										

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

Completion Depth (ft.): **29.0**
Date Started: **4/11/18**
Date Completed: **4/11/18**
Drilled By: **MW / Mike**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings.Offset hole 9.6' from stake along a bearing of N7W. Ground surface between stake and hole is relatively flat. Elevatons were provided by Neel-Schaffer**

TEST BORING LOG

TEST BORING NO. SCR-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 694.0
Location: N 245041.6875 E 2202339.3504

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (10.4 inches)										
		0.8										
		BASESTONE (38.4 inches) A--1		72		30-19-6			4.0			
		4.0										
4		LEAN CLAY (CL), brown, gray and olive, moist firm to stiff, (FILL) A-7-5		87		3-3-9			17.4	33	17	16
				100		3-5-6			21.6			
8				100		2-3-5			18.7			
12												
				100		4-4-6			20.4			
16												
		19.0										
20		LEAN CLAY (CL), Residual soil, moist to slightly wet near bottom, firm to stiff A-7-5		93		1-2-5			20.0			
24				100		4-5-6			18.1			
28				100		4-7-9			25.8			

Completion Depth (ft.): **45.1**
Date Started: **4/17/18**
Date Completed: **4/17/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring moved to 19.1' offset due to overhead power. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. SCR-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 694.0
Location: N 245041.6875 E 2202339.3504

MATERIAL DESCRIPTION

Depth, feet	Graphic Log	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32											
36											
40											
44											
48											
52											
56											
60											

33.7 — AUGER REFUSAL AT 33.7
BEGAN CORING AT 33.7

RUN 1 — 35.1 — 100 — 43 — --
LIMESTONE, gray, hard, argillaceous with shale partings
Weathered shale parting from 34.7' - 35.1'

RUN 2 — 100 — 98 — --

40.1

RUN 3 — 100 — 90 — --

45.1

CORING TERMINATED AT 45.1

Completion Depth (ft.): **45.1**
Date Started: **4/17/18**
Date Completed: **4/17/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring moved to 19.1' offset due to overhead power. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

APPENDIX D
LABORATORY TESTING PROCEDURES

LABORATORY TEST PROCEDURES

NATURAL MOISTURE CONTENT
ASTM D 2216 / AASHTO T265

The moisture content of soil is an indicator of various physical properties, including strength and compressibility. The sample is weighed, then placed in an oven set to 110° ± 5°C until the free moisture evaporates. The dried sample is removed from the oven, allowed to cool, and weighed. The moisture content is computed by dividing the weight of evaporated water by the weight of the dry sample. The results, expressed as a percent, are presented on the respective boring logs.

GRAIN SIZE DISTRIBUTION
ASTM D 422 / AASHTO T 88

The grain size distribution of soil particles is an indicator of certain physical properties including permeability, compaction characteristics, consolidation, shrinkage and swelling, liquefaction, and others. The soil specimen is dried and then passed through a series of nested sieves. The portion of sample retained on each sieve is weighed and the percent of the total sample retained is computed. For fine-grained soils, a hydrometer test is also performed where the grain size distribution is estimated by the rate at which soil particles suspended in water fall. The results are plotted on the Report of Particle Size Analysis of Soils sheets in Appendix G.

ATTERBERG LIMITS
ASTM D 4318 / AASHTO T 89/T 90

Representative samples were subjected to Atterberg limits testing to determine the soil's plasticity characteristics. The plasticity index (PI) is the range of moisture content over which the soil deforms as a plastic material. The liquid limit (LL) marks the transition from the plastic state to the liquid state. The plastic limit (PL) marks the transition from the plastic state to the solid state.

To determine the liquid limit, a soil specimen is wetted until it is in a viscous fluid state. A portion of this soil is then placed in a brass cup of standardized dimensions, and a groove made through the middle of the soil specimen with a grooving tool of standardized dimensions. The cup is attached to a cam that lifts the cup 10 mm, and then allows the cup to fall and strike a rubber base of standardized hardness. The cam is rotated at about 2 drops per second until the two halves of the soil specimen come into contact with each other at the bottom of the groove along a distance of 13 mm. The number of blows required to make this degree of contact is recorded, and a portion of the specimen is subjected to a moisture content determination. Additional water is added to the remainder of the specimen, and the grooving process and cam action process repeated. The number of blows vs. moisture content is then plotted on semi-logarithmic graph paper, and the moisture content corresponding to 25 blows is designated the liquid limit.

The plastic limit is the lowest moisture content at which the soil is sufficiently plastic to be manually rolled into threads 3 mm in diameter. It is determined by taking a pat of soil remaining from the liquid limit test, and repeatedly rolling, kneading, and air drying the specimen until the soil breaks into threads about 3 mm in diameter and 3 to 10 mm long. The moisture content of these soil threads is then determined, and is designated the plastic limit. The results of these tests are presented on the Boring Logs.

LABORATORY TEST PROCEDURES (CONTINUED)

STANDARD PROCTOR COMPACTION
ASTM D 698 / AASHTO T 99

Representative samples of soils from expected cut areas and pavement subgrade areas were obtained for a laboratory determination of compacted density at various moisture contents. This test is used to estimate the maximum density to which the soil may be compacted in the field with conventional construction equipment. The sample was divided into at least four separate portions. After each portion was air-dried or moistened to a different moisture content, it was compacted in three equal layers in a 4-inch diameter mold. Each layer was subjected to 25 blows of a 5.5-pound hammer falling 12 inches. Each compacted specimen had a known volume of 1/30 ft^3. After compaction, the dry unit weight and moisture content of the samples were obtained and plotted on a graph of moisture content (abscissa) versus dry density (ordinate). A smooth curve was drawn from the data points. The test results, including the test method used, the origin of the sample, the maximum dry density, optimum moisture content, and the curve defining the moisture-density relationship are shown on the Report of Standard Proctor Test sheets in Appendix G.

APPENDIX E
SOIL CLASSIFICATION CHARTS

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)		
		GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)		
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)		
		SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)		
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

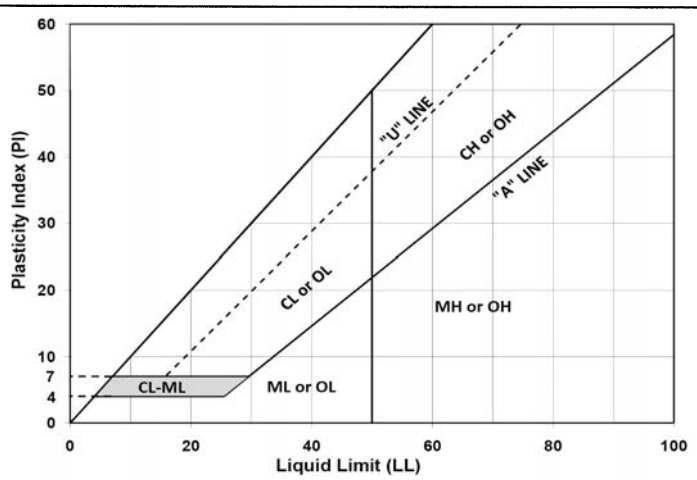
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART



General Classification	Granular Materials								Silt-Clay Materials						
	35 percent or less of total sample passing No. 200 (75 µm)								More than 35 percent of total sample passing No. 200 (75 µm)						
Group Classification	A-1		A-3 [1]		A-2				A-4		A-5	A-6		A-7	
	A-1-a	A-1-b	A-3	A-3a	A-2-4	A-2-5	A-2-6	A-2-7	A-4a	A-4b		A-6a	A-6b	A-7-5	A-7-6
Sieve analysis, percent passing:						*				**	*			*	
No. 10 (2 mm)	50 max														
No. 40 (425 µm)	30 max	50 max	51 min	[2]					[3]	[4]					
No. 200 (75 µm)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	35 max	36 min	50 min	36 min	36 min		36 min	
Characteristics of fraction passing No. 40															
Liquid limit	—	—	Non-	—	40 max	41 min	40 max	41 min	40 max		41 min	40 max		41 min	
Plasticity index	6 max	6 max	Plastic	6 max	10 max	10 max	11 min	11 min	10 max		10 max	11 – 15	16 min	≤LL-30	>LL-30
Group Index	0						4 max		8 max		12 max	10 max	16 max	20 max	
Usual types of significant constituent materials	Stone fragments, gravel and sand		Fine sand	Sand	Silty or clayey gravel and sand				Silty soils			Clayey soils			
General rating as subgrade	Excellent to good								Good to fair						

Notes

With the test data available, the classification of a soil is found by proceeding from left to right on the chart. The first classification that the test data fits is the correct classification.

* A-2-5 is not allowed under 703.16.B. A-5 and A-7-5 is not allowed under 703.16.A. See "Natural Soil and Natural Granular Soils" (203.02.H) in this manual

** A-4b is not allowed in the top 3 feet (1.0 m) of the embankment under 203.03.A.

[1] The placing of A-3 before A-2 is necessary in the "left to right" process, and does not indicate superiority of A-3 over A-2.

[2] A-3a must contain a minimum 50 percent combined coarse and find sand sizes (passing No. 10 but retained on No. 200, between 2 mm and 75 µm).

[3] A-4a must contain less than 50 percent silt size material (between 75 µm and 5 µm).

[4] A-4b must contain 50 percent or more silt size material (between 75 µm and 5 µm).

JOB NO.: 300-18-0001

CLIENT: Neel-Schaffer

I-75 interchange at I-24
Chattanooga, TN

AASHTO CLASSIFICATION CHART

PIN 114174.00
I-75 INTERCHANGE AT I-24

CHATTANOOGA, TENNESSEE

KSWA
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Appendix E

APPENDIX F
LABORATORY TEST RESULTS

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

350 Cal Batsel Road
Bowling Green, KY 42101
Phone: (270) 842-1070
Fax: (615) 256-5873

REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	RW-2 3.5-5
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Yellow Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	213.79
Oven Dry Mass of Sample Retained on No. 200 (grams):	39.33
Percentage Passing No. 200 Sieve:	**81.6%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	0.61	0.61	0.3%	99.7%
No. 10	2.00	0.00	0.61	0.3%	99.7%
No. 16	1.18	6.88	7.49	3.5%	96.5%
No. 30	0.60	5.07	12.56	5.9%	94.1%
No. 40	0.425	5.13	17.69	8.3%	91.7%
No. 60	0.250	7.72	25.41	11.9%	88.1%
No. 100	0.150	4.44	29.85	14.0%	86.0%
No. 200	0.075	12.03	41.88	19.6%	80.4%

Remarks :

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

54 Lindsley Avenue
Nashville, Tennessee 37210
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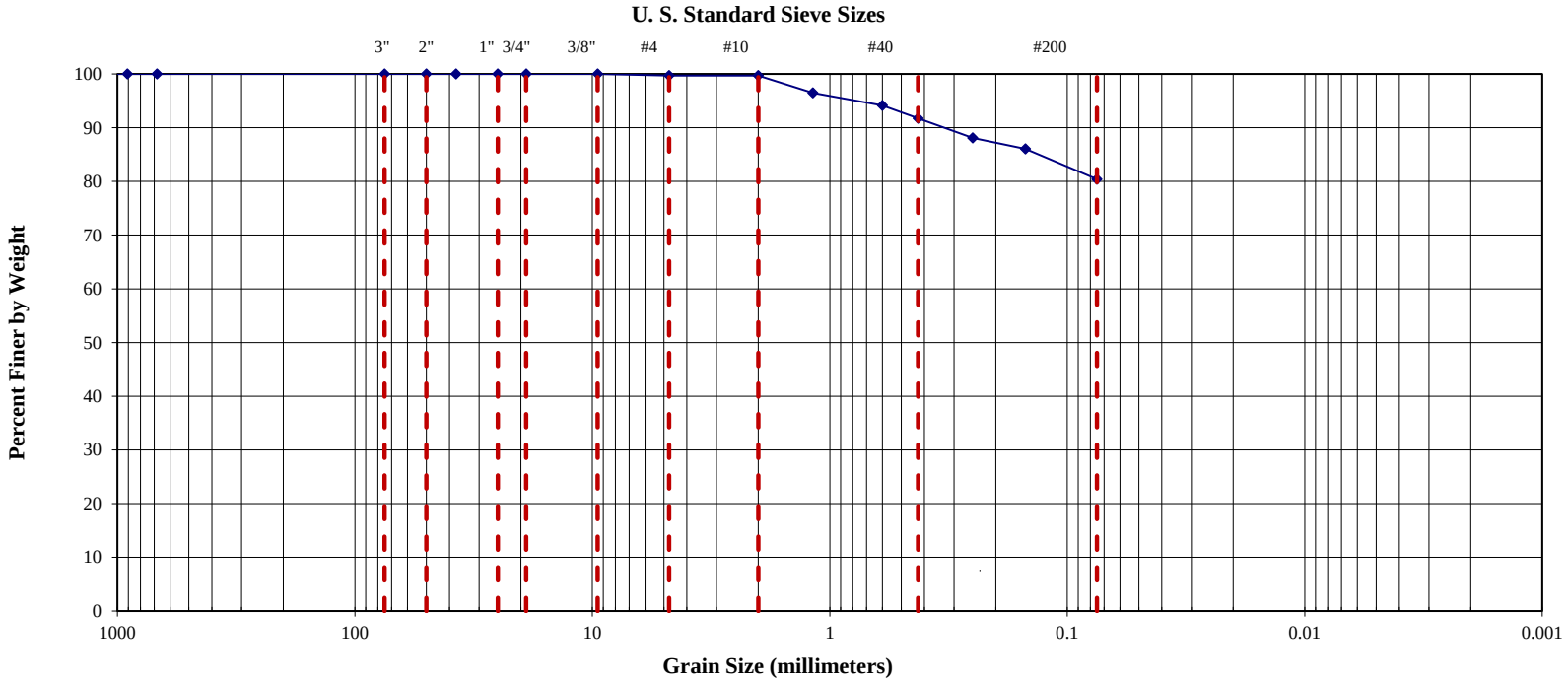
fax: 615-256-5873

REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D422 AND SIEVE ANALYS ASTM C136



Project Name:	I-75 @ I-24	Sample ID:	RW-2 3.5-5
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Yellow Brown		
Date Received:	4/26/2018		

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

350 Cal Batsel Road
Bowling Green, KY 42101
Phone: (270) 842-1070
Fax: (615) 256-5873

REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	RW-2 13.5-15
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	207.99
Oven Dry Mass of Sample Retained on No. 200 (grams):	178.10
Percentage Passing No. 200 Sieve:	**14.4%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	21.58	21.58	10.4%	89.6%
No. 4	4.75	30.08	51.66	24.8%	75.2%
No. 10	2.00	39.09	90.75	43.6%	56.4%
No. 16	1.18	17.41	108.16	52.0%	48.0%
No. 30	0.60	26.18	134.34	64.6%	35.4%
No. 40	0.425	10.84	145.18	69.8%	30.2%
No. 60	0.250	20.92	166.10	79.9%	20.1%
No. 100	0.150	5.97	172.07	82.7%	17.3%
No. 200	0.075	4.94	177.01	85.1%	14.9%

Remarks :

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

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Geotechnical • CEI • Environmental

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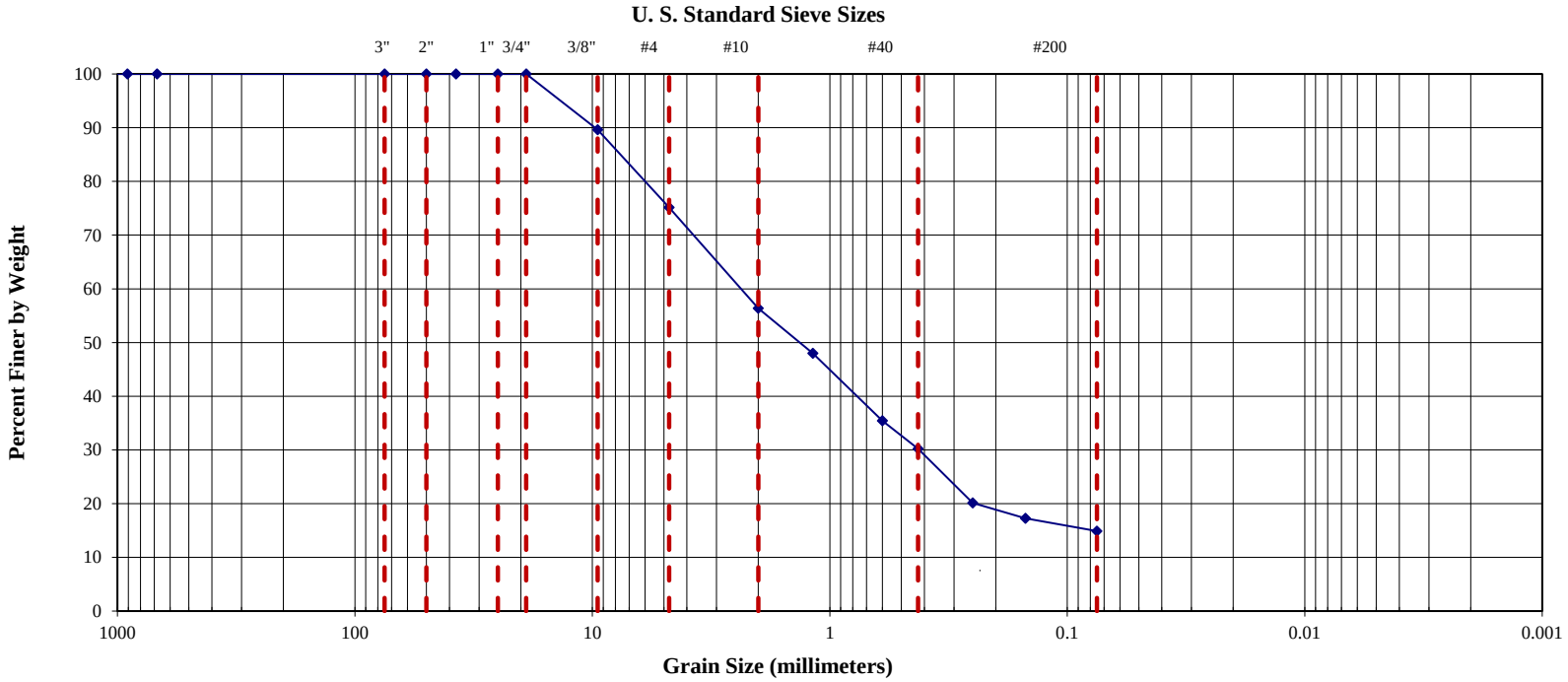
REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D422 AND SIEVE ANALYS ASTM C136



Project Name:	I-75 @ I-24	Sample ID:	RW-2 13.5-15
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		

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Bowling Green, KY 42101
Phone: (270) 842-1070
Fax: (615) 256-5873

REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	RW-3 3.5-5
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	200.77
Oven Dry Mass of Sample Retained on No. 200 (grams):	24.32
Percentage Passing No. 200 Sieve:	**87.9%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	0.00	0.00	0.0%	100.0%
No. 10	2.00	2.89	2.89	1.4%	98.6%
No. 16	1.18	1.62	4.51	2.2%	97.8%
No. 30	0.60	2.15	6.66	3.3%	96.7%
No. 40	0.425	1.37	8.03	4.0%	96.0%
No. 60	0.250	3.07	11.10	5.5%	94.5%
No. 100	0.150	3.25	14.35	7.1%	92.9%
No. 200	0.075	9.85	24.20	12.1%	87.9%

Remarks :

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

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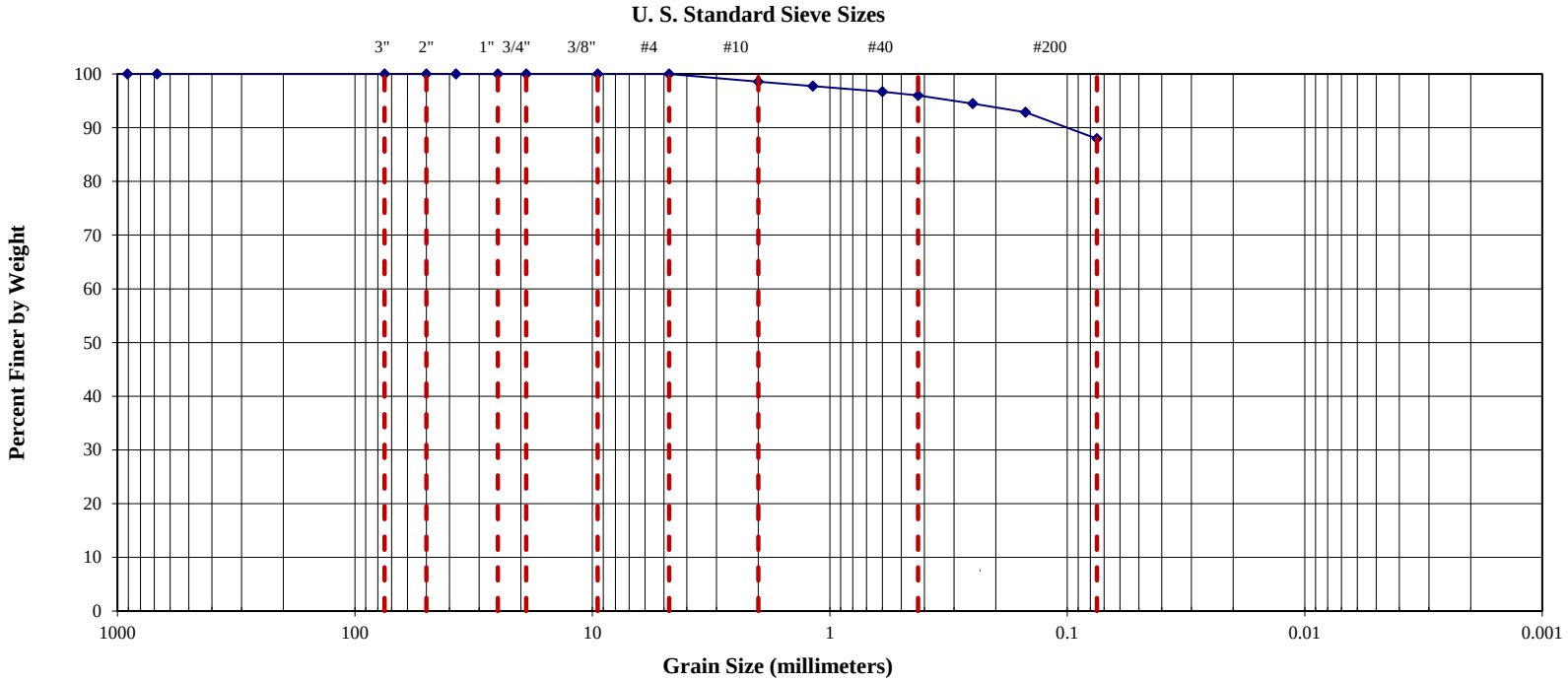
REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D422 AND SIEVE ANALYS ASTM C136



Project Name:	I-75 @ I-24	Sample ID:	RW-3 3.5-5
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		

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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	RW-3 13.5-15
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	429.09
Oven Dry Mass of Sample Retained on No. 200 (grams):	392.16
Percentage Passing No. 200 Sieve:	**8.6%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	37.60	37.60	8.8%	91.2%
No. 4	4.75	56.45	94.05	21.9%	78.1%
No. 10	2.00	76.98	171.03	39.9%	60.1%
No. 16	1.18	35.53	206.56	48.1%	51.9%
No. 30	0.60	56.23	262.79	61.2%	38.8%
No. 40	0.425	41.99	304.78	71.0%	29.0%
No. 60	0.250	57.74	362.52	84.5%	15.5%
No. 100	0.150	17.58	380.10	88.6%	11.4%
No. 200	0.075	11.09	391.19	91.2%	8.8%

Remarks :

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

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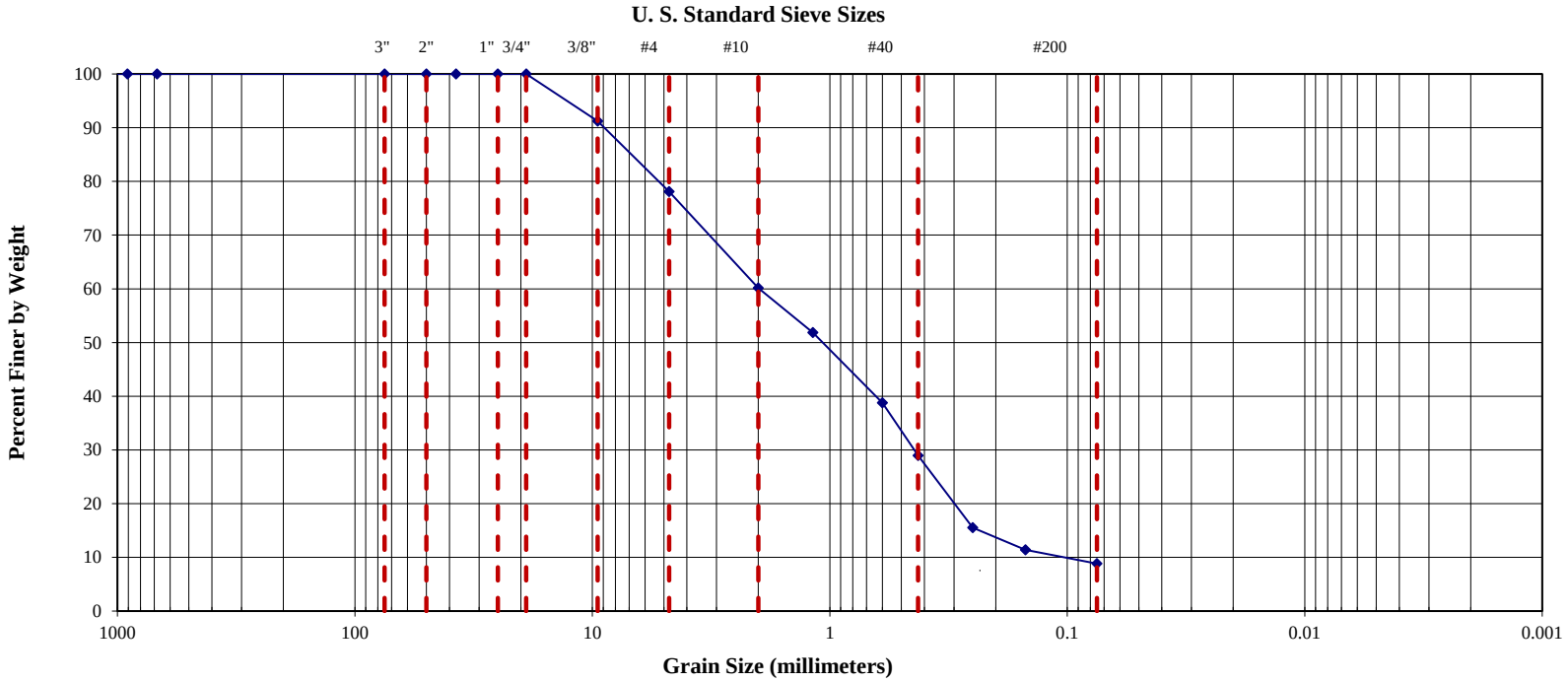

Project Name:	I-75 @ I-24	Sample ID:	RW-3 13.5-15
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Brown		
Date Received:	4/26/2018		

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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	RW-4(A) 19-21
Project Number:	300-18-0001	Test Date:	5/7/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	177.86
Oven Dry Mass of Sample Retained on No. 200 (grams):	30.66
Percentage Passing No. 200 Sieve:	**82.8%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	0.00	0.00	0.0%	100.0%
No. 10	2.00	0.00	0.00	0.0%	100.0%
No. 16	1.18	0.00	0.00	0.0%	100.0%
No. 30	0.60	0.10	0.10	0.1%	99.9%
No. 40	0.425	0.02	0.12	0.1%	99.9%
No. 60	0.250	2.21	2.33	1.3%	98.7%
No. 100	0.150	6.35	8.68	4.9%	95.1%
No. 200	0.075	20.99	29.67	16.7%	83.3%

Remarks :

Submitted By:	M. Naser	Date:	5/7/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

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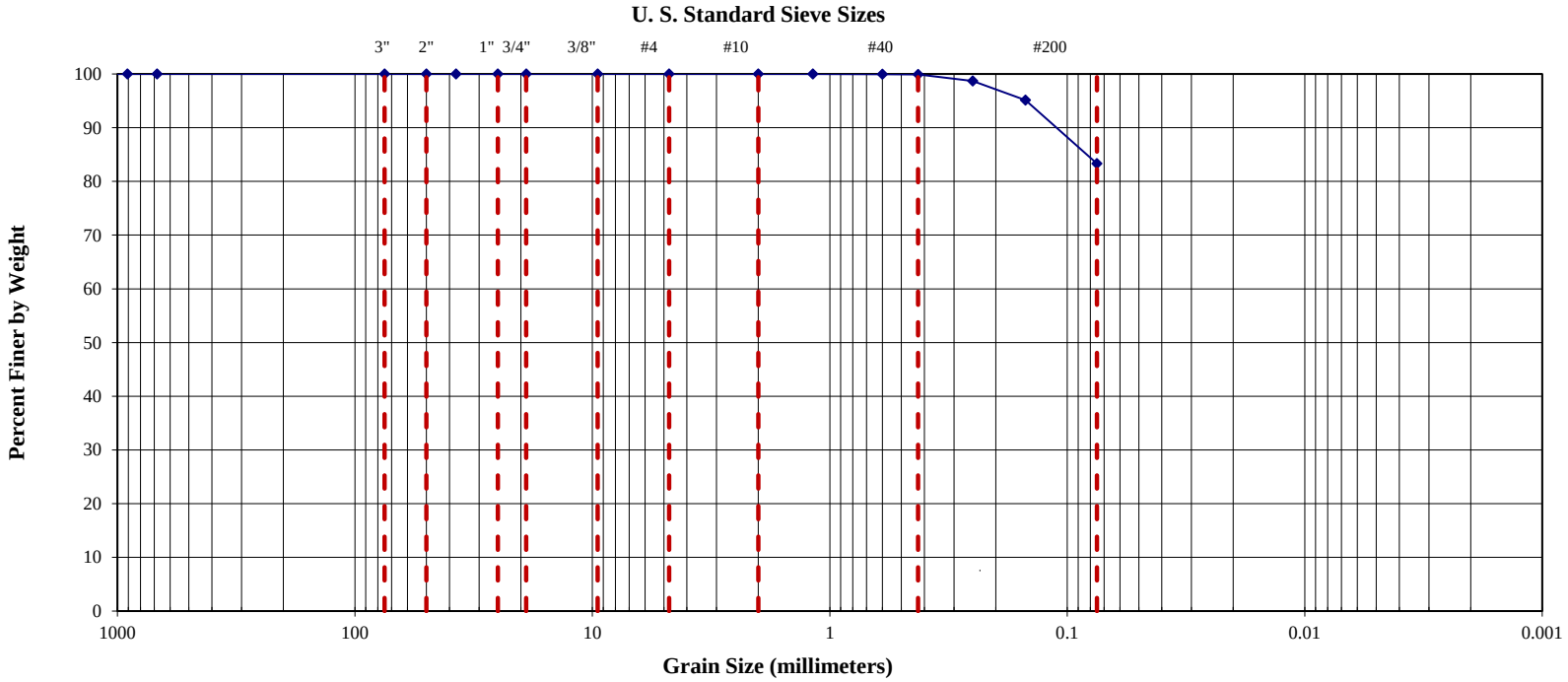

Project Name:	I-75 @ I-24	Sample ID:	RW-4(A) 19-21
Project Number:	300-18-0001	Test Date:	5/7/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		

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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	RW-4(A) 21-23
Project Number:	300-18-0001	Test Date:	5/7/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	123.26
Oven Dry Mass of Sample Retained on No. 200 (grams):	19.79
Percentage Passing No. 200 Sieve:	**83.9%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	0.00	0.00	0.0%	100.0%
No. 10	2.00	0.00	0.00	0.0%	100.0%
No. 16	1.18	0.00	0.00	0.0%	100.0%
No. 30	0.60	0.04	0.04	0.0%	100.0%
No. 40	0.425	0.03	0.07	0.1%	99.9%
No. 60	0.250	0.67	0.74	0.6%	99.4%
No. 100	0.150	3.17	3.91	3.2%	96.8%
No. 200	0.075	15.50	19.41	15.7%	84.3%

Remarks :

Submitted By:	M. Naser	Date:	5/7/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

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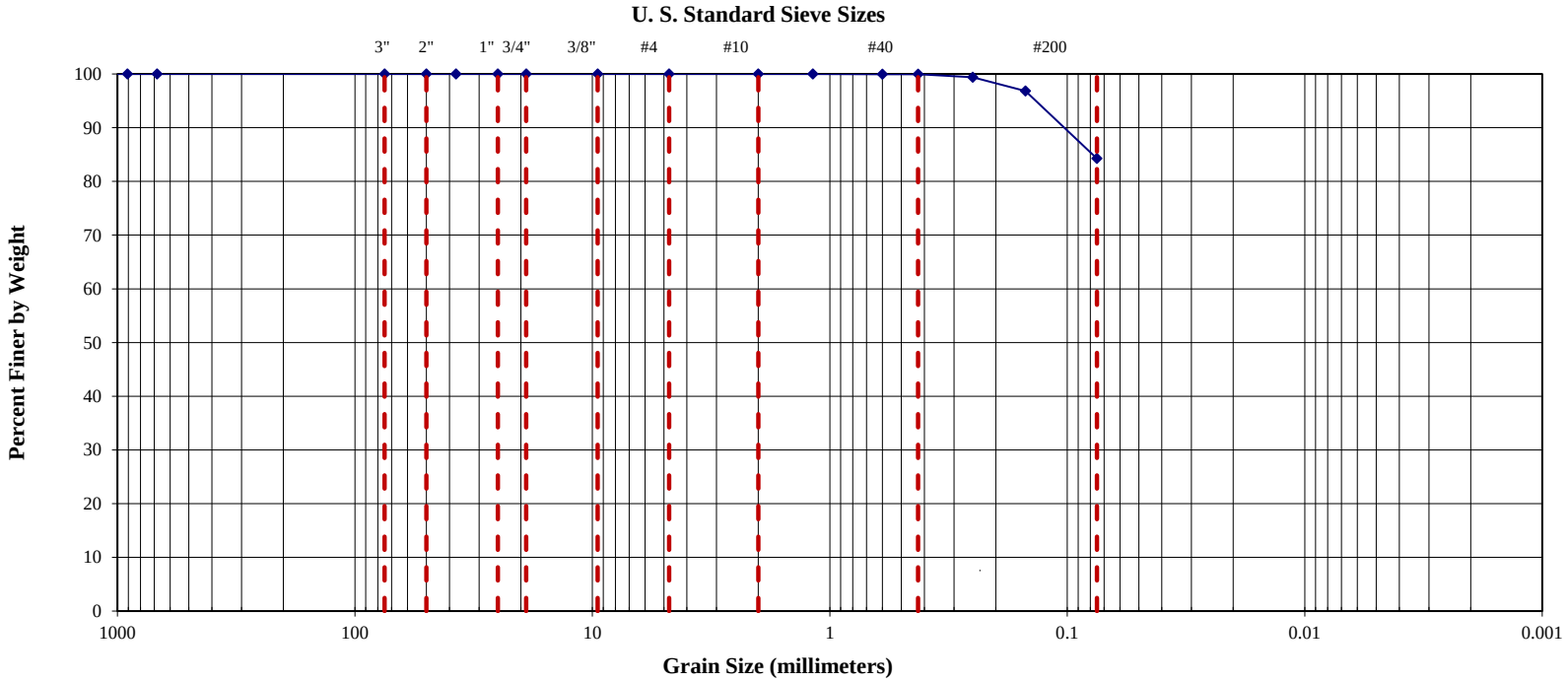

Project Name:	I-75 @ I-24	Sample ID:	RW-4(A) 21-23
Project Number:	300-18-0001	Test Date:	5/7/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		

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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	RW-5 13.5-15
Project Number:	300-18-0001	Test Date:	5/8/2018
Sample Description:	Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	210.93
Oven Dry Mass of Sample Retained on No. 200 (grams):	51.26
Percentage Passing No. 200 Sieve:	**75.7%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	0.46	0.46	0.2%	99.8%
No. 10	2.00	9.19	9.65	4.6%	95.4%
No. 16	1.18	9.00	18.65	8.8%	91.2%
No. 30	0.60	10.00	28.65	13.6%	86.4%
No. 40	0.425	3.55	32.20	15.3%	84.7%
No. 60	0.250	7.70	39.90	18.9%	81.1%
No. 100	0.150	3.55	43.45	20.6%	79.4%
No. 200	0.075	8.05	51.50	24.4%	75.6%

Remarks :

Submitted By:	M. Naser	Date:	5/8/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

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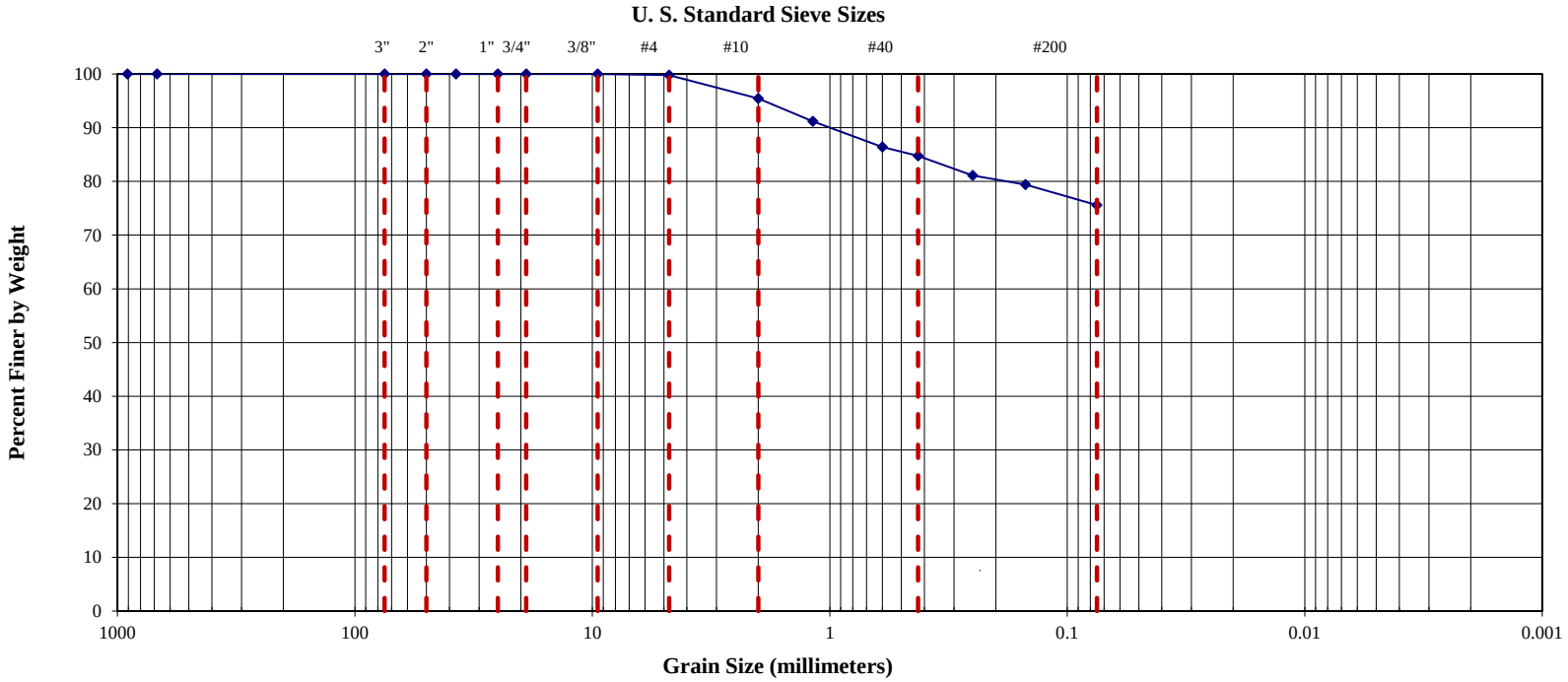
REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D422 AND SIEVE ANALYS ASTM C136



Project Name:	I-75 @ I-24	Sample ID:	RW-5 13.5-15
Project Number:	300-18-0001	Test Date:	5/8/2018
Sample Description:	Brown		
Date Received:	4/26/2018		

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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	RW-6 13.5-15
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Yellow Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	209.53
Oven Dry Mass of Sample Retained on No. 200 (grams):	96.59
Percentage Passing No. 200 Sieve:	**53.9%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	2.83	2.83	1.4%	98.6%
No. 10	2.00	24.52	27.35	13.1%	86.9%
No. 16	1.18	16.98	44.33	21.2%	78.8%
No. 30	0.60	18.10	62.43	29.8%	70.2%
No. 40	0.425	7.59	70.02	33.4%	66.6%
No. 60	0.250	11.30	81.32	38.8%	61.2%
No. 100	0.150	8.72	90.04	43.0%	57.0%
No. 200	0.075	6.70	96.74	46.2%	53.8%

Remarks :

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

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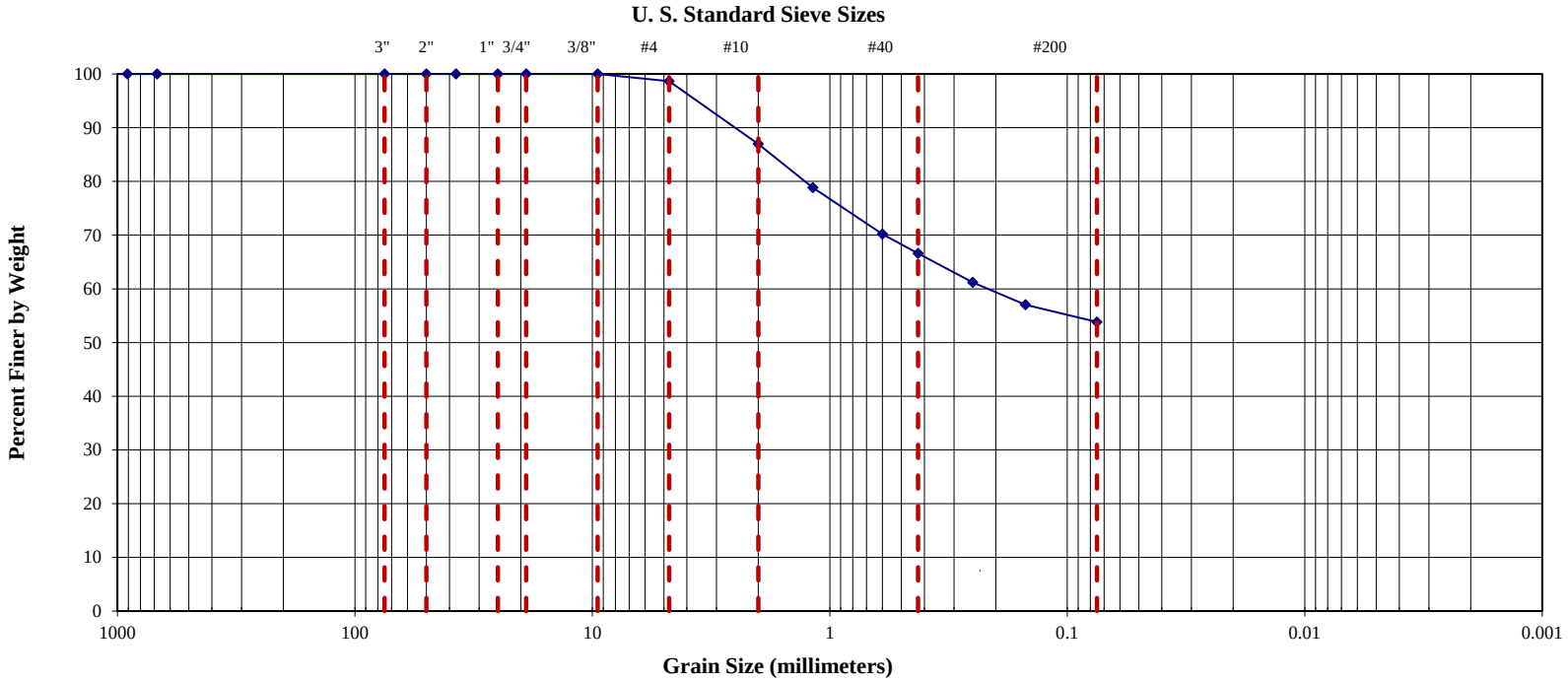

Project Name:	I-75 @ I-24	Sample ID:	RW-6 13.5-15
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Yellow Brown		
Date Received:	4/26/2018		

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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	RW-6 33.5-35
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	107.56
Oven Dry Mass of Sample Retained on No. 200 (grams):	78.64
Percentage Passing No. 200 Sieve:	**26.9%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	4.02	4.02	3.7%	96.3%
No. 10	2.00	13.36	17.38	16.2%	83.8%
No. 16	1.18	7.31	24.69	23.0%	77.0%
No. 30	0.60	10.40	35.09	32.6%	67.4%
No. 40	0.425	10.12	45.21	42.0%	58.0%
No. 60	0.250	24.19	69.40	64.5%	35.5%
No. 100	0.150	4.65	74.05	68.8%	31.2%
No. 200	0.075	5.27	79.32	73.7%	26.3%

Remarks :

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

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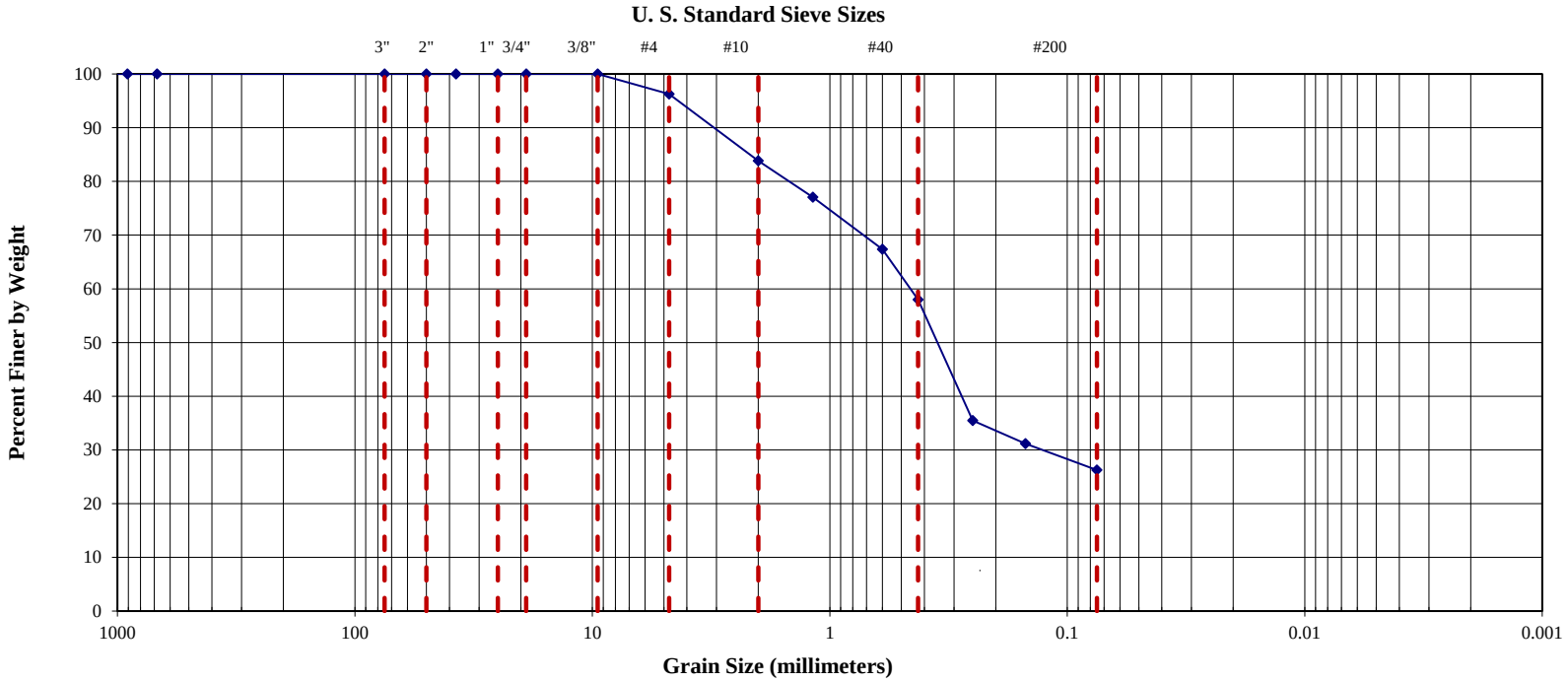

Project Name:	I-75 @ I-24	Sample ID:	RW-6 33.5-35
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		

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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	SCC-1 8.5-10
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	211.67
Oven Dry Mass of Sample Retained on No. 200 (grams):	37.65
Percentage Passing No. 200 Sieve:	**82.2%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	0.00	0.00	0.0%	100.0%
No. 10	2.00	0.13	0.13	0.1%	99.9%
No. 16	1.18	0.01	0.14	0.1%	99.9%
No. 30	0.60	0.13	0.27	0.1%	99.9%
No. 40	0.425	0.16	0.43	0.2%	99.8%
No. 60	0.250	0.78	1.21	0.6%	99.4%
No. 100	0.150	13.99	15.20	7.2%	92.8%
No. 200	0.075	22.22	37.42	17.7%	82.3%

Remarks :

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

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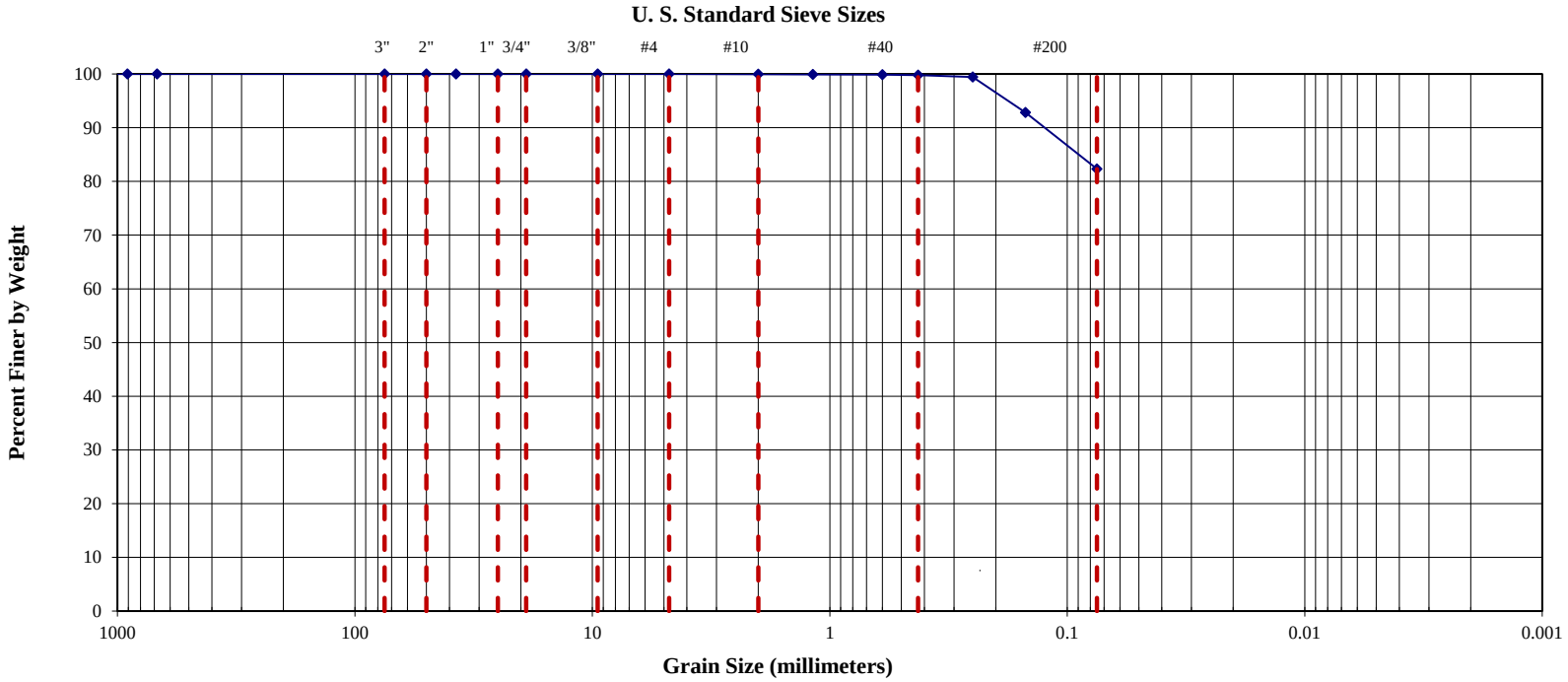

Project Name:	I-75 @ I-24	Sample ID:	SCC-1 8.5-10
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		

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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	SCC-3 6-7.5
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Gray Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	159.38
Oven Dry Mass of Sample Retained on No. 200 (grams):	33.27
Percentage Passing No. 200 Sieve:	**79.1%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	0.00	0.00	0.0%	100.0%
No. 10	2.00	0.23	0.23	0.1%	99.9%
No. 16	1.18	0.18	0.41	0.3%	99.7%
No. 30	0.60	0.59	1.00	0.6%	99.4%
No. 40	0.425	0.61	1.61	1.0%	99.0%
No. 60	0.250	6.77	8.38	5.3%	94.7%
No. 100	0.150	10.68	19.06	12.0%	88.0%
No. 200	0.075	14.07	33.13	20.8%	79.2%

Remarks :

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

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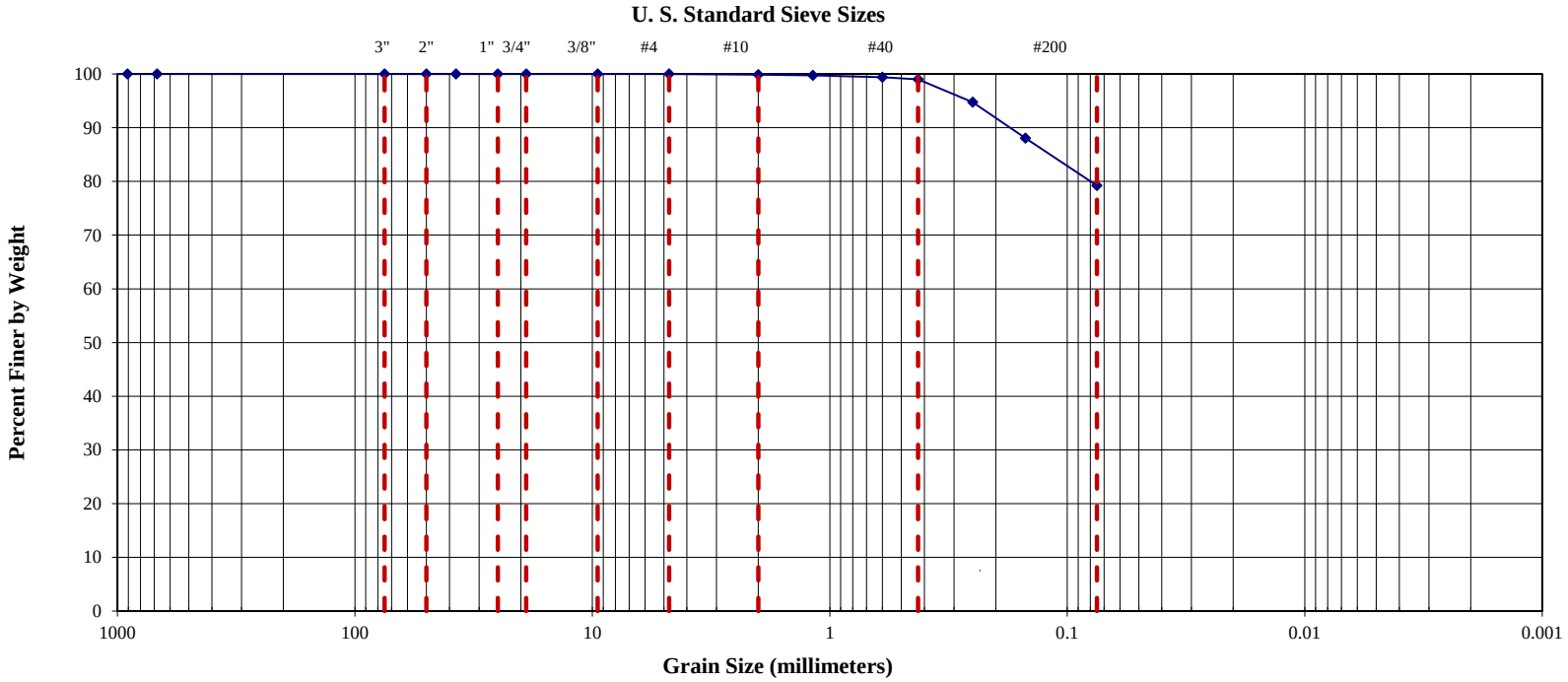
REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D422 AND SIEVE ANALYS ASTM C136



Project Name:	I-75 @ I-24	Sample ID:	SCC-3 6-7.5
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Gray Brown		
Date Received:	4/26/2018		

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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	SCC-4 8.5-10
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	263.13
Oven Dry Mass of Sample Retained on No. 200 (grams):	182.24
Percentage Passing No. 200 Sieve:	**30.7%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	11.63	11.63	4.4%	95.6%
No. 4	4.75	29.12	40.75	15.5%	84.5%
No. 10	2.00	40.18	80.93	30.8%	69.2%
No. 16	1.18	19.25	100.18	38.1%	61.9%
No. 30	0.60	16.37	116.55	44.3%	55.7%
No. 40	0.425	7.11	123.66	47.0%	53.0%
No. 60	0.250	16.48	140.14	53.3%	46.7%
No. 100	0.150	12.00	152.14	57.8%	42.2%
No. 200	0.075	10.93	163.07	62.0%	38.0%

Remarks :

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

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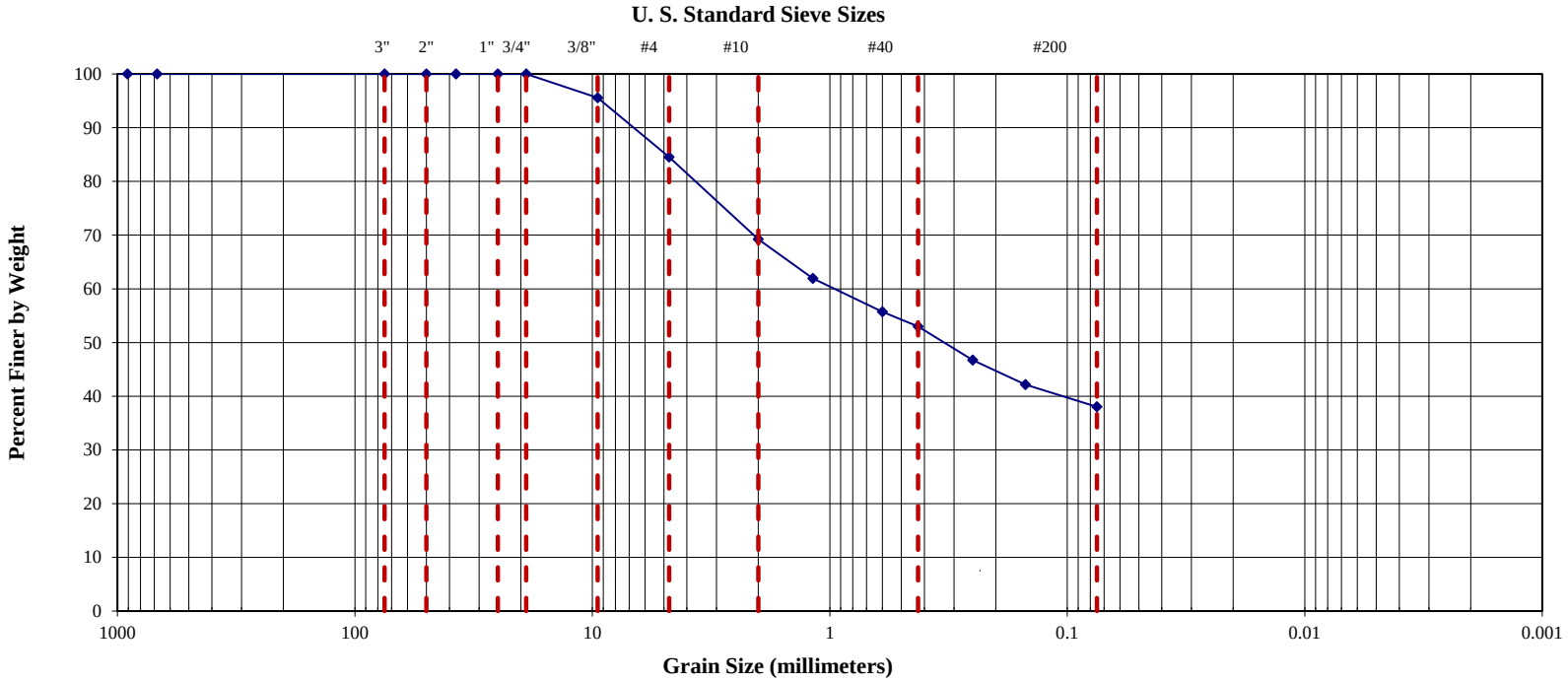
REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D422 AND SIEVE ANALYS ASTM C136



Project Name:	I-75 @ I-24	Sample ID:	SCC-4 8.5-10
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Brown		
Date Received:	4/26/2018		

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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136

Project Name:	I-75 @ I-24	Sample ID:	SCK-5 18.5-20
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		
Equipment Used:	Balance, Sieves, Oven, Water, Wetting Agent, Tare Containers		

No. 200 Wash

Original Oven Dry Mass of Sample (grams):	221.84
Oven Dry Mass of Sample Retained on No. 200 (grams):	35.09
Percentage Passing No. 200 Sieve:	**84.2%**

Sieve Analysis

Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	0.52	0.52	0.2%	99.8%
No. 10	2.00	0.72	1.24	0.6%	99.4%
No. 16	1.18	1.69	2.93	1.3%	98.7%
No. 30	0.60	5.37	8.30	3.7%	96.3%
No. 40	0.425	3.78	12.08	5.4%	94.6%
No. 60	0.250	8.90	20.98	9.5%	90.5%
No. 100	0.150	7.93	28.91	13.0%	87.0%
No. 200	0.075	5.19	34.10	15.4%	84.6%

Remarks :

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

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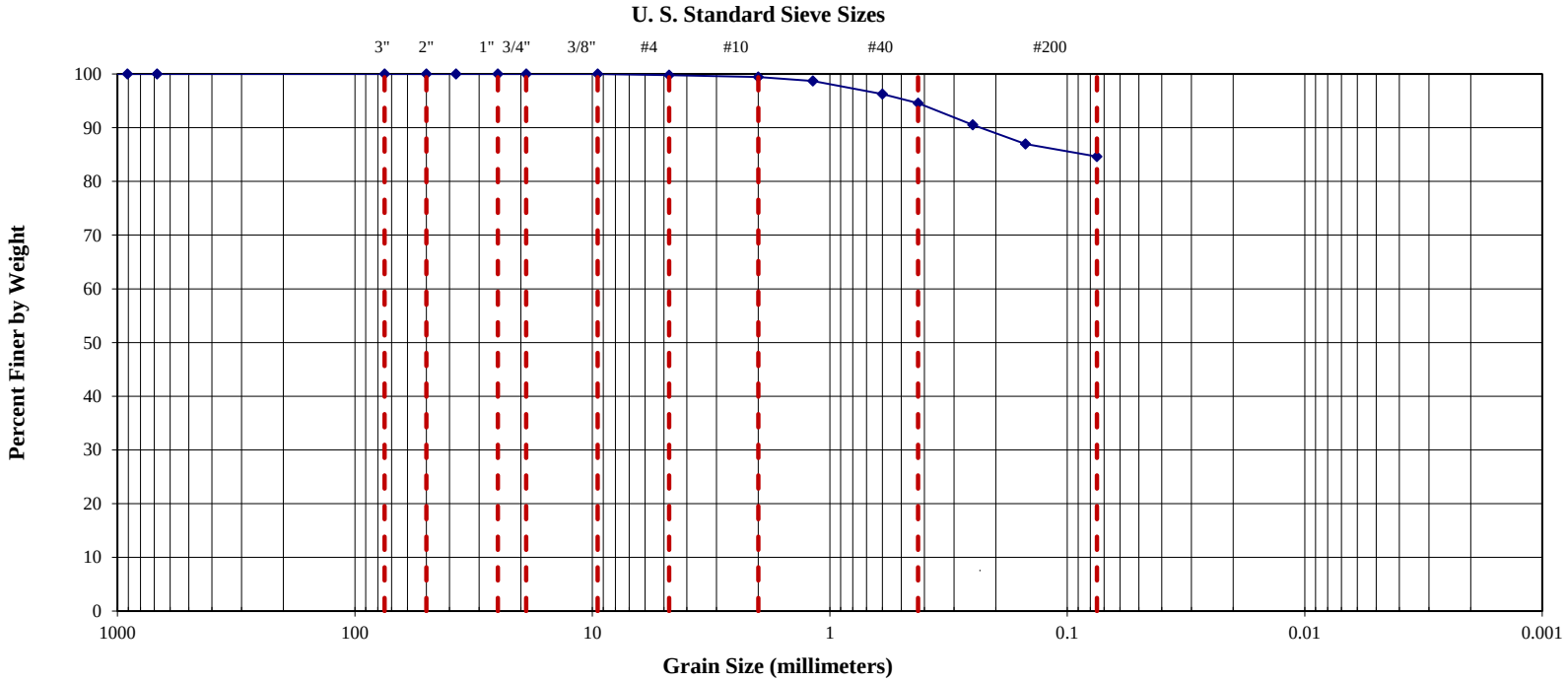
REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D422 AND SIEVE ANALYS ASTM C136



Project Name:	I-75 @ I-24	Sample ID:	SCK-5 18.5-20
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		

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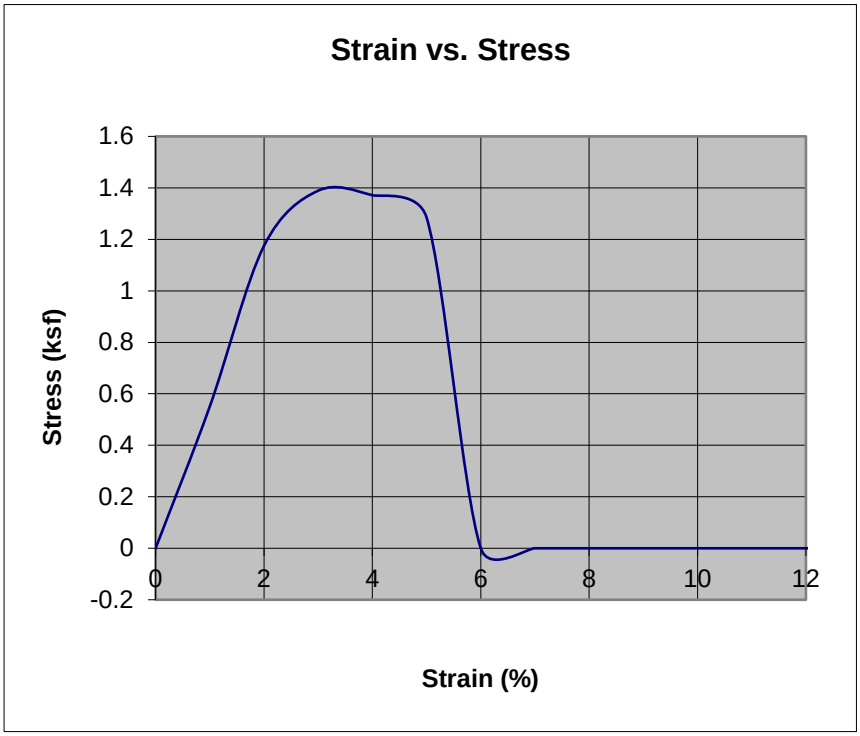
REPORT OF UNCONFINED COMPRESSION TEST, ASTM D2166

Project Name:	I-75 @ I-24	Sample ID:	RW-4(A) 21-23
Project Number:	300-18-0001	Test Date:	43228
Sample Description:	Brown		
Date Received:			
Equipment Used:	Oven, Ohaus 3kg Scale, Metal Tares, Model 7691 S/N 2147, Sample Extruder, Timer,		

Wet Density (pcf):	128.7	**Initial Height (in):**	5.56
Dry Density (pcf):	105.0	**Initial Diameter (in):**	2.83
Moisture Content:	22.6%	**Specific Gravity:**	
Deg of Sat.:	NP		

Qu= 1.4 KSF



Remarks :

Submitted By:	Z. Shannon	Date:	5/8/2018
Reviewed By:	D, Hidnett	Date:	5/9/2018

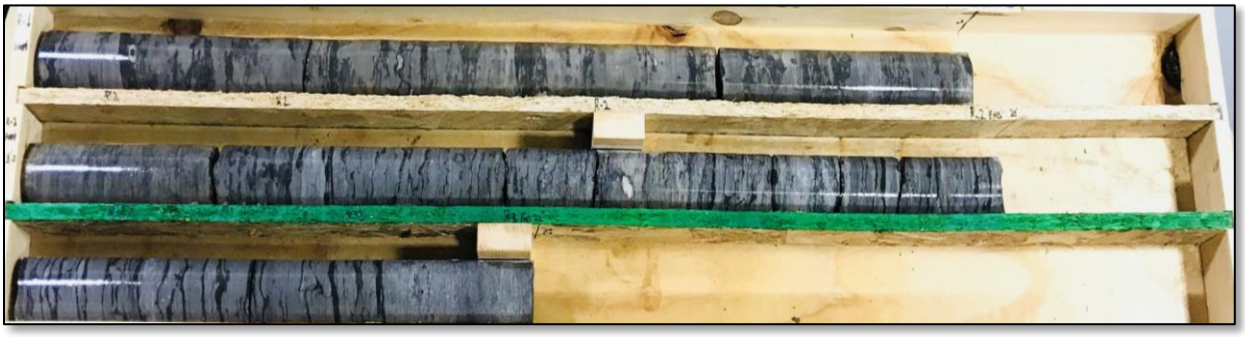
APPENDIX G
ROCK CORE PHOTOGRAPHS

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
B-92 Box 1 of 1	1	35 – 39.7	100	100
	2	39.7 – 44.7	100	100
	3	44.7 – 46.7	100	100

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
B-93 Box 1 of 1	1	7 – 11	80	45
	2	11 – 16	98	90
	3	16 – 21	98	96

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-21 Box 1 of 1	1	12 – 15.9	100	100
	2	15.9 – 20	100	85
	3	20 – 22	100	100

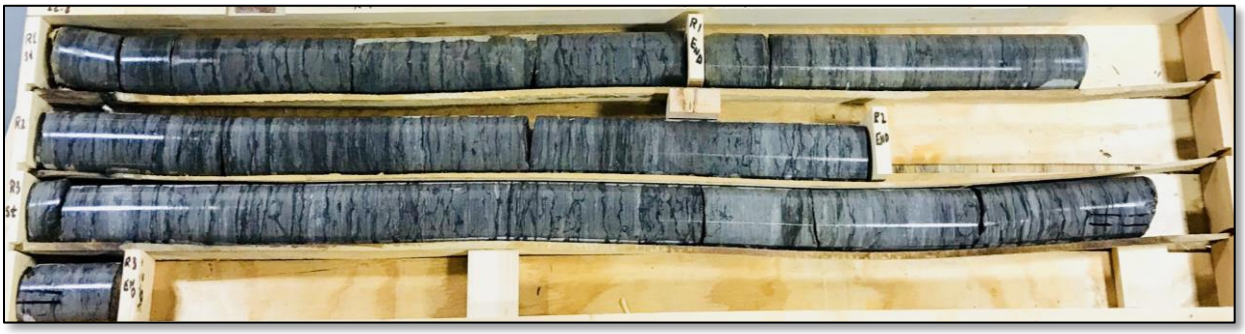
Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-22 Box 1 of 1	1	14 – 15.5	100	100
	2	15.5 – 20.5	100	100
	3	20.5 – 25.5	100	100

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-23 Box 1 of 1	1	11.4 – 15.4	100	78
	2	15.4 – 20.4	100	100
	3	20.4 – 23.4	100	100

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-24(A) Box 1 of 1	1	28 – 30.6	100	85
	2	30.6 – 35.5	100	94
	3	35.5 – 40.5	98	94

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

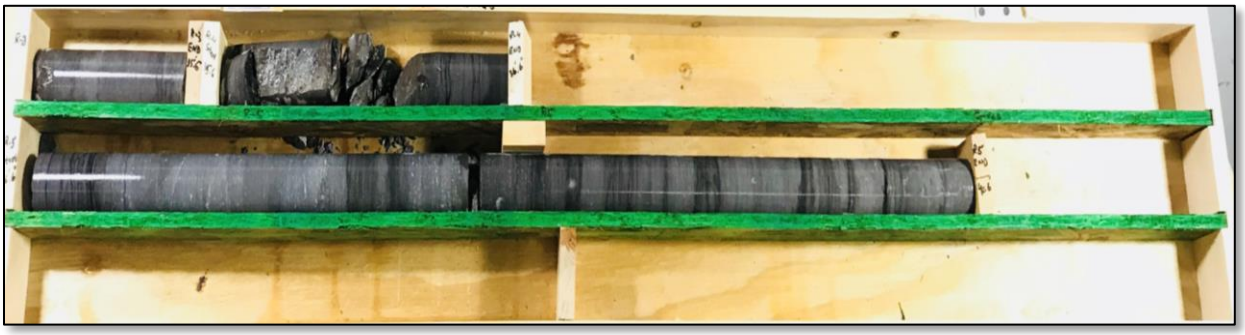


Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-31 Box 1 of 1	1	22.8 – 25.6	100	79
	2	25.6 – 30.6	100	98
	3	30.6 – 35.6	100	96

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-32 Box 1 of 1	1	19.4 – 20.6	100	100
	2	20.6 – 25.5	100	96
	3	25.5 – 30.5	100	100

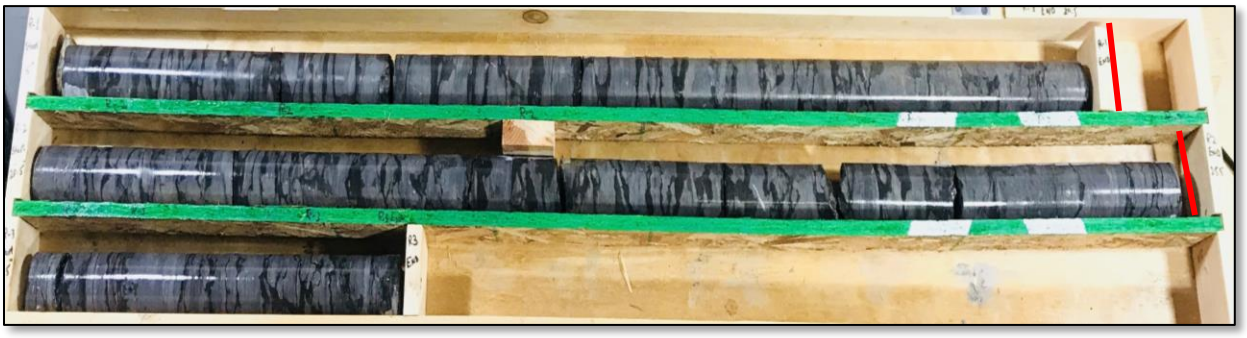
ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-34 Box 1 of 2	1	21.1 – 25.7	100	83
	2	25.7 – 30.7	94	72
	3	30.7 – 35.7	100	98



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-34 Box 2 of 2	3	30.7 – 35.7	100	98
	4	35.7 – 36.7	100	40
	5	36.7 – 40.6	100	100

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

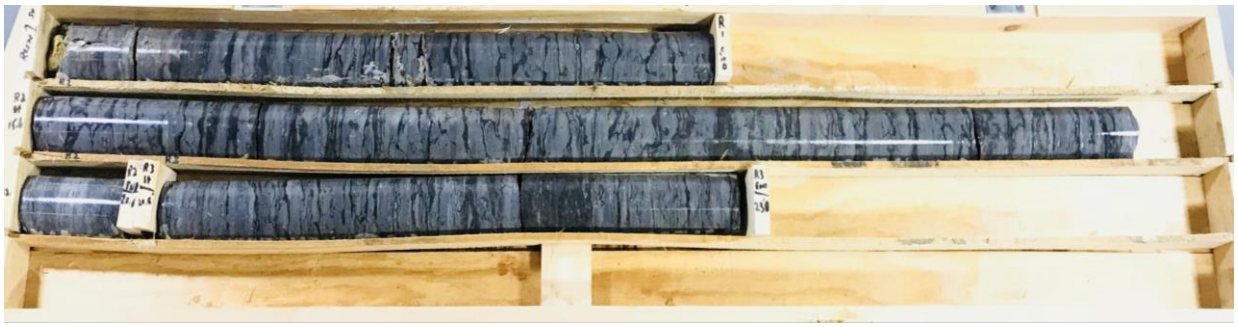


Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BS-22 Box 1 of 1	1	16 – 20.5	100	98
	2	20.5 – 25.4	100	100
	3	25.4 – 27	100	88

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BS-24 Box 1 of 2	1	13 – 13.4	31	0
	2	13.4 – 16	100	84
	3	16 – 21	100	98
	4	21 – 24.3	100	42

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

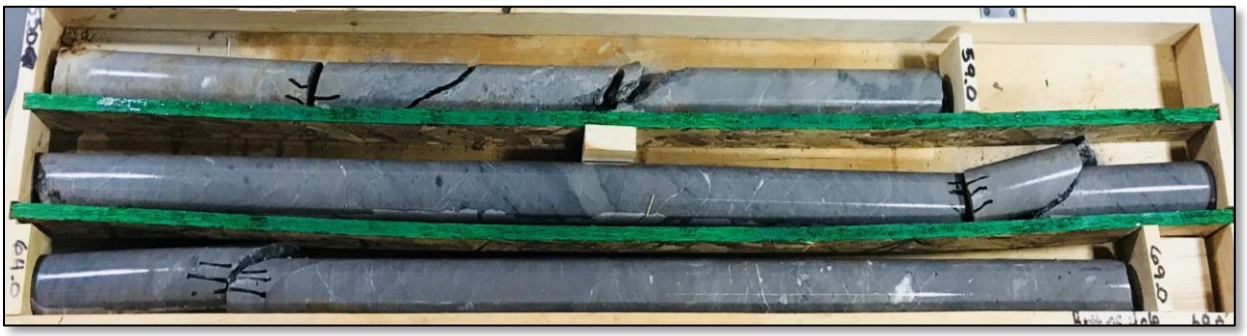
Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BS-24 Box 2 of 2	5	24.3 – 29.3	98	96



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BS-32 Box 1 of 1	1	12.9 – 15.7	100	82
	2	15.7 – 20.7	100	100
	3	20.7 – 23.1	100	100

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BS-33 Box 1 of 1	1	27.9 – 29.5	69	0
	2	29.5 – 30.2	14	0
	3	30.2 – 31	100	100
	4	31 – 34.5	100	63
	5	34.5 – 39.5	100	92
	6	39.5 – 42.2	100	93



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
CSX-2 Box 1 of 1	1	50 – 59	95	95
	2	59 – 64	100	100
	3	64 – 69	90	90

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
CSX-3 Box 1 of 1	1 and 2	57.9 – 60.3	50	0
	3	60.3 – 64.7	100	100
	4	64.7 – 69.7	100	100
	5	69.7 – 72.7	100	100

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
M-1 Box 1 of 1	1	30.1 – 34.9	100	88
	2	34.9 – 39.9	100	92

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
M-2 Box 1 of 2	1	8.1 – 13.1	100	96
	2	13.1 – 18.1	100	52
	3	18.1 – 23.1	100	56

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
M-2 Box 2 of 2	3	18.1 – 23.1	100	56
	4	23.1 – 27.1	100	100
	5	27.1 – 29.3	100	100
	6	29.3 – 34.3	48	48

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
MCB-1 Box 1 of 1	1	27.2 – 28.6	100	43
	2	28.6 – 33.4	88	50
	3	33.4 – 38.4	100	100
	4	38.4 – 42.4	100	100

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
MCB-2 Box 1 of 1	1	31.1 – 34.9	95	87
	2	34.9 – 39.9	98	84
	3	39.9 – 42.1	100	100

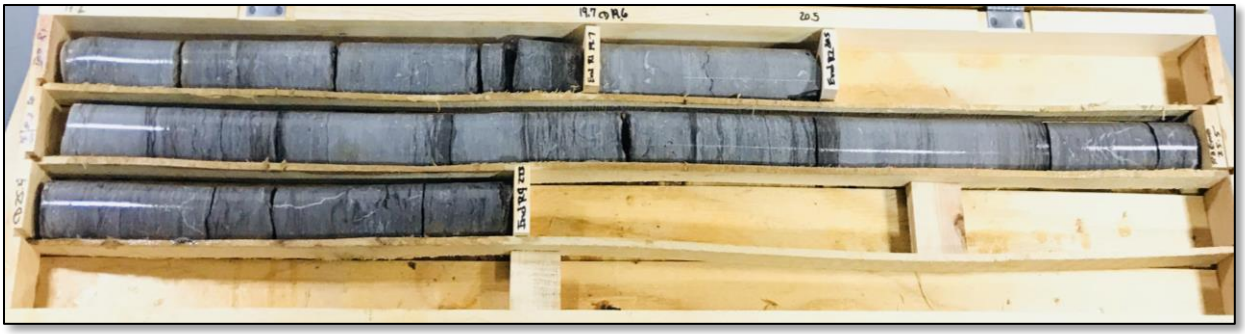
ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCC-1 Box 1 of 1	1	17.5 – 20	96	84
	2	20 – 25	98	94
	3	25 – 27.5	100	100

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCC-2 Box 1 of 1	1	4 – 6	70	70
	2	6 – 11	0	0
	3	11 – 16	0	0
	4	16 – 21	78	34
	5	21 – 26	100	100
	6	26 – 31	98	90

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCC-3 Box 1 of 1	1	14.3 – 15.6	100	100
	2	15.6 – 20.5	100	92
	3	20.5 – 25.6	100	88



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCC-4A Box 1 of 1	1	17.2 – 19.6	96	75
	2	19.6 – 20.5	100	100
	3	20.5 – 25.4	98	94
	4	25.4 – 27.3	100	100

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCK-1 Box 1 of 1	1	29.8 – 34.3	93	91
	2	34.3 – 39.3	100	92
	3	39.3 – 44.3	100	92

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCK-2 Box 1 of 1	1	26.2 – 30.7	96	96
	2	30.7 – 35.7	100	100
	3	35.7 – 36.7	100	100

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCK-3 Box 1 of 1	1	29.5 – 33.6	90	15
	2	33.6 – 34.5	78	0
	3	34.5 – 39.5	100	84
	4	39.5 – 44.5	100	100

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCK-4 Box 1 of 1	1	28 – 30.5	80	90
	2	30.5 – 35.5	100	100
	3	35.5 – 38	100	100

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCK-5 Box 1 of 1	1	32.8 – 34.7	37	12
	2	34.7 – 39.2	100	100
	3	39.2 – 44.7	100	100
		44.7 – 48.7	100	100

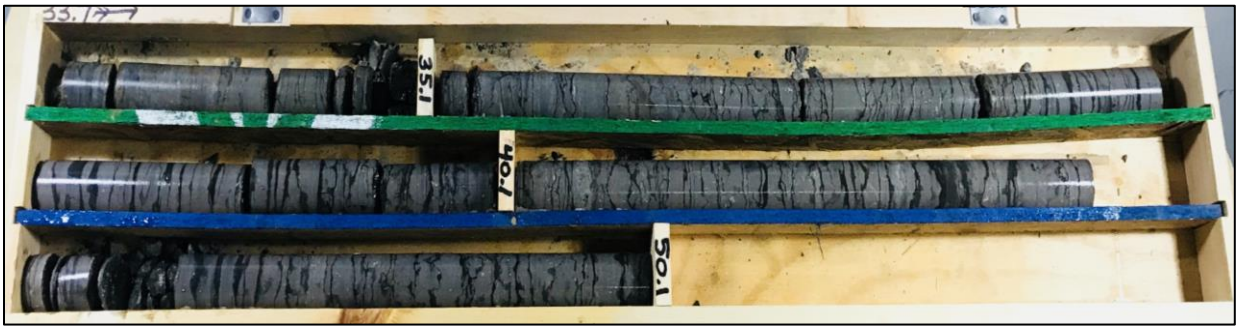
Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCK-6 Box 1 of 1	1	26.8 – 29.8	100	87
	2	29.8 – 34.8	100	76
	3	34.8 – 39.8	100	100

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCR-1 Box 1 of 1	1	40.7 – 45.5	94	60
	2	45.5 – 50.5	98	84
	3	50.5 – 55.5	96	82

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCR-2 Box 1 of 1	1	17 – 19	100	100
	2	19 – 24	90	90
	3	24 – 29	96	96

ROCK CORE PHOTOGRAPHS
TDOT I-75 INTERCHANGE
CHATTANOOGA, TENNESSEE
KSWA PROJECT NO. 300-18-0001



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCR-3 Box 1 of 1	1	33.7 – 35.1	100	43
	2	35.1 – 40.1	100	98
	3	40.1 – 45.1	100	90

APPENDIX H
TRAFFIC DATA

TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: IM/NH-75-1(131) : 33005-0176-44 ROUTE: I-24 @ I-75
COUNTY: HAMILTON CITY: CHATTANOOGA
PROJECT PIN NUMBER: 114174.00
PROJECT DESCRIPTION: I-24 @ I-75 INTERCHANGE MODIFICATION [DESIGN BUILD]

[1] I-24 AVERAGE TRAFFIC DATA
[2] I-75 AVERAGE TRAFFIC DATA

DIVISION REQUESTING:

MAINTENANCE	☐	PAVEMENT DESIGN	☐
S.T.I.D.	☐	STRUCTURES	☐
PROG. DEVELOPMENT & ADM.	☐	SURVEY & ROADWAY DESIGN	☒
PUBLIC TRANS. & AERO.	☐	TRAFFIC SIGNAL DESIGN	☐
		OTHER	☐

YEAR PROJECT PROGRAMMED FOR CONSTRUCTION: 2020
PROJECTED LETTING DATE:

TRAFFIC ASSIGNMENT:

	BASE YEAR		DESIGN YEAR					DESIGN ROADWAY % TRUCKS		DESIGN AVERAGE DAILY LOADS	
	AADT	YEAR	AADT	DHV	%	YEAR	DIR.DIST.	DHV	AADT	FLEX	RIGID
[1]	118,410	2020	146,100	13,465	9	2040	50-50	12	18	5,680	8,972
[2]	101,260	2040	127,360	12,067	9	2040	53-47	12	18	5,030	7,952

REQUESTED BY: NAME ROBERT ROGERS DATE 6/15/17
DIVISION REGION II DESIGN
ADDRESS 4005 CROMWELL ROAD
CHATTANOOGA TN 37421

REVIEWED BY: TONY ARMSTRONG Tony Armstrong DATE 6-26-17
TRANSPORTATION MANAGER 1
SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: JIM WATERS DATE 6/26/17
ASSISTANT DIRECTOR
SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

PLEASE FURNISH THE 2020-2040 TRAFFIC DATA AND ADL's FOR PAVEMENT DESIGN FOR THE INTERCHANGE MODIFICATION AS SHOWN IN THE ATTACHED FUNCTIONAL LAYOUTS.

THIS TRAFFIC IS BASED ON TWO PREVIOUS PROJECTS PREPARED FOR PAVEMENT DESIGN [I-75 @ S.R. 8] DATED 4/5/2017 AND FOR ENVIRONMENTAL [I-24 @ I-75] DATE 9/24/2014. THESE TWO PROJECTS WERE COMBINED INTO THIS PROJECT. AADT's, DHV's AND ADL's ARE INCLUDED.

DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 AADT.

NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLs ARE NOT REQUIRED FOR ADTs OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS.
SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS. (REV. 2/22/17)

TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: IM/NH-75-1(131) : 33005-0176-44 ROUTE NO.: I-24 [1]
COUNTY: HAMILTON CITY:CHATTANOOGA
PROJECT DESCRIPTION: I-24 @ I-75 INTERCHANGE MODIFICATION.

Interstate

Pavement Structural Design

Calculation of Equivalent Daily 18 Kip Single Axle Loads

Type Vehicle		ADT (No. Counted)	Flexible 18-kip Factor	Flexible ADL	Rigid 18-kip Factor	Rigid ADL
Pass. cars and motorcycles (1-2)		73,707	0.001	74	0.001	74
Pick-up, Panel, Van (3)		34,743	0.004	139	0.005	174
Sing. Unit	Buses (4)	423	0.300	127	0.300	127
	2-axle, 6-tire (5)	2,658	0.170	452	0.170	452
	3-axle or more (6-7)	1,561	0.700	1,093	1.000	1,561
Comb.	4-axle (8)	608	0.700	426	0.780	474
	5-axle or more (9-13)	18,555	1.100	20,411	1.780	33,028
Totals (2030 AADT)		132,255		22,720		35,889

Suggested Percentages of Trucks in Design Lane

	4 Lane	6 Lane	8 Lane
5,000 or less ADT	90%	75%	70%
5,000 - 10,000 ADT	80%	70%	65%
10,000 - 15,000 ADT	75%	65%	60%
15,000 - 20,000 ADT	75%	65%	55%
20,000 - 30,000 ADT	70%	60%	50%
30,000 Plus ADT	65%	60%	50%

No. of Lanes: 8 TO 10
% Trucks in Design Lane: 50%
ADL in Design Lane:

FLEX:	0.5	X	0.50	X	22720.2	=	5,680
RIGID:	0.5	X	0.50	X	35889.3	=	8,972

ADL Calculations By: TONY ARMSTRONG Date: 6/23/2017
Reviewed By: Date: 6/23/17
[REV. 7-1-14]

TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: IM/NH-75-1(131) : 33005-0176-44 ROUTE NO.: I-75 [2]
COUNTY: HAMILTON CITY:CHATTANOOGA
PROJECT DESCRIPTION: I-24 @ I-75 INTERCHANGE MODIFICATION.

Interstate

Pavement Structural Design

Calculation of Equivalent Daily 18 Kip Single Axle Loads

Type Vehicle		ADT (No. Counted)	Flexible 18-kip Factor	Flexible ADL	Rigid 18-kip Factor	Rigid ADL
Pass. cars and motorcycles	(1-2)	58,367	0.001	58	0.001	58
Pick-up, Panel, Van	(3)	34,922	0.004	140	0.005	175
Sing. Unit	Buses (4)	412	0.300	124	0.300	124
	2-axle, 6-tire (5)	2,423	0.170	412	0.170	412
	3-axle or more (6-7)	960	0.700	672	1.000	960
Comb.	4-axle (8)	582	0.700	407	0.780	454
	5-axle or more (9-13)	16,644	1.100	18,308	1.780	29,626
Totals (2030 AADT)		114,310		20,121		31,809

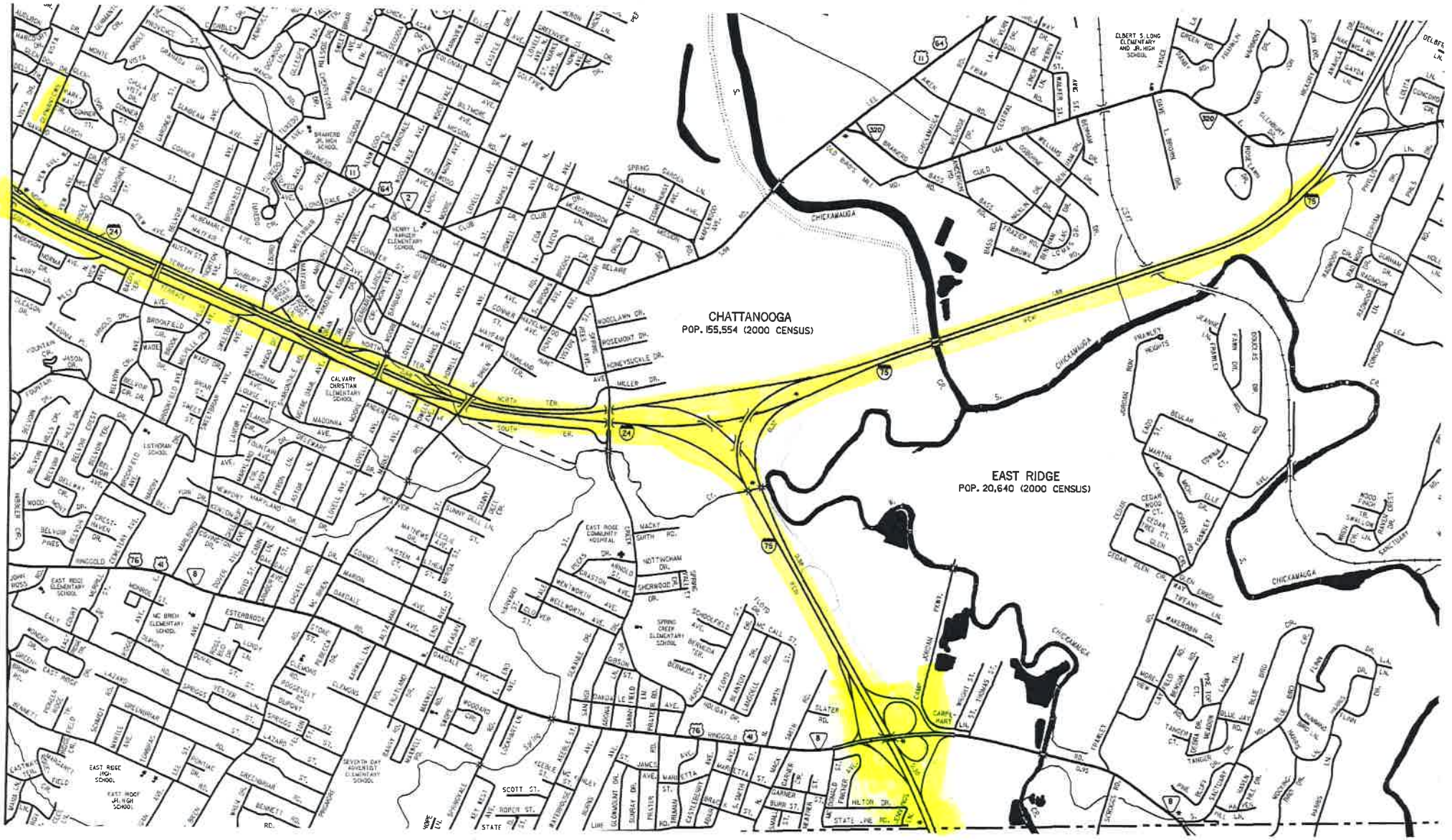
Suggested Percentages of Trucks in Design Lane

	4 Lane	6 Lane	8 Lane
5,000 or less ADT	90%	75%	70%
5,000 - 10,000 ADT	80%	70%	65%
10,000 - 15,000 ADT	75%	65%	60%
15,000 - 20,000 ADT	75%	65%	55%
20,000 - 30,000 ADT	70%	60%	50%
30,000 Plus ADT	65%	60%	50%

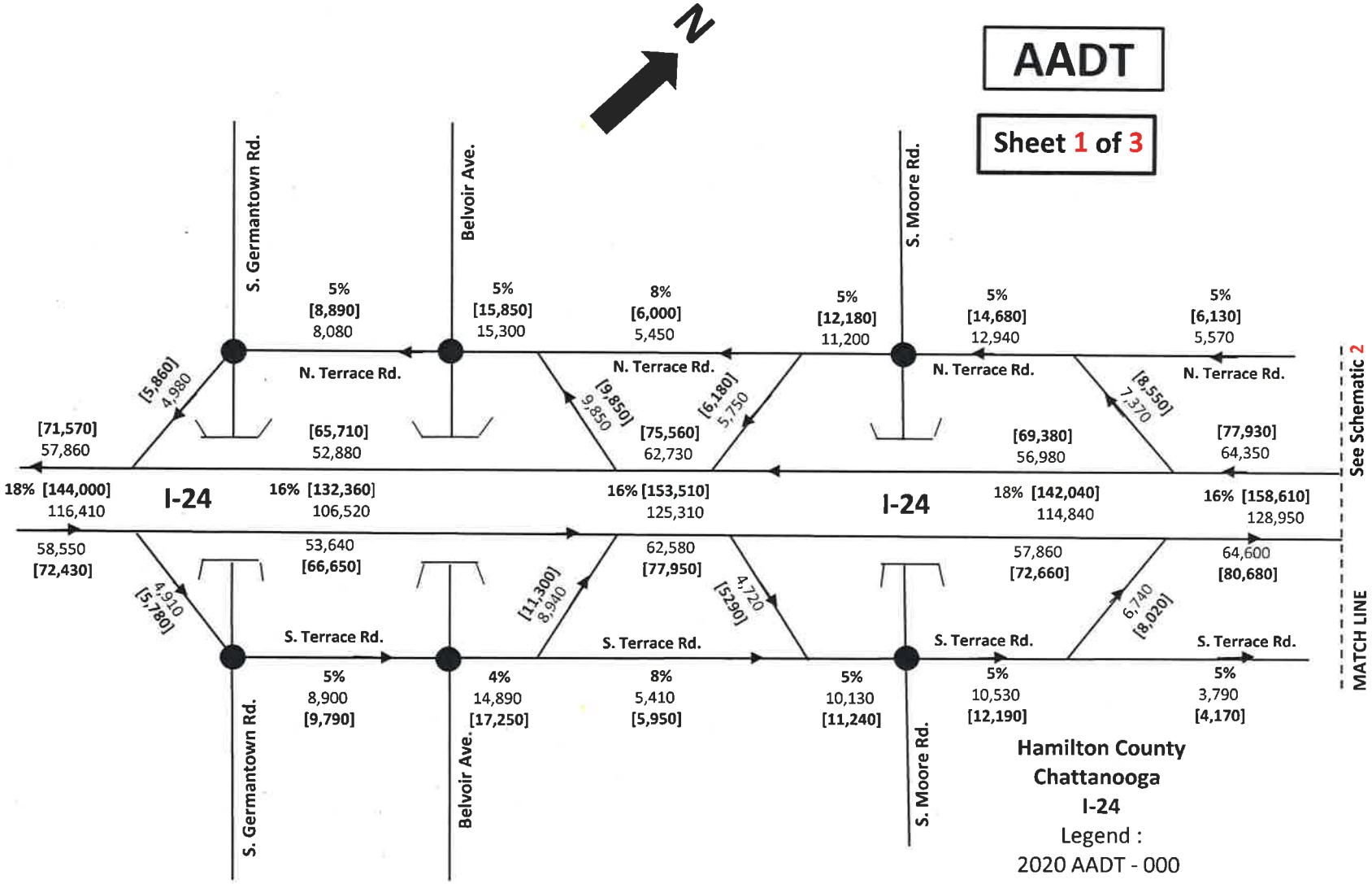
No. of Lanes: 10
% Trucks in Design Lane: 50%
ADL in Design Lane:

FLEX:	0.5	X	0.50	X	20121.4	=	5,030
RIGID:	0.5	X	0.50	X	31808.8	=	7,952

ADL Calculations By: TONY ARMSTRONG Date: 6/23/2017
Reviewed By: Date: 6/26/17
[REV. 7-1-14]



HAMILTON COUNTY
CHATTANOOGA
I-24 @ I-75



Hamilton County
Chattanooga
I-24

Legend :

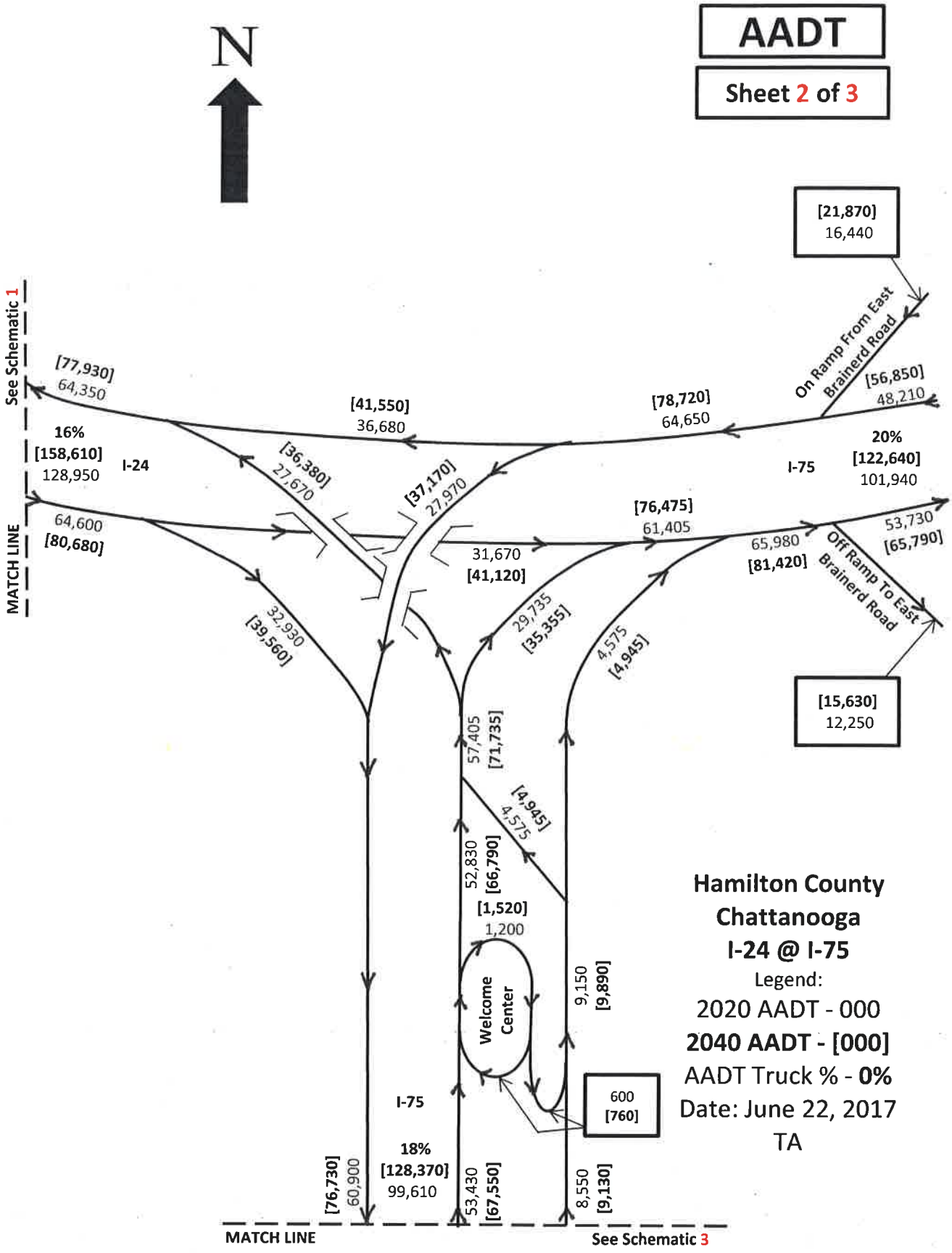
2020 AADT - 000

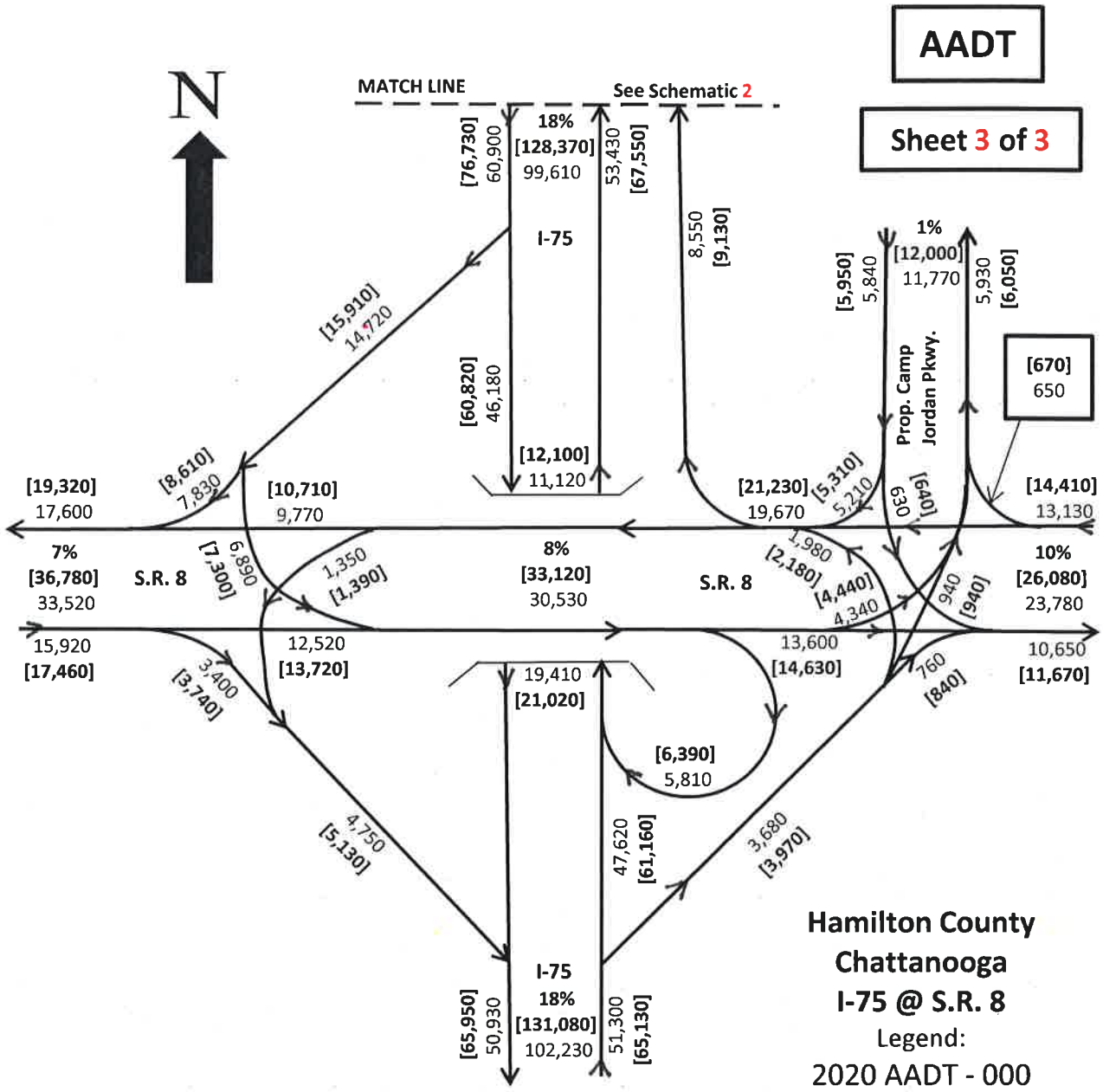
2040 AADT - [000]

AADT Truck % - **0%**

Date: June 22, 2017

TA


N
AADT
Sheet 2 of 3
[21,870]
16,440
On Ramp From East Brainerd Road
[56,850]
48,210
See Schematic 1
[77,930]
64,350
[41,550]
36,680
[78,720]
64,650
16%
[158,610]
128,950
I-24
[36,380]
27,670
[37,170]
27,970
I-75
20%
[122,640]
101,940
MATCH LINE
64,600
[80,680]
[76,475]
61,405
53,730
[65,790]
31,670
[41,120]
65,980
[81,420]
Off Ramp To East Brainerd Road
32,930
[39,560]
29,735
[35,355]
4,575
[4,945]
[15,630]
12,250
57,405
[71,735]
[4,945]
4,575
52,830
[66,790]
[1,520]
1,200
Welcome Center
9,150
[9,890]
600
[760]
I-75
18%
[128,370]
99,610
[76,730]
60,900
53,430
[67,550]
8,550
[9,130]
MATCH LINE
See Schematic 3
Hamilton County
Chattanooga
I-24 @ I-75
Legend:
2020 AADT - 000
2040 AADT - [000]
AADT Truck % - 0%
Date: June 22, 2017
TA



Hamilton County
Chattanooga
I-75 @ S.R. 8

Legend:

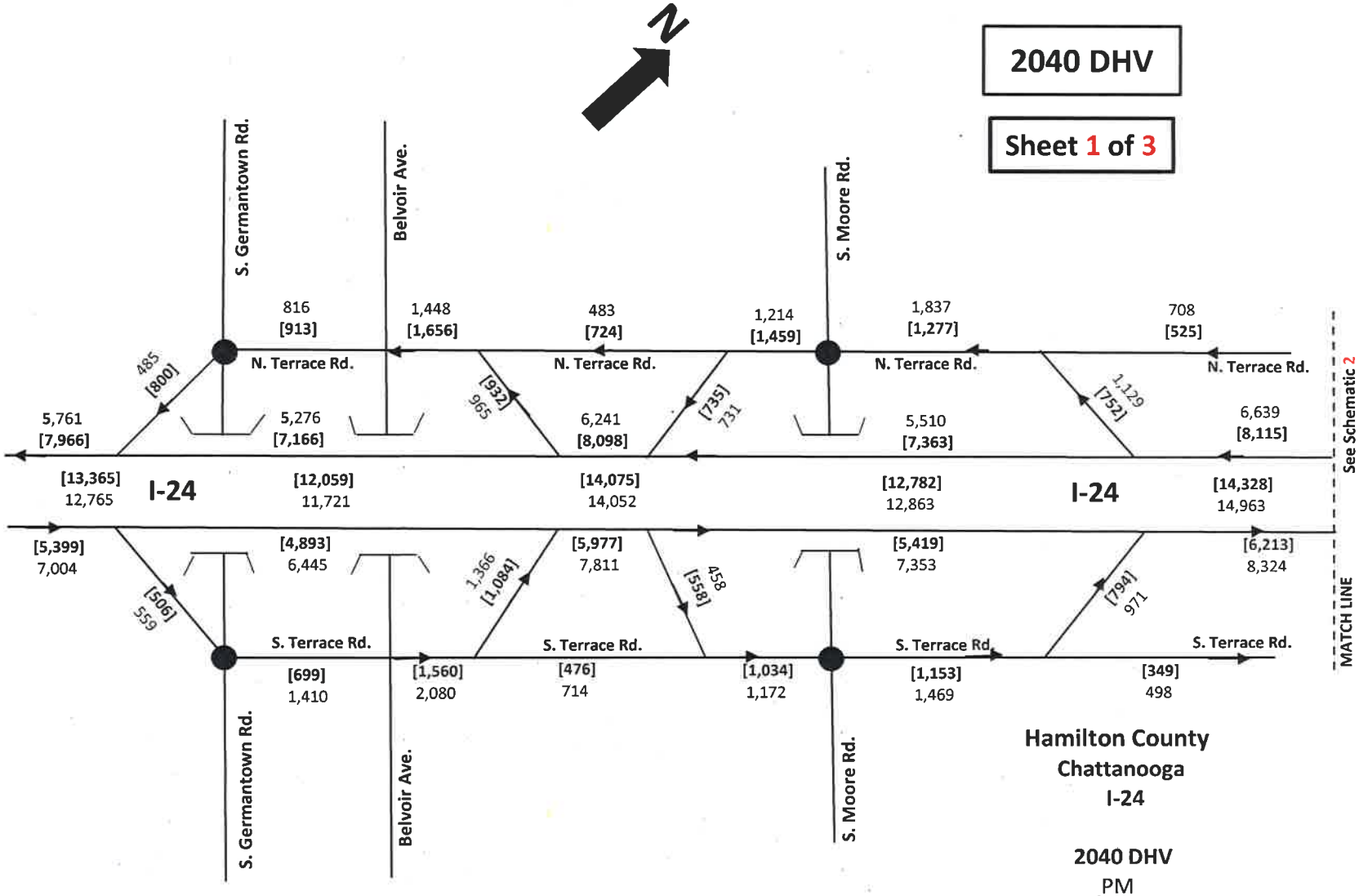
2020 AADT - 000

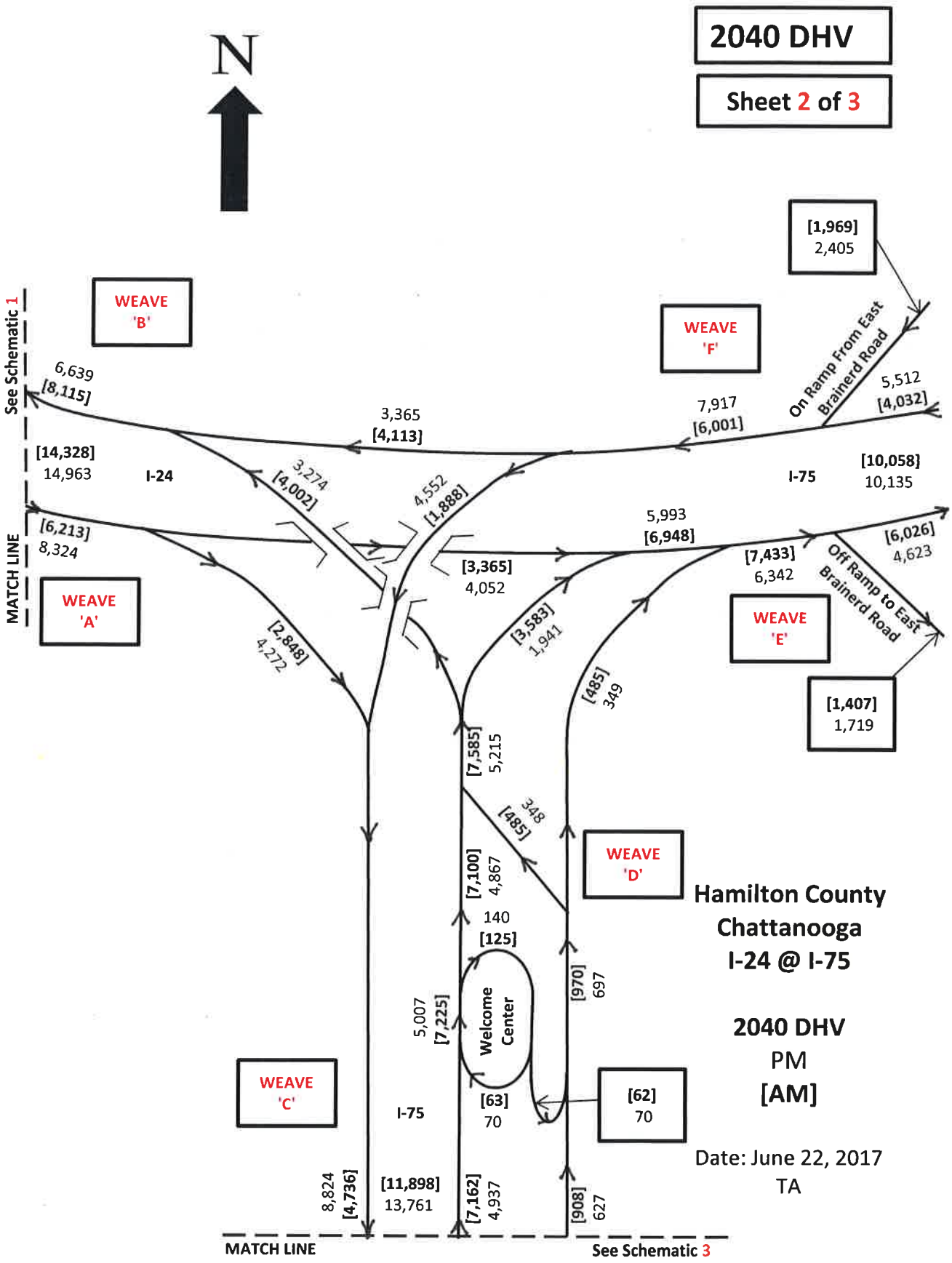
2040 AADT - [000]

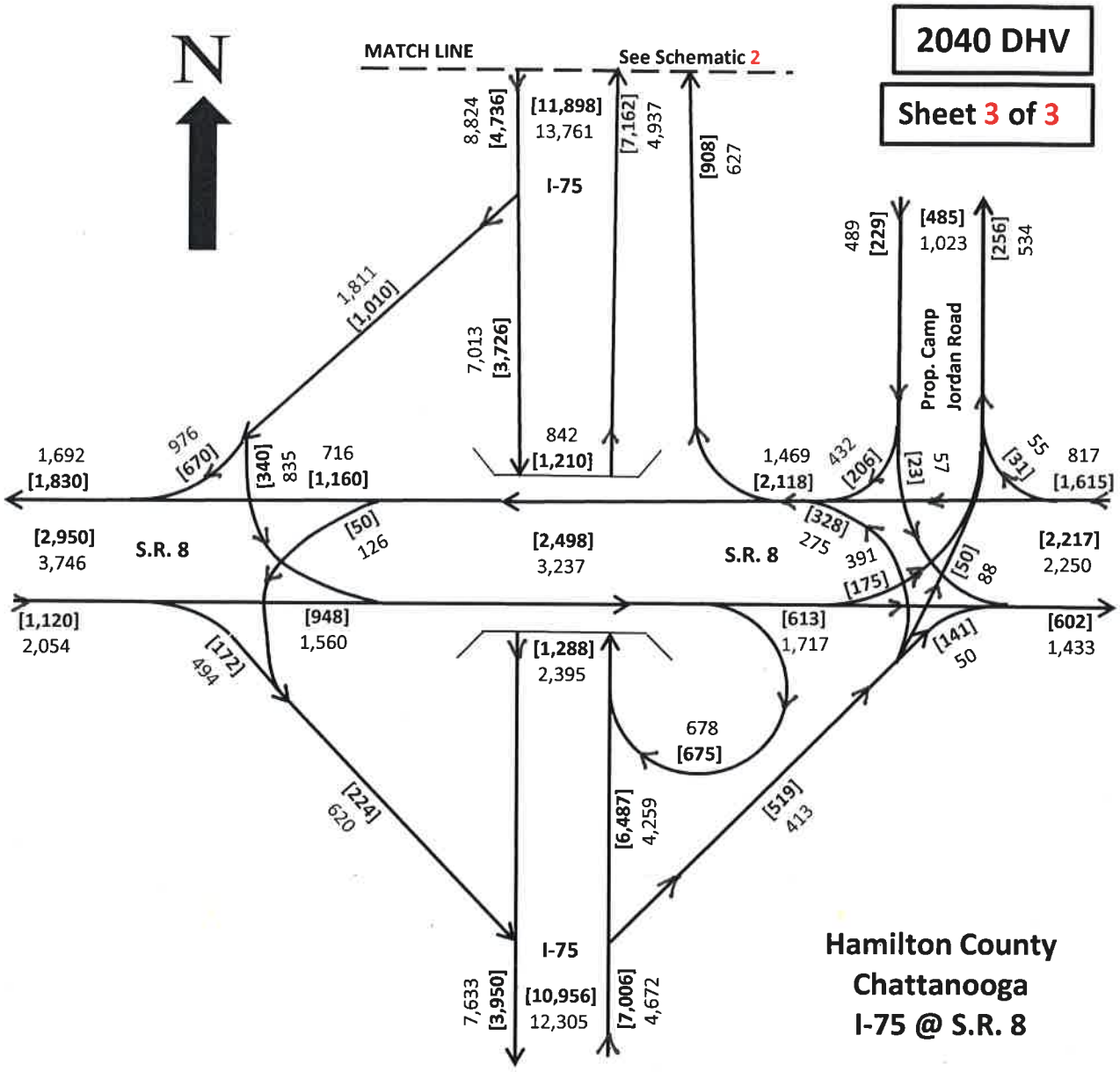
AADT Truck % - **0%**

Date: June 22, 2017

TA


N
2040 DHV
Sheet 1 of 3
S. Germantown Rd.
Belvoir Ave.
S. Moore Rd.
N. Terrace Rd.
S. Terrace Rd.
I-24
816
[913]
1,448
[1,656]
483
[724]
1,214
[1,459]
1,837
[1,277]
708
[525]
485
[800]
[932]
965
[735]
731
1,129
[752]
5,761
[7,966]
5,276
[7,166]
6,241
[8,098]
5,510
[7,363]
6,639
[8,115]
[13,365]
12,765
[12,059]
11,721
[14,075]
14,052
[12,782]
12,863
[14,328]
14,963
[5,399]
7,004
[4,893]
6,445
[5,977]
7,811
[5,419]
7,353
[6,213]
8,324
[506]
559
1,366
[1,084]
458
[558]
[794]
971
[699]
1,410
[1,560]
2,080
[476]
714
[1,034]
1,172
[1,153]
1,469
[349]
498
See Schematic 2
MATCH LINE
Hamilton County
Chattanooga
I-24
2040 DHV
PM
[AM]
Date : June 22, 2017
TA


2040 DHV
Sheet 2 of 3
N
See Schematic 1
WEAVE 'B'
WEAVE 'F'
[1,969]
2,405
On Ramp From East Brainerd Road
6,639
[8,115]
3,365
[4,113]
7,917
[6,001]
5,512
[4,032]
[14,328]
14,963
I-24
3,274
[4,002]
4,552
[1,888]
I-75
[10,058]
10,135
[6,213]
8,324
MATCH LINE
5,993
[6,948]
[6,026]
4,623
[7,433]
6,342
Off Ramp to East Brainerd Road
[3,365]
4,052
WEAVE 'A'
[2,848]
4,272
[3,583]
1,941
WEAVE 'E'
[485]
349
[1,407]
1,719
[7,585]
5,215
348
[485]
WEAVE 'D'
[7,100]
4,867
140
[125]
Welcome Center
[970]
697
5,007
[7,225]
WEAVE 'C'
[63]
70
[62]
70
I-75
8,824
[4,736]
[11,898]
13,761
[7,162]
4,937
[908]
627
MATCH LINE
See Schematic 3
Hamilton County
Chattanooga
I-24 @ I-75
2040 DHV
PM
[AM]
Date: June 22, 2017
TA

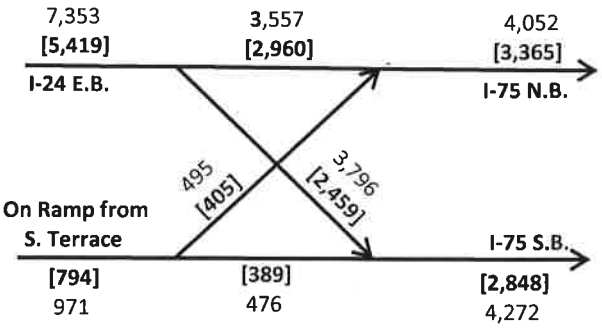


Hamilton County
Chattanooga
I-75 @ S.R. 8

2040 DHV
PM
[AM]

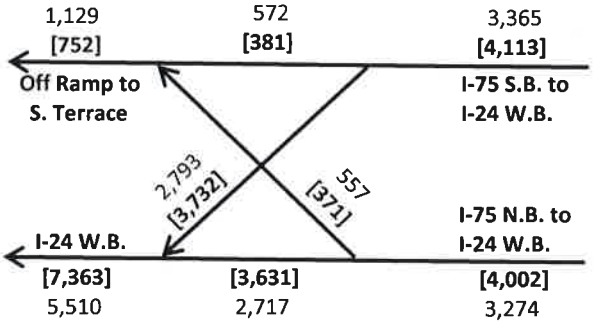
Date: June 23, 2017
TA

Weave 'A'



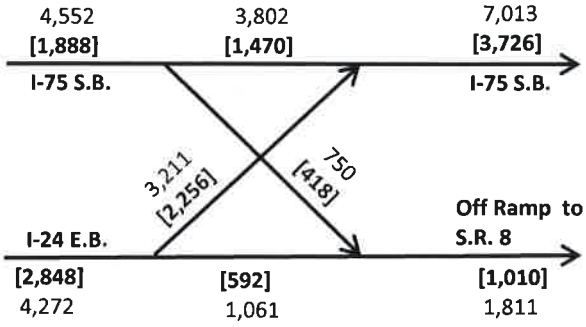
2040 DHV
PM
[AM]

Weave 'B'



2040 DHV
PM
[AM]

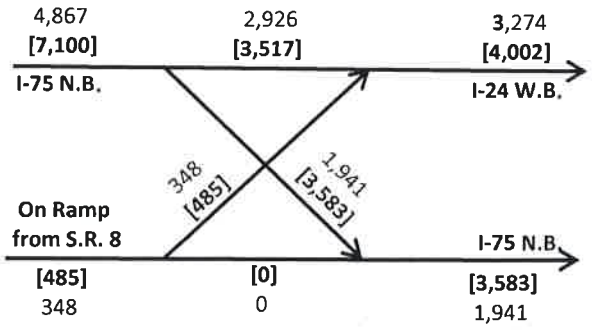
Weave 'C'



2040 DHV
PM
[AM]

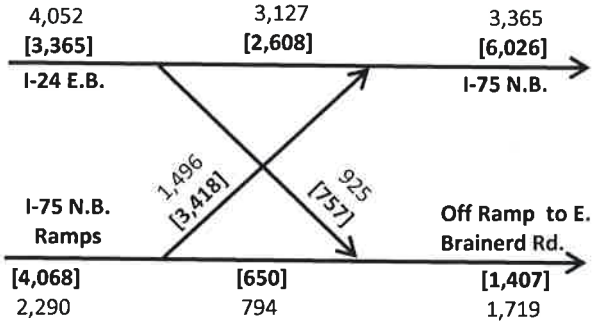
See DHV Sheet 2 of 3 for WEAVE Locations.

Weave 'D'



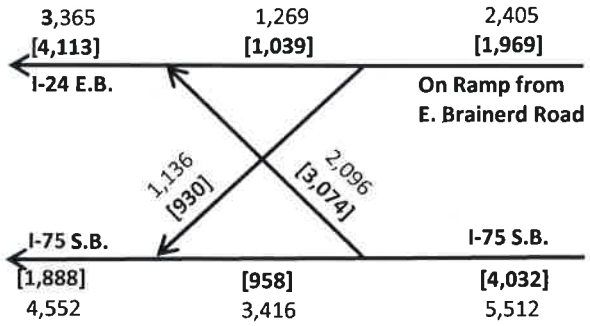
2040 DHV
PM
[AM]

Weave 'E'



2040 DHV
PM
[AM]

Weave 'F'



2040 DHV
PM
[AM]

See DHV Sheet 2 of 3 for WEAVE Locations.